

Sudan Health

An Annotated Chronicle

Ahmed El Safi

Sudan Health
An Annotated Chronicle

**Copyright © 2022 Ahmed El Safi & Sudan Medical
Heritage Foundation**

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the publisher's express written permission.

ISBN: 9798401713230

Acknowledgments

It took a long time to compile this chronicle. Many people and institutions contributed data, ideas, and advice. So many that I can hardly list them all. Therefore, I thank only a sample and extend my warmest regards to the others. I thank the authors of the pioneering books that made this book possible. Mansour Ali Haseeb and Ahmed Bayoumi for their illuminating and resourceful monographs. Professors Abdel Hamid Ibrahim, Mohamed Hamad Satti, Ahmed Mohamed El-Hassan, El-Hadi Ahmed El-Shaikh, Ahmed Abdel Aziz Yacoub, Abdel Rahim Mohamed Ahmed, and Daoud Mustafa for the information they generously provided.

The information retrieved forms the biographies we authored and published, the archival material they generously deposited in Sudan Medical Heritage Foundation (SMHF) Archives, and other uncountable resources. This information has built this chronicle.

In addition, the works of Herbert Squires, Patrick D'Arcy, Heather Bell, Hassan Bella Mohamed El-Amin, Siddig Ibrahim Khalil, Amro Abbas, Badr. El-Din Hamid El Hashimi, Ahmed Adil, Tarig Abdel Karim El-Hadd, and Ahmed Mahmoud Taha El Faki were valuable resources.

We also thank the early Wellcome Tropical Research Laboratories staff for making valuable source information available.

Dedication

This book is a tribute to the pioneers who contributed their fair share in establishing, developing, and promoting Sudanese health care services.

Contents

Acknowledgments	vi
Dedication.....	vii
List of Abbreviations and Acronyms	xxxvi
Preface.....	xxxix
Introduction	41
Health Before the 20th C.	46
Overview	46
Glimpses of the past.....	52
Naom Shugair	55
Samuel White Baker	56
Hassan Sala.....	57
Wad Daif Allah.....	58
Muhammad Ibn Umar Al-Tunisi	58
Charles Jacques Poncet	60
Theodoro Krump	60
James Bruce	61
William George Browne	62
Johann Ludwig Burckhardt.....	63
George August Schweinfurth	65
The Tinnes Sisters.....	66
George Alexander Hoskins	67
James Bayard Taylor.....	68
H. A. R. Gibb	68
John Petherick.....	69
Ignatius Palmme.....	69
Health in the condominium-ruled Sudan.....	72
Overview	72
Sources of study	73
Contribution of botanist.....	73
Contribution of anthropologists.....	74
Wellcome's legacy.....	75
Baghdadi's legacy.....	76
Institutional Research	77
Contribution of health service workers.....	78
Sudan Notes and Records	78
WTRLK reports	79

Health in independent Sudan	80
Overview	80
Tigani El-Mahi's legacy	82
Sudanese academic and literary writings.....	83
Health system organization.....	86
Federal Ministry of Health	86
State Ministries of Health	87
Federal level	87
Development Of The Local Pharmaceutical Industry	97
Health legislations	99
Health research and research ethics.....	103
Health training	103
Health care policies and plans.....	104
Primary Health Care expansion.....	105
Information technology	106
Private health care system.....	107
International Health	108
International relations	108
Human resources	108
Sudanese medical textbooks.....	109
The Chronicle	110
1898.....	111
• The Reconquest	111
• Kitchener Conceived the Idea of Establishing GMC.....	111
• Appeal to Establish GMC.....	111
• Henry S. Wellcome Supports GMC Establishment.....	112
• Omdurman Military Hospital Established	112
1899.....	113
• Constitutional Charter Organized Medical Services	113
• First Doctors in the Medical Service.....	113
• Sudan Penal Code 1899 Enacted.....	114
• GMC Building Started.....	114
1900.....	115
• James Currie Was Appointed the First Principal of GMC	115
• Ahmed Mohammed Hashim Baghdadi Arrived	115
• Henry S. Wellcome Visited Sudan	115
• Six Civil Hospitals Established	116
• Atbara Civil Hospital Supplied with Electricity	116

• Sanat Um-Sikaikoun (Plague of Small Grasshopper).....	116
1901.....	117
• The Foundation of The Educational System Laid Down	117
• Civilian British Medical Doctors And Nurses Started Arriving	117
• Wellcome Wishes To Donate Laboratories Expressed..	118
• Sanat Abu-Farrar (CSM Epidemic).....	119
1902.....	120
• GMC Inaugurated.....	120
• Wellcome Donated Laboratories to GMC.....	120
• Wellcome Identifies Andrew Balfour as Director.....	121
• Andrew Balfour Was Appointed Director of WTRLK.....	121
• The Collection of Health Data Started	121
• John B. Christopherson Arrived	121
• American Missionary Mission Arrived	122
• WTRLK, Museum and Library Equipment Delivered	122
1903.....	123
• Balfour And His Wife Arrived in Khartoum	123
• WTRLK Staff Assumed Office	123
• WTRLK Established.....	123
• WTRLK museums and therapeutic gardens established.....	125
• Therapeutic Garden Abandoned.....	126
• Missionaries Operate in North Sudan.....	126
• WTRLK Renamed.....	127
• Wellcome WTRLK Director's qualities set	127
1904.....	128
• Andrew Balfour Appointed Medical Officer.....	128
• WTRLK Workers Assumed Office	128
• The First WTRLK Report 1904 Issued	128
• The Medical Department Founded	129
• Beginning of Science and Medical Libraries.....	130
• Bilharzia Spread to Sudan Through Egyptian Military Operations.....	130
1905.....	132
• Central Sanitary Board Established	132
• Director of Medical Department appointed	132
1906.....	133
• WTRLK Workers Assume Office	133

• The Second WTRLK Report 1906 Issued	133
1907.....	134
• Floating Laboratory Maiden Journey	134
• British Nurses Arrived	134
1908.....	135
• Third WTRLK Report 1908 Issued	135
• Christian Missionary Society Hospital, Omdurman, Started 135	
• Khartoum Civil Hospital Built	135
• The First Anthropometric Study Done	135
• Apprenticeship of Workers in Industries Act Enacted ..	136
1909.....	137
• Khartoum Civil Hospital Inaugurated	137
1910.....	138
• Vaccines Against Smallpox Made Available	138
• The First Cases of Cutaneous Leishmaniasis Reported .	138
1911.....	139
• The Fourth WTRLK Report 1911 Issued	139
• The First Indigenous Case of Cutaneous Leishmaniasis Described.....	139
1912.....	140
• The First Public Health Ordinance.....	140
1913.....	141
• Andrew Balfour Resigned.....	141
• Sudan United Mission Granted Permission to Work in the South	142
1914.....	143
• Kitchener Appealed to Found a School of Medicine	143
• Bilharzia In Khartoum Detected Among Egyptian Soldiers 143	
1915.....	144
1916.....	145
1917.....	146
• Baghdadi Trust Established	146
• Christopherson Discovered the First Cure for Bilharzia	147
1918.....	148
• Treating Bilharzia With Tartrate Started	148

• Medical Assistants Training Started.....	148
1919.....	149
• Bilharzia Became Endemic in Sudan	149
1920.....	150
• WTRLK Reorganization Discussion Started	150
• Medical Assistants Training Started in Medani and Sennar 150	
• Christopherson was Nominated for Nobel Prize.....	150
• Ms. M. E. Wolff arrived in Sudan	150
1921.....	152
• The Medical Department Annual Reports Started.....	152
• Medical Assistants Training School Opened	152
• Midwifery Training School Opened in Omdurman	152
• Bilharzia Became Endemic in Irrigated Farms.....	153
• KSM Building Started	154
1923.....	155
• Bilharzia spreads in Northern Provinces	155
1924.....	156
• KSM Inaugurated	156
• Baghdadi was the First to Sign in the Visitors' Book	157
• KSM Teachers Appointed.....	157
• First Lecturer of Medicine in KSM	157
• Training of Medical Assistants Shifted to Omdurman ..	158
• Sudan Medical Services Replaced the Medical Department.....	158
• Public Health Ordinance 1924 Enacted.....	158
• Medical Assistants Training transferred to Omdurman	158
1925.....	159
• Laboratory Assistants' Training Started	159
• School of Laboratory Assistants Training Started	159
• First Women Hospital in Omdurman Established	159
• Hospital Orderlies Deployed as Auxiliary Nurses	159
• Gezira Irrigation Scheme Started	160
1926.....	161
• School of Laboratory Assistants founded	161
• Bilharzia Became Prevalent West of The White Nile	161
• H. Squires Appointed Lecturer in KSM	161
• No Intake for KSM	161

1927.....	163
• Women Nursing Training School Established	163
• Stack Medical Research Laboratories Established	163
• Graphic Museum Proposed	163
• Medical Assistants School Renamed	164
• The First Batch of KSM Graduated	164
1928.....	165
• The First Batch of KSM Graduated	165
• Medical Officers Started General Practice and Surgery	165
• The First British Eye Surgeon in Sudan.....	166
• Gezira Irrigation Scheme Started	166
1929.....	167
• EWT Morris Started Service	167
1930.....	168
• Postgraduate Exposures Abroad Started	168
• Sudan Medical Services Regulation 1930 Issued	168
• Italian Mission Operated.....	169
• Wellcome's Offer to Build New Laboratories in Khartoum Rejected.....	169
• No Students Graduated from KSM	170
1931.....	171
• Training of Public Health Officers Started	171
1932.....	172
• Graphic Museum Proposal Renewed	172
• KSM's First Teacher of Pharmacology	172
1933.....	173
• Robert Kirk Legacy	173
• The Assistant Radiographer Training Started.....	173
• Public Health Ordinance 1933 Enacted.....	174
• College of Public Health Established	174
• Bryant Reports Onchocerca Volvulus.....	174
• Baghdadi Died And was Buried In Khartoum	174
• Eric Pridie Appointed Director of SMS and KSM	175
1934.....	175
• Public Health Officers and Sanitary Overseers Training Started	176
• Dismantling WTRLK Started	176
• Why Was WTRLK Dismantled?	177

•	Dividing WTRLK Library	178
•	The National Workers Club Founded	178
1935.....		179
•	Royal Sanitary Institute Approved Public Health Training 179	
•	Dismantling of WTRLK Continued	179
•	Stack Laboratories Became Part of SMS	179
1936.....		181
•	The Graphic Museum Opened	181
•	Museum Acquisitions Lost	181
•	School of Dispensers Established	182
1937.....		183
•	Postgraduate Training Abroad Started	183
•	First Pharmacy Graduate from AUB.....	183
•	A Sudanese Pharmacist Opened the First Pharmacy	183
•	First Pharmacists to Graduate Abroad	183
•	No Intake for KSM	184
1938.....		185
•	The Chemical Laboratories Established	185
•	Sudan Interior Mission Started Work	185
•	No Students Graduated From KSM	185
•	Medical Assistants Schools Renamed Medical Assistants 185	
•	The London Royal Colleges Granted KSM Partial Recognition	185
•	KSM Inspection Started.....	186
1939.....		187
•	Public Health Ordinance 1939 Enacted.....	187
•	KSM The Academic Year Raised to 6 Years	187
•	The Central Board of Public Health Replaced Central Sanitary Board	187
•	Wellcome Chemical Laboratories Established	187
•	Mohamed Sherif Daoud Fights Endemic Diseases and Blindness	188
•	Pharmacy and Poisons Ordinance 1939 Enacted.....	189
•	The Poisons Regulations 1939 Issued	189
•	The Poisons Order 1939 Issued.....	190
1940.....		191

•	WCL transferred to Shambat; Barracks Established	191
•	Christian Mission in Sudan Started Operation	191
•	Central Medical Stores Started	191
•	Bilharzia Reached Alarming Levels.....	192
•	The First Yellow Fever Epidemic in Sudan.....	192
•	RCP Allowed KSM Graduates to Take the Membership	193
•	Sudanese Doctors Joined Sudan Defense Force as Volunteers	193
1941.....		194
•	No Intake for KSM	194
•	No Students Graduated from KSM	194
1942.....		196
•	No Students Graduated from KSM	196
•	First Private Clinic Opened by a Sudanese	196
1943.....		197
•	Graphic Museum Approved	197
•	Robert Kirk Honored	197
•	Mansour Ali Haseeb Acquired Diploma of Bacteriology	197
1944.....		198
•	Nursing Courses and Entry Requirements Revised	198
•	Graphic Museum Proposed	198
•	Poisons (Control of Sale Order) Issued	198
•	No Students Graduated from KSM	198
1945.....		199
•	Library of University of Khartoum Established	199
•	Sudan Medical Corps Established	199
•	Schools and Colleges, and GMC Formed KUC	199
•	School of Hygiene Inaugurated.....	199
•	No Intake for KSM	200
1946.....		201
•	Multi-Purpose Auxiliary Training School Started	201
•	Postgraduate Scholarships Became Regular	201
•	Greany Conducted A Comprehensive Study on Bilharzia in Gezira	201
•	London Royal Colleges Granted KSM Full Recognition .	201
1947.....		204
•	Health Visitors Training Began	204
•	Workers Affairs Commission Founded.....	204

• No Intake for KSM	204
• No Students Graduated from KSM	204
• First Sudanese Doctor Acquired MRCP	204
1948.....	205
• Abdel Halim Mohamed was the First Sudanese Physician 205	
• UN Declared	206
• Central Nursing Council Established	208
• Specialization in Ophthalmology Sudanized	208
• Tigani El-Mahi Specializes as First Sudanese Psychiatrist 208	
• Hussain A. Hussain was the First Sudanese Ophthalmologist.....	209
• Postgraduate Scholarships Became Regular	209
• National Nursing Council Established	209
• Workers Trade Unions Act Enacted	210
• Workers Compensation Act Enacted	210
• Workers And Employers Act Enacted	210
• Workers Disputes Act Enacted.....	210
• Workshops and Laboratories Act Enacted	210
• The First Minister of Health Appointed	210
• The Advisory Council for Northern Sudan Formed	210
1949.....	212
• Liquid Air Company Established	212
• Ministry of Health Replaced SMS.....	212
• Liquid Air Company Established	213
• Abdel Hamid Bayoumi Specializes in First Sudanese Surgeon	213
• Dismantling of WTRLK Continued	214
• School of Dispensers Developed	215
• Sudan Medical Association Founded	215
• First Workers Conference Held	215
• No Students Graduated from KSM	215
• Clinic for Nervous Disorders Established	215
• WCL Housed In A Hazardous Place	216
• Medical Assistants School Accepts Male Nurses	216
1950.....	217
• El-Baghir Ibrahim was the First Sudanese to Obtain DO 217	

• Sudan Association for Prevention of TB Established	217
• Psychiatric Services in Sudan Inaugurated.....	218
• KSM External Examiners Included President of RCP	218
1951.....	219
• Abdullah O. Abu Shamma, First Public Health Specialist	219
• Second Private Clinic Opened by a Sudanese	220
• Medical Assistants Training School Curriculum	
Lengthened.....	220
• Bakhit M. Omar was the First Doctor to Acquire FRCS, Edin.	220
• KSM Incorporated Into the University College of Khartoum.....	221
• First MOH 10-Year Plan Formulated	221
• No Students Graduated From KSM	221
• KSM Annual Prize Established	221
• Local Government Act 1951 Enacted.....	221
• Medical Assistants School Renamed	222
• Department of Anatomy, FOM, UOK Established	222
• Department of Psychiatry, FOM, UOK Established	222
• Department of Obstetrics and Gynaecology, FOM, UOK Established	222
• Department of Community Medicine, FOM, UOK Established	222
• Department of Medicine, FOM, UOK Established	223
• Department of Biochemistry and Physiology, FOM, UOK Established	223
• Department of Physiology, FOM, UOK Established	223
1952.....	224
• KSM Kitchener Prize of Medicine Barred	224
• First Female Doctors Graduated	224
• Ibrahim M. El-Moghraby first Sudanese to Obtain FRCS England.....	224
• CMS Moved to Khartoum South	226
• FOM's Visitors Book	226
• Robert Kirk was Appointed the First Professor of Pathology.....	227
• Robert Kirk Opened the First Skin Clinic in KCH	227
• KSM Included in Gordon Memorial College	227

• Ali Bedri Elected RCP Fellow	227
• Mansour Ali Haseeb Acquired Diploma of Bacteriology	228
1953.....	229
• Laboratory Technicians' Education Started	229
• Ophthalmic Assistants School Started	229
• Sudan Medical Journal Established	229
• First Sudanese Senior Physician Appointed	229
• First Sudanese Director of Khartoum Civil Hospital Appointed.....	229
• DJ Lewis Honored.....	230
1954.....	231
• KSM Kitchener Prize of Medicine Resumed	231
• Dismantling WTRLK Continued	231
• WHO Consultant Advised on Pharmacy Education	231
• First Sudanese Graduate Pharmacist Appointed in MOH 233	
• Quarantine Act 1954 Enacted	234
• First Minister and Under-Secretary of Health Appointed 234	
• Robert Kirk Appointed KSM Dean	234
• Abdel Gadir H. Ishag Obtained DO.....	234
• School of Dispensers Closed	235
• The Students Medical Society Established.....	235
1955.....	236
• Sudan Medical Council Ordinance 1955 Enacted	236
• Kitchener School of Medicine Renamed	236
• No Students Graduated from KSM	236
• MOH, Central Information Unit, Formed	236
• First Sudanese Pharmacist Appointed in KCH.....	236
• Sudan Joined WHO.....	237
• Medical Corps Founded	237
• Snail Control and Use of Copper Sulphate Started	237
• Bilharzia Research by Sudanese Scientists Started	237
• Mollusciciding Applied	237
1956.....	239
• School of Dispensers Resumed Work	239
• MOH Applied to Construct WCL.....	239
• Khartoum Nursing College Established	239
• KUC Became the University of Khartoum	239

• Abdel Hamid Ibrahim First Sudanese Chemist	240
• The First Pharmacist Joined MOH in Khartoum Civil Hospital	243
• Dar El-Shifa Private Hospital Established	243
• Sudan Medical Corps Founded	243
• First Military Hospital Established.....	243
1957	244
• Kober Forensic Institute Established.....	244
• First International Drug Tender Made	244
• Ali Badri Described Medical Services	244
• Julian Taylor Joined UOK.....	245
• Abdel Hamid Ibrahim was Appointed the Government Analyst.....	245
• Expansion of Medical Services	247
• Ibrahim Gasim Mokheir Appointed Senior Pharmacist In KCH	247
• El-Hakeem Medical Students Journal Established	248
1958.....	249
• Ministry of Health Regulation 1958 Issued	249
• CBPH Committee Revised PPA	249
• Daoud Mustafa Legacy.....	249
1959.....	250
• Mitral Valvotomy Operations Started.....	250
• Department of Surgery, FOM, UOK Established	250
• Health Visitors School Opened	250
• Diploma of KSM Changed to MB BS.....	250
• Local Manufacture of Medicine by the Private Sector Encouraged.....	251
• Building Central Laboratory Idea Approved.....	251
• More Beds and Hospitals Added	251
• CBPH Appointed a Drug Control Sub-committee.....	252
• Sudanese Ophthalmological Society Established.....	252
1960.....	253
• CMS Upgraded to a Division	253
• Private Sector Importing Drugs.....	253
• An Independent Department of Biochemistry, FOM, UOK Established	253
• An Independent Department of Physiology, FOM, UOK Established	253

• The Department of Microbiology, FOM, UOK Established	253
• No Drugs Locally Manufactured	254
• School of Dental Assistants Established	254
• School of Hygiene Inaugurated	254
• School of Radiography Established	254
• Khartoum is Recognized as a Center for Primary FRCS .	255
• NAMRU-3 Cairo Started Investigating Visceral	
Leishmaniasis	255
• The Province Administration Act 1960 Enacted	255
1961.....	256
• Department of Laboratory Technology Established	256
• The Graphic Museum Closed	256
• TRAINING OF PHARMACISTS IN AUB INITIATED	257
• Section For Laboratory Work In Nutrition Established .	258
• Occupational Health Specialization Started	258
• Sudanese Chemical Industries Established	258
• Nicholas Drug Company U.K. Established	259
• Central Laboratory Building Started	259
• The New Khartoum Civil Hospital Built	259
1962.....	260
• No students graduated from KSM	260
• Cancer Institute established	260
• El-Sheikh Abdel Rahman specialized in radio-therapy..	260
• Training of scientific officers started.....	260
• Orthopaedic Oxford-Sudan Program initiated	261
• Faculty of Pharmacy, UOK establishing agreed upon ...	261
• Coral reef pollution studied	262
• Pharmaceutical Industrial Laboratory Established	263
• Postgraduate Specialization of Pharmacists Started	263
• The First Doctor Elected Fellow of RCP	264
1963.....	265
• Assistant Anaesthetists School Established	265
• Professor Daoud Mustafa Replaced Morgan	265
• Pharmacy and Poisons Act 1963 Enacted	265
• National Drug Quality Control Laboratory Established .	266
• Mansour Ali Haseeb, Appointed the First Chair of	
Microbiology, and Dean FOM	267
• Sudan Association Of Surgeons Founded	267

1964.....	268
• School of Dispensers Closed Permanently.....	268
• Sir Graham Wilson Supported the NHL Project Idea	268
• Thoracic Surgery Established	268
• School Of Dispensers Closed	269
• Pathology Museum Revived	269
• Faculty of Pharmacy, UOK Established	270
• Khartoum Civil Hospital Recognized for MRCOG	
Appointments At Khartoum Recognized	271
• Preparation for open-heart surgery started	271
• Professor Mansour Ali Haseeb Appointed First Dean...	271
• Intermediate Nursing School started	271
1965.....	273
• Medical Assistants Training School course lengthened	273
• Ahmed Mohamed El-Hassan Replaced Lynch.....	273
• Bilharzia Society formed	273
• Codex Alimentarius Commission membership acquired	274
• Postgraduate Specialization Of MOH Pharmacists	274
• Mansour Ali Haseeb Made RCP Fellow	274
• Sudanese Fertility Society Founded	274
• The First Psychiatry Ward Established	274
• Independent Department Of Paediatrics Founded.....	275
1966.....	276
• School of Tropical Medicine Proposed.....	276
• National Council for Research Proposed and Lobbied..	276
• Sudan Cancer Registry Established	278
• Pharmaceutical Assistants School Established.....	279
• First Sudanese Professor Of Pathology Appointed	279
• Institute of Medical Laboratory Technology	280
• History of Bilharzia in Sudan Reviewed.....	280
• Sudanese Physicians Association Established	280
• Sudanese Association of Surgeons Proposes Super	
Specialises In Surgery	281
1967.....	282
• Statistical Clerks Training Started	282
• Institute Of Medical Laboratory Technicians Established	282

• Ibrahim Gasim, first Sudanese Dean, Faculty of Pharmacy	282
• The Household Remedies Regulation 1967 Issued	282
• El-Hadi A. El-Sheikh First Full-Time Lecturer of	
Ophthalmology	283
1968.....	284
• The Paediatric Department of FOM/UOK Established ..	284
• OAU Recognizes TM	284
• UOK Reviewed Baghdadi's Trust	284
• Science Laboratory Technicians Department Established	285
• The First Batch of Faculty of Pharmacy, UOK, Graduated	285
• Ethical Committee Established	285
• Radiotherapy Hospital Inaugurated	285
• Sudan Medical Council Inaugurated	285
• Neurosurgical Unit Proposed	286
• Ahmed Mohamed El Hassan Replaces Lynch.....	286
1969.....	287
• NHL Inaugurated	287
• Sudan Medical Corps Moved to Omdurman.....	287
• Schools of Medical Assistants in Juba and El-Obeid	
Established	287
• National Center for Eye Diseases Proposed.....	287
• Building of the Central Laboratory Completed	288
• NHL Succeeded SMRL	288
• CMS Rehabilitated.....	288
• Medical Photography Unit Established in FOM UOK	288
• Council of Higher Medical Education Established	289
• The Neurology Unit In Shaab Hospital Organized	289
• Sudan Medical Council Moral Conduct Act Enacted	289
• NCL Medical Entomology, Schistosomiasis Laboratories,	
and Stack Moved To NHL	290
• Husein Suleiman Abu Salih Specializes in Neurosurgery	290
1970.....	291
• Open Heart Surgery Program Launched	291
• The Department of Anesthesia, FOM/UOK Established	291

• First Professor, Department of Physiology, FOM, UOK Nominated.....	292
• National Council for Research Founded.....	292
• Medicinal and Aromatic Herbs Research Unit Established	293
• National Health Laboratory Opened	293
• Mohamed Hamad Satti's role in building NHL	293
• Plots of Land West of FOM, UOK Allocated for FOM	
Future Expansion.....	294
• The Plot Of Land Allocated To The Proposed NHL	294
• Household Remedies Regulation 1970 Issued	295
• Postgraduate Medical Education Board Established	295
• Department of Anaesthesia, FOM, UOK Established	295
• A Committee For The Ethics of Health Research Formed	295
1971.....	297
• Ministry of Higher Education and Scientific Research Established	297
• Poisons List Order 1971 Adopted.....	297
• Ionizing Irradiation Act 1971 enacted	297
• Sudan Medical Association Dissolved	298
• Building Regional Laboratories Started.....	298
• Popular Local Governance Rule In 1971 Introduced.....	298
• UOK Plans Succeeded In Improving Baghdadi's Trust...	298
• Husein Abu Salih Starts The Neurology Unit	299
1972.....	300
• Institute For Tropical Diseases Research Established ...	300
• Tigani El-Mahi Psychiatric Hospital Established	300
• Medical And Science Libraries Evolved	300
• Food Industrial Corporation Established.....	301
• Births And Deaths Registration Act 1972 Enacted	301
• First Successful Kidney Transplant	301
• Gastrointestinal Endoscopies Introduced	302
• Postgraduate Medical Education Board Dissolved	302
1973.....	303
• The Aftermath of the Suez Canal War	303
• The Anesthesia and Intensive Care Program Started ...	304
• Khartoum Cheshire Home Established	304
• Pharmacy And Poisons Act Amended	305

• Food Control Act 1973 enacted	305
• School Health Act Enacted	306
• Medical Commission Act 1973 Enacted	306
• A Pharmacist was Added as Assistant to The Secretary-General, SMC.....	306
• Quarantine Act 1973 Enacted	306
• Mansour Ali Haseeb Was Awarded Shousha Prize in 1973	307
• SMC Appoints a Pharmacist, Secretary-General	307
• SMC Updated Moral Act	307
1974.....	308
• The National Prosthetic and Orthotic Center Established	308
• Medical and Science Library Continued to Grow	309
• University of Khartoum Library Grew	309
• Library of FOM, UOK	309
• UOK Library	310
• The Sudan Collection, UOK	310
• Pharmaceutical Products Registration Regulation 1974	Issued310
• General Food Hygiene Regulation Issued	310
• FOM, UOK Celebrate Golden Jubilee	311
1975.....	312
• Pediatric Cardiology And Cardiac Surgery Started	312
• Environmental Health Act 1975 Enacted	313
• Public Health Ordinance 1975 Enacted.....	313
• Sterling Winthrop Established	313
• Daoud Mustafa was Awarded Professor Emeritus of	Medicine.....
• Maternal And Child Welfare Society Established.....	313
• Public Service Regulation Established.....	314
• Gastroenterology Socieed.....	314
1976.....	315
• The Open Heart Program Launched.....	315
• Community Pharmacies Proposed	315
• Higher Studies Council Started Recruitment.....	316
• Primary Health Care Adopted	316
• Faculty of Medicine, University of Gezira, Founded	316
• Faculty of Medicine, University of Juba, Founded	316

• The Police Hospital Established	316
1977.....	318
• Sale Of Veterinary Drugs Regulations 1977 Issued	318
• Community Pharmacies Revisited.....	318
• The First Community Pharmacy Opened	319
• Essential Drugs List Proposed	319
• R. Kirk's Papers Were Deposited in Rcs Library.....	319
• Research In Medicinal Plants Started	320
1978.....	321
• The Open-Heart Surgery Program Started.....	321
• Catheter Laboratory in Shaab Hospital Operated.....	322
• Restrictions On Advertisement Of Drugs Regulations 1978 Issued.....	322
• Food Control Administration in the Directorate in Central MOH	322
• Local Manufacture of Medicines	323
• Essential Drugs List.....	323
• Human Tissues and Parts Act 1978 Enacted	324
• WHO Developed Questionnaire.....	324
• WHO Passes Resolutions on TM	324
1979.....	326
• Blue Nile Health Project launched	326
• Institutional Research in Traditional Medicine Started	327
• Trachoma Research Organized	329
• The First Pharmacist Director of CMS Appointed	329
• National Center For Eye Diseases Approved.....	329
• Health Research Ethical Committee formed.....	330
• Building regional laboratories completed.....	330
• Seven Central Ministries Cancelled.....	331
• AMSA Deliberate on TM	331
1980.....	332
• Onchocerciasis Research Organized	332
• Michigan University State Research Work in Sudan Started.....	332
• Health Development Conference Convened	333
• The First Institutional Research Ethics Committee Established	333
• The Local Government Act 1980 Enacted	333
• Educational Development Center Established.....	333

1981.....	334
• Abdel Hamid Ibrahim elected Vice-Chair, Codex Alimentarius Commission.....	334
• Technical Committee to Develop a National Drug Policy Formed	334
• Sudan NDP Internationally Acclaimed	335
• Local Manufacture of Medicines: Supports NDP	335
• Traditional Medicine Research Institute Established....	336
• Ahmed El Safi. Tigani El-Mahi Selected Essays (Eng.) Published	337
• SMC Doctors' Advancement Program Established	337
1982.....	339
• Sudan Health Museum Proposed	339
• National List of Essential Drugs Selected	339
• Port Sudan Regional Laboratory Started Work.....	339
• Sir Mr. Magdi Yacoub in Sudan	339
1983.....	341
• Regulation of Smoking Act 1983 Enacted	341
• Amipharma Drug Factory Started Production	341
• El-Obeid Regional Laboratory Started Work.....	341
1984.....	342
• WHO Collaborating Center for TM designated	342
• Ahmed El Safi (Ed.) Tigani El-Mahi Selected Essays (Arabic) Published	343
• Sigma Tau Drug Factory Established	344
1985.....	345
• National Drug Quality Control Laboratory Equipped and Staffed	345
• Mohamed Hamad Satti was Awarded Shousha Prize ...	345
• Atbara regional laboratory building started	345
1986.....	346
• CMS Rehabilitated.....	346
• Ahmed Mohamed El-Hassan Awarded Shousha Prize ..	346
• Community Pharmacies Establishment and Organization Regulation 1986 Issued	346
• Directorate General at MOH Formed	347
• Abdelmoneim Company for Medical Industries Established	347

1987.....	348
1988.....	349
• Sudan Essential Drugs Program	349
• Wafra Drug Factory Established.....	350
1989.....	351
• National Conference For Peace 1989 Federalism Recommended	351
• El-Sheikh Mahgoub Gaafar was Awarded Shousha Prize 351	
• Sudanese Doctors' Union Dissolved.....	351
• Open Heart Surgery Program Halted	352
1990.....	353
• Local Plants Started Producing Medical Gases	353
• National Drug Quality Control Laboratory transferred to MOH 353	
• The Private Health Sector Flourished.....	353
• Trade Unions Act Enacted	353
1991.....	355
• Mycetoma Research Center established	355
• Al Bagair Plant Started	356
• CMS Public Corporation (CMS) Act Enacted	356
• Out-Of-Pocket Pay for Health Services in Public Hospitals Started	356
• Ahmed Mohamed El-Hassan Became Emeritus Professor of Pathology	357
• The Sudan Federal System Adopted	357
1992.....	358
• Fee-For-Service Policies Enforced	358
• National Council for Research Demoted.....	358
• Local Manufacture of Medicines Strategy Established ..	358
• Institute for Endemic Disease Established	359
• National Comprehensive Strategy for Health Offered ..	359
• Investment Encouragement Act, 1992 Enacted.....	359
1993.....	361
• Institute of Endemic Diseases Established.....	361
• The Department of Ophthalmology, FOM/UOK Established	361
• Sterling Winthrop Sold Out	362

• Local Industry of Medicines Started	362
• Generic Names of Drugs Regulation Issued	362
• The Essential Drugs List Revised	362
1994.....	363
• Sudan Society of Tropical Medicine and Hygiene Established	363
• The National Health Insurance Corporation Legislation Enacted.....	364
• Atbara Regional Laboratory Opened	364
1995.....	366
• National Medical Specialization Board Act 1995 Enacted 366	
• National Medical Specialization Board Established	366
• Generic Names of Drugs Regulation Issued	366
• National Health Insurance System Proposed.....	366
• Community Pharmacies Khartoum State Regulation Issued367	
• Public Service Regulation Replaced	367
• The Essential Drugs List Revised	367
1996.....	368
• The Production and Circulation of Medicinal Plants 1996 368	
• Licensing of Pharmaceutical Establishments Issued	368
• Manufacture and Marketing of Herbal Medicines Regulations 1996 Re-enacted.....	368
• Endoscopic surgery Established	369
• Sudanese Doctors' Union President.....	369
1997.....	370
• Local Manufacture of Medicines	370
• The Household Remedies Regulation 1970 Redrafted .	370
• Health Area System Established	370
1998.....	371
• Local Governance Act Enacted.....	371
• A Health Research Committee Formed	371
• Health Policy South Sudan, 1998 Developed	371
1999.....	372
• Licensing of Pharmaceutical Regulations Circulated	372

• Ahmed El Safi: Traditional Sudanese Medicine Published	372
• Local Manufacture of Medicines	373
• D'Arcy <i>Laboratory on the Nile</i> Published	373
• Frontiers of Medicine in the Anglo-Egyptian Sudan Published	373
• Ahmed El Safi. <i>Manual of Rules of Order</i> Published	374
• National Health Research Council Formed	374
• Sudan Medical Specialisation Board Act Enacted	374
• FOM, UOK Celebrated Diamond Jubilee	374
2000.....	375
• Sudan Medical Heritage Foundation established	375
• Schistosomiasis Spread in Sudan	376
• National Health Insurance Act Enacted	376
2001.....	377
• Pharmacy and Poisons Act 2001 and Regulations Enacted 377	
• The Narcotics and Psychotropic Substances Act 2001 Enacted.....	377
• Drugs and Poisons Ordinance 2001 Enacted	378
• Central Medical Supplies Incorporated.....	378
2002.....	379
• FMOH reorganized	379
• National Health Research Council Subcommittees Formed 379	
• The National Pharmacy and Poisons Board Established	379
• National Health Research Ethics Committee Established 379	
• WHO Traditional Medicines Strategy (2002–2005) Developed	380
2003.....	381
• Licensing Pharmaceutical Regulations 2003 Enacted ...	381
• Pharmaceutical Specialization Council in SNSB Established 381	
• Local Governance Act 2003 Enacted.....	381
• NPP Board Two Technical Advisory Committees Formed 382	
• The 25-Year Strategic Health Plan Provided	382
• 10-year HRH Strategic Projection Plan, 2003-2012	383

2004.....	384
• Social Insurance Act Amended	384
• List of Essential Drugs Updated	384
• Sudan Medical Specialisation Board Act Amended	384
• The National Biodiversity Framework was Developed .	384
2005.....	385
• Sudan Museum of Health Proposed	385
• SUH Clinical Health Research Center Established	386
• Sudanese National Academy of Sciences.....	387
• Quality Assurance Of Medical Gases Enforced	388
• National Medical and Health Professions Council Established	389
• Sudan Interim Constitution 2005 Enacted	389
• The Joint Assessment Mission-Darfur Report Issued....	389
2006.....	390
• GMP for Medical Gases.....	390
• Sudan Household Health Survey Conducted	390
• Tuberculosis National Strategic Plan 2006-2010	391
• The National Health Policy, 2006 Developed.....	391
• The Joint Assessment Mission Framework, 2006-2011 Report Issued.....	391
2007.....	392
• Salam Center for Cardiac Surgery Established	392
• Quarter-Century Strategic Plan for Health Produced ...	392
• The National Health Policy Approved	392
• National Health Information Strategic Plan	393
• Health Information System	393
2008.....	394
• Ahmed El Safi. <i>Sudan Health Trilogy</i> , a Plea for Documentation	394
• Ahmed El Safi. <i>Zar, and Tumbura in Sudan</i>	394
• National Public Health Ordinance 2008 Enacted	394
• Ahmed El Safi: Ahmed Mohamed El-Hassan, His Life, And Work.	395
• Ahmed El Safi: Abdel Hamid Ibrahim Suleiman, His Life, And Work	395
• Pharmaceutical Products Registration Regulation 1974 Updated.....	395
• National Medical Commission Act 2008 enacted	396

• Guideline for Ethical Conduct of Research published ...	396
• The Sudan National Census.....	396
• National Drug Quality Control Laboratory Transferred	397
2009.....	398
• Drugs and Poisons Act 2009 enacted	398
• Ahmed El Safi. <i>Daoud Mustafa Khalid Published</i>	398
• Environmental Health Act 2009 Enacted	398
2010.....	399
• Ahmed El Safi. El-Hadi Ahmed El-Shaikh Published	399
• Ahmed El Safi. Mohamed Hamad Satti Published	399
• Establishing the discipline of Medical Anthropology Proposed	399
2011.....	400
2012.....	401
• National Health Research Council Established	401
• 5-Year Sector Strategic Plan 2012-2016 Produced	401
• Federal And State Ministries Of Health Established	402
• The Local/District Health Sector Established	402
• Ministry of Science and Technology Founded	402
2013.....	405
• Ahmed El Safi. <i>The Wise Physician Published</i>	405
2014.....	406
• Sudan Health Observatory Launched.....	406
• National Medical Supplies Fund Established	406
• Ahmed Abd Aziz Yacoub Published	406
• Abdul Rahim Mohamed Ahmed Published	407
• SMC issued the Manual of Medical Moral Conduct.....	407
• WHO Traditional Medicines Strategy (2014–2023) Developed	407
2015.....	408
• Ahmed El Safi. <i>The Right To Health Published</i>	408
• Health Monitor Established	409
2016.....	410
• Ahmed El Safi. <i>The Model Physician Published</i>	410
• Ahmed El Safi. <i>The Medical Vernacular Published</i>	410
2017.....	411
• 5-Year Strategic 2017-2020 Plan Produced	411
• Strategy and Information Act 2017 Enacted.....	411

2018.....	412
2019.....	413
• Sudan Country Strategic Plan 2019-2023 Produced	413
2020.....	414
2021.....	415
2022.....	416
Appendices	417
Pioneers of medicine and allied health sciences.....	417
Presidents of Sudan Medical Council	418
Presidents of Students Medical Society FOM/UOK.....	419
Presidents of Central Medical Supplies.....	419
First Seven Medical Graduates of KSM	420
Agenda for Future Health Planning	422
Health policy guidelines	426
Policy reform agenda	428
Health Care Services Policy Framework	431
Ahmed El Safi Contribution.....	437
About the Author	450
Index.....	451
References and Resources	461

List of Abbreviations and Acronyms

IST	Institute of Science Technology
AMSA	Association of Medical Schools in Africa
AUB	Americal University of Beruit
CBPH	Central Board of Public Health
CMS	Central Medical Supplies
CMSD	Central Medical Supplies Division
CSB	Central Sanitary Board
CTPB	Central Town Planning Board
DGLMR	Directorate General of Laboratories and Medical Research
DRA	Drug Regulatory Authority
EMRO	WHO East Mediterranean Regional Office
FAO	Food and Agricultural Organization
FBPP	Federal Board of Pharmacy and Poisons
FIC	Food Industries Corporation
FMOH	Federal Ministry of Health
FOM	Faculty of Medicine
FOM, UOK	Faculty of Medicine, University of Khartoum
FOP, UOK	Faculty of Pharmacy, University of Khartoum
GIS	Gezira Irrigation Scheme
GM	Graphic Museum in Khartoum
GMC	Gordon Memorial College
GMC	Gordon Memorial College
GOSS	Government of Southern Sudan
HCF	Health care finance
HGS	Health governance and stewardship
HIS	Health information systems
HRH	Human resources for health
HSD	Health service delivery
HTP	Health infrastructure, technologies, pharmaceuticals
IAEA	International Atomic Energy Agency
ICRI	Industrial Consultancy and Research Institute
IDPC	Industrial Development Public Corporation

IHR	International Health Regulations
KCH	Khartoum Civil Hospital
KSM	Kitchener School of Medicine
KTH	Khartoum Teaching Hospital
KTI	Khartoum Technical Institute
KUC	Khartoum University College
MOH	Ministry of Health
MRC	Medical Research Council
NAMRU-3	United States Naval Medical Research Unit Number Three
NCL	National Chemical Laboratories
NCR	National Council for Research
NDP	National Drug Policy
NDQCL	National Drug Quality Control Laboratory
NHL	National Health Laboratories
NLED	National List of Essential Drugs
OAU	Organization of African Unity
PHC	Primary Health Care
PILL	Pharmaceutical Industrial Laboratory Ltd
PPA	Pharmacy and Poisons Act
RCP	Royal College of Physician, England
RCS	Royal Commonwealth Society
RHL	Regional Health Laboratories
SAD	Sudan Archives, University of Durham Library
SBCM	Supreme Board for Control of Medicines
SEDP	Sudan Essential Drugs Program
SGPAO	Sudan Government Purchasing Agent Office
SHM	Sudan Health Museum
SMC	Sudan Medical Council
SMRL	Stack Medical Research Laboratory
SMS	Sudan Medical Service
SNDP	Sudan National Drug Policy
SNRO	Sudan National Records Office
SSTMH	Sudanese Society of Tropical Medicine and Hygiene``
SUH	Soba University Hospital
TM	Traditional Medicine
TMRI	Traditional Medicine Research Institute
UCK	University College of Khartoum
UNDP	United Nations Development Program
UOK	University of Khartoum
WCL	Wellcome Chemical Laboratories
WHO	World Health Organization

WTRLK	Wellcome Tropical Research Laboratories in Khartoum
-------	-----------------------------------------------------

Preface

This book describes what happened in health in the twentieth century and beyond. It includes the salient features in the first two decades of the twenty-first century and an analysis of what history has left behind for the healthy life of Sudan before 1900.

It is a comprehensive, minimally annotated, minimally descriptive chronological catalog of Sudan's healthcare activity milestones from its inception in 1899. Hopefully, the chronicle gives accurate documentation of the progression of the health system through the years.

The chronicle lists what happened and when with dates, persons, events, and activities. It chronicles the contribution of philanthropy, charities, trust leaders, fundraisers, grant-makers, and other financiers. Finally, it summarises the epidemics, pandemics, famines, droughts, and natural disasters that affected Sudan's health in recent history.

This book is bridge-building. It surveyed almost all available sources for information. However, the books that have appeared in the series of "Pioneers of Sudanese Medicine" and published by the Sudan Medical Heritage Foundation loomed high in this work. Indeed, the life and work of the pioneers we studied in the last four decades proved to be the most resourceful personalities in the history of medicine in Sudan.

We have been contemporaneous to those we wrote about in the 'Pioneers of Medicine' series. Apart from Dr. Ali Badri, we met, knew, worked with, or studied under most of them. Since we met Tigani El-Mahi one evening in 1966, who gave us six precious books to help us with our first study,

Native Medicine in Sudan, our bibliography currently boasts more than 20K citations of Sudanese medical literature.

Scholars should be encouraged to thoroughly write down the specialties' history before it is too late. In addition, they should write down their memoirs and document their journals, experiences, and unique achievements in medicine and life.

Indeed, this book is not a medical evaluation of the medical profession or a historical study. However, to situate it in the day's polemics, it is an explicit statement saying that Sudanese have a rich medical legacy.

In this book, we have concentrated on being as helpful as possible to students and researchers by providing them with facts and dates and tabulating data in a simple-to-follow style.

Consequently, this book is not a story of health. However, the *Table of Contents* and *Index* should be read as light short stories. The *Index* contains tabulations of specific chronicles, e.g., health legislations or notable anthropologists. The TOC should help scan the contents of the book at a glance. This chronicle is read as a historical narrative, making amendments easy.

We reviewed almost all the sourcebooks and provided uncountable resources in Arabic and English. However, the activities of more than a century cannot be entirely covered in one go. Therefore, readers' contribution is badly required.

This chronicle should help policymakers, educators, researchers, instructors, students, and other health care providers. Advocates for improving the health status of the Sudanese people should find plenty of information, hopefully authentic.

Indeed, all UN agencies, World Bank, embassies, NGOs, and the international donor community should keep this book handy.

Introduction

Sudan gained its independence in January 1956. Since then, the country has witnessed significant health, education, mechanized farming, irrigation, and industry changes.

Sudan was a vast country, even after the secession of the south on July 9, 2011. Its area spans an estimated 1.8 million square kilometers and has a population of about 44 million, of which about seven million live in the country's triangular capital, 2 million are displaced from the country's south, west, and east.

Sudan is situated in the north-eastern African continent, extending from latitude 4° N to latitude 22° N, and shares borders with Egypt, Libya, Chad, Central African Republic, Zaire, South Sudan, Uganda, Ethiopia, and Eritrea. It also has a coastline of some 640 kilometers along the Red Sea.

Sudan's land topography is generally flat, with some hills to the extreme southeast, northeast, and west. The River Nile traverses the country from south to north, with the Blue Nile and White Nile meeting at Khartoum.

Bilad al-Sudan, 'the land of the blacks' as medieval Muslim geographers, signifies all sub-Saharan Africa extending from the Red Sea to the Atlantic Ocean. Sudan unqualified refers to the present political entity first used well after the Turco-Egyptian conquest of 1821.

Not much is yet known about the pre-history of this region. Nevertheless, Sudanese man appears to have undergone a typical world development pattern from hunter to the settled farmer and then a centralized kingdom member.

Kerma kingdom stands as the first centralized power in Sudan. It dates approximately 2000 to 1600 BC, and a powerful kingdom ruled the entire area between the second and fourth cataracts. The peak of the ancient Sudanese culture is thought to have been reached during the second century BC to the third century AD, when the Meroitic civilization developed its form of writing, art, and belief style.

Several Christian kingdoms rose and fell along the Nile valley, while the Beja of the eastern desert and Red Sea hills remained pagan through various Islamic immigration waves. Then, waves of Arab tribes infiltrated the country in the seventh century AD, bringing a new religion and culture.

Sudan's Islamization had gradual beginnings but achieved full sway by 1504 AD when the Fung rulers established the first Muslim monarchy. The Fung Kingdom lasted for over three centuries before the Turkish forces conquered it. The Turkish rule ended in 1885 at the hands of the Mahdi. That independent state lasted until 1898 when the combined British and Egyptian forces re-conquered the country.

Sudan is ethnically and culturally diverse. The country's two official languages are Arabic and British English, and its constitution respects the rest of the languages and encourages their use and development. Sudanese speak 114 languages in more than 500 dialects. However, the pervasive lingua franca in Sudan is Arabic, with vocabulary from all languages and dialects. Therefore, we expect many colloquial terms as complex as these languages and dialects.^[1]

It is estimated that 66.7% of the population live in rural settings (2012), 17.0% are between the ages of 15 and 24 years (2015), and life expectancy at birth is 63 years (2012). Literacy rates (2012) are 87.9% for youth (15 to 24 years), 73.4% for adults, and 65.3% for adult females.^[2]

The burden of disease attributable to communicable diseases is 52.8%, noncommunicable diseases 33.9%, and injuries 13.4% (2012). The share of out-of-pocket expenditure

is 78.9% (2013), and the health workforce density is 2.5 physicians and 4.5 nurses and 3.9 midwives per 10 000 population (2014).

During the last two decades of the 20th century, the world realized significant disparities between populations, life expectancy, health equities, and human development potential that need to be globally addressed. It was also recognized that to bridge these significant gaps between developed and developing countries, and within countries, specific problems must be addressed, goals and objectives set, and the appropriate strategies selected to ameliorate them.

The Safe Motherhood Initiative (1987), the Summit for Children (1990), the International Conference on Population and Development (1994), and the Millennium Development Goals (2000), the Sustainable Development Goals are all driving towards the elimination of poverty and hunger, gender biases, premature death of mothers and prevention of the current significant killers. Eight goals with targets achievable by 2015 were set, a national commitment was rallied, and technical and material support was generated. However, the country failed to achieve any of the targeted MDGs. National authorities, civil societies, UN Agencies, and communities should stand solidly together to achieve the SDGs by the deadline.

Estimates in 1990 indicated that more than a tenth of all children born in Sudan die of preventable diseases such as diarrhea, chest infections, neonatal tetanus, and measles before their fifth birthday. Moreover, by 2010, more than a tenth does not get to the fifth anniversary due to malaria, HIV/AIDS, Tuberculosis and malnutrition, and the diseases of poverty. These adverse conditions were aggravated because the probability of these children's mothers dying (maternal mortality) is among the world's highest.

However, Sudan's people suffer an additional burden limiting the potential for progress and prosperity. Non-

communicable diseases and long-duration chronic illnesses claim more lives and resources than ever.

For a critical review of the state of health development in Sudan over the preceding four or so decades and foresee trends and prospects, policymakers must consider this under a broad set of contexts, including the demographic and socio-economic transition, the epidemiological transition of diseases, the cost of health and health financing and the political and health system strategic choices

We have good reason to believe that most health care programs in Sudan failed implementation. Modern facilities are not easily accessible and are not always the first choice of patients and families. Moreover, consistent, challenging to explain the deterioration of health care parameters is most pronounced in war-affected, marginalized, and low States of Sudan.

Total coverage with primary health care services is far from satisfactory. Even when services have reached the towns or villages, they have not reached the people. Healthcare trends need to be identified, so accurate information gathering and verification are required. Unfortunately, precise data is insufficient and available data is inaccurate.

This book attempts to provide an authoritative, authentic document of facts and figures about Sudan's health system in the present and recent past. Therefore, we surveyed and compiled as many available facts and figures covering Sudan's health system.

The neglected tropical diseases in Sudan include leishmaniasis, schistosomiasis, lymphatic filariasis, onchocerciasis, trachoma, guinea worm, mycetoma, soil-transmitted helminths, and leprosy.

The communicable diseases include HIV/AIDS, tuberculosis, and malaria. Vaccine-preventable include diphtheria, whooping cough, measles, yellow fever, neonatal tetanus, Hepatitis B, and cerebrospinal meningitis.

Non-communicable diseases include diabetes mellitus, cardiovascular disease, malnutrition, mental illness and substance abuse, disability and rehabilitation, and diseases of violence and injury.

The routine immunization program schedule introduced the hepatitis B (HepB3) vaccine. In addition, the rotavirus vaccine was introduced in 2011. The pneumococcal vaccine was introduced in August 2013, meningitis in 2016, and yellow fever in 2017. Other diseases are related to gender, age, social status, environment, and human rights.

To sum up, health services in Sudan faced enormous challenges aggravated by poverty, food scarcity, poor infrastructure, and significant geographic and socioeconomic disparities in access to and utilization of available resources over the last hundred years.

The different generations spared no effort to cover basic needs, control infectious and non-communicable diseases, manage the sick, and deliver good health services. Constant and persistent endeavors were to strengthen primary health services to address the leading causes of morbidity and mortality and maintain a healthy, productive workforce. The story of this profession with its difficulties, achievements, and failures is here recollected, consolidated, and told.

Health Before the 20th C.

Overview

At the end of the Fung Sultanate in 1805, there were no hospitals in Sudan other than *khalwas* and *maseed* sanctuaries and asylums for patients with mental illnesses. There were no doctors, and there were no medicines other than those provided by mother nature.

With its practitioners, practices, and prescriptions, folk medicine was available to people in the face of epidemic and endemic diseases.

Public health measures and ways and means of environmental sanitation and hygiene were primitive, except for those dictated by the teachings of Islam.

Surgery was rudimentary, and women knew only the traditional birth attendants who would assist them in childbirth and other diseases.

The story of health and disease in Sudan is not very different from that reported globally. Therapy began spontaneously, based on inspiration, coincidence, intuition, and experimentation. The person treated the symptoms and signs of diseases without knowing the natural causes and used medications that he did not know their origins, even if they knew their properties.

Experimentation continued, and observation and development of medicine continued to develop human knowledge. The man knew what was harmful and avoided it, and he knew dangerous animals and harmful insects on land and sea, and he avoided them. As for diseases he did not see an exact cause for and could not cure, he attributed them to evil powers, the envious eye, the malevolence of the ma-

levolent, and the curse of the dead. He has no control over all these powers. So they did their best to appease and pacify these unforeseen forces.

Medicine was not known as a profession in the nineteenth century. However, in the 1830s, some medical services administration signs began to emerge centrally when the French doctor Suleiman Effendi was appointed chief medical officer and medical services inspector in Sudan. As a result, some doctors spread from Sudanese cities and garrisons where they were stationed to remote locations without a connection between them and their presidency. Finally, Dr. Alfred Bani (1850 to 1861) attempted to organize medical services centrally, followed by Dr. Dologlu.

During the Turkish era, illness was a significant problem for the ruling authorities, which had to overcome it to secure an appropriate environment for its soldiers and employees and its sovereignty and control over Sudan, its people, and resources. It became clear to the Turkish authorities that ensuring their employee's and soldiers' health will not be done in isolation from the concern for the local population's health and the environment and combating epidemics such as cholera, malaria, and smallpox. So, they established a few unknown treatment centers and organized vaccination campaigns against smallpox in the country.

Public health systems and means for environmental and hygiene were rudimentary, and organized medical services were limited to a few hospitals in major cities. The knowledge of physicians about surgery was primitive at best. They did not know anesthesia or sterilization, there were no treatment institutions, and women only knew traditional midwives assisting them in childbirth.

At the beginning of the nineteenth century, Sudan was plagued by several famines, and several pandemics ravaged it, such as malaria, dysentery, smallpox, and venereal diseases. During the reign of Osman Bey (1825-1826), the epidemic of smallpox spread, the price of food increased, and

the people were hungry until they ate dogs and donkeys. Half of the population perished from disease, drought, and the injustice of the Turkish rulers. These diseases threatened Muhammad Ali Pasha's project and his plan to build a strong army handled by Sudanese in preparation for the battle of Egypt's independence from the Ottoman Empire and almost condemned this project to failure. Although the prisoners who were forcibly recruited to build that army were vaccinated against diseases (in the traditional way) and were given some medical care available at the time, they nevertheless died in the thousands before reaching the Aswan region, where Muhammad Ali set up training camps for his new army.

To overcome this obstacle, it became clear to Muhammad Ali Pasha that he needed competent doctors and medical services at a higher level than was the case then, and there were not enough qualified Egyptians and doctors in Algeria who could dispense with and send them to Sudan. So Muhammad Ali inaugurated a new project to train the Egyptians. He founded the Abu Zaabal Medical School in Cairo in 1827 and appointed Clute Bey its first director.^[3]

In the previous centuries, the general picture of Sudanese health was that they were healthy people in an unspoiled environment threatened by famines and epidemics. Smallpox and cholera, when they hit, came over entire villages. Dysentery and malaria spread and destroyed large numbers of the population, especially as Sudanese had no other than the traditional medicines.

Healers and laypersons alike have differentiated between *al-burjum* (chickenpox) (also known as *al-burjuk*) and *hisba* (measles). *Judari* has always been difficult to diagnose except during epidemics. They have also identified several skin rashes and labeled the itchy type *dam al-tayyir*. The infecting agents in all these diseases were unknown, but contagion methods were suspected, and, therefore, they developed many ways for management.

We have no evidence that people knew the agent that caused smallpox. Healers infrequently confuse its diagnosis with impetigo, psoriasis, and other skin lesions. People refer to deadly smallpox as *judari al-karufa* (جدري الكروفة), a phrase indicating that the disease is so virulent that it is contracted through breathing.

Smallpox is a highly dreaded and stigmatized disease. It has been known in the Nile valley and neighboring countries for around a millennium.^[4] Many devastating epidemics have scourged the land during recorded history, raising alarming mortality. However, of all diseases, smallpox was unique in lending itself to traditional control measures, and more than one method of variolation, prevention, and treatment was practiced.

Except for anointing the skin with oil and dusting bodies with ashes, particularly in Sudan, other preventive measures were also known in neighboring Egypt and Ethiopia. People shut themselves indoors. The sick were segregated, and sometimes the population moved en masse.

Traditional variolation is practiced to protect cattle against cowpox and *Abu-qinniet* (pleuro-pneumonia) (أبو قنيت). A piece of an infected cow's lung is cut after it has died and sewn in an incision inflicted in a healthy cow's ear in cowpox. In cases of pleuro-pneumonia, inoculation is done on the tip of the cow's tail. In *Abu-lisan* (أبو لسان), a piece of cloth is soaked in the saliva and tears of an infected cow, and the contents blew up the nostrils of a healthy animal.

Several methods of traditional inoculation were practiced in Sudan in the early days. Some were perhaps indigenous to Africa; others were probably Arabian.^[5]

Inoculation was known in the eighteen century or earlier. Pus was taken from a pustule of an infected person and rubbed into a healthy one's scarred wound. A highly infected person was preferred as a donor to somebody lightly infected; the disease caught from a heavily infected person is

said to have spent itself and, therefore, would not be severe if caught. Bloss noted that the mortality among those inoculated was only about two or three percent, which was very small considering the total mortality.^[6]

This method, they observed, was unpopular in both northern Sudan and southern Egypt. Moreover, little benefit was gained from this technique, which consists of rubbing the fluid taken from an infected person's pustule into an incision inflicted on a person's leg to be inoculated.

Throughout Sudan, smallpox patients were isolated and put under the care of elderly persons, such as a woman well past her menopause. For example, in Darfur, a patient was isolated in a cottage called *al-kurbaba* (*kurfa* in central Sudan) and nursed by someone who had had the disease before. Patients were fed on a frugal diet, mainly milk and porridge. They lay on beds of ash. When the eyes were inflamed, onion juice was dropped in.

However, Beaton writes that smallpox is treated as an honored guest and referred to euphemistically as grandfather (*Abu*). Grain and flour are sprinkled outside houses to propitiate it and avert a fatal visitation. As propitiatory rites, a deputation is sent to an infected village where pustules are punctured, and the pus is conveyed to the uninfected village for use in a primitive sort of inoculation.^[7] The Acholi generally isolate the affected cases when smallpox hits a village, and villages are often burnt after an epidemic. People are vaccinated. Pus from a patient's wound is rubbed into a healthy person.^[8]

Boss, a medical doctor, interviewed Bembashi Hassan Efendi^[9] Zaki, who was working during Khartoum's siege, and recorded some valuable information about his health in Khartoum before falling into the hands of the Mahdi.

Dr. Hassan Zaki said that several Egyptian doctors worked in Khartoum during his time. The most famous was Nassib Selim, who performed surgeries, including removing bladder stones, amputation, and *Madura* treatment, incising ab-

scesses, and treating wounds. The general anesthetic at the time was Chloroform. When Khartoum fell into the hands of the Ansar in 1885, the city had one large hospital under the management of the Egyptian Medical Corps and several doctors in the town, most of whom were Egyptians, and some drug stores owned by Greek merchants, and some extra points were belonging to Austrian missionaries. The country's health program was modest and included only vaccination against smallpox and very few simple measures to restore the environment. Otherwise, traditional medicine was the master of the situation.

Until the beginning of the nineteenth century, people in Sudan practiced medicine based on the ancient Arabic medicine books and their summaries dating back to Galen, Hippocrates, and Muslim physicians and philosophers. These books were the same textbooks adopted in many European medical colleges. "The Canon" (القانون) of Avicenna (ابن سينا)^[10], for example, was a reference book in European universities until the seventeenth century and was the principal textbook in the curriculum of the University of Montpellier in southern France until the early nineteenth century.

The books that were generically named *Al-Tibb Al-Nabawi* (الطب النبوي) (the Prophet Muhammad's Medicine) were many. These books added an essential part to Sudanese folk medicine and became a source for studying and understanding this system.

These books had been compiled by Muslim exegesis starting from the 10th century AD. The most important are Al-Zahabi, Ibn Qayyim Al-Jawziyya, and probably Al-Siyouti. Every one of the above scholars produced a book named *Al-Tibb Al-Nabawi* (الطب النبوي).

These books were in addition to those of jurisprudence and religion that contained sections on health preservation. These books include (إحياء علوم الدين) (Reviving the Sciences

of Religion) by al-Ghazali, Kitab al-Shifa (كتاب الشفاء) by Judge Ayyad, who, according to the Tunisi account, were read in the Sultan's Council in Darfur. (The Complete Industry) (كامل الصناعة) by Al-Majusi.^[11]

In addition, other books specialize in medicine and are well-known to the Sufis throughout Muslim Sudan. The Sudanese drew their medical knowledge from these books and added to them.

The books included:

1. Expression of Revelation (تعبير الرؤيا) by Ibn Sirin,^[12]
2. Tazkirat Daoud (تذكرة داود الضرير الأنطاكي) by Daoud, the blind physician of Antioch,^[13]
3. Mujarrabat Al-Derby (مجربات الديربي)
4. (vocabulary of medicines) (مفردات الأدوية) by Ibn Al-Bitar,
5. (لقط المرجان في أحكام الجان) by Ibn Al-Qayyim,
6. (أحكام المرجان في أخبار وأحكام الجان) by Judge Badr Al-Din Al-Shibli Al-Hanafi,
7. (الفتوحات المكية) by Ibn Arabi.
8. *Al-Rahma fi Al-Tibb wa Al-Hikma* (الرحمة في الطب والحكمة) by Al-Siyouti,^[14]
9. *Shams Al-Ma'arif Al-Kubra* (شمس المعارف الكبرى), by Al-Bony,^[15]
10. *Shumus Al-Anwwar* (شموس الأنوار) and (منبع أصول الحكمة) by Al-Tilmisani.^[16]

Glimpses of the past

The Sudanese historian Abbas Ibrahim Mohamed Ali noted that in the decade between the arrival of James Bruce in Sinnar in 1772 and the Mahdi's take over of the country, more European visited Sudan and penetrated the hinter-

lands, mainly during the Ottoman rule and a few decades earlier,^[17]

Abbas Ibrahim identified some examples of bias and partiality in the reviewed narratives. He could see the predilection of those early writers for describing strange customs, on which they did not hesitate to pass moral judgments. None of them had the scholarship or imagination to view those customs in the society's social and cultural context in which those customs were dominant. He quoted a few interesting examples.

Foreigners viewed the custom of breaking off the lower two front teeth with distaste, a tradition most of the tribes of southern Sudan practice. An American observer, Bayard Taylor, described the practice as giving "their faces a wolfish expression."^[18] Schweinfurth confessed that the object of this hideous mutilation is hard to determine.^[19]

With outstanding scholarship, Sudanese psychiatrist and bibliophile Tigani Al-Mahi has questioned the quality of the ethnographic literature produced by the European travelers who visited Sudan before the First World War. Tigani Al-Mahi thought it was fair to admit that those writers were the faithful offspring of their times. Travelers expressed the values of nineteenth-century Europe and not those of Sudan of those times. Historical factors contributed to their orientation, and the realities and stamps of the time influenced and shaped the pattern of values affecting human relations and attitudes. The methodology, thus, of those writers, in particular, leaves much to be desired. He said:

"The review of the literature until the First World War, for example, and in this respect, I shall have to be very frank, reveals a fictitious quality and grossly incorrect; half belief and half belief and half make-believe. Many authors were curiosity-hunters rather than academics, whose predilections were obtrusively for the strange and whimsical. Their writings created

more enigma than they solved. The gulf between the observer and the observed was seemingly immense.”^[20]

The liberal policy of Mohamed Ali Pasha in Sudan encouraged Christian Missions to establish themselves in the country and through it to Sudan’s hinterlands.

In 1846 the Roman Catholics declared Khartoum as the center of activity of the Apostolic Vicariate of Central Africa.^[21] In 1848, an Austrian Mission arrived in Sudan and established centers in several provinces, especially in the south. Gordon, Governor of Equatoria, invited the Christian Missionary Society (CMS), maintained through Gordon Memorial Missionary Fund, and resumed work again during the Condominium rule with a concentration in Non-Muslim southern Sudan.

Veronica's Fathers, known as the Austrian Mission, worked as ward sisters in government hospitals at Juba and Wau.

Sir Winston Churchill (1889-1892) stated that when the epidemics of smallpox, measles, and cholera followed that famine, they destroyed the weak people from excessive hunger and poverty.

Shuqair said that Sudan’s population in 1881 was estimated at ten million, and by the end of the century, they were no more than four million.

In his memoirs, Ibrahim Fawzi, published in 1901 under the title *Sudan in Gordon and Kitchener’s hands*, that the number of those who perished in starvation is not less than three-quarters of the population.

The Mahdiya curtailed missionary activity and forbade alcoholic beverages and snuff.

Apart from contemporary anthropologists and other interested scholars, many Europeans, Americans, and Arabs have visited Sudan in the last two centuries as travelers, tourists, hunters, explorers, missionaries, historians, antiquaries, administrators, traders, soldiers, archaeologists, geographers, naturalists, and botanists. As a result, they

have played an essential role in describing health, hygiene, sanitation, and medical practices.

They have recorded helpful information about the country, its people, and prevalent customs and practices. They have contributed their fair share in studying or describing the healing methods of the people they came across and represented the state of health, hygiene, sanitation, and medical practices in the early times. These sources remain our central repositories of the past of man's health in Sudan.

Most travelers (and sojourners) did not see anything more than a collection of strange and barbaric customs, and some even created several myths and stereotypes about which present-day researchers are still trying to separate fact from fiction Tigani Al-Mahi noted.^[22] Others made sweeping generalizations about the people-their physical characteristics, vices and virtues, how they behaved, and their beliefs. Nonetheless, there is much to learn from the accounts they left behind, which are, in most cases, extremely engaging.

Naom Shugair

During the Anglo-Egyptian Condominium, government officials contributed remarkably to our knowledge about Sudan's socio-cultural and health states at the beginning of the twentieth century. For example, Naom Shugair (1863-1922) compiled a sizeable treatise (Geography and History of Sudan) of the 19th century Sudan, published in 1903. The book has lengthy sections on the habitat, foods of the different tribes, manners, prevalent health customs, diseases, and treatment in other Sudan parts.^[23]

Shuqair confirmed that the country knew about malaria, Guinea worm, and cholera, which they called it (الهيضة). They also knew (bejel) and called it Hungarian gonorrhea. In addition, they knew (*Teana solium*) worm, smallpox, leprosy, and scabies. Then, in five chapters, Shuqair described Sudan's people's morals, customs, and myths.

We are interested in what historians wrote about the country's health and people and how health and disease were managed. The documentaries left by these early writers frequently proved to be of the utmost importance in tracing several medical practices. For example, much has been learned about *zar* and *tumbura* from Frobenius,^[24] Hurgronje,^[25] Plowden,^[26] Junker,^[27] and others, female circumcision from Browne's writings,^[28] Burton,^[29] and Bruce.^[30] Cursory comments could be found in several books of travelogues.

Samuel White Baker

The British administrator, traveler, and sportsman Samuel White Baker (1821-1893) wrote many books on Sudan, but they contained little health information. He was in Sudan from 1861-65 and traveled all over the country. He mentioned the occurrence of a severe smallpox epidemic. In 1866, he said a plague broke out in Khartoum, but he did not accurately identify the disease.^[31]

In *The Nile Tributaries of Abyssinia*, Baker wrote:

“The name of God is coupled with every trifling incident in their life, and they believed in the continual action of Divine special interference Nothing can happen in the usual routine of daily life without a direct connection with the Hand of God, according to the Arabs' belief.”^[32]

Several European, Arab, and Muslim travelers, Geographers, discoverers, and historians wrote about Sudan after visiting the country or quoting other writers. These Arab and Muslim travelers and geographers include Ibn Batuta (ابن بطوطة), Ibn Salim Al-Aswani (ابن سليم الأسواني), Ibn Hawqal (ابن حوقل), Al-Idrisi (الإدريسي), Al-Maqrizi (المغريزي), Salim Qubtan (سليم قبطان), and Al-Tunisi (التونسي), and recent

writers including Tayib Mohamed El-Tayib, Hassan Nagiela, Oan El-Sherif Gasim, Mohamed Ibrahim Abu Salim, Yousif Fadl Hasan

Sudanese historians and writers include Hassan Sala (حسن عوز الكريم محمد), Awad El-Kariem Mohamed Hindi (عوز الكريم محمد), Babiker Bedri (بابكر بدري), Hassan Nagiela (حسن سالة), Wad Daif Alla (ود ضيف الله), Katib El-Shouna (كاتب الشونة).

Very little relevant material of medical nature is found in the works of these writers. Nonetheless, students are encouraged to look into these writings and study them in-depth.

For example, Ibn Salim Al-Aswani, in his Account of Nubia (975-996), described the practice of female circumcision in the Bega tribes of eastern Sudan and stated that it had been popular among their women, but it had later declined.

Hassan Sala

The Hasan Sala^[33] manuscripts were written in Hidjas and reflected on Sudan only as Mahadiya officers. However, in the last century, Hassan Sala, a Sudanese scholar, gave an interesting description of the art of divination and traced its origin back to the Holy Quran.^[34] Hassan Sala (1842-1903) was born in Kordofan in western Sudan; later, he moved with his family to the Hidjaz, where he settled in Medina for 30 years and where he became curator of its main library. During his lifetime, Sala gained a wide reputation as an expert on *al-raml* (الرمل), *al-awfaq* (الوقف), *al-tanjim* (التنجيم), and *al-zayirga* (الزايرجة). He was indeed said to be one of the few mastered *al-wafaq*.

When the Ottoman Sultan Abd Al-Hamid Ibn Abd Al-Magid sent to the Hidjaz looking for someone proficient in *al-wafaq*, Hassan Sala was selected for the job and was the

one who ordered the placing of *alwafaq al-maini al-'adadi* (الوفيق المئيني العددي) on the war banners of the Sultan.

Hassan Sala wrote three books on the subject, which are now kept in Sudan National Archives Office in Khartoum.^[35] One document is on *tanjim* (astrology) and is called *Mabariz Al-Nafahat wa Dalayil Al-Awqat fi 'Ilm Al-Falak*^[36] (مبارز النفحات ودلائل الأوقات في علم الفلك), the second on numerology, *Al-Jawhar Al-Takwini fi Al-Wafaq Al-Maini*^[37] (الجوهر التكويني في الوفاق المئيني), the third, *Manba' Al-Ishara bi 'Ilm Al-Ithara*^[38] (منبع الإشارة بعلم الإثارة). In these books, the author described the art of *al-raml* at length. In addition, he enumerated the sources he studied and acknowledged the scholars in whose footsteps he followed.

Wad Daif Allah

Al-Tabaqat (طبقات) (ود ضيف الله)^[39] covers the period (1504-1821) of the Islamic Fung Kingdom in Sudan. In this chronicle, Ibn Daif Allah narrates several anecdotes describing the epidemics that hit the land at his time. He accounts for afflictions resembling smallpox, which killed many sufferers, and left scars on those who survived.^[40] Very little, if any, medical or health-related information is found in Katib Al-Shouna.

Muhammad Ibn Umar Al-Tunisi

Most notable of the latest travelers in Sudan were Muhammad bin Omar Al-Tunisi, a Tunisian father and grandfather, Egyptian mother, and education. He died in 1857. Al Tunisi visited Darfur in 1803 and had a sufficient opportunity to gain a broad knowledge of the social and economic conditions of Darfur, its political and administrative systems, and its relations with its neighbors. Accordingly, he reported in an organized fashion on several aspects of the

land and people of Darfur of the 18th century in his book (تشحيذ الأذهان بسيرة بلاد العرب والسودان).

Al Tunisi went to Darfur to join his father, who had gone earlier to Sennar and Darfur. Al Tunisi benefited from his father and grandfather's relationships in those areas to know their political, social, and historical conditions. They all worked with religious science and trade and moved between Tunisia, Egypt, Hijaz, Sennar, Darfur, and Waday, and they had broad commercial interests, prominent political centers, and excellent religious standing among their kings' jurists. Al-Tunisi wrote about Darfur and its people, the Fur kings, the names of their positions, their ranks, their clothes and their councils, customs and practices, diseases that spread in the region, methods of treatment, and several medicinal recipes. He described food fauna and flora.^[41]

Of particular note were his comments on the magical roots rife in the region. He also described castration, magic, cataract operations, divination methods, and fevers.

There is very little else to rely on for understanding the history before and after the Fung Sultanate.

The observations of travelers and explorers who visited Sudan at different times beginning in the last half of the eighteenth century covered some aspects of the country's health and diseases when they described their observations of the country's social conditions and the conditions of its population and climate.

These travelers' observations differed in their size, accuracy, and credibility, but they necessarily became our most important source for knowing Sudan's health conditions in the past centuries.

Their notes, which were dispersed haphazardly in their journals, indicated that the country's health situation, in general, was critical and that many epidemics of cholera and smallpox overran the country in a repetitious manner these epidemics destroyed large numbers of people. These travelers note that most epidemics have come from neigh-

boring countries and have been associated with long-standing famines, drought, and prevailing poverty. We have not counted the writings of all travelers and explorers who visited Sudan over the centuries. So, researchers need to monitor the work of those we did not mention here and re-read all their writings. However, the benefit we can reap from their observations is assured.

The European writers include James Bruce,^[42] Samuel Baker,^[43] William John Browne,^[44] William Burckhardt,^[45] Waddington,^[46] Ferdinand Verne,^[47] George Hoskin,^[48] George Schweinfurth,^[49] Theodoro Krump, The Tinne Sisters,^[50] James Pierre Tyler,^[51] Gypsum,^[52] and Ignatius Palmme.^[53]

There are, in addition, several books that have been published recently.

Charles Jacques Poncet

Poncet was a French physician and Apothecary who traveled to Gondar in Abyssinia in 1698-1699 through Sudan and stayed in Sennar for three months. He passed through Hafir Maschu (حفير مشو), where he treated the Nubian prince of Argo for an unknown ailment and reported on a plague epidemic that reached the upper fringes of Nubia and wiped out the whole population of many villages. He estimated the population of Sennar as 100,000. During his short journey, he encountered ophthalmia (trachoma) and syphilis.

Theodoro Krump

One of the earliest European travelers who recorded some ethnographic notes on Sudan was Theodoro Krump (1660-1724), a Bavarian Catholic missionary.^[54] Krump was not a doctor but learned Arabic and had two years of training in medicine. He toured through Sudan from 1700 to 1702 under the pseudonym Mua'llim Yunus (معلم يونس).

Krump noted that except for plague and smallpox, which the locals dreaded, Krump wrote, no other diseases were prevalent, except abostem, ulcer, coughing, and ophthalmia; but *il mal francese* (syphilis) was expected. He treated patients for jaundice and practiced cupping and leeching. Krump noted that the Sudanese native healers practiced cupping and leeching in Sennar. He also noted that cauterization was quite common as a treatment for animals and men.

“In these countries, they not only treat camels and donkeys in this way but men, too. If anyone suffers from sciatica, they fetch a cotton cloth, bind it very firmly to the thumb’s thickness, set it alight, and cauterize the spine up to the neck to two or three fingers’ width lies between each branding mark. Similarly, they treat colic by cauterizing both sides of the navel. They apply this treatment behind the ears and on the temples.”^[55]

After Krump’s caravan traveled the *Darb Al-Arba’in* (the forty-days-route) from Egypt, he stayed for a while at Mo-sho at the third cataract of the Nile. There he described the household utensils (grinding mill consisting of two stones which are turned about using a stick or by hand in the same way as painters grind their colors), cooking vessels (earthen pots), drinking vessels (hollowed pumpkin split in the middle), foods (fowls, chickens, kids, sheep, fish, lentils, rice, beans, *kisra*^[56] (كسرة) bread made of durra and dates), *busa* (بوصة) (durra beer), and the abundance of game.

James Bruce

In 1772 James Bruce, a Scottish Laird nicknamed (Hakim Yagoub) described the commoner type of inoculation, *tishteree el jidderee* (buying smallpox). This type was

common among the Shulluk, the Nuba, and Arabs. So in Bruce's words, women, blacks and Arabs, and those who live in the plains, the Shulluk inhabitants of El-Aice, the Nuba and Guba, those that live in the mountains, all the various species of enslaved people that come from Dyre and Tegla, have known a type of inoculation, which they call.'

During the fairest and driest season of the year, and upon the first appearance of smallpox, women of Sennar go to an infected person and wrap a fillet of cotton cloth around an infected area. They then start bargaining with the patient's mother over this 'infected charm' price. After being bought, it is taken home and tied around the person's arm to be inoculated. When people develop the disease, they get no more pustules than paid for in the bargain.^[57]

He described several diseases in Sennar, including *Dra-cunculus medienensis*, dysentery (bloody flux), fevers, smallpox, epidemics, hepatomegaly, and venereal diseases. He collected and illustrated some plants of Sudan. The plant used as purgative was identified as *brucea antidysenterica*.

William George Browne

The English explorer William George Browne traveled from Egypt by the *Darb Al-Arba'in* to Darfur in 1793. He settled at Kobbe, disguised as a North African Arab, until his return in 1796 by the same route. His narrative, published in 1800, though criticized for inaccuracy, remains an authority on Darfur. He devoted a chapter to remarks on health conditions in Sudan and Egypt.^[58] Trachoma (psorophthalmia) was prevalent in Egypt and northern Sudan. The causes of the disease, he thought, were dust and irritant fats. He also said that the higher the people's social standing, the less the disease incidence. On the other hand, the plague, which always ravaged the Turkish empire, was epi-

demic in Egypt and had been there since 1348 [the plague ravaged Europe].

He mentioned smallpox as the primary epidemic disease and recorded local inoculation methods. Scurvy was existent in Darfur, especially in years of poor crops. He described syphilis as:

“The disease which attacks the principles of generation and destroys in its source, one among the few solaces with which human life is sparingly diversified ... does not appear in Egypt with all the terrors that mark its course in other countries.”^[59]

He continued that the tertiary forms of syphilis-aneurysm, tabes, and general paralysis of the insane were very common sequelae in Europe, but in the tropics, they were rare compared to the frequency of the disease.^[60]

Leprosy was one of the commoner diseases in Egypt and Darfur. People also suffered from tapeworms, enlarged spleens [possibly due to bilharzia or malaria], liver diseases, jaundice, hernia, hydroceles, hemorrhoids, and fistulae. Herniae were treated with locally made trusses and hemorrhoids and fistulae with cautery. Childbirth was particularly easy. Sunstroke was uncommon, and rabies almost unknown. Aphrodisiacs such as natron, infusions of *tamarhinde* [Tamarind, *Tamarindus indica*], and *hashish* [Cannabis, *Cannabis sativa*] were in great demand as medicines.^[61] He described female circumcision, which he stated is less common in Darfur. Phlebotomy and leeching were used in Darfur. He used the native drugs of tamarind and natron.

Johann Ludwig Burckhardt

The Swiss scholar and explorer Johann Ludwig Burckhardt (1839-1908) traversed Sudan to Makka from 1812 to 1814. Speaking Arabic fluently, he dressed as an Arab and trav-

eled as a Muslim merchant. He entered the country through Wadi Halfa. In his book *Travels in Asia*,^[62] he recorded his met diseases in Berber and Shendi towns in 1814.

The health of the people of Berber, he said, was on the whole a healthy race, probably due to the town's situation on the edge of the desert. However, when the Nile was in flood, a fever called *wirdee* [*wird* is a generic Arabic name for fever] occasionally became epidemic. It did not occur every year, but there was a high incidence of death among those afflicted when it did. The plague was unknown, and he had never heard of a case south of the Assuan cataract.

Smallpox became an epidemic every eight or ten years, brought in by the Suakin traders. A severe epidemic broke out in 1812, which, coupled with famine, was said to have carried off over two-thirds of the population. Burckhardt knew that over fifty members of one family died from smallpox that year. Mild cases were few, and those who contracted the disease were heavily pocked. The mortality rate in children was said to be less than in adults. He reported a method of inoculation called *dag el jederee* (hitting smallpox) and noted that it was not practiced extensively^[63]. An infected pustule's fluid was rubbed into an incision wound made in the person's leg to be inoculated in this method. Venereal diseases and 'ophthalmia' were common, but not as much as in Egypt. He saw one case of guinea worm at Berber, which was probably an imported case. He said the arms and legs were usual places for the worm to appear. He saw one patient on whom the worm came out in the breast.

He also noted a large slave market at Shendi, and although the enslaved people endured great hardships, they were not as strong as their masters were. As a result, many enslaved people died long before they ever reached the market, and many travelers mentioned the rapidity with which some diseases overtook the enslaved people after their capture.

At Shendi, a particularly fatal inflammatory fever, probably cerebrospinal meningitis, carried off many enslaved people. An enslaved person who had had smallpox would sell at a higher price than one who had not. If an enslaved woman became pregnant, her master would do his best to procure an abortion. They knew several ways of causing abortion. Various drugs were given orally by beating the woman on the abdomen or putting the Dead Sea fruit extract on a piece of cotton inside the vagina. Enslaved people that snored, or ground their teeth at night, fetched a low price. If an enslaved person had a disease that did not clear up within the time prescribed by the vendor, he or she could be returned.^[64]

George August Schweinfurth

George August Schweinfurth traveled in eastern Sudan collecting botanical species in 1864 and 1868. He also traveled as far as Khartoum and descended the Nile to the Azande land in the south, where he discovered the Uelle River in 1870-71. Schweinfurth mentioned in his book *Heart of Africa* that leprosy existed in the southern provinces. Apart from this, he recorded little information of medical interest.^[65]

He also had interesting comments on Sudanese morals and customs. He judged that all the Arabs had the same aim: to do as little as possible and sleep.^[66] However, on the other hand, he observed that the Nubians exhibited a more decided idleness and disliked work than any other people. He said about the custom of extracting the lower teeth among the Negroes, 'it is hard to determine, ... and is quite beyond my comprehension.'^[67]

Early travelers and geographers described several tribes in southern Sudan as cannibals by early travelers and geographers. In addition, some writers claimed that they witnessed some acts of cannibalism. Schweinfurth shared with other travelers that some southern Sudanese tribes were canni-

bals. He did not hesitate to assert that the Zande were anthropophagi. He claimed that the Zande did not disown their cannibalism.

On the contrary, they gloried their reputation as cannibals. As a result, they were much dreaded by other tribes.^[68] The cannibalism of the Monbuttoo tribes, he said, was said to be unsurpassed by any nation in the world. However, he felt bound to record that some Zande turned with such aversion to human flesh consumption that they would refuse to eat out of the same dish as a cannibal.^[69] Cannibalism was emphasized among the tribes of Idio and Bamba, known as Makaraka, were cannibals also reported on by Wilhelm Junker^[70] in his book *Travels in Africa, during the Years 1879-1883*.^[71]

The Tinnes Sisters

The Tinnean Expedition^[72] to Sudan was a remarkable and tragic journey organized and financed by three illustrious Dutch women: Mme Henriette Loise Marie Tinne and her sister Mlle. Adrienne de Capellen, and Mlle. Alexandrine Tinne, Mme. Tinne's daughter. Theodore Kotschy, co-editor of the book that contained the botanical results of the expeditions,^[73] wrote in the preface the following:

“The principal object of this journey was a desire to learn about the Ethiopians, those inhabitants of the banks of the Nile whence it has been the custom, up to the present, to enslave people. Moreover, they wished to contribute as far as possible to abolish traffic so shameful and already prohibited by laws. Moreover, keen love of science and new knowledge counted not a little in the motives involved in their perilous enterprise.”^[74]

During the excursion, which started in July 1861, two women, Mme. Tinne (20/7/1863), her sister, Mme.

Adrienne and Dr. Steudner, the botanist, and plant photographer of the Expedition (10/4/1861), two Dutch servants, among another unidentified number of the team, died of fever. The survivors left Sudan by way of Sawakin and Berber in March 1864.

The results of the expedition were remarkable in terms of botanic surveys covering chiefly the areas watered by the Bahr Al-Ghazal River, between 9° and 10° North Latitude and 27° and 32° East Longitude (Meridian of Greenwich).^[75] Seventy-seven species and genera were described, 24 of which for the first time. The expedition remains an excellent example of collaborative scientific ventures in which the efforts of philanthropists, naturalists, geographers, explorers, botanists, and photographers are gainfully combined. The plant samples were professionally collected and preserved, described, and some items were deposited in the Imperial Herbarium of the Court of Vienna. However, no evidence of the anti-slavery campaign was reported.

George Alexander Hoskins

The British archaeologist George Alexander Hoskins, who died in 1863, visited Egypt and Sudan in 1833. He toured the northern region, making archaeological drawings and notes. He wrote his memoirs in a book called *Travels in Ethiopia*. After his encounter with the Arab tribes of northern Sudan, he had this to say, sharing the view of other European travelers, that an Arab accepts whatever comes across his way with unquestioned resignation:

“Endowed with an imperturbable stock of apathy more comfortable perhaps, although not so intellectual as European philosophy, they submit to a distressing accident, which would throw one of our countrymen almost into a fever, without allowing their equanimity to be in the least disturbed. ‘*Mactub min Allah*,’ ‘it is

written, it is the will of God,' they explain with placid resignation, and instead of brooding over their misfortune, become immediately reconciled to it and, with amazing facility, banish it from their thoughts."^[76]

James Bayard Taylor

The American diplomat, traveler, (and translator of Faust), James Bayard Taylor, visited Sudan in 1851-2. He considered that the Arab fatalism gave him a calm and equable temperament under all circumstances, and God wills it or 'God is merciful' was the solace of every misfortune.^[77]

H. A. R. Gibb

Some early writers alluded that Muslim resignation and indolence go hand in hand and that an Arab can never change or improve his conditions or progress unless he gets rid of his resignation habits and laziness. Abbas provided a more recent view. He quoted the modern English Orientalist H.A.R. Gibb as saying:

"Muslim 'fatalism' ... does not go very much beyond that found in any community (Muslim, Christian, or Hindu) in which poverty and ignorance breed resignation in the face of bodily ill, physical disasters, and the violence of tyrants. The ordinary Muslim takes thought for the morrow, like any other, and he assumes, like other civilized persons, that given actions will produce results. Even in his future in the next life, he takes predestination much more lightly than the Calvinists, since he believes that whomever they may be whom God has predestined to hell-fire, they are certainly not to be found; in the Orthodox Muslim community."^[78]

John Petherick

John Petherick (1875-1942), a Welsh mining engineer, trader, and explorer, lived at Al-Ubiyyid and traded gum Arabic from Kordofan from 1848-1853. He was engaged in different activities between the years 1853-8. In 1858, he was appointed vice-consul in Khartoum until 1864, when he left office because of allegations that he was involved in the slave trade. Nevertheless, in his writings, he had something positive about what other travelers considered a dirty and repugnant operation, the *dilka* or, as he calls it, the Turkish bath. Petherick's notes came from direct experience; he, while feverish, had undergone the procedure:

“After a little consideration, although not much liking being smeared with oil, I submitted to the operation and found its effects much less unpleasant than I anticipated. The following morning I awoke quite revived; the feverishness had subsided with a calm and refreshing sensation through my limbs and body.”^[79]

Petherick also described how the people of Kordofan treated smallpox. He said:

“As soon as the disease is pronounced, a bed of ashes^[80] is prepared on the ground. Upon this bed, the patient is laid nude. He is not removed until either carried to the grave or, by a marvel, he recovers. The only remedy applied is the juice of raw onions to the eyes when they become attacked.”^[81]

Ignatius Palmme

In 1834, Ignatius Palmme wrote his observations on the diseases of Kordofan. He said that the prevalent diseases are fevers, dysentery, abscesses about the neck (called *du-rore*) [tuberculous adenitis!],^[82] dropsy, smallpox, jiggers, skin diseases, and lues [syphilis]. He said for treating du-

rore, ‘they open the abscesses with the actual cautery, and when the matter is discharged, dress the wound with an ointment prepared of butter and clay.’ He said that syphilis had been unknown in this region in the preceding century, and the local people had only been inoculated a few years before he wrote when the stationing of Egyptian troops in the province provided the impetus and the technical means. He also described how the local people of Kordofan give lavage through an enema syringe.

“The lavements [lavages] are administered in the following manner: they take the thigh bone of a fowl, and clearing away the marrow, fasten to it a portion of the intestines of a sheep, into which they pour a decoction of *qara*’ [pumpkin!], and then insert the pipe into the anus, compressing the gut until the whole of the contents passes into the abdomen.”^[83]

Many travelers shared the image of the Negro as a brute, a beast, or, at best, a child; Pallme thought it was necessary to treat them like children; their mental faculties were very limited, and they were, indeed, on the lowest scale in this respect.^[84]

The Negroes were bestial and childish, so they could not be expected to have any religion-judged most writers.^[85] “Historic man believes in divinity; the tribes of central Africa know no God; are they of our Adamite race?” asked Sir Samuel Baker.^[86] Therefore, it was thought that the Negro was incapable of understanding the truths of religion. General Gordon believed that it was impossible that the Negro could ever understand the love of God in Christ. Therefore, he concluded that the Negro races must pass their youth period before being taught.^[87]

The first hospital in Sudan

The first hospital in Sudan was built in Khartoum in 1830 and remained open until 1885, when it was abandoned during the Mahdi rule.^[88]

The hospital was reopened in 1901 and functioned as the Egyptian Army Military Hospital (EAMH) and later became the River Hospital, housed in the Federal Ministry of Health buildings.

Health in the condominium-ruled Sudan

Overview

The Sudanese described in their oral literature their health norms, explained ill health, and offered various forms of treatment from time immemorial. However, they did not write down explicitly what causes disease, disability and harm. Neither did they write down their recipes. These we had to reconstruct by analyzing the available anecdotes and data. We had to conduct intensive field surveys and dig into several sources. The sources include archaeological relics, oral tradition, information scattered in historical chronicles, travelers' accounts, and literary sources. All contributed remarkably to our knowledge of many tribes and ethnic groups and documented and preserved valuable data.

We know very little about the country's health and diseases. We do not know much about the health and medicine of the ancient man or ancient healers of Sudan who used to treat illnesses, relieve pain and heal wounds. All of our written information on health and disease does not cover further than the beginnings of the Fung Sultanate, and all the information available to us does not cover more than the last four centuries, and the information that is provided does not help much, and raises more questions than it answers.

Until 1910, Sudan knew no medicines other than smallpox vaccines, the same as those used in the nineteenth century.

In the first three decades of the twentieth century, Sudan knew no treatment for kala-azar, dysentery, recurrent fever,

typhoid, cerebrospinal meningitis, gonorrhea, and other killer diseases.

The treatment situation was not surprising. Prontosil^[89] was not used successfully before 1937 to treat gonorrhea and other diseases. Penicillin, discovered in 1929, was not famous for treating fulminating wound infections, gonorrhea, syphilis, and trachoma until after 1941.

By the 1940s and 1950s, Sudan had provided some new medicines such as sulfaristan to treat syphilis and sulfonamide.

Quinine was under trial for the treatment of malaria. Also, Arsenic preparations were used for the treatment of syphilis. Calomel and Magnesium sulfate were used as laxatives. Potassium antimony tartrate was used in the treatment of bilharzia. Silver nitrate was used to treat trachoma. They knew tartar emetic, cupping, phlebotomy, and purgation.

The previous pages described health and healthcare delivery from the earliest times to the reconquest's eve.

In the coming chapters, we follow the historical milestones of health care services in the twentieth century covering the Anglo-Egyptian Condominium rule (1898-1956) and the period after independence.

Sources of study

Contribution of botanist

Several poisonous plants grow naturally in Sudan. Early researchers, including Sir Andrew Balfour, described some of these plants in the Wellcome Research Laboratories' early reports in the first decade of the twentieth century.^[90] Robert Kirk^[91] in 1946 and Mansour Ali Haseeb^[92] in 1972 updated the knowledge in this field. Some minor accounts have appeared in Arabic describing the chemistry and pharmacology of some of these plants.^[93] Professor Salah Adam of the College of Veterinary Sciences researched this

field extensively (and helped researchers) in toxic and poisonous plants affecting animals and humans.^[94]

Early in the twentieth century, Broun. Massey and Andrews compiled two books on Sudanese flora that have become indispensable research sources, beneficial for those studying traditional medicine, even though they have not explicitly dealt with medicinal plants.

The Arab Organization for Agricultural Development published in 1988 *Al-Nabatat Al-Tibbiyya Wal- 'Itriyya Wal-Samma Fi Al-Watan Al-Arabi*. The book contains profiles for 256 entries. Many plants have been illustrated in line drawings, and some were reproduced in colored photographs. Each entry includes the common Arabic names and the English and Latin equivalents. In addition, the book describes each plant, habitat, active principles, and uses.^[95] Many plants listed in this book were drawn from Sudan.

Contribution of anthropologists

Anthropologists have contributed immensely to our medical knowledge, namely traditional medical knowledge in Sudan, by studying the healing systems in several Sudanese societies. Edwards Evans-Pritchard studied the Azande,^[96] the Nuer, the Ingassana,^[97] the Bongo, the Mberidi and Mbegumba of Bahr Al-Ghazal; R. G. Lienhardt,^[98] the Dinka; Jean Buxton,^[99] the Mandari; Charles and Brenda Seligman the pagan tribes of the White Nile and southern Sudan and Harold MacMichael^[100] drew a history of Arabs in Sudan. In J. S. Trimingham's studies on Islam in Sudan,^[101] we find a perceptive analysis of the magico-religious beliefs and practices associated with affliction and misfortune. Ian Cunnison studied the Humur tribes of southern Kordofan^[102] and Harold Barclay Burri Al-Lamab, a suburban village in central Sudan.^[103]

Several case studies in healing practices were partially fulfilled with postgraduate degrees in anthropology, folklore,

medicine, pharmacy, veterinary sciences, agriculture, or other academic pursuits.^[104]

L. Holy^[105] and Abdullahi Osman Al-Tom studied the *Berti* tribe of Darfur.^{[106]·[107]}

Nadel studied the Nuba of southern Kordofan^[108]; Sharaf Al-Din Abd Al-Salam studied the saints' cult in Sudan^[109]; Abdullahi Ali Ibrahim,^[110]the Impact of Rubatab Metaphor on Social, Political, and Health Life of that tribe and their neighbors.

Awad Al-Karim Muhammad Hindi, a goldsmith in Omdurman, compiled a three-volume compendium of a wide range of information, including a section on medicinal recipes and health-promoting advice. He named the book *Mukhtarat Al-Sayigh* (مختارات الصائغ)^[111] and published it in Cairo in 1948. In the introduction to this work, Al-Sayigh listed his sources, mainly medieval: *Al-Qanun*^[112] and *Al-Hawi* by Ibn Sina, *Al-Tazkira Al-Tibbbiya*^[113] by Al-Antaki, *Al-Kamil* by Al-Razi, *Al-Risala*^[114] by Al-Maridini and *Al-Tibbb Al-Nabawi* (the Prophet Muhammad's Medicine).^[115] This information testifies that many Sudanese, not necessarily *faqirs*, had access to and used medieval Arabic medical books.^[116]

Wellcome's legacy

During the Anglo-Egyptian Condominium (1899-1956), medical doctors in the Egyptian Medical Corps, scientists, and administrators contributed a lot to our knowledge of the local practices in the various parts of the country. The articles they wrote were pioneering in every sense. Some of these articles were published in the *Wellcome Research Laboratories reports* (1906-1911),^[117]edited by Sir Andrew Balfour;^[118]others appeared in *Sudan Notes and Records* (1918-).

Abdel Hamid Ibrahim reviewed the medicinal plants and minerals in the Wellcome Research Laboratory Reports

publications for 1906, 1908, and 1911. He compiled an inventory of the cited plants and minerals with their catalog numbers in the Wellcome Museum of Medicine in Khartoum, which also contained artifacts and local articles relevant to health and disease, as varied as surgical instruments, splints, amulets, pathology specimens, and material related to public health, sanitation, and hygiene. The inventories have been appended to the Government Analyst's Annual Wellcome Chemical Laboratories Reports for 1958-59 and 1959-60.^[119] These appendices would have been of much help to researchers; the museum and artifacts were not lost!

Baghdadi's legacy

Ahmed Muhammad Hashim Baghdadi (1875-1933) was born in Persia and raised in Baghdad. He came to Sudan as a poor single young man in 1900, among the first non-European civilians to arrive in Sudan after the reconquest. Baghdadi worked in antique trading, collecting a fortune to purchase real estate. He owned many residential plots, houses, agencies, and offices in Omdurman and Khartoum. As for the shop he used to work in, it became in the late 1960s a rented shop for the Tarazi (شبيرقلة).

Dr. Ali Badri and Al-Hadi El Nagar, who were close to Baghdadi, noted that he led a lonely life but was loved by all who knew him. He was eager to study Persian poetry, and he would often read some poems to his visitors. He spoke Arabic with a foreign accent but did not speak English. We were told that he married an Omdurman woman but had no children. He and his wife were separated when medical students knew him. Very little is known about his family. However, a cousin visited him for a short time. Some servants from Egypt and Baghdad lived with him in his home.

The Baghdadi trust (Waqf Al-Baghdadi) included Khartoum, a club, shops, houses, agencies, and shops in Khartoum and Omdurman.^[120]

Institutional Research

WTRLK was undoubtedly the first laboratory to lay the foundation for training researchers and laboratory technicians. The laboratories proved to be the case later through. Before the first World War (1914-1918), Sudan depended entirely on expatriate staff to deliver healthcare. The Medical Department had been sufficiently developed, yet remote areas were still under military personnel. Junior staff, such as nurses and dispensers, were in-house trained orderlies. The war conditions and the start of major development schemes like the Gezira Irrigation Scheme made it clear that Sudanese workforce training was necessary.

After WW1, training of medical assistants started in 1918, Domiciliary Midwives in 1921, Laboratory Assistants and Auxiliary Nurses in 1925, Public Health Officers and Sanitary Overseers in 1931, Radiographers in 1933, and Dispensers in 1936.

Kitchener School of Medicine was opened in 1924. After four years of tuition, the first batch of 7 Sudanese doctors graduated in 1928.

Before, during, and immediately after WW2, the momentum of training technical and professional personnel speeded up. The training course increased, curricula improved, intake increased, and more schools opened.

Several institutions helped in preserving Sudanese healing practices, especially the Institute of African and Asian Studies of the University of Khartoum, the Aromatic and Medicinal Plants Research Institute and the Traditional Medicine Research Institute of the National Council for Research

Contribution of health service workers

Workers under WTRLK, Medical Department, or Sudan Medical Service enriched our knowledge enormously. After Kitchener recovered Khartoum, the Europeans became safer and spread in Sudan until they reached the far south, and few were scattered in the east and west of the country, and they conducted many anthropological, folklore, and historical studies that included the popular health systems in Sudan. By directing and centralizing distribution, the British army doctors dispersed in various parts of Sudan to provide medical services to the citizens, and in every region where they worked, they recorded the medicines and popular practices they saw.

British and Syrian doctors and Army officers recorded the medicines and popular practices they observed. They studied and described the country's health conditions at the end of the nineteenth and first fifty years of the twentieth centuries. They recorded, investigated, and reported on the different healers and folk remedies and published their studies in two important sources: the Wellcome Tropical Research Laboratories Reports (1906, 1908, 1911, 1913) and Sudan Notes and Records.

Sudan Notes and Records

Sudan Notes and Records journal was established by the Philosophical Society of Sudan^[121] in 1918. Sanderson reviewed the material published in this journal from 1918 until 1964. He noted that the articles related to medicine were published before 1948, mainly on traditional medical lore.^[122]

Hussey described a *fakir's* clinic in Muslim Sudan in 1923^[123], and Ahmed Abd Al-Halim wrote an article on local medicine in northern Sudan in 1939. Other traditional medical data is included in the anthropological and ethnographic accounts of the different tribes of Sudan.

WTRLK reports

Bimbashi R. G. Anderson, while Senior Medical Officer in Kordofan, described the medical practices and superstitions amongst that region's people.^[124] Later, he also investigated the tribal customs of the Nyam-Nyam^[125] and Gour people inhabiting the eastern Bahr Al-Ghazal region and the relation to the medicine and morale of these tribes.^[126]

Bimbashi L. Bousfield, an Egyptian Medical Corps and Senior Medical Officer in Kasala in eastern Sudan, described the region's local treatment methods.^[127]

Bimbashi Hasan Effendi Zeki, of Sudan Medical Department and Medical Officer at Gordon Memorial College, has described the dervishes' healing art during the rule of the Mahdi and his *Khalifa* (successor).^[128] Zeki had been taken captive to Omdurman by the Mahdi after he had captured the city and had worked during his captivity as the Mahdi's medical adviser and attended him during his death. Sir Rudolph Baron von Slatin Pasha, Inspector General, Sudan Government, has contributed brief but exciting Sudanese health notes. In addition, he has furnished the *Wellcome Laboratories Reports* with notes on the local methods of the dervish healing practices and customs.^[129]

Health in independent Sudan

Overview

The “Sudanese medical community,” the concrete, self-conscious scientific community distinct from other professional organizations, has been in the making for almost a century. This community must be strong, unified, and embrace a national strategic vision.

Unfortunately, we believe it lacks identity. It is currently weak and weaker in daily education, training, research, and service delivery.

This community’s determinants are the level and type of scientific research conducted, the quality of the teaching and training system developed, and the coherence, interdependence, and stability of the healthcare delivery system it established and maintained.

Healthcare delivery and clinical practice are far from satisfactory. The scientific research that rose to a high degree of excellence in the first seventy years of the twentieth century has declined steadily in quality and worth: the scientific publications, the leading indicator of intellectual productivity, lack collective vision. The medical journals do not herald a better world, introduce valid theories, or launch new advances. Apart from a few modest textbooks, the absence of published social, cultural, and academic works in the entire field in hundred years is notable and indicates how culturally sterile the area is.

Modern public health care delivery facilities are not easily accessible and are not always the first choice of patients and families. It is challenging to explain the deterioration of

healthcare parameters most pronounced in war-affected, marginalized, and impoverished Sudan.

Unfortunately, accurate data is insufficient and available information is inaccurate. As a result, coverage with primary healthcare services is far from satisfactory. Even when services have reached the towns or villages, they have not touched the people.

For over a century, the Sudanese medical community could not identify as part of Africa's extensive history, diverse heritage, rich legacy, archaeological, historical, and technological, nor its Arabic and Islamic roots. As a result, it did not feel unique and earned the label of being 'Sudanese.'

There have always been coexisting generations working together, and there has always been a generation gap in the medical profession and other disciplines to be more accurate. The younger generations have grumbled about how their elders behaved and treated them, and have repeatedly deviated from the set norms, sometimes in obstinate and intentional rebellion.

The generation gap that has characterized the last decades was wide and unfortunate and should be bridged. The apprenticeship tradition, the hallmark of medical teaching and training in the recent past, has suffered badly due to many social and economic factors.

There are also more apparent gaps. Indeed, there are many gaps between generations other than those related to patients: a gap between doctors and patients; a gap between biological medicine and the humanities; a gap between the practice of medicine and Sudan's social history throughout the ages; a gap between the school and the community around; a gap between evidence-based medicine and traditional, alternative and complementary medicines, and a gap between biological medicine and its scientific roots and historical currents.^[130] All these gaps need bridging,

The time-honored Sudanese medical system is currently on the brink of collapse due to a shortage of experienced lead-

ers, educators, and trainers. As a result, hundreds of resourceful medical scholars were forced into exile or unnecessarily alienated in the last three or four decades. We need to put much effort into bridging those gaps, preventing imminent dangers, breaking barriers, and reaching those difficult to reach.

Traditions, culture, and moral definitions change, and generations interact. Wise interaction and even frictions between generations narrow the gap and reproduce yet another generation, hopefully, more intelligent and mature.^[131]

When staffed by British doctors in the first quarter of the last century and by the Sudanese who nationalized the service, why did the 'Sudanese medical community' rise to great heights in all fields in the first seventy years of the twentieth century? Why did it fall? We gave this issue much attention, and our take discussed in depth elsewhere is summarized here.^[132]

Tigani El-Mahi's legacy

Sudan shared a recent worldwide resurgence of interest in culture studies, searching for identity, self-sufficiency, and fulfilling national pride. Tigani Al-Mahi unequivocally pioneered this search with much enthusiasm, devotion, and talent in this endeavor.

Tigani was a Sudanese psychiatrist and social scientist of great distinction; he lived with an unequalled love of the Sudanese culture. Over and above his interest, his psychiatric career made him contact with invaluable sources and critical informants in research fields. Tigani Al-Mahi contributed significantly to the inception and promotion of an African model of psychiatric health delivery that came to be known as the "village system," as typified by that of Aro's village in Abeokuta in western Nigeria. The system permitted mental ill-treatment by utilizing the social environment's inherent dynamic resources as the principal therapeutic technique.

Besides, Tigani's insights in fieldwork and methodology problems in the social sciences are shrewd and should be carefully studied by all field workers in the social sciences, especially the uninitiated. So much is to be found in his book *An Introduction to the History of Arabic Medicine*^[133] (Arabic) and the two volumes of essays collected and edited by Ahmed El Safi and Taha Baasher and published in 1981^[134] and 1984.^[135]

Sudanese academic and literary writings

Several gifted writers among Sudanese doctors contributed literary works of excellent quality; they documented their own experiences and life achievements in memoirs, narratives, and stories. For example, professor Omer Beleil described the kidney transplant in *Two Lives: Death Odyssey of a Transplant Surgeon*.^[136] In addition to his many poems, Dr. El-Zain Abbas Amara described his life journey in psychiatry in Sudan and abroad (رحلتي مع الطب النفسي).^[137] Professor Beshir Hamad narrated his childhood, school days, and early career in two volumes (من زمني وتحناني).^[138] While professor Musa Abdalla Hamid, a notable Sudanese surgeon, is a prolific writer. His *Khor Taqat Trilogy*, *Ratib Al-Imam El-Mahdi*, and several other memoirs, historical writings, and translations have been excellent works of documentation and prose.^[139] Dr. Mustafa Al Sayyid wrote (مشاوير في دروب الحياة).^[140] Ann Chrichton-Haris wrote a remarkable biography (Poison in Small Measures: Dr. Christopherson and the Cure for Bilharzia) describing the life and work of Dr. Christopherson. Salih Yassin Salih contributed a textbook and a biography (مذكرات طبيب وآراء), and Mamoun Yousif Hamid contributed a biography (تكريات على). On medical ethics and judicial studies, Amir Abdel Razig contributed (المسؤولية القانونية للمهن الطبية),

Rasha Ali El Baroudi contributed (قضايا الطب المعاصر، منظور (أخلاقي)، Babiker El Sheikh contributed (المسؤولية القانونية للطبيب). Sudanese manuals in Arabic are not too many to recount. Hafiz El-Shazali wrote: *Our Children Food and Health* (1972);^[141] Mohi El-Din Mahdi: *Sudan Red Crescent Manual* (1963);^[142] Daoud Iskander: *Guide for Pregnant Women*;^[143] El-Sayyid Hassan Daoud: *Forensic Medicine* (1995);^[144] Mohamed Osman Abdel Malek: *Guide to the Principles and Practice of Forensic Medicine* (2001);^[145] Ali Mohamed Ahmed Awad: *Diabetes Mellitus, problems and solutions* (2001);^[146] Awad Mohamed Ahmed: *Obstetrics* (1996);^[147] The manuals of Kamal Mekki El-Manna wrote for Anaesthesia Medical Assistants, and medical students were beneficial and resourceful. They include *Basics of Anaesthesia* (1984),^[148] *Drugs of Anaesthesia* (1986),^[149] Kamal and Tahir Fadil: *Companion in Medicine* (2000),^[150] *Anaesthesia and Resuscitation for Medical Students* (1996),^[151] and *Drug Interactions* (2000).^[152] El-Hag Malek: *World Medical History* (Arabic) (unpublished). Sayyid Hamid Hurreiz described the birth, marriage, death, initiation customs and beliefs^[153] and rites of passage^[154] in central Sudan. Idris Salim Al-Hasan studied Um Dawan Ban Religious institutions,^[155] Awad Al-Basha, couching techniques in Kordofan,^[156] Amir Ali Hasan studied the *maseed* system in the Gezira,^[157]^[158] Pamela Constantinidis^[159] and Samia Al-Nagar^[160] studied women institutions, especially the *zar* cult, and Gerasimos Makris, and Ahmed El Safi^[161] studied the *tumbura* cult in Omdurman. Several other works appeared outside the postgraduate field, namely Ahmed El Safi *Native Medicine in Sudan: Sources, Concepts, and Methods*,^[162] in 1968, *Traditional Sudanese Medicine*^[163] in 1999; Hamid Rushwan *Female Circumcision: prevalence, complications, attitudes and change*^[164] and Asma Al-Darir *Woman, why do you*

weep?^[165] Both were reports on a WHO-sponsored survey that spanned almost all of northern Sudan.

More contributions documenting progress in Sudan's medical services are found in the books, memoirs, reports, journal articles, and narratives of colonial doctors and administrators. These works, however, are not always available or easily accessible.

The books of note by Sudanese on Sudanese medicine and medical research are notably few. Mansour Ali Haseeb, Ahmed Bayoumi, Ahmed El Safi, Herbert Squires, P. D'Arcy, Heather Bell. These works touched very little, if at all, on pharmaceutical services in Sudan. The history of pharmaceutical services is reviewed in an excellent concise work by Abdel Hamid Ibrahim Suleiman.^[166]

Apart from these works, little has been written on definitive documentation of the history of health services in Sudan. Other than autobiographies, few documented the lives and work of the pioneers.

However, of note is the Pioneers series produced by Ahmed El Safi, which documented the lives and work of almost all the pioneers of medicine and health in Sudan.

Mansour Ali Haseeb dedicated his book *A Monograph on Biomedical Research in Sudan* (1970) to the NCR to benefit young research workers. The monograph included a 1500-entry bibliography of biomedical literature with a concise and highly informative introduction.^[167]

Ahmed Bayoumi's *The History of Sudan Health Services* revised his doctoral thesis (University of Khartoum, 1974).^[168] His primary aim was to trace health services in Sudan through their historical development, emphasizing the social, economic, and administrative factors. The book undoubtedly filled a gap in the history of health services and research in Sudan and proved invaluable to health care providers, researchers, and students. The book was reprinted in 2002 in volume one: *Health Care System* and volume two: *Disease Epidemiology*.

Ahmed Bayoumi also reviewed the epidemics that have swept Sudan in the last three centuries. He has described at length the history and traditional treatment of smallpox. In his book, *The History of Sudan Medical Service*, we read the following:

“Of all the serious epidemic diseases which haunted the land, smallpox was unique in lending itself to traditional control efforts and was perhaps the first to be subdued by modern medical techniques. More than one method of traditional variolation was practiced by the people of Sudan, among other local cures for disease, long before the Turks introduced modern-style Jennerian vaccination into the country after 1820.”^[169]

Dr. Herbert Squires joined the medical services in Sudan in 1908, four years after the Civil Medical Service's inauguration in 1904, since he had been closely associated with this service for almost forty-three years. His book *Sudan Medical Service: an experiment in social medicine* (1958) was accurate first-hand information and an excellent description of health care in the first half of the twentieth century.^[170]

Badrel Din Hamid El Hashimi's contributions to veterinary research and translating relevant historical and academic works written in English are of note.

Health system organization

Federal Ministry of Health

The Federal Ministry of Health (FMOH) is responsible for formulating national health policies and relevant health legislation and undertaking strategic planning consultations with states. In addition, it must respond to epidemics, meet international health obligations and monitor and evaluate the performance of health systems.

State Ministries of Health

The State Ministries of Health are primarily responsible for providing health services to the state population and undertake relevant planning, programming, and project formulation following the national health policies and strategic health plans. The localities deliver health services focusing on primary health care, preventing and controlling communicable diseases, and promoting health and the environment.

Federal level

At the Federal level, the Minister of Health, supported by the State Minister, provides overall policy direction and facilitates coordination councils and para-statal agencies. The Under Secretary is the technical head of the FMOH and provides leadership and coordination to about nine policy, technical, and administrative divisions, each headed by a Director General (DG) level officer. Under each DG, directors are responsible for developing policies and strategies for specific programs/activities, including standards and harmonized protocols for quality assurance, supportive supervision, and monitoring and evaluation. The Under Secretary also has a Council and coordinates legal affairs, internal audits, and media affairs.

In addition to FMOH, there are other federal agencies involved in health care delivery, notably the Armed forces, which operate about 51 hospitals with nearly 2,700 beds, 69 primary health care centers, and three diagnostic centers, Ministry of Interior, which has 25 hospitals, and health insurance program which, in addition to reimbursing government health facilities, also operates about 148 facilities. The Ministry of Higher Education operates the teaching hospitals. While each of these agencies caters to specific population subgroups, they also offer services to the general population. Donors also support national priority programs, especially the Expanded Program of Immunization,

Reproductive Health, Integrated Management of Childhood Illnesses, malaria, tuberculosis, and HIV/AIDS. While these additional inputs immensely help improve the delivery of essential health services, they have resulted in parallel planning, procurement, supportive supervision, and monitoring and evaluation systems. Under the overall direction of the State Governor, the Minister of Health provides political leadership to the State Ministry of Health (SMOH) in each state. The SMOH is responsible for planning, management, and provision of health services in the state within the overarching national policy framework provided by the FMOH. The Director-General of State Health Services is the technical head of the SMOH. It leads the State health management Team, which comprises six Directors (Planning, Primary care, Curative Medicine, Preventive Medicine, and Public Health and Pharmacy) supported by managers for different programs who also support the locality health authorities in providing health services. In addition, most states have established revolving drug funds to ensure a sustained supply of essential medicines. Some national priority programs also provide a limited number of additional consultants and direct funding to help their respective SMOH focal points support these programs' implementation.

The health system's third and most crucial layer is the locality, where a local health authority based on a district health system approach is responsible for providing integrated primary health care services. The Locality Commissioner is the administrative head of the Locality or District in Sudan and is supported by the locality health council, the political wing consisting of the elected representatives from the community. The respective departments implement all social sector programs, including Health. The Sudanese Expert Committee 2003 recommended three local staffing structures based on population, number of health facilities, and geographic area. The Locality Health Administrator is

the locality health management team (LHMT). In addition, four program managers responsible for Primary Health Care, Community Outreach, Environmental Health, and Communicable Diseases Control are recommended for the more prominent localities. In addition, staff members with expertise in statistics and health information, administration, and financial management are also expected to be available at this level. However, it is unclear how the States and Localities implement these recommendations.

The Government health system is a three-tiered network. Primary health care was adopted as a central strategy for health care provision in Sudan in 1976 and re-emphasized in the National Comprehensive Strategy for Health in 1992 and the 25-Year Strategic Health Plan 2003-2027.

Primary health care facilities are primary health care units (PHCU), dressing stations (DS), dispensaries, health centers, and rural hospitals. PHC units are staffed by community health workers (CHWs), nurse staff dressing stations, and medical assistant who heads dispensaries.

According to a recent FMOH document, the least acceptable level for health services provision is the primary health unit (dispensary), structured and staffed to deliver integrated PHC and health care services and, hence, PHC units and dressing stations dispensaries should be upgraded to this level. The health center is the referral point for the lower-level facilities; it is headed by a physician (medical officer). The localities manage health centers. The rural hospitals, on average, have bed capacities of 40 to 100 and are managed by SMOHs. Tertiary hospitals, including teaching, specialized, and general hospitals, are located in State capitals and are operated by the SMOHs. Also, the FMOH operates 21 tertiary-level hospitals and specialized centers.

Modern organized medical service in Sudan started with the inauguration of the Anglo-Egyptian Condominium in 1899. A Medical Department (MD) was founded in 1904, ending with the military domination of the medical services

in Northern Sudan. The Southern areas remained under military government.

Dr. Jack B. Christopherson was appointed the first civilian Director of MD.^[171] However, Dr. G. D. Hunter, the Egyptian Army's principal medical officer, was this department's first officially appointed director.^[172]

In 1924, the Medical Department was replaced by Sudan Medical Services (SMS). Dr. O. F. H. Atkey was appointed as the first director responsible for all health services, including military medical services.

SMS took over 19 hospitals and 55 dispensaries (شفخانة) run by 16 British doctors, 30 Syrian doctors, and 30 medical assistants (مساعد حكيم).

The Advisory Council for Northern Sudan was formed in 1948. In 1949, the Ministry of Health (MOH) emerged to replace the SMS. Dr. Ali Bedri, one of the first seven graduates of Kitchener School of Medicine (KSM), was appointed the first Minister of Health (before independence). During the first twenty years, several activities took place. The number of posts held by Sudanese doctors increased. The specialization policy was augmented, namely with the UOK. Third, Sudanese doctors were appointed to the three assistant directors (hospitals, public health, and research) and senior surgeon posts. More hospitals of all types entered the service—more expenditure on health services. More training was sponsored.

The introduction of federalism in Sudan fostered a three-layered health system structure. The Federal Ministry of Health (FMOH), State Ministries of Health (SMOH), and Local Health System.

The first layer is the FMOH with its ten general directorates. It is the primary layer for policymaking, strategic planning, coordination, regulation, international relations,

and the central source of technical support and guidance. The FMOH is linked to 26 State Ministries of Health (18 in the geographic north of the country). Within each State, there are several localities (186 in total) managed through a district health system.

The second layer comprises 26 State Ministries of Health before the secession of the South. Together they share the responsibility of the planning, legislation, and the Federal MOH. However, it takes direct responsibility for the state's organization and the local health system's support. Nevertheless, there are notable gaps due to their weak capacities—Khartoum and Gezira SMOH have relatively better-performing health systems.

The third layer in the federal setup is the locality level. The local health system is based on the district health system approach. It emphasizes primary health care principles represented in decentralization, community participation, intersectoral coordination, and integration of services. Local councils are also responsible for water and sanitation services. The district health system has been established to strengthen the health management capacity in the localities' administrative boundaries. This arrangement is to overcome supervision, leadership, curative-preventive dichotomy, and support the referral system.

The district health administration is led by the district health administration team trained in planning and management. The team supports the process of bottom-up planning. The district health system team should work with accountability to the district health council, which is part of the local board administrative setup and under the technical direction of the SMOH. The implementation of the district health system faced many constraints. The States varied in their commitment to this policy. The primary limitations included instability of medical doctors, continuous amendments in local government act, lack of state ministry of

health support, lack of resources, and community involvement in health affairs.^[173]

Till 1920, midwifery in most of northern Sudan had been entirely in the hands of *dayat al-habl* (دايات الحبل) (the midwives of the rope) and other traditional midwives in the rest of the country.^[174]

Until the 1970s, there was very little legislation for the regulatory control of foods. A few sections in the Penal Code prohibited adulterated food, food unfit for human consumption, and food not of the quality demanded. Local Government legislation gave local government councils the authority to control food sanitation and hygiene.

The WCL/NCL was to test and report on food samples submitted by public health inspectors working for the local government councils. There was no national central food control administration at MOH. Therefore, NCL was responsible for all national food science standards and quality control issues.

The water section, which played a vital role in testing and certifying drinking water for fitness for human consumption and other uses, relied until the 1960s on trained technicians to do the routine analysis. By the end of the 1970s, seven scientists had received postgraduate degrees and training in water analysis.

The only safe and wholesome water source for domestic use in most Sudan areas is surface water (from surface wells) and underground water (from deep boreholes). In many places, especially Northern Kordofan, surface and subsurface water contain high concentrations of nitrates (claimed to cause infantile methemoglobinemia to infants under one year old) exceeding the national times more than the recommended international limit. Yet the inhabitants of many villages strongly resisted the closure of government-dug boreholes because their water exceeded the national limit of nitrate content, but at the same time, its nitrate content was lower than that found in their private surface wells

So, in 1968 Dr. Mohamed Hamad Satti and Prof. Abdel Hamid Ibrahim organized a large, unprecedented multidisciplinary medical expedition to two villages in Northern Kordofan (Um-Gozein and Al-Mazroob) to investigate the health impact of the consumption of water exceptionally high nitrate content (which happened to be the only water available in those villages) on the health of the inhabitants. The team comprised Dr. Nasr El-Din Ahmed Mahmoud (Physiologist), Dr. Osman Modawi (Obstetrician), Dr. Mahmoud Mohamed Hassan (Paediatrician), and Dr. Mohamed Hamad Satti (Pathologist). Unfortunately, Prof. Ibrahim could not participate in this mission because of illness. Nevertheless, no ill health effects were detected in men, women, and children of all ages in the two villages!

In 1985, Prof. Abdel Hamid Ibrahim invited a WHO staff expert in drinking water standards (Dr. Hind) to join a national committee of representatives and experts from all water supply agencies chaired by Prof. Ibrahim to develop for the first-time national drinking water standards based on scientific evidence, experience and the practical situation on the ground.

In 1968, practically all pharmacists who graduated abroad chose to work in the private sector except Ibrahim Gasim Mokheir in 1937, Omer Gabbani in 1954, and Salih Suleiman Eisa in 1955 Sudan Medical Services. This trend continued until the mid-sixties when students sent to the American University of Beirut by the Ministry of Health to study pharmacy graduated and started to return and work in the Ministry of Health and after the Faculty of Pharmacy started to graduate pharmacists in 1968.^[175] Since then and until now, and despite the large numbers of graduates, most pharmacists have worked in the private sector.^[176]

Throughout the history of medical services in Sudan and 1986, pharmacy and pharmaceutical services were not recognized as separate administrative or professional entities. During SMS and MOH, pharmaceutical service was con-

sidered a central service in hospitals, like X-ray service, and its role was confined to dispensing medicines specified or prescribed by clinicians. There is no department of pharmacy.

At SMS or MOH – HQ’s levels, pharmaceutical services, like all clinical services, were under the Assistant Director of Hospitals (later Directorate, then Directorate General of Curative Medicine).

There was no official HQ post for a pharmacist. Instead, drug regulatory affairs were administered by the Central Board of Public Health (CBPH).

In 1967 the Senior Pharmacist Omer Gabbani was transferred to MOH - HQ to oversee the new Pharmacy Section in the Directorate of Curative Medicine to be in charge of drug regulatory activities and implement the Pharmacy and Poisons Act, the administration of the national MOH pharmaceutical services. In the same year, 1967, and for the first time, a pharmacist (Salih Suleiman Eisa) was transferred to the Central Medical Stores to fill the post of Superintendent of Medicines previously filled by a dispenser (Hassan Bushara).

In 1968 Salih S. Eisa was transferred to the Directorate of Pharmacy at MOH HQ and was superseded by Hamid Elo-beid at CMS.

In 1969 the new military government re-organized MOH HQ into four sectors, each headed by a deputy undersecretary. One of the four Deputies to the Under Secretary led the Laboratories and Pharmaceutical services sector, so the Pharmacy Section came under that Deputy, a clinician (Dr. Mohamed Elsayed Ibrahim).

In 1972 the Section was upgraded to a Directorate headed by Senior Pharmacist Omer Gabbani.

Until 1970, no pharmacist from the general MOH list (including the senior pharmacist) was specialized or had a postgraduate qualification, except for drug analysts in the National Health Laboratories. Then, however, they trained

pharmacists as drug analysts by attending post-graduate MSc courses in pharmaceutical analysis at the UOK. In 1970 and for the first time, two hospital pharmacists were sent abroad for postgraduate MSc courses, followed by a few others in subsequent years.

In 1978, the Minister of Health appointed a 10-member committee in March 1978 to upgrade pharmaceutical services. The committee was appointed to respond to a memorandum submitted to the Minister of Health by the Pharmacists Syndicate. The committee is chaired by Prof. Abdel Hamid Ibrahim Suleiman, the Government Analyst and chairman of the Drugs Registration Committee, to make recommendations regarding the development of pharmaceutical services.

The Committee submitted a comprehensive report on 31 May 1978 that included 8-page recommendations regarding all aspects of pharmaceutical administration and services. The recommendations included the following:

1. The establishment of a Directorate General of Pharmacy headed by a Director-General should be the same as other Directors General at MOH Headquarters. The Directorate General should have three Directorates: pharmaceutical services and pharmaceutical personnel; the second for pharmaceutical regulatory affairs; and the third for drug information, statistics, planning, and research. The terms of reference for each directorate were detailed in the report.
2. The Central Medical Supplies upgraded from a division to a Directorate-General to strengthen CMS's capacity with well-qualified and trained staff, appropriately equipped stores, and updated operational procedures.
3. The upgrading of the national drug quality control laboratories enables it to perform all drug analysis

and analytical services in regional health laboratories.

4. Introduction of pharmaceutical administration and services in all the provinces
5. Detailed recommendations regarding the re-organization, upgrading, and strengthening of pharmaceutical services at all hospitals, establishing a Pharmacy Department in all teaching hospitals equivalent to the clinical departments
6. Update drug legislation and regulations and strengthen drug control administration activities.
7. The government's support and encouragement to the local pharmaceutical industry help it overcome the problems facing local drug factories; and encourage the local production of packaging materials.
8. Moreover, the implementation of the Biological Products Institute project to produce sera, vaccines, blood products, and large volume parenteral (IV fluids) is approved in the government's six-year plan.
9. The upgrading of the government terms of pharmacists' service encourages more of them to join the Ministry of Health as they are needed to implement other recommendations and upgrade government pharmaceutical services.

These recommendations constituted a blueprint of a national drug policy and strategy and a development plan for good pharmaceutical services in the public sector. However, the recommendations were very slow because of the acute shortage of pharmacists in the public sector (about 40 in 1978) and their little weight as a pressure group compared to medical doctors. Nevertheless, the Directorate of Pharmacy was unofficially functioning as a Directorate-General directly responsible to the Under Secretary.

In 1981, MOH formulated and adopted a comprehensive National Drug Policy reaffirming the need to upgrade the Directorate of Pharmacy to a Directorate-General officially.

However, in 1985 MOH Organizational Chart placed the Directorate of Pharmacy under the Directorate General of Curative Medicine. This arrangement prompted MOH senior pharmacists to jointly submit a memorandum dated ----- to the Minister of Health protesting against placing the Directorate of Pharmacy under the Directorate General of Curative Medicine and calling for its official upgrading of the Pharmacy Department at HQ to a Directorate-General directly under the Under Secretary of MOH. As a result, the Directorate of Pharmacy was officially upgraded to a Directorate-General at MOH Headquarters in 1986.

Development Of The Local Pharmaceutical Industry

During the Condominium rule, local pharmacy education was neglected, and hospital pharmaceutical services were provided by medical officers, hospital-trained nurses, and medical assistants. In addition, no local pharmaceutical industry was established or encouraged.

Since independence, Sudan has not enjoyed any long era of political, social, or economic stability and was thus unable to develop the infrastructure necessary for economic development. The lack of sustained strength and viable infrastructure did not encourage foreign investments in general and local pharmaceutical production. Moreover, national economic policies prioritize agricultural development and the industry to process locally produced crops (production of vegetable oils, sugar, spinning, weaving of cotton, tanning hides, and production of canned and preserved fruits and vegetables). Despite the above, some small drug formulation industries were established in the early sixties.

In 1999 (check date, 14 national pharmaceutical manufacturing groups could produce medicines/ vaccines. A price control scheme is functioning (strictly enforced) for all drugs, and the regulation is for all products, including over-

the-counter OTC. The following components are added to the cost and freight (CandF) in the medicines price chain:

1. Insurance (2%)
2. Bank fees (15%)
3. Custom tax or duty (15%)
4. Clearance fees (3-5%)
5. Sudanese Standards and Meteorology Organization (15%)
6. Ministry of Foreign Trade (14 US \$)
7. Pharmacy Career Fund (1%)
8. El-jareeh Stamp (1%)
9. Administration OR "Other" expenses (5%)
10. Distribution margin/ wholesale mark-up (15%)
11. Retail mark-up (20%)
12. Distribution charges (varies from state to state)

Pesticides

The enormous amounts of toxic pesticides used in Sudan for agricultural and public health purposes constituted a natural health hazard. As early as the late 1950s, Prof. Abdel Hamid Ibrahim raised the alarm about the wide use of toxic insecticides on cotton in the Gezira Scheme and other public and private schemes without knowing the health hazards of their residues. As a result, a new section for analysis of pesticide residues in food, water, and the human environment was established, and three analysts obtained their MSc and training in pesticide residue analysis. Moreover, for the first time, radioactive tracer techniques were used to follow the presence and movement of DDT used on the cotton plant, on the cottonseed, in the oil extracted from the seed, and in the remaining cake, which food-producing animals consume. A unique IAEA Class C laboratory was equipped for those studies.

Laboratory work

These laboratories greatly impacted the development of health services, medical research, and education in Sudan. In addition, they undoubtedly put Sudan at the forefront of tropical diseases research a hundred years ago.^[177]

Health legislations

The overarching constitutional frameworks for all ensuing acts and ordinances started with the Constitutional Charter of Sudan signed by Butrus Pasha, Minister of Foreign Affairs of Egypt, and Lord Cromer, British High Commissioner, in 1899. This Charter provided the constitutional and legal basis and agreement for the Anglo-Egyptian Condominium that reigned, overruling Sudan for more than fifty years.

Over twenty-nine legislation were enacted to regulate health care practices in Sudan in the last hundred years. About ten acts are directly related to medicine and health. Nineteen Acts are closely related to health and impact its specific ways. The latest version of the Acts will be listed. In addition, a brief description of the objectives of these acts will be given. Finally, a list of the regulations to fulfill this legislation will also be provided. The current health acts include:

1. Interim Constitution 2005
2. CPA
3. Organization of Ionizing Irradiation Act 1971 (قانون تنظيم العمل بالإشعاعات المؤينة لسنة ١٩٧١)
4. Food Control Act 1973 (قانون رقابة الأطعمة لسنة ١٩٧٣)
5. School Health Act 1973 (قانون الصحة المدرسية لسنة ١٩٧٣)
6. Quarantine Act 1973 (قانون الحجر الصحي لسنة ١٩٧٣)
7. Human Tissues and Parts Act 1978 (قانون الأعضاء) (والأنسجة البشرية لسنة ١٩٧٨).

8. Regulation of Smoke Act 1983 (قانون تنظيم التدخين)
(للسنة ١٩٨٣)
9. National Public Health Ordinance 2008 (قانون الصحة)
(العمامة القومي لسنة ٢٠٠٨)
10. National Medical Commission Act 2008 (قانون)
(القومسيون الطبي القومي لسنة ٢٠٠٨)
11. Drugs and Poisons Act 2009 (قانون الأدوية والسموم لسنة)
(٢٠٠٩)
12. Environmental Health Act 2009 (قانون صحة البيئة لسنة)
(٢٠٠٩)

The closely health-related acts include:

1. Sudan Medical Council Act 2004 (قانون المجلس الطبي)
(السوداني لسنة ٢٠٠٤).
2. National Health Insurance Corporation legislation
(قانون التأمين الصحي والخدمات الطبية)
3. National Medical Specialization Board Act (قانون)
(المجلس القومي للتخصصات الطبية لسنة ١٩٩٥)
4. Births and Deaths Registration Act 1972 (قانون تسجيل)
(المواليد والوفيات لسنة ١٩٧٢)
5. Work Security Act (قانون الأمن الصناعي) (check)
6. Pesticides Act (قانون المبيدات)
7. Food Inspection Act (قانون تفتيش اللحوم)
8. Criminal Act 1991 (القانون الجنائي لسنة ١٩٩١)
9. National Medical and Health Professions Council
(قانون مجلس المهن الطبية والصحية لسنة ٢٠٠٥ Act)
10. قانون حماية البيئة لسنة ٢٠٠١
11. قانون البضائع الممنوعة والمقيدة
12. قانون لجنة الطاقة الذرية السودانية

13. قانون الهيئة السودانية للمواصفات والمقاييس
14. قانون رعاية الأحداث (أصبح قانوناً ولائياً)
15. قانون الهيئة العامة للإمدادات الطبية
16. قانون المجلس الأعلى للمستشفيات التعليمية والمراكز الطبية المتخصصة
17. قانون تنظيم وإدارة المستشفيات التعليمية لسنة ١٩٨٦
18. قانون المجلس الأعلى لتنظيم وإدارة المستشفيات التعليمية لسنة ١٩٨٦
19. قانون المخدرات والمؤثرات العقلية
20. مشروع قانون المجلس القومي للغذاء والتغذية
21. مشروع قانون الطب النفسي
22. قانون مشروع الدواء الدوار
23. قانون العمل لسنة ١٩٦٧
24. قانون الحكم المحلي لسنة ٢٠٠٣
25. قانون الطفل لسنة ٢٠١٠
26. قانون حماية المستهلك

Traditional medicine legislations

Traditional medicine in Sudan has never been condemned or prohibited in total. At times, however, the government has enacted and enforced a ban on some forms, adopted an attitude of tolerance, and ignored most traditional medical practices as long as no disturbance is officially reported. The practices prohibited by legislation were *Pharaonic* circumcision in the Muslim Sudan and the secret witchcraft societies in the south. Other legislations suppressed traditional medicine indirectly.

The Ministry of Health has produced legislation and regulations for the proper practice of modern medicine. Sudan Medical Council's terms of reference, rules, orders, and regulations were set to achieve a high standard of professional medical practice and maintain moral and ethical codes. There has been no clause, now or in the past, in the Sudan Medical Council's ordinance or the Ministry of Health's Public Health Acts, or any legislature in any other

institution that identifies or recognizes traditional medicine or acknowledges any alternative system of health care. On the contrary, definite clauses could be interpreted to the detriment of traditional medicine, its practitioners, and sometimes their customers.

As they did in many former colonies, the British introduced several health care concepts. Among these was the need to promulgate laws to regulate medicine, ensure a high professional competence, and implement ethical and disciplinary codes. Other laws were devised to keep the profession a prerogative of licensed professionals. Since its inception in 1955, Sudan Medical Council^[178] has followed in the British Medical Council's footsteps. This was expected since Sudan was a former British colony. Likewise, the systems of medical education and training followed the British tradition. Gordon Memorial College^[179] (the predecessor of the University of Khartoum) was affiliated with the University of London when it was upgraded to a higher education level in 1947. Kitchener School of Medicine^[180] (the predecessor of the Faculty of Medicine, University of Khartoum) was founded in 1924 and was intended to be a part of the international medical community.

Jan Stepan summed this up in the following:

“Legislation was designed to regulate health care delivery as a monopoly of formally educated physicians and a few other professions. Subsequently, even the practice of the allied and auxiliary health professions was limited to licensed persons.”^[181]

Systems of control of the profession were envisaged,^[182] and two bodies were designated to carry out these tasks: ^[183] Sudan Medical Council and the Ministry of Health's Public Health Board. The first is an autonomous body concerned with the medical profession (doctors, pharmacists, and dentists). The second, a Ministry of Health department, regu-

lates the paramedical profession, personnel, health facilities, and public health measures.

Health research and research ethics

In 1968 a committee for ethics was formed in the Ministry of Health to formulate ethics in the medical profession. In 1969 the Act of Ethics of Medical Professions was developed. In 1979 a committee for health research ethics was formed in the National Health Laboratories. In 1980 a Research Ethics Committee was established in the FOM, UOK.

According to Sudan Interim Constitution, 2005O, research oversight in Sudan is assigned to the Ministry of Higher Education and Scientific Research and the Minister of Science and Technology.

Article 13 (6) of the Interim Constitution stipulates that “The State shall guarantee academic freedom in higher education institutions and shall protect the freedom of scientific research within the ethical parameters of scientific research.”

In 1995 the Law of Regulation of Higher Education and Scientific Research put research policies.

In 1998, the Ministry of Higher Education formed specialized committees following the Law of Regulation.

Sudan Quarter Century Strategy (2000-2025) emphasized the development of scientific research. In 2004 a national biodiversity framework was developed.

NHREC issued ethics guidelines in 2005, 2006, 2007, and 2008. In addition, in 2007 Sudanese National Commission for UNESCO formed Sudan National Bioethics Committee.

Health training

The Academy of Health Sciences (AHS) was established as a degree-awarding body for nurses, medical assistants, midwives, and other allied health professionals to correct

the skill mix imbalance. There is one in each state, with its headquarters located in Khartoum. Currently, over 15,000 students are enrolled in different disciplines in these academies. (date).

Health care policies and plans

All plans are listed below. In addition, more details are given for the latest (2012-2016).

The national health sector strategic plan 2012–2016 aims to improve the population's health status, impoverished, underserved, and vulnerable groups. Three directions for action are identified: strengthening primary health care by expanding high-quality, people-centered services and improving equity in access; strengthening referral care; and ensuring social protection by increasing health insurance coverage, reducing reliance on out-of-pocket payment, and provision of a universal minimum package of health care.

The Federal Ministry of Health has formulated 22 health system policies, including a national health policy (2007). In addition, the Federal Ministry of Health has developed a monitoring and evaluation framework (2011) and strategy (2014) to ensure accountability.

The “one plan, one budget, one report” approach is being adopted for the health sector, and one strategic plan was developed for 2015 at the federal level and in three states. Training occurs at state and federal levels to support a 2016 project and the third strategic plan (2017–2021). A policy and planning forum involving non-health sectors has been created to support health integration into all policies. Policy dialogue is continuing on universal coverage and health system reform.

Priorities include strengthening effective leadership, good governance and accountability of the health system, improving equitable coverage and accessibility of high-quality integrated primary health care, and ensuring that health sys-

tem financing is sustainable, efficient, and impartial and provides social protection to the population.

Primary Health Care expansion

A primary health care expansion plan (2012–2016) has been developed to extend quality health care services from 86.0% to the whole population. The main aim is to improve access to essential primary health care services. The PHC plan has been done through the construction and equipment of 92 new family health care centers and 176 family health units; the training of over 800 community health workers, with an additional 1000 people undergoing basic community health training, achieving 74.0% of the target across the 18 states; and the necessary training of an estimated 6000 community midwives (72.0% of the target) and around 215 assistant health visitors (full achievement of the target). Also, an estimated 1400 medical assistants are now enrolled in basic training.

The curricula of all existing medical cadres have been upgraded, and a postgraduate family medicine program for doctors in health centers has been established at the public health institute and implemented in six states. In addition, a high priority has been given to strengthening the referral system by training doctors at rural hospitals. Another critical policy of the Federal Ministry of Health is providing free drugs for children under five years of age to reduce child mortality and morbidity to accelerate reaching Millennium Development Goal targets.

However, although the family practice is part of the national health policy, the program covers only 15.0% of primary health care facilities in Gezira, Khartoum, and White Nile states. As a result, low quality of care and medical errors remain challenges for health care delivery. Improving fair coverage and accessibility of integrated primary health care and ensuring high-quality primary, secondary, and tertiary health care are the major priorities for service provision and

provide a stable and equitably distributed health workforce with an appropriate mix of skills to meet agreed health sector needs.

Pre-independence Ten-year Plan	1960/61	1969/
Five-year Plan	1970/71	1974/75
Six-year Plan	1977/78	1982/83
Tripartite Economic Rescue Program	1991-93	
The Comprehensive National Strategy	1992-2001	
Quarter-Century Strategy	2007-2031	
Five-year Plan	2007/2011	
Five-year Plan	2012-2016	

Information technology

The routine health information system is based on quarterly and annual reports from health facilities and daily and weekly communicable diseases surveillance reporting, with data published annually in a health statistics report.

A national health information strategy 2012–2016 has been developed focusing on integration, improving reporting and data quality, computerizing the system, and building human and infrastructure capacity. In addition, to strengthen the health management information system and improve the quality and accessibility of health indicators data, a system integrated health information and district health information system have been developed, with a community health information system in the piloting phase.

The health information system is digitized, and around 7000 health workers have been trained in the new format. A national list of indicators has been developed, and registries and reporting forms have been updated. A research directorate within the health information, research, and evidence administration act as a health research council secretariat that involves stakeholders outside the Ministry.

In 2014, a health research policy and strategy were endorsed, and a national health observatory website was launched to become a platform for disseminating health

information and aid in evidence-based decision-making. In addition, a plan for civil registration and vital statistics has been developed, and an e-health strategy developed, although progress on implementation has been slow. The health information system faces fragmentation and verticality, with health programs having procedures for collecting data. Priorities include full implementation of the integrated health information system to address fragmentation, verticality, and different data flow channels, rolling out of the district health information system to aid digitization of the health information system, and strengthening the health research system by updating the national health research priority list.

Private health care system

Health services are provided through different partners, including Federal and State Ministries of Health, the Armed Forces, Police, universities, the private sector (both for-profit and philanthropic), and civil society. However, those partners perform in isolation due to ill-defined managerial systems for coordination and guidance.

In northern Sudan, the private, for-profit, charity, and trusts (الأوقاف)^[184] sector plays an increasing role in health service provision, especially in cities, towns, and better-off rural areas. Private sector providers focused on curative services, research, and general-purpose grants. In Sudan (2006 report), 172 (check) private hospitals and medical centers, out of 119, are located in Khartoum. Khartoum's share of private clinics equals 1,558 1243 beds, 739 specialists' clinics, 539 GP clinics, 288 dental clinics, 799 private laboratories, 30 X-ray units, 17 physiotherapy clinics, 195 public pharmacies, 1220 private pharmacies, 1012 veterinary drug stores.

NGOs also play an essential role in filling gaps in government system coverage and serving populations that are not

attractive markets for private providers, such as IDPs. In Khartoum, for example, the number of NGO health centers (114) is comparable to that of government centers (136). International NGOs also implement a small number of health programs ^[185]. Again, foreign Aid has been helpful.^[186]

International Health

The government has requested a second extension to meet the obligations for implementing International Health Regulations (IHR 2000) by June 2016, necessitated by the significant changes in South Sudan's separation.

International relations

The country is not a member of the World Trade Organization, no current laws contain the Agreement on Trade-Related Aspects of Intellectual Property Rights flexibility and safeguards, and no WHO prequalified products are locally produced. However, in 2015, the government endorsed a national policy promoting local pharmaceutical manufacturing that emphasizes increasing accessibility to medicines and using the allowances provided by the Doha Declaration. The country joined the WHO Good Governance for Medicines program in 2010. In 2011, a national assessment for good governance for medicines was carried out. In 2015, the Federal Minister of Health issued two decrees to establish good governance for the drugs steering committee and good governance for the medicines technical committee to develop a country framework. Improving equitable access to essential pharmaceuticals and health technologies is a priority for the country.

Human resources

Before the Second World War, the SMS sent Sudanese doctors abroad for postgraduate courses. Two doctors were

sent for three months to the UOK in 1937. In the following years, an aggressive plan of sending doctors to specialize in Britain started. Sudanese started gradually and steadily to specialize and replace British doctors in SMS and MOH. A list of the pioneers is appended.

MOH decided to train pharmacists abroad to run government services till a faculty of pharmacy is established. Accordingly, three batches of secondary school graduates were selected for training in 1961, 1962, and 1963 at the Faculty of Pharmacy of the American University of Beirut (AUB).

Sudanese medical textbooks

There were few Sudanese medical monographs, training manuals, or instruction books on medical sciences. They include El-Sheikh Mahgoub: *Mycetoma* (1973),^[187] and *Tropical Mycoses* (1989),^[188] M.Y. Sukkar: *Human Nutrition* (1970),^[189] Shawgi H. El-Masri: *Common Anorectal Problems* (2006),^[190] and *Portal Hypertension* (2003),^[191] Ahmed Abdel Aziz Yagoub: *The Figh of Medicine* (2001),^[192] Salih Yassin: *Medical Rounds* (2005),^[193] Ahmed El Safi: *Traditional Sudanese Medicine* (1999, 2007).^[194] Salah Abdel Rahman Ali Taha. *Society, Food and Nutrition in the Gezira* (1977); Ahmed Mohamed El-Hassan. *The Impact of Endemic Diseases on Health and Development* (1995). Nabri, *Malignant Lymphoma*. Mohamed Toum Musa and Randa Zaki AM Khair. *Atlas; of Common Surgical Problems* (2006); Mohamed Toum Musa and Randa Zaki AM Khair. *General Surgery for Dental Students* (2006).

The Chronicle

1898

- **The Reconquest**

After Kitchener re-conquered Khartoum on 2 September 1898, the British, Syrians, and Egyptian army doctors, anthropologists, researchers, and others dispersed in Sudan. They reached the far south, and a few spread in the east and west of the country to provide medical services to the army and citizens. In addition, they were instructed to conduct anthropological, folkloric, and historical studies, including traditional medical practices among Sudan's different tribes.

- **Kitchener Conceived the Idea of Establishing GMC**

On the 20th of September 1898 and 18 days after the reconquest, Lord Kitchener disclosed to Reginald Wingate, Director of Intelligence of the expedition to Khartoum, to establish Gordon Memorial College (GMC) as the first Condominium project to be founded in Sudan.^[195]

- **Appeal to Establish GMC**

On November 30, 1898, Lord Kitchener, Governor-General of the Anglo-Egyptian Sudan (1898-1899), appealed to establish the Gordon Memorial College (GMC). The appeal was successful, and 100,000 pounds was raised in six weeks.

- **Henry S. Wellcome Supports GMC Establishment**

Four days before the public announcement of Kitchener's appeal to establish GMC on November 30, 1898, Henry Solomon Wellcome (1853-1936), an American and naturalized British industrial philanthropist, pharmacist, chemist, and bacteriologist, having advanced knowledge of this project, sent a cheque for 100 guineas and an offer to contribute complete medical equipment and stock for a dispensary in the College when it was finished.

- **Omdurman Military Hospital Established**

On 4 September 1898, the first British Military Hospital was established in Omdurman. Its building is the present Women's Prison.

1899

- **Constitutional Charter Organized Medical Services**

Organized medical services in Sudan began in 1899 when Butrus Pasha, Minister of Foreign Affairs of Egypt, and Lord Cromer, British High Commissioner, signed the **Constitutional Charter of Sudan**. This Charter provided the constitutional and legal basis and agreement for the Anglo-Egyptian Condominium that reigned, overruling Sudan for over fifty years.

- **First Doctors in the Medical Service**

Initially, Sudan's health care was run by the Egyptian Army Medical Corps (EAMC). Then, the British Royal Army Medical Corps (RAMC) nominated the Principal Medical Officer and his senior staff.

Most of the lower-ranking youngest doctors were Syrian medical graduates of the Syrian Protestant College, afterward a part of the American University. A few had been trained at the French Medical School in Beirut.

The British and Syrian medical doctors looked after the troops' health, and non-commissioned officers were seconded for civilian duties in addition to the Sudanese public. Immediate attention was directed towards establishing essential cleanliness and sanitation elements and a vaccination campaign against smallpox.

Six small hospitals were built, and the army started a smallpox vaccination program.

- **Sudan Penal Code 1899 Enacted**

Sudan Penal Code (قانون عقوبات السودان) was enacted in 1899. It prohibits the sale of adulterated or expired medicine. It is still in action under a new name (القانون الجنائي).

- **GMC Building Started**

On 5 January 1899, Lord Cromer, British High Commissioner, laid the cornerstone of GMC, and Queen Victoria accepted to be the college's patron.

1900

- **James Currie Was Appointed the First Principal of GMC**

On the first of January 1900, Mr. James Currie (later Sir) was appointed the first Principal of GMC even before the buildings were completed and formally inaugurated.^[196] He remained in this position for 15 years.

- **Ahmed Mohammed Hashim Baghdadi Arrived**

The Persian philanthropist Ahmed Muhammad Hashim Baghdadi arrived in Sudan.^[197]

- **Henry S. Wellcome Visited Sudan**

Henry Solomon Wellcome traveled to Sudan with the first European civilians to visit the country in 1900/1901 after Khartoum's fall in 1898. General Sir R. F. Wingate, Governor-General of Sudan, and James Currie hosted him in Sudan. He was briefed about the GMC project, which he already knew. Currie whispered to Wellcome that there were still unoccupied rooms in the new buildings, which could be utilized for auxiliary institutions, including a small analytical laboratory, if not for lack of funds. This information was hesitantly passed to Wellcome "more in a spirit of expectation than a practical proposal".^[198]

During that visit, the Government of Sudan provided Wellcome with a boat, the *Dahabiya*, which enabled him to cruise on the Upper Nile and study the people and land. The impassioned account he wrote was later recalled in his

statement before the Committee on Foreign Affairs of the House of Representatives of the United States in 1928 to support the founding of the Gorgas Memorial Laboratory in Panama.^[199]

The picture he drew for Sudan of the time was gloomy.

“Famine and pestilence were abroad everywhere ... the disease of some kind infected not only human life but animal and plant life and all sources of the food supply. Nearly everything was wrecked and in a state of chaos and demoralization.”

That inspection tour left a deep impression on Wellcome and made him consider devising a plan to establish research laboratories in GMC in Khartoum. The friendly information passed to him by Currie bore fruit. He probably clarified his wish because Currie asked him to put his intentions in a formal request.

- **Six Civil Hospitals Established**

By 1900 six small civil hospitals had been opened in Khartoum, Omdurman, Kassala, Berber, Dongola, and Sawakin. In addition, Wadi Halfa Civil Hospital was built during the Turkish era.

- **Atbara Civil Hospital Supplied with Electricity**

Atbara Civil Hospital was the first hospital to be supplied with electricity.^[200]

- **Sanat Um-Sikaikoun (Plague of Small Grasshopper)**

Sanat um-sikaikoun (plague of small grasshopper) was named in 1900.^[201]

1901

- **The Foundation of The Educational System Laid Down**

By 1901 the building-up of an administrative system for the Gordon Memorial College began. Understandably within the Department of Education, which was in its embryonic stage. From 1900-1902, Mr.Currie opened an educational institution outside its campus while awaiting the College's building's completion. He hoped these institutions would either be absorbed later within the College to form its initial core of the student body or be a new venture within the Department of Education and be transferred to the Sudan Government budget. Therefore, he made every care to follow his concept of utilitarian education in establishing them so that the further assimilation of anyone within the envisioned College would not be problematic.

Mr.Currie established a Technical School at the Docks-Yard Work in Omdurman for apprentices in trades. He was helped in this project by Mr.Bond, the Officer in Command of the Water Transport in Sudan. In addition, Mr.Currie established two Primary Schools – one in Khartoum and the other in Omdurman. The Khartoum School was to be the future GMC; the Omdurman was to be transferred to the Government budget and run by the Department of Education, and in pursuance of his utilitarian concept of education, he attached to the Omdurman School A Section for Teachers and Schoolmasters.^[202]

- **Civilian British Medical Doctors And Nurses Started Arriving**

In 1901 and 1902, three civilian British medical doctors. The three doctors were Dr. Gates, Dr. Webb Jones, and Dr. Crispin.

Dr. E. A. Gates was stationed in Khartoum and Kassala; he left after one year. Dr. Webb Jones was stationed in Wadi Halfa and quickly left the service. Dr. E. S. Crispin stayed in Sudan for twenty years. Dr. Theodore Dyke Aucland had been a medical advisor to Sudan.

- **Wellcome Wishes To Donate Laboratories Expressed**

Wellcome wrote a request letter addressed to the Governor-General of the Anglo-Egyptian Sudan, Major General Sir F. Reginald Wingate (1899-1916), on September 28, 1901. He asked Wingate to accept complete equipment for Chemical and Bacteriological Laboratories for Analytical and Research work in GMC, Khartoum. The laboratories, he said, would be designed to:

- Promote technical education.
- Undertake the testing and assaying of agricultural, mineral, and other substances of practical interest in Sudan's industrial development.
- Carry out such tests connected with water, food-stuffs, and sanitary matters.
- Aid criminal investigation in poisoning cases (which are so frequent in Sudan) by detecting and experimental determination of toxic agents, particularly those unknown potent substances employed by the natives.
- Study bacteriologically and physiologically tropical disorders, especially the infective disease of both man and beast peculiar to Sudan, and help the offic-

ers of health and the Civil and Military Hospitals' clinics.

Wellcome's offer was considered and gratefully accepted at the meeting of the executive committee of the GMC held in October 1901. The aims mentioned above were later put forward as objectives for the Research Laboratories and appeared in the Laboratories' First Report of activities published in 1904.

- **Sanat Abu-Farrar (CSM Epidemic)**

Sanat Abu-Farrar (year of the stiff neck) was given in 1901. It was named after an epidemic of Cerebrospinal meningitis that hit the country that year.^[203]

1902

- **GMC Inaugurated**

On 8 November 1902, GMC (كلية غردون التذكارية) buildings were completed and inaugurated by Lord Kitchener as the first Condominium Western project. Though buildings were completed, it is not yet a university-level institution.

- **Wellcome Donated Laboratories to GMC**

In 1902, Henry Solomon Wellcome, an American and naturalized British industrial philanthropist, pharmacist, chemist, and bacteriologist, gave the government of Sudan a laboratory he called "Wellcome Tropical Research Laboratories" in Khartoum (WTRLK). These laboratories were established as independent bodies from the Medical Department and Education Department. The first founding director of these laboratories was Dr. (later Sir) Andrew Balfour. WTRLK was officially opened on November 8, 1902. The laboratories and museums occupied the first floor of the eastern wing of GMC (buildings of the current Physics Department).

Andrew Balfour and a group of British scientists participated in that period with research that was not limited to tropical and endemic diseases as expected but included folk medicine, public health, anthropology, geological surveys, soil chemistry, water and food, and various research in the plants and animals of Sudan, its insects, scorpions, and snakes.

- **Wellcome Identifies Andrew Balfour as Director**

Wellcome did not leave things to chance. He engineered Dr. Andrew Balfour's application to the post, sat on the committee that interviewed him, and eventually shortlisted him. Later, he ensured Balfour was well-coached and trained for the job. Balfour spent one month in the London School of Tropical Medicine and was introduced to Britain's elite scholars at the time. Seventy-eight of London's most eminent medical and research specialists attended the farewell dinner Wellcome arranged in Balfour's honor on 8 December 1902. On his way to Sudan, Balfour was given letters of introduction to the highest-ranking administrators in Egypt and Sudan, Cromer and Wingate.

- **Andrew Balfour Was Appointed Director of WTRLK**

Wingate, Governor-General of Sudan, appointed Dr. Andrew Balfour in 1902 as the founding Director of Wellcome Tropical Research Laboratories at Khartoum. He was then 29 years old.

- **The Collection of Health Data Started**

The health data collected from the medical and health facilities and native practices began with modern medical services in 1902. Thus, the WTRLK reports edited by Andrew Balfour and published are real milestones.^[204]

- **John B. Christopherson Arrived**

Dr. Christopherson was one of three British civilian doctors to arrive in Sudan. He was appointed as Director of the Medical Department in 1904.

- **American Missionary Mission Arrived**

The American Missionary Mission established stations among the Shilluk in Doleib Hills in 1902, the Nuer at Nasir, and two dispensaries at Doleib Hills and Wanglel in the Upper Nile Province.

- **WTRLK, Museum and Library Equipment Delivered**

The laboratories, museum, and library were delivered as promised in 1902; they were to the latest European specifications. The woodwork and fittings of the laboratories were specially made to suit Sudan. They were made of the finest English oak and East Indian teak, seasoned for the Sudanese climate through high-temperature baking for several months. Earlier, Wellcome also kept his promise and provided a complete outfit for the GMC dispensary.

1903

- **Balfour And His Wife Arrived in Khartoum**

Balfour and his wife left Britain for Egypt on December 11, 1902. After three weeks in Cairo, they left for Sudan to reach Khartoum on January 22, 1903. Balfour immediately took over as Director of the WTRLK.

- **WTRLK Staff Assumed Office**

John Newlove, who had been interviewed earlier by Balfour for the post of assistant director, arrived in Khartoum and assumed his duties on April 1, 1903.

- **WTRLK Established**

WTRLK was established in 1903 and accommodated in the East Wing of the GMC with the following objectives:

- To promote technical education.
- To undertake the testing and assaying of agricultural, mineral, and other substances of practical interest in Sudan's industrial development.
- To carry out such tests connected with waters, food-stuffs, and sanitary matters.
- To aid criminal investigation in poisoning cases (which are so frequent in Sudan) by detecting and experimental determination of toxic agents, particularly those unknown potent substances employed by the natives.

- To study bacteriologically and physiologically tropical disorders, especially the infective disease of both man and beast peculiar to Sudan, and help the officers of health and the Civil and Military Hospitals' clinics.

The laboratories directed attention to the need to investigate poisoning cases by the experimental determination of toxic agents, particularly the mysterious potent substances employed by the local people. Consequently, several pioneering reports on native medical practices in different parts of Sudan were published. Other studies covered subjects such as the fauna and flora of the country, food, water, hygiene, sanitation, customs, and habits affecting health.^[205]

WTRLK, consisting of bacteriological, entomological, and chemical sections, was affiliated to the Department of Education under James Currie, Director of Education and Principal of GMC, but they were essentially autonomous financially and administratively professionally.

The laboratories had links with the London and Liverpool Schools of Tropical Medicine, providing teaching materials, and aided Britain's Cancer Research Fund in its inquiries.

The work carried out in these laboratories mainly was scientific research and studies with little routine work. However, routine work increased and encroached on research over the years, significantly hampering it. Therefore, the laboratories became more concerned with routine work, training, and advice as time passed.

WTRLK conducted all types of research necessary for laying down the infrastructure of new government services and research in a virgin land. The research was not limited to tropical diseases, sanitation, and hygiene. However, it covered various subjects, including traditional medicine, physical anthropology, geological surveys, soil chemistry, water, food, exhaustive investigations of Sudan's fauna and

flora, various pests of man, scorpions, snakes, and snakes, mosquitoes, flies, and ticks.

Through these laboratories and between the family of hospitals in Sudan, several discoveries were made in the first decades of the twentieth century and published several books that affected medical education and medical services worldwide.

- **WTRLK museums and therapeutic gardens established**

Since he arrived in Khartoum and resumed office, Andrew Balfour started building up the two museums founded with WTRLK, medical museums, and general and economic museums. In the first WTRLK report, Balfour had this to say about the Laboratory Museum:

“The museum of the laboratories has progressed steadily since its formation. It is primarily devoted to collecting and exhibiting specimens and photographs showing the diseases of man and animals met within Sudan and maps indicating their respective distribution. It now contains over a score of mounted specimens illustrative of human pathology and tropical disease – those of mycetoma, so prevalent in Sudan, may be specially mentioned, several of veterinary interest, a small collection of skulls, and what promises to be a very fine and complete set of photographs illustrative of the native diseases of Sudan. In addition to these exhibits, a collection has been made of the remedies indigenous to, or used in, Sudan by the native races. Over a hundred different drugs have been obtained from various parts, some of considerable interest, and to facilitate the study

of those of vegetable origin and poisonous plants employed in Sudan, a plot of ground has been enclosed and what may be called a “therapeutic garden’ has been started”^[206]

Of the General and Economic Museum of the laboratories, Balfour reports:

“In this museum, but associated with the laboratories’ work, are various specimens of diseased dura, a collection of mosquitoes including microscopical preparations of the three genera most common in Khartoum, examples of injurious insects such as those which destroy the melon plant, and the aphides, so destructive to the dura crop.”^[207]

Over the years, both museums grew markedly in size, and the laboratory Museum in particular increased in terms of its pathological and entomological material, biting flies, ticks, mosquitoes, and native drugs from different parts of the country. Most probably, the exhibits of these museums were similarly distributed among the different splinters of the dismantled WTRLK.

- **Therapeutic Garden Abandoned**

The ‘Therapeutic Garden,’ the museum, and the library were all launched together with the start of the laboratories. However, unfortunately, the ‘garden’ did not succeed and was soon abandoned.

- **Missionaries Operate in North Sudan**

In 1903, the authorities loosened restrictions that prevented missionaries from operating north of the tenth latitude. As a result, the missions established schools and treatment sta-

tions in the Muslim north, but their services were concentrated in southern and western Sudan.

- **WTRLK Renamed**

The laboratories started work officially on February 1, 1903. They were initially called ‘The Wellcome Research Laboratories at the Gordon Memorial College,’ and their first, second and third reports took that name. The ‘Wellcome’ emerged out of Khartoum in 1903.^[208] Later, the word ‘Tropical’ was added at the suggestion of Wellcome. The fourth report published in 1911 carried ‘Wellcome Tropical Research Laboratories at the Gordon Memorial College.’ This name was later clearly spelled in Wellcome’s Will.^[209]

- **Wellcome WTRLK Director’s qualities set**

The letter with the gift offer, which Wellcome addressed to Wingate, was also clear about the qualities and qualifications of the first director of the laboratories. Accordingly, the following specifications were put forward:

“In order that the work of the Laboratories may be thorough and efficient, it is very desirable that the Director shall be skilled and resourceful and be prepared to direct and carry out with zeal and energy all branches of work for which the Laboratories are equipped, and a man who is willing to devote his life to the work of the Institution.”^[210]

1904

- **Andrew Balfour Appointed Medical Officer**

In 1904, Andrew Balfour was appointed Medical Officer of Health in Khartoum.

- **WTRLK Workers Assumed Office**

Chemist Dr. William Beam assumed office in October 1904.

- **The First WTRLK Report 1904 Issued**

The first *Wellcome Research Laboratories Report*, edited by Andrew Balfour, was issued in 1904.^[211]

The works carried out by Balfour and his team of researchers and the scientific articles he solicited from civilian and military doctors in the outposts of the country, and related articles reprinted from other journals (Lancet, BMJ) were published under the WTRLK in four lavish institutional reports at Wellcome's expense. The first report covered the period February 1, 1903, to February 1, 1904; the second was published in 1906, the third in 1908, together with a supplement: *Review of some of the More Recent Advances in Tropical Medicine*, by Balfour and Archibald; the fourth was issued in 1911 in two volumes A-Medical and B-General Science with a supplement.

Wellcome made sure that the first report was widely circulated free of charge to everybody of note worldwide. The list he drew up was added to Wingate, Currie, and Balfour. Recipients of the leather-bound complimentary copies were

many. They included HM the King of Great Britain, the Czar of Russia and the emperors of Germany and Japan, 1200 notable personalities, politicians, government officials in Britain, the USA, and the colonies, tropical medicine men and institutions and business people, editors of 181 journals and newspapers in Britain, the empire and the world, 67 libraries of universities and societies in USA and Britain. Two thousand copies were produced and supplemented by the second run of 600 to satisfy demand. The third report was the first to be offered to the public for sale. After publishing these four reports and supplements, the laboratories published no more reports though they were produced regularly. Failure to publish was due to several contributing factors. James Currie, Director of Education and Principal of GMC, and civil administrators in Sudan and Egypt did not see the actual worth of publishing such reports and continuing to finance them. They failed to raise £500 for Dr. Chalmers to publish even one more report. After repeated correspondences between Wellcome and Currie and the involvement of Kitchener, they asked Wellcome to continue financing the publications until 1915. In the meantime, Andrew Balfour resigned his post in 1913, the First World War broke in 1914, and Kitchener died in 1916. Until the end of the war and after that, priorities were different, and conditions were no longer the same.

- **The Medical Department Founded**

Modern organized medical service in Sudan started with the inauguration of the Anglo-Egyptian Condominium in 1899. A Medical Department (MD) was founded in 1904, ending with the military domination of the medical services in Northern Sudan. The Southern areas remained under military government.

Dr. Jack B. Christopherson was appointed the first civilian Director of MD.^[212] However, Dr. G. D. Hunter, the Egyp-

tian Army's principal medical officer, was this department's first officially appointed director.^[213]

- **Beginning of Science and Medical Libraries**

WTRLK established the first general-purpose library that increased in size with the growth of the laboratories. The library contained medical, agricultural, veterinary, chemical, and other sciences. Reporting on the early beginnings of this Library, Andrew Balfour wrote:

“The United States Department of Agriculture has been approached and has most kindly consented to send its valuable publications for the use of the library, a gift of great importance considering the prevalence of fungus diseases and insect pests in Sudan. The library itself is well stocked and is supplied with a selection of necessary scientific journals and periodicals. In addition, the authorities of the Natural History Department of the British Museum have been good enough to present it with several of their valuable publications.”^[214]

In its early beginnings, this library had been well supplied with books, and the number of scientific journals taken in or presented had undergone considerable addition. As a result, it became rich in biomedical journals, dating back to the first volume. It also contained early published and unpublished reports, reviews, publications of the laboratory staff, visiting research fellows, and commissions.

- **Bilharzia Spread to Sudan Through Egyptian Military Operations**

In 1904, Andrew Balfour, in agreement with Archibald on the role of Egyptian military operations in spreading the

schistosomiasis disease, drew attention to a focus on "endemic Haematuria" in Khartoum Primary School, where he found 17% of the children to be suffering from urinary schistosomiasis.^[215]

1905

- **Central Sanitary Board Established**

The Central Sanitary Board (CSB) (المجلس المركزي للصحة) was established on 29 October 1905 by a decree from the Governor-General to be responsible for all matters about the general medical and sanitary policy and all aspects of public health.

Under this board's control, all activities related to importing and distributing medicines, dressings and related items, and prescriptions were confined entirely to government channels inside hospitals. Thus, the government was the sole importer and distributor of drugs.

- **Director of Medical Department appointed**

The first Director of the Medical Department appointed on 1 March 1905 was Dr. GD Hunter, then a principal medical officer of the Egyptian Army (PMO).

1906

- **WTRLK Workers Assume Office**

Entomologist Harold H. King assumed office in 1906.

- **The Second WTRLK Report 1906 Issued**

The second *Wellcome Research Laboratories Report*, edited by Andrew Balfour, was issued in 1906.^[216]

1907

- **Floating Laboratory Maiden Journey**

Sudan Government built the vessel for the legendary floating laboratory in the Khartoum shipyards and supplied a towing launch named *Culex*; Henry Wellcome fitted and equipped the barge at his expense, WTRLK and the London School of Tropical Medicine jointly staffed its laboratory and planned the medical research. The laboratory was a two-decked barge completely furnished, fitted, and equipped for the full range of tropical research. Living accommodations were on the upper deck, and the laboratory was below.

Culex was required to sail the Nile, diagnose cases, collect specimens, make observations on the diseases of humans and animals disease vectors, and gather information on the lives, customs, and traditional practices of the peoples along the Nile.

The boat left Khartoum on its maiden journey on April 15, 1907, bound for Taufikia in the *Sudd* area of the White Nile, under the command of Dr. Charles Morley Wenyon, protozoologist to the London School of Tropical Medicine.^[217] Wenyon's return journey commenced on February 17, 1908, and after a few days' stay in Khartoum, he left for home, reaching London on March 22, 1908, after an absence of one year and twenty-two days.^[218]

- **British Nurses Arrived**

Two nurses, Miss Pye Moore and Jones, joined the Sudan service and worked in Khartoum Hospital. Ms. Pye Moore became the first Matron of Khartoum Civil Hospital.

1908

- **Third WTRLK Report 1908 Issued**

The third *Wellcome Research Laboratories Report*, edited by Andrew Balfour, was issued in 1908.

- **Christian Missionary Society Hospital, Omdurman, Started**

The Christian Missionary Society Hospital at Omdurman was started in 1900/1901 and closed in 1903 following Dr. Hall's death. It was reopened in January 1908 when Dr. F. O. Lasbery arrived from Cairo CMS Hospital and started a small hospital in a modest Omdurman house. In May 1908, Lasbery was succeeded by Dr. Lloyd. A permanent hospital was started in 1913 in Dr. Hall's memory and served as a center for CMS medical work in the north of Sudan.

The first part of the new hospital was opened in March 1914, and Lloyd became its first director. Dr. F. Wakefield joined him in 1917, and Dr. A. Worsleyas gynecologist in 1921. The hospital had three doctors and three English nurses on its staff.^[219]

- **Khartoum Civil Hospital Built**

Khartoum Civil Hospital was established in 1908.

- **The First Anthropometric Study Done**

Anthropometric studies in Sudan were pioneered by Alexander MacTier Pirre, who studied the Dinka, the Nuer, the

Shilluk, and the Brun in the first decade of the twentieth century.^[220] Dr. Pirre also collected artifacts, including medical and surgical appliances.^[221] In addition, the physical characteristics of the Arabs have been studied by crow-foot.^[222]

- **Apprenticeship of Workers in Industries Act Enacted**

Industries Apprenticeship Act (قانون التلمذة الصناعية) was enacted in 1908 in response to the demands of the increasing number of paid workers in government service.

1909

- **Khartoum Civil Hospital Inaugurated**

Khartoum Civil Hospital was inaugurated in 1909 as a modern-type hospital. Concurrently, similar hospitals were built in Atbara and Port Sudan.

1910

- **Vaccines Against Smallpox Made Available**

Until 1910, the vaccine against smallpox was not different from that used since the occupation of the armies of Muhammad Ali Pasha in 1820.

- **The First Cases of Cutaneous Leishmaniasis Reported**

Thompson and Balfour reported the first cases of cutaneous leishmaniasis in Sudan in 1910 in two Egyptian soldiers who contracted the disease in Upper Egypt.

1911

- **The Fourth WTRLK Report 1911 Issued**

The fourth *Wellcome Research Laboratories Report*, edited by Andrew Balfour, was issued in 1911.^[223]

- **The First Indigenous Case of Cutaneous Leishmaniasis Described**

Archibald, RG reported in WTRL's fourth report the first indigenous case of cutaneous leishmaniasis in Sudan in a native from the Nuba Mountains of Kordofan.

1912

- **The First Public Health Ordinance**

In 1912, the first Public Health Ordinance (قانون الصحة العامة)
١٩١٢ included pharmacy practices in Sudan.

1913

- **Andrew Balfour Resigned**

Andrew Balfour resigned from his position as director of laboratories in 1913 to be succeeded by Dr. Albert J. Chalmers (1913-1920) as director of WTRLK but not as Medical Officer of Health of Khartoum. Dr. Leonard Bousfield took the post of Medical Officer of Health. Dr. Robert (later Sir) G. Archibald^[224] succeeded Chalmers in 1920 and was in office up to 1935.

Belfour returned to England to establish the London School of Hygiene and Tropical Medicine, and his successor in laboratory management was Albert Chalmers, who built a good reputation in research and teaching of tropical medicine. The book he wrote in collaboration with Aldo Castellani for three editions. Chalmers confirmed Lieber's discovery of cochlea as a mediator for schistosomiasis in Egypt in 1915. Chalmers's work in Sudan immortalized his name when the Royal Society of Tropical Medicine and Health issued a medal in his name (Chalmer's Medal of the Royal Society of Tropical Medicine and Hygiene).

In his concluding remarks on the Wellcome laboratories, D'Arcy said:

“In just a few years, the laboratories gained international status and recognition for their pioneer work on the tropical diseases of humans, animals, and plants. It was the start of dedicated programs of research which were to continue throughout the life of the laboratories and which were to influence the health and well-being of Sudanese people directly.”^[225]

- **Sudan United Mission Granted Permission to Work in the South**

In 1913 Sudan United Mission was granted permission to open a station in Melut in Upper Nile Province. As a result, a small hospital with a leper service was started, and a dispensary at Rom. In 1921 it extended its services to the Nuba Mountains. In the 1940s, it helped in establishing leprosy services.

1914

- **Kitchener Appealed to Found a School of Medicine**

Like his earlier appeal to raise funds to establish GMC in 1900, Lord Kitchener, the High Commissioner in Egypt, made another appeal to establish a medical school in Sudan during his last visit to Khartoum in the summer of 1914. Unfortunately, the plans were suspended during the First World War. Lord Kitchener died at sea in 1916, and it was decided then to carry out his proposal in his honor.

- **Bilharzia In Khartoum Detected Among Egyptian Soldiers**

In 1914 Robert Archibald reported four cases of intestinal schistosomiasis in Khartoum, three of which were Egyptian soldiers.^[226]

1915

1916

1917

- **Baghdadi Trust Established**

When the project to establish a medical school in Khartoum was declared to commemorate Lord Kitchener, who died of drowning with his ship during World War I in 1916, Baghdadi was the first contributor. On September 27, 1917, he suspended all his properties in Omdurman and Khartoum to sustain and pay the tuition fees for poor and needy students from that school based on merit and eligibility without distinction based on color and race, or religion.

Ahmed Bey gave his parental care to the Kitchener School of Medicine (Faculty of Medicine, University of Khartoum later), was keen on their comfort, generously honored them, and gave each student a pound every month to dress. He visited them in their dorms, inspecting their conditions, and they regularly visited him in his house without embarrassment or permission, as his house was close to the dorms. When the number of school students increased after its opening, he allocated to them his two-story house.

When the Kitchener School of Medical Board was formed, Al-Baghdadi was one of its members and on the school executive committee. He was photographed sitting in the middle front row of all the commemorative photos taken for graduates of 1928, 1929, 1931, and 1932. He died in 1933.

In his honor, King George V granted him the title (MBE), and the Egyptian government awarded him (the Nile Medal) and the title (Bey). In addition, the Faculty of Medicine, University of Khartoum, gave his name to one of its halls and the city of Khartoum, a street.

As for his endowment, it is still standing. It is managed by (the Endowment Headmaster) at the University of Khartoum, assisted by the Baghdadi Endowment Board of Trustees and the Investment Committee for the Endowment of Al-Baghdadi.

- **Christopherson Discovered the First Cure for Bilharzia**

J. B. Christopherson used Potassium Antimony Tartrate successfully to treat 70 patients in Khartoum Civil Hospital in 1917.^[227]

1918

- **Treating Bilharzia With Tartrate Started**

J. B. Christopherson reported in 1918 on relief of symptoms in 13 patients with cessation of egg excretion within 2-3 weeks of starting treatment with Potassium Antimony Tartrate.

- **Medical Assistants Training Started**

Medical Assistants (المساعدين الطبيين) training started in Port Sudan Hospital and later years in the larger district at Wad Medani and Sennar hospitals. This step came as an effect of the First World War on the medical policy of Sudan and the difficulty of recruiting expatriate medical personnel. From 1918 to 1926, the products of this course were called assistant medical officers (مساعد حكيم).

1919

- **Bilharzia Became Endemic in Sudan**

Christospherson and Newlove (1919) maintained that bilharzia was endemic in all parts of Sudan except the Red Sea area, as judged from hospital clinical records.^[228]

Routine long courses of potassium antimony tartrate have been used for mass treatment campaigns since the discovery of the drug by Christopherson in 1919.

1920

- **WTRLK Reorganization Discussion Started**

Dr. Robert G. Archibald (later Sir)^[229] succeeded Chalmers in 1920 and was in office up to 1935. During Archibald's tenure and due to expanding educational needs of the GMC, a discussion aimed at reorganizing the laboratories commenced. Discussion of the political and economic milieu of the time and the stage that lead to the evolution and devolution of WTRLK have been thoroughly reviewed lately by Kirk,^[230] Ibrahim,^[231] Bayoumi,^[233] Bell,^[234] D'Arcy,^[235] and Adeel.^[236]

- **Medical Assistants Training Started in Medani and Sennar**

In 1920, training courses for medical assistants were carried out in Wad Medani and Sennar.

- **Christopherson was Nominated for Nobel Prize**

For his unique and pioneering contributions to medicine by developing the Potassium Antimony Tartrate as the treatment for bilharzia in 1917 in Khartoum, Dr. Christopherson was nominated for the Nobel Prize in Medicine in 1920.

- **Ms. M. E. Wolff arrived in Sudan**

In November 1920, the British Sister Mable Wolff arrived in Sudan from Cairo to establish midwifery services in Sudan.

1921

- **The Medical Department Annual Reports Started**

The Medical Department issued its first annual report in the year 1921.

- **Medical Assistants Training School Opened**

In 1921, a training course for medical assistants was inaugurated under VS Hodson's director, Khartoum Civil Hospital.

- **Midwifery Training School Opened in Omdurman**

Miss Mabel E. Wolff established the first midwifery school (مدرسة القابلات) in Sudan in 1921 in Omdurman. She was Matron of the school up to 1930. She then became Inspector of Midwives until her retirement in 1937. Mable Wolff also started the first ante-natal clinic in Sudan.

Before she became Inspector, Mable was joined by her sister Gertrude L. Wolff, who took over the job of Matron of the school. When the School of Midwifery started recruitment, candidates included *habl* midwives.^[237] Midwifery candidates were selected by nomination by tribal chiefs or by other senior persons agreed upon by the villagers. This scheme led gradually to the incorporation of many traditional birth attendants into the mainstream of healthcare delivery.

- **Bilharzia Became Endemic in Irrigated Farms**

By 1921, bilharzia had established itself in irrigation farms and spread widely in the Dongola area. Other foci were discovered in Kordofan Province at Umm Ruwaba and Abu Zabad.

- **KSM Building Started**

The Kitchener School of Medicine (KSM) building began in May 1922 over a plot of land donated by the Government of Sudan. KSM was earlier called The Kitchener Memorial Medical School, Khartoum.

1923

- **Bilharzia spreads in Northern Provinces**

In 1923, Archibald attributed the spread of bilharzia in the Northern Province to the Egyptian laborers employed in the irrigation canals in the pump schemes. The experience in the Northern Province was an early warning to medical planners about the hazards that might arise in the Gezira Irrigation Scheme.^[238]

1924

- **KSM Inaugurated**

The Kitchener School of Medicine was inaugurated by governor-general Sir Lee Stack on February 29, 1924. The intake was from the best Gordon Memorial College secondary school graduates. It is noteworthy that GMC started as an elementary school in 1902 and eventually became a secondary school. Khartoum Civil Hospital (established 1909) was the main teaching hospital.

KSM was the first medical school established in Sudan and the second with a comprehensive syllabus in North Africa.^[239]

The objectives of this school were:

1. To build up a cadre of Sudanese doctors in a particularly favourable position to combat the epidemic and endemic diseases that were wasting and debilitating the country's population and preventing its natural increase.
2. To allow educated Sudanese to take part in the development of their country.
3. To provide postgraduate courses for doctors trained at the School and provide particular study and research opportunities.^[240]

KSM started under the auspices of SMS with four years of training, extended to 5 years in 1934 and six in 1939. Dr. Normal F. Smith was the first Dean. The school faculty is

mainly from SMS and Wellcome Tropical Research Laboratories in Khartoum.

The school was managed by a council headed by the Dean with an SMS representative.

KSM maintained links with the Royal College of Physicians (RCP), which contributed several lecturers, assessors, and external examiners.

- **Baghdadi was the First to Sign in the Visitors' Book**

On the inauguration of the Kitchener School of Medicine on February 29, 1924, Baghdadi was the first to sign in the Visitors' Book.^[241]

- **KSM Teachers Appointed**

KSM was part of SMS and depended on its academic staff on doctors seconded from SMS on its inception. WTRLK staff (later SMRL staff) taught pre-clinical medical students, while clinicians from Khartoum Civil Hospital (KCH) took over teaching clinical subjects and carried out postmortems.

Later, the full-time staff of the School and later the Faculty of Medicine is augmented by the Ministry of Health by part-time teachers and full-time technicians.^[242]

- **First Lecturer of Medicine in KSM**

- **Training of Medical Assistants Shifted to Omdurman**

In 1924, systematic training courses for medical assistants were transferred to Omdurman Civil Hospital.

- **Sudan Medical Services Replaced the Medical Department**

In 1924, the Medical Department was replaced by Sudan Medical Services (SMS). Dr. O. F. H. Atkey was appointed as the first director responsible for all health services, including military medical services.

SMS took over 19 hospitals and 55 dispensaries (شفخانة) run by 16 British doctors, 30 Syrian doctors, and 30 medical assistants (مساعد حكيم).

- **Public Health Ordinance 1924 Enacted**

Public Health Ordinance 1924 was issued to replace that of 1912. This ordinance enabled the Governor-General of Sudan to issue administrative regulations in 1933.

- **Medical Assistants Training transferred to Omdurman**

In 1924, Medical Assistants Training was transferred to Omdurman Hospital.

1925

- **Laboratory Assistants' Training Started**

In 1925 WTRLK started a tuition course to train selected hospital orderlies in more straightforward laboratory routine tests, after which they were sent to work in provincial hospitals. In the first ten years (1924-1934), eighteen laboratory assistants (مساعد طبي معامل) were trained.

- **School of Laboratory Assistants Training Started**

Dr. Mohamed Hamad Satti secured approval for creating a full-fledged two-year course school of laboratory assistants, who eventually became the backbone of medical diagnostic laboratory services at all health care facilities.

- **First Women Hospital in Omdurman Established**

The first Women's Hospital in Sudan was opened in Omdurman in 1925. The training of female nurses was thought of and started in 1926.

- **Hospital Orderlies Deployed as Auxiliary Nurses**

In 1925, auxiliary male nurses were mostly male hospital orderlies, with few females working under 11 British sisters.

- **Gezira Irrigation Scheme Started**

The Gezira Irrigation Scheme started expanding the bacteriological department to teach KSM students and the Chemical and Entomological departments to cater to this project's requirements.

1926

- **School of Laboratory Assistants founded**

In 1926, the School of Laboratory Assistants was founded in the Bacteriology section of WTRL to provide laboratory assistants to carry out laboratory diagnostic work in hospitals.

- **Bilharzia Became Prevalent West of The White Nile**

In 1926, it was realized that the spread of urinary schistosomiasis in the Gezira human population was low, and it was decided to examine all the males, adults, and children. The results showed that 91% of the discovered cases were immigrants from the West of the White Nile.^[243]

- **H. Squires Appointed Lecturer in KSM**

Herbert Chavasse Squires (1880–1964), then Director, Khartoum Civil Hospital, was appointed lecturer of medicine in KSM. Later, joined by Roy Mervyn Humphreys (physician), Finlay Mayne (surgeon), and JS Hovell (gynaecologist).

- **No Intake for KSM**

No intake of medical students for KSM.

1927

- **Women Nursing Training School Established**

Women's Hospital in Omdurman inaugurated a female nursing training school in 1927. The course of training was two years. This school ushered in the systematic training of female nursing.

- **Stack Medical Research Laboratories Established**

In 1924, Sir Lee Stack, the Governor of Sudan, was assassinated in Cairo. As a result of this incident, the British evacuated Sudan from all Egyptian forces and replaced the Sudanese forces with British and Syrian doctors. In 1928, Stack Laboratories buildings were completed and inaugurated to memorialize Sir Li Stack for the Egyptian government's funds in compensation for the assassination. The building was almost a mirror image of the KSM dome. From 1927 to 1935, the laboratories formed the bacteriological unit of the Wellcome laboratories. The Laboratories were direct off-shoots of Wellcome Tropical Research Laboratories.

- **Graphic Museum Proposed**

Building a graphic museum was proposed for the first time by Sir Alexander Biggam and Mr. Robert Dolbey in the first Report by assessors of the final examination at the Kitchen School of Medicine in December 1927.

- **Medical Assistants School Renamed**

The graduates of the Medical Assistants School (مدرسة
(حكيم شفاخانه) (المساعدین الطبییین) were renamed dispensary hakims
in 1927.

- **The First Batch of KSM Graduated**

Seven Sudanese doctors graduated from KSM on December 20, 1927, to be employed in a few days. The London Royal Colleges supervised the examinations. The first examiners included Sir Alexander Biggam (1888–1963), Sir Henry Tidy (1877–1960) and Sir Walter Langdon-Brown (1870–1946), and Mr. Robert Dolbey. They Both attested that the standard of the graduates was no less than that of England, Egypt, or Lebanon graduates.

1928

- **The First Batch of KSM Graduated**

Seven Sudanese doctors graduated from KSM in 1928 with a Diploma from the Kitchener School of Medicine (D. K. S. M.). The graduates were appointed immediately in SMS as house officers on the Group 6 salary scale with a monthly pay of 168 Sudanese pounds.^[244]

It is to be noted that the school did not admit new students in 1926, 1937, 1941, 1945, and 1947. Consequently, no students graduated in 1930, 1938, 1941, 1942, 1944, 1947, 1949, 1951, 1955 and 1962.

- **Medical Officers Started General Practice and Surgery**

All Sudanese doctors who graduated from KSM in 1928 performed surgery as general practitioners using chloroform and ether for anaesthesia and spinal blocks. In an excellent article entitled “Milestones in the History of Surgical Practice in Sudan, Professor Abdel Aal Abdalla Osman documented the first cases of surgery performed by Sudanese doctors. He said:

“It is interesting to note that the first Sudanese graduate to perform a planned non-barber surgical operation in Khartoum Civil Hospital was Ali Bedri. According to KCH Operations Registry, it was an excision of Madura in a fourteen-year-old patient named Ali Khidir done under chloroform on the third of May 1928.”^[245]

- **The First British Eye Surgeon in Sudan**

In 1928, Dr. AR McKelvie, a Glasgow University graduate, arrived in Khartoum as the first eye surgeon in Sudan. Dr. McKelvie immediately established an eye clinic in the Egyptian Army hospital, later becoming the River Hospital.

- **Gezira Irrigation Scheme Started**

The KSM and Gezira Irrigation Scheme (GIS) establishment in 1924 and 1925 created new demands on WTRLK. The Bacteriological section of the laboratory was enlarged and moved to SMRL on completion of its buildings in 1928.^[246] A pathology section was added to meet the needs of teaching medical students. The Chemical and Entomological sections were also expanded to meet GIS demands.

1929

- **EWT Morris Started Service**

Mr. EWT Morris, a Fellow of the Royal College of Surgeons of England, joined Sudan Medical Service in 1929. Mr. Morris spent much of his service in Sudan's Southern and Western Provinces. In 1944, he succeeded Mr. Mayne in the twin posts of Senior Surgeon and Lecturer in Surgery, which he held for five years until 1949, when F. Bartholomew succeeded him. On retirement, Mr. Morris took a post in the Department of Anatomy of his old hospital, St. Thomas'.^[247] He taught anatomy in the Faculty of Medicine, the University of Khartoum, in the 1960s.

1930

- **Postgraduate Exposures Abroad Started**

Before that, doctors were sent for three months to obtain postgraduate experience. Ali Badri and Hussein Ahmed Hussein were among the first to benefit from these short missions in 1930.

- **Sudan Medical Services Regulation 1930 Issued**

Sudan Medical Services Regulations 1930 (لائحة السودان للخدمات الطبية لسنة ١٩٣٠) was issued. It has been a comprehensive and detailed document governing all administrative, financial, and medical issues. The regulation contained 230 articles and seven appendices, including the Medical Services Pharmacopoea.^[248]

This Pharmacopoea contained 57 medicinal preparations, including 29 mixtures (مزيج), six lotions (دهونات), two linctuses (لعوق), three gargle solutions, four enema solutions, four powders (مساحيق), one gripe water for neonates (ماء), one gripe water for neonates (دهونات ومراهم). In addition, six tablets were included in Schedule A: Quinine, Trional or Veronal, Aspirin, Phenacetin, Antipyrin, and Emetine Bismuth Iodide.

Most of these items are kept in concentrated stock mixtures. They were prepared by Doctors and dispensary hakims (مساعد الحكيم للصيدلة) by diluting them before dispensing them to patients.

- **Italian Mission Operated**

During the 1930s, the Italian Mission operated in the Upper Nile Province and ran dispensaries staffed by orderlies “mission boys” trained for six to 12 months in the Government Hospital. The dispensaries were run along government lines, and the drugs, dressings, and equipment were supplied by SMS.

- **Wellcome's Offer to Build New Laboratories in Khartoum Rejected**

The links of Henry Wellcome with Sudan were maintained up to two years before his death in 1936. In 1930, through his trustees, he offered to build new laboratories in Khartoum for over £60,000. There was no immediate response to this call. He renewed the offer two years later, but his terms were not accepted, and he withdrew his offer. Prof. Kirk commented on this, saying:

“Unfortunately, Henry Wellcome and Sudan Government disagreed over this project. Wellcome insisted on a first-class riverfront site that would be worthy of the fine building he proposed to erect. The government, or whoever represented it, did not agree to this and suggested an alternative site. Sir Henry Wellcome had become an autocratic old gentleman accustomed to having things done the way he wanted, so the offer was withdrawn.”^[249]

After the death of Sir Henry Wellcome, it was revealed that his will provided for an annual endowment to WTRLK, provided they were still in existence and had existed continuously since their foundation. In addition, the following extract from his will was revealed:

“I authorize my Trustees out of the Research Fund to make grants after the first five years af-

ter my death of a sum not exceeding Two Thousand Pounds a year and after ten years after my death of a sum not exceeding Three Thousand Pounds a year to the Trustees of the Gordon Memorial College at Khartoum under the supervision of such Trustees in conjunction with the Government of Sudan for the exclusive use of the Wellcome Tropical Research Laboratories ... for so long only as such Laboratories shall be conducted on the lines and for the purposes indicated in my letter of the gift of the said Laboratories.”^[250]

They still survived in their chemical section and did not make a case, and the Wellcome Trustees could not accept this view, and the legacy lapsed.^[251] Wellcome pledged that endowment despite the several disappointments and hard blows from his spiteful kinsfolk. The dismantling of WTRLK might have resulted from several factors working individually or collectively. The result was a redistribution of WTRLK departments and a redefinition of the fate of research in Sudan.

- **No Students Graduated from KSM**

KSM did not graduate any students this year.

1931

- **Training of Public Health Officers Started**

Training of public health officers (ضباط الصحة) and sanitary overseers (ملاحظ الصحة) started in 1931. The course of instruction was three years long. The first batch graduated in 1934. They proved to be helpful.

1932

- **Graphic Museum Proposal Renewed**

The idea of building a graphic museum was proposed for the first time by Sir Alexander Biggam and Mr. Robert Dolbey in the first Report by assessors of the final examination at the Kitchener School of Medicine in December 1927 and raised again in 1932.

- **KSM's First Teacher of Pharmacology**

Nagieb Suleiman was a Syrian auxiliary pharmacist. He had a Diploma in Pharmaceutical Chemistry; he arrived in Sudan in 1925 and worked in class A hospitals, including KCH. He started teaching pharmacology in KSM from 1932 until the end of 1951.

1933

- **Robert Kirk Legacy**

Prof. Robert Kirk (1905-1962)^[252] joined Sudan Medical Service in 1933, eventually becoming Director of the Wellcome and Stack Laboratories in Khartoum. Robert Kirk joined the University College from the Stack Laboratories with a worldwide reputation as a research worker who had made outstanding contributions to understanding kala-azar, yellow fever, and many other tropical diseases.

Prof. Kirk's interests were wide and varied. Unfortunately, dermatology was not taught systematically in the Kitchener School of Medicine. In fact, in the middle of the 1930s, it was decided that a course of lectures would be inappropriate, as there would not be enough clinical material in Khartoum to illustrate the subject. However, a reassessment of this position in 1952 showed no dearth of material and that even a brief introduction to the subject would greatly assist the students when they qualify.

A special issue of *Al Hakeem Medical Students Journal* containing Prof. Morgan's articles on the skin was dedicated to Prof. Kirk.^[253] The Editors of *Al Hakeem* rightfully commented that they commemorate the stimulus Robert Kirk gave to a branch of medicine allied to but different from the pre-eminent field, hoping that future dermatology developments in Sudan will pay tribute to his genius.^[254]

- **The Assistant Radiographer Training Started**

Training of assistant radiographers was started in Khartoum Civil Hospital in 1933. It was started on an in-service basis.

- **Public Health Ordinance 1933 Enacted**

The Public Health Ordinance 1933 replaced that of 1924. According to this ordinance, the Governor-General of Sudan formed several councils and specialized committees, including the Central Sanitary Board (المجلس المركزي للصحة).

- **College of Public Health Established**

College of Public Health was established as a departmental school for the training of Health Officers (ضباط الصحة) in the Ministry of Health in 1933. In 1973 it joined the Department of Higher Education in the Ministry of Education. The college grants a diploma (from the Royal Society for the Promotion of Health in the UOK) in three years. In 1976 a charter made it an independent college in higher education.

- **Bryant Reports Onchocerca Volvulus**

Bryant first reported *Onchocerca volvulus* in 1933 in Sudan Medical Services Report. He also associated it with endemic blindness in Southern Sudan.

- **Baghdadi Died And was Buried In Khartoum**

Baghdadi hoped that he would die and be buried in Sudan. So, he prepared his grave in Farooq's Cemetery in Khartoum, and he ensured that his tomb resembled the Egyptian tombs and visited him every year. However, unfortunately, he died in Khartoum on January 22, 1933, from Double Pneumonia and Jaundice. These were fatal diseases, as antibiotics of all kinds were unknown.

Baghdadi was buried in the grave he built. Later, KSM graduates visited Baghdadi's grave and added a dome in the

shape of the KSM building to honor his memory and as an act of gratitude.

- **Eric Pridie Appointed Director of SMS and KSM**

In 1933, Sir Eric Pridie (1896–1978) became director of the Sudan Medical Service and of the KSM.

- **KSM Study Period is 4 Years**

Unit 1933, study period in KSM was four years.

- **KSM Study Period is 4 Years**

Unit 1933, study period in KSM was four years.

1934

- **KSM Study Period was Increased**

In 1934, study period raised to five years.

- **Public Health Officers and Sanitary Overseers Training Started**

Training of public health officers (ضباط الصحة) and sanitary overseers (ملاحظ الصحة) started in 1931. The course of instruction was three years long. The first batch graduated in 1934. They proved to be helpful.

- **Dismantling WTRLK Started**

In 1934 and 1935, the process of disbanding WTRLK started, and sections were distributed among different government departments, namely SMS, Agriculture and Forests Department, and Public Works Department. This reorganization ushered the research from an autonomous enterprise to a government-run activity. The fate of WTRLK is summarised as follows from the available records:

1. The bacteriological section was transferred to SMS.
2. The geological section was transferred to Public Works Department
3. The entomological and chemical section was transferred to the Department of Agriculture and Forests. They together made the foundation for the Agricul-

tural Research Farm in Wad Medani (معهد الأبحاث
(الزراعية-التجارب).

4. The Chemical Laboratory was split into two sections:
 - a. The Soil Research Section is centered at Wad Medani, and
 - b. The Chemical Analytical Section and other functions referred to SMS, and the new entity took the name of **Wellcome Chemical Laboratories**.
5. The Entomological section was split into two: agricultural entomology retained by the Agricultural Research Farm in Wad Medani. Medical Entomology was retained by SMS though stationed in Wad Medani.

• **Why Was WTRLK Dismantled?**

The reasons for dismantling WTRLK were many. They might have been the outcome of the redefinition of domains (medicine and agriculture), the result of a conflict of interests of capital (Wellcome and the Cotton industry), or the inevitable result of competing fields and needs of practice (researchers and practitioners). The changing priorities of patrons, intellectual interests of successive directors and researchers, interdepartmental competitiveness, and search for self-reliance and independence played a role. The manifestation of the economic recession that loomed over the 1930s and the precise, urgent needs and pressing government priorities characteristic of the inter-and post-war era were instrumental.

It was also considered that the activities of the WTRLK became varied and dispersed; GMC decided to re-organize them by re-grouping activities of similar nature and con-

ducting work outside Khartoum whenever found more appropriate; but the College was very keen on up-keeping in memory the name of the original donor of these laboratories. Mr. Winter decided to leave “a small nucleus of the laboratories which will continue to bear Sir Henry’s name”.^[255] Whatever these reasons were, WTRLK seized to be that independent and autonomous body.

- **Dividing WTRLK Library**

WTRLK library was divided up when these laboratories were dismantled. Each section took its share of related books. Pure science books went to WCL in MOH buildings at Nile Avenue; medical books and periodicals went to SMRL, and agricultural books to the Entomology section. As a result, Hassan Hallab, in *The Health of Sudan: A Bibliography*^[256], identified two distinct libraries, the Medical Research Laboratories (Stack) Library and the Chemical Research Laboratories (Wellcome) Library, as the oldest medical libraries in Sudan. He said that they came under the administration of SMS in 1937.

- **The National Workers Club Founded**

The National Workers Club (نادي العمال الوطنيين) was founded in 1934 in Khartoum to serve workers, government officers (الموظفين), professionals (المهنيين), and work owners (اصحاب العمل). The number of clubs increased steadily to reach 65 in 1950.

1935

- **Royal Sanitary Institute Approved Public Health Training**

The Royal Sanitary Institute of England approved the training of public health officers, supervised training, and granted its diploma to successful candidates.

Sudan Medical Service was reorganized in 1935. The work of laboratory assistants was assessed. Four months of refresher courses were held for laboratory assistants at Stack Medical Research Laboratories. From 1935 to 1952, 57 laboratory assistants were trained.

- **Dismantling of WTRLK Continued**

In April 1935, SMRLs was designated the official research organs of SMS, and WTRLK ceased to exist. Dr. E. S. Horgan succeeded Robert Archibald as assistant director of research, MOH. SMRL was, thus, the temporal successor of WTRLK.

- **Stack Laboratories Became Part of SMS**

Stack Medical Research Laboratories were built in 1927 by Sir Li Stack. In 1935 they became the center of medical research in Sudan and an integral part of Sudan Medical Service. From April 1st, 1935, under Dr. Eri S. Horgan as Assistant Director for Research. The Sudan Medical Service research section consisted of the Stack Laboratories, the Wellcome Chemical Laboratories, and the Medical Entomology section at Wad Medani.

1936

- **The Graphic Museum Opened**

In a paper presented to the Eighth Annual Conference of the Philosophical Society of Sudan, Khalafalla Babiker El-Badri, Chief Public Health Inspector, MOH, read the following regarding the Graphic Museum (GM) (المتحف التصويري) in Khartoum:

“The Graphic Museum in Khartoum, opened in 1936, plays a prominent part (in health education). It is a good institution for training medical and health students, and it is very frequently visited by members of the public, schoolboys, and girls. In addition, the Graphic Museum sends models, posters, and leaflets to the outstations to form cultural shows and tribal gatherings. Other functions of the Museum include short courses to administrative officers (including police, prison, and local government officers), medical corps members, auxiliary health workers, school boys, and girls.”^[257]

During the conference sessions mentioned above, the curator of the GM, Mr.Sayyid Baroudi, and his staff arranged 61 items relating to the health of Sudan.

The GM building stood east of SMRL, had a similar architecture and occupied approximately the same area as the NHL, which was later built on its site.

- **Museum Acquisitions Lost**

Whether in SMRL, WCL, or Medical Entomology section, the exhibits, which WTRLK collected through decades of hard work, were distributed haphazardly over the different departments or treated as showpieces and carefully attended, eventually lost. The catalogs published for the herbal, organic, and inorganic exhibits and the WTRLK Reports were the only reminders of these remarkable bodies.

- **School of Dispensers Established**

Before 1936 medical officers were responsible for the supervision of drug dispensing services to patients in the hospital pharmacy, which were manned by specially trained nurses (تمرجية) called pharmacy nurses (MOH memorandum 1969). To save medical officers the time and effort needed for their clinical work, Sudan Medical Service established 1936 a departmental school for training dispensers in Khartoum Civil Hospital (KCH).

1937

- **Postgraduate Training Abroad Started**

Before the Second World War, the SMS sent Sudanese doctors abroad for postgraduate courses. The first two doctors to be sent for three months to the UOK in 1937 were Dr. Ali Bedri (1903–1987, sent to Hammersmith, and Hussain Ahmed Hussain to Moorfields. Both lived in the international hostel in Andsley Gardens in London.

- **First Pharmacy Graduate from AUB**

Pharmacist Mokheir graduated from AUB in 1937. He started his career by opening Omdurman Pharmacy in 1937.

- **A Sudanese Pharmacist Opened the First Pharmacy**

. Pharmacist Ibrahim Gasim Mokheir who graduated from AUB in 1937, opened Omdurman Pharmacy in 1937.

- **First Pharmacists to Graduate Abroad**

Yousuf Bedri and Ibrahim Gasim Mokheir were the first pharmacists to graduate from AUB in 1937. On return to Sudan, Yousuf Bedri opted to continue his father's legacy and manage the Al Ahfad enterprise. Mokheir joined the private sector and opened Omdurman Pharmacy in 1937 as the first pharmacy opened by a Sudanese and the second in

Sudan after London Pharmacy, which G. Morhig opened in 1907.

- **No Intake for KSM**

No intake of medical students for KSM.

1938

- **The Chemical Laboratories Established**

- **Sudan Interior Mission Started Work**

When it was expelled from Ethiopia in 1938, Sudan Interior Mission was admitted to Suan and given a field of activity extending from the White Nile to the Ethiopian border. It took over missionary medical work in the Renk-Melut area from Sudan United Mission, acquired responsibilities of Melut Hospital and its subsidiary units, and opened dispensaries in Abaiyath, Doro, and Banjag.

- **No Students Graduated From KSM**

KSM did not graduate any students this year.

- **Medical Assistants Schools Renamed Medical Assistants**

In 1938 the assistant's name was renamed medical assistants (مساعد طبي).

- **The London Royal Colleges Granted KSM Partial Recognition**

In 1938 the Kitchener School was partially recognized by the royal colleges forming the London Conjoint Board. Consequently, graduates who had at least two years' hospital experience after qualification were eligible for admis-

sion to the final examination of the board (the MRCS LRCP qualification) on completion of one year's practice in a recognised hospital and medical school in the UK.

- **KSM Inspection Started**

Starting in 1938, visiting examiners inspected KSM.

1939

- **Public Health Ordinance 1939 Enacted**

On 31.8.1939, a new Public Health Ordinance 1939 was enacted to replace 1924.

- **School of Science, UOK, Established**

School of Science, UOK, Established resulting in raising study period to six years.

- **KSM Study Period Raised to Six Year**

KSM Study Period Raised to Six Year

- **KSM The Academic Year Raised to 6 Years**

After GMC established the School of Science, the KSM curriculum was adjusted, and the academic year, and hence the curriculum, raised to six years.

- **The Central Board of Public Health Replaced Central Sanitary Board**

In the Public Health Ordinance 1939, “Sanitary” was replaced by “Public Health.” Hence the Central Sanitary Board (CSB) was renamed the Central Board of Public Health (CBPH) in 1939.

- **Wellcome Chemical Laboratories Established**

In July 1939, the chemical laboratories in Khartoum were transferred to SMS, and the name of the laboratories was modified to the 'Wellcome Chemical Laboratories,' reflecting a new emphasis on the 'analytical' rather than the 'research' components. They then became part of the Research Service of SMS.^[258]

- **Mohamed Sherif Daoud Fights Endemic Diseases and Blindness**

Dr. Mohamed Sherif Daoud Suleiman was born in Wadi Halfa in 1914. He received his elementary and intermediate education in Halfa, secondary in Gordon Memorial College, Khartoum, and medicine in KSM. He graduated with DKSM in February 1939, immediately joined SMS, and worked as a house officer in the 'River Eye Hospital' for Eye in Khartoum. He was sent to fight yellow fever in the Nuba Mountains in 1941 and was the first Sudanese doctor vaccinated against this disease. After that, he worked as a medical officer in several regions of Sudan, starting with El-Obeid, Diling, Youbo River Hospital, Meridi, Juba, Yambio, Nimolig, Torit, Rumbaik, Yarol, Shambi, Lado, Berber, Wadi Halfa. He was assigned to fight sleeping sickness and leprosy in the southern region. He was sent for postgraduate training in Ophthalmology in London, the UOK, in 1955. He returned to the Eye Hospital, Khartoum, in 1959.

He was known for pioneering work in fighting endemic diseases and blindness, which he started with the help of the WHO.

Dr. Daoud started a survey of the 'River Blindness' in Bahr El-Ghazal (Wau), and the work extended east up to Yai. Then, in 1960, he started an experimental trial of treating this disease with a modified dose of Suramin, which had several side effects and complications, including death. However, this made Suramin acceptable, and the new mod-

ification became known as the ‘Sherif Regiment or Sudan Regiment.’

Later, an entomologist joined the Sherif team expected to fight the ‘black fly’ in the South and Abu Hamad. In 1960, he started surveying blindness in the northern province, surveying the etiology of blindness in that area, and then started a project to fight trachoma, which included awareness-raising, eye cleansing, and house-to-house treatment. Up until recently, this survey was extended to include all Sudan. The Nilain University granted Dr. Daoud an honorary Ph.D. Dr. Daoud died on 16 October 2005.

- **Pharmacy and Poisons Ordinance 1939 Enacted**

On 31.8.1939, the first pharmacy and medicines legislation was enacted. The **Pharmacy and Poisons Ordinance 1939** (PandP Ordinance) was enacted. The PandP Ordinance was essentially an abridged version of the British Pharmacy and Poisons Act. The new PandP Ordinance made the CBPH the drug regulatory authority under the Public Health Ordinance.

This Ordinance aims to improve pharmacy control and trade provisions in medicines and poisons. It provides for the licensing of pharmacists (registration), their business premises, and licensing of sellers of poisons.

The CBPH had the authority to register pharmacists and license private pharmacies and drug stores, while province governors were the licensing authority for Part 3 poisons, poisons not used in medicine (pesticides, industrial chemicals).

- **The Poisons Regulations 1939 Issued**

On 31.8.1939, the **Poisons Regulations 1939** (لائحة السموم لسنة ١٩٣٩) with its five schedules.^[259]

- **The Poisons Order 1939 Issued**

The Poisons Order 1939 (أمر قائمة السموم لسنة ١٩٣٩) was issued.

1940

- **WCL transferred to Shambat; Barracks Established**

In 1940, the Second World War circumstances dictated that the Gordon Memorial College buildings be temporarily evacuated. The Wellcome Chemical Laboratories were transferred to Shambat. GMC buildings were converted into military barracks.

- **Christian Mission in Sudan Started Operation**

By the 1940s, the Christian Missionary Society (CMS) operated three hospitals, seventeen dispensaries, two leprosy clinics, and five welfare centers and had eight qualified missionary doctors and eight nurses.^[260]

- **Central Medical Stores Started**

Since the 1940s, SMS has had its own Central Medical Stores (CMS).^[261] However, the stores were limited and housed partly in the eastern part of the present Directorate of Pharmacy offices, with some warehouses at Kilo 5 south of Khartoum.

CMS imported, stored, and distributed drugs, dressings, disinfectants, public health pesticides, medical laboratory supplies, medical gases, hospital instruments, and equipment to all public sector health facilities. Concerning drugs, until the mid-1960, CMS imported and supplied about 85% of the country's requirement of drugs and dressings and practically all laboratory supplies and medical equipment.

Before independence, all medical supplies for the public sector were ordered through Sudan Government Purchasing Agent Office (SGPAO) in London directly from well-known reputable suppliers, mostly British companies. In 1957, Assistant Director MOH, Dr. El-Hadi El-Nagar, became the first Sudanese to be appointed Chief of Division Medical Supplies Head of CMS.

For the first ten years, Prof. Abdel Hamid Ibrahim Suleiman^[262] as Government Analyst, was closely associated technically with CMS and, together with Chief Pharmacist Ibrahim Gasim Mokheir and other senior medical specialists, took part in revising drugs and dressings items in the CMS tender book in drugs and dressings tender selection committees, and in arrangements for the laboratory analysis of samples of drugs and dressings taken from delivered consignments in NCL.

- **Bilharzia Reached Alarming Levels**

In the 1940s, the first alarming reports of schistosomiasis spreading in the Gezira were published. By 1942, it was realized that *S. haematobium* was increasing, and *S. mansoni* was also common. The Stephenson survey of 1942 to 45 (1947) showed that urinary schistosomiasis was 21% in adults and 45% in children, with a range of 1 – 81%. It also showed that the minor canals were the source of the infection.^[263]

- **The First Yellow Fever Epidemic in Sudan**

The first recorded yellow fever epidemic in Sudan was reported in 1940. Then, it was considered a famous event in the annals of tropical medicine.

- **RCP Allowed KSM Graduates to Take the Membership**

In 1940, the RCP allowed KSM graduates to take the membership exam, on the production of a letter of recommendation from the director of the Sudan Medical Service.

- **Sudanese Doctors Joined Sudan Defense Force as Volunteers**

Five Sudanese civilian medical doctors who graduates of KSM joined the Sudan Defense Forces during the Italian Sudanese war in eastern Sudan during the Second World War. They were released to resume civilian life when the war was over. The doctors were:

1. Mohamed Abdalla El Awad (بكباشي طبيب)
2. Zein El Abdeen Ibrahim (يوزباشي طبيب)
3. Ibrahim Yasin (يوزباشي طبيب)
4. Amin Abdel Karim (يوزباشي طبيب)
5. Sayed Ali Abdel Karim (يوزباشي طبيب)

1941

- **No Intake for KSM**

No intake of medical students for KSM.

- **No Students Graduated from KSM**

KSM did not graduate any students this year.

1942

- **No Students Graduated from KSM**

KSM did not graduate any students this year.

- **First Private Clinic Opened by a Sudanese**

The first private clinic (to be opened by a Sudanese doctor) was opened by Dr. Mohamed Adam Adham (DKSM, 1938) in 1942 in Omdurman, and the second in Khartoum in 1951-2. No rates were set for patients. However, the able patients are expected to pay around 20-30 piastres and 30 piastres for home visits. The poor patients were treated free of charge.

1943

- **Graphic Museum Approved**

The graphic museum was approved in 1943, and the building began.

- **Robert Kirk Honored**

Because of his contributions to tropical medicine, Prof. Kirk was awarded the Chalmers Medal of Tropical Medicine and Hygiene in 1943.^[264] The medal was awarded to DJ Lewis in 1953.

- **Mansour Ali Haseeb Acquired Diploma of Bacteriology**

Mansour Ali Haseeb (1910–1973) graduated with the DKSM in 1937. In 1943, he gained the diploma of bacteriology from London. He specialized was thus the first Sudanese to specialize in bacteriology and parasitology.

1944

- **Nursing Courses and Entry Requirements Revised**

In 1944 the period of nursing training was extended to three years, and entrance requirements were specified as at least four years of schooling.

- **Graphic Museum Proposed**

The graphic museum was opened in 1944. Dr. H. A. Crouch, Assistant Director of Public Health, was responsible for the layout and arrangement of its acquisitions.

The museum was modeled similar to the Wellcome Institute and the School of Hygiene and Tropical Medicine in London. It was sited east of Stack Research Laboratories.

- **Poisons (Control of Sale Order) Issued**

In 1944, the **Poisons (Control of Sale Order)** was issued.

- **No Students Graduated from KSM**

KSM did not graduate any students this year.

1945

- **Library of University of Khartoum Established**

The University of Khartoum Library started in 1945 by acquiring 3000 volumes from the Higher Schools (later GMC) and 3000 volumes from the Civil Secretary library. Sudan Collection in this library is rich and includes bio-medical literature. In addition, the library keeps copies of medical theses accepted for higher degrees by the University of Khartoum and most of the theses presented to foreign universities on medical studies related to Sudan or by Sudanese.

- **Sudan Medical Corps Established**

In 1945, Dr Osman Abu Akar (أميرالاي) (graduate of KSM) was appointed the founding commander of the Sudan Medical Corps in replacement for the Sudan Defense Force.

- **Schools and Colleges, and GMC Formed KUC**

Kitchener School of Medicine (1924), together with the Law School (1926) and the Colleges of Veterinary Science and Agriculture (1938), were grouped in 1945 with Gordon Memorial College to form Khartoum University College under the umbrella of London University. The faculty was removed from the care of the Director of Education.

- **School of Hygiene Inaugurated**

The School of Hygiene was inaugurated in 1945. It offers a three-year training course to intermediate school graduates. In addition, it started a one-year training course for sanitary overseers drawn from mosquito-men, house-to-house inspectors in control of food stuffs, water supplies, hygiene of schools, communicable diseases, methods of disinfection, village sanitation, office routine, and storekeeping. In practice, sanitary overseers work as assistants to public health officers at the local village level and under their direct supervision.

- **No Intake for KSM**

No intake of medical students for KSM this year.

1946

- **Multi-Purpose Auxiliary Training School Started**

In 1946, multi-purpose medical assistants, laboratory assistants, sanitary overseers, and dispensers were opened in Juba Hospital and continued to provide their services to the southern region until 1959.

- **Postgraduate Scholarships Became Regular**

In 1946, postgraduate scholarships became regular, and this time, Dr. Hussain and Dr. Mansour Ali Haseeb were the lucky ones to be sent to London, the UOK, under the sponsorship of the British Council. Dr. Hussain specializes in Ophthalmology, and Dr. Haseeb in microbiology.

- **Greany Conducted A Comprehensive Study on Bilharzia in Gezira**

By 1946, Sudan Medical Service was concerned, and Greany conducted a comprehensive study of the disease in the Gezira.^[265] He found *Bulinus* and *Biomphalaria* in all irrigation canals in a density closely related to the weed growth. The infection rate in *Bulinus* was 1.2%, while *Biomphalaria* was 0.06 %. Snail control using copper sulfate was successful, and Greany advised its application twice annually.^[266]

- **London Royal Colleges Granted KSM Full**

Recognition

The London Royal Colleges granted KSM full recognition, and KSM diploma holders were enabled to sit for the MRCP and LRCP examinations.

1947

- **Health Visitors Training Began**

Health Visitor Training began in 1947. Candidates were selected from nurses, midwives, and staff midwives.

- **Workers Affairs Commission Founded**

Workers Affairs Commission (هيئة شؤون العمال) was founded in July 1947.

- **No Intake for KSM**

No intake of medical students for KSM.

- **No Students Graduated from KSM**

KSM did not graduate any students this year.

- **First Sudanese Doctor Acquired MRCP**

Dr. Abdel Halim Mohamed Abdel Halim was the first Sudanese to acquire MRCP in 1947.

1948

- **Abdel Halim Mohamed was the First Sudanese Physician**

Abd al-Halim Muhammad Abd al-Halim (1910-2009) graduated from Kitchener Medical School in 1933. He was the first Sudanese to acquire the Royal College of Physicians in London in 1948 and is thus known as (the Father of medicine in Sudan). He was awarded the Royal College of Physicians Fellowship in London in 1962 and was also the first Sudanese to obtain this degree. He was awarded an honorary doctorate in science from the University of Khartoum in 1965. He worked as a doctor in Khartoum Hospital from his graduation until 1947 and as director and head of the Department of Internal Medicine at Omdurman Hospital (1950-1953).

He was appointed chief physician at the Ministry of Health in 1953 and director of Khartoum Civil Hospital (1953-1956), during which he supervised the construction of the new Khartoum Hospital. In addition, he inaugurated several new specialties, including pediatrics, cardiology, kidney and orthopedics, the establishment of a blood bank, the Shaab Hospital for Chest Diseases, and the Dermatology Hospital. Abdel Halim Mohamed was a member of the Senate of the University of Khartoum since the University College of Khartoum was affiliated with the University of London, and he was the first president of the University Council in the year 1956. In addition, he was a member of the Scientific Council of the Khartoum College of Medical Sciences from its establishment in 2000 until his death.

He edited Al-Fajr magazine, took over the presidency of the Al-Mutamar newspaper for the alumni conference, and drafted the famous alumni memo in 1942. He was the first president of the Sudanese Medical Association from its establishment in 1949 to 1965. In 1924, He was established with Ahmed Youssef Hashem and Mohamed Ahmed Mahgoub (Al Hashemab Cultural Association).

In the October government, Abdel Halim Mohamed was the member and alternate president of the Sudanese Supreme Council of State. In addition, he chaired the Sudanese Football Association and was one of the founders of the Confederation of African Football.

Abdel Halim Mohamed was an example of a doctor committed to his professional ethics and intellectual who did public work, especially in the sports field, a good area. He discovered the Prince of Oud, Hassan Attia, and enrolled him in the Laboratory Technician School.

- **UN Declared**

Most UN organizations, especially the World Health Organization, stipulated in their laws and covenants that enjoying the highest levels of health is one of the fundamental rights of every human being, one of the innate rights linked to human nature because it is human. They are the rights that everyone has the right to enjoy without any discrimination based on color, gender, language, religion, political opinion, or any other opinion, his national or social origin, the amount of his wealth, or any other status, without any distinction between women and men. Everyone has the right to life, liberty, and personal safety, and all people are equal before the law. They have the right to enjoy equal protection from it without any discrimination, and they all have the right to equal protection against any discrimination. These rights are not granted from one to another and

are not a ruler or a government gift. On the contrary, they are inherent supplies for every human being.

Consequently, it is not for any party to prevent, detract from or violate it. In order to guarantee these rights and achieve their proper exercise, it was necessary to provide for them in clear and precise text in the country's constitution. Sudan adhered to international covenants in this regard and signed and even guaranteed them in its 2005 transitional constitution, which is commendable.

Article 25 of the Universal Declaration of Human Rights recognizes that: "Every person has the right to a standard of living sufficient to guarantee health and well-being for himself and his family, especially regarding food, clothing, housing, and medical care." This article also referenced that the state must take the necessary measures to ensure the enjoyment of all citizens and an adequate standard of living regarding food, clothing, housing, medical care, and necessary social services. Furthermore, articles IX and XII of the International Covenant on Economic, Social, and Cultural Rights refer to the right of everyone to access social security and enjoy the highest level. Therefore, physical and mental health is attainable. However, what do we mean by "decent standard of living" and "enjoying the highest standard?" Especially since citizens suffer from diseases that could have been avoided or cured if the state guaranteed adequate health care and suitable living conditions for all citizens.

The right to health is a clear example of the interdependence and indivisibility of human rights. It can be said that the enjoyment of an adequate level of health is essential, directly or indirectly, for the enjoyment of many other human rights recognized by international treaties. The adverse effects of not guaranteeing the right to enjoy an adequate level of health extend beyond the right to health itself, as this negatively affects the enjoyment of the right to participate in public life and provide care for the rest of the fami-

ly. It impedes economic, social, cultural, political, and civil rights.

Realizing the right to health on the ground has been a significant dilemma for the human rights community and health politicians alike worldwide. Achieving the highest levels of health requires providing the necessary resources and developing related measures and procedures such as establishing facilities, enacting laws, setting standards, and providing services. Of course, all these measures are insufficient, but the government must enjoy this right, be willing and working for it, and not waste all of its money on curative services. However, it must also strive to advance society's and the environment's health, protect people from epidemic and endemic and occupational diseases, fight them, and eradicate them as possible.

- **Central Nursing Council Established**

Central Nursing Council was established and entrusted with developing and coordinating both males and females throughout the country.

- **Specialization in Ophthalmology Sudanized**

In 1948, Dr. AR McKelvie retired to replace Dr. Hussain as the first Sudanese Ophthalmologist.

- **Tigani El-Mahi Specializes as First Sudanese Psychiatrist**

Prof. Tigani Mohamed El-Mahi (1911-1970) graduated from Kitchener School of Medicine in 1935. He obtained the Diploma of Psychological Medicine at the London Institute of Psychiatry in 1948 and was the first Sudanese and African to specialize in this field; hence, he was deservedly

named the father of Sudanese and African psychiatry. He established the first psychiatric clinic in Sudan in Khartoum North in 1950 and 1969 and became the first professor of psychiatry at the Faculty of Medicine, University of Khartoum.

- **Hussain A. Hussain was the First Sudanese Ophthalmologist**

Dr. Hussain Ahmed Hussain (1904-1987) was born on 14 November 1904 in Berber and died in Khartoum on 3 May 1987. Dr. Hussain was among the third KSM graduates who graduated on 14 January 1931. After graduation, he worked for two and a half years in Kassala and for a year in Gedaref before being transferred to Khartoum to establish Eye services.

- **Postgraduate Scholarships Became Regular**

In 1946, postgraduate scholarships became regular, and this time Dr. Hussain and Dr. Mansour Ali Haseeb were the lucky ones to be sent to London, the UOK, under the sponsorship of the British Council. Dr. Hussain specializes in Ophthalmology, and Dr. Haseeb in microbiology. In 1948, Dr. AR McKelvie retired to replace Dr. Hussain as the first Sudanese Ophthalmologist.

- **National Nursing Council Established**

National Nursing Council was established in 1948 to develop and coordinate the training of males and females all over the country. Since then, forty-two general auxiliary nurses training schools have been established. The graduates of these schools were considered approximately equivalent to the level of SRN in Britain.

- **Workers Trade Unions Act Enacted**

Workers Trade Unions Act (قانون نقابات العمال) was enacted in 1948.

- **Workers Compensation Act Enacted**

Workers Compensation Act (قانون تعويضات العمال) in 1948.

- **Workers And Employers Act Enacted**

Workers and Employers Act (قانون المخدمين والأشخاص المستخدمين) was enacted in 1948.

- **Workers Disputes Act Enacted**

Workers Disputes Act (قانون منازعات العمل) was enacted in 1948.

- **Workshops and Laboratories Act Enacted**

Workshops and Laboratories Act (قانون الورش والمعامل) was enacted in 1948.

- **The First Minister of Health Appointed**

Dr. Ali Badri was appointed the first minister of health in 1948. He stayed in the office until 1953.

- **The Advisory Council for Northern Sudan Formed**

The Advisory Council for Northern Sudan was formed in 1948.

1949

Liquid Air Company Established •

Before 1949 all medical gases used to be imported, stored, and distributed to hospitals by Sudan Medical Service (SMS) Central Medical Supplies (CMS). However, in 1949 Liquid Air Company was established and started producing medical oxygen locally in its plant in Khartoum, importing medical nitrous oxide gas in bulk, filling it in cylinders, and distributing it to hospitals through CMS. The medical gases were required to comply with British Pharmacopoeia or equivalent standard specifications and with British Standard Specifications in their packaging in steel cylinders, construction, shapes, colors, valves, and regulator fittings markings.

• Ministry of Health Replaced SMS

In 1949, the Ministry of Health (MOH) emerged to replace the SMS. Dr. Ali Bedri, one of the first seven graduates of Kitchener School of Medicine (KSM), was appointed the first Minister of Health (before independence).

During the first twenty years, several activities took place. The number of posts held by Sudanese doctors increased. The specialization policy was augmented, namely with the UOK. Sudanese doctors were appointed to the three assistant directors (hospitals, public health, and research) and senior surgeon posts. More hospitals of all types entered the service. More expenditure on health services. More training

- **Liquid Air Company Established**

Before 1949 all medical gases used to be imported, stored, and distributed to hospitals by Sudan Medical Service (SMS) Central Medical Supplies (CMS). However, in 1949 Liquid Air Company was established and started to produce medical oxygen locally in its plant in Khartoum and import medical nitrous oxide gas in bulk, fill it in cylinders and distribute it to hospitals through CMS. The medical gases were required to comply with British Pharmacopoeia or equivalent standard specifications and with British Standard Specifications in their packaging in steel cylinders, construction, shapes, colors, valves, and regulator fittings markings.

- **Abdel Hamid Bayoumi Specializes in First Sudanese Surgeon**

Mr. Abdel Hamid Mohamed Saeed Sayid Bayoumi (13 March 1911- 24 January 2004) is rightly the father of surgery in Sudan.^[267] Dr. Bayoumi was born in Merawi on 13 March 1911. He completed his elementary schooling in Merawi and secondary school in Khartoum before joining Kitchener School of Medicine (KSM) in 1934.

After graduation, he worked in Omdurman, Khartoum North, Port Sudan, and Torit, where he spent five years and learned the Baria language. He then worked in Abu Usher and Wau to land in 1945 in Khartoum as Surgical Registrar with Mr. Bartholomew, the Senior Surgeon.^[268]

In 1947, he was sent for postgraduate studies in the UOK, where he spent two years in Edinburgh, after which he acquired the FRCSE and later the FRCS Glasgow. He returned to Sudan in 1949 to take up the Omdurman surgeon post vacated by Mr. Bartholomew. In 1953, he was promoted to senior Surgeon and lecturer in surgery in MOH in place of Mr. Bartholomew, thus becoming the first Sudanese Senior Surgeon.

Before retiring, Mr. Bayoumi worked as a surgeon in MOH for 30 straight years (1935-1965). In 1984, he was made Professor in the Faculty of Medicine, University of Khartoum, and worked until 1999. He made substantial contributions to anatomy and expanded the department considerably.

Mr. Bayoumi's repertoire of surgical operations was limitless. He would start his list with tonsillectomy, thyroidec-tomy, or cholecystectomy, then LSCS, ending the list with setting bones. He used to give his anesthetics with the help of the theatre attendants.

Mr. Bayoumi laid down the foundation of Sudanese surgery. He helped several surgeons train and endorse orthopedic surgery's budding as a separate discipline.

From May to June 1949, the laboratories were moved from Shambat to the first floor of Al Nahr Hospital (current Federal Ministry of Health buildings).

From 1949 onwards, Omdurman Medical Assistants Training Schools intake was from the ranks of certified male nurses with five years of experience.

- **Dismantling of WTRLK Continued**

From May to June 1949, the Wellcome Chemical Laboratories were transferred from Shambat to the first floor of the left wing of the River Hospital (current FMOH and WHO main buildings), i.e., on top of the leading administration of offices.

Organization of research under SMS

The Director of SMS had two Assistants. One for Administration and the other for research.

The Assistant Director for Research was responsible for Stack Medical Laboratories, Wellcome Chemical Laboratories, and Medical Entomology Laboratory.

- **School of Dispensers Developed**

After 1949, the school of dispensers was confined to those with secondary school certificates and good English and arithmetic knowledge. A three-year course was designed, where students spent their first year studying general science at Gordon Memorial College, followed by two years at the School of Dispensers at KCH. The training was conducted by the KCH Pharmaceutical Registrar and later by the Senior Pharmacist as part of his duties. The course included practical training in hospitals during vacations.

- **Sudan Medical Association Founded**

Sudan Medical Association (الجمعية الطبية السودانية) was founded in 1949 as the academic body and the bargaining front for all Sudanese doctors. Abdul Halim Mohammed was the first president of the Sudan Medical Association (1949-1964).

- **First Workers Conference Held**

First Workers Conference (مؤتمر عمالي) was held in Atbara in the period 5-8 1949 to revisit the Trade Unions Act of 1948, its regulations, and other workers' acts.

- **No Students Graduated from KSM**

KSM did not graduate any students this year.

- **Clinic for Nervous Disorders Established**

In 1957, Dr. Tigani El-Mahi established the Clinic for Nervous Disorders in Hai El-Amlak (حي الأملاك) in Khar-

toum North. In this clinic, Tigani laid the foundations of psychiatry and the program.

- **WCL Housed In A Hazardous Place**

Earlier in 1949, the WCL was hosted on the first floor of the Ministry of Health building. However, because of their wooden verandas and roofs, these laboratories lacked space and natural fire hazards.

- **Medical Assistants School Accepts Male Nurses**

From 1949 onwards, Omdurman Medical Assistants Training Schools intake was from the ranks of certified male nurses with five years of experience.

1950

- **El-Baghir Ibrahim was the First Sudanese to Obtain DO**

Dr. El-Baghir Ibrahim Abdel Magid was born on 1914 in Berber. He graduated from KSM in 1936.

In 1950, Dr. El-Baghir was the first Sudanese to obtain the Ophthalmology (DO) diploma from London University and the third Sudanese doctor to join this specialty in SMS. Dr. El-Baghir became the Senior Ophthalmologist in the Ministry of Health and Director of the Eye Hospital from 1962-1965).

With the help of the Lions Club, he established the first Institute for Teaching of the Blind (معهد النور) in Sudan. The buildings of this institute are situated east of the National Cinema in Khartoum North. Dr. Baghir was the first director of this institute and chairperson of the national committee to care for the blind in Sudan. Dr. Baghir died in 1978.

- **Sudan Association for Prevention of TB Established**

In 1950, Dr. Sherif, and the wife of the late Dr. Labib Abdalla (the pioneer Sudanese Paediatrician), among others, founded the Sudan Association for the Prevention of Tuberculosis to support the domiciliary program. The association's main objective was to care for TB patients and their low-income families. The association, Sudanese Red Crescent, and the Red Cross established a TB rehabilitation center for cured patients. In addition, the Association conducted social surveys for patients, supported them finan-

cially until they were cured, and enrolled them in the appropriate vocational training program (sewing, handcrafts).

- **Psychiatric Services in Sudan Inaugurated**

The Mental Health Services in Sudan were inaugurated in 1950. Prior to that, there had been no mental health institutions of any kind in the country. In that year, a community clinic was opened in Khartoum North to assess the type-extent of psychiatric morbidity in the country, developing the methodology and techniques appropriate to the socio-economic-cultural background and acting as a spearhead for future mental health development eventually.

- **KSM External Examiners Included President of RCP**

In 1950, Lord Brain (1895–1966), the President of the RCP was part of the external examiners in KSM finals.

1951

- **Abdullah O. Abu Shamma, First Public Health Specialist**

Dr. Abdullah Omar Abu Shamma graduated from Kitchener School of Medical on January 1, 1933, as part of the fifth batch of graduates, which included: Hadi Al-Nugr, Ahmed Bukhari, Abdul Aziz Muhammad Ahmed, Muhammad Ahmed Ali, Bashir Abdul Rahim, Zaki Mustafa, Abdul Halim Muhammad, and Muhammad Hassan.

Dr. Abu Shama was the first Sudanese doctor to work in Equatoria Province in 1934 and thus the first Sudanese to work in areas south of Kosti. He was promoted to medical inspector in 1940, a position rarely held by a Sudanese. In 1941 he held the position of assistant medical inspector for the health of Khartoum.

In 1948, he was sent to Britain to specialize in public health, and he received a DPH degree in 1951, making him the first Sudanese to obtain this degree, after which he became an inspector for Khartoum's health. After that, Dr. Abu Shamma was transferred to the Blue Nile to serve as the area health inspector in 1953, replacing the British doctor. During his time in the Blue Nile and the irrigated Gezira region, Dr. Abu Shamma planned to eradicate schistosomiasis-carrying snails from the Gezira project. He also introduced the services of mobile units to treat (leprosy), which became a public policy in Sudan.

In 1954, Dr. Abu Shamma was transferred to Khartoum to be an assistant to the director of hospitals and a few months

later to become deputy director at the Ministry of Health until 1962 and then director of the ministry.

Dr. Abu Shamma was known in the departments of the World Health Organization, and he was a member of its specialized committees; then, he became deputy chairman of the Executive Board of the World Health Organization, and it was said that he was known to health politicians in more than 120 countries at the time.

- **Department of Biochemistry Established in FOM, UOK**

Prof. Dean Smith established the Department of Biochemistry in FOM, UOK

- **Second Private Clinic Opened by a Sudanese**

The second private clinic was opened by Dr. Mohamed Adam Adham (DKSM, 1938) in Khartoum. No rates were set for patients. However, the able patients are expected to pay around 20-30 piastres and 30 piastres for home visits. The poor patients were treated free of charge.

- **Medical Assistants Training School Curriculum Lengthened**

In 1951, the Medical Assistants Training School course was increased from one year to 18 months.

- **Bakhit M. Omar was the First Doctor to Acquire FRCS, Edin.**

Bakhit Muhammad Omar won the Edinburgh Fellowship in surgery in 1951. He was thus the first Sudanese to acquire this degree.

- **KSM Incorporated Into the University College of Khartoum**

In September 1951, KSM and the Gordon Memorial College were amalgamated into the University College of Khartoum, and KSM officially became the Faculty of Medicine in the University College.^[269]

- **First MOH 10-Year Plan Formulated**

In September 1951, the Ministry of Health formulated a ten-year plan (1951-1961) to expand and consolidate health services.

- **No Students Graduated From KSM**

KSM did not graduate any students in 1951.

- **KSM Annual Prize Established**

In its third Council meeting on 21 November, KSM established Kitchener Medical Prize for the student with the best academic performance in the final examinations. No winners in 1951.

- **Local Government Act 1951 Enacted**

In 1951, the Local Government Act 1951 was enacted. The rural and civil councils represented the local government responsible for immediate service delivery, including

health. Between 1951 and 1960, the health sector was managed according to this Act.

- **Medical Assistants School Renamed**

In 1951, the Medical Assistants Training School course was lengthened from one year to 18 months.

- **Department of Anatomy, FOM, UOK Established**

In 1951, the Department of Anatomy, FOM, UOK, was established. Professor Harris of Cambridge University was the first Head of the Department.

- **Department of Psychiatry, FOM, UOK Established**

In 1951, the Department of Psychiatry, FOM, UOK, was established. Professor El-Tigani Mohamed El-Mahi was the first Head of the Department.

- **Department of Obstetrics and Gynaecology, FOM, UOK Established**

In 1951, the Department of Obstetrics and Gynaecology, FOM, UOK, was established. Professor Daly was the first head of the department. Dr. Ahmed Abu El Fotouh Shandall was the first Sudanese Head of the Department.

- **Department of Community Medicine, FOM, UOK Established**

In 1951, the Department of Community Medicine, FOM, UOK, was established. Professor Anis Mohamed Ali El Shami was the first head.

- **Department of Medicine, FOM, UOK Established**

In 1951, the Department of Medicine, FOM, UOK, was established. Professor H. Morgan was the first head.

- **Department of Biochemistry and Physiology, FOM, UOK Established**

In 1951, a Department of Biochemistry and Physiology, FOM, UOK, was established. Professor Dean Smith was the first Head of the Department.

- **Department of Physiology, FOM, UOK Established**

In 1951, a Department of Physiology, FOM, UOK, was established. The Paediatrician, Dr. Coles, used to teach physiology.

- **KSM was Part of the MOH**

Until this year, KSM was part of the Ministry of Health.

1952

- **KSM Kitchener Prize of Medicine Barred**

No winners for this prize in 1952.

- **First Female Doctors Graduated**

Dr. Khalda Zahir El-Sadati and Dr. Zarwi Sirkisian were the first two female Sudanese to graduate as medical doctors at KSM in 1952.

- **Ibrahim M. El-Moghraby first Sudanese to Obtain FRCS England**

Mr.Ibrahim Mohamed El-Moghraby (1913-1993), DKSM, D Chir., D Orth., FRCS, FICS, Ph.D. (Hon) had his secondary education at Gordon's Memorial College, Khartoum, and joined Kitchener School of Medicine and qualified at the age of 21 in 1935. He was top of his class throughout his school career and won the Anatomy and Physiology prizes in 1932. He passed his final examinations with distinction and won the Waterfield prize in Surgery and the school prize in Medicine.

He joined Sudan Medical Service (SMS), and after finishing his house jobs at Khartoum Civil Hospital, he was posted to several districts of Sudan. As a Medical Inspector in Wadi Halfa, he conducted the Gambia Mosquito Campaign and fought typhus.

In 1939, Dr. Moghraby was chosen as the first Sudanese Surgical Registrar and was trained by the late Mr.T.S. Mayne.^[270] From 1946 to 1949, he left for Egypt on his own

and attended postgraduate courses at Kasr El-Aini Medical School, King Fouad 1 University, Cairo. He obtained a Diploma in General Surgery and a Diploma in Orthopaedic Surgery. He then trained at his own expense in the UOK for the Surgical Fellowship at Guy's, St. Mark's, the National Orthopaedic and the Marsden Hospitals, and the Institute of Urology, London.

In 1952, he became the first Sudanese and the first graduate of KSM to obtain the English Fellowship. He participated in research projects on Metabolic Response to Trauma, and Fluid Balance in Prostatectomy Patients at the Royal Infirmary, Liverpool, under Professor Charles Wells. On return to Sudan in 1953, he was posted to Wad Medani to become the first Sudanese Consultant Surgeon to take over the Blue Nile Province from the British.

He rapidly developed the Wad Medani Hospital, which became the leading surgical center in Sudan. Under his leadership, it gained the recognition of the Royal Colleges for training for the final Fellowship examinations. In addition, he gained nationwide fame for treating football injuries and pioneered modern orthopedic surgery. He wrote extensively on the surgical diseases of Sudan and became an authority in the surgery of massive Pyloro-duodenal Fibrosis (Syn. Shaigi Syndrome), Bilharziasis, and Portal Hypertension in Sudan. He also researched Mycetoma (Madura foot) in collaboration with the London School of Tropical Medicine and Hygiene. The research was supported by a grant from the MRC (UOK).

In 1965, he was transferred to Khartoum as Senior Surgeon at the Ministry of Health. A post he held until his retirement in 1969. Mr. Ahmed Abdel Aziz Yacoub succeeded him.

Among other achievements as Senior Surgeon, he championed the cause of the Omdurman Military Hospital until it gained recognition for the final Fellowship training in general surgery and ophthalmology by the Royal College. He

then taught undergraduate and post-graduate students in surgery, anatomy, and pathology. In addition, he was anatomy, pathology, and surgery examiner for the MB Diploma and the local Masters in Surgery (MS), Khartoum University.

He was instrumental in the compilation and production of the first issue of the Sudan National Formulary. He was the President of the Sudan Association of Surgeons for two terms of office. He was a founder and first president of the Sudan Section of the International College of Surgeons (Chicago) in 1972. He was awarded an honorary Ph.D. from Gezira University in 1989.

He founded El-Nilein Trading Agencies to import pharmaceuticals and surgical instruments and equipment. He also had notable activities and contributions outside the medical field. He was the chairperson and member of the board of directors of some of the leading companies of Sudan (The General Insurance Company, Sudan Plastics, the Nile Cement Company, and National Footwear).

- **CMS Moved to Khartoum South**

In 1952, the CMS was moved to its new and present premises in Khartoum South. Until then, the CMS Director was a British medical doctor, and his 'number 2', the Controller of Stores, was a non-medical British official.

- **FOM's Visitors Book**

An exciting tradition was established by the Department of Physiology, FOM, UOK. It is used to photograph all third-year students to complete the first MB successfully. Photographs of all batches throughout the years were displayed along the department's corridors. Unfortunately, this photo gallery disappeared, and currently, the corridors of this de-

partment are barren; the photos were lost, and the tradition was discontinued! We are left with no more than memories.

- **Robert Kirk was Appointed the First Professor of Pathology**

In 1952, Robert Kirk was appointed the first Sudanese Professor of Pathology at the University College of Khartoum.

- **Robert Kirk Opened the First Skin Clinic in KCH**

Before joining the Faculty, Prof. Robert Kirk was interested in parasitological and pathological aspects of dermatology. Professor HV Morgan introduced dermatology teaching and set up the first skin clinic in Khartoum Civil Hospital in 1952. Professor El-Hassan attended those clinics as a house physician and later discussed the pathology of the week's cases, showing the microscopic slides; this was the basis for Prof. El-Hassan's interest in dermatology. He believes this discipline demands clinical experience and pathology by practicing dermatologists and pathologists. Working with Prof. Kirk and Prof. Morgan, Dr. Abdel Moneim Wasfi developed an interest in dermatology and helped establish the discipline in the Ministry of Health.

- **KSM Included in Gordon Memorial College**

KSM Integrated into Gordon Memorial College and renamed Khartoum University College.

- **Ali Bedri Elected RCP Fellow**

In 1952, Dr. Ali Bedri was the first Sudanese to be elected fellow of the RCP.

- **Mansour Ali Haseeb Acquired Diploma of Bacteriology**

Mansour Ali Haseeb (1910–1973) was appointed the first Sudanese director of research in Ministry of Health in 1952.

1953

- **Laboratory Technicians' Education Started**

Training of Laboratory Technicians (فني معامل) with good primary education started in 1953.

- **Ophthalmic Assistants School Started**

Ophthalmic Assistants School was started with a two-year course in 1953.

- **Sudan Medical Journal Established**

In 1953, the Sudan Medical Journal was established as the official organ of the Sudan Medical Association to encourage research and diffusion of medical and scientific knowledge among doctors and research workers in Sudan. Professor Mansour Ali Haseeb was elected the first Editor-in-Chief.^[271]

- **First Sudanese Senior Physician Appointed**

Abdel Halim Mohamed Abdel Halim was appointed the first Sudanese Senior Physician in 1953.

- **First Sudanese Director of Khartoum Civil Hospital Appointed**

Abdel Halim Mohamed Abdel Halim was appointed the first Director of Khartoum Civil Hospital in 1953. He suc-

ceeded Dr. Buchanan, who succeeded Dr. Cruickshank in this position in 1948.

- **DJ Lewis Honored**

Because of his contributions to tropical medicine, DJ Lewis was awarded the Chalmers Medal in 1953.

1954

- **KSM Kitchener Prize of Medicine Resumed**

Ali Khogali Ismail won the KSM Kitchener Prize of Medicine, shared with Yousif Mahadi.

- **Dismantling WTRLK Continued**

In 1954, the mineral analysis services were transferred to the newly established Geological Survey Department laboratories.

- **WHO Consultant Advised on Pharmacy Education**

On several occasions, some dispensers applied to the Central Board of Public Health (CBPH) (which was the pharmacist's registration authority before the establishment of the Sudan Medical Council) to be registered as pharmacists under the Pharmacy and Poisons Act of 1939 and hence to be granted licenses for private pharmacy practice. However, the CBPH rejected those applications as it only recognized registered and licensed pharmacists who graduated from universities recognized by the Board.

In 1954 the Dispensers Syndicate collectively demanded on behalf of all dispensers that the CBPH recognize dispensers as equivalent to qualified pharmacists and hence be granted licenses for private pharmacy practice. The CBPH reaffirmed its commitment to comply with internationally recognized standards of the profession of a pharmacist and hence license to practice. MOH then decided to request the

World Health Organization (WHO) to send a consultant knowledgeable in pharmacy education and training to assess the curriculum, facilities, students, and graduates of the School of Dispensers and whether the standard of dispensers qualifies them to be registered and licensed to practice as pharmacists.

WHO, in 1954, selected Prof. Mohamed Mohamed Motawea, a Professor of Pharmacology and Dean Faculty of Pharmacy at Cairo University, for the assignment. In his report, the consultant made the following remarks:

1. The School of Dispensers in KCH is only one room for theoretical and practical teaching.
2. The equipment and instruments available in that room are rudimentary and few.
3. The teaching staff is only one part-timer who is the Chief Hospital Pharmacist.
4. The curriculum lacks many pharmaceutical sciences, which are necessary for qualifying pharmacists.
5. Previous students who were not secondary school graduates could not absorb pharmacy lessons.

The consultant went on to make the following recommendations:

1. The School of Dispensers should be closed immediately. It does not serve any useful purpose and further aggravates the dispenser's problems.
2. A faculty of pharmacy should immediately be established in the University College of Khartoum.
3. In the meantime, and till the faculty of pharmacy is established, selected students can be sent to study pharmacy abroad.
4. In order to assess the standard of present dispensers to know whether any one of them might be eligible for registration and licensing, all these dispensers should sit for an examination conducted by appropriate examiners from the University College of Khartoum.

MOH endorsed all the recommendations. The CBPH, on 16 January 1955, endorsed the recommendation regarding the licensing examination for all dispensers. Accordingly, an examiner's board was formed.

Only ten dispensers sat for the examination conducted from 3 to 6 December 1955 and all failed. The Examiners board, in their report, made the following remarks:

1. When setting the examination, the examiners set a minor standard necessary for practicing pharmacy, emphasized practical aspects, avoided setting high standards in chemistry and pharmacology and gave the examinees a wide range of questions.
2. The examination was simple, clear, and straightforward, and anyone with average knowledge of pharmacy will not make any mistake, yet the examiners were surprised by the poor performance of all examinees.
3. No one of the dispensers who sat for examination could be considered a standard that would qualify him to practice or be a pharmacist.
4. Nevertheless, three of those examined may qualify in the future if they get appropriate teaching and training.

That examination ended the dispenser's demand for licensing as a pharmacist.

It is also noteworthy that MOH seriously pursued implementing WHO consultant recommendations regarding the establishment of the faculty of pharmacy and sent selected undergraduate students to study pharmacy and qualify as graduate pharmacists abroad, as mentioned below.

- **First Sudanese Graduate Pharmacist Appointed in MOH**

Omar Taha Al Gabbani was the first Sudanese graduate pharmacist appointed to MOH in February 1954. He

worked first in Juba to replace the Lebanese pharmacist who evacuated the post due to Sudanization. Then, in 1955 he replaced (Sudanize) Lebanese Pharmacist Wadie Shuqair in Khartoum Civil Hospital.

- **Quarantine Act 1954 Enacted**

The new Sudanese Legislative Assembly enacted the Quarantine Act in 1954. Through this first legislation, Sudan adopted the International Sanitary Regulations.

- **First Minister and Under-Secretary of Health Appointed**

In 1954, Dr. Mohamed Amin El-Sayid was appointed as the first Minister of Health in independent Sudan, and Dr. Ahmed Ali Zaki was appointed the first Sudanese under-secretary.

- **Robert Kirk Appointed KSM Dean**

In October 1954-March 1955, Robert Kirk was appointed Dean of the Medical School.^[272] In his post, he was succeeded by Dr. Mansour Ali Haseeb, the first Sudanese doctor to join SRL, as the assistant director of research.

- **Abdel Gadir H. Ishag Obtained DO**

Dr. Abdel Gadir Hassan Ishag obtained his DO in the UOK in 1954. He worked as an ophthalmologist in Omduram Civil Hospital, where he established an emergency department for eye diseases.

As Senior Consultant Ophthalmologist for MOH, he spread eye services in Wau, El-Fashir, El-Dueim, Sennar, Shendi, Gedaref, and Dongola. In addition, he started upgrading

services in the Eye Hospital by introducing the Orbit Clinic, Orthoptic Clinic, and Clinic for Contact Lens.

He started a diabetes clinic with the help of Professor Nasr El-Din Ahmed Mahmoud. He also gave special attention to training paramedical cadres and sent refractionists to the UOK for training. In addition, he supported postgraduate training, which started in 1978. However, he mainly kept on medical ophthalmology and sent the registrar to work with Professor Daoud Mustafa.

Dr. Abdel Gadir was the person who gave exceptional support and established classes to fight adult functional illiteracy among hospital staff irrespective of their worksite. As a result, illiterate workers were taught reading, writing, and vocational training.

- **School of Dispensers Closed**

In 1954 the School of Dispensers was closed, but two years later, the school resumed its activities and conducted a comprehensive two-year course.

- **The Students Medical Society Established**

The Students Medical Society (later association) of the Faculty of Medicine, University of Khartoum, was established. Mohamed Ahmed Gabani was elected the first president.

1955

- **Sudan Medical Council Ordinance 1955 Enacted**

According to the provisions of the Autonomy Act, the Medical Council Ordinance was enacted in 1955 by the Sudanese Parliament. However, for various reasons, the Council was not formed until 1968.

- **Kitchener School of Medicine Renamed**

Kitchener School of Medicine renamed the Faculty of Medicine, University of Khartoum

In 1955, Kitchener School of Medicine was renamed Faculty of Medicine, University of Khartoum.

- **No Students Graduated from KSM**

KSM did not graduate any students in 1955.

- **MOH, Central Information Unit, Formed**

In 1955, a central information unit was formed, which later developed into the National Health Information Center. Candidates are selected from experienced nurses.

- **First Sudanese Pharmacist Appointed in KCH**

In 1955, Omar Taha Al Gabbani replaced (Sudanize) Lebanese Pharmacist Wadie Shuqair in Khartoum Civil Hospital.

- **Sudan Joined WHO**

Sudan joined the WHO in 1955 as an associate member and a full member in 1956 when the country achieved complete independence. The admission to the international arena ushered in a series of WHO and other UN agencies-assisted projects.

- **Medical Corps Founded**

In 1955 the Medical Corps of the Sudanese Army was formed but remained administratively a part of the Ministry of Health, and its commanding officer continued to be responsible to the director and Minister of Health till 1958.

- **Snail Control and Use of Copper Sulphate Started**

By 1955, successful trials of snail control in the irrigation canals were concluded, and the WHO supported a massive campaign. As a result, from Nov 55 to May 56, the Sennar reservoir and the irrigation system were treated with copper sulfate, carefully planning measures against re-infestation.^[273]

- **Bilharzia Research by Sudanese Scientists Started**

Documented research on bilharzia by Sudanese scientists started around 1955 when H. Sharaf El-Din and El-Hadi El-Nagar attempted to control transmission and snail intermediate hosts and cover the different features of the disease and its control.^[274]

- **Mollusciciding Applied**

In a pilot control trial, H. Sharaf El-Din and El-Nagar 1955 recommended weeding of the irrigation canals use of copper sulfate in the canals of the Gezira area (5,000 km) at an optimum initial concentration of 30 ppm followed by a maintenance dose of 0.125 ppm as a chemical barrier (mechanical traps) at the heads of the minor canals.

1956

- **School of Dispensers Resumed Work**

In 1956-7, the school resumed work, and the course was extended to three years, and the curriculum stressed the teaching of practical dispensing and pharmaceuticals.

- **MOH Applied to Construct WCL**

In 1956, MOH applied to include the construction of WCL new buildings in the 1957/58 Government Building Program in the area allocated between the Faculty of Medicine, University of Khartoum, and the present building of the Faculty of Pharmacy on Palace Avenue.

The new building was planned to accommodate beside the WCL the Medical Entomology and the Schistosomiasis Departments, which were in Wad Medani, to constitute the proposed Medical Research Institute (MRI) as advocated by Dr. Satti.

- **Khartoum Nursing College Established**

Khartoum Nursing College was established in 1956 with the help of WHO.

- **KUC Became the University of Khartoum**

In 1956 Sudan became an independent republic, and the Khartoum University College was renamed the University of Khartoum. Thus, it became the first national university.

When the Sudanese parliament conferred full university status on UCK, KSM was made a faculty and named the Faculty of Medicine, University of Khartoum (FOM, UOK). Graduates were granted MB BS instead of DKSM.

- **Abdel Hamid Ibrahim First Sudanese Chemist**

Professor Abdel-Hamid Ibrahim Suleiman, Research Professor and National Consultant for Drug Affairs, Federal MOH, is one of Sudan's most outstanding scientists and civil servants who have served his country in health and other public fields with distinction and dedication.

Prof. Ibrahim is a civil servant *par excellence*. He has more than 60 years of continuous service in the Sudan Government, recognizing his competence and integrity. During these years, Prof. Ibrahim has rendered exceptional services to the country and has made many outstanding achievements. He has planned, organized, managed, implemented, contributed to, and influenced many significant health policies, plans, events, and achievements in many fields and in particular in chemical laboratory services, environmental health regulation, quality control of foods, drugs, community water supply and effluents, forensic science and toxicology, environmental contaminants, commodity standardization and specifications, health legislation, scientific consultations and studies, and in research and training.

Throughout the last five decades, he has been an undoubted authority in several fields of health. His vast experience, depth, and knowledge about everything related to health made even closer associates mistake him for a medical graduate. He knows enough about health legislation, rules, regulations, and standards that it would be unwise to write on these matters or make any amendments without his consultation. Whatever he contributes in these fields will likely be highly informative and authoritative. He has always been the trusted guide from whom help, advice, and direc-

tion are sought by all levels of personnel in health and other public and private sectors.

In the prevailing precarious milieu, obtaining accurate information in health management became difficult. Prof. Ibrahim functioned literally and practically as a repository and living database of health information. His enormous resources were handy. He passed others reliable knowledge and provided the institutions with a steady flow of accurate information.

Prof. Ibrahim has been an outstanding counselor and teacher. He is highly organized, with a sharp memory despite the inevitable memory lapses in a man approaching eighty; he is always available for students to meet and talk to without formalities or protocols. Whoever asked him obtained good advice, and he benefited from the association. His answers are ready, and his advice is usually sound. Moreover, he has never been patronizing or snobbish in passing his knowledge or advice on to others.

Throughout years of personal contact with Prof. Ibrahim, we can testify that, in addition, he has proved to be a reliable sounding board, offering a shrewd second opinion and oft-needed emotional and moral support. He is content, humble, and honest and his ability and willingness to share what he has with others is unparalleled. He has provided his expertise and wisdom to less experienced individuals to help them advance their careers, enhance their education, build their capabilities, or assist them in efficiently performing the job. In helping others grow, he probably sees this as a scientific obligation and a social imperative. After all, the young faces he sees today are the faces of the workforce and leaders of tomorrow. Moreover, while preparing this work, Prof. Ibrahim gratefully acknowledged his older and younger colleagues' help, support, and contributions to his achievements.

Prof. Ibrahim was born in Khartoum on 31 May 1929. His outstanding educational career included getting third place

in the national competitive intermediate schools' examination in December 1942 to enter the Omdurman Secondary School and Grade One Cambridge School Certificate examination in December 1946 with seven distinctions and two credits (a national record at the time).

The following incident was destined to change his career. As his interest was to become a medical doctor, he joined the biological section of the School of Science of GMC, where students spend two years before applying to join KSM. In December 1948, the class sat for the London Intermediate examination, which only two students passed, Abdel Hamid Ibrahim and Amin El-Tayib Abdel Magsoud. GMC decided to keep both students in the School of Science against their will to sit for the London B.Sc. examination in Science in December 1950; this was necessary for the affiliation of GMC to London University as a university college. Nevertheless, he reluctantly remained in the School of Science, sat for the GMC Diploma examination in December 1949, and was awarded a Diploma in Science (with Distinction).

In December 1950, Prof. Ibrahim sat for the London B.Sc. General Degree examination in Science (Chemistry, Zoology, and Botany) was conducted for the first time in GMC in Khartoum. He passed with Second Class Honours. Thus, Prof. Ibrahim and his colleague were the first locally examined Sudanese awarded a London University B.Sc. degree. In 1952, Prof. Ibrahim proceeded to the United Kingdom, awarded a B.Sc. Special Honours Degree in Chemistry with First Class Honours from London University in 1954, M.Sc. (London) in Chemistry of Foods and Drugs and the Diploma of Imperial College of Science Technology, London (D.I.C.) in Chemistry of Food and Drugs, both in 1956. In addition, Prof. Ibrahim attended many instruction and training courses in diverse subjects and analytical skills needed for the work of the Wellcome Chemical Laborato-

ries in the United Kingdom, USA, Egypt, and other European countries.^[275]

- **The First Pharmacist Joined MOH in Khartoum Civil Hospital**

After independence, the top pharmacy post in Sudan was the Chief Pharmacist of Khartoum Civil Hospital. The first Sudanese to fill the post was pharmacist Ibrahim Gasim Mokheir in 1956-57. After that, the hospital pharmacist's office was always in the hospital pharmacy building.

- **Dar El-Shifa Private Hospital Established**

Dr. Abdel Hamid Salih Abdel Gadir established Dar El-Shifa as a private hospital in Sudan.

- **Sudan Medical Corps Founded**

The Sudan Medical Corps (السلح الطبي) was founded as a unit in the Sudanese Armed Forces on February 1956.

- **First Military Hospital Established**

The first Military Hospital was established in the current University of Khartoum barracks (الإسلاق الشمالي).

1957

- **Kober Forensic Institute Established**

In a collaboration between the Psychiatry Department, Ministry of Health, and Prisons Department in the Ministry of Interior, Kober Forensic Institute started admitting psychiatric patients and by doing psychiatric in-patients are officially accepted.

- **First Teaching Assistant, Department of Physiology, FOM, UOK Appointed**

Dr. Ali Khogali Ismail was appointed the first teaching assistant in FOM, UOK.

- **First International Drug Tender Made**

The first international drug tender for a two-year supply of drugs and dressings was made in 1957.

- **Ali Badri Described Medical Services**

In his introduction to Herbert Squires's book (Medical Services in Sudan, An Experiment in Community Medicine), Dr. Ali Badri said in his book, published in 1957, that medical services in Sudan were among the most efficient. Everyone who has contributed to the foundations of this service is entitled to be proud as he recalls the memories of those good days. They all had the right to be included in the pages of history.

- **Julian Taylor Joined UOK**

Professor Julian Taylor (26 January 1889 - 15 April 1961), CBE, MS, FRCS, Hon. FRACS, of the University College Hospital, London, was a specialist in neurological surgery, Senior Surgeon at University College Hospital, a former Vice-President of the Royal College of Surgeons, and later Professor of Surgery at the University of Khartoum.

Professor Taylor joined the University of Khartoum in 1957 as a Professor of Surgery. He pioneered the development of surgery in Sudan, inspired and helped several Sudanese become surgeons, and arranged for Mr. Ahmed Abdel Aziz for training in University College Hospital, London. In 1960, he persuaded the Royal College of Surgeons of England to establish a yearly examination for the Primary Fellowship held in Khartoum. Successful candidates, whose percentage is high, work for a year as registrars in Khartoum Civil Hospital and then come to England for further training and sit their Final Fellowship. Professor Taylor was the first surgeon to start a scheme of subspecialization in Sudan. This scheme was expanded by Professor Nicholls, who replaced him in Surgery at Kitchener School of Medicine. A Julian Taylor Prize has been established by public contribution in his honor.

- **Abdel Hamid Ibrahim was Appointed the Government Analyst**

The post of Government Analyst (GA) (or Government Chemist as previously called in the United Kingdom and some other countries), which Prof. Ibrahim filled for over 26 years (excluding the five years of his secondments), was one of Sudan's civil service's most highly esteemed posts. As GA was the State consultant and a legally recognized expert in all technical matters within the duties and responsibilities of the WCL (since 1962 called the NCL), he headed and directed. It is appropriate to mention here that

the famous national scientific evaluation of all government civil service posts by the Ministry of Labour and Administrative Reform conducted in 1978, according to job responsibilities and qualifications and experience requirements of the holder at the time, the post of GA and its holder got the top score over all other posts in the government civil service.^[276]

When Prof. Ibrahim took office as Acting GA in 1957, he planned to expand and strengthen health-related analytical laboratory services for regulation and quality control of food, drugs, community water supply, environmental contaminants, toxicology, clinical chemistry, and forensic science (the last till 1966). He also intended to provide the customary technical and analytical services to most public sector institutions and private commercial and industrial sectors. However, during the few years following the independence of Sudan in 1956, the public sector started to procure its goods, materials, and other commodities through public, local, and international tenders. The result was many substandard items and others not conforming to specifications.

Consequently, the government directed Prof. Ibrahim as GA to provide the WCL urgently with all the testing facilities and expertise necessary for the quality control of all public sector supplies. As a result, in 1960, two laboratory rooms were equipped for testing textile materials, paper, and leather goods. Furthermore, all other testing sections and facilities were upgraded and supplied with up-to-date equipment and trained personnel. In addition, after the evacuation of the River Chest Hospital in 1961, a four-room pharmaceutical testing laboratory and a large air-conditioned chemicals store were established on the first floor of the central hospital building. Later, an expatriate Yugoslav pharmacist headed the Pharmaceutical testing section from 1963-66.

At the same time as the abovementioned strengthening and expansion of WCL testing facilities, Professor Ibrahim encouraged and guided all government and public sector departments that needed routine laboratory testing services to establish their laboratories. In addition, Prof. Ibrahim provided these departments with the help and guidance they needed, including training their laboratory personnel.

- **Expansion of Medical Services**

Starting in 1957 and up to 1969, several steps to plan for national development in medical services in curative and preventive services, and much attention to upgrading and providing laboratory services. As a result, budgets were allocated for the following:

1. Upgrade diagnostic laboratory services in hospitals to level A to be at the level and supervision of a pathology specialist (was not fulfilled because of shortage of specialists).
2. Expanding laboratory technician training
3. You are generalizing Blood Banks services.
4. Expanding vaccine production by establishing new units for production in Kuku village and the Agricultural Research Farm in Wad Medani in Soba.
5. Expanding chemical analysis services to supervise medicines, water, food, and poisons.
6. Promoting forensic medicine services
7. Continue conducting medical studies and research.

- **Ibrahim Gasim Mokheir Appointed Senior Pharmacist In KCH**

Ibrahim Gasim Mokheir was appointed Senior Pharmacist in KCH in 1957.

- **El-Hakeem Medical Students Journal Established**

El-Hakeem Medical Students Journal was established in the Faculty of Medicine, University of Khartoum. It was the second medical journal in the country (second to the Sudan Medical Journal). The first issue was published in September 1957. The first editor was Kamal Zaki Mustafa.

1958

- **Ministry of Health Regulation 1958 Issued**

The Ministry of Health Regulation 1958 was issued. These regulations replaced and repealed almost all Sudan Medical Service Regulations 1930.

- **CBPH Committee Revised PPA**

After Sudan's independence in 1956, there was a need to update all health legislations. Therefore, in 1958 the CBPH formed a committee to formulate a new Pharmacy and Poisons Act.

- **Daoud Mustafa Legacy**

Professor Daoud Mustafa Khalid (later Professor Emeritus) graduated from KSM in 1940 and acquired the MRCP, London, in 1952. On return to Sudan in 1952, he was appointed specialist in internal medicine in Atbara Hospital, and in 1953 he was transferred back to Khartoum to work as a specialist in Omdurman Civil Hospital and part-time lecturer in the Faculty of Medicine, the University of Khartoum up to 1958 when he was appointed full-time Senior Lecturer. In addition, Prof. Daoud led an exemplary career as a clinician and tutor.^[277] Please refer to Ahmed El Safi's book *Daoud Mustafa Khalid, his life, and work*.^[278]

1959

- **Mitral Valvotomy Operations Started**

Mr.Ahmed Abdel Aziz Yacoub deserves the father of chest and heart surgery in Sudan. His interest in this field was early in his surgical career. He performed his first case of mitral valvotomy in December 1959 with the help of Mr.John Jacques. Mr.Jacques, FRCSE, performed mitral valvotomy in Sudan in Khartoum Civil Hospital (KCH) in 1959.

- **Department of Surgery, FOM, UOK Established**

In 1959, the Department of Surgery, FOM, UOK, was established. Professor Hickey was the first Head of the Department, followed by Professor Julian Taylor. Professor Bakhiet Mohamed Omer was the first Head of the Department.

- **Health Visitors School Opened**

Health Visitors School opened in Omdurman in 1959. This school's two health visitors and staff midwives combined and trained health visitors and staff midwives. The course is one year long, and training was carried out for six months in Midwifery School and six months in Health Visitors School.

- **Diploma of KSM Changed to MB BS**

In 1959, for the first time in the Faculty of Medicine, UOK granted its graduates the combined degree of Medical Bachelor and Bachelor of Surgery (MB BS) instead of the Diploma of Kitchener School of Medicine (D. K. S. M).^[279]

- **Local Manufacture of Medicine by the Private Sector Encouraged**

After independence, the government started to give increasing attention to industrial development; in 1959, the government adopted a revolutionary national industrialization policy in the public and private sectors. As a result, private industry was encouraged, supported, and given land at a nominal price and was exempted from customs duties on machinery, raw, and packaging materials for the first five years.

The government's industrial strategy is to establish public sector factories to produce sugar, processed fruits, vegetables, cotton spinning, weaving, dried milk, and tanneries. Other industries, including medicines, were left to the private sector.

- **Building Central Laboratory Idea Approved**

In 1959 the idea of building a new laboratory complex was approved to accommodate the Chemical Laboratories, the Medical Laboratories, and Medical Entomology Laboratory in place of the Graphic Museum, destined for demolition.

- **More Beds and Hospitals Added**

KCH increased its capacity by 700 beds, making 1000 beds. Most of these beds were allocated to teaching and training medical students.

Omdurman Civil Hospital and Khartoum North Civil Hospitals were also added to the teaching hospitals for FOM and UOK.

- **CBPH Appointed a Drug Control Sub-committee**

In 1959, the CBPH appointed a **Drug Control Sub-committee**, chaired by Dr. El-Hadi El-Naggar, director of Central Medical Supplies, and Prof. Abdel Hamid Ibrahim Suleiman, the Government Analyst (أخصائي الحكومة للتحاليل) as Secretary, and Ibrahim Gasim Mokheir, Senior Pharmacist, Dr. Zaki Mustafa, Khartoum Province Officer of Health, and Dr. Adams, lecturer of biochemistry, Faculty of Medicine, the University of Khartoum as members to make recommendations regarding the control of pharmaceuticals. As a result, the Sub-committee drafted a new **Pharmacy and Poisons Act** and **Poisons Regulations** and recommended that a pharmaceutical quality control section be established in WCL. The CBPH approved the recommendations and directed Prof. Ibrahim to follow up on their implementation.

- **Sudanese Ophthalmological Society Established**

The Sudanese Ophthalmological Society was established in 1959 as a Sudanese Medical Association and the Sudanese Doctors Union.

1960

- **CMS Upgraded to a Division**

In 1960 CMS upgraded to a division, and Dr. El-Hadi El-Nager continued as Chief Division of Medical Supplies.

- **Private Sector Importing Drugs**

Until 1960, most reputable multinational drug companies had licensed local agents (importers/wholesalers) in Sudan and distributed their products through licensed private pharmacies. As a result, private pharmacies supplied about 15% of the drugs consumed in Sudan.

- **An Independent Department of Biochemistry, FOM, UOK Established**

In 1960, the Department of Biochemistry separated from Physiology and became an independent entity in FOM, UOK. Dr. Saad Mohamed Ibrahim was the first head.

- **An Independent Department of Physiology, FOM, UOK Established**

In 1960, the Department of Physiology separated from Biochemistry and became an independent entity in FOM, UOK.

- **The Department of Microbiology, FOM, UOK Established**

In 1960, the Department of Microbiology, FOM, UOK, was established under the supervision of Professor James Dunbar from the UK.

- **No Drugs Locally Manufactured**

Until 1960 there were no drugs locally manufactured.

- **School of Dental Assistants Established**

School of Dental Assistants was established in 1960 with the help of WHO. The training program is two years long and is conducted over the WHO Standard Dental Education Program lines.

- **School of Hygiene Inaugurated**

The School of Hygiene, inaugurated in 1945, offered a three-year training course to intermediate school graduates and raised its entry requirement to the secondary level in 1960. Though the study duration remained three years, students can now take the Royal Society of Health examination. As a result, the curriculum is now more intensified, and the intake of students increased. This school also graduates sanitary overseers and offers short courses to local government executive officers, health visitors, nurses, and medical assistants.

- **School of Radiography Established**

School of Radiography was established in Khartoum Civil Hospital in 1960-61 to give a two-year training course based on the Society of Radiographers, London, for secondary school certificate level graduates. Dr. Habib Abdalla was the founding director.

- **Khartoum is Recognized as a Center for Primary FRCS**

In 1960 the Royal College of Surgeons of England recognized Khartoum as an examination center for the primary examination for membership in the Royal College of Surgeons.^[280]

- **NAMRU-3 Cairo Started Investigating Visceral Leishmaniasis**

The United States Naval Medical Research Unit Number Three (NAMRU-3 Cairo) started a five-year investigation (1960-1964) on the epidemiology of visceral leishmaniasis in the Malakal Paloich and Bahr El-Ghazal Province.^[281]

- **The Province Administration Act 1960 Enacted**

The Province Administration Act 1960 was enacted. The Act aimed to strengthen the provinces to activate an effective mid-level administration representing the central government. From 1960 to 1971, the health sector was managed according to this Act.

1961

- **Department of Laboratory Technology Established**

As early as 1961, Prof. Abdel Hamid Ibrahim, in collaboration with the Faculty of Science, UOK, and Ministry of Education, initiated contacts with the United Nations and UNESCO to establish Laboratory Technology in the Khartoum Technical Institute (KTI) again in 1964 without success. Professor Ibrahim sent NCL Senior Technical Assistant Abu Bakr Ahmed Akour to the United Kingdom to train in science laboratory technology at Paddington Technical College and sit for the Science Laboratory Technicians Certificate offered jointly by the City Guilds Institute of London and the Institute of Science Technology.

Mr.Akour, who became NCL's Superintendent, was the first Sudanese to get the Associate Membership of the Institute of Science Technology (AIST). In addition, professor Ibrahim directed Mr.Akour to collaborate with the Faculty of Science, University of Khartoum's Head Technician (Mr.Davies) to conduct a joint evening part-time training course for the university and NCL laboratory technicians.

Eventually, in 1966, an international commission for technical education visited Sudan at the request of the government to review and promote technical education in Sudan. As a result, the Committee supported the recommendations of Prof. Ibrahim and others to establish a department in Khartoum Technical Institute (now the Sudan University of Science and Technology) for graduate science technicians.

- **The Graphic Museum Closed**

The Report of the Medical Services, MOH for 1963/1964, stated that ‘The Graphic Museum has been closed since its demolition in 1962. A new building is nearing completion and is expected to open soon.’^[282]

The GM probably was out of function even earlier when it was condemned and closed pending demolition. The ‘new building’ alluded to was built but never functioned as GM. Instead, it is occupied by the current FMOH Continuous Professional Development Center between the two FOM hostels, UOK.

When the GM was demolished, its exhibits were packed up and stored in the new buildings. They were never unpacked and displayed for reasons unknown. The rooms that were earmarked to be museum rooms were converted into offices, and the exhibits were lost. Reminders of these items are in anecdotal nostalgic memories of the elderly who enjoyed visiting the GM.

- **Training of Pharmacists in AUB initiated**

MOH decided to implement the WHO consultant's recommendation of training pharmacists for government service abroad till a faculty of pharmacy is established.

In 1961, the government contacted USA Operation Mission to Sudan, which offered to train three batches of selected secondary school graduates at the Faculty of Pharmacy of the American University of Beirut (AUB) in 1961, 1962, and 1963. Prof. Ibrahim selected and processed the first group of six secondary school graduates appointed by the MOH and started their studies at AUB in 1961.^[283] The second group of two students followed in 1962, and a third and last group of four followed in 1963. Most of these students returned five years later as graduate pharmacists, but fewer than half chose to stay and work in the public sector.

- **Section for Laboratory Work in Nutrition Established**

In 1961, Prof. Abdel Hamid Ibrahim established a new section for laboratory work in nutrition, which was intended to function in harmony with the Ministry of Health Nutrition Division and provide laboratory support for researchers in the health field and the preparation and compilation of food composition tables, and nutritive values of everyday food recipes. Five chemists from NCL attended postgraduate MSc and Ph.D. courses in nutrition and allied subjects in the United Kingdom. However, all of them left NCL for better jobs inside and outside the country, and the section was finally closed in 1980.

- **Occupational Health Specialization Started**

From 2 October to 25 November 1961, Prof. Abdel Hamid Ibrahim and Dr. Zaki Mustafa attended a Joint WHO/ILO Training Course on Occupational Health at Alexandria's High Institute of Public Health. This course was later expanded to an entire postgraduate-level course in occupational health. On his return, Prof. Ibrahim procured all the equipment needed for the physical and chemical testing of the work environment and created a post for a chemist to do the work, but both the equipment and the post were transferred to the Occupational Health Department, MOH, in 1973.

- **Sudanese Chemical Industries Established**

Sudan's economic situation and stability at the time encouraged private investors. As a result, a reasonably sizable factory for producing medicines and cosmetics was established in 1961 by a local investor in Khartoum North Industrial Area by Sudanese Chemical Industries (SCI).

- **Nicholas Drug Company U.K. Established**

In 1961, Nicholas Drug Company U.K. and its local Sudanese agent Bodourian company established a small facility at Wad Medani for the production of ASPRO tablets (Acetylsalicylic acid (ASA) tablets), and two hydroquinone-based cosmetic creams (Ambi, and Cleartone creams).

- **Central Laboratory Building Started**

After preparing all engineering designs, and the budget, the building of the Central Laboratory, started in 1961, finished in 1969, and was officially called the Central Laboratory.

- **The New Khartoum Civil Hospital Built**

In 1961/62, the new Khartoum Hospital was built.

- **UoK Special Committee Confirmed Need for Faculty of Pharmacy**

A University of Khartoum special committee reconfirmed the proposal of Prof. Mutawi in 1954. The committee was formed of Prof. WH Linnell, Dean of School of Pharmacy, University of London, Prof. Amin F. Haddad, Director, School of Pharmacy, American University of Beirut, Dr. L. Goodwin, Chairman, Wellcome Laboratories of Tropical Medicine, London.

1962

- **No students graduated from KSM**

KSM did not graduate any students in 1962

- **Cancer Institute established**

In collaboration with a WHO consultant on radiotherapy in EMRO, Dr. Mohamed Hamad Satti supervised the building of the Cancer Institute (later to become the Radiation and Isotope Center in Khartoum). Dr. El-Sheikh Abdel Rahman was the specialist in charge still under training in the UOK during 1959-1962.

- **El-Sheikh Abdel Rahman specialized in radiotherapy**

Dr. El-Sheikh Abdel Rahman (MB BS, DMRT, FRCR) finished his postgraduate studies in the UOK and returned in 1962. He became the first founding director of the Radiation and Isotope Center.

- **Training of scientific officers started**

Dr. Mohamed Hamad Satti recruited scientific officers and sent them abroad for training on malacology, medical entomology, malariology, parasitology, and onchocerciasis. These officers were recruited from graduates of the Faculty of Science, the University of Khartoum, who joined the service of MOH.

A post of a vertebrate ecologist was created. Many of those recruits later became leaders in their fields, and several attained national and international recognition. He also recruited and sent a team of medically qualified research workers for postgraduate training in the United Kingdom to specialize in different laboratory disciplines, including pathology, bacteriology, hematology, histopathology, parasitology, virology, biochemistry various other specialized disciplines like vaccine-making. These were supposed to fill the new laboratory posts to meet the health services expansion, which was very much ahead of the laboratories that were left to lag over the years. The theses for higher degrees by these, and other graduates, Prof. Haseeb, commented, proved helpful in the research program sponsored by the Sudan Ministry of Health.^[284]

- **Orthopaedic Oxford-Sudan Program initiated**

From 1962 to 1964, under Professor Joseph Trueta, BT O'Connor^[285] was seconded to Sudan as the first Senior Registrar in launching the Oxford-Sudan Program. Dr. O'Connor took up his post on 21 July 1962.

- **Faculty of Pharmacy, UOK establishing agreed upon**

The MOH, which was well represented in the FOM, UOK, and the UOK Council, used its influence to convince UOK institutions to endorse and establish a Faculty of Pharmacy. Finally, in July 1962, a decision was taken to that effect. As a result, Prof. Patrick F. D'Arcy,^[286] professor of Pharmacology at the Queen's University of Belfast, and Professor of Pharmacology, FOM, UOK, was appointed as the first founding Dean of the new established School of Pharmacy, University of Khartoum (FOP, UOK).

He was assigned to establish and prepare the faculty to receive its first batch of pharmacy undergraduates selected to spend their first session 1963-64 of the five-year Bachelor of Pharmacy course in the Faculty of Science. They would start their second session in 1964 in the newly built Faculty of Pharmacy.

- **Coral reef pollution studied**

One of Prof. Abdel Hamid Ibrahim's early inputs in the prevention/control of environmental contaminants was the study he and Mr. Khalil Kronfoli (Deputy Municipal Engineer of Khartoum) did in March 1962. The Central Town Planning Board (CTPB) and the National Land Allocation Authority assigned them to investigate possible air, water, and coral reef pollution from effluents from the proposed Shell Company petroleum refinery at Port Sudan. At the team's request, Shell Company arranged the team's visits to a similar refinery, Air Pollution Research Laboratory, and Water Pollution Research Laboratory in Stevenage, England. In March 1962, Prof. Ibrahim and Engineer Kronfoli visited a similar Shell refinery in Godort (West Germany), 5 kilometers away from Cologne City, and met the health officials concerned in the nearby city of Cologne. At length, the team discussed with technical refinery staff, Cologne health officials, and Air/Water Pollution Research Laboratories scientists possible air, water, and coral reef pollution by the refinery gaseous and liquid effluents and measures to prevent any pollution.

The 8-page report submitted by Prof. Ibrahim and Engineer Kronfoli to the CBPH was comprehensive, scientific, and contained all the information and facts about possible pollution hazards by the proposed Port Sudan Refinery and the measures to be taken guard against such hazards.

The team recommended stringent measures to be taken and conditions to be met in the construction and operation of

the proposed Refinery, which Shell Company considered as exaggerated because of the small size of the refinery, its design, its methods of refining (no cracking process), and the quality of the crude oil used. In the end, Shell accepted all of the recommendations, which were documented, and included in the Shell Refinery Agreement with the Government of Sudan.

- **Pharmaceutical Industrial Laboratory Established**

In 1962, Sudanese and Egyptian pharmacists jointly established Pharmaceutical Industrial Laboratory Ltd (PILL) in Khartoum North Industrial Area.

The economic feasibilities of SCI and PILL were based on the supply of medicines to public sector health facilities that consumed about 85% of the requirements of national medicine. Therefore, both factories had to bid in the Central Medical Supplies (CMS) biennial international tenders to supply medicines for the public sector. Unfortunately, both local manufacturers could not compete with international bidders even after the government gave them 15% more on the selected bidders' prices. As a result, the two local manufacturers suffered sustained losses throughout the sixties and seventies, leading to the regression of their production and intermittent closures. Their failure discouraged other investors. On the other hand, the Nicholas-Bodourian factory, which relied on its leading household ASPRO tablets, continued.

- **Postgraduate Specialization of Pharmacists Started**

With the start of FOP, UOK, three teaching assistants were appointed: Yahiya Mohamed El-Khair, Osman Hassan Osman, and Mohamed Hussain El-Mufti, who left the Fac-

ulty later. The first two attained the first MSc from UOK. Dr. Yahiya obtained Ph.D. in pharmacology in 1970 and Osman Hassan Osman in 1969.

- **The First Doctor Elected Fellow of RCP**

Dr. Abdel Halim Mohamed Abdel Halim was the first Sudanese to be elected fellow of the RCP of England.

1963

- **Assistant Anaesthetists School Established**

Assistant Anaesthetists School was established in Khartoum Civil Hospital in 1963. Candidates are selected from among experienced nurses.

- **Professor Daoud Mustafa Replaced Morgan**

In 1963, Professor Daoud Mustafa Khalid replaced Professor HV Morgan as the first Sudanese Head of the Department of Medicine in the Faculty of Medicine, University of Khartoum.

- **An Independent Faculty of Pharmacy, UOK Established**

A stand alone Faculty of Pharmacy, University of Khartoum was named in 1963. Prof. Patrick F. D'Arcy,^[287] professor of Pharmacology at the Queen's University of Belfast, and Professor of Pharmacology, FOM, UOK, was appointed as the first founding Dean

Pharmacy and Poisons Act 1963 Enacted

The Pharmacy and Poisons Act 1963 (قانون الصيدلة والسموم)

(لسنة ١٩٦٣) (Pharmacy, and Poisons Act) was drafted in 1959, endorsed by the CBPH, enacted, and published in Sudan Legislative Gazette on 15 September 1963 to be effective as from first October 1963. The new Act provided the registration of pharmaceutical products, a control pro-

cedure not common globally, and provided for licensing local drug factories.

In its meeting no. 419 dated 26 June 1963, the CBPH appointed a 12-member technical committee to investigate and advise the Board on the registration of pharmaceutical products. The committee was short for looking into all applications for registration of all pharmaceutical products already in the country. The CBPH met on 16 October 1963 and made very vital resolutions; (1) Considered anyone legally holding a valid pharmacist business license on 30.9.1963 might carry on his business till the expiry date of his license; (2) To register free of charge any pharmaceutical product lawfully manufactured, imported, or sold in Sudan before 1 October 1963 provided that a list of such products available in the country is immediately submitted to the Board. Any person wishing to manufacture or import a new medicine should arrange for its registration under the new Act, (3) approve the draft of the new Poisons Regulations and Schedules (which were never published till that day), (4) Approved all prescribed forms, and amended Poisons Lists.

The Pharmacy and Poisons Act 1963 was issued in Arabic and English. Based on this Act and that of 1939, the Central Board of Public Health that was formed according to the 1939 Act remained the National Medicines Regulatory Authority (NMRA) (السلطة القومية المختصة بالرقابة الصيدلانية والدوائية).

- **National Drug Quality Control Laboratory Established**

Prof. Abdel Hamid Ibrahim gave special attention to the pharmaceutical testing laboratory, established as a separate section in WCL and headed by an expatriate Yugoslav pharmaceutical chemist in 1963.

- **Mansour Ali Haseeb, Appointed the First Chair of Microbiology, and Dean FOM**

In 1963, Dr. Mansour Ali Haseeb became the first Sudanese to hold the Microbiology and Parasitology chair and Dean of the Faculty of Medicine, University of Khartoum (1963-1969).

- **Sudan Association Of Surgeons Founded**

The Sudan Association of Surgeons was founded in 1963. Mr. Abdel Hamid Bayoumi was elected the first president.

1964

- **School of Dispensers Closed Permanently**

In 1964, the school of dispensers was closed permanently with the commencement of studies in the new Faculty of Pharmacy at the University of Khartoum.

- **Sir Graham Wilson Supported the NHL Project Idea**

Dr. Mohamed Hamad Satti, Director of SMRL (1963-1968), was highly convinced of building the National Health Laboratories, so much so that he fought for it and solicited foreign help to support the project.

In 1964, he engineered an invitation to Sir Graham Wilson, ex-director of the Public Health Laboratories of England, and Wales, to visit Sudan and support this project.^[288] Sceptics were many. They were not convinced about the worth of this enormous building. They thought the cost of upkeep of this colossal building far exceeded its usefulness and was a liability. They discouragingly called it ‘Satti’s white elephant,’ the legendary white elephant in Southeast Asian traditions. This animal was held sacred and protected by law from labor. Hence, possessing a white elephant is both a blessing and a curse: a blessing because the animal has a scary nature and a curse because it could be put to no practical use.

- **Thoracic Surgery Established**

From 1964 to 1972, Ahmed Abdel Aziz performed about 500 thoracic surgery cases. The chest problems included tuberculosis of the lung, chest injuries, empyema, lung abscesses, carcinoma of the esophagus, hydatid cysts of the lung, achalasia of the cardia, carcinoma of the lung, hiatus hernia, patent ductus arteriosus, bronchiectasis, constrictive pericarditis, pericardial cysts, cysts of the lung, adenoma of the bronchus, coarctation of the aorta, diverticulum of the esophagus, and pharyngeal pouch. Over the same period, 200 bronchoscopies and oesophagoscopies were done to diagnose, remove foreign bodies, and insert Celestin tubes for inoperable cancers of the middle esophagus.

- **School Of Dispensers Closed**

The School of Dispensers, organized in 1939, was closed in 1964 on the recommendations of a WHO consultant, Prof. Mutawa (محمد محمد مطوع) Dean of the Faculty of Pharmacy, the University of Cairo, in 1954.

Teaching Pharmacy Started

Teaching Pharmacy in Faculty of Pharmacy, University of Khartoum started in August 1964. The first batch is formed of 20 students.

- **Pathology Museum Revived**

The pathology museum, established with the Department of Pathology in the FOM, UOK, grew steadily in time, and all specimens were professionally kept and displayed. In 1964, recognizing the importance of preserving these specimens, Professor Ahmed Mohamed El-Hassan upgraded this museum and did his best to maintain it. The museum was envisaged as a repository and historical record for the exciting

and rare specimens he and other Sudan pathologists received daily. In addition, the museum provided teaching material for undergraduate, postgraduate, and health sciences students. Currently, this museum is showing signs of decay, and instead of maturing, its growth was arrested, and it needs immediate rehabilitation.

- **Faculty of Pharmacy, UOK Established**

The Faculty of Pharmacy, University of Khartoum was inaugurated in July 1964. It was the first school of pharmacy in Sudan. It was a great challenge to Prof. D'Arcy, who managed to formulate the 4-year pharmacy curriculum, recruit expatriate academic staff, prepare temporary lecture rooms and laboratories, and receive his first batch of eighteen Pharmacy undergraduates in 1964, as planned, after completing their first-year course in the Faculty of Science. Professor D'Arcy appointed several newly graduated Sudanese pharmacists as academic assistants trained and eventually qualified as lecturers. He also recruited qualified Sudanese chemists as organic chemistry, analytical chemistry, and pharmacology lecturers.

In support of the newly established Faculty, Prof. Abdel Hamid Ibrahim Suleiman allowed two NCL chemists (the late professor Rifaat Botrous and the late Associate Professor Mobarak Ali Karrar) to be permanently transferred to the Faculty of Pharmacy to relieve its staff shortage. Prof. Ibrahim later became a Faculty Board of Pharmacy member during 1969-1972 in his post of Director CMS. In addition, he has been an external examiner in faculty examinations and supervisor or external examiner to many postgraduate pharmacy students for many years.

The Faculty of the Pharmacy University of Khartoum remained the only faculty of pharmacy in Sudan until establishing a faculty of pharmacy at the University of Gezira.

Since then, several faculties of pharmacy have been established in public, and private universities, and colleges

- **Khartoum Civil Hospital Recognized for MRC-OG Appointments At Khartoum Recognized**

In October 1964, the Council of the Royal College of Obstetricians and Gynaecologists of England recognized appointments at Khartoum Civil Hospital, the primary teaching hospital of the Faculty of Medicine, fulfilling one year's training requirement for membership in the College.^[289]

- **Preparation for open-heart surgery started**

Preparation for launching the open-heart surgery program took over 20 years of animal experimentation, building new premises, laying down infrastructure, and training personnel. In addition, Mr.Yacoub did extensive training in this field in Britain.^{[290]-[291]}He founded the Shaab Hospital Operations Theatre Complex in 1964 to care for heart, chest, and neuro-surgery.

- **Professor Mansour Ali Haseeb Appointed First Dean**

Professor Mansour Ali Haseeb was appointed the first Dean of the Faculty of Medicine, University of Khartoum.

- **Intermediate Nursing School started**

Intermediate Nursing School started in 1946. However, the school was discontinued after finding that the assistant sisters had no fundamental role.

1965

- **Medical Assistants Training School course lengthened**

From 1965 onwards, the Medical Assistants Training School course lasted two years. Initially, hospital orderlies (الفراشين) with sufficient practical experience were selected for a one-year intensive course, after which theoretical, clinical, and practical examinations were held.

- **Ahmed Mohamed El-Hassan Replaced Lynch**

Dr. Ahmed Mohamed El-Hassan was promoted to senior lecturer in 1965 and the first Sudanese Head Department of Pathology, University of Khartoum, replacing Prof. James B Lynch (the founder of the Department of Pathology, University of Khartoum).

- **Bilharzia Society formed**

The *Bilharzia Society* was founded in 1965 by medical staff, veterinarians, and scientists. This society planned research to tackle medical problems in humans and cattle. The founding members were Professor Ibrahim El-Desogi Mustafa, Professor of Veterinary Pathology, Faculty of Veterinary Medicine, University of Khartoum, Dr. Gaafar Karrar, Under-Secretary, Ministry of Animal Resources, Tawfeeg Fawi, Pathologist, Ministry of Animal Resources, Professor Mansour Faris, Professor of Veterinary Pathology, University of Khartoum, and Professor Mutamad Ah-

med Amin from Medical Laboratories. Prof. El-Hassan was the coordinator.

- **Codex Alimentarius Commission membership acquired**

Sudan, led by Prof. Abdel Hamid Ibrahim, became an FAO/WHO Codex Alimentarius Commission member in 1965. Prof. Ibrahim established a National Codex Committee to follow up on FAO/WHO Codex activities.

- **Postgraduate Specialization Of MOH Pharmacists**

In 1965, Dr. Hafiz Siddig El-Shaikh was appointed as the assistant science officer in the Chemical Laboratory in Section (D) Research as the first pharmacist in this laboratory.

- **Mansour Ali Haseeb Made RCP Fellow**

Based on his publications, he was made a Fellow of the Royal College of Pathologists in 1965.^[292]

- **Sudanese Fertility Society Founded**

Sudanese Family Planning Society (جمعية تنظيم الأسرة السودانية) was founded by Abdel Rahman Atabani, Abdel Salam El-Moghraby, and El-Hadi El-Zain El-Nahass in 1965.

- **The First Psychiatry Ward Established**

Tigani El-Mahi and Taha Baashar established the first psychiatry ward in Khartoum Teaching Hospital in 1965. The ward was run by the Department of Psychiatry, Faculty of Medicine, University of Khartoum.

- **Independent Department Of Paediatrics
Founded**

Professor Neil, the first Professor of Paediatrics in Sudan, found an independent department in the Faculty of Medicine, University of Khartoum. The clinical side of the department was in Khartoum Teaching Hospital. راجع مذكرات

مأمون حامد

1966

- **School of Tropical Medicine Proposed**

In 1966, Dr. Mohamed Hamad Satti proposed establishing a school for Tropical Medicine and a hospital. He reckoned that it was high time for some form of a school of tropical medicine with an extensive team of teachers and research workers in the various fields of tropical medicine with particular emphasis on Sudan's local problems. He suggested that the school should set off under the auspices of the university (then the University of Khartoum, and the only one in the country) with moral and material support from the Ministry of Health. He thought this setup was essential and urgent because they were then absorbed in the service of many doctors who had been trained in non-tropical countries, including Europe. These graduates were never exposed sufficiently to tropical medicine. He thought this was unfair to patients and doctors, and the situation should be remedied. This institute, he envisioned, could be developed later into a good school; whatever Dr. Satti proposed materialized and proliferated several institutions years later. He thought the proposed institutions should have good relations with other schools of tropical medicine in London, Liverpool, and Calcutta. He rightly thought establishing such a school would create great interest in studying Sudan's local health problems.^[293]

- **National Council for Research Proposed and Lobbied**

Though Dr. Satti's main contribution was fieldwork and laboratory investigations, he had far-reaching efforts to or-

ganize and direct research in medicine. As a developing nation, he believed that Sudan could contribute to science development and advancement. However, he said, ‘we should not expect other people to come and solve our problems. I should hesitate to allow foreign scientists to be let loose to go up and down the country. This is extremely dangerous, and much espionage is done through the smokescreen of science. Young developing nations have to be very careful.’^[294]

In 1966, Mr. Abdel Hamid Ibrahim Suleiman and other prominent scientists made significant contributions to establishing the NCR. A 10-page memorandum was submitted to the prime minister (Mohamed Ahmed Mahgoub) to establish the National Council for Research and Technology. They regarded it as a contribution to the then-ongoing series of meetings sponsored by the Prime Minister and headed by Dr. Abdel Halim Mohamed on ways and means to establish a national council for scientific research as promoted at the time by UNESCO. Prof. Mansour Ali Haseeb and Prof. Amin El-Karib have shared the implementation of the UNESCO proposal. Eventually, Dr. Abdel Halim Mohamed proposed the idea on 13 June 1966 and discussed it in a Council of Ministers meeting.

Prof. Mustafa Hassan, Dr. Gaafar Karrar, Dr. Mohamed Abdul Rahman Ziyada, and Mr. Abdel Hamid Ibrahim supported the issue. This group issued a vindication memo on 16 June 1966 addressing the controversial issues and suggesting solutions.

Coincidentally, Dr. Satti proposed in the same year, 1966, creating a Medical Research Council and a Higher Scientific Council for Research under which all research disciplines were included. The proposal entitled “Memorandum on cooperation in Medical Research in Sudan, and the suggestion of establishing a school of tropical medicine” appeared in the SMRL Annual Report of 1965/1966. The memo succinctly stated:

“Having been engaged in research of one form or another with particular reference to our local problems for the last quarter of a century or so, and because I am in continuous contact with and aware of the many urgent public health matters, I am struck, and in reality perturbed by the great number of medical problems in this country that shout, and press for solutions. Naturally, this cannot be carried out without intensive research, which necessitates the exploitation of all our available scientific workforce regardless of the differences of the units, institutions, or ministries to which they belong.”^[295]

- **Sudan Cancer Registry Established**

With the help of the late Dr. Dennis Burkitt (of Burkitt’s Lymphoma), the late Prof. El-Sayyid Daoud Hassan, Senior Pathologist and Director of Laboratories, MOH, and prof. El-Hassan established Sudan Cancer Registry (CR) in 1966 in the NHL to register laboratory-confirmed cancers. However, it was understood that a hundred percent complete data was complicated, if not impossible, to obtain in a country like Sudan, yet the registry was devised as an objective measure of obtaining reliable data. The CR provided information that elucidates the incidence rate of the different types of cancer in the country, site, and trend. It would also highlight how the demographic variables of age and sex are related to incidence. The results have helpful guidelines for active control measures, epidemiologic studies, and research. Dr. Burkitt helped to fund the project. A health visitor and a secretary were appointed for a start.

The registry proved its worth in the 1981 Ministry of Health Annual Statistical Report. Total reported skin cancer cases, female breast, cervix, and uterus were analyzed for 1969-1978. Similar data covering 1973-1979 was also ob-

tained to analyze all cancer sites. The annual numbers of new cases from 1969-1980 were obtained for these diseases. Results were obtained using scientific methods and tools.^[296] Several researchers used this registry and published papers on cancer epidemiology. Notable among these was Prof. Mohamed Osman Abdel Malik. The CR was maintained for at least twenty years before it vanished! Yes. It is nowhere to be found.

Fortunately, this registry is now being revived. In 2008, the FMOH appointed a committee chaired by Prof. El-Hassan and asked to re-establish the registry on a state-of-the-art methodology.

- **Pharmaceutical Assistants School Established**

In 1966, the Ministry of Health established a school of pharmaceutical assistants who (like other medical assistants) were selected from qualified nurses from different provincial hospitals and given a training course of two years. This school has been departmental under Dr. Ibrahim Gasim Mokheir, a senior pharmacist in Khartoum Civil Hospital. Dr. Mokheir established and equipped the school and deployed the lecturers in the Faculty of Pharmacy to write its curriculum and teaching. Kamal Abdalla Shafie was appointed as the first director of the school.

- **First Sudanese Professor Of Pathology Appointed**

In 1966, Prof. El-Hassan was appointed the first Professor of Pathology^[297] and Chairman of the Department of Pathology in the Faculty of Medicine, University of Khartoum. During his term of office, the department was engaged in teaching undergraduate, and postgraduate students, rendering pathology services, and research. The department served the three towns and major cities in Sudan.

In addition, several Sudanese teaching assistants were trained in England, and several are now full professors in pathology.

Prof. El-Hassan was elected Dean, Faculty of Medicine, University of Khartoum, in September 1969. His term of office lasted up to August 1971. During this time, the number of students intake rose from 60 to 120. He was also elected Deputy Vice-Chancellor of the University of Khartoum during his tenure.

- **Institute of Medical Laboratory Technology**

In 1966, the Institute of Medical Laboratory Technology (IMLT) was established in collaboration with the Sudanese Ministry of Health. Graduates from this institute are now operating the diagnostic and research laboratories in Sudan and many Arab countries. In addition, many students have obtained MSc and Ph.D. degrees in technology from reputable local and foreign universities. At least two graduates are now full professors.

- **History of Bilharzia in Sudan Reviewed**

In 1966[], El-Hadi El-Nagar reviewed the history of schistosomiasis in Sudan, its recognition as a health problem, and its bearing on the economic and social life of the population concerning the Gezira irrigated scheme.

- **Sudanese Physicians Association Established**

Sudanese Physicians Association was established. Dr. Abdel Halim Mohamed was elected as the first president. He was followed by Daoud Mustafa?, Mohi El-Din Mahadi, Abdel Razzaq El-Mubarak, Abdel Monieum Wasfi, Mo-

hamed El-Hassan Gabir, and Mohamed El-Hassan Abu Bakr.

- **Sudanese Association of Surgeons Proposes Super Specialises In Surgery**

At the Annual Conference of the Sudanese Association of Surgeons, IM El Moghraby the Senior Surgeons decided to endorse Abdel Hamid Bayoumi's initiative of starting super-specializations in Surgery Neurosurgery.

1967

- **Statistical Clerks Training Started**

The statistical Clerks training program was started in 1967 by the Vital Statistics Division of the Ministry of Health with the help of WHO. Statistical Clerks were spread to all hospitals to collect, analyze, and compile reports on vital statistical data on the health in each area.

- **Institute Of Medical Laboratory Technicians Established**

The Institute of Medical Laboratory Technicians (IMLT) was established within the Faculty of Medicine, the University of Khartoum, as a joint venture with the Ministry of Health. The training program is three-year-long for a general education certificate with 12 years of schooling.

- **Ibrahim Gasim, first Sudanese Dean, Faculty of Pharmacy**

In 1967, Prof. D'Arcy was superseded by Dr. Ibrahim Gasim Mokheir, the first Sudanese Dean. In 1968, the first batch of eighteen pharmacists graduated with a Bachelor's Degree in pharmacy from FOP, UOK.

- **The Household Remedies Regulation 1967 Issued**

The Household Remedies Regulation 1967 (لائحة قائمة الأدوية (لائحة بيع الأدوية البسيطة لسنة ١٩٦٧) (المنزلية لسنة ١٩٦٧), and published in the Government Gazette on 15 March 1967 were issued.

- **El-Hadi A. El-Sheikh First Full-Time Lecturer of Ophthalmology**

In September 1967, Professor El-Hadi Ahmed El-Sheikh was the first full-time lecturer at the UOK to teach Ophthalmology. For an unknown time, he had shouldered the responsibility of teaching undergraduate students of the FOM, UOK. Although the undergraduate syllabus remained meager, it consisted of formal lectures, clinical sessions, and surgical demonstrations. As a result, an ophthalmology department was established, and the syllabus was revised and improved.

1968

- **The Paediatric Department of FOM/UOK Established**

Pediatrics split from the Department of Medicine, and an independent Department was established in July 1968. Professor Hafiz El-Shazali was the first Head of the Department.

- **OAU Recognizes TM**

The Organization of African Unity (OAU) program on traditional medicine also regarded the matter as a high priority.^[298] Accordingly, the Scientific, Technical, and Research Commission (STRC) of the OAU held a conference on African medicinal plants and Pharmacopoeia in Dakar (Senegal) in 1968. The conference resolved that African scientists should direct efforts towards finding scientific evidence for the efficacy or otherwise of traditional medicines. For its part, STRC assists in research in that field, organizes conferences, and publishes a specialized journal called *Journal of African Medicinal Plants* and a newsletter.

- **UOK Reviewed Baghdadi's Trust**

The University of Khartoum noticed in 1968 that the financial return from that endowment, despite its large size, was minor, and its buildings were in the worst conditions possible. So it was decided to demolish some of those buildings and rebuild them to overcome the obstacles of the prevailing rental law.

- **Science Laboratory Technicians Department Established**

A Science Laboratory Technician department was established at KTI in 1968. KTI succeeded in arranging with the City and Guilds Institute in London to be a center for examinations for the British Science Laboratory Technicians Certificate. Mr. Akour was later released to head that department, which has since played a significant role in providing the country with qualified science laboratory technicians.^[299]

- **The First Batch of Faculty of Pharmacy, UOK, Graduated**

Seventeen pharmacists graduated from the Faculty of Pharmacy, UOK, in 1968 after five years of teaching and training, the first two of which were spent in the Faculty of Science

- **Ethical Committee Established**

The National Health Laboratories of the Ministry of Health formed the first ethical committee for the medical profession in 1968.

- **Radiotherapy Hospital Inaugurated**

The Radiotherapy Hospital in Khartoum was inaugurated on 18 October 1968 and was then the only hospital in Africa. It was thought to be exemplary in international collaboration. Treatment in this hospital has been free of charge.

- **Sudan Medical Council Inaugurated**

By the Medical Council Ordinance 1955, Sudan Medical Council was formed to control the practice of medicine, dentistry, and pharmacy in Sudan and supervise medical ethics. However, it was not inaugurated until 1968. Dr. Ali Bedri was appointed first president, and Dr. Ibrahim Abu El-Rish as secretary-general.

In its first meeting on 25 July 1968, the Sudan Medical Council formed a committee to write a document to regulate doctors' moral conduct. As a result, the committee provided the (Moral Conduct Act, 1969) (قانون آداب السلوك لعام ١٩٦٩).

- **Neurosurgical Unit Proposed**

In 1968, the 6th Arab Congress was held in Khartoum. In that meeting, it was decided to establish a neurosurgical department as the need for that type of surgery was rising, and the expenses abroad were unaffordable for most patients.

- **Ahmed Mohamed El Hassan Replaces Lynch**

Prof Lynch left the Department of Pathology and was succeeded by Prof Ahmed Mohamed El Hassan in 1968

1969

- **NHL Inaugurated**

Mohamed Hamad Satti and colleagues proved to be right in establishing the NHL. The laboratories were built from 1963 to 1968 with an approximate cost of \$ 5 million. In 1969, the buildings were equipped, functioned, and staffed. They became a landmark in the city of Khartoum. Tens of researchers were sent for training within the budget of the UNDP project in 1972-77. The NHL soon proved its worth.

- **Sudan Medical Corps Moved to Omdurman**

The Sudan Medical Corps (السلح الطبي) HQ was moved to its current site in Omdurman, and the Military College relocated to Wadi Saidna north of Omdurman.

- **Schools of Medical Assistants in Juba and El-Obeid Established**

In addition to the school in Omdurman, founded in 1924, two Medical Assistants schools were established in Juba and El-Obeid in 1969.

- **National Center for Eye Diseases Proposed**

Dr. Abdel Gadir Hassan Ishag proposed on 2 January 1969 and 1973 establishing a National Center for Eye Diseases. When he repeated his proposal for the third time in 1979, The General Secretariat of the Scientific Council of Higher Education approved the idea and assigned a government

house as a start base for this project. MSU, USA, promised to help establish and furnish this Center with equipment and training. However, the project was halted after a group of senior ophthalmologists wrongly suggested to the authorities that the project would be affiliated with the University of Khartoum. Twenty-six years later, the General Secretariat looked into the project and contacted Professor El-Sheikh with his opinion. A detailed historical assessment was given.^[300]

- **Building of the Central Laboratory Completed**

The Central Laboratory finished in 1969, and the building was officially called the Central Laboratory.

- **NHL Succeeded SMRL**

SMRL, the temporal successor of WTRLK, was succeeded by the NHL in 1969.

- **CMS Rehabilitated**

During 1969-1972, Prof. Abdel Hamid Ibrahim was called upon and accepted a temporary transfer to rehabilitate the CMSD. During his three years as Director, he managed to re-organize the CMS and establish a sound drug supply management system based on bulk procurement of all medical supplies by tenders on a biennial basis following a specific timetable. In addition, he converted the imperial system of measurements to the metric system, brought a railway siding into the CMS, and established a training center for supply personnel.

- **Medical Photography Unit Established in FOM**

UOK

When Dean, Faculty of Medicine, University of Khartoum, Prof. Ahmed Mohamed qEl-Hassan initiated the Medical Photography and Illustration Unit. He recruited the able photographer Sayyid Ahmed Osman, a man with many talents and an all-rounder technician, to run this unit. In addition to being a competent photographer, Sayyid Ahmed was a skillful tennis player, an elegant, well-dressed gentleman, and a dancer. He was a Khartoum Ice Skating Club member and champion of ice-skating in Khartoum in the 1930s. The Photography and Illustration Unit helped in all FOM activities before they disintegrated late. Three technicians were sent to Britain, where they trained as medical photographers.

- **Council of Higher Medical Education Established**

In 1969 the Council of Ministers asked the University of Khartoum to establish the Council of Higher Medical Education to supervise post-graduate clinical studies.

- **The Neurology Unit In Shaab Hospital Organized**

Prof. Daoud Mustafa Khalid organizes clinical work and research in Neurology. He established the Neurology Unit in Shaab Teaching Hospital in the late 1960s and early 1970s and directed work in this field until he retired due to ill health in the 2000s.

- **Sudan Medical Council Moral Conduct Act Enacted**

The SMC provided the (Moral Conduct Act, 1969) (قانون (أداب السلوك لعام ١٩٦٩).

- **NCL Medical Entomology, Schistosomiasis Laboratories, and Stack Moved To NHL**

By 1969, the NCL Medical Entomology, Schistosomiasis laboratories, and all (Stack) departments were moved entirely to the new NHL. During the seventies, three Regional Health Laboratories (RHL) were constructed in Port Sudan, El-Obied, and Juba, and in the nineties, Atbara RHL was completed.

- **Husein Suleiman Abu Salih Specializes in Neurosurgery**

In 1969, the Ministry of Health decided to train doctors in neurosurgery abroad, and Dr. Hussein Abu Salih was sent to Egypt for two years of training (1969-1971). He joined Prof. Ahmed Benhawi at Ain Shams University Hospital, Maadi Army Hospital, and Alexandria University Hospital. That was a significant push to develop neurology and neurosurgery in Sudan.

1970

- **Open Heart Surgery Program Launched**

Preparation for launching the open-heart surgery program took over 20 years of animal experimentation, building new premises, laying down infrastructure, and training personnel. In addition, Mr. Yacoub did extensive training in this field in Britain.^{[301]-[302]} He founded the Shaab Hospital Operations Theatre Complex in 1964 to care for heart, chest, and neuro-surgery.

Surgeons (e.g., Muhammad Saied El-Fiel, Ibrahim Mustafa) and physicians (Siddig Ibrahim Khalil) were sent for training in both disciplines. In addition, high School nurses (Hayat Bab Allah, Nimat Mohamed Malik)^{and} pump technicians (e.g., Himaidan from the Military Corps) were sent for training in Harefield, UK. Other surgeons, cardiologists, and anesthetists were attracted to join the program at different stages of its development. Several surgeons were involved in this venture and assisted Mr. Ahmed Abdel Aziz in heart or chest surgery. Mr. Mirghani Sanhoury's career path continued in excellence in general and chest surgery. Mohammed Saied El-Fiel^[303], who finished his training in Ireland, and returned home in 1982, carried on with chest and heart surgery.

- **The Department of Anesthesia, FOM/UOK Established**

The Department of Ophthalmology, FOM, UOK, was established in 1970. Professor El-Tahir Fadl was the first Head of the Department.

- **First Professor, Department of Physiology, FOM, UOK Nominated**

In 1970, Professor Ali Khogali Ismail was named the first Head Department.

- **National Council for Research Founded**

Professor Abdel Hamid Ibrahim Suleiman, and other personalities, including Hussain Idris, Director of the Agricultural Research Corporation, and Mahdi Mustafa El-Hadi of the Ministry of Foreign Affairs, supported founding the NCR continued pressing. The NCR establishment decision was one of the first decisions by the Ministers' new May 1969 regime cabinet.

The NCR was established in 1970 by a presidential decree as an advisory body with the following objectives:

1. To effect coordination in research and scientific activities.
2. To formulate and follow the nation's services policy, mainly research and development.
3. To render advice to the Government in training the scientific workforce on technology in the country's development.
4. To create a healthy atmosphere for scientists and research workers to use their knowledge and energy to solve problems in its development.

The NCR initially consisted of four sub-councils:

1. Medical Research Council
2. Agricultural Research Council
3. Industrial Research Council
4. Economic and Social Research Council

The NCR secretariat was accommodated on the 5th floor of the NHL and was headed by Dr. El-Samani Abdalla Yagoub from the Department of Physics, University of Khartoum. In addition, the building accommodated the Institute

of Tropical Medicine Research and the Schistosomiasis Research Unit.

- **Medicinal and Aromatic Herbs Research Unit Established**

The Medicinal and Aromatic Herbs Research Unit (MAHRU) was established in 1970, affiliated with the Medical Research Council of the National Council for Research, to research medicinal plants, emphasizing herbal taxonomic, pharmacognostic, chemical, galenical, toxicological, and experimental pharmacological research. It was also stipulated that the Unit (later Institute) should research aromatic plants and their industrial and commercial uses. Over thirty years of activity, the country surveyed broad areas for herbal specimens, inventories made, and a herbarium maintained for the various specimens. The taxonomic, phytochemical, and pharmacological screening was performed on the collected samples.^[304] When the TMRI was established in 1981, the MAHRU was renamed MAHRI.

- **National Health Laboratory Opened**

The National Health Laboratory (NHL) was opened in 1970 and included Stack Laboratory, the Medical Insect laboratory, the Wellcome Chemical Laboratory, the Department of Pathology, and the Department of Microbiology of the Faculty of Medicine UOK. It also housed the Medical Research Council of the National Council for Research.

- **Mohamed Hamad Satti's role in building NHL**

One of Dr. Satti's central roles in research development in Sudan was supervising a 6-story building complex that

formed the new National Health Laboratories. The building was planned to accommodate the expansion of health laboratory services.

- **Plots of Land West of FOM, UOK Allocated for FOM Future Expansion**

In 1957, that area was re-allocated for the immediate expansion of the Faculty of Medicine, University of Khartoum, to meet the proposed larger intake of medical students, which the government gave top priority.

- **The Plot Of Land Allocated To The Proposed NHL**

An alternative piece of land was allocated for the new laboratory buildings, the current venue of the Continuing Medical Education Department of the Ministry of Health. Unfortunately, the new area contained six old government houses and would need many years to evacuate.

At the same time, the Graphic Museum (المتحف التصويري) building was condemned and closed pending demolition. Because of the expected difficulties and years of delay needed to remove those houses, Prof. Abdel Hamid Ibrahim Suleiman suggested constructing the proposed combined medical MRI/WCL building in the Graphic Museum and building a new museum in the (now) Continuing Medical Education buildings. The new suggestion was immediately approved, and Prof. Abdel Hamid was directed to follow up with the design of the buildings and allocate laboratory space for the listed departments and sections. To expedite the design, the Ministry of Works contracted a foreign engineering firm (Peter Muller Engineering Co.) to undertake the architectural and structural design and cost of the pro-

posed building, which were immediately submitted for financial approval in the 1961-1962 budget.

Dr. Satti, Dr. Sayyid Daoud Hassan, and Prof. Abdel Hamid Ibrahim earnestly chased financial approvals and supervised the construction and equipment of the new multi-story National Health Laboratory in Khartoum (NHL).

- **Household Remedies Regulation 1970 Issued**

The Household Remedies (Control of Sale) Regulation 1970 detailed drugs sold by full-time retired medical and pharmaceutical assistants in-licensed drug shops. The Regulation was redrafted in 1997.

- **Postgraduate Medical Education Board Established**

The Postgraduate Medical Education Board (PGMEB) was a joint venture of the Ministry of Health and the University of Khartoum. The main objective was to organize post-graduate courses leading to professional qualifications.

- **Department of Anaesthesia, FOM, UOK Established**

The Department of Anaesthesia was established in 1970 within the Department of Surgery in the Faculty of Medicine, University of Khartoum. Professor Tahir Fadl was appointed the first Head.

- **A Committee For The Ethics of Health Research Formed**

In 1979 a committee for health research ethics was formed in the National Health Laboratories.

1971

- **Ministry of Higher Education and Scientific Research Established**

In 1971, Prof. Ahmed Mohamed El-Hassan founded the Ministry of Higher Education and Scientific Research. During his tenure, he laid the foundation of the ministry, and with the help of many academicians, he maintained the independence that Sudanese universities enjoyed over the years. He introduced some reforms in technical education and reinstated the Islamic University, which had been downgraded to a college. The National Council for Research (NCR) ensured independence, and its institutions were evaluated. Several changes were made in the NCR's managerial and academic workforce and other high learning institutes.

- **Poisons List Order 1971 Adopted**

The Poisons List Order 1971 (أمر قائمة السموم لسنة ١٩٧١) was adopted by the CBPH on 20 March 1971 and published in Sudan Legislative Gazette in Arabic and English. The order detailed Parts 1, 2, and three poisons. It has not been changed ever since.

- **Ionizing Irradiation Act 1971 enacted**

Organization of Ionizing Irradiation Act 1971 (قانون تنظيم العمل بالإشعاعات المؤينة لسنة ١٩٧١). (Check latest).

- **Sudan Medical Association Dissolved**

The Sudanese Medical Association (الجمعية الطبية السودانية) was dissolved in 1971 and replaced by a new organization called Sudan Doctors' Union (نقابة أطباء السودان). Dr. Mohammed Shaker Al-Sarraj was the first president (نقيب الأطباء) (1973-1978). Dr. Al-Sarraj was followed by Dr. Harith Hamad (1978-1980), Dr. Taha Ahmed Talat (1980-1981), and Dr. Guzuli Dafaalla (1982-1985). Dr. Khaled Yagi completed the Guzuli Dafaalla tenure when Guzuli was appointed Prime Minister in the April Uprising government). Dr. Abd Al-Rahman Abu al-Kull (1986-1989) and Dr. Maamoun Muhammad Hussein completed Abu al-Kull tenure when Abu al-Kull was appointed Minister of Health)

- **Building Regional Laboratories Started**

Building regional laboratories started in Port Sudan, Obeid, and Juba.

- **Popular Local Governance Rule In 1971 Introduced**

The Popular Local Governance Rule was introduced in 1971. This was meant to be yet another practical administrative/political level where the province remained responsible for the essential services (education, public health, agriculture, and community development).

- **UOK Plans Succeeded In Improving Baghdad's Trust**

In 1971 the University of Khartoum succeeded when the authorities agreed on several steps to facilitate cooperation with the endowment and its promotion.

- **Husein Abu Salih Starts The Neurology Unit**

Husein Abu Salih starts the Neurology Unit in Shaab Hospital sharing beds and facilities with the Cardiac and Chest Surgery Unit.

1972

- **Institute For Tropical Diseases Research Established**

During 1972-77, Prof. Ahmed Mohamed El-Hassan was Chairperson of the Medical Research Council (MRC) in Sudan. During that period, he and others helped establish the Institute for Tropical Diseases Research (ITDR) at the NCR with its two parts: the Hospital for Tropical Diseases in Omdurman and the Laboratory in Khartoum. Several researchers were recruited and sent for training in Britain's tropical medicine, pathology, epidemiology, and parasitology.

- **Tigani El-Mahi Psychiatric Hospital Established**

The first psychiatric teaching hospital that Tigani El-Mahi started in Omdurman in 1972 was named after him in commemorating his outstanding contribution as the father of African and Sudanese psychiatry.

- **Medical And Science Libraries Evolved**

In 1972, both libraries (the Medical Research Laboratories (Stack) Library and the Chemical Research Laboratories (Wellcome) Library) were combined to form the NHL Library and were housed on the ground floor of the NHL building. However, when the entomology and bilharzia sections were created in NHL, no books, and for that matter, no museum specimens were transferred from Wad Medani to Khartoum. Thus, the two sections started afresh.

In 1972, both libraries (the Medical Research Laboratories (Stack) Library and the Chemical Research Laboratories (Wellcome) Library) were combined to form the NHL Library and were housed on the ground floor of the NHL building. However, when the entomology and bilharzia sections were created in NHL, no books, and for that matter, no museum specimens were transferred from Wad Medani to Khartoum. Therefore, the two sections started afresh.

In 1974, according to Hallab, this library ‘contained 4000 books, 80 journals, and a constant up-to-date flow of WHO publications.’ However, he noted that the library. This library still exists but is poorly kept, neglected, and has more or less been closed for the last fifteen years.

- **Food Industrial Corporation Established**

In 1972, Prof. Abdel Hamid Ibrahim, at the request of Prof. Ahmed Abdel-Rahman Elagib, Director General, IDPC, was appointed as the Managing Director of FIC (incorporating 25 public sector food factories). However, after two years of achievements, as recognized by the Minister of Industry (the late Musa Awad Bilal), who wanted to extend his secondment, Prof. Ibrahim insisted on returning to the NCL in 1974.

- **Births And Deaths Registration Act 1972 Enacted**

Births, and Deaths Registration Act 1972 (قانون تسجيل المواليد)
١٩٧٢ (والوفيات لسنة) enacted.

- **First Successful Kidney Transplant**

Prof. Omer Mohamed Bilal performed the first successful kidney transplant operation in Soba University Hospital in

1972. The patient was a Saudi national, and the operation was probably the first in the Middle East.

- **Gastrointestinal Endoscopies Introduced**

Dr. Beshir Arbab used gastrointestinal endoscopies regularly.

- **Postgraduate Medical Education Board Dissolved**

The Postgraduate Medical Education Board (PGMEB), established as a joint venture of the Ministry of Health, and the University of Khartoum, was dissolved.

1973

- **The Aftermath of the Suez Canal War**

The 1973 Suez Canal war led to the rapid escalation of petroleum prices with a subsequent steep increase in drug prices. In the following years, developing countries with limited foreign exchange resources became increasingly unable to procure essential drug requirements for their populations. With its meager foreign exchange resources, the Sudan government was increasingly incapable of availing CMS of sufficient hard currencies to procure the drugs needs of public sector health facilities, and these soon were unable to provide most of the prescribed drugs to their patients. Patients reverting to private pharmacies found drug prices unaffordable. At the community level, patients stopped going to peripheral primary health care facilities (rural health centers, dispensaries, dressing stations) because of the lack of drugs. As a result, the rural population missed the preventive, promotive, and social health care services provided by those health facilities. The availability and affordability of drugs soon became a public issue and a national problem. However, like most governments in developing countries with limited foreign exchange resources, the Sudan government practically realized its inability to provide free medicines to patients in public health facilities. The cost of medicines would constitute over 40% of the health budget. The government was convinced of the need for the contribution of the patient or community contribution to the cost of prescribed drugs in public health facilities. Schemes of self-help cost-sharing as a mechanism for such contribution were advocated. Many provincial health authorities introduced self-financing schemes for procuring

drugs, and other medical supplies, e.g., fees for hospital visitors, consultation fees, benevolent drug fund, a surcharge on the price of sugar, cost recovery/sharing, and others.

- **The Anesthesia and Intensive Care Program Started**

In 1973, Hassan Mohamed Ibrahim, senior anesthetist, Khartoum Teaching Hospital, and Senior Anaesthetist, MOH, short-listed several doctors through examination. The selected doctors were sent to the UOK for specialization. Almost all attained DA and or FFARCS.^[305] These anesthetists were invaluable in launching meaningful open heart, neurosurgery, and advanced surgery programs. They were fortunate to have also the support, and guidance of a highly trained team of anesthetists from the Faculty of Medicine, the University of Khartoum, led by Professor Abdel Rahman Abdel Salam.

- **Khartoum Cheshire Home Established**

By 1992, there were 270 homes in 49 countries founded by Leonard Cheshire (1917–1992) International.^[306] These homes provide rehabilitation services to disabled children free of charge. For example, two Cheshire Services in Sudan provide residential care and outreach/community-based rehabilitation program. These services cover disadvantaged areas and displacement camps and offer physiotherapy, orthopedic workshops, surgery, educational, and creative activities such as handicrafts.

The services work with many partners, including the Christoffel Blinden Mission, the Broader Horizon Institute in Atbara, Sudan north, and the western Sudan Union of the Disabled. Khartoum Cheshire Home (KCH) was established in 1973 as a local voluntary organization. This reha-

bilitation center assesses children with mobility impairments, refers, gives pre-and postoperative care and treatment, and provides physiotherapy services and mobility devices to children with physical - mobility impairment. The center has 34 beds for post-operative care. In addition, the admitted children get an education during their stay in the rehabilitation center to prepare them to join schools once they are discharged.

Those who helped in the foundation of the KCH include Mr.Adam Fadalla, Mr.Abdel Rahim Mohamed Ahmed, and Dr. Ahmed Abdel Mageed. KCH is managed by an Executive Committee of 12 to 15 members and is traditionally headed by the British Ambassador in Sudan. The Department of Orthopaedic, Faculty of Medicine, University of Khartoum covers all clinical activities of KCH. Around 1500 children are seen in KCH, 330 children are operated on annually, and an additional 3000 children are given mobilization aid. The departments of KCH are:

- Physiotherapy, including hydrotherapy.
- Orthopedic workshop unit for orthotics production.
- Surgery.
- Outreach unit and community-based rehabilitation.

• **Pharmacy And Poisons Act Amended**

Pharmacy and Poisons Act was amended in 1973. The sections concerned with the registration of pharmacists were deleted as Sudan Medical Council assumed that role after its formation in 1968. However, a new section was introduced, allowing the CBPH to form technical committees to recommend the board registration and de-registration of pharmaceutical products.

• **Food Control Act 1973 enacted**

In 1973, with the help of an FAO expert, a new Food Control Act (قانون رقابة الأطعمة لسنة ١٩٧٣) was enacted, which made the GA the secretary of a multidisciplinary Food Control Advisory Committee (advisory to the Minister of Health). Several regulations were issued (copies available in AI Su-leiman Collection in SMHF):

1. General Food Hygiene Regulation
2. Food Additives
3. Food Inspection
4. Food Sampling and Analysis
5. Registration of Pre-packed Food Regulations

- **School Health Act Enacted**

School Health Act 1973 (قانون الصحة المدرسية لسنة ١٩٧٣) was enacted in 1973. State Act. One regulation: Health insurance for pupils (translation. Needs updating).

- **Medical Commission Act 1973 Enacted**

Medical Commission Act 1973 was enacted as a State Act. Regulations: Health regulations to protect pilgrims (check).

- **A Pharmacist was Added as Assistant to The Secretary-General, SMC**

Sudan Medical Council decided in 1973 to designate a pharmacist as an assistant to SMC Secretary-General. Pharmacist Hamid El-Obaid was the first to fill this new post.

- **Quarantine Act 1973 Enacted**

Quarantine Act 1973 (قانون الحجر الصحي لسنة ١٩٧٣) enacted.

- **Mansour Ali Haseeb Was Awarded Shousha Prize in 1973**

In recognition of Haseeb's significant contribution to medical education and research in Sudan, the W.H.O. General Assembly, in its twenty-six meeting at Geneva, decided to award him the Dr. A. T. Shousha Prize^[307] and Medal for 1973.^[308]

- **SMC Appoints a Pharmacist, Secretary-General**

In 1973, the Sudan Medical Council appointed a pharmacist as secretary-general. Pharmacist Hamid El-Obaid was the first to fill this post.

- **SMC Updated Moral Act**

The SMC revised and updated the Moral Conduct Act in 1973. However, the *Medical Ethics* and *Medico-Moral Problems* (قواعد وآداب السلوك للمهن الطبية) document that replaced the Act was not enforced until late 1979.

Council of Higher Education Act Enacted

- **On 28 August 1973 Constitution of Postgraduate Studies Approve**

On 28 August 1973 the UOK Senate approved the constitution of the Council of Postgraduate Medical Studies.

1974

- **The National Prosthetic and Orthotic Center Established**

Artificial limb making made a modest start in the early 1940s through a personal initiative in the workshops of the Mechanical Transplant Department. This is dedicated to serving the amputees of the Sudan Defence Force during the Second World War. The service gradually expanded to include civilians. The Senior Surgeon to the MOH became actively involved in the prescription and supervision of the fittings with the initiation of orthopedic surgery in Khartoum Hospital. In the early sixties, the workload on this small unit became more extraordinary, and the MOH needed to take over. The Center was officially inaugurated in May 1974.

The buildings of this Center are situated in the Industrial Area in Khartoum, some three kilometers from Khartoum Civil Hospital. They consist of a complete outpatient block, three adjoining blocks, which serve as workshops, and a service/administrative block.

The technical staff consists of four Khartoum Senior Trade School graduates technicians. The course in this school included 12 years of general and three years of technical education. After a two-year on-the-job training in the Old Unit, technicians are sent 18 months upgrading courses to London and Tehran. Staff also included four senior forepersons with many years of experience, of whom two had three months of upgrading courses in Cairo, and senior skilled laborers specializing in metal, wood, and leatherwork.

The machines were bare hands, bench tools, and light machinery bought from Hangers Ltd, UOK. This leaves the

center dependent on importing some prefabricated components in the initial phase. However, plastics have already been introduced and prove to be very satisfactory in prostheses and orthoses.

- **Medical and Science Library Continued to Grow**

In 1974, the NHL library, according to Hallab, 'contained 4000 books, 80 journals, and a constant up-to-date flow of WHO publications.' However, he noted that the library lacked proper cataloging and classification and needed a professional librarian's services. This library still exists but is poorly kept, neglected, and has more or less been closed for the last fifteen years.

- **University of Khartoum Library Grew**

In 1974, the late Prof. Tigani El-Mahi's family donated his library to the University of Khartoum. The donation included 14502 books, 2634 manuscripts of historical value, and 640 rare maps. The donation was housed on the ground floor of the main library and named *Tigani El-Mahi Library*.

In 1974, the University of Khartoum library boasted 250,000 books on its bookshelves.

- **Library of FOM, UOK**

Although there are medical, pharmaceutical, and dental libraries in each new university or college, the medical library of the FOM, UOK, remains the largest in the country. In 1974, this library had 11,000 books and took 425 journals, including 42 crucial indexing and abstracting services in biomedical sciences. The library also received WHO

publications regularly. In addition, biological and Chemical Abstracts were available.^[309]

- **UOK Library**

The current University of Khartoum Library started by acquiring 3000 volumes from the Higher Schools (later GMC) in 1945 and 3000 volumes from the Civil Secretary library. By 1974, this library boasted 250,000 books on its bookshelves.

- **The Sudan Collection, UOK**

Sudan Collection in this library is rich and includes biomedical literature. In addition, the library keeps copies of medical theses accepted for higher degrees by the University of Khartoum, and most of the theses are presented to foreign universities on medical studies related to Sudan or by Sudanese.

- **Pharmaceutical Products Registration Regulation 1974 Issued**

The essential Regulation issued under the PPA was the Pharmaceutical Products Registration Regulation of 1974.

It detailed the requirements for applications for registration of pharmaceutical products and the criteria to be considered by the CBPH for registration: need efficacy, quality, price, control of numbers of similar products, or other considerations.

- **General Food Hygiene Regulation Issued**

In 1974, Prof. Abdel Hamid Ibrahim issued the General Food Hygiene Regulation,^[310] Food Additives, Food Inspec-

tion, Food Sampling, and Analysis^[311] and the Registration of Pre-packed Food Regulations.^[312] Furthermore, to ensure effective control of food quality and safety, he promoted, and implemented, as with medicines, compulsory pre-packed foods, considered an innovative approach to ensure food safety and quality.

- **FOM, UOK Celebrate Golden Jubilee**

FOM, UOK Celebrate Golden Jubilee on 29 February 1974.

1975

- **Pediatric Cardiology And Cardiac Surgery Started**

Professor Mohamed Ibrahim Ali Omer established neonatology first in Khartoum Teaching Hospital and later in So-ba University Hospital.

Abdel Moniem El-Sied established pediatric cardiology in 1975. Thus, a pediatric cardiology service began, which became available for babies and children with congenital heart disease for the first time in Sudan. In addition, the pediatric cardiology outpatient department provided patients a chance to teach and train under- and post-graduate students in pediatric cardiology. The OPD service was soon followed by cardiac catheterization in a child for the first time in Sudan, which he performed in 1976.

Dr. Abdel Moniem El-Seid established strong working relations with the Royal Brompton Hospital. As a result, the prominent cardiac surgeon, Mr.Chris Lincoln, and pediatric cardiac cardiologists Dr. E. A. Shinebourne and Dr. M. C. Joseph from Royal Brompton Hospital visited Sudan.

Dr. El-Sied was aware of the need for pediatric cardiac surgery. So he made plans for the late Dr. Ibrahim Mostafa to train in the UK under Mr.Magdi Yacoub and Mr.Chris Lincoln. Training of theatre attendants and technicians was also undertaken.^[313]

After years of training, Dr. Ibrahim returned to Khartoum and started a marvelous surgery program for children with congenital and acquired heart disease for the first time in Sudan. However, shortly after returning to Sudan, he died in a tragic gas cooker fire in 1984, ending the pediatric and adult heart surgery program.^[314]

- **Environmental Health Act 1975 Enacted**

Environmental Health Act 1975 was enacted as a federal act (State Act). Regulations include (translation, which needs updating):

1. Regulation of disposal of chemicals and pesticide containers.

- **Public Health Ordinance 1975 Enacted**

A new Public Health Ordinance 1975 was enacted. According to the article (81) of the Ordinance, the Minister of Health can issue all necessary regulations. However, before it was superseded by a new one in 2008, several modifications were made to suit the constitutional and administrative reforms.

- **Sterling Winthrop Established**

In 1975, Sterling Winthrop established a small Khartoum North Industrial Area facility to produce popular OTC products, mainly Cafenol (ASA) and Panadol (Paracetamol) tablets.

- **Daoud Mustafa was Awarded Professor Emeritus of Medicine**

In 1975, the University of Khartoum bestowed Professor Daoud Mustafa Khalid's Professor Emeritus of Medicine status.

- **Maternal and Child Welfare Society Established**

Material and Child Welfare Society (جمعية رعاية الأمومة والطفولة) was established by Abdel Salam Gerais and Hamid Rushwan in 1975.

- **Public Service Regulation Established**

Public Service Regulation 1975 (لائحة الخدمة العامة لعام ١٩٧٥) established.

- **Gastroenterology Society Established**

Gastroenterology Society was established. The first president was

- **Soba University Hospital Joined FOM, UOK**

Soba University Hospital Joined FOM, UOK

1976

- **The Open Heart Program Launched**

In preparation for launching the open-heart surgery program on humans, Mr.Ahmed Abdel Aziz Yacoub befriended and invited to Sudan several notables, including Richard Emanuel and Mr.Donald Ross. As a result, he started experimenting with open-heart surgery on animals in 1976 with the help of veterinarian Dr. Salah Umbabi, who gave anesthesia and was joined by Christopher Lincoln on UCT Ken in February 1977. This small team operated on forty (40) cases (11 goats and 29 sheep) in preparation for launching a human open-heart surgery program.

Mr.Yacoub started open-heart surgery in man in 1978. In collaboration with Mr.Donald Ross, he and his team operated on nine (9) cases. The Sudanese team included Mr.Mirghani Sanhoury, Mr.Kamil El-Sadig, and anesthesiologists, including Drs. Hassan Mohamed Ibrahim, and Laila Abdalla.

- **Community Pharmacies Proposed**

In 1976 the health authorities in Khartoum and El-Obied came up with the idea of Community Pharmacies owned and run by the health authority. CMS made arrangements to provide these pharmacies with essential drugs at the tender prices plus departmental fees, and the community pharmacy sells the drug to the public at the much lower CMS price plus a small mark-up.

Despite the stiff opposition of drug importers and private pharmacies, community pharmacies soon became very popular as they provided much cheaper drugs at an afford-

able cost to most patients. Because of the popularity of community pharmacies, MOH drafted a plan for the establishment of a public company to be called the National Company of Community Pharmacies to be registered under the Companies Act 1925, with shares to be owned by MOH, Ministry of Finance, a public sector bank, and regional governments, but the project was not realized.

- **Higher Studies Council Started Recruitment**

Candidate registration for Higher Studies Council started.

- **Primary Health Care Adopted**

Primary Health Care has been adopted as the main strategy for health care in Sudan.

Faculty of Medicine, University of Gezira opened

- **Faculty of Medicine, University of Gezira, Founded**

Faculty of Medicine, University of Gezira opened in 1976 as a community-based university, thanks to the pioneering ideas of Professor Beshir Hamad.

- **Faculty of Medicine, University of Juba, Founded**

Faculty of Medicine, University of Juba opened in 1976, thanks to the pioneering work of Professor Abdel Aal Abdalla Osman.

- **The Police Hospital Established**

The Police Hospital was established in 1976 in Khartoum to provide health services for police forces, their families, and civilians. It became a training center for the National Ribat University students later.

1977

- **Sale Of Veterinary Drugs Regulations 1977 Issued**

In 1977 the **Sale of Veterinary Drugs Regulations 1977** (لائحة بيع الأدوية البيطرية لسنة ١٩٧٧) was issued, which allowed the sale of certain listed veterinary drugs by a full-time licensed veterinary practitioner.

- **Community Pharmacies Revisited**

In 1977, the local drug situation continued to worsen. The government could not avail of the foreign exchange that enables CMS to procure sufficient essential drugs needed by public health facilities. In most cases, patients had to revert to private pharmacies whose drug prices were unaffordable to most of them.

The government was convinced of its inability to provide free medicines to patients in public health facilities and of the need for the contribution of the patient or the community in the cost of the drug. Hence the terms cost-sharing and self-help. Many provincial health authorities introduced schemes for financing drug supplies, e.g., fees for hospital visitors, consultation fees, and a surcharge on the price of sugar. Health authorities in Khartoum and El-Obied came up with the idea of Community Pharmacies owned and run by the health authority.

CMS made arrangements to provide these pharmacies with essential drugs at the tender price plus departmental fees, and the community pharmacy sells the drug to the public at a much lower CMS price plus a small mark-up. Despite the

stiff resistance of drug importers and private pharmacies, community pharmacies soon became very popular and were opened by health authorities in most provinces as they provided much cheaper drugs at an affordable cost to most patients. Because of the popularity of community pharmacies, MOH drafted a plan for the establishment of a public company to be called the National Company of Community Pharmacies to registered under the Companies Act 1925, with shares to be owned by MOH, Ministry of Finance, a public sector bank, and later regional governments, but the project was not realized.

- **The First Community Pharmacy Opened**

The first community pharmacy (صيدلية شعبية) opened in Omdurman in 1977

- **Essential Drugs List Proposed**

To enable developing countries maximum use of their limited foreign exchange in providing the health needs of their population with essential, indispensable drugs, WHO in 1977 advocated and promoted the concept of essential drugs, and included essential drugs as one of the eight components of primary health care.

WHO also recommended that developing countries formulate national drug policies based on that concept and on the selection of a national list of essential drugs that satisfy the priority health needs of the population and which should be made available to those who need them in good quality, and sufficient quantities, and at a reasonable cost.

- **R. Kirk's Papers Were Deposited in Rcs Library**

In 1955, Prof. Robert Kirk took his last journey to Malaya and thence to Hong Kong, where he died in 1962. In addition to the many papers, he authored and already documented^[315], many other papers and manuscripts relating to medical practice in Sudan were found among his effects after his death. They were presented to the Royal Commonwealth Society in the United Kingdom by Prof. JB Gibson, Dean of the Faculty of Medicine, Hong Kong, through Dr. KE Robinson in February 1977.^[316]

- **Research In Medicinal Plants Started**

In the seventies, more organized laboratory research started. Its main objectives were to validate claims of efficacy that healers attributed to their medicinal recipes and to analyze medico-legal samples collected in cases of injury or death suspected of poisoning. Other studies dealt with theories, and concepts of traditional medicine, its clientele, the healers' roles, and the national *materia medica*.

In 1977, the WHO Eastern Mediterranean Advisory Committee on Biomedical Research reported that traditional medicine was one of the region's resources that had received scant attention. It consequently recommended exploring means of incorporating traditional healers within the health service.

1978

- **The Open-Heart Surgery Program Started**

Mr.Yacoub started open-heart surgery in the man program in 1978. In collaboration with Mr.Donald Ross, he and his team operated on nine (9) cases. The Sudanese team included Mr.Mirghani Sanhour, Mr. Kamil El-Sadig, and anesthetists, including Drs. Hassan Mohamed Ibrahim, and Laila Abdalla.

Surgeons (e.g., Muhammad Saied El-Fiel, Ibrahim Mustafa) and physicians (Siddig Ibrahim Khalil) were sent for training in both disciplines. In addition, high School nurses (Hayat Bab Allah, Nimat Mohamed Malik) and pump technicians (e.g., Himaïdan from the Military Corps) were sent for training in Harefield, UOK. Other surgeons, cardiologists, and anesthetists were attracted to join the program at different stages of its development. Several surgeons were involved in this venture and assisted Mr.Ahmed Abdel Aziz in heart or chest surgery. Mr.Mirghani Sanhour's career path continued in general surgery and chest surgery with excellence. Mohammed Saied El-Fiel^[317], who finished his training in Ireland, and returned home in 1982, carried on with chest and heart surgery.

Mr.Yacoub started open-heart surgery in man in 1978. In collaboration with Mr.Donald Ross, he and his team operated on nine (9) cases. The Sudanese team included Mr.Mirghani Sanhour, Mr. Kamil El-Sadig, and anesthetists, including Drs. Hassan Mohamed Ibrahim, and Laila Abdalla.

In January and February 1982, Mr.Ahmed Abdel Aziz's team, headed by Mr.Ibrahim Mostafa, launched the open-heart surgery program. Sir Mr.Magdi Yacoub and Richard

Emanuel consolidated this venture by visiting Sudan in 1982 with an entire team of surgical anesthetic registrars, pump technicians, and sisters and operated on eleven (11) cases.

- **Catheter Laboratory in Shaab Hospital Operated**

Without qualified cardiologists and catheter laboratories, no fully-fledged open-heart surgery program would be possible. While in the UOK, Dr. Muhammad Sirag Abbashar, then cardiologist in Harefield, did the first catheter in the newly established Catheter Laboratory in Shaab Hospital in 1978. The catheter work became a regular activity in 1980 and continued with excellence. Eight cases were done each week in three sessions. However, in 1989, activities in this laboratory slowed down and came to a standstill later due to a lack of funding and the inability to maintain equipment. Ultrasonography and stress tests started in 1981.

- **Restrictions On Advertisement Of Drugs Regulations 1978 Issued**

The Restrictions on Advertisement of Drugs Regulations 1978 (لائحة تقييد الإعلان عن العقاقير لسنة ١٩٧٨) was made which prohibited advertisements of drugs to the public and only allowed pre-approved advertisement to health personnel.

- **Food Control Administration in the Directorate in Central MOH**

In 1978, Prof. Abdel Hamid Ibrahim submitted a proposal to the Food Control Advisory Committee to establish a Food Control Administration in the Directorate of Envi-

ronmental Health in Central MOH. He actively followed up the establishment of the administration and its activities. In addition, Prof. Ibrahim arranged for the training of the Head of the Directorate to make orientation visits to FDA, WHO, and FAO, and the training of a good number of public health officers in food inspection in the Netherlands and Kenya.

- **Local Manufacture of Medicines**

As a result of the 1973 Middle East war that caused a phenomenal increase in petroleum prices, there were continuous steep increases in imported medicines during the mid-seventies, making the government unable to provide the necessary foreign exchange for import medicines. As a result, many international pharmaceutical companies withdrew from the Sudanese market, which led to severe shortages in essential medicines and other medicinal products for the first time. These effects made the government in 1978 and after advocate support to local drug production, which also suffered from shortages of foreign exchange that resulted in the reduction of production capacities of local factories to less than 15%, and their inability to compete in the significantly reduced, and limited CMS drug tenders during that decade.

- **Essential Drugs List**

In 1978 an outline of MOH drug policy was issued based on that concept and on the selection of a national list of essential drugs that satisfy the priority health needs of the population and which should be made available to those who need them in reasonable quality, and sufficient quantities, and at a reasonable cost.

- **Human Tissues and Parts Act 1978 Enacted**

Human Tissues and Parts Act 1978 (قانون الأعضاء والأنسجة)
(البشرية لسنة ١٩٧٨) (check name and latest version).

- **WHO Developed Questionnaire**

In 1978, a WHO working group developed a questionnaire to collect baseline information on traditional medicine in the countries of the eastern Mediterranean Region (EMRO).^[318] On reviewing the questionnaire, EMRO noted that, though varying degrees of interest in traditional medicine were shown in all countries of the region, many problems still beset integrating traditional medicine with the existing health delivery system. Some underlying issues were:

- How can the available workforce resources of traditional healers be effectively utilized?
- What can be done to improve traditional healers' knowledge, skills, attitudes, and competence?
- To whom are traditional healers to be responsible and accountable?
- How should their credibility and acceptability be assessed in the community?
- To what extent does the community mobilize and support the integration of the two systems?
- Which priorities in health care should be set for traditional healers, and what would be the economic implications?

- **WHO Passes Resolutions on TM**

Several resolutions were passed in 1978 at the 31st World Health Assembly (WHA) regarding promoting traditional medicine.^[319] These resolutions initiated a public program to promote and support the use, development, and adaptation

of diagnostic, therapeutic, and rehabilitative technologies and the proper use of medicinal drugs appropriate for specific national systems and institutions.^[320]

1979

- **Blue Nile Health Project launched**

A pilot multi-disciplinary project was launched in the mid-seventies of the twentieth century involving researchers, laboratory technicians, and fieldworkers. The objective of this project was to control the disease through molluscicides, which were then thought to be a promising tool for controlling schistosomiasis. Many medical and paramedical staff and scientists were trained. These groups later became the *Blue Nile Health Project* (BNHP).

Research on *S. mansoni* infection in the *Gezira Scheme* led to the formation of the BNHP, which reduced the infection in the population from 80% to 6% through various preventive measures. In addition to reducing morbidity and mortality, that project had an economic impact by increasing workers' productivity and reducing absenteeism from work. The project director was Prof. Ahmed Ayoub El-Gaddal, a professor of community medicine at Sennar University.

The *Blue Nile Health Project* was a joint venture between Sudan Government and WHO. It was started in 1979 and became operational in 1980. Apart from Sudan and WHO support, funds were made available from the USA government, Japan, Holland, and the United Kingdom. Other diseases included in the project were malaria and diarrhoeal diseases. A member of this group, Dr. Allan Fenwick, headed a similar project to control schistosomiasis in Egypt and achieved great success.

The veterinary group's research on *S. bovis* in cattle led to discovering the first effective vaccine against the disease. The work was a joint venture between Veterinary Science,

the University of Khartoum, and the London School of Tropical Medicine.

Later on, in basic research, Sudanese scientists collaborated with French researchers to elucidate the genetics of humans' susceptibility to Summer's fibrosis (liver fibrosis), a significant cause of death in those infected with *S. mansoni*.

- **Institutional Research in Traditional Medicine Started**

Up to 1979, institutional research in traditional medicine was confined, understandably, to the field of medicinal plants. However, it has been noted that medicinal plants were given more attention than the rest of traditional medicine. Efforts have thus been directed to make this omission good, and the idea of founding TMRI emerged.

In 1979, a memorandum entitled Organization of Research in Traditional Medicine in Sudan was presented to the Medical Research Council for appraisal. The memo highlighted the recent official resurgence of interest in research in traditional medicine worldwide and the reasons behind this movement. It also outlined the field of traditional medicine and its potential benefits for the country. The memorandum stressed the often-quoted justifications: that many domains are touched on other than medicine proper in traditional medicine. Because of this multi-disciplinary nature, a national body must develop a unified research policy. This body should also coordinate activities and foster cooperation between researchers to avoid duplication of effort, and workforce and money are used efficiently and effectively. It should have a policy that safeguards against the scientific isolation of workers involved in traditional medicine inside and outside the country and against the harmful dissipation of data and material. It should also facilitate the storage, retrieval, dissemination, and exchange of knowledge. Moreover, more importantly, it should 'gener-

alize the matter,' making research activities in traditional medicine operational, more realistic, and official.

As a result, the memo suggested establishing the Institute for Research in Traditional Medicine and that it be affiliated with the Medical Research Council. The proposed Institute was envisaged as functioning provisionally through three prototype units covering definitive fields of traditional medicine: phytotherapy, physical therapy, and psychotherapy (including parapsychology). The fact that phytotherapy research had already been taken care of was also noted. The memo also proposed that the existing institutions work with revised objectives if necessary to ensure adequate coverage. In addition, the need for in-depth studies of traditional theories and concepts of health and disease was duly stressed. Finally, provisional responsibilities and objectives of the envisaged institute were suggested.^[321]

The Medical Research Council did not take the memo seriously, and certainly not by the ad hoc committee to look into it. The latter did not even convene to discuss the matter, and the Council did not pursue it further. Instead, other avenues were sought to achieve the objectives set in the memo. This time the Ministry of Health was approached. Though the primary function of the Ministry is health care delivery rather than pure research, the Minister of Health at the time, Mr. Khalid Hassan Abbas, responded immediately and issued two directives to form the necessary committees to look into ways of organizing the efforts necessary to make the best use of traditional medicine.^[322] The second directive, in particular, was made in response to a program in Sudan Broadcasting Service given by the author of this book highlighting the importance of traditional medicine and the need for official recognition and support.^[323]

Following the second directive, the health minister appointed a multi-disciplinary committee, and a working paper was prepared for its perusal.^[324] The committee unanimously endorsed the memo and agreed on the proposals offered,

namely establishing what was later called the *Traditional Medicine Research Institute*. The Committee's unanimous agreement later received the joint endorsement and support of the Ministry of Health and the *National Council for Research*. Furthermore, as suggested in the memo, both bodies agreed that the proposed institute should be affiliated with the *Medical Research Council*.

- **Trachoma Research Organized**

In 1979, as preparation for collaborative work with Professor Barrie R. Jones of the Institute of Ophthalmology, London, UOK, Professor El-Sheikh single-handedly surveyed 11 villages around Khartoum for the incidence and severity of trachoma as well as recording the pattern of eye disease in those communities.

With Professor Barrie Jones, he worked for three weeks in Habiba village near Khartoum, studying the retention and effect of rifampicin focused on treating active trachoma. Unfortunately, the Ocuserts were not well retained by children, badly affected by active trachoma.

- **The First Pharmacist Director of CMS Appointed**

Abdel-Rahman Al-Rasheed Sid Ahmed was the first pharmacist to become Director of CMS in 1979.

- **National Center For Eye Diseases Approved**

Dr. Abdel Gadir Hassan Ishag proposed on 2 January 1969 and 1973 establishing a National Center for Eye Diseases. When he repeated his proposal for the third time in 1979, The General Secretariat of the Scientific Council of Higher Education approved the idea and assigned a government

house as a start base for this project. MSU, USA, promised to help establish and furnish this Center with equipment and training. However, the project was halted after a group of senior ophthalmologists wrongly suggested to the authorities that the project would be affiliated with the University of Khartoum. Twenty-six years later, the General Secretariat looked into the project and contacted Professor El-Sheikh with his opinion. A detailed historical assessment was given.^[325]

- **Health Research Ethical Committee formed**

In 1979, the National Health Laboratory formed a national committee for ethics in human subjects research. The committee is established to guide scientific work carried out by its scientists. The objectives of the committee are:

1. To address current issues, anticipate potential future problems, and facilitate productive communication.
2. To protect the research subjects.
3. To protect physicians and scientists.
4. To protect the State and its citizens from low priority and external research.
5. To drive the research towards health priorities.
6. To review all research proposals.

This committee did not find the necessary support.

- **Building regional laboratories completed**

The building of Port Sudan and El-Obeid regional laboratories was completed. However, the buildings of the Juba laboratory stopped due to the unrest in the South.

- **Seven Central Ministries Cancelled**

In 1979, seven central ministries were canceled, and the authorities of four ministries, including the ministry of health, were reduced and given to the provincial authorities.

- **AMSA Deliberate on TM**

The Association of Medical Schools in Africa (AMSA) in 1979 deliberated exhaustively on traditional medicine and, after passing several resolutions, recommended that the medical schools: teachers and learners, including medical and paramedical students, should recognize the role of traditional medicine in their environment, participate in research in this field to identify the positive, and negative aspects of traditional medicine, and ensure that students are exposed to the practices of traditional medicine.^[326]

1980

- **Onchocerciasis Research Organized**

In collaboration with Professors Barrie R. Jones and AC Bird from the Institute of Ophthalmology, London, Dr. C. Mackenzie from the London School of Tropical Medicine and Hygiene, and Dr. D Hutchinson from the Wellcome Foundation, Beckenham, Drs J. Amderson, and R. Baker WHO short term consultants, Drs Izz El-Din Galal, and Osman Abd El-Nur, Dr. El-Sheikh carried out fieldwork in several regions of Sudan.

- **EDC, FOM, UOK Established**

Education Development Centre, FOM, UOK was established

- **Michigan University State Research Work in Sudan Started**

Collaborative research on parasitic diseases in Sudan project between biomedical researchers at the Michigan University State school of medicine, and faculty and staff of the Ministry of Health and Faculty of Medicine, University of Khartoum, Sudan, started in September 1980. Studies were directed to Malaria, Schistosomiasis, and Onchocerciasis. The Principal Investigator and project director was Jeffrey F. Williams. The project number was 5P01A1016312-07 funded by Michigan State University.

- **Health Development Conference Convened**

In November 1980, a six-day conference was convened under “Comprehensive Health Development of the People, and the Nation. “ During that conference, drug access was seriously discussed and recognized as a priority issue.

- **The First Institutional Research Ethics Committee Established**

The first institutional research ethics committee was established in Khartoum's Faculty of Medicine.

- **The Local Government Act 1980 Enacted**

In 1980, the Local Government Act divided Northern Sudan, excluding Khartoum, into five regions and Southern Sudan into three regions.

- **Educational Development Center Established**

Educational Development Center established.

1981

- **Abdel Hamid Ibrahim elected Vice-Chair, Codex Alimentarius Commission**

In 1981, Professor Abdel Hamid Ibrahim Suleiman was elected Vice-Chairperson of the Codex Alimentarius Commission and its Executive Committee for the biennium 1981-1983.^[327]

- **Technical Committee to Develop a National Drug Policy Formed**

On 7 February 1981, the Minister of Health issued Ministerial Order No. 1/1981, by which he constituted a 29-member Technical Committee to develop a national drug policy. The Committee included representatives of all stakeholders in public and private drug and drug-related sectors. MOH presented a draft national drug policy (NDP) paper as a working paper to the committee. The Committee held 15 meetings that witnessed heated discussions but reached a consensus on most issues and presented its report to the Minister in May 1981, which enclosed minutes of all meetings, a proposed text of the NDP document, and a selected list of essential drugs based on the first 1977 model WHO list.

The NDP document was comprehensive, covering 12 components and essential drugs. It stated its objectives of making their needs of essential drugs of good quality to the population at the least possible cost and the rational use of essential drugs. The Minister of Health (Khalid Hassan Abbas) adopted that policy in the national health plan, developed in 1981.

One of Prof. Abdel Hamid Ibrahim's significant achievements in the drug field is his advocacy of essential drugs since 1977 and the formulation of SNDP in 1981. As chairperson of the national multidisciplinary committee appointed by the Minister of health and against private solid drug sector opposition, the committee formulated a comprehensive NDP document that addressed almost all drug-related components. This document was approved and adopted by the Minister of Health in 1981 and was considered by WHO to outstanding achievement and an example to be followed.

- **Sudan NDP Internationally Acclaimed**

WHO highly acclaimed Sudan's comprehensive NDP. Sudan was one of the few developing countries that developed an NDP and were probably the first to develop a comprehensive NDP that addressed all components and activities that affect the quality, availability, affordability, and proper use of essential drugs. In addition, this NDP opened the way for active collaboration with WHO in implementing and updating the NDP and the National List of Essential Drugs (NLED). The NDP was updated in 1997.

- **Local Manufacture of Medicines: Supports NDP**

In 1981 the Ministry of Health (MOH) made history by formulating and adopting a comprehensive national drug policy (NDP) based on essential drugs. All drug and drug-related public and private sectors developed that NDP.

The NDP objectives were to make the population need good quality essential drugs and promote their rational use. The World Health Organization highly praised the adopted NDP and promised to support the government's implementation. Accordingly, in 1981 the Minister of Health ap-

pointed a multidisciplinary committee composed of representatives from MOH, and other ministries concerned, the Bank of Sudan, and a representative of each local drug manufacturer. The committee's terms of reference were to study and propose means of using the existing capacities of local drug factories. The committee submitted a comprehensive report and recommendations that found wide acceptance from local drug producers and the ministries concerned.

MOH eventually adopted the committee recommendations, Ministry of Industry and Finance. This was considered a significant practical step in implementing the NDP concerning local production of medicines as it provides practical government support that ensures viability, sustainability, and development of local drug industries. This newly adopted government policy encouraged investment by the private sector in local drug production.

Limitations include small capacities, limited financial resources for expansion, and acquisition of modern technologies, limited working capital, lack of trained personnel in drug manufacturing technology, and inability to compete with foreign suppliers in CMS tenders.

Most local factories were working at 20 to 25 percent of their designed capacities despite the increase in their pharmaceutical products and their share of the private market.

- **Traditional Medicine Research Institute Established**

The *Traditional Medicine Research Institute* (TMRI) was founded in 1981 to believe that traditional medicine is integral to a rich, varied indigenous culture and that many domains and disciplines other than medicine are touched on. Later, TMRI took several initiatives. For example, it brought together many scholars from human and behavioral sciences and others from the health sciences for the first

time in Sudan. Both were represented in its policy-making Board of Directors.

TMRI has been envisaged as a national action-oriented research institute with the following objectives: ^[328]

1. To draw up a national policy to stimulate, organize, and direct multi-disciplinary research in traditional medicine in Sudan.
2. To evaluate traditional medicine in the light of modern science to maximize value and effective practices and discourage harmful ones.
3. To promote the integration of valuable knowledge, attitudes, and skills in traditional medicine, including appropriate foreign technologies (e.g., acupuncture), into the existing health delivery system.
4. To relate the research program to the country's general policies and socio-cultural needs.

- **Ahmed El Safi. Tigani El-Mahi Selected Essays (Eng.) Published**

Ahmed El Safi, et al. Tigani El-Mahi Selected Essays (Arabic) book published in 1981.

- **SMC Doctors' Advancement Program Established**

In December 1981, Dr. El-Hadi El-Zain Al Nahhas, President of Sudan Medical Council (SMC), asked Dr. Ahmed El Safi to provide SMC with baseline data on postgraduate medical qualifications, equivalence, and recognition countries. The assignment was carried out, and a report was handed in in August 1982.^[329]

Based on this report, SMC passed bylaws for Specialist Registration, and a Specialist Register was established in 1986. This Register, however, recognized one level of a

specialist with no differentiation or levels or types of specialization.

1982

- **Sudan Health Museum Proposed**

Aware of the fate that befell all medical and health museums in Sudan, Ahmed El Safi proposed establishing a Sudan Health Museum (SHM) in 1982.^[330] The nucleus of this museum was started in the Traditional Medicine Research Institute (TMRI), and the actual acquisition of artifacts began in 1984.

- **National List of Essential Drugs Selected**

A National List of Essential Drugs was listed in 1981 and printed in 1982. It was not adopted but laid the foundation and methodology for selecting the national lists. It was updated to include use levels and printed in 1985, 1987, 1995, and 2007. In all the above activities (but one), Prof. Abdel Hamid Ibrahim was the main editor.

- **Port Sudan Regional Laboratory Started Work**

Port Sudan regional laboratory started work in 1982, including a school of laboratory assistants.

- **Sir Mr. Magdi Yacoub in Sudan**

In January and February 1982, Mr. Ahmed Abdel Aziz's team, headed by Mr. Ibrahim Mostafa, launched the open-heart surgery program. Sir Mr. Magdi Yacoub and Richard Emanuel consolidated this venture by visiting Sudan in 1982 with an entire team of surgical anesthetic registrars,

pump technicians, and sisters and operated on eleven (11) cases. The Sudanese team included Dr. Ahmed El Safi.

1983

- **Regulation of Smoking Act 1983 Enacted**

Regulation of smoking Act 1983 (قانون تنظيم التدخين لسنة ١٩٨٣) was enacted.

- **Amipharma Drug Factory Started Production**

In 1983, the Amipharma drug factory in Khartoum North industrial area started production.

- **El-Obeid Regional Laboratory Started Work**

El-Obeid regional laboratory started work in 1983, including a school of laboratory assistants.

1984

- **WHO Collaborating Center for TM designated**

Between 5-10 March 1983, Dr. B. Sankaran, Director, DTR, WHO Geneva, and Dr. Taha Baasher, Regional Advisor on Mental Health, EMRO/WHO, met with the nationals concerned and visited the offices and research facilities of TMRI. The expressed interest of the Sudanese national authority for further collaboration with WHO and further development of traditional medicine research was noted. The following were the joint observations, and findings regarding TMRI, and its affiliates:

1. It has an excellent scientific and technical standing.
2. It occupies an essential place in the country's research.
3. Enjoys competent scientific and technical leadership and has several qualified staff.
4. It is one of the active institutions in the Sudan National Research Council, the highest in the country, and is well supported by this central national organizational body.
5. It has the ability and readiness to contribute to WHO program activities.

On 5-12 September 1983, Dr. O. Akerele, the WHO Program in Traditional Medicine, Geneva, visited Sudan. He met the concerned officials and nationals and discussed traditional medicine activities and possible Sudanese involvement in the WHO traditional medicine program. As a result, it was provisionally agreed to designate TMRI a WHO Collaborating Center, and uncertain terms of reference were jointly made.

The WHO East Mediterranean Regional Office has noted the ability and readiness of TMRI to contribute to the WHO global traditional medicine program. As a result, TMRI was designated a WHO Collaborating Center for Research in Traditional Medicine on 7 March 1984 with the following terms of reference:

1. To promote research and development of traditional medicine systems in the region's countries, considering furthering their use within the framework of national health systems.
2. To promote studies of herbal remedies used by traditional practitioners in the region's countries in ethnobotanical, medical, anthropological, experimental, pharmacological, chemical, and clinical aspects.
3. To collect, analyze, and disseminate information relating to traditional medicine systems,
4. To participate with other WHO Collaborating Centers for traditional medicine in joint studies to evaluate national traditional medicine systems.
5. To report annually on activities undertaken by the Center concerning the objectives and achievements of investigation carried out by the Center.
6. To perform consultant services in areas of competence of the Center at the request of WHO and other institutions in the countries of the Region.
7. At its Headquarters and Regional office in Alexandria, WHO recognized at once the ability, and readiness of TMRI to contribute to its global traditional medicine program, and it was designated a WHO Collaborating Center for Traditional Medicine in 1984.

- **Ahmed El Safi (Ed.) Tigani El-Mahi Selected Essays (Arabic) Published**

Ahmed El Safi, et al. Tigani El-Mahi Selected Essays (English) book published in 1984.

- **Sigma Tau Drug Factory Established**

Sigma-tau drug factory started production as a joint Sudanese-Italian venture in 1984.

1985

- **National Drug Quality Control Laboratory Equipped and Staffed**

With WHO and UNDP support, the National Drug Quality Control Laboratory was greatly expanded, adequately equipped, and staffed as a National Drug Quality Control Laboratory (NDQCL). By 1985, eleven pharmacists and two chemists were qualified with postgraduate MSc, Ph.D. degrees, and practical training in pharmaceutical analysis.

- **Khartoum Kidney Dialysis Joined FOM, UOK**

Khartoum Kidney Dialysis Joined FOM, UOF

- **Mohamed Hamad Satti was Awarded Shousha Prize**

Dr. Mohamed Hamad Satti was awarded the Shousha Prize and Medal in 1985. On May 15, 1985, he addressed the World Health Assembly for 20 minutes. Shortly after this celebration, he donated the prize money to the Palestinian Liberation cause.

- **Atbara regional laboratory building started**

Atbara regional laboratory building started in 1985.

1986

- **CMS Rehabilitated**

In 1986, at the request of MOH, WHO called on donor countries to help Sudan implement its main NDP components, including the top priority rehabilitation of CMS and upgrading its supply system. In 1986, the Government of the Netherlands responded and signed an agreement with Sudan Government for CMS's complete physical and technical rehabilitation. As a result, during the period 1986 up to 1991, and under the leadership of CMS Director Pharmacist Abdel-Rahman Al-Rasheed, all drugs, and other storage facilities were wholly overhauled and expanded, new cooling systems were installed, standard operating procedures for good storage practice were implemented, and a modern organizational chart for management of CMS was designed.

- **Ahmed Mohamed El-Hassan Awarded Shousha Prize**

Prof. Ahmed Mohamed El-Hassan was awarded the Shousha Prize and Medal in 1986.

- **Community Pharmacies Establishment and Organization Regulation 1986 Issued**

Popular Pharmacies Establishment and Organization Regulation (لائحة إنشاء وإدارة الصيدليات الشعبية لسنة ١٩٨٦) was issued in 1986.

- **Directorate General at MOH Formed**

The directorate of Pharmacy was officially upgraded to a Directorate-General at MOH Headquarters in 1986.

- **Abdelmoneim Company for Medical Industries Established**

Abdelmoneim Company for Medical Industries was established in 1986.

1987

1988

- **Sudan Essential Drugs Program**

Earlier under the heading (National Drug Policy), it was mentioned that SEDP, managed by Prof. Ibrahim, aimed to develop, and test new strategies for improving the drug supply system, upgrade diagnostic, prescribing, and dispensing skills of health workers, improve patient compliance, and public knowledge, attitudes, and practices (KAP) in drug use. Accordingly, all newly developed strategies were designed, tested, and evaluated nationally for future replication.

The Program also included operational research in drug stability, antimicrobial resistance (AMR), and drug use in health facilities and communities. In these strategies, studies, and surveys, the Program developed research protocols, made baseline, and post-intervention surveys to measure impact, developed indicators, and made recommendations on improvements. This was part of what SEDP did during its 10-year existence (1988-1997), and most of its activities have been documented.

Prof. Ibrahim may not have been the primary researcher in these studies and surveys. However, as manager, coordinator, and leader of SEDP, he has guided, contributed, and participated in developing study protocols, their implementation plans, and analysis of results, conclusions, recommendations, and documentation. Some of the areas covered by SEDP studies were:

- Health Area drug distribution system.
- Drug Ration Kits distribution methodology.

- Drug stability studies (local and global) during transport, storage, and distribution.
- In-service training in rational use of drugs (for prescribers and dispensers at all levels).
- Revision of curricula in formal education (medical and pharmacy).
- Studies of drug use in health facilities and communities (several studies).
- Information, education, and communication (IEC) improve public KAP on drug use.
- Antimicrobial resistance studies on the bacterial urinary tract and gastrointestinal tract infections in Khartoum Province.

As expected, both locally produced and WHO protocols of these studies are updated and used by researchers.

- **Wafra Drug Factory Established**

Wafra Drug Factory (owned by the Sudanese Army) was established in 1988.

1989

- **National Conference For Peace 1989 Federalism Recommended**

Sudan adopted the federal system as the basis of governance and was re-divided into twenty-six states with significant autonomy and powers. The system outlined the interrelations between the various federal and state authorities. The Fourth Constitutional Directive established the Federal Government Bureau to coordinate duties between the various organs and bodies. The new system formed one federal ministry of health and 26 state ministries of health.

These changes were a genuine search for a system of governance that helps achieve stability, socio-economic development, equitable resource allocation, and effective and efficient service delivery. The system also sought popular participation, consultation, mobilization, power distribution, and wealth justice. Nevertheless, unfortunately, the implementation was disastrous.

The national essential medicine list was updated and approved in 2014, building upon the approved national standard treatment guidelines set in 2013.

- **El-Sheikh Mahgoub Gaafar was Awarded Shousha Prize**

Prof. El-Sheikh Mahgoub Gaafar, the Mycologist, was awarded the Shousha Prize and Medal in 1989.

- **Sudanese Doctors' Union Dissolved**

Sudanese Doctors' Union (نقابة أطباء السودان) was dissolved in 1989 and replaced by Sudan Doctors' Association (اتحاد أطباء السودان). The change happened when the Professional Associations Act was passed in 1990. Dr. Hassan Seed Ahmed Quraish was appointed the first president of the newly formed association (1990-1996).

- **Open Heart Surgery Program Halted**

By the end of the eighties of the twentieth century, and under a grant given by King Fahd, a Saudi Arabian heart surgeon named Hassaan Al Raffa visited Sudan. This surgeon made a lot of ho ha surgery, and worst of all, he attracted the program team of nurses and technicians to join him in Jeddah in Saudi Arabia. The sabotage brought the open-heart surgery program to a complete halt in 1989.

1990

• **Local Plants Started Producing Medical Gases**

In 1990, a local plant at Al Bagair started producing and marketing medical oxygen and nitrous oxide, and the third plant in Khartoum North started marketing medical oxygen in 2005. Many other producers of industrial oxygen in the states are expected to do the same. Moreover, medical gases are now sold by producers directly to the public and private hospitals all over Sudan.

• **National Drug Quality Control Laboratory transferred to MOH**

In 1990, the National Drug Quality Control Laboratory (NDQCL) administration was transferred from the National Chemical Laboratories to the Directorate General of Pharmacy MOH to better coordinate drug control activities.

• **The Private Health Sector Flourished**

Private clinics, hospitals, and medical centers started to flourish. However, with the introduction of the user fees policy, the absence of precise mechanisms for public health financing and prepaid schemes resulted in access based on the ability to pay in public or private health facilities.

• **Trade Unions Act Enacted**

Trade Unions Act was enacted in 1990. Accordingly, Dr. Hassan Sid Ahmed Goraish was elected the first President of the Sudanese Doctor's Union (اتحاد أطباء السودان).

1991

- **Mycetoma Research Center established**

In 1991, the Mycetoma Research Center was established at Soba University Hospital, Khartoum, under the umbrella of the University of Khartoum. Prof. Ahmed Hassan Fahal was the founding director. The main aim of this center was to eradicate mycetoma through research, education, prevention, and treatment. Prof. Ahmed Mohamed El-Hassan was there as a founding member; his sound advice and remarks were intended to help patients refine and polish research work, educate medical and para-medical staff, and improve and develop the center was helpful. This center is currently a leading international base in mycetoma research.

The Mycetoma Research Center consists of a clinic complex housed in the same building, linking clinical services with research. It contains a library and archives containing historical documents on mycetoma, including the papers and correspondence of the late Mr. Ibrahim Mohamed El-Moghraby,^[331] the pioneer of mycetoma clinical practice and research in Sudan.

The main achievements of this Center in this field are in the epidemiology, immunology, therapy, and experimental infection of laboratory animals. In addition, a project on the genetic basis for susceptibility to the disease is being launched, and a full-fledged program is underway.

This success story is due to two scientists, Prof Ahmed Hassan Fahal, Professor of Surgery who is also the Chairperson of the Mycetoma Research Group at IED and Director of the Center, and Mr.Suleiman Hussein, Director of SUH. The Center collaborates closely with IED in the field of mycetoma.

Prof. El-Hassan was also actively involved in the field study of mycetoma in the Western Sennar region, Central Sudan, a mycetoma endemic area with a high morbidity rate. Professor El-Hassan spent a reasonable time in the field, observing and talking to the mycetoma patients, interviewing community leaders and elders, conducting health education sessions, and encouraging the local health authority to help those affected by the disease. He also gave presentations on the subject to the staff and students of Sennar University.

- **Al Bagair Plant Started**

In 1990, a local medical gases plant at Al Bagair (الباقير) started producing and marketing medical oxygen and nitrous oxide, and the third plant in Khartoum North started marketing medical oxygen in 2005. Many other producers of industrial oxygen in the states are expected to do the same. Moreover, medical gases are now sold by producers directly to the public and private hospitals all over Sudan.

- **CMS Public Corporation (CMS) Act Enacted**

In 1991 the **Central Medical Supplies Public Corporation Act 1991** (قانون الهيئة العامة للإمدادات الطبية ١٩٩١) was enacted and issued on 18 May 1991 and CMS became an autonomous public corporation under the auspices of the Minister of Health. On 25 September, the Cabinet of Ministers issued its decision number (846) dated 25 September 1991, forming a 19-person Board of Directors with Dr. Kamal Mohamed Medani as president.

- **Out-Of-Pocket Pay for Health Services in Public Hospitals Started**

During the very first years of the Inqaz regime, user fees were introduced in public health facilities. These fees gradually increased.

- **Ahmed Mohamed El-Hassan Became Emeritus Professor of Pathology**

The career of Prof. Ahmed Mohamed El-Hassan has been crowned academically, and his excellence was acknowledged when the University of Khartoum bestowed on him the status of Professor Emeritus of Pathology in 1991.

- **The Sudan Federal System Adopted**

The adoption of the federal system in Sudan started in 1991. The regions were upgraded into nine States that further became 26 in 1994.

A single ministry for health and social affairs was found in each state, while separate ministries for health and social affairs were found in Khartoum. The locality remained at an adequate administrative level with its resources and was responsible for essential services, including health.

1992

- **Fee-For-Service Policies Enforced**

User fees introduced in public health facilities during the Inqaz regime's first years were associated with a more devastating step. These included trade liberalization, privatization, devaluation of the currency exchange rate, and reduction of government expenditures. These measures affected health and education negatively.

- **National Council for Research Demoted**

In 1991, the National Council for Research was demoted and restructured to become the National Center for Research under the Ministry of Higher Education and Scientific Research. The specialized councils were dissolved, and several specialized research institutes were developed under the same umbrella. The Center became a research body to conduct scientific and applied research for economic and social development in Sudan.

Most academic institutions lack facilities, training for their personnel, and long-term coordinated research projects. Moreover, many new universities were established due to the higher education revolution in 1992, resulting in a frail infrastructure for many new tertiary education institutions.

- **Local Manufacture of Medicines Strategy Established**

The ten-year National Strategy (1992-2001), which included a ten-year Health Strategy, included the following:

- Support the local pharmaceutical industry to achieve self-sufficiency and exportation at the end of the strategy period.
- Establish new drug factories in different production areas, and support the Army drug factory.
- Upgrade existing drug factories' productivity, speed up approved factories' construction, and establish industries for raw materials and packaging materials.

- **Institute for Endemic Disease Established**

Institute for Endemic Disease was established at the University of Khartoum in 1992, situated in FOM.

- **National Comprehensive Strategy for Health Offered**

National Comprehensive Strategy for Health was produced in 1992 by the Ministry of Health.

- **Investment Encouragement Act, 1992 Enacted**

The private for-profit sector that expanded following the promulgation of the Investment Encouragement Act, 1992⁴ focused on curative care in urban areas. Of about 255 private hospitals and medical centers, 162 or over 63% are in Khartoum State. In addition, Khartoum has a variety of clinics: 684 specialist clinics, 392 GP clinics, 173 dental clinics, 447 laboratories, 33 x-ray units, and seven physiotherapy clinics. The private health sector owns 38% of total hospitals, 6% of bed capacity, and 31% of X-ray units. According to a survey conducted in Khartoum and Gezira States, 22% consulted the private sector of all patients seeking health care. The private sector share was 31% and 7%

of hospital admissions and surgical interventions, respectively, while 47% sought diagnostic services. However, though developed, a policy for the private sector has not been implemented.

1993

- **Institute of Endemic Diseases Established**

In 1993, along with other colleagues, Prof. Ahmed Mohamed El-Hassan founded the Institute of Endemic Diseases (IED), University of Khartoum, and held the founding director's post up to 2000. The objectives of the Institute are to undertake research on endemic diseases, train medical and paramedical staff, and offer specialized services in endemic diseases. The main research areas of the IED included leishmaniasis, malaria, tuberculosis, leprosy, cancer, mycetoma, and genetic diversity concerning the disease. In addition, molecular biology and immunology departments were established for the first time in Sudan. The many students, who obtained their MSc, and Ph.D. degrees from the IED, are currently establishing other research institutions and colleges and helping others.

The Third World Academy of Sciences lists the Institute of Endemic Diseases as a center of excellence. Further recognition of the Institute followed when one of Professor El-Hassan's co-workers, Dr. Hiba Salah El-Deen Mohamed, was awarded the 2007 Pfizer/Royal Society prize for her work on genetics leishmaniasis. As a result, professor El-Hassan nominated her for the Sudanese National Academy of Sciences president.

- **The Department of Ophthalmology, FOM/UOK Established**

The Department of Ophthalmology, FOM/UOK, was established in 1993. Professor El-Hadi Ahmed El-Shaikh was the first Head of the Department.

- **Sterling Winthrop Sold Out**

In 1993 Sterling Winthrop sold their production facility to Humavit, a Sudanese company.

- **Local Industry of Medicines Started**

In 1993, the local drug industry made a particular tender for locally produced medicines confined to competition between local manufacturers. At the same time, CMS made 60% advanced payments to successful local bidders to enable them to purchase starting and packaging materials. This practical support by CMS enabled the successful bidders to supply CMS with about 30 pharmaceutical items and contributed to easing drug shortages resulting from the economic sanctions imposed against Sudan.

- **Generic Names of Drugs Regulation Issued**

In 1993, the **Use of Generic Names of Drugs Regulation 1993** (لائحة استعمال الأسماء الجنسية للأدوية لسنة ١٩٩٣) was issued. However, it was not issued until 1995.

- **The Essential Drugs List Revised**

In November 1993, a workshop was convened in Khartoum to revise the essential drugs list of 1987 and revise levels of use. An amended list was passed by Ministerial Order No. 4/1995 on 16 April 1995. The origin list was produced in Arabic and English, published, and circulated widely.

1994

- **Sudan Society of Tropical Medicine and Hygiene Established**

Professor Ahmed Mohamed El-Hassan, Prof. Suad Mohamed Suleiman, and others established the Sudanese Society of Tropical Medicine and Hygiene (SSTMH) in 1994.^[332] Prof. El-Hassan was the first president of SSTMH. The society contributed significantly to promoting tropical medicine in Sudan and the region and conducted numerous seminars, guest lectures, and workshops. Members met through his consistent encouragement and contributions, and several issues of the SSTMH Newsletter were published. As a result, many Sudanese and non-Sudanese members in Sudan and abroad enrolled in its membership. Unfortunately, like many initiatives, this society lacked institutional support and eventually lost momentum, and its newsletter was discontinued after releasing five excellent issues.

Organization of Teaching Hospitals Regulations Issued

Organization of Teaching Hospitals Regulations issued by Minister of Health Hussain Suleiman Abu Salih in September 1985.^[333]

In 1994, the Higher Council for Teaching Hospitals and Specialized Medical Centers was formed under the patronage of the President of the State. The Council was built on the above model.

This council is responsible for managing hospitals and medical centers to promote and improve clinical and medical research and promote the training of medical profes-

sionals in coordination with relevant institutes and bodies. In addition, the Higher Council is empowered to carry out a set of functions, including developing and endorsing the overall strategies, policies; plans, and guidelines to improve the quality of medical services; Setting the levels and standards of medical services and performance; sets the guideline for hospitals budget proposals; monitor, implement, and execute hospitals, and medical centers budgets; participate in collaboration with relevant entities in developing the general policy for training of medical students, and health personnel; coordinates hospitals' clinical, and therapeutic policies; monitors the overall performance of hospitals and medical centers, and the medical statistics; raises revenues from different sources, and charities.

- **The National Health Insurance Corporation
Legislation Enacted**

Establishing the **National Health Insurance Corporation** legislation (قانون التأمين الصحي والخدمات الطبية) was enacted, and **Health Insurance Fund** was formed by passing legislation in 1994 (check legislation).^[334] Thus, the National Health Insurance Corporation was formed. First, social Health Insurance was introduced as a central state-parallel body. It sets the health insurance policy framework, premium rates that the council must approve of ministers, resource allocation and utilization guidelines, and coordination between the state's insurance authorities. Then, the States' Health Insurance Corporations were given more autonomy to collect the premiums, manage their resources, and administer their affairs according to central policy.

- **Atbara Regional Laboratory Opened**

Atbara regional laboratory, whose building started in 1985, was opened in 1994.

1995

- **National Medical Specialization Board Act 1995 Enacted**

National Medical Specialization Board Act (قانون المجلس القومي)
للتخصصات الطبية لسنة ١٩٩٥ was enacted in 1995.

- **National Medical Specialization Board Established**

National Medical Specialization Board was established in 1995. It occupied the buildings of the Old Khartoum Civil Hospital, which was built in 1909.

- **Generic Names of Drugs Regulation Issued**

In 1995, the Use of Generic Names of Drugs Regulation 1995 (لائحة استعمال الأسماء الجنسية للأدوية لسنة ١٩٩٥) was issued. The Regulation made generic names mandatory in prescriptions, tenders, drug orders in the public sector, and on labels of registered pharmaceutical products. However, the Regulation was not published in the Government Gazette nor publicized.

- **National Health Insurance System Proposed**

In 1995, Prof. Abdel Hamid Ibrahim Suleiman chaired the Technical Committee appointed by the Ministerial Committee to establish Sudan's first Health Insurance Public Corporation (later Fund). The Technical Committee sub-

mitted a comprehensive report incorporating a plan of action, proposed budgets, and a law draft to establish, administer, finance, and run the National Health Insurance System.

- **Community Pharmacies Khartoum State Regulation Issued**

Community Pharmacies Establishment, and Organization, Khartoum State Regulation 1995 (لائحة إنشاء وتنظيم عمل الصيدليات الشعبية بولاية الخرطوم لسنة ١٩٩٥) issued.

- **Public Service Regulation Replaced**

Public Service Regulation 1995 (لائحة الخدمة العامة لعام ١٩٩٥) replaced the one established in 1975.

- **The Essential Drugs List Revised**

In November 1993, a workshop was convened in Khartoum to revise the essential drugs list of 1987 and levels of use. An amended list was passed by a Ministerial Order No. 4/1995 issued on 16 April 1995. The origin list was produced in Arabic and published and circulated widely in English.

1996

- **The Production and Circulation of Medicinal Plants 1996**

In 1996, the **Production and Circulation of Medicinal Plants 1996** (لائحة تصنيع وتداول المستحضرات النباتية لسنة ١٩٩٦) were made, which controlled the production, formulation, sale, and registration of locally produced, and formulated medicinal plant products.

- **Licensing of Pharmaceutical Establishments Issued**

In 1996, **The Licensing of Pharmaceutical Establishments and Their Management Regulations 1996 model** (مشروع لائحة تنظيم ومزاولة مهنة الصيدلة وإدارة الصيدليات وتخزين وبيع الأدوية) (لائحة نموذجية للولايات لسنة ١٩٩٦ -) was formulated but not presented to the CBPH for approval. However, it was circulated to all state ministries of health as a model as these have the authority to make their state regulations. As a result, Khartoum State MOH issued that model as a State Regulation in 1999 and enforced its implementation within the State.

- **Manufacture and Marketing of Herbal Medicines Regulations 1996 Re-enacted**

The Manufacture and Marketing of Herbal Medicines Regulations 1996 were re-enacted.

- **Endoscopic surgery Established**

Endoscopic surgery started with difficulty until Soba Hospital joined the program in 2000.

- **Sudanese Doctors' Union President**

Dr. Mohamed Hassan Al-Tayeb was elected president of the Sudanese Doctors' Union (نقابة أطباء السودان) (1996-2004).

Dr. Ali Ahmed Salameh completed Dr. Mohamed Hassan Al-Tayeb's tenure in office.

1997

- **Local Manufacture of Medicines**

In 1997, the NDP was updated and officially adopted by ministerial order on the first of May 1997. Concerning local drug production, the NDP stated several support clauses. The Ministry of Health recognizes the limited resources of the local drug industry and undertakes its support in many areas or with technical support from the World Health Organization.

- **Saad Abul Ila Hospital Joined FOM, UOK**

Saad Abul Ila Hospital Joined FOM, UOK

- **The Household Remedies Regulation 1970 Redrafted**

The Household Remedies Regulation 1970 was redrafted in 1997 into the Household Remedies Regulation (أمر بيع الأدوية (البسيطة لسنة ١٩٩٧). The regulation listed and detailed the drugs sold by full-time retired medical and pharmaceutical assistants in-licensed drug shops.

- **Health Area System Established**

The health area system was implemented in 1997 in Khar-toum state.

1998

- **Local Governance Act Enacted**

The Local Governance Act was enacted in 1998. It sets in the government structure as follows:

- Federal level;
- State-level: 26 states;
- Provincial-level: 17 Provinces;
- Local-level: 633 Localities;

Localities are given financial responsibilities regarding raising revenues (agro-pastoral production taxes (60% to be used locally, 40% to be transferred to the state level; business and trade taxes (40% to be transferred from the State to the localities); locality investment revenues, locality development fund transfers, share on the States, and federal investments within the locality boundaries. Moreover, localities manage and deliver social service providers, including health services.

- **A Health Research Committee Formed**

Undersecretary, FMOH, issued a decree for forming a committee to review health research. Consequently, the committee for review of health research ethics was established.^[335]

- **Health Policy South Sudan, 1998 Developed**

A health policy for Southern Sudan came into effect on October 1, 1998. The policy emphasized health as a major development issue.

1999

- **Licensing of Pharmaceutical Regulations Circulated**

Pharmaceutical Establishments' Licensing and Their Management Regulations were formulated in 1996. However, it was not presented to the CBPH for approval. Instead, it was circulated to all state ministries of health as a model as these have the authority to make their state regulations.

- **Ahmed El Safi: Traditional Sudanese Medicine Published**

Ahmed El Safi: *Traditional Sudanese Medicine, a primer for healthcare providers, researchers, and students*, was published in 1999 (first edition) and is available in paper form and eBook on Amazon and free to download from several platforms. The book is a wide-ranging 730-page account of traditional Sudanese medicine that every health care provider, student of medicine, pharmacy, veterinary, agriculture, medical sociology, medical anthropology, and folklore should read.

The book contains a comprehensive 2500-reference *General Bibliography* and a 670-item *Sudanese Materia Medica*. It is an essential companion and an indispensable learning tool for researchers interested in undertaking meaningful research.

It is also a long-awaited coursebook for community medicine, preventive medicine, and public health departments and a valuable resource for medical legislators and *entrepreneurs* looking for sound investment in medicinal, aromatic, and culinary plants.

- **Local Manufacture of Medicines**

The CMS support did not continue long and was stopped in 1999. Nevertheless, six new medicines factories and one plant for producing medical gases were established during the nineties. However, these new factories were small drug formulation facilities with limited capacity and non-sterile products.

- **D'Arcy *Laboratory on the Nile* Published**

Based on the Wellcome Research Laboratories Reports,^[336] Prof. Patrick Francis D'Arcy (OBE) wrote *Laboratory on the Nile: A History of the Wellcome Tropical Research Laboratories*.^[337] The book he opened with Surat Al-Fatihah (The Opening) of the Noble Quran described the inception of WTRLK, their progression to world-renowned centers of excellence of research into tropical diseases, and their demise.

- **Frontiers of Medicine in the Anglo-Egyptian Sudan Published**

Heather Bell's book '*Frontiers of Medicine in the Anglo-Egyptian Sudan*,' 1899-1940, is insightful and informative. It was a revised and extended version of her doctoral thesis.^[338] The author sought to describe and define Sudan's 'colonial' and the 'medical' between 1899 and 1940. She argued that colonial medicine was concerned with boundaries and frontiers of all kinds: physical, psychological, natural, imposed, accurate, and imagined. Colonial officials, including doctors, worked at physical frontiers, between provinces, nations, peoples, zones of infection, and non-infection. The book is full of helpful information from primary sources in several repositories. She and other writers made maximum use of the documents, and manuscripts that reside unstudied in Sudan National Records Office

(SNRO), Sudan Archives, University of Durham Library (SAD), Rockefeller Archive Center, and the Wellcome Institute for the History of Medicine Library, Royal Commonwealth Society Library, Library of the Congress, USA, and possibly in several other libraries throughout the world. Bell did an excellent job in exploring information in some of these repositories. The book also included a helpful bibliography.

- **Ahmed El Safi. *Manual of Rules of Order Published***

Ahmed El Safi. *Manual of Parliamentary Procedure* (Arabic) (المرشد إلى قواعد وإجراءات التنظيمات الحديثة) First edition in 1999, was published.

- **National Health Research Council Formed**

In 1999, the National Health Research Council was formed in the Federal Ministry of Health.

- **Sudan Medical Specialisation Board Act Enacted**

The Sudan Medical Specialisation Board Act was enacted in 1999.

- **FOM, UOK Celebrated Diamond Jubilee**

FOM, UOK celebrated its Diamond Jubilee on February 29, 1999.

2000

- **Sudan Medical Heritage Foundation established**

Sudan Medical Heritage Foundation was established in Khartoum in 2005 and registered as a not-for-profit, non-governmental organization with the following objectives:

[339]

1. Stimulates and encourages research in all aspects of Sudanese medical heritage by supporting clinical research projects on the safety and efficacy of products.
2. Advocates the rational use of traditional medicine by promoting evidence-based use.
3. Helps in articulating national policies that facilitate the integration of traditional therapies and products that were proven effective by modern science into the national health care system and program.
4. Helps develop human resources by training researchers, educating, training, and rehabilitating traditional healthcare practitioners.
5. Participates in formulating strategies, general policies, and plans for healthcare education and fighting harmful practices in traditional medicine.
6. Participates in formulating and circulating legislation, laws, regulations, standards, and guidelines that organize research in and practice of traditional medicine, including protecting endangered plant species.
7. Manages information on traditional medicine by acting as a clearinghouse to facilitate information

exchange and advise universities, institutions, centers, and societies working in health.

- **Schistosomiasis Spread in Sudan**

In 2000, the Schistosomiasis Control Unit, Federal Ministry of Health, confirmed schistosomiasis in eastern and southern states. In the central states, the significant sugar schemes reported urinary and intestinal infections, i.e., 50% Assalaya, 80% Kenana, 60% Genaid, and 37% Sennar.^[340]

- **National Health Insurance Act Enacted**

In 2000, the National Health Insurance Act (المرسوم المؤقت (لقانون التأمين الصحي لسنة ١٩٩٤) was enacted. It replaced the Health Insurance Public Commission Act of 1994 (قانون الهيئة (العامة للتأمين الصحي لسنة ١٩٩٤).

2001

- **Pharmacy and Poisons Act 2001 and Regulations Enacted**

In 1992, the Minister of Health appointed a committee to update all health legislation. As a result, a draft for an updated Pharmacy, Drugs, Cosmetics, and Medicinal Devices Act was presented to the Council of Ministers in 1993. At the same time, the Ministry of Agriculture (including the Ministry of Animal Resources) decided to take away veterinary medicines from MOH and presented a draft of a Veterinary Drugs Act to the Council of Ministers. However, the Ministry of Health and The Association of Pharmacists rejected having two laws regulating drugs, and the control of veterinary drugs, registration, licensing, and sale by veterinary practitioners. It took eight years to compromise between the two ministries, and a single Pharmacy and Poisons Act (PPA) regulating both human and veterinary medicinal products was finally enacted in August 2001.

The PPA was brought under regulatory control for cosmetics, medicinal products other than drugs (devices), and clinical trials involving humans and animals.

- **The Narcotics and Psychotropic Substances Act 2001 Enacted**

The Narcotics and Psychotropic Substances Act was enacted in 2001. The Act controls the production, export, import, acquisition, sale, and use of narcotics and psychotropic substances.

- **Drugs and Poisons Ordinance 2001 Enacted**

Drugs and Poisons Ordinance 2001 was enacted, and accordingly, the Federal Council for Pharmacy and Poisons (المجلس الاتحادي للصيدلة والسموم) became the national authority responsible for the supervision of pharmacy, and drugs in Sudan.

- **Central Medical Supplies Incorporated**

CMS was incorporated under the Public Corporation Act 2003. CMS is responsible for all activities related to the supply of medicines and medical appliances for all government facilities at both federal and state levels.

2002

- **FMOH reorganized**

The FMOH was re-structured. New directorates were instituted into States Affairs; Quality Council and Directorate; Human Resources and Training; Health promotion Directorate; Health Policy and Planning Directorate; Health Economics Directorate; IT and Computer; Monitoring and Evaluation, and Policy Intelligence Unit.

- **National Health Research Council Subcommittees Formed**

In 2002, the National Health Research Council, founded in 1999 in the Federal Ministry of Health, formed two subcommittees, technical and ethical.

- **The National Pharmacy and Poisons Board Established**

In 2002, the Pharmacy and Poisons Act 2001 provided the constitution of a National Pharmacy and Poisons Board appointed by the Council of Ministers. The board was constituted of 37 members representing nearly all stakeholders on the recommendation of the Minister of Health as a supreme Drug Regulatory Authority under the auspices of the Minister of Health.

- **National Health Research Ethics Committee Established**

In November 2002, the National Health Research Ethics Committee was established by an FMOH Minister's resolution. Accordingly, each state in the country has the right to form its own Ethics Review body. As a result, the NHREC formed two sub-committees: The National Technical Committee and the National Ethical Committee.^[341]

- **WHO Traditional Medicines Strategy (2002–2005) Developed**

WHO Traditional Medicines Strategy (2002–2005) was developed.

2003

- **Licensing Pharmaceutical Regulations 2003 Enacted**

The Licensing and Regulation of Activities in Pharmaceutical Business Regulations 2003 was enacted.

- **Pharmaceutical Specialization Council in SNSB Established**

Specialization of pharmacists in SNSB was established in 2003 to fill the gap of specialization in practical and applied areas, e.g., industrial pharmacy, pharmacy technology, drug analysis, hospital pharmacy, and clinical pharmacy. After finishing a study period by courses, examinations, and complementary assignments, the successful candidate will be given (Sudan Medical Specialization Board Membership in Pharmaceutical Services).

- **Local Governance Act 2003 Enacted**

Local Governance Act 2003 was enacted in 2003. This act canceled the previous localities and provincial level, which the 1998 Act set. The structure is now a three-tiered governance system (Federal Government, 15 states, and 144 localities).

The localities are given more administrative and executive authority. The organizational structure at the locality level should have four directorates at a maximum. This act also described the relationship between the executive and legislative systems and resolved most of the ambiguities in re-

sponsibilities. Further, this new reform gives the localities responsibilities for service provision and development, including monitoring and supervision, and they represent the state ministers in running the mandates and functions of the respective ministries. It clearly defined the localities' responsibilities in policy setting and service provision. In addition to planning and managing primary health care services, environmental health, and malaria control. Financial Sources include:^[342]

- Assets taxes
- Agro-pastoral production taxes (40% should be transferred to the state level
- the locality share of the VAT collected at the state level
- share on the State and Federal investments within the locality boundaries
- The states approve loans and grants.
- Other sources

- **NPP Board Two Technical Advisory Committees Formed**

The Pharmacy and Poisons Act 2001 also formed two technical advisory committees for human and veterinary medicines. Moreover, it was able to issue and has issued the Licensing of Pharmaceutical Establishments, and Their Management Regulations 2003, and Authorization of Powers Order 2003.

- **The 25-Year Strategic Health Plan Provided**

The 25-Year Strategic Health Plan 2003-2027 was provided by the Federal Ministry of Health, Sudan. The Federal Ministry of Health has produced a 25-year strategic plan

for the health sector (2003-2027). The Strategy has eight goals, with sub-objectives, targets, and indicators.

The Strategic Plan does not contain any objectives for improving MandE, nor does it have a chapter on MandE explaining how the 25-year Strategic Plan will be monitored and evaluated.

- **10-year HRH Strategic Projection Plan, 2003-2012**

In 2003, the FMOH launched the strategic 10-year HRH projection plan (2003-2012) with the help of the WHO. This plan adopted the service-target approach for health workforce projections, building on the country's new organization of health facilities and the staffing norm policy. Based on the strategic plan, the human resource department of the FMOH issued annual and biannual plans for national health workforce projections.

2004

- **Social Insurance Act Amended**

The Social Insurance Act (check date) was amended. The National Health Insurance Corporation was transformed into the National Health Insurance Fund, giving the center more power over resources and management. However, comprehensiveness, universality, portability, and accessibility remain issues of concern during the social health insurance life span.

- **List of Essential Drugs Updated**

In May 2004, the Standing Committee on Drug Registration (اللجنة الدائمة لتسجيل الادوية) updated the list of essential drugs and replaced the word ‘drugs’ with ‘medicines’ in compliance with WHO recommendations.

- **Sudan Medical Specialisation Board Act Amended**

Sudan Medical Specialisation Board Act was amended in 2004.

- **The National Biodiversity Framework was Developed**

In 2004 a national biodiversity framework was developed.

2005

- **Sudan Museum of Health Proposed**

The Sudan Museum of Health's establishment as a governmental or non-governmental facility is a high priority in Sudan Medical Heritage Foundation's proposed projects. This excellent innovative project provides a facility currently unavailable.

The Health Museum in Wellcome Research Laboratories (The current National Health Laboratories) was transferred to the College of Health, Khartoum. It was once a famous educational institution for the public and science students. Unfortunately, this museum has been lost, and the incident was reported. We spent a few years looking for the lost items with no luck! We then proposed establishing a new one in 1982 with the inception of the Traditional Medical Research Institute, and later.^[343] A nucleus of this museum was started, and the actual acquisition of artifacts began in 1984.

The Museum's mission is to enhance understanding of the history of health care in Sudan. The Museum's goal is achieved by collecting, exhibiting, preserving, and studying Sudan's maternal health culture and understanding Sudan's health care diversity.

The Museum will also contain a medicinal Herbarium^[344] and a Botanical Garden (harboring living specimens) that will generate, provide access to, and transfer knowledge on the nature, extent, and origin of botanical diversity of Sudanese medicinal, aromatic, nutritional, and poisonous plants.

- **SUH Clinical Health Research Center Established**

In a paper solicited by Director, SUH in 2005, Prof. Ahmed Mohamed El-Hassan put forward an elaborate document on the need for a Clinical Health Research Center at SUH. The memorandum was based on a sound situation analysis of research conditions in the country at the time.

Prof. El-Hassan noted that research had not been given high priority in most developing countries, including Sudan. He said that since the mid-seventies of the twentieth century, research output in the university started to decline. The total number of publications in 1970-79, 80-89, 90-99 was 745, 1000, and 701. One-third of those publications were in medicine, and only 9% were in humanities, science, engineering, and social sciences. This low output was even though the staff in these disciplines formed 35% of the University staff. In 1983, the University Senate made several recommendations to correct this deficiency, which were not implemented. This resulted partly in the unfortunate low international rating of the University of Khartoum based on research output. As a result, the university was put among the lowest in Africa.

The research carried out in the medical field is primarily funded by international agencies, mainly WHO and Wellcome. Because of the political situation in the country, funds from other international organizations have greatly diminished. Most of this research is carried out in the basic sciences departments. Clinicians have little chance to do research mainly because of proper forums. Apart from the IED and the Mycetoma Research Center, which have limited funds and space and thus give limited opportunities for clinicians to do research, no other clinical research institution exists.

Considering these reasons, Professor El-Hassan thought there is a genuine and urgent need to establish a center for research that allows clinicians to engage in research, cham-

pion its cause, and enhance clinical studies at the university and the national level. This center aims to promote health for development in the University, strengthen the University's voice in the setting, and implement the national research agenda.^[345]

The research center in Soba has been built. A state-of-the-art mycetoma research center with laboratory facilities and patient management amenities has already started functioning and will be officially inaugurated soon. A research project on the immunology and genetics of mycetoma has already been planned. It is hoped that other research activities such as the breast cancer research unit and another research program will be started and strengthened.

- **Sudanese National Academy of Sciences**

In 2005, with the help of outstanding Sudanese scientists from within and outside the country, the Sudanese National Academy of Sciences (SNAS) was established as a non-profit, non-governmental organization and was elected its first founding president. SNAS has been founded on the premise that development in its broadest sense cannot be achieved without using the latest achievements of science and technology. Therefore, improving the current situation in Sudan can only be achieved by strengthening and promoting the local research institutions and educational systems and establishing organizations and platforms dedicated to promoting science and technology. One instrument that proved helpful in achieving this in many parts of the world is a National Academy forum.

SNAS is envisioned as the highest academic institution in the country with the following objectives:

1. Promote research, and uphold the cause of science in its primary and applied forms.

2. Offer to advise and consultation to institutions, the public, and the private sectors in science, technology, research, and education.
3. Help disseminate science and research results through publishing and assisting in publishing periodicals, books, and the organization of scientific meetings.
4. Raise community awareness about the importance of science and technology in sustainable social, economic, and environmental development.
5. Collaborate with similar regional and global organizations.
6. Raise funds, and accept endowments for fulfilling its objectives.
7. Help in capacity building of scientific institutions in the country.
8. Award grants, scholarships, prizes, and medals in the field of research.

Membership of SNAS maintains the momentum of this organization and keeps it going against numerous difficulties and constraints.

Quality Assurance Of Medical Gases Enforced •

In 2005 the Standing Committee for Registration of Medicinal Products for Human Use decided that it was time to make medical gas producers aware of GMP, pharmacopoeial, and British Standard Specifications requirements and direct them to comply. As WHO has not developed GMP guidelines for medical gases, the Registration Committee followed the Canadian Guidelines for Medical Gases after making the necessary modifications. The Directorate General of Pharmacy (DGOP) also decided to address this vital issue by convening a one-day orientation workshop in which representatives of medical gases producers, some

knowledgeable senior consultant anesthetists, an experienced anesthetic machines technician, and a drug quality control analyst from the NDQCL participate, and contribute papers, and take part in discussions.

- **National Medical and Health Professions Council Established**

National Medical and Health Professions Council was established in 2005 as the counterpart regulatory body to Sudan Medical Council, responsible for all workers other than doctors, dentists, and pharmacists.

- **Sudan Interim Constitution 2005 Enacted**

Sudan Interim Constitution 2005 was enacted as the overarching framework for all subsequent legislation.

Accordingly, Sudan is governed through a Federal System of governance with three levels of administration. Health is included in the concurrent list of the Interim Constitution (2005) and follows the principles of devolution

- **The Joint Assessment Mission-Darfur Report Issued**

The Joint Assessment Mission-Darfur Report was issued in 2005.

2006

- **GMP for Medical Gases**

In 2006, the MOH Standing Committee for Registration of Medicinal Products adopted the guidelines for medical gases based on the Canadian Guidelines for Good Manufacturing Practices (GMP) for Medical Gases (revised 2002), whether imported or locally produced, be applied and complied with by all concerned. The state generally applies principles and practices that facilitate fabricators, packagers, wholesalers, and importers of medical gases with GMP. A significant advantage of this document is that it gives the rationale and interpretation of all provisions and requirements for compliance.

- **Sudan Household Health Survey Conducted**

The Sudan Household Health Survey (SHHS) is conducted every four years. The first SHHS was conducted in 2006 in all 25 States in a joint effort of the National Government of Unity (NGU) and the Government of South Sudan (GOSS). The survey has been conducted to assess children and women's situations and monitor progress towards selected MDG indicators.

However, the SHHS incorporates several questions from several international surveys, is very recent, has been used as a baseline for the 5-year health sector strategic plan, and seems well conducted. In addition, many indicators correspond with the WHO essential indicator list. Therefore, the second

round of SHHS should be planned for mid-2011, towards the end of the current 5-year plan.

- **Tuberculosis National Strategic Plan 2006-2010**

The Tuberculosis National Strategic Plan 2006-2010 was a sub-sector plan.

- **The National Health Policy, 2006 Developed**

The National Health Policy was developed in 2006.

- **The Joint Assessment Mission Framework, 2006-2011 Report Issued**

The report was prepared by a joint mission represented by the Government of Sudan, SPLM, World Bank, WHO, and UNICEF. The report's purpose was to assess the essential social services, including health, based on the available knowledge and information.

2007

- **Salam Center for Cardiac Surgery Established**

The Salam Center for Cardiac Surgery has been designed and built by the Italian *EMERGENCY*. The center has 63 beds, 300 local staff, and a separate medical staff accommodation compound for 150 people. It is located in Soba, 20 kilometers south of Khartoum. Construction began in October 2004 and ended in March 2007. The Center covers an area of 12,000 meters indoors, on many lands of roughly 40,000 meters on the bank of the Blue Nile.

- **Quarter-Century Strategic Plan for Health Produced**

Quarter-Century Strategic Plan (الخطة الربع قرنية لمصحة لعام) ٢٠٣١ – ٢٠٠٧() produced by the Federal Ministry of Health.

- **The National Health Policy Approved**

In 2007 a National Health Policy was approved. The policy formulates the vision for the future and the mission of the FMOH. The guiding principles for this policy stress that it will be based on solid policies, scientific evidence, and critical situation analysis. The policy considers the following cross-cutting issues:

1. Multisectoral involvement and attention to health promotion
2. Gender mainstreaming
3. Quality of health care and clinical governance

4. Partnerships with other sectors, NGOs, universities, and donors
5. Consumer satisfaction and patients "s rights

- **National Health Information Strategic Plan**

As a sub-sector plan, the National Health Information Strategic Plan was drawn in 2007.

- **Health Information System**

In 2007 an extensive, participatory review and assessment of the HIS was done using the Health Metrics Network framework. This tool scores the completeness of the HIS on six significant dimensions: HIS resources (not adequate), indicators (adequate), data sources (not adequate), data management (not functional), information products (adequate), dissemination, and use (not adequate). It also includes SWOT analysis and recommendations on potential development areas (with existing resources). Based on this, the NHIC produced a 5-Year National Health Information Strategic Plan 2007-2011. However, the implementation of this plan is hampered by a lack of funds.

2008

- **Ahmed El Safi. *Sudan Health Trilogy, a Plea for Documentation***

Ahmed El Safi took documenting the history of Sudan's health seriously. He launched a major study project entitled '*Sudan Health Trilogy*,' for which he solicited the help of teams of co-workers, co-authors, fieldworkers, and editors. The Trilogy includes compiling a Biographical Dictionary of Health Care Professionals in Sudan, a Bibliography of Biomedical Literature in Sudan, and a Pioneers of Sudanese Medicine series.

- **Ahmed El Safi. *Zar, and Tumbura in Sudan***

Ahmed El Safi et al. *Zar and Tumbura in Sudan* was published in 2008.

- **National Public Health Ordinance 2008 Enacted**

The National Public Health Ordinance 2008 was enacted under the Sudan Transitional Constitution of 2005 on 27th July 2008. It superseded that of 1975.

The latest regulations that were issued in fulfillment of the dictates of this ordinance are (translated): fighting sleeping sickness, fighting malaria, fighting bilharzia, private laboratories, higher committee on occupational health, central committee on midwifery affairs, central committee on health training, central committee on health planning, central committee on nursing, maternal, and child welfare, private clinics, a higher council of teaching hospitals, medical

research committee, ministry of health, structure, and organization of private health institutions (proposal) Khartoum state issued its executive regulations.

- **Ahmed El Safi: Ahmed Mohamed El-Hassan, His Life, And Work.**

Ahmed El Safi: Ahmed Mohamed El-Hassan, his life, and work published in 2008.

- **Ahmed El Safi: Abdel Hamid Ibrahim Suleiman, His Life, And Work**

Ahmed El Safi: *Abdel Hamid Ibrahim Suleiman's life and work* were published in 2008. The book was the first in a series of monographs documenting the lives and work of the men and women who have shaped health care services in Sudan. Prof. Abdel Hamid Ibrahim Suleiman, the subject of this monograph, has contributed significantly to the establishment and development of the medical profession.

He laid down with the help of other notables traditions and established a firm foundation for health care delivery, research, teaching, and training. He taught and trained several generations and, more importantly, mentored and provided guidance and encouragement to the young and aspiring Sudanese scientists and physicians.

The monograph contains eight sections, including a photo gallery, references, notes, and a complete citation of Prof. Ibrahim's publications.

- **Pharmaceutical Products Registration Regulation 1974 Updated**

The essential Regulation issued under the PPA was the Pharmaceutical Products Registration Regulation of 1974.

It was updated and adopted in March 2008. Prof. Abdel Hamid Ibrahim was the only one who continued as a member of the Drug Regulatory Boards and the Pharmaceutical Products Registration Committee (and its chairperson during 1976-1989) from 1963 to 2008.

- **National Medical Commission Act 2008 enacted**

National Medical Commission Act 2008 (قانون القومسيون الطبي) ٢٠٠٨ لسنة القومي) was enacted.

- **Guideline for Ethical Conduct of Research published**

Guideline for Ethical Council of Research Involving Human Subjects published in 2008. The document provided the national guidelines regulating health research. It was developed by the National Health Research Ethics Committee, Federal Ministry of Health, Republic of Sudan.^[346]

- **The Sudan National Census**

In April 2008, the Central Bureau of Statistics (CBS) conducted a new census, while the previous one was done in 1993. A short questionnaire, including questions on gender, age, nationality, and place of residence, was filled out for all residents in Sudan. In addition, a longer questionnaire was used on a sample of 10%. This questionnaire included additional questions on disability, literacy, education level, employment status, marital status, number of children (alive and dead), number of children born in the last 12 months (and how many of those have died), housing (tenure status, number of rooms, sources of energy available, source of drinking water, toilet facilities), proxy questions

for wealth/income, the primary source of livelihood, deaths in last 23 months (including information on gender, age, and whether the death was an accident or pregnancy-related (among girls/women 12-54).

- **National Drug Quality Control Laboratory Transferred**

In 1990, the National Drug Quality Control Laboratory (NDQCL) administration was transferred from the National Chemical Laboratories to the Directorate General of Pharmacy MOH to better coordinate drug control activities. In 2008 transferred to the FBPP as part of the new drug regulatory authority.

2009

- **Drugs and Poisons Act 2009 enacted**

1. Poisons
2. Registering types of drugs
3. Sales of veterinary drugs
4. Restricting advertising of drugs
5. Use of generic names of drugs
6. Manufacture and distribution of herbal and vegetable preparations
7. Organization of meetings of the State Council of Pharmacy and Poisons.
8. Licensing pharmaceutical firms and organizing their work.

- **Ahmed El Safi. *Daoud Mustafa Khalid Published***

Ahmed El Safi. His life, and workbook, Daoud Mustafa Khalid, was published in 2009.

- **Environmental Health Act 2009 Enacted**

Environmental Health Act was enacted in 2009 (قانون صحة)

(البيئة لسنة ٢٠٠٩).

2010

- **Ahmed El Safi. El-Hadi Ahmed El-Shaikh Published**

Ahmed El Safi. El-Hadi Ahmed El-Shaikh, his life, and work. 2010.

- **Ahmed El Safi. Mohamed Hamad Satti Published**

Ahmed El Safi. Mohamed Hamad Satti, his life, and work. 2010.

- **Establishing the discipline of Medical Anthropology Proposed**

In 2010, Ahmed El Safi proposed that Sudan should establish medical anthropology and organize and institutionalize this field.

2011

2012

- **National Health Research Council Established**

On 18th January 2012, the Federal Minister resolved the establishment of the National Health Research Council. This is the main body entrusted with the responsibility of upholding the health of all the population in the country. It is mainly responsible for formulating national policies, plans, and strategies, resource mobilization, comprehensive monitoring and evaluation, coordination, supervision, training, and external relations. The Directorate of Health Research also resolved that the Federal Ministry of Health house the Council and act as secretariat.

- **5-Year Sector Strategic Plan 2012-2016 Produced**

The Republic of Sudan's Health Sector Strategic Plan (HSSP) for 2012-2016 forms part of the national development plan and is the second 5-year strategy in the current 25-year health plan period. This health strategy provides the overarching framework and direction for different players in the sector, including programs within the public health sector, the National Health Insurance Fund (NHIF), and state ministries of health (which have all developed their five-year strategies), as well as for other sectors, and development partners.

The HSSP has been developed through a participative process involving national and state ministries, other vital institutions and associations, national and international partners, and civil society. It builds on extensive situation analysis and evidence from surveys and studies. It also included

a comprehensive costing exercise to assess the plan's feasibility.

- **Federal And State Ministries Of Health Established**

(Current number of states 18):

Undertake formulation of State's policies, plans, and strategies according to federal guidelines, funding, and implementation of plans.

- **The Local/District Health Sector Established**

Carry out implementing national/state policies and service delivery based on the primary health care approach.

- **Ministry of Science and Technology Founded**

This Ministry was formed in 2001 on the infrastructure of the NCR. Several of the existing research institutions were repositioned under the MOST and moved away from their mother ministries which were initially established, and followed their specialized pattern of service i.e.

- Agricultural Research Corporation was established in 1918 in Wad Medani, Gezira area, to study cotton cultivation.
- Veterinary Research Corporation was established as the Fisheries and Marine Biology Center at El-Shagara in 1953 and the *Animal* Production Administration in 1955.
- The Industrial Research and Consultancy Center (IRCC) was founded in 1965 with the United Nations Industrial Development Organization (UNIDO) assistance as a non-profit scientific, governmental organization. The center was considered

the principal advisor to the public and private industrial sectors.

- IRCC was previously affiliated with the Ministry of Industry, but later, in 2001, it was shifted to the newly formed Ministry of Science and Technology and other research organizations in the country. However, in June 2010, a presidential decree was issued to transfer its affiliation to the Ministry of Industry.
- Atomic Energy Commission.

The Atomic Energy Research Institute was established in 1991 as one of the research institutes of the National Center for Research.

The National Atomic Energy Board remained under the Minister of Higher Education's supervision and was designated to coordinate the technical aid granted by the Atomic Energy Agency to augment atomic technology in Sudan. The Sudanese National Assembly issued the Sudanese Atomic Energy Corporation Act in January 1996, and in 2001, the Corporation was affiliated with the Ministry of Science and Technology. The Corporation is currently a member of the Federal Union of Sudan Academy of Sciences and implements the postgraduate programs in atomic energy, approved by SAS.

During the early years of its establishment, MOST founded:

Sudan Academy of Sciences (SAS): <http://www.sas.edu.sd/>

It was established in 2004 as the first full-fledged State University for postgraduate training in Sudan, concerned with its research and development (R, and RandD).

It was envisaged to become one of the Government advising bodies in science and technology and operate an original composition based on a federal system. In addition, SAS was envisaged to be affiliated with the research corporations and centers which would function as colleges for running the research of the registered candidates.

Functions and funding of MOST research were scarce and tied to the government ministerial policies and the country's general economic situation.

In 2012, MOST was coupled with Min. of Telecommunications to reduce government expenditures. As a result, many research projects in the different institutions under MOST closed for lack of financial support. Grants and Agreements with external organizations were truncated, and subscriptions to international agencies and journals were not covered due to a lack of hard foreign currency. A few new agreements and memoranda of understanding were signed, e.g., the Indian Science Academy (INSA) and the Ministry of Science, and Technology, South Africa. However, those were not sustained for long.

Scientific research funding was affected by the political sanctions on the country and restrictions on complicated currency transfers through banks. As a result, meager funding came through international agencies, donors, the UN, and NGOs.

2013

- **Ahmed El Safi. *The Wise Physician Published***
Ahmed El Safi. *The Wise Physician (Arabic)* (الحكيم) was published in 2013.

2014

- **Sudan Health Observatory Launched**

Sudan Health Observatory (www.sho.gov.sd) was launched in 2014 as an open-access tool for information sharing and dissemination.

- **National Medical Supplies Fund Established**

The National Medical Supplies Fund (NMSF) (الصندوق القومي للإمدادات الطبية) succeeded the Central Medical Stores (CMS) and Central Medical Supplies Public Corporation (CMS) in 2015 by an Act of the National Assembly. It is situated in Khartoum, with branches in fourteen States in 2014 (check).

The CMS operates on a cash and carry basis, meaning the States must buy their medicines and organize their transport, storage, and distribution. In addition, all hospitals, as financially autonomous entities, are responsible for their drug procurement system. At the PHC level, health workers often have to rely on “self-help” kits, privately bought. Recently the CMSPC was decentralized and branched and established in 19 states.

- **Ahmed Abd Aziz Yacoub Published**

Ahmed El Safi published his book Ahmed Abd Aziz Yacoub, his life, and his work.

- **Abdul Rahim Mohamed Ahmed Published**

Ahmed El Safi published his book Abdel Rahim Mohamed Ahmed's life and work in 2014.

- **SMC issued the Manual of Medical Moral Conduct**

To keep abreast of change in the field, SMC issued *The Manual of Medical Moral Conduct* (دليل أخلاقيات مهنة الطب) in 2014, and the Arabic translation of the United Kingdom's *Good Medical Practice* (الممارسة الطبية الجيدة).

- **WHO Traditional Medicines Strategy (2014–2023) Developed**

WHO Traditional Medicines Strategy (2014–2023) was developed.

2015

- **Ahmed El Safi. *The Right To Health* Published**

Ahmed El Safi et al. *The Right to Health, a fundamental human right*. 2015 (Arabic).

The Action (Realizing the Right to Health) conducted three baseline studies on the right to health concept on 11, 20 August, and 4 September 2014. Several key informants were interviewed. The resulting studies helped in training the targeted groups. The studies were also edited into papers and published in the book reviewed below. The Action made a pioneering step when it convinced Sudan Medical Council to include “the right to health” as a module in its medical professionalism program. The “Right to Health: a fundamental right” is a 100-page book published by Sudan Medical Heritage Foundation in 2015 and printed by Khartoum Currency Press. Several writers author the book. The book contained a preface, introduction, eight chapters, and a note on the Health Monitor. The chapters covered the articles that the Action solicited during its tenure.

Chapter 1 was titled “The Concept of the Right to Health” by Prof. Ahmed El Safi. The chapter addressed the health rights of the marginalized, the poor, the weak, people with mental health conditions, vagrant kids, prisoners of consciousness, the displaced, and refugees. It also addressed medical mistakes, euthanasia, and palliative care. The second chapter, “The Status of the Right to Health in Sudan,” by Prof. M. O. Abdel Malik. He addressed health rights in the health system and their relevance to the Millennium Development Goals, the Sustainable Development Goals, and the covenants of Human Rights. It also addressed the differences between the concepts of the right to health and

the rights to health care. The two-part “Forensic Medicine in Sudan” written by Advocate Mahmoud Shaarani addressed forensic medicine and the impact of private practice on the right to health. Chapter Four, titled “The Right to Health,” is written by Dr. El-Khatim Elias. The chapter covered patients, hospitals, companions, the elderly, the mentally ill, children, and patients with special needs.

It also drew attention to the rights of the medical institutions and doctors that patients and families should preserve. Ms. Entisar A El-Agali discussed the social determinants of health, including poverty, life expectancy, vulnerable groups needing help, the elderly, women, children, and the need for healthy habitats and environment. The article addressed the threats to people's health posed by inequality, poverty, crowded living, and environmental threats. The article concludes with recommendations and solutions. The article by Architect Osman Mohamed El-Khair titled “Environment, Health, and Safety in Urban Settings.” He discussed the natural and urban environments, the history of urbanization, and how Khartoum, the capital of Sudan, looks now. He stated clearly that healthy living is a healthy right. Ahmed El Safi tabulated and described the laws that regulate the medical profession in Sudan and those that have some bearing on health. In the last chapter, Prof. Ahmed El Safi described the “Health Monitor” launched during this Action and situated in SMHF.

- **Health Monitor Established**

Health Monitor was established in 2015 to monitor the state of

2016

- **Ahmed El Safi. *The Model Physician*** Published
Ahmed El Safi. *The Role Model Physician* (Arabic) (الطبيب
القدوة). 2016.

- **Ahmed El Safi. *The Medical Vernacular Published***
Ahmed El Safi. *The Medical Vernacular* (Arabic) (الكلمني بي
لغة أفهما). 2016.

2017

- **5-Year Strategic 2017-2020 Plan Produced**

The Federal Ministry of Health developed the 5—year Strategic Plan 2017-2020.

- **Strategy and Information Act 2017 Enacted**

Strategy and Information Act 2017 enacted

2018

2019

- **Sudan Country Strategic Plan 2019-2023 Produced**

The Sudan Country Strategic Plan 2019-2023 was produced.

2020

2021

2022

Appendices

Pioneers of medicine and allied health sciences and date specializing degree acquired

Name	Specialization	Degree
Abdalla Omer Abushamma	Public Health	1951
Abdalla Saad	ENT	
Abdel Halim Mohamed	Medicine	1948
Abdel Hamid Bayoumi	Surgery	1949
Abdel Hamid Ibrahim	Chemist	1956
Abdel Monim El-Sied	Pediatric cardiology	
Abdel Rahim Mohamed Ahmed	Orthopedics	
Abdel Rahman Atbani	Obs., and Gyn.	
Abdel Rahman M. Musa	Nephrology	
Abdel Rhman Salim	Virology	
Ahmed Abdel Aziz Yacoub	Chest and Heart Surgeon	
Ahmed Abdel Magied	Dentistry	
Ahmed El-Bella Hamza	Othopaedic (Military)	
Ahmed Mohamed El-Hassan	Pathology	
Ali Khogali Ismail	Physiology	
Anis Mohamed Ali El-Shami	Public Health	
Awad Omer	Haematology	
Bakhiet Mohamed Omer	Surgeon	1951
Batoul Mohamed Eisa	Midwifery	
Beshir Hamad		
Daoud Iskandar	Obs. & Gyn	
El-Baghir Ibrahim	Ophthalmology	1950
El-Shaikh Abdel Rahman	Radiotherapy	
El-Shaikh Mahgoub Gafar	Mycology	
El-Tahir Fadl	Anesthesia	
Habib Abdalla	Radiology	
Hashim Hassan Erwa	Microbiology/Immunology	
Hassan Abu Saba	Therapeutics	
Hawa Ali El-Basir	Nursing	

Hawa Mohamed Salih	Nurse Health Visitor	
Hussain Ahmed Hussain	Ophthalmology	1948
Ibrahim Abdel Aziz	Pediatric surgeon	
Mahmoud Ziada	Clinical Haematology	
Ibrahim Gasim Mokhair	Pharmacy	
Ibrahim Mohamed El-Moghraby	Surgeon	1952
Khalda Zahir/Zarwi Sirkisian	First women graduates	1952
Labib Abdalla	Pediatrics	1954
Mahmoud Mohamed Hassan	Pediatrics	
Makram Girgis	Anatomy	
Makram Girgis	Anatomy	
Mamoun Hussain Sherif	Chest	
Mansour Ali Haseeb	Microbiology	
Mohamed Ali Ahmed/Wasfi	Dermatology	
Mohamed Hamad Satti	Pathologist	
Mohamed Hamad Satti		
Mohi El-Din Mahadi	Chest	`
Occupational Medicine	Ali Ibrahim	
Omar El Bagir Ahmed	Epidemiologist	
Omar M. Belail	Renal Transplant	
Osman Awad Alla	Urology	
Rashid El-Amin	Parasitology	
Saad Mohamed Ibrahim	Biochemistry	
Sadig Abdel Wahab	First MRCPATH	
Sulaiman S. Fedail	GI Endoscopy	
Suleiman Abu Salih	Nursing	
Tigani El-Mahi	Psychiatry	1948
Tahir Fadl	Anaesthesiology	

Presidents of Sudan Medical Council

Ali Bedri	1968-1974
Ibrahim Mohamed El-Moghraby	1974-1978
Mohamed Ali Ahmed	1978-1981
El-Hadi El-Zain El-Nahas	1981-1985
Mohamed El-Hassan Abu Bakr	1985-1989
Ahmed Abdelaziz Yacoub	1989-1991
Mirghani Sanhoury	1991-1992
Abdel Rahman El-Tom Ziyad	1992-2004
Abdel Rahman Mohamed Musa	2004-2009
Zain El-Abdeen Abdel Rahim Karrar	2009-2018

Abdel Azim Mohamed Kabalo	2018-2019
El-Khatim Elias	2020-

Presidents of Students Medical Society FOM/UOK

Mohamed Ahmed Gabbani	1954-1955
Haddad Omer Karoam	1955-1956
Hassan Mohamed Ibrahim	1956-1957
Mohamed Abdel Aziz Abu Samra	1957-1958
Musa Abdalla Hamid	1958-1959
Abdel Rahman Mohamed Musa	1959-1960
Salah Taha Salih	1960-1961
Hassan Osman Omer	1962-1963
Mohamed Zain Mohamed	1963-1964
Osman Mohamed Ahmed Taha	1964-1965
Ali El-Hag Mohamed	1965-1966
Mirghani Ahmed Abdel Aziz	1966-1967
Abdel Salam Girais	1967-1968
Hassan Fadl Alla	1968-1969
Ahmed Ibrahim Mukhtar	1969-1970
Ahmed El Safi	1970-1971
Omer Ibrahim Aboud	1971-1972
Mohamed El-Mahadi Bella	1972-1973
Abdel Rhmanan Ali	1973-1974
Abdel Magid Mohamed Musaad	1974-1975
Bakri Osman Saied	1975-1976
Bella Mohamed El-Bashir	1975-1976
Tarig Ismail Humaida	1976-1977
Abdel Halim Mahadi	1977-1978
Ahmed Farah Shadoul	1978-1979
Asim Sid Ahmed	1979-1980

Presidents of Central Medical Supplies

Presidents of Sudan Medical Specialisation Board

Prof. Abdel El-Rahman Mohamed Musa was the first president, followed by Prof. Salih Yasin Salih, Prof. Osman Taha, Prof. Shakir Zain El-Abdeen, and Prof. Mohamed El-Meki Ahmed (current).

First Seven Medical Graduates of KSM

The seven graduates are:

1. Ali Bedri
2. Ahmed Akasha
3. Amin El-Sayid
4. Daoud Iskander
5. El-Tahir Yousuf
6. El-Nour Shams El-Din
7. El-Fadil El-Bushra

Commanders of the Sudan Medical Corps

1956-2022

Osman Y. Abu Akkar was the founding commander

	Name	Rank	School
1.	Osman Yousuf Abu Akar	أميرالاي	KSM ()
2.	Mahmoud Hussain	أميرالاي	KSM ()
3.	Hamadnalla El Amin	أميرالاي	KSM ()
4.	Abdalla Ahmed Galander	لواء	FOM,UOK
5.	Hussain A. El Shalali	فريق	Egypt
6.	Hafiz Salim El Hakeem	فريق	FOM,UOK
7.	Abdel Salam S. Isa	فريق	FOM,UOK
8.	Khalil Badi	فريق	FOM,UOK
9.	Ahmed Abdel Aziz Yacoub	فريق	FOM,UOK
10.	Ahmed Abdel Rahim Saeed	لواء	FOM,UOK
11.	Ali M. O. El Fadlabi	فريق	Egypt
12.	Siddig El Hussain	فريق	FOM,UOK
13.	Malik El Agib	فريق	FOM,UOK
14.	Samir Ahmed Abbaro	فريق	Egypt
15.	Izz El Din Omer Sulaiman	فريق أول	USSR
16.	Ahmed Ibn Idris	فريق	USSR

		أول	
17.	Sayid Ali	فريق	FOM,UOK
18.	Khatir Tobai	فريق أول	FOM,UOK
19.	Abdalla El Atta	فريق	FOM,UOK

Agenda for Future Health Planning

Below is a reform agenda for health that makes the ‘medical community’ more responsive to the aspirations of the Sudanese people, more consistent with internationally accepted principles and declarations, and better able to nurture a healthy population.

If a broad consensus on the main agenda of reform is not reached, more deliberations will be needed. Nevertheless, these points provide food for thought for any further attempts in this direction.

The proposed reform agenda adopts the WHO Health System's six Building Blocks as a framework for analysis. In addition, other tools were also invoked into action, including WHO Framework for Health System Performance Measurement, human resources for health assessment, situation analysis tools, costing methodologies, microeconomic studies, unit service costing for establishing national and social insurance schemes, methods for determining, prioritizing, and costing of Basic Package of Services, frameworks for developing performance-based funding models, disease burden studies, specific disease or service impact studies, and other methodologies.

Health governance and stewardship

- The consecutive Sudanese governments neglected their constitutional obligation to uphold the right to health as a fundamental human right.
- The requirements of good governance in the sector have been neglected.

- There is a lack of participatory approaches to decision-making in service delivery at all levels of government. There was representation in committees and councils, but they were without mandates or explicit authorizations.
- Stakeholders, NGOs, donors, UN agencies, and partners are excluded from decision-making processes. As a result, sector representation in governance is narrow in deciding on health matters.
- There is a lack of accountability mechanisms to monitor, guide, and verify health-related resource allocation, budget planning, and spending.
- The lack of health system performance benchmarks is scientifically established, rigorously monitored, and transparently reported.
- Defective and confused accountability pathways and fragmentation of the locus of responsibility in key health sector governance areas, including health infrastructure development, HTP procurement standards, health service delivery standards, and regulatory control over non-state, are easily demonstrated.
- There is rampant corruption and mismanagement in the health sector.

Health infrastructure, technologies, and pharmaceuticals

- Several new hospitals, universities, and institutions have been established for political gains with few justifications. Examples are many:
 - There is a medical school with no electricity, water supply, paved roads, or internet services. The venue is too small for a secondary school.
 - A multi-million-dollar hospital was built in an almost uninhabited region.

- Several provincial universities were started in the country's capital city and stayed there for ages.
- Several existing institutions were neglected or actively dismantled, including:
 - The time-honored Primary Health Care network preceded the Alma Ata Declaration of 1976.
 - The Blue Nile Health Project
 - The Cancer Registry, founded in 1966 to register laboratory-confirmed cancers, survived for 20 years before it vanished.
- There is an absence or ineffective regulatory control over health care supplies, medicines, medical technologies, laboratory, radiology, and other health technologies.
- The procurement processes have been far from transparent and fair.
- The health budget hardly covers salaries; little is allocated to development, training, or research.
- The Central Medical Stores (CMS) imported, stored, and distributed drugs, dressings, disinfectants, public health pesticides, medical laboratory supplies, medical gases, hospital instruments, and equipment to all public sector health facilities. In 1972, the Senior Medical Officer in every hospital in Sudan, no matter how far away from the capital city, received the BMJ and Lancet regularly. The Central Supplies Fund replaced the CMS, renovated the building, and upgraded the operational technologies. However, it deviated completely from its noble foundation goals that were set over 60 years ago: the ad-hoc drug and medical supplies management and distribution systems. The CMS operates on a cash and carry basis, meaning the States must buy their medicines and organize their

transport, storage, and distribution. In addition, all hospitals, as financially autonomous entities, are responsible for their drug procurement system. At the PHC level, health workers often must rely on “self-help” kits, privately bought.

- Local drug manufacturing was neglected, and the country relied heavily on importation at a high cost to the government and patients.
- Failure to take advantage of international trade arrangements with critical regional and international suppliers and manufacturers to benefit from volume discounts, importation of generic name medicines, join voluntary pooled procurement arrangements for childhood vaccines, maternal health commodities, and other missed opportunities.

Human resources for health

- The health workforce is inadequate and inequitably distributed.
- There is a lack of human resource management policies—uncontrolled workers with mediocre skills.

The health information system

- The health information system is defective. Collection, analysis, reporting, and utilization of data are weak. Consequently, decision-making was ineffective—weak performance of all health surveillance systems and poor accountability at national, local, and facility levels.
- The tendency to manipulate health information to serve political ambitions is made possible. It is also questionable that data is not reported or conveyed. In most cases, health data did not render helpful information.

Health care financing

- There is chronic under-funding of all health sector programs, and when combined with inadequate coverage with insurance schemes, it results in a cat-

astrophic increase in the out-of-pocket expenditure, which amounts to more than 75% of total health expenditure.

- UN and donor program contributions are not reflected in the national health accounts, preventing realistic and holistic budgeting and financial accountability.

Health service delivery

- All governments failed to implement existing health policy strategies, mainly by regressing Alma Ata Declaration principles by focusing less on primary health care (PHC) and more on secondary and tertiary care.

Health policy guidelines

The following guidelines consider several provisions:

1. Health is a fundamental human right.
2. Health is an investment in human development.
3. In the last hundred years, Sudan's health sector achieved considerable progress in reducing the disease burden, increasing access to primary health care services, and strengthening the health system blocks to sustain the gains. However, Sudan's key health indicators today are declining is an integral part of a deliberate policy of withdrawing governmental support from the entire sector and allowing rampant market forces to determine what services are delivered to citizens, at what price, and with what quality.
4. The policy should be pro-poor, gender-responsive, and equity-focused.
5. The public health sector, civil society, private sector, educational institutions, health workers, trade unions, informal community-based groups, national and formal NGOs, and the private sector are partners in formulating and supporting health policies, developing strategies, monitoring, and implementing.

6. The government must lay down robust health policy strategies and establish priorities, norms, and standards of health care service. Then, allocate resources to regulate service delivery at public, private, and not-for-profit partners.
7. Traditional medicine (TM) has gained unprecedented popularity in the last few years due to its help to the public at the PHC level. TM is necessary and time-honored in Sudan. It has a long history of treatment, health maintenance, disease prevention, and rehabilitation.
8. There is a need to establish a national health museum to provide a repository of Sudanese medical and health artifacts, including surgical instruments, pathology specimens, commemorative objects, public health items, historical archives, and history of health care in Sudan.
9. The institutions that organize doctors, pharmacists, dentists, and allied health sciences pass through a crisis period. However, their medical associations and trade unions are still in limbo.
10. Culturally competent care occurs when cultural values and beliefs are known and used appropriately with people of diverse or similar cultures. Cultural competence is about being respectful and open to different cultural perspectives. Relationship building is fundamental to cultural competence and accepting each other's expectations.
11. Competencies are the attributes that doctors should demonstrate in professional practice. They integrate knowledge, skills, facts, and attitudes needed to serve the patient, community, and the profession.
12. The poor work environment and poor remuneration of health care providers are Achilles's heel of Sudan's health care delivery system.

Policy reform agenda

Based on the above analysis, this book is aptly concluded with the following health policy reform measures, which are neither comprehensive, final, or conclusive, but open-ended and open for discussion.

For brevity and clarity, all measures are numbered or bulleted.

1. Peace and stability in all regions of Sudan are necessary prerequisites for any development strategy.
2. Rehabilitate the essential health services, and resuscitate the healthcare facilities affected by civil conflict. Concurrently, allocate enough budgets to health at national and subnational levels (states and municipalities).
3. Review and evaluate Sudan's human resources in the health sector, and develop short-and medium-term policies and strategies to decide on the projected needs for resource production. The studies should consider the existing discrepancies, production, distribution, and deployment. Several graduate health care cadre should be addressed. Consider possible closure or amalgamation of some universities.
4. Develop a Basic Service Package (BSP) to be delivered to all citizens and migrants in Sudan through public sector outlets at primary, secondary, and tertiary levels.
5. Financing the health care service delivery in Sudan includes national health insurance for all government employees, their families, refugees, and inter-

nally displaced persons living in Sudan. It must also include creative co-financed insurance schemes between government and private sector employers (starting with large formal industries and enterprises and carefully drawing the line within the small and medium enterprises) and community-based insurance schemes.

6. Rehabilitate the Emergency Medical System at all health care delivery levels.
7. Rehabilitate the school health system, including basic hygiene, sanitation, vaccination, nutrition, eye health, dental health, lifestyle improvement, psychosocial and mental health interventions, and sexual and reproductive health interventions.
8. Develop mechanisms that ensure innovative partnerships with the private sector.
9. Comply with global aid effectiveness measures, and engage all stakeholders.
10. Establish accountability measures at service delivery points, municipal, state, and national levels.
11. Conduct desk review of crucial health information and data.
12. Review, and update the health legislative system.
13. Develop a comprehensive National Health Policy and a Strategy and Implementation Plan to guide

Sudan's health sector development and performance.

14. Develop, and implement a Primary Health Care network as a pivotal part of the health sector's strategy.
15. Develop a well-established patient referral system.
16. Identify, and manage chronic non-communicable disease risk factors.
17. Improve chronic disease management support palliative and home-based care services and early detection and prevention programs for cancer, diabetes, hypertension, and other non-communicable diseases.
18. Establish regular public multi-disciplinary, multi-sectorial, and multi-stakeholder joint health sector review events.
19. Develop a mechanism to assure the formal accountability of health service delivery institutions.
20. Develop, and implement a proper comprehensive HRH policy.
21. Ensure minimum government expenditure (% of total government expenditure and USD/capita).
22. Rehabilitate the rural health service policy, and improve its ability to redistribute, support, and retain appropriate types, mixes, and numbers of health workers in under-served areas and populations.

23. Increase the investments and technical inputs to improve the quality of health science training and education quality in both public and private educational and training institutions.
24. Establish the Ministry of Health archive and library.
25. Formulate the Sudan TM Policy to set intentions, goals, methods, and tools for influencing the quality, safety, and effectiveness of products, practices, and practitioners in TM, and promote TM's role in the national health care delivery system.
26. The *Sudan National Museum of Health* (SNMH) should be established under the auspices of the Federal Ministry of Health. The SNMH was an excellent innovative project which will provide a facility currently unavailable in Sudan.

Health Care Services Policy Framework

1. Aware of the fact that Sudan faces enormous health care problems aggravated by poverty, food scarcity, poor infrastructure, significant geographic and socio-economic disparities in access to and utilization of health services; meager inequitably distributed resources; distorted priorities; insufficient policy and management capacity at both federal, and state levels; and poor health outcomes associated with a health care system that is significantly underfunded, unbalanced, and inefficient;
2. Recognizing that large parts of Sudan are isolated and underdeveloped, with very minimal access to essential health services and infrastructure;

3. Aware of the critical health care available to the poor, refugees, the marginalized, physically disabled, vulnerable groups, namely women and children, and the world's most prominent displaced citizens, and their need for humanitarian assistance during resettlement;^[347]
4. Noting that HIV/AIDS is a severe threat that needs concerted multi-sectoral preventive efforts alongside the program to meet the needs of people living with HIV/AIDS;
5. Drawing on Federal Ministry of Health 25-year strategy draft^[348] providing health policy framework; on analysis of the available health information, field missions, and recent sector reviews;^[349] on Post-Conflict Sudan Needs Assessment & Policy Options identifying priorities and issues in health services on which urgent action is needed;^[350] on UN agencies, NGOs, donors' post-conflict workshops, conferences, and working groups initiatives;^[351] and a "National Poverty Eradication Strategy Concept Note" committed the interim authorities to forge a sound recovery, and development program which provides the internationally agreed targets against which the needs of the people of Sudan can be assessed, particularly in war-affected, and disadvantaged regions;^[352]
6. Noting with concern the failure of the MDGs, the onset in 2015 of the Sustainable Development Goals (SDGs) relevant goals, and whether the lessons of MDGs failure are understood.
7. Noting with satisfaction the health-related provisions of the Comprehensive Peace Agreement (CPA)^[353], and its embodiment in the Sudan Interim Constitution,^[354] the implementation of which re-

quires sweeping reforms in governance, the creation of new institutions, and significant capacity building at all levels of government to allow for effective decentralization, and equitable resource allocation;

8. Recalling Sudan's 25-Year Strategy, identifying priority rehabilitation program, and initiatives that need to be implemented; the Ministry of Health Policy, which sketches the vision of an equitable health sector with primary health care as founding principle; the World Bank latest Needs Plan, addressing humanitarian assistance program; the Sudan's HIV/AIDS Policy, and strategies to prevent, and decrease HIV transmission, reduce HIV/AIDS-related morbidity, and mortality, and protecting the rights of persons afflicted with the disease;^[355] the Sudan Nutrition Policy, and Plan of Action with the objectives of reducing the prevalence of micronutrient deficiencies, and acute, and chronic malnutrition to half the baseline values; the Joint Assessment Mission (JAM) Cluster Reports namely Social Basic Services Report, which is a distillation of the assessments of the available information, and of extensive consultations with the leading sector partners federal, and state counterparts, the Health, Education, and Water Secretariats of the Sudan, UN agencies, NGOs, and donors;
9. Appreciative of the challenges that face health services in trying to cover basic needs, control diseases associated with poverty, infectious and non-communicable diseases, managing the sick, and delivering health services on the one hand, and coping with more significant and faster medical advances on the other, and how to match consistency in pursuing reform with sensitivity to satisfying basic health needs for all citizens;

10. Aware of the fact that the overall government spending on health, which is lower than that in other countries with similar conditions, is skewed towards curative services in urban areas;
11. Aware of the disturbing conditions of the non-availability of potable water supply, sanitation, and environmental hygiene in several regions in the country and their negative impact on the health of the people, namely in rural and nomadic communities;
12. Determined to combat epidemics and infectious diseases aggressively;
13. Affirms that health is a fundamental human right, and healthcare is a priority in the reconstruction and development plan; that men and women are the means and target of development, and that primary health services need to be strengthened not only to address the leading causes of morbidity, and mortality but to maintain the healthy productive men, and women;
14. Affirms that patients should have access to prompt modern, and dependable medical treatment irrespective of their social or financial status;
15. Understands that reforming health services needs active and broad participation, partnership, commitment, and expertise;
16. Commits to the following policy packages:
 - Strengthen the capacity of, and democratic process in the Federal Ministry of Health, and State Ministries of Health to:
 - i. increase professional participation in priority settings,

- ii. manage the challenges of sector recovery needs,
 - iii. bring about the expected increase in inflows of financial resources, requirements for strategic planning, policy reforms, capacity-building, and institutional strengthening,
 - iv. coordinate the activities of international partners,
 - v. establish partnerships with private and non-governmental service providers to rapidly scale up the coverage of health services;
- Support decentralized governance at all levels through the transfer of financial resources, administrative authority, and capacity to the state level;
- Assure clinical governance in all healthcare institutions, and provide authoritative guidance to all health professionals on the latest standards, technologies, and drugs so that clinical decisions are based on the best possible evidence of effectiveness;
- Empower local communities, vulnerable groups, and civil society organizations;
- Restructure of budget priorities and processes, including reorientation towards social services, productive sectors, and infrastructure, and encouraging their role in planning and implementation of health services;
- Improve financial management capacity and mechanisms at both the federal and state

levels to ensure efficiency, transparency, and accountability;

- Initiate, and strengthen disease-specific programs (viz. malaria, TB, HIV/AIDS, schistosomiasis, trypanosomiasis, leishmaniasis).
- Integrate private-sector strengths and resources.
- Strengthen health information systems and health systems research at all levels to guide planning, and resource allocation decisions.
- Strengthen Primary Health Care around the goals of equity, financial sustainability, and accountability;
- Moreover, for professional staff who were alienated, we call on all health professionals, academicians, workers, and stakeholders to come forward, individually and collectively, and join hands to set up Sudan's medical consensus and critique, expand, and set on track this policy framework, and content through all forums.

Ahmed El Safi Contribution

We think we have contributed our fair share to medical teaching, training, and research. This pamphlet highlights our accomplishments and achievements and showcases our impact. Indeed, we ask all doctors to follow suit and document their experiences. Refraining from documenting one's achievement is not modesty it is a deficiency.

All our activities as anesthesiologists, anthropologists, researchers, writers, and medical historians are related and neatly knit in one fabric: culture building, strengthening people, better management, efficiency, perfecting techniques, practices, and processes in every human endeavor.

We broke new grounds in several fields, established unique institutions, and advanced several new concepts and theories. We founded several organizations – governmental and non-governmental, including:

1. Traditional Medicine Research Institute in Sudan Research Council in 1982
2. Traditional Medicine Research Institute WHO Collaborating Center for research in Sudan Research Council in 1984
3. Sudan Medical Heritage Foundation in 2005
4. Maharat Medical Training Center as a high-skills medical training center in 2008
5. IBRAZ Medical Simulation Center in Ibn Sina University 2017 introduced medical simulation concepts and practices.

We broke new grounds in health system research, history of medicine, medical anthropology, medical folklore, and civic education. In these fields and others, we wrote and pub-

lished paperbacks, ebooks, over eighty (80) books, and hundreds of articles in Arabic and English.

Our marketing machinery and advocacy have been a week. Though these publications are available for sale in several bookstores in Sudan and Egypt and available online on scholarly platforms free to download, they are still unknown in the profession. Nevertheless, the publications that were read were positively acclaimed. Indeed, few became textbooks and teaching and training manuals in several universities.

PUBLISHED PAPERBACKS AND EBOOKS ON AMAZON

[Ahmed El Safi Paperbacks published on Amazon](#)

[Ahmed El Safi eBooks published on Amazon](#)

[Ahmed El Safi Arabic eBOOKS published on Amazon](#)

SOCIAL MEDIA

[Virtual Museum of Health Heritage](#) (2005)

The Museum contains an extensive gallery of images and videos. In addition, several reports and manuscripts, photographs, and video recordings still reside unstudied in the Sudan Archives in Durham University Library in the UK, in Rockefeller Archive Center, in Wellcome Institute for the History of Medicine, Royal Commonwealth Society Library, and possibly in several other libraries throughout the world. In addition to the acquisitions of Sudan's Ministry of Culture Archives, Sudan National Archives, and the Institute of African and Asian Studies in Khartoum, Sudan.

[Sudanese Medical Tales](#) (حكاوي طبية سودانية) (2018)

This blog comprises over a hundred short stories, primarily ethnomedical and historical. Each tale has been designed to help in preparing one or more lectures. In addition, the ac-

counts provide opportunities for comparing different medical scenarios and theories.

THE MEDICAL PIONEERS SERIES

After so many generations, experience, and enormous sacrifices, Ahmed El Safi tried to substantiate what the medical profession gained thus far and put it on record. Therefore, he has systematically written down the biographies of health pioneers and recorded their scholarly achievements in biomedicine. In addition to their historical importance, these biographies should help teach and train. Indeed, the lives and work of the pioneers studied (and books published) proved to be the most inspiring and resourceful personalities in Sudan's history of medicine. The list below is expected to grow steadily through the contribution of other authors.

El-Tigani El-Mahi: Selected Essays (English) (1981)

Ahmed El Safi & Taha Baasher (Editors)

Khartoum: Khartoum University Press Celebrating the University of Khartoum Silver Jubilee, 1956-1981. 187 pages.

After the untimely death of Tigan El Mahi in January 1970, I spent ten years (1970-1980) collecting and editing his scattered work.

El-Tigani El-Mahi: Selected Essays (Arabic) (1984)

Ahmed El Safi & Taha Baasher (Editors)

Khartoum: Khartoum University Press 1984

(التجاني الماحي، مقالات مختارة)

Abdel Hamid Ibrahim Suleiman, his life and work (2008)

Sudan Currency Printing Press, Khartoum, 2008: 100 pages), and Amazon KDP

Ahmed Mohamed El-Hassan, his life, and work (2008)

Sudan Currency Printing Press, Khartoum, 120 pages, and Amazon KDP (2020).

Daoud Mustafa Khalid, his life and work (2009)

Also, Amazon KDP (2020) and Amazon KDP (2022).

El-Hadi Ahmed El-Sheikh, his life, and work (2010)
Currency Printing Press, Khartoum and Amazon KDP (2020).

Abdel Rahim Mohamed Ahmed, his life and work (2011)
Currency Printing Press, Khartoum, and Amazon KDP (2020).

Ahmed Abdel Aziz Yacoub his life and work (2011)
Currency Printing Press, Khartoum), Amazon KDP (2020), and Amazon KDP (2022).

Mohamed Hamad Satti, his life, and work (2011)
Currency Printing Press, Khartoum, and Amazon KDP (2020).

BIBLIOGRAPHIES OF MEDICINE

A Bibliography of Biomedical Literature of Sudan in the 20th Century and Beyond (2022)
Amazon, KDP.

The currently published document is a 15,000+ inventory. This bibliography lists the citations of health sciences literature produced by Sudanese and expatriate doctors, pharmacists, biomedical scientists, and scholars during the 20th century and beyond in all fields of medicine, health sciences, and related applied and social sciences in all languages, whether carried out in Sudan or abroad.

The bibliography includes the citations of the biomedical material that has been published (scientific articles, books, and book chapters) and unpublished documents (postgraduate dissertations, technical reports, white papers, manuscripts, newsletters, departmental manuals, memoranda, project summaries, pamphlets, magazine articles), conferences and workshops papers, abstracts, and proceedings. The subject bibliographies drawn are:

A Bibliography of Female Genital Cutting.

In Preparation:

Anthropology (218)
Arabic Medical Books & Articles (201)
Blood (448)
Brucellosis (56)
Cancer (492)
Cardiovascular Disease (616)
Connective Tissue, Joints & Bones (346)
Dentistry (226)
Endocrine System
Epidemics & Disease Outbreaks
Filariasis (304)
Fluids and Electrolytes (239)
Fungal Disease (458)
Genetics (1721)
History of Medicine (108)
Immunology & Immune System (1519)
Kidney & Urinary System (473)
Kidney & Urinary System (473)
Leishmaniasis (854)
Liver and Biliary Tract (832)
Malaria (1227)
Medical Research (88)
Medicinal & Poisonous Plants (551)
Nursing & Midwifery (217)
Nutrition & Vitamins (775)
Obstetrics & Gynaecology (362)
Onchocerciasis (261)
Pathology (1415)
Protein Calory Malnutrition (220)
Psychiatry (1058)
Psychology (370)
Respiratory System
Schistosomiasis (647)
Sexually Transmitted Disease (651)
Skin Disease (571)

Spirit Possession Cults (678)
Surgery (544)
Traditional Medicine (2515)
Virus Disease (157)

HEALTH

Women's Medicine (1991)

Lewis, IM, Ahmed El Safi, and Sayyid Hurreiz (editors and contributors); International African Seminars, Edinburgh University Press, Edinburgh 1991: 300 pages

Native Medicine in Sudan (1970)

Sudan Research Unit, Faculty of Arts, University of Khartoum Sep. 1970, Salamabi Prize Competition Series No 1, 74 pages. This book was the first on the subject. It celebrated its golden anniversary last year.

Traditional Sudanese Medicine (1999)

Azza Press. Cairo: 2006: 742 pages, and Amazon, KDP, 2021.

This book has been a wide-ranging 730-page account of traditional Sudanese health culture, targeting healthcare providers, students of medicine, pharmacy, veterinary, agriculture, medical sociology, medical anthropology, and folklore. In addition, the book contains a comprehensive 2500-reference *General Bibliography* and 670-item Sudanese recipes. The book has been an essential companion, an indispensable learning tool for researchers interested in undertaking meaningful research, and a sourcebook for Sudanese university students.

What is said About El-Tigani El-Mahi in the Last Fifty Years (2022)

Amazon, KDP. (Arabic) eBooks.

(نصف قرن على رحيل التجاني الماحي)

ولد التجاني محمد الماحي في ٧ يناير ١٩١١م. وتخرج في مدرسة كتشنر الطبية في ١٩٣٥، وتخصص في الطب العقلي والنفسي في بريطانيا في ١٩٤٩ فكان بذلك أول أفريقي يجاز في هذا التخصص. بعد رجوعه السودان مباشرة قام التجاني بتأسيس أول عيادة للأمراض العصبية بالمصلحة الطبية السودانية بالخرطوم بحرى في أكتوبر ١٩٥٠. من عام ١٩٥٩ إلى ١٩٦٤ شغل منصب مستشار الصحة العقلية لمنطقة شرق حوض البحر الأبيض المتوسط (منظمة الصحة العالمية) بالاسكندرية. وبعد ثورة ٢١ أكتوبر ١٩٦٤ اختير عضواً ورئيساً مناوياً لمجلس السيادة السوداني. وفي سنة ١٩٦٩ التحق استاذاً في الطب النفسي في كلية الطب، جامعة الخرطوم. توفي التجاني الماحي في الثامن من يناير ١٩٧٠. جمع هذا الكتاب كلمات الشكر والتأبين والذكريات والدراسات والآراء العابرة عن البروفيسور التجاني محمد الماحي التي وصفت جوانب ثقافته الواسعة إسهاماته في الطب النفسي وريادته لهذا الحقل، كما تعرضت أخرى بالوصف لمكتبته العامرة ومحتوياتها وما آل إليه حالها بعد أن أهدتها عائلة الراحل لجامعة الخرطوم. كان من المقرر أن ينشر بروفييسور قاسم عثمان نور الذي اختطفته المنية قبل عامين نسخة شبيهة بهذه المجموعة. شكلت مساهماتي ومساهمات بروفييسور قاسم أغلب ما جاء في هذا السفر.

The Promised Health (2022)

(Arabic). Amazon, KDP

الصحة التي كنتم توعدون

An Introduction to Divination in Sudan (2022)

Amazon, KDP.

كيف يشخص السودانيون أمراضهم

(مدخل لدراسة أساليب التنبؤ بالغيب في السودان)

لتحديد مجال هذا الكتاب نقول أن الغيب هو ما لا نعتمد في إدراكه على إحدى الحواس الخمس المعروفة، لكن وإن كنا نتوصل إليه بأساليب وسيلتها الظن والتخمين والحدس وخداع الملكات الواعية وبالتالي لا يدخل في دائرة الاستنباط أو الاستدلال أو القياس والاجتهاد المنطقي، إلا أن لهذه الحواس مكان في التنبؤ بالغيب عندما

يعتمد على التجربة والعادة والاعتماد على مقبل الأحداث بما وقع قبل ذلك كالقيافة والعيافة والزجر والفأل والطيرة وما إليها.

Al-Hakeem (2013)

(الحكيم، من أجل أطباء أكثر وعياً ببيئتهم وفهماً لثقافات مجتمعاتهم)

Sudan Currency Printing Press. 2013: (50 pages). (Arabic)

استهل بروفيسور عبد الله علي إبراهيم هذا الكتاب بكلمة أسماها (المرض، علاجاً وثقافة) تعرض فيها لمحاولة أحمد الصافي في أن يحرر المنهج الطبي بتعريض ناشئة الأطباء لمعارف ونظم أخرى للطب غير التي ألفوها ولشيء من تراثهم الثقافي العريض، فالكتاب في تقديره محاولة لرد البركة إلى المتقف الذي تشرد في الأفق، وأنه مبحث يخلق في طلاب العلوم الطبية وعياً مبتكراً بالمرض كثقافة لا مجرد سقطات صحية.

Zar and Tumbura in Sudan (2015)

Ahmed El Safi & Samira Amin. (Arabic) Sudan Currency Printing Press. 2015.

The book features the late El-Tigani El-Mahi's seminal articles on the zar cult published in 1946. From 1970-1980, Prof. Ahmed El Safi searched for Al-Tigani's scattered works. These efforts resulted in three publications collecting pioneering research in Arabian Medicine, traditional Sudanese medicine, psychiatry, and extensive and varied writings. In addition, critical studies on tumbura have appeared in Women's Medicine: the zar-bori cult in Africa and beyond (1991).

The Right to Health, a fundamental human right (2015)

(الحق في الصحة، أصل الحقوق)

Amazon, KDP (2022).

This book promotes and strengthens medical doctors' role in protecting patients' right to health, especially vulnerable groups. It raises medical doctors' awareness and knowledge about human rights. The book introduced the *Sudan Health*

Monitor, established by the Sudan Medical Heritage Foundation (2015).

Lexicon of Sudanese medical vernacular (Arabic) (2015)
(كلمني بى لغة أفهما) Madarik Publishing, and Amazon, KDP (2022).

The Lexicon of Sudanese medical vernacular (Arabic) (كلمني بى لغة أفهما) literally: (Talk to me in a language I understand), compiled popular terms that would be of help to doctors while communicating with patients and relatives. It describes and provides binomial, classical Arabic, English, and medical equivalents vernacular medical terms. The lexicon also includes the local names of the most popular medicinal, poisonous, nutritional, and aromatic plants, Sudanese months' names, and the vernacular names of the popular Sudanese snakes.

The Sudanese speak 114 languages in more than 500 dialects, and many speak in local tongues at home. However, Arabic is Sudan's official national language and the *lingua franca* in daily use at all levels of healthcare delivery and in communicating with patients, families, and relatives. This book addresses the laity's language, through which doctors communicate with patients and co-patients. This language is undoubtedly neither English nor classical Arabic.

The Role Model Physicians, traits and attributes (2016)

(الطبيب القدوة، في وصف خصال الحكيم)

Amazon, KDP (2022). eBook.

The book describes the merits that the Sudanese, and possibly anyone else, look for in their healers. In addition, the author alluded to the traits and attributes of excellence manifested in the lives of the Sudanese pioneers, including notable scientists, pharmacists, technicians, nurses, and other health workers.

Sudan Health, an annotated chronicle (2022)

Amazon, KDP. eBook and paperback.

If one is looking for a comprehensive and accurate chronological catalog of Sudan's health care system activities from its inception in 1899, do not look further. This book describes the milestones of Sudan's health in the twentieth century during the Condominium rule and after independence. In addition, it used all available historical resources to reconstruct the state of health during the Sennar Sultanate, Turkish rule, and earlier.

The book lists dates, persons, events, and activities. It tried to include philanthropy, charities, trust leaders, fundraisers, grantmakers, and other financiers. It recorded the epidemics, pandemics, famines, droughts, and natural disasters that affected Sudan's health in recent history. It identified Sudan's health pioneers, new schools, specialties, hospitals, and research facilities dates.

The book surveyed almost all available sources for information and listed the progression of health legislations, by-laws, regulations, policies, and plans. Consequently, the book should help policymakers, educators, researchers, instructors, students, and other health care providers. In addition, advocates of improving the Sudanese people's health status should find plenty of authentic information in the book. All UN agencies, EU, World Bank, embassies, NGOs, and the international donor community should keep this book handy.

Foundational Basis of Sudanese Psychiatry

Amazon, KDP 2022.

This book reiterates El-Tigani El-Mahi's legacy and pleas to psychiatrists to read him more thoroughly. In addition, the book highlights and describes the seminal ideas and concepts that El-Tigani El-Mahi propounded and on which Sudanese Psychiatry was founded. The book also contains two supporting studies by Tigani's contemporaries, T. A. Baasher and Sheikh Idris Abdel Rahim.

AL-HAKEEM THEORY SERIES

Al-Hakeem Theory for Culturally Competent Professionals (2022)

Amazon, KDP, 14K words

Flexner's structure- process-based educational system started a revolution in teaching in the wake of the twentieth century. Competence-based educational pedagogy is the vogue of the twenty-first.

Al-Hakeem's Theory for Culturally Competent Professionals launches an educational framework that embodies all domains of culture in all aspects of healthcare delivery. It adds cultural competence to undergraduate and postgraduate curricula, enhances the efficiency and effectiveness of the patient-physician interaction, and ensures that students have the knowledge, skills, and attitudes to work effectively with culturally diverse patients, families, and communities inland and abroad.

This theory introduces an alternative culture-based approach to medical education and professionalism. It targets health care organizations, healthcare educators, and providers, including but not limited to medical graduates and medical and allied health sciences students. Because the basic tenets of professionalism, culture, and cultural competence skills apply to all professions, the theory could also be helpful to students in non-medical disciplines.

Thus, the *theory* whose text is contained in this book is about achieving the exalted status of '*Al-Hakeem*,' the intellectual and the competent professional.

This series includes this text of pedagogic considerations and the following eleven explanatory books:

The medical humanities

Culture and management of diversity

Professionalism and medical ethics

Understanding the Sudan health system

Understanding the Sudanese health heritage

Beliefs in supreme beings

Beliefs in the supernatural

Managing health

Managing Ill-health

Magic and witchcraft

Traditional medicine practitioners.

PARLIAMENTARY PROCEDURE SERIES

A Manual on Rules and Procedure of Parliamentary Procedure (1999, 2009)

(المرشد إلى قواعد وإجراءات التنظيمات الحديثة)

Azza Press. 1999, 2006: 570 pages and Amazon, KDP eBooks.

This book is an invaluable and timely toolbox for coaching citizens on parliamentary procedure in a country undergoing a democratic transformation. The *Manual* is an authority manual in parliamentary procedure written to help all citizens irrespective of age or rank. This book is ranked by literary critics as the only book in Arabic on the bookshelves of Sudan and Arabic-speaking countries. The book was written to empower citizens, whether organized or on their way to organize, to achieve professional and personal goals through efficient and effective systematic deliberations.

The authority manual is divided into 23 booklets published as Amazon KDP ebooks in 2022, including:

Committees

Deliberative Bodies In The Democratic State

Meeting Etiquette and Decorum

Parliamentary Procedure Terms Dictionary

Terms Glossary
Civil Society Organizations
The Secretary & Secretary-General
The President
Meetings
Types of Meetings
Debating Matters And Taking Decisions
Motions And Requests
General Meeting And General Assembly
The Organization Members
Keeping The Organization Finances
Documenting Meetings
Debate
Meeting Agenda
General Elections
Executive Office Officers
How To Establish A New Organization
What Is The Executive Office?
Governance Documents

About the Author

Ahmed El Safi, MB BS (University of Khartoum), DA, RCP, RCS (England), FFARCS (England), FRCA (England), Certificate of Acupuncture (China), is a Sudanese anesthesiologist, researcher, administrator, and writer. As a medical biographer, he is known in the medical field and noted for his role as the founder of institutional research in the history of medicine and health heritage. He broke new grounds by establishing unique non-governmental high-skills medical training. In addition, he founded or co-founded several organizations – governmental and non-governmental, and held executive offices in many.

He studied the Sudanese health culture for over four decades and wrote extensively on health care issues in Arabic and English.

He founded the Traditional Medicine Research Institute in the National Council for Research in Sudan in 1980 and the World Health Organization Collaborating Center for Research in Traditional Medicine in Khartoum in 1984. He was Founding Director for both till 1989.

In 2005, he founded the Sudan Medical Heritage Foundation, a non-profit organization dedicated to researching, developing, and conserving Sudanese health care heritage and resources.

He published several books and articles in Arabic and English.

Index

- A. El Safi, iv, v, xxx, xxxiii, xxxv, xxxvi, xxxvii, xxxviii, 94, 97, 98, 124, 268, 359, 360, 361, 362, 366, 395, 397, 418, 419, 420, 423, 425, 426, 432, 433, 434, 435, 436, 438, 448, 466, 467, 468, 469, 472, 474, 481
- A. El Safi Publications
- Abdel Hamid Ibrahim
Sulaiman, his life and work, 2008, vi, xxii, xxix, xxxv, 86, 98, 106, 107, 109, 112, 210, 258, 260, 263, 271, 276, 278, 282, 286, 290, 294, 297, 308, 313, 316, 322, 333, 345, 356, 357, 361, 390, 420, 421, 444, 469
- Abdel Rahim Mohamed
Ahmed, his life and work, 2014, vi, 326, 434, 444, 469
- Ahmed Abd Aziz Yacoub,
his life and work 2014, 434
- Daoud Mustafa Khalid, his life and work, 2009, 268, 469
- El-Hadi Ahmed El-Shaikh, , his life and work, 2010, vi, 425
- El-Hadi Ahmed El-Shaikh,
his life, and work, 2010, vi, xxxvi, 384, 425
- Manual of Parliamentary Procedure (Arabic)
المرشد إلى قواعد وإجراءات (التنظيمات الحديثة) 1999, 2006, 398, 478, 479
- Mohamed Hamad Satti, his life and work, 2010, 426
- Mohamed Hamad Satti, his life, and work, 2010, 426, 470
- Native Medicine in the Sudan, sources, concepts, and methods, 1970, xlv, 97, 472
- The Right to Health, a fundamental human right, 2016, 435, 474
- The Role Model Physician (Arabic) (الطبيب القدوة). 2016, 438, 475
- The Wise Physician (Arabic) (الحكيم) 2013, xxxvii, 432
- Tigani El-Mahi Selected Essays (Arabic), 1981, xxx, 360, 366, 469
- Tigani El-Mahi Selected Essays (English), 1984., 366, 468
- Traditional Sudanese Medicine, a primer for

- healthcare providers,
researchers and
students, 1990, xxx,
360, 366, 469
- Zar and Tumbura in Sudan,
2008, 418, 474
- A. El-Safi, 267
- A. El-Safi Publications
Abdel Hamid Ibrahim
Sulaiman, his life and
work, 2008, vi, 86, 98,
106, 107, 109, 112, 210,
258, 260, 263, 271, 276,
278, 282, 286, 290, 294,
297, 308, 313, 316, 322,
332, 345, 356, 357, 361,
390, 420, 421, 444
- Ahmed Abd Aziz Yacoub,
his life and work 2014,
434
- Daoud Mustafa Khalid, his
life and work, 2009, 268
- El-Hadi Ahmed El-Shaikh, ,
his life and work, 2010,
vi, 425
- Manual of Parliamentary
Procedure (Arabic)
المرشد إلى قواعد وإجراءات (,
التنظيمات الحديثة) 1999,
2006, 397
- Mohamed Hamad Satti, his
life and work, 2010, 426
- The Right to Health, a
fundamental human
right, 2016, 435
- The Role Model Physician
(Arabic) (الطبيب القدوة).
2016, 438
- The Wise Physician (Arabic)
(الحكيم) 2013, 432
- Tigani El-Mahi Selected
Essays (Arabic), 1981,
360, 366
- Tigani El-Mahi Selected
Essays (English), 1984.,
366
- Traditional Sudanese
Medicine, a primer for
healthcare providers,
researchers and
students, 1990, 360,
366
- Zar and Tumbura in Sudan,
2008, 418
- Abdalla Omer Abu Shamma,
444
- Abdalla Saad, 444
- Abdel Halim Mahadi, 448
- Abdel Halim Mohamed Abdel
Halim, xix, 221, 222, 223,
247, 248, 284, 297, 301,
444
- Abdel Hamid Bayoumi, xix,
230, 287, 301, 444
- Abdel Hamid Ibrahim, vi, xxii,
xxix, xxxv, 86, 98, 106,
107, 109, 112, 210, 258,
260, 263, 271, 276, 278,
282, 286, 290, 294, 297,
308, 313, 315, 316, 322,
332, 345, 356, 357, 361,
390, 420, 421, 444, 469
- Abdel Magid Mohamed
Musaad, 448
- Abdel Moneim Wasfi, 245,
301, 446
- Abdel Rahim Mohamed
Ahmed, vi, 326, 434, 444,
469
- Abdel Rahman Atbani, 444
- Abdel Rahman Mohamed
Musa, 447

- Abdel Rhman Salim, 444
 Abdel Rhmanan Ali, 448
 Abdel Salam Girais, 448
 Abdullahi Ali Ibrahim, 85
 Abdullahi Osman Al-Tom, 85
 Academic and Historical
 Writings
 Ahmed Bayoumi, vi, 97, 98
 Ahmed El Safi, iv, v, xxx,
 xxxiii, xxxv, xxxvi, xxxvii,
 xxxviii, 94, 97, 98, 124,
 267, 359, 360, 361, 362,
 366, 395, 397, 418, 419,
 420, 423, 425, 426, 432,
 433, 434, 435, 436, 438,
 448, 466, 467, 468, 469,
 472, 474, 481
 Ali Mohamed Ahmed
 Awad, 95
 Amir Abdel Razig, 95
 Amir Ali Hasan, 96
 Amro Abbas, vii
 Ann Chrichton-Haris, 95
 Awad Al-Basha, 96
 Awad Mohamed Ahmed,
 96
 Babiker El Sheikh, 95
 Badrel Din Hamid El
 Hashimi, 99
 Beshir Hamad, 94, 338, 445
 El-Sayyid Hassan Daoud, 95
 El-Zain Abbas Amara, 94
 Gerasimos Makris, 96
 Heather Bell, vii, 97, 397
 Herbert Squires, vii, 97, 99,
 175, 262
 Idris Salim Al-Hasan, 96
 Kamal Mekki El-Manna, 96
 Leonard Bousfield, 159
 Mamoun Yousif Hamid, 95
 Mansour Ali Haseeb, vi,
 xxiv, xxvii, 84, 97, 98,
 219, 226, 247, 252, 287,
 291, 294, 297, 328, 446
 Mohamed Osman Abdel
 Malek, 95
 Mohi El-Din Mahdi, 95
 Musa Abdalla Hamid, 94,
 447
 Mustafa Al Sayyid, 95
 Mustafa Al-Sayyid (مشاوير في
 دروب الحياة), 95
 Omer Beleil, 94
 Omer Beleil (*Two Lives
 Death Odyssey of a
 Transplant Surgeon*),
 94
 P. D'Arcy, 97
 Pamela Constantinidis, 96
 Rasha Ali El Baroudi, 95
 Salih Yassin Salih, 95
 Samia Al-Nagar, 96
 Sayyid Hamid Hurreiz, 96
 Siddig Ibrahim Khalil, vii,
 312, 343
 Ahmed Abdel Aziz Yacoub,
 vi, 243, 269, 337, 445, 470
 Ahmed Akasha, 448
 Ahmed El Safi, iv, v, xxx,
 xxxiii, xxxv, xxxvi, xxxvii,
 xxxviii, 94, 97, 98, 124,
 267, 359, 360, 361, 362,
 366, 395, 397, 418, 419,
 420, 423, 425, 426, 432,
 433, 434, 435, 436, 438,
 448, 466, 467, 468, 469,
 472, 474, 481
 Ahmed Farah Shadoul, 448
 Ahmed Ibrahim Mukhtar, 448
 Ahmed Mohamed El-Hassan,
 xxv, 306

- Ali Bedri, 103, 183, 201, 229, 306, 447, 448
- Ali Khogali Ismail, 249, 313, 445
- Anis Mohamed Ali El-Shami, 241
- Anthropologists
- A. El Safi, iv, v, xxx, xxxiii, xxxv, xxxvi, xxxvii, xxxviii, 94, 97, 98, 124, 267, 359, 360, 361, 362, 366, 395, 397, 418, 419, 420, 423, 425, 426, 432, 433, 434, 435, 436, 438, 448, 466, 467, 468, 469, 472, 474, 481
- A. El-Safi, 94, 97, 98, 124, 267, 359, 360, 361, 362, 366, 395, 397, 418, 419, 420, 423, 425, 426, 432, 433, 434, 435, 436, 438, 448, 481
- Abdullahi Ali Ibrahim, 85
- Abdullahi Osman Al-Tom, 85
- Amir Ali Hasan Abdalla, 96
- Awad Al-Basha, 96
- Brenda Seligman, 84
- Edwards Evans-Pritchard, 84
- Gerasimos Makris, 96
- Harold Barclay, 85
- Harold MacMichael, 85
- Holy, 66, 85
- Ian Cunnison, 85
- Idris Salim Al-Hasan, 96
- Jean Buxton, 84
- JS Trimmingham, 85
- Pamela Constantinidis, 96
- RG Lienhardt, 84
- Samia Al-Nagar, 96
- Sayyid Hamid Hurreiz, 96
- Sharaf Al-Din Abd Al-Salam, 85
- Arab and Moslem Travellers
- Al-Idrisi, 65
- Ibn Batuta, 65
- Ibn Hawqal, 65
- Ibn Salim Al-Aswani, 65
- Maqrizi, 65
- Mohamed Ibn Omer El-Tunisi, 59, 65, 67, 68
- Naom Shugair, 63
- Salim Qubtan, 65
- Arab and Muslim Travelers
- تشحيد الأذهان بسيرة بلاد (العرب والسودان), x, 59, 65, 67, 68
- Al-Idrisi, 65
- Ibn Batuta, 65
- Ibn Hawqal, 65
- Ibn Salim Al-Aswani, 65, 66
- Maqrizi, 65
- Naom Shugair, x, 63
- Salim Qubtan, 65
- Asim Sid Ahmed, 448
- Awad Al-Basha, 96
- Bakhiet Mohamed Omer, 269, 445
- Bakri Osman Saied, 448
- Batoul Mohmed Eisa, 445
- Biomedical Journals, 147
- Brenda Seligman, 84
- Charles Morley Wenyon, 151
- Charlest Gordon, xxi, xli, 62, 80, 90, 116, 126, 133, 143, 174, 188, 206, 209, 217, 232, 239, 242, 245
- Christian Missions
- Austrian Mission, 62
- Christian Missionary Society, xiii, 62, 153, 209

- Christian Missionary
Society Hospital, xiii,
153
- Gordon Memorial
Missionary Fund, 62
- Roman Catholics, 62
- Sudan United Mission, xiv,
160, 203
- The Apostolic Vicariate of
Central Africa, 62
- The Italian Mission, xvi, 187
- The Sudan Interior Mission,
xvii, 203
- Communicable diseases
HIV/AIDS, 49, 51, 101, 460,
461, 464
- Malaria, 49, 51, 54, 55, 63,
73, 83, 101, 348, 383,
406, 419, 464
- Tuberculosis, 51, 101, 289,
383
- Constitutional Charter of the
Sudan, 1899, xi, 113, 128
- Daoud Iskander, 95, 448
- Edwards Evans-Pritchard, 84
- El-Tigani Mohamed El-Mahi,
xi, xix, xxvii, xxx, xlv, 61,
63, 93, 94, 225, 226, 233,
240, 295, 321, 331, 359,
360, 366, 446, 468, 469,
472, 474, 476
- Endemic Diseases
Guinea Worm, 51, 74
- Leishmaniasis, 50, 156,
157, 275, 383, 464
- Leprosy, 51, 64, 75, 160,
206, 209, 237, 383
- Lymphatic Filariasis, 50
- Malaria, 49, 51, 54, 55, 63,
73, 83, 101, 348, 383,
406, 419, 464
- Mycetoma, 51, 141, 377,
378, 383, 411
- Onchocerciasis, 50, 280
- Schistosomiasis, xxv, 50,
73, 83, 148, 159, 161,
165, 166, 167, 168, 171,
173, 180, 210, 219, 237,
255, 301, 321, 322, 348,
400, 419, 464
- Trachoma, 51, 70, 83, 207,
351
- Epidemic Diseases
Cholera, 54, 55, 62, 64, 69
- Smallpox, xiii, 55, 56, 74,
156, 483
- Yellow Fever, 51, 191, 206,
211
- European Travelers
Ferdinand Verne, 70
- George Hoskin, 70
- George Schweinfurth, 70
- Gypsum, 70
- James Bruce, x, 60, 69, 71
- James Pierre Tyler, 70
- Samuel Baker, 69, 80
- Waddington, 70
- William Burckhardt, 69
- William John Browne, 69
- F. Reginald Wingate, Major-
General, Sir, 126, 130, 134,
137, 143, 145
- Ferdinand Verne, 70
- Floating Laboratory, 151
- Food, 51, 55, 68, 105, 112,
131, 136, 140, 218, 224,
264, 265, 278, 322, 333,
345, 450, 459
- George Hoskin, 70
- George Schweinfurth, 70
- Habib Abdalla, 275, 445
- Haddad Omer Karoam, 447
- Harold Barclay, 85

- Harold MacMichael, 85
- Hashim Hassan Erwa, 445
- Hassan Fadl Alla, 448
- Hassan Mohamed Ibrahim, 325, 337, 343, 344, 447
- Hassan Osman Omer, 447
- Hawa Mohamed Salih, 445
- Health Care
- Cardiology, xxviii, 222, 334, 444
 - Chest Surgery, 312, 343
 - Dentistry, 306
 - Ophthalmology, xix, xxv, xxxii, 206, 219, 225, 226, 235, 303, 313, 351, 354, 384, 445
 - Orthopaedics, 444
 - Surgery, xv, xxii, xxv, xxvi, xxxi, xxxv, 53, 124, 183, 185, 242, 243, 244, 263, 269, 270, 289, 301, 312, 317, 320, 326, 334, 343, 374, 377, 416, 444, 471
 - Urology, 243
- Health Education, 199, 378
- Health Legislations
- Births and Deaths
 - Registration Act 1972, 323
 - Criminal Act 1991, 115
 - Drugs and Poisons Act
 - 2009, xxxvi, 114, 423
 - Environmental Health Act
 - 2009, xxxvi, 114, 424
 - Food Control Act 1973, xxvii, 113, 327
 - Food Inspection Act, 115
 - Human Tissues and Parts
 - Act 1978, 114, 346
 - National Health Insurance
 - Corporation Act, 114, 387
 - National Medical
 - Commission Act 2008, xxxvi, 114, 421
 - National Medical
 - Specialization Board
 - Act, xxxii, 114, 389
 - National Public Health
 - Ordinance 2008, xxxv, 114, 419
 - Organization of Ionizing
 - Irradiation Act 1971, 113, 319
 - Pesticides Act, 115
 - Quarantine Act 1973, xxvii, 113, 328
 - Regulation of Smokine Act
 - 1983, 114
 - School Health Act 1973, 113, 327
 - Sudan Medical Council Act
 - 2004, 114
 - Work Security Act, 115
- Health Strategies & Plans
- 25-Year Strategic Health
 - Plan 2003-2027, xxxiv, 102, 406, 407, 461
 - 5-year Strategic 2017-2020
 - Plan, 439
 - 5-year Strategic Plan 2012-2016, 439
 - Local Manufacture of
 - Medicines Strategy, xxix, xxx, xxxii, xxxiii, 345, 357, 380, 393, 396
 - National Comprehensive
 - Strategy for Health, xxxii, 102, 381
- Historical Chronicles

- (مختارات الصائغ), 85
 (مخطوطة كاتب الشونة), 66
 Al-Tabaqat, 67
 Ibn Daif Allah, 67
 Historical Writings
 Heather Bell, vii, 97, 397
 Herbert Squires, vii, 97, 99, 175
 Ibn Daif Allah, 67
 Siddig Ibrahim Khalil, vii, 312, 343
 Hussain Ahmed Hussain, 201, 226, 445
 Ian Cunnison, 85
 Ibrahim Gasim Mokheir, xxii, xxv, 107, 201, 202, 210, 261, 265, 266, 271, 299, 302, 445
 Idris Salim Al-Hasan, 96
 Iqnatius Palmme, 70
 James Bruce, x, 60, 69, 71
 James Pierre Tyler, 70
 JB Christopherson, xii, xiv, 95, 103, 137, 138, 147, 165, 166, 167, 168
 Jean Buxton, 84
 Jerasimos Makris, 96
 JS Trimmingham, 85
 Khalda Zahir El-Sadaty, 242, 446
 L. Holy, 66, 85
 Laboratory on the Nile, xxxiii, 396
 Laboratory Work, 278
 London School of Tropical Medicine, 137, 151, 243, 349, 354
 Mahdiya, 62
 Mahmoud Mohamed Hassan, 106, 446
 Makram Girgis, 446
 Mansour Ali Haseeb, vi, xxiv, xxvii, 83, 97, 98, 219, 226, 247, 252, 287, 291, 294, 297, 328, 446
 Medical Libraries, 147, 196
 Medieval Arabic Books
 أحكام المرجان في أخبار أو أحكام (الجان), 60
 (إحياء علوم الدين), 59
 (الرحمة في الطب والحكمة), 60
 (الطب النبوي), 58, 59
 (الفتوحات المكية), 60
 (القانون), 58, 115, 129, 483
 (تذكرة داود الضرير الأنطاكي), 59
 (تعبير الرؤيا), 59
 (شمس المعارف الكبرى), 60
 (شموس الأنوار), 60
 (كامل الصناعة), 59
 (كتاب الشفاء), 59
 (لقط المرجان في أحكام الجان), 60
 (مجربات الديري), 59
 (مفردات الأدوية), 60
 Al-Qanun, 58, 115, 129, 483
 Mirghani Ahmed Abdel Aziz, 447
 Mohamed Abdel Aziz Abu Samra, 447
 Mohamed Ahmed Gabbani, 447
 Mohamed Ali Ahmed, 446, 447
 Mohamed Hamad Satti, vi, xxvi, xxxi, xxxvi, 106, 178, 280, 288, 296, 307, 315, 367, 425, 426, 446, 470
 Mohamed Zain Mohamed, 447
 Musa Abdalla Hamid, 94, 447
 Museums
 General and Economic Museum, 141

- Graphic Museum, xv, xvi, xvii, xviii, xxiii, xli, 181, 190, 199, 215, 216, 270, 277, 315
- Herbarium, 314
- Medical Museum, 141
- Therapeutic Garden, xii, 142
- Non-communicable Diseases
 - Diabetes Mellitus, 51
 - Malnutrition, 49, 51, 461
- Omer Ibrahim Aboud, 448
- Osman Mohamed Ahmed Taha, 447
- Pamela Constantinidis, 96
- Pesticides, 112, 207, 209, 335, 452
- Pharmacy
 - First Pharmacy
 - London Pharmacy, 202
 - Omdurman Pharmacy, 201, 202
- Pharmacy Legislations
 - Central Medical Supplies
 - Public Corporation Act 1991, 378, 433
 - Community Pharmacies
 - Establishment and Organization Regulation 1986, xxxi, 368
 - Generic Names of Drugs
 - Regulation 1993, 384
- Pharmacy and Poisons Act
 - 1963, xxxiv, xlii, 108, 207, 249, 267, 271, 285, 286, 326, 401, 403, 406
- Pharmacy and Poisons Ordinance 1939, xvii, 207
- Restrictions on
 - Advertisement of Drugs
 - Regulations 1978, xxix, 344
 - Sale of Veterinary Drugs
 - Regulations 1977, xxviii, 340
 - Sudan Medical Services
 - Regulation 1930, xvi, 186
 - Sudan Penal Code, xi, 105, 129
 - The Poisons List Order
 - 1971, xxvii, 318
 - The Poisons Regulation
 - 1939, xvii, 207, 208, 271, 286
 - The Production and Circulation of Medicinal Plants 1996, xxxiii, 391
- Philanthropists
 - Ahmed Muhammad
 - Hashim Baghdadi, xi, xii, xiv, xv, xvi, xxv, xxvii, 87, 130, 164, 165, 175, 192, 193, 304, 320
 - Henry Solomon Wellcome, xi, xii, 127, 130, 136, 151, 187, 188, 196
 - Salam, xxxv, 85, 294, 325, 336, 416, 448
- Pioneers of Medicine
 - Abdalla Omer Abu Shamma, xx, 237, 238
 - Abdel Halim Mohamed, xix, 221, 222, 223, 247, 248, 284, 297, 301, 444
 - Abdel Hamid Bayoumi, xix, 230, 287, 301, 444
 - Daoud Mustafa Khalid, vi, xxii, xxiv, xxviii, xxxvi, 253, 267, 285, 301, 310, 335, 423, 469

- Hussain Ahmed Hussain, 201, 226, 445
- Mohamed Hamad Satti, vi, xxvi, xxxi, xxxvi, 106, 178, 233, 257, 280, 288, 296, 297, 298, 307, 315, 316, 367, 425, 426, 446, 470
- Pioneers of Pharmacy
- Hafiz El-Shazali, 95, 304
- Ibrahim Gasim Mokheir, xxii, xxv, 107, 201, 210, 261, 265, 266, 271, 299, 302, 445
- Mohi El-Din Mahdi, 95
- Omer Beleil, 94
- Salih Suleiman Eisa, 107, 108
- Yousuf Bedri, 201
- Primary Health Care, 50, 100, 101, 102, 104, 118, 119, 120, 324, 341, 406, 429, 454, 461
- RG Lienhardt, 84
- Salah Taha Salih, 447
- Samia Al-Nagar, 96
- Samuel Baker, 69, 80
- Sayyid Hamid Hurreiz, 96
- SF Nadel, 85
- Sharaf Al-Din Abd Al-Salam, 85
- Siddig Ibrahim Khalil, vii, 312, 343
- Sudanese Historian and Writers
- Hassan Sala, x, 65, 66, 67
- Mohamed Ibrahim Abu Salim, 65
- Oan El-Sherif Gasim, 65
- Sudanese Historians and Writers
- Awad El-Kariem Mohamed Hindi, 65, 85
- Awad El-Karim Mohamed Hindi, 65, 85
- Babiker Bedri, 65
- Hassan Nagiela, 65
- Tayib Mohamed El-Tayib, 65
- Tarig Ismail Humaida, 448
- Therapeutic Garden, xii, 142
- Traditional Medicine, 55, 58, 84, 116, 140, 304, 342, 346, 347, 349, 350, 353, 359, 364, 365, 399, 400
- Training of Health Workers
- Assistant Anaesthetists, xxiv, 285
- Auxiliary Nurses, 179, 227
- Dental Assistants, xxiii, 274
- Health Visitors, xviii, xxii, 221, 269
- Laboratory Assistants, xv, 88, 178, 180
- Laboratory Technicians, xxi, xxv, 247, 276, 302, 305
- Medical Assistants, xiv, xv, xvii, xix, xx, xxiv, xxvi, 96, 166, 168, 170, 176, 177, 182, 203, 231, 233, 234, 238, 240, 293, 307
- Midwifery Training, xiv, 170
- Midwifery Training School, xiv, 170
- Public Health Officers, xvi, 88, 189, 194
- Sanitary Overseers, xvi, 88, 194
- Statistical Clerks, xxv, 302
- Vaccine Preventable Diseases
- Diphtheria, 51
- Measles, 49, 51, 56, 62

Neonatal Tetanus, 49, 51
Whooping Cough, 51
Yellow Fever, 51, 191, 206,
211
Waddington, 69
Wellcome Tropical Research
Laboratories

Dismantling started, 194
Laboratory on the Nile,
xxxiii, 396
William Burckhardt, 69
William John Browne, 69
Zarwi Sirkisian, 242, 446

References and Resources

-
- [1] Safi book
- [2] Compiled from Sudan Health Observatory and several other reliable sources including WHO/EMRO Health Profile-Sudan 2015 and 2006.
- [3]
- [4] Pankhurst, Richard. The history and traditional treatment of smallpox in Ethiopia. *Medical History*; 1965; 9: 343-55.
- [5] Miller, G. *The Adoption of Inoculation for Smallpox in England and France*. Philadelphia: University of Pennsylvania Press; 1957: 45-69 (chapter 3).
- [6] Bloss, J.F.E. Notes on the Health of the Sudan Prior to the Present Government. *Sudan Notes and Records*; 1941; 24: 131.
- [7] Beaton, A.C. The Fur. *Sudan Notes and Records*; 1948; 29(1): 1-39.
- [8] Grove, Captain E. T. N. Customs of the Acholi. *Sudan Notes and Records*. 2(2): 157-182.
- [9] Effendi was the title given by the British to non British doctors.
- [10] أبو علي الحسين بن عبد الله (ابن سينا). (القانون في الطب).
- [11] علي بن عباس المجوسي. (كامل الصناعة الطبية)، بولاق 1294. (عدة طبعات).
- [12] ابن سيرين (القرن الأول الهجري). (تعبير الرؤيا هو مختصر كتاب منتخب الكلام في تفسير الأحلام). مطبعة الاستقامة، القاهرة ١٩٥٩ (عدة طبعات بدون تاريخ).
- [13] داود الضرير الأنطاكي. (تذكرة أولى الألباب والجامع للعجب العجائب). (عدة طبعات).
- [14] جلال الدين السيوطي. (١٤٤٥-١٥٠٥). (الرحمة في الطب والحكمة)، عباس شقرون القاهرة، طبعات عديدة بدون تاريخ.
- [15] محي الدين (أو) شرف الدين أحمد بن علي القرشي البوني المتوفي العام ٦٢٢ هـ. (شمس المعارف الكبرى) أو (شمس المعارف ولطائف العوارف في علم الحروف والخواص). مطبعة عباس شقرون، القاهرة (عدة طبعات بدون تاريخ)؛ (منبع أصول الحكمة)، مطبعة الببائي الحلبي، القاهرة (عدة طبعات).
- [16] التلمساني. (992-1584 هـ) - (1041-1631 هـ) (شموس الأنوار).

-
- [17] Abbas Ibrahim Muhammad Ali. *Anglo-Saxon Teutonic Images of the People of the Sudan, 1772-1881*. African Studies Seminar Paper No. 6, Sudan Research Unit, Faculty of Arts University of Khartoum: May 1969: 35 pages (Photostat.)
- [18] Bayard, Taylor. Op. Cit. Page 337.
- [19] Op. Cit. Page 119.
- [20] Tigani Al-Mahi. Op. Cit.
- [21] Bayoumi.
- [22] Tigani Al-Mahi. Techniques in Ethno psychiatry in relation to Cultural background of some countries in Africa. In: Ahmad Al-Safi et al (Edits). *Tigani Al Mahi: Selected Essays*. Khartoum University Press. 1981: 30.
- [23] Naom Shuqair. *Gughrāfiyat wa Tariikh Al-Sudan* (1903) [Arabic]. Beirut: Dar Al-Thaqafa; Many editions, 1972.
- [24] Frobenius, L. *The Voice of Africa*. London: Hutchinson; 1913. [English version].
- [25] Hurgroenje, Snouck C. *Mekka in the latter Part of the 19th Century, 1889* [English Translation from German]. Monaham, J.H., Translator. Leyden; 1931.
- [26] Plowden W.Ch. *Travels in Abyssinia and the Galla Country*. London: Longmans and Green; 1868.
- [27] Junker, Dr. Wilhelm. *Travels in Africa, During the Years 1879-1883*. London: Chapman and Hall; 1891; 3 vols. : page 140.
- [28] Browne, W.G. *Travels in Africa, Egypt and Syria from the Year 1792 to 1798*. London; 1799.
- [29] Burton, R.F. *First Footsteps in East Africa*. 1856 1st ed. London; 1966.
- [30] Bruce, James (1765-1777). *Travels to Discover the Source of the Nile (in the years 1768, 69, 70, 71, 72 & 73)*. Edinburgh; 1790. Vol. 4: 5.
- [31] See relevant publications in the *Bibliography* (in press).
- [32] Baker, Sir Samuel White. *The Nile Tributaries of Abyssinia*. London. 1867: 128-131.
- [33]
- [34] “Say: ‘Have you thought of what you invoke apart from God? Show me what they have created of the earth. Or do they have a share in the heavens? Bring me a Book before this or a trace of knowledge, if you are truthful.’” (4) The Bounteous Koran: chapter 46, surat *Al Ahqaf*.
- [35] These manuscripts were reviewed by Yahiya Muhammad Ibrahim in *Jaridat Al-Sahafa*, 26 October 1978.
- [36] Hasan Sala (1842-1904). *Mabariẓ Al-Nafabat wa Dalayil Al-Anqat fi Ilm Al-Falak* [Arabic manuscript]: Central Records Office, Khartoum.

-
- [37] Hasan Sala (1842-1904). *Al-Jawhar Al-Takwini fi Al-Wafaq Al-Maini* [Arabic manuscript]: Central Records Office, Khartoum.
- [38] Hasan Sala (184-190 4). *Manba' Al-Ishara bi 'Ilm Al-Ithara* [Arabic manuscript]: central Records Office, Khartoum.
- [39] Muhammad Al-Nur Ibn Daif Allah. Op. Cit.
- [40] Muhammad Al-Nur Ibn Daif Allah = (-1809). *Kitab Al-tabaqat fi khusus Al-awliy wa l-salihin wa l-ulama wa l-shu'ara* (1805!) [Arabic]. Yusuf Fadl Hasan, editor. Khartoum: Khartoum University Press; 1985.
- [41] Muhammad Ibn Umar Al-Tunisi. *Tashhidh Al-Adhban Bi-Sirat Bilad Al-'Arab Wa-l-Sudan* (Arabic), (Eds) Khalil M. 'Asaker and Mustafa M. Mus'ad, Cairo: Al-Dar Al-Masriya Lil-Ta'lif wal-Tarjama, 1965: 328.
- [42] Bruce, James (1765-1777). *Travels to Discover the Source of the Nile (in the years 1768, 69, 70, 71, 72 & 73)*. Edinburgh; 1790. Vol. 4: 5.
- [43] Baker, S.W. *Albert Nyanza*; 1967. Vol. ii, page 318.
- [44] Browne, William George. *Travels in Africa, Egypt, and Syria from the Year 1792 to 1798*. London; 1799.
- [45] Burckhardt. *Travels in Asia*. 1819, pages 229 and 337.
- [46]
- [47]
- [48] Hoskins, G.A. *Travels in Ethiopia*. London, 1845: 67.
- [49] Schweinfurth, George (1836-1925). *Heart of Africa* [English translation]. London; 1873.
- [50] Kotschy, Theodore and Peyritsch, M, Editors. *Plantes Tinneennes: Plants collected on the Tinnean Expedition in Central Africa by 3 Dutch ladies (1861-3)* [French & Latin]. Tinne, Henriette Loise Marie Mme.; Tinne, Alexandrine Mlle.; de Capellen, Adrienne Mlle.; Steudner Dr. (Botanist), and de Heuglin, M. Theodore, Explorers, botanists and naturalists. Vienna; 1867; 2 feet high by eighteen inches wide and less than an inch thick book, with 27 plates. Seventy seven species are described. The Tinne name is preserved in some species' names in the plants they described, of which 24 are described for the first time. The book was dedicated to Sophie Frederique Matilde, Queen of the Netherlands.
- Expedition started from La Haye to Egypt and Khartoum on July 18th 1861. Tothill, Beatrice H. Translator into English and reviewer in: *Sudan Notes and Records*, Volume 28, 1947: 25-44.

[51]

[52]

[53] Pallme, Ignatius. *Travels in Kordofan* (1844). London; 1844.

[54] Theodor Krump, a member of the Catholic Franciscan order, was born about 1660 at Aichach in Bavaria (Germany). After having studied Arabic and medicine he was attached to a deputation of missionaries who in 1700 left Cairo for Gondar, at that time the residence of the Abyssinian sovereign. In the Sudan, Krump was ordered to remain behind to act as a physician at the disposal of the Fung king. In November 1702, he left the Sudan. Upon his return to Germany, Krump became a curate at Dingolfing, where he died on 8th October, 1724. (For a detailed review of Krump's work see, Herzog, Rolf. *Ethnographical Notes on the Sudan in an Early Traveller's Account. Sudan Notes and Records*; 1957; 38: 119-129.)

[55] Krump, Theodor (1660-1724). *High and fruitful palm-tree of the Holy Gospel . . .* [German]. Augsberg; 1710. 510 pages. Note: The book has a title 198 words long, page 245.

[56] This is described by Krump as 'our Khessere, is not made of wheat but of dura ... Krump: page 222.

[57] Bruce, James (1767-1777). *Travels to Discover the Source of the Nile (III ears 11'68, 69, 70, 71, 79, & 73)*. Edinburgh; 1790. Vol. 4; 5.

[58] Quoted from Bloss J. F.E. Notes on the Health of the Sudan Prior to the Present Government. *Sudan Notes and Records*; 1941; 24: 131.

[59] Browne, William George. *Travels in Africa, Egypt and Syria from the Year 1792 to 1798*. London; 1799.

[60] Browne, W.G. *Travels in Africa, Egypt and Syria from the Year 1792 to 1798*. London; 1799.

[61] Quoted by Bloss, J.F.E. Op. Cit: 131.

[62] Burckhardt, J.L. *Travels in Asia*; 1819: pages 229 and 337.

[63] Burchhardt, J.L. *Travels in Asia*; 1819: pages 229 and 337.

[64] Quoted in Bloss J.F.E. Notes on the Health of the Sudan Prior to the Present Government. *Sudan Notes and Records*; 1941; 24: 131.

[65] Schweinfurth, George (1836-1925). *Heart of Africa* [English translation]. London; 1873.

[66] Op. Cit, Vol. 2, page 329.

[67] Op. Cit, Vol. 1, page 119.

[68] Op. Cit. Vol. 2, page 19.

[69] Op. Cit, Vol. 2, page 19.

[70] The German traveller and naturalist, Wilhelm Junker (1840-1892), explored the River Sobat and the western trib-

utaries of the Upper White Nile, from 1876 to 1878. After some time in Europe, he came back to the Sudan in 1879. He spent four years with the Azande and Monbuttu peoples of the southern Sudan. He discovered the River Mbo-mu, the important northern tributary of the Uele.

[71] Junker, Dr. Wilhelm. *Travels in Africa, During the Years 1879-1883*. London; 1891: pages 233-4.

[72] The expedition which was sponsored and financed by these ladies was also joined by Dr. Steudner (Botanist), and M. Theodore de Heuglin, explorers, botanists and naturalists. The expedition was documented in a book published in Vienna in 1867. The book was translated into English and reviewed by Tothill, Beatrice, H. in *Sudan Notes and Records*, Volume 28, 1947: 25-44. The book is (2) feet high by eighteen inches wide and less than an inch thick, with 27 plates. Seventy seven plant species are described. The Tinne name is preserved in some species' names in the plants they described, of which 24 for the first time. The book was dedicated to Sophie Frederique Matilde, Queen of the Netherlands. The expedition started from La Haye to Egypt and Khartoum on July 18th 1861.

[73] Kotschy, Theodore; Peyritsch, M, Editors. *Plantes Tinneennes: Plant: collected on the Tinnean Expedition in Central Africa by 3 Dutch ladies (1861-3)* [French & Latin]. Vienna; 1867.

[74] Tothill, Beatrice H. Reviewer and translator. *Plantes Tinneennes* [French & Latin]. Kotschy, Theodore; Peyritsch, M., Editors. *Sudan Notes and Records*; 1947; 28: 25-44.

[75] During the time of preparation for this journey, M. Theodore de Heuglin and Dr. Steudner happened to arrive in Khartoum. These travellers, as learned as they were audacious, were returning from Abyssinia wither they had been sent at the expense of all Germany to try to get news of Dr. Vogel, of whom all trace had been lost since he had penetrated into the interior of Africa. As Madame Tinne desired to contribute to the full extent of her means to the advancement of knowledge she, offered these naturalists the opportunity of joining her expedition. "From Kotachy's Preface: Tothill. Op- Cit."

[76] Hoskins, G.A. *Travels in Ethiopia*. London, 1845: 67.

[77] Taylor, Bayard. *A Journey to Central Africa*. London, 1856: 396.

[78] Gibb, H.A.R. *Modern Trends in Islam*. Chicago, 1947: 22 (quoted by Abbas Op. Cit).

- [79] Petherick, John. *Egypt, the Sudan and Central Africa*. London: 1861: 109-11.
- [80] When the female poet Banouna wept her brother Amara she said she didn't want to see him die in a bed of ash (the way a patient afflicted with small pox was treated). (ما دايرالك (الميتة أم رماداً شح، دايرالك يوم لقا بدمية تتوشح).
- [81] Petherick, John. Op. Cit.
- [82] Comment by A. Cruickshank.
- [83] Pallme, Ignatius. *Travels in Kordofan* (1844). London; 1844.
- [84] Pallme, Ignatius. Op. Cit., pages 108-9.
- [85] Abbas Ibrahim Muhammad Ali, page 27.
- [86] Baker, S.W. *Albert Nyanza*; 1967. Vol. ii, page 318.
- [87] Gordon, N.A. *Letters of C.G. Gordon to his Sister*. London; 1888: page 176.
- [88] Siddig I. Khalil. Physicians of Sudan: historical perspective. *Sudan Medical Journal*. 2015. 51(1). 53-58.
- [89] Prontosil was discovered in 1932.
- [90] Balfour, Sir Andrew. Op. Cit.
- [91] Kirk R. Some Vegetable Poisons of the Sudan. *Sudan Notes and Records*. 1946: 27: 127-157.
- [92] Mansour Ali Haseeb. Some Poisonous Plants in the Sudan. *Sudan Medical Journal*, 1972: 10: 94-101.
- [93] Abbas Al-Hamidi: Al-Nabatat Al-Sammah fil Sudan. *Bulletin of Sudanese Studies*, 1970: 2 (1): 128-131.
- [94] Safi. bibli
- [95] Abd Al-Aziz Muhammad Khalaf Allah, Editor, Compiler. *Al-Nabatat Al-Tibbiyya Wal-'Itriyya Wal-Samma Fil-Watan Al-Arabi*. Arab Organization for Agricultural Development, Sponsor. 1st ed. Cairo: Dar Misr Lil-Tiba'a; 1988. 477 pages.
- [96] Evans-Pritchard, Edward E. *Witchcraft, Oracles, and Magic among the Azande*. Oxford: Clarendon Press; 1937. 558 pages, with plates. With a foreword by C.G. Seligman.
- [97] Evans-Pritchard, Edward E (1927): Op. Cit.
- [98] Lienhardt, Godfrey. *The Dinka of the Nilotic Sudan* [D. Phil.] London: Oxford; 1951.
- [99] Buxton, Jean C. *Religion and Healing in Mandari*. Oxford: The Clarendon Press; 1973. 444 pages.
- [100] MacMichael, Harold A. *A History of Arabs in the Sudan: and some account of the people who preceded them and of the tribes inhabiting Darfur*. 1967 2nd ed. London: Frank Cass; 1922; 2 vols. vol. 1: 347 pages, vol. 2: 488 pages.
- [101] Trimingham, J. Spence. *Islam in the Sudan*. London: Oxford University Press; 1949. 280 pages.
- [102] Cunnisson, Ian.

-
- [103] Barclay, H. B. *Burri Al-Lamaab: a suburban village in the Sudan*. Ithaca New York: Cornell University Press; 1964.
- [104] Ahmed El Safi. TSM.
- [105] Holy, L. *Neighbours and Kinsmen: A Study of the Berti People of Northern Sudan*. London: C. Hurst; 1974.
- [106] Abdullahi Osman El-Tom. *Conceptualization, etiology and treatment of illness among the Berti people of Northern Darfur, Sudan* [M.A. Thesis]. Unpublished: Queen's University of Belfast; 1979. 103.
- [107] Abdullahi Osman El-Tom. *Religious Men and Literacy in Berti Society* [Ph.D. Thesis]. Unpublished: University of St. Andrews; 1983 Oct. 320.
- [108] Nadel, S. F. *The Nuba: An anthropological study of the Hill Tribes of Kordofan*. London: Oxford University Press; 1947.
- [109] Sharaf Al-din A. Abd Al-salaam. *A Study of Contemporary Sudanese Muslim Saints' Legends* [Ph.D. Thesis]: Indiana University; 1983.
- [110] Abdullahi Ali Ibrahim. *Assaulting with Words. The Socio-poetics of the Rubatab Evil Eye Metaphors* [Ph.D. Thesis]: Folklore Institute, Indiana University; 1987 May 20. 315.
- [111] Awad Al-Karim Muhammad Hindi (Al-Sayigh). *Mukhtarat Al-Sayigh* (The Goldsmith Collection) [Arabic]. Cairo: Maktaba'at Al-Zahran; 1949; 3 vols.
- [112] Ibn Sina (Avicenna), Abu Ali Al-Hussein Ibn Abd Allah (D. 1037 A.D., 428 A.H.). *Al-Qanun fi Al-Tibbb* [Arabic]. Rome: First edition, later published in Egypt, Iran, India, and Europe many times; 1593. Note: Avicenna referred to Dioscorides book 'Plants' as a source.
- [113] Ibn Al-Baitar, Dhia Al-Din Abd Allah Ibn Ahmad Ibn Muhammad Al-Maliqi (D. 1248 A.D., 646 A.H.). *Al-Jami' Li Mufradat Al-Adwiyaa wa Al-Aghzbiyya (Mufradat Ibn Al-Baitar)* [Arabic]. Cairo: Matba'at Bulaq; 1874 (1291 A.H.); 4 Vols. Note: Many manuscripts are available around the world. Also published in Baghdad, and translated into French (1877-1883), German (1870-1872), and Turkish. The book has many synopses.
- [114] Al-Maridini, Abd Allah Ibn Ali Ibn Osman (D. 769 A.H.). *Al-Risala*.
- [115] . Awad Al-Karim Muhammad Hindi. *Mukhtarat Al-Sayigh* (The Goldsmith excerpts of 360 books in religion, arts, wisdom, modern, ancient and folk medicine, etc.) [Arabic]. 2nd ed. Cairo, Egypt: Matba'at Zahran; 1949; 3 vols., vol. 1: 480 pages, vol. 2: 292 pages, vol. 3: 383 pages.

Author is nicknamed after his profession: Al-Sayigh (The goldsmith).

- [116] Awad Al-Karim Muhammad Hindi (Al-Sayigh). *Mukhtarat Al-Sayigh* (The Goldsmith Collection) [Arabic]. Cairo: Mak-tba'at Al-Zahran; 1949; 3 vols.
- [117] Balfour, Sir Andrew. Editor. *Wellcome Research Laboratories Reports*; 1906, 1908, 1911, 1913.
- [118] Sir Andrew Balfour, MD, BSc, FRCP, Edin., DPH Camb., (1873-1931), a British medical doctor and researcher. He was the first director of the Wellcome Tropical Research Laboratories, Khartoum, in 1902. He was also the first Medical Officer of Health of Khartoum after Kitchener's reconquest of the Sudan.
- [119] Abd Al-Hamid Ibrahim. *Folk Medicine and Materia Medica, Catalogue of Vegetable Samples with Notes on Uses* [Appendix 21. In: Annual Report of the Government Analyst. Wellcome Chemical Laboratories Reports; 1958-59: 27-39, and: Abd Al-Hamid Ibrahim. *Folk Medicine and Materia Medica, Catalogue of Mineral Samples with Notes on Uses* [Appendix 2]. In: Annual Report of the Government Analyst. Wellcome Chemical Laboratories Reports; 1959-60: 24-29.
- [120] Among al-Baghdadi's real estate, there are 33 leased stores in Khartoum Market, including Al-Halawani Building, Al-Gomhouria Street, Al-Fawal Building, west of the United Nations Square, the Bible Library Building in Central Station in Khartoum, and 14 pieces in Omdurman Market.
- [121] The Philosophical Society of the Sudan was founded on February 2, 1946.
- [122] Sanderson, G.N. *Sudan Notes and Records* as a Vehicle of Research on the Sudan. *Sudan Notes and Records*; 1964; 45: 164-169.
- [123] Hussey, Eric R.J. A Feki's Clinic. *Sudan Notes and Records*; 1923; 6: 35.
- [124] Anderson, R.G. Medical Practices and Superstitions Among the People of Kordofan. *Wellcome Research Laboratories Reports*; 1908, 281-322.
- [125] "The Bahr El-Ghazal Handbook says that the name is probably of onomatopoeic origin and was originally applied to the unknown conglomeration of people whose cannibal propensities were a matter of common report. It now seems to have become the general name in the Sudan for the Azande, though it is not used by the Officials in the South of the Province, who have to differentiate between many different tribes all of whom are described further

- north as Nyam-Nyam. 'This name, being as I have said completely meaningless, might be discarded.' Major R. G. C. Brock. Some Notes on the Azande Tribe as Found in the Meridi District (Bahr El-Ghazal Province). *Sudan Notes and Records*. 1918; 1: 249-262.
- [126] Anderson, R.G. Some Tribal Customs and Their Relation to Medicine and Morals of the Nyam-Nyam and Gour People Inhabiting the eastern Bahr El-Ghazal. *Wellcome Research Laboratories Reports*. London: Bailliere, Tindall and Cox; 1911; 4A pp. 239-277.
- [127] Bousfield, L. The Native Methods of Treatment of Diseases in Kassala and Neighbourhood. *Wellcome Research Laboratories Report*; 1908; 3: 273-279.
- [128] Hasan Zeki. The Healing Art as Practiced by the Dervishes in the Sudan during the Rule of the Mahdi and the Khalifa. *Wellcome Tropical Research Laboratory Report*; 1908; 3: 269-272.
- [129] Rudolph Baron von Slatin Pasha, Sir, Inspector General, Sudan Government. Additional Notes [on native medicine of the dervishes]. *Wellcome Research Laboratories Report*; 1908; 3: 277-79.
- [130] Ahmed El Safi. Abdel hamid ibrahim suleiman his life and work. <https://www.slideshare.net/ahmadasafi3/abdel-hamid-ibrahim-suleiman-his-life-and-work>.
- [131] Ahmed El Safi. Abdel hamid ibrahim suleiman his life and work. <https://www.slideshare.net/ahmadasafi3/abdel-hamid-ibrahim-suleiman-his-life-and-work>
- [132]
- [133] Tigani Al-Mahi. *An Introduction to the History of Arabian Medicine*. (in Arabic) Khartoum: Misr Printing Press, 1959: 185 pp.
- [134] Ahmed El Safi; Taha Baasher, Editors. *Tigani Al-Mahi: Selected Essays*. 1st ed. Khartoum: Khartoum University Press; 1981; University of Khartoum, Silver Jubilee-1956-1981. 187 pages.
- [135] Ahmed El Safi; Taha Baasher, Editors. *Tigani Al-Mahi: Selected Essays*. [Arabic] 1st ed. Khartoum: Khartoum University Press; 1984; University of Khartoum, pages.
- [136] Beileil, O. M.: *Two Lives: Death Odyssey of a Transplant Surgeon (in conversation with Cliff Osmond)*
- [137] El-Zein Abbas Amara: *My Journey in psychiatry*. (in Arabic) 2003: 300 pages.

-
- [138] Beshir Hamad. *Min Zamani wa Tabnani* (Book 1 Arabic). Dar Mashaf Afriqiya: 2004, 218 pages; Book 2 (Arabic), 2005, 283 pages.
- [139] Musa Abdalla Hamid.
- [140] Mustafa El-Sayyid.
- [141] Hafiz El-Shazali. *Children Food and Health* (in Arabic). Khartoum University Press, 1972.
- [142] Mohi El-Din Mahdi. *Sudan Red Crescent Manual* (in Arabic). Misr Printing Press, Khartoum, 1963.
- [143] Daoud Iskander. *Guideline for Pregnant Women* (in Arabic). Christian Publishing House, Khartoum.
- [144] El-Sayyid Hassan Daoud. *Forensic Medicine*. Africa International University Printing Press, (Arabic) 1995: 342 pages.
- [145] Mohamed Osman Abdel Malek. *Guide to the Principles and Practice of Forensic Medicine*. (Arabic) Khartoum University Press, 2001: 419 pages.
- [146] Ali Mohamed Ahmed Awad: *Diabetes Mellitus, problems and solutions* (Arabic) 2001: 162 pages.
- [147] Awad Mohamed Ahmed. *Obstetrics* (in Arabic). Asala Printing Press, 1996: 236 pages
- [148] Kamal Mekki El-Manna. *Basics of Anaesthesia* (in Arabic), Khartoum, 1984: 310 pages.
- [149] Kamal Mekki El-Manna. *Drugs of Anaesthesia* (in Arabic), Khartoum, 1986: 160 pages.
- [150] Kamal Mekki El-Manna and Tahir Fadil. *The Companion in Medicine*. (in Arabic). Dar Hayil for Printing and Publishing, Khartoum, 2000: 383 pages
- [151] Kamal Mekki El-Manna and Tahir Fadil. *Anaesthesia and Resuscitation for Medical Students*. (in Arabic) Khartoum University Printing Press. 1996: 248 pages.
- [152] Kamal Mekki El-Manna and Tahir Fadil. *Drug Interactions*. (in Arabic), Dar Hayil Printing Press, Khartoum, 2000: 240 pages.
- [153] Sayyid Hamid Hurreiz. *Birth, Marriage, Death and Initiation Customs and Beliefs in the Central Sudan* [Ph. D. Thesis]: Leeds University; 1966.
- [154] Sayyid Hamid Hurreiz. *Rites of passage in Central Sudan*. Leeds; 1965.
- [155] Idris Salim Al-Hasan. *On Ideology: The Case of Religion in Northern Sudan* [Ph.D. Thesis]: University of Connecticut; 1980. 254 pages.
- [156] Awad Al-Basha. *Couching for Cataract in Western Sudan* [M.S. Thesis]. Khartoum: University of Khartoum; 1980.

-
- [157] Amir Ali Hasan. *A descriptive study of the Maseed comprehensive approach in health and other services*. Institute of African & Asian Studies: University of Khartoum; 1983.
- [158] Amir Ali Hasan. *Health care in Gezira, patterns and determinants with special reference to mental health*. London School of Hygiene and Tropical Medicine; 1988.
- [159] Constantinidis, Pamela M. *Sickness and the Spirits: a study of the Zaar spirit possession cult in the Northern Sudan* [Ph.D. Thesis]. Unpublished: London University; 1972. 349 pages.
- [160] Samia Al-Hadi Al-Nagar. *Spirit Possession and Social Change in Omdurman* [M.Sc. Thesis]. Unpublished: University of Khartoum; 1973.
- [161] Makris, Gerasimos P.; Ahmed El Safi. The *tumbura* spirit possession cult of the Sudan, past and present. I.M. Lewis; Ahmed El Safi; Sayyid Hamid Hurreiz, editors. *Women's Medicine: The Zar-Bori Cult in Africa and Beyond*. Edinburgh: Edinburgh University Press; 1991: 118-136.
- [162] Ahmed El Safi. *Native Medicine in the Sudan*, Sudan Research Unit, Faculty of Arts, University of Khartoum, 1970: 74 pp. (Photostat)
- [163] Ahmed El Safi. TSM.
- [164] Hamid Rushwan; Slot, Carry; Asma Al-Dareer; Nadia Bushra. *Female Circumcision, Prevalence, Complications, Attitudes and Changes*. Faculty of Medicine, University of Khartoum; 1983.
- [165] Asma Al-Dareer. *Woman, Why Do You Weep? Circumcision and its Consequences*. London: Zed Press; 1982. 130 pages.
- [166] Abdel Hamid Ibrahim. On the History of Pharmacy in Sudan. Edited by Ahmed El Safi. 2018.
- [167] Haseeb, M.A. *A Monograph on Biomedical Research in the Sudan*. Volume 1: Introduction and Bibliography. Khartoum University Press, Khartoum, 1972. 121 pages.
- [168] Ahmed Bayoumi. *The History of Sudan Health Services*. Kenya Literature Bureau, Nairobi, 1979. 351 pages.
- [169] Ahmed Bayoumi. *The History of Sudan Medical Service*. Nairobi: Kenya Literature Bureau, 1979: 44-65.
- [170] Squires, Herbert Chavasse. *The Sudan Medical Service: An Experiment in Social Medicine*. London: Heinemann Medical Books, 1958: 138 pages.
- [171] Dr Jack Brian Christopherson (1868-1955) was best known for developing treatment for schistosomiasis using injections of tartar emetic or potassium antimony tartarate in Khartoum Civil Hospital during the First World War. Squires (1958) commented on this achievement saying that

it was ‘probably the most significant contribution to medicine made by a member of the Sudan Medical Service’. This medical milestone was commemorated in Sudan in 2003. Prof. Abel Rahman Mohamed Musa (MRCP, FRCP) and coworkers initiated the idea of honouring Dr Christopher-son by fixing a plaque in Ward 4 (Arbaagi), currently in the west wing of the old Khartoum Civil Hospital buildings (currently the National Council for Medical Specialization Board) where he carried out his historic work. A symposium was also held on bilharzia in the same place.

[172] Bell, Op. Cit. Page 23.

[173] This section relied heavily on the framework laid down in EMRO/WHO Health System Profile-Sudan 2006 and updated in this book.

[174] Sobhi El-Hakim. Sudan: Replacing TBAs by Village Midwives. In: A. Mangay-Maglacas and H. Pizurki, Editors. *The Traditional Birth Attendant in Seven Countries: Case Studies in Utilization and Training*. Geneva: World Health Organization; 1981: 131-166. 211. (Public Health Papers; v. 75).

[175] Abdel Hamid Ibrahim Suleiman. A short history of pharmacy in Sudan. (unpublished paper). Copy was included in Ahmed El Safi (editor): Abdel Hamid Ibrahim Sulaiman, Tribute and Commemoration. 2016, and almost all information has been included in Ahmed El Safi. Abdel Hamid Ibrahim Sulaiman,

[176] Abdel Hamid Ibrahim Suleiman. A short history of pharmacy in Sudan. (unpublished paper). Copy was included in Ahmed El Safi (editor): Abdel Hamid Ibrahim Sulaiman, Tribute and Commemoration. 2016, and almost all information has been included in Ahmed El Safi. Abdel Hamid Ibrahim Sulaiman,

[177] D’Arcy. Op. Cit.

[178] The Sudan Medical Council was founded by Act 7, Medical Council Ordinance, 1955, being, thus, one of the first organs to be founded by the Sudanese Parliament enactments on the eve of the country’s independence, and was inaugurated in 18/7/1968. The ordinance was amended 1968, 1973, and 1406 AH. Several interim amendments were made (1978, 1981, 1983) but not sanctified.

[179] The foundation stone was laid in 5th January 1900 in memory of General Charles Gordon of the Sudan.

[180] Lord Kitchener, the first Governor General of the Sudan (1898-99), suggested the establishment of a school of medicine on his last visit to the Sudan in 1914. After his death at

sea in 1916, his proposal was followed up, and the school was founded in 1924, and named in his memory. It was incorporated in the University College of Khartoum in 1951.

[181] Stepan, Jan. Op. Cit.

[182] British medical doctors from Qasr Al-Aini Hospital in Cairo, Egypt, who were assessors in the final examinations of the first Conjoint Board of the Royal Colleges of England, approved the school. Many graduates have since obtained the membership or fellowship of these Colleges.

[183] Mansour Ali Haseeb. *A Monograph of Bio-medical Research in the Sudan: An Introduction and Bibliography*. Khartoum: Khartoum University Press; 1973. 121 pages.

[184] أمثلة للمؤسسات الوقفية والخيرية: مستشفيات أحمد قاسم، إبراهيم مالك، النور، البلك، الصادق أبو عاقلة، الضو حجوج، السلمي، فتح الرحمن البشير، سمير، عوض حسين، حاج الصافي، مركز محمد صالح إدريس للنزف المعوي، محمد الأمين حامد، ومحمد علي فضل بام درمان، ومركز حبيب للحمل الحرج في سوبا، وقف الشبيخة نورا (قطر) المسمى مركز نورا للأمراض الكلى بمستشفى سوبا الجامعي، ووقف البغدادي، كما أوقف لاحقاً المحسن عبد المنعم محمد ١٠٪ من أملكه دعماً للخدمات العلاجية، وبنت السيدة سكيئة أحمد حسن عبد المنعم (١٨٩٨-١٩٧٥) مستوصفاً ومستشفى في أم درمان وأوقفت لها منزلاً صار بدوره مستشفى قائماً بذاته. وهذه بعض الأمثلة لمساهمات المواطنين وبعض الأجانب في دعم الخدمات الطبية (مراكز تخصصية، ومستشفيات، ومراكز صحية، وأجنحة داخل المستشفيات، ومعدات ودعم مالي، الخ) في عاصمة البلاد وفي غيرها من مدن السودان الأخرى.

[185] منظمة الدعوة الإسلامية، الجمعية الطبية الإسلامية، منظمة رعاية مرضى السكري، الجمعية السودانية لسكري الأطفال، جمعية مرضى القلب، برنامج الكشف المبكر لأورام الثدي وسرطان عنق الرحم في المبادرات النسائية، جمعية مكافحة المخدرات، الجمعية السودانية لحماية المستهلك، جمعية رعاية المسنين، منظمة سواعد الصحة، صندوق إعانة المرضى (الكويتي) بالسودان، جمعية رعاية المعاقين، لضغط الدم، الجمعية جمعوية سرطان الأطفال، الجمعية السودانية للمستشفيات، والجمعية السودانية للأورام، منظمة أم درمان لرعاية النفسية السودانية.

[186] مستشفى السلام للقلب (إيطاليا)، مستشفى الصداقة (الصين)، والمركز التركي لطب العيون (تركيا).

[187] El-Sheikh Mahgoub and Ian G. Murray: *Mycetoma*. William Heinemann Medical Books Ltd, London, 1973.

[188] El-Sheikh Mahgoub. *Tropical Mycoses*. Janssen Research Council, Beerse, Belgium, 1989.

[189] Sukkar, M. Y. *Human Nutrition*. London: Biddles Ltd.; 1985.

-
- [190] Shawgi H. El-Masri. *Common Anorectal Problems*. 2006: 256 pages.
- [191] Shawgi H. El-Masri. *Portal Hypertension* The Academy of Sciences Printing Press, 2003: 331 pages.
- [192] Ahmed Abdel Aziz Yagoub. *The Figh of Medicine* Ta-Ha Publishers Ltd. London, 2001: 349 pages.
- [193] Salih Yassin. *Medical Rounds* (2005)
- [194] Ahmed El Safi. *Traditional Sudanese Medicine, a primer for health care providers, researchers, and students*. Azza Press, Cairo 2007, 730 pages.
- [195] Zein A. Ibrahim. Gordon Memorial College at Khartoum. The chronicle of a college. 2009. Page 1.
- [196] Zein. Op. Cit. Page 10.
- [197] Among al-Baghdadi's real estate, there are 33 leased stores in Khartoum Market, including Al-Halawani Building, Al-Gomhouria Street, Al-Fawal Building, west of the United Nations Square, the Bible Library Building in Central Station in Khartoum, and 14 pieces in Omdurman Market.
- [198] Currie, J. The education experiment in the Anglo-Egyptian Sudan, 1900-1933, *Journal of the African Society*, London (quoted by AAA Adeel. Henry Wellcome and the Sudan. 18 September 2000, electronic copy).
- [199] Gorgas Memorial Laboratory: Hearings before the Committee on Foreign Affairs, House of Representatives, Seventieth Congress, first session on H.R. 8128 to authorize a permanent annual appropriation for the maintenance and operation of the Gorgas Memorial Laboratory. 1928. Washington: United States Government Printing Office.
- [200] Cruckshank.
- [201] Hamilton-Grierson, P.F.A. Local Calendar. *Sudan Notes and Records*, 1923: 6, 118-121. The local people have named several years in their local calendar after these tragic incidents. Hamilton-Grierson, a district judge working in the town of Geteina town in the White Nile Province during the Anglo-Egyptian Condominium, quotes an interesting experience.^[201] He said that in 1923 when he was in the course of deciding land cases, he found that it was impossible to get dates according to the number of the year, either Arabic or English. He found it useful to compile a calendar of the years, as they are known by their local names.
- [202] Zein. Op. Cit. Page 12.
- [203] Hamilton-Grierson. Op. Cit.
- [204] WTRLRK Reports.

-
- [205] Four Reports edited by Dr. Adrew Balfour, were published in 1904, 1906, 1908 and 1911.
- [206] Balfour, Andrew. (Ed.) *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; First Report. 1904: Pages 9, 11.
- [207] Balfour, Andrew. Op. Cit. Pages 9, 11.
- [208] Currie to Wellcome, 3 Aug. 1903, File 3c, Box 42 Miscellaneous correspondence 1903 WA (quoted from Heather Bell, footnote, page 62).
- [209] D'Arcy. Op. Cit. Page 243.
- [210] Letter of Gift addressed to Wingate.
- [211] Balfour, Andrew (Ed.) *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1904 (First Report).
- [212] Dr Jack B. Christopherson (1868-1955) was best known for developing treatment for schistosomiasis using injections of tartar emetic or potassium antimony tartarate in Khartoum Civil Hospital during the First World War. Squires (1958) commented on this achievement saying that it was 'probably the most significant contribution to medicine made by a member of the Sudan Medical Service'. This medical milestone was commemorated in Sudan in 2003. Prof. Abel Rahman Mohamed Musa (MRCP, FRCP) and coworkers initiated the idea of honouring Dr Christopherson by fixing a plaque in Ward 4 (Arbaagi), currently in the west wing of the old Khartoum Civil Hospital buildings (currently the National Council for Medical Specialization Board) where he carried out his historic work. A symposium was also held on bilharzia in the same place.
- [213] Bell, Op. Cit. Page 23.
- [214] Balfour, Andrew. (Ed.) *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; First Report. 1904: Page 13.
- [215] Suad M. Sulaiman. Situation Analysis of Health Research in Sudan (Bilharzia Research). Unpublished paper.
- [216] *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1906 (Second Report);
- [217] D'Arcy. Op. Cit.
- [218] D'Arcy. Op. Cit.
- [219] Bayoumi. 114.+
- [220] Waterson, David. Report Upon the Physical Charasteristic of Some of the Nilotic Negroid Tribes. Third Report, Well-

-
- come Research Laboratories. London: Bailliere, Tindall and Cox; 1908; pp. 324-376.
- [221] Vallance. DJ. Notes on the Ethnographical Specimens Collected by Dr. A. MacTier Pirrie. Third Report, Wellcome Research Laboratories. London: Bailliere, Tindall and Cox; 1908; pp. 376-384.
- [222] Crowfoot, J.W. Customs of the Rubatab. *Sudan Notes and Records*; 1918; 1: 119-134.
- [223] *Wellcome Research Laboratories Reports*. London: Bailliere, Tindall and Cox; 1911.
- [224] For a concise summary of his work in Sudan, see Squires (1958). Op. Cit. Page 11.
- [225] D'Arcy. Op. Cit. Page 57.
- [226] Archibald. Reported by Suad. Check.
- [227] Christopherson. Lancet.
- [228] Christopherson. (Christopherson & Newlove, 1919). (Bayoumi, 1973, & Adeel, 2000).
- [229] For a concise summary of his work in Sudan, see Squires (1958). Op. Cit. Page 11.
- [230] Kirk, R. Sir Henry Wellcome and the Sudan. *Sudan Notes and Records*, 37: 79-89.
- [231] Abdel Hamid Ibrahim. Development of Health Laboratory Services in Sudan 1903-1994. Paper presented in a seminar entitled 'Towards an Effective Role of the National Health Laboratory held at NHL Khartoum 4-6 April 1994: 9 pages in Arabic.
- [232] Abdel Hamid Ibrahim. Chemical Laboratories, Ministry of Health 26 August 1969: 10 pages in Arabic.
- [233] Bayoumi. Op. Cit.
- [234] Bell. Op. Cit
- [235] D'Arcy. Op. Cit.
- [236] Ahmed Awad Abdel Hamid Adiel. (Two electronic reports) Andrew Balfour of Khartoum at <http://www.geocities.com/aaadeel/abofkrt.html>, and Henry Wellcome and the Sudan at <http://www.geocities.com/aaadeel/hsw.html>.
- [237] Miss Mabel E. Wolff established in Omdurman the first midwifery school in the Sudan in 1921, and was Matron of the school up to 1930. She was then Inspector of Midwives till her retirement in 1937. Miss Wolff also started the first ante-natal clinic in the Sudan. Before she becomes Inspector, she was joined by her sister Gertrude L. Wolff, who took over the job of Matron of the school.
- [238][238] Archibald. Cited by Suad.

-
- [239] The first is Qasr Al Eini in Egypt which was founded by Mohamed Ali Pasha and opened in 1825.
- [240] KSM was administered by Registrars until 1944. From 1944 onwards by deans.
- [241] An interesting tradition was established by the Department of Physiology, FOM, UK. It used to photograph all third year students on successful completion of the first MB. Photographs of all batches throughout the years were displayed along the corridors of the department. This photo gallery disappeared, and currently the corridors of this department are barren; the photos lost and the tradition discontinued! We are left with no more than memories.
- [242] Haseeb. Op. Cit. page 16.
- [243] Humpherys, 1932.
- [244] Haseeb. Op. Cit. page Page 13.
- [245] Abd Al-Al A. Osman. Milestones in the History of Surgical Practices in the Sudan. *Sudan Notes and Records*. 1973; 54:139-152
- [246] Stack laboratories were built to commemorate the death of Sir Lee Stack who was assassinated in Egypt in 1924.
- [247] Squires, Herbert Chavasse. *The Sudan Medical Service: An Experiment in Social Medicine*. London: Heinemann Medical Books, 1958: pages 53, 54, 55.
- [248] عبد الحميد إبراهيم. جانب من تاريخ الصيدلة في السودان. ٤٢.
- [249] Kirk, R. Op. Cit. Pages 79-89.
- [250] Extract from Will of Sir H. Wellcome (Deceased).
- [251] Kirk, R. Op. Cit. Page 84.
- [252] McFadzean, AJS, Teoh, TB, Bell, GH. Robert Kirk (26 January 1905 - 16 December 1962). *The Journal of Pathology and Bacteriology*, 88, 2 (1964): pp 614-621.
- [253] Skin Problems of the Sudan. *Al Hakeem Medical Journal-Symposium*, No. 18, January 1965.
- [254] Op. Cit. (Editorial)
- [255] Zein. Op. Cit. Page 87.
- [256] Hassan Hallab (Ed.). *The Health of the Sudan: A Bibliography*. Faculty of Medicine, University of Khartoum. Golden Jubilee (1924-1974), 1974.
- [257] Khalafalla Babiker El-Badri. Health Education of the Public. In: *The Health of the Sudan: A Study of Social Development*. Proceedings of the Eighth Annual Conference 14th & 15th January 1960. The Philosophical Society of the Sudan, Khartoum, 1963: pages 130-131.

[258] Abdel Hamid Ibrahim. The Wellcome Chemical Laboratories. A written Contribution presented in the Eighth Annual Conference of the Philosophical Society of the Sudan on The Health of the Sudan, A Study in Social Development, 14-15 January 1960 at the University of Khartoum (Proceedings published in a book in 1963. A 39-page manuscript is also found in Sudan Medical Papers of Robert Kirk. Reference GPR/0115/RCMS 122. Cambridge University Library: Royal Commonwealth Society Library, London: 26 pages.

[259] عبد الحميد إبراهيم. جانب .. لمزيد من الشرح.

[260] Bayoumi, 141.

[261] Excerpts from an unpublished paper by Abdel Hamid Ibrahim Suleiman titled (A Short History of Pharmacy in the Sudan). Copy in Sudan Medical Heritage Foundation Archives under Abdel Hamid Ibrahim Suleiman Collection.

[262] In 1969, Prof. Abdel Hamid Ibrahim was transferred to CMS.

[263] Stephenson, R.W. (1947): Bilharziasis in the Gezira irrigated area of the Sudan. Trans. Roy. Soc. Trop. Med. Hyg. 40, 204.

[264] Bayoumi, A. *The History of Sudan Health Services*. Kenya Literature Bureau, 1979: pp 130-133.

[265] Greany, W.H. (1952): Schistosomiasis in the Gezira irrigated area of the Anglo-Egyptian Sudan. Public health and field aspect. Ann. Trop. Med. Parasit. 46, 250.

[266] Greany, W.H. (1952): Schistosomiasis in the Gezira irrigated area of the Anglo-Egyptian Sudan. Clinical study of Schistosoma mansoni. Ann. Trop. Med. Parasit., 46, 298.

[267] I am deeply indebted to Mr. Magdi Bayoumi (son) and Abdel Aziz Bayoumi (brother) of the late Mr. Abdel Hamid Bayoumi for providing most of the information on Mr. Bayoumi in this section.

[268] Mr. F. Bartholomew, joined SMS in 1932. He got his Edinburgh FRCS while working in Merawi. He worked in Omdurman Hospital (1937-49) as surgeon and director. He died in UK in 1952.

[269] Mansour. Page 13.

[270] FS Mayne obtained his medical degrees at Queens University, Belfast, and FRCSE. He was posted to Sennar in place of O'Shaughnessy on his retirement in 1929. He had had considerable surgical experience when he succeeded Grantham-Hill in Khartoum in 1933. He continued as Senior Surgeon and Lecturer in Surgery until 1944 when he was

forced to retire due to illness. (Squires, Herbert Chavasse. *The Sudan Medical Service: An Experiment in Social Medicine*. London: Heinemann Medical Books, 1958: page 53.

[271] Haseeb. Op. Cit. page 8.

[272] The first Dean of the Khartoum Medical School was Dr. JS Aldridge (November 1944-November 1946), and was the last to occupy the office of Registrar (before it was upgraded to Dean post) of the Khartoum Medical School (November 1938-November 1944). The first Sudanese Dean was Professor Mansour Ali Haseeb (September 1963-September 1969) (See details in MA Haseeb. *A Monograph on Biomedical Research in the Sudan*. Khartoum University Press: 1973.

[273] Suad M. Sulaiman. Op. Cit.

[274] Sharaf El-Din, H. and El-Nagar, H. (1955) Control of snails by copper sulphate in the Gezira Irrigated Area of the Sudan. J. Trop. Med. Hyg. 260 – 63.

[275] Three months training in Scotland Yard, Tropical Products Institute and Government Chemist Laboratories in London in 1959; Two months training course in Occupational Health at High Institute of Public Health, Alexandria in 1961; Two months training at FDA/USA offices and laboratories in Rockville, Washington, Philadelphia and Harrisburg in 1970.

[276] A famous national survey designed and implemented in accordance with internationally recognized methodology by the Ministry of Labour and Administrative Reform in 1978 for the quantitative scientific evaluation of every post in the civil service using a scoring system for duties, responsibilities, qualifications requirements, working conditions, etc. including interviews with job holders resulted in the post of Government Analyst and Director of the National Chemical Laboratories getting the highest score as the number one post in the civil service (مشروع تقويم وترتيب الوظائف (بواسطة الجهاز المركزي لتقويم وترتيب الوظائف عام ١٩٧٨).

[277] Ahmed El Safi. Daoud Mustafa Khalid, his life and work.

[278] Ahmed El Safi. *Daoud Mustafa Khalid, his life and work*. 2009.

[279] Bayoumi. Op. Cit. Page 100.

[280] Haseeb. Op. Cit. page 15.

[281] Haseeb. Op. Cit. page 8.

[282] Report of the Medical Services, Ministry of Health for the year 1963/1964. Page 80.

[283] The six students were Abdel-Rahman Al-Rasheed Sid Ahmed, Gasim Ibrahim Gasim Mokheir, Mohamed Hamed

Abdalla, Hassan Mohamed Ahmed Hassan, Mohamed Awad Omer El-Huwaig, and Abdel Azim El-Sheikh Medani.

[284] Haseeb. Op. Cit. Page 9.

[285] Brian Thomas O'Connor, MS., M. Ch. Orth., FRCS, FRACS (1929–1999). Nuffield Department of Orthopaedic Surgery, University of Oxford.

[286] Patrick F. D'Arcy (1927-2001), OBE, Bpharm, PhD, DSc, DSc (Hon), FRPharmS, Cchem, FRSC, FPSNI. Prof. Emeritus of Pharmacy in The Queen's University of Belfast, Northern Ireland, United Kingdom, formerly Prof. of Pharmacology and Dean, Faculty of Pharmacy, University of Khartoum, Sudan (1962-1967).

[287] Patrick F. D'Arcy (1927-2001), OBE, Bpharm, PhD, DSc, DSc (Hon), FRPharmS, Cchem, FRSC, FPSNI. Prof. Emeritus of Pharmacy in The Queen's University of Belfast, Northern Ireland, United Kingdom, formerly Prof. of Pharmacology and Dean, Faculty of Pharmacy, University of Khartoum, Sudan (1962-1967).

[288] For more information on the Wilson report, see Ahmed Bayoumi, Op. Cit. Pages 134-135.

[289] Haseeb. Op. Cit. page 15.

[290] Ahmed Abdel Aziz Yacoub. Rheumatism and the history of mitral valvotomy. *Annals of the Royal College of Surgeons of England*, Vol 54: June 1974; 309-312.

[291] Ahmed Abdel Aziz Yacoub. The role of surgery in treatment of rheumatic heart disease in the Sudan. A thesis submitted to the University of Khartoum at the Faculty of Medicine for the Degree of Master of Surgery, 1972.

[292] Haseeb. Op. Cit. page 8.

[293] MH Satti. Op. Cit.

[294] Haseeb. Op. Cit.

[295] MH Satti. Memorandum on cooperation in Medical Research in Sudan and the suggestion of the establishment of a school of tropical medicine. "SMRL Annual Report (1965/1966).

[296] Sudan Ministry of Health Annual Statistical Report, 1981.

[297] The few professors who attained their chairs in medicine through the readership system include Mansour Ali Haseeb, Daoud Mustafa and Ahmed Mohamed El-Hassan.

[298] Adjanohohn, E. Contribution of the OAU/STRC Inter-African Committee on African Medicinal Plants Research and Utilization. OAU/STRC Inter-African Symposium on

African Medicinal Plants and Traditional Pharmacopoeia; 25-29 September 1979; Abidjan, Ivory Coast.

[299] Safi. Abdel Hamid. Pge 49.

[300] El-Sheikh, El-Hadi. Handwritten message to Mohamed Abdeen. 7 January 1955.

[301] Ahmed Abdel Aziz Yacoub. Rheumatism and the history of mitral valvotomy. *Annals of the Royal College of Surgeons of England*, Vol 54: June 1974; 309-312.

[302] Ahmed Abdel Aziz Yacoub. The role of surgery in treatment of rheumatic heart disease in the Sudan. A thesis submitted to the University of Khartoum at the Faculty of Medicine for the Degree of Master of Surgery, 1972.

[303] Acquired FRCSI in February 1976, and did later two years training in the Cardiothoracic Institute in Dublin.

[304] These tasks were the stipulated goals of the Unit, and although work is apparently still going on, it is, in general, of low quality and certainly far less than should be achieved in that span of time. Were it not for the lack of managerial skills that prevailed for so long, and lack of resources, this facility would have contributed substantially to the field and to the country.

[305] Dr. Ahmed El Safi attained his DA (England) in 1976, and FFARCS (England) in 1977. He came back to Sudan in 1978 and was immediately assigned to start anaesthesia for neurosurgery, chest, and heart surgery at the Shaab Hospital. He and other anaesthetists, cardiologists, technicians, nurses and other supporting staff were all enthusiastically involved with Mr. Ibrahim Mostafa in launching an ambitious heart surgery programme. This programme was unfortunately brought to a complete halt due to the premature death of Mr. Mostafa in 1984. Dr Safi also helped in anaesthesia and intensive care work for the cases done by Mr. Magdi Yacoub. Anaesthetists including Dr. Laila Abdalla and later Dr. Mamoun Hanafi Obeid, and Dr. Batoul Ibrahim Ishag covered neurosurgery in the same complex. This is the prime time of work of Mr. Hussain Sulaiman Abu Salih and the new comers in neurosurgery: Mohsin Mohamed Hussain, Ali Mohamed Abdel Rahman and Mohamed Mohi Eldin Abusaif.

[306] This section is a reconstruction of information obtained from different sources. Professor Samir Shahin contributed substantially to this section.

[307] In 1966, the Nineteenth World Health Assembly, with a view to honouring the memory of the late Dr AT Shousha

(1891-1964) one of the World Health Organization founders, as well as one of its most faithful servants and friends, established a foundation bearing his name. The foundation purpose is to award a prize to be known as the Dr AT Shousha Foundation Prize to be given to a person having made the most significant contribution to any health problem in the geographical area in which Dr Shousha served the WHO.

[308] Haseeb. Op. Cit. page 8.

[309] University of Khartoum. Op. Cit. (Introduction).

[310] General Food Hygiene Regulation. Copy in SMHF Archives under Abdel Hamid Ibrahim Suleiman Collection.

[311] Food Additives, the Food Inspection, Sampling and Analysis Regulations. Copy in SMHF Archives under Abdel Hamid Ibrahim Suleiman Collection.

[312] Registration of Pre-packed Food Regulations. Copy in SMHF Archives under Abdel Hamid Ibrahim Suleiman Collection.

[313] The paediatric cardiologist, Dr. Abdel Monem El-Seed, went to UK in 1969. His first post was an SHO at the Royal Hos for Sick Children, Bristol with Professor Nevil Butler. After obtaining his DCH, he left to Newcastle upon Tyne in March 1970 & worked in the Royal Victoria Infirmary with David Kerr until he obtained his MRCP in September 1971. In February 1972, he was appointed as a registrar in paediatric cardiology at Royal Brompton hospital, a post that he held until 1974. There he was trained by some of the best doctors & in one of the best centres. It was a hands-on training on the devious aspects of paediatric cardiology including clinical, echo-Doppler, cardiac catheterization & research. The years 1972-74 were important. He published a number of papers that appeared in quite respectable medical journals. Some of the published research formed the basis on which some of the most important therapeutic interventions in pediatric cardiology were subsequently based on how surgical closure of the ductus arteriosus can unmask hidden coarctation of the aorta & this formed the basis on which prostaglandins were later used to maintain ductal patency. Similarly, the publi-

cations on Doppler were important & came when Doppler was in its infancy.

He had training in the best centers in the USA, and was in contact with the masters of paediatric cardiac anatomy & physiology. For training in paediatric cardiac anatomy, he went to Harvard & worked with Professor Richard Van Praque who was the world's leading cardiac anatomist. Then, he went to the University of California, San Francisco where he spent another month with Professor Abe Rudolph one of the finest cardiac physiologists & a superb paediatrician.

[314] Abdel Monem El-Seed. Letter to Tarik Elhadd and passed to me (2008).

[315] Haseeb. Op. Cit. page .

[316] Sudan Medical Papers of Robert Kirk, GPR/0115/RCMS 122, Cambridge University Library: Royal Commonwealth Society Library.

[317] Acquired FRCSI in February 1976, and did later two years training in the Cardiothoracic Institute in Dublin.

[318] The Ministry of Health chose the author (Dr. Ahmed El Safi) as a source man to respond to the WHO base-line information questionnaire.

[319] WHO, WHO Global Medium-Term Programme, 12.4 Traditional Medicine (1984-89). Geneva; September 1983; TM/MTP/83.1.

[320] WHO. Seventh General Programme of Work Covering the Period 1985-89. Geneva; 1982. 100.

[321] Ahmed El Safi. Organization of Research in Traditional Medicine in the Sudan. A proposal document presented to the Medical Research Council, May 1980: 9 pages and a flow chart.

[322] The first directive was given in Aug. 1980 and the second on 30th April, 1981. Dr. Ahmed El Safi was head (and reporter) of the second committee.

[323] Ahmed El Safi. Tigani Al-Mahi: a pioneer of research in Traditional Medicine: in Sudan Broadcasting Service: Sudanese folklore Programme, prepared by Mahgoub Karrar, 1st April, 1981 (two series repeated over a month period).

[324] This working paper was the memorandum presented earlier to The medical Research Council.

[325] El-Sheikh, El-Hadi. Handwritten message to Mohamed Abdeen. 7 January 1955.

[326] The Association of Medical Schools in Africa. 13th Annual Meeting. Addis Ababa; 23-28 April 1979.

[327] The Codex Alimentarius Commission was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations. The Codex Alimentarius, or the food code, has become the global reference point for consumers, food producers and processors, national food control agencies and the international food trade. The code has had an enormous impact on the thinking of food producers and processors as well as on the awareness of the consumers. Its influence extends to every continent, and its contribution to the protection of public health and fair practices in the food trade is immeasurable.

[328] National Council for Research Act, 1983.

[329] Ahmed El Safi. Sudan Medical Council: Postgraduate Qualifications, Equivalence and Recognition. 58 pages report, August 1982.

[330] Ahmed El Safi. Museum of the History of Medicine and Health Culture in Sudan. Proposal memorandum presented by Traditional Medicine Research Institute, National Council for Research, Khartoum to UNESCO 1985.

[331] Dr (Mr) Ibrahim Mohamed El-Moghraby (1913-1993) graduated at the age of 21 from Kitchener School of Medicine in 1935 with distinction and won the Waterfield prize in Surgery and the school prize in medicine. In 1952, he became the first Sudanese and the first graduate of Kitchener School of Medicine to obtain the English Fellowship in surgery. He was a pioneer of modern Orthopaedic surgery, and an authority in the surgery of massive Pyloro-Duodenal Fibrosis (Syn. Shaigi Syndrome), Bilharziasis and Portal Hypertension in Sudan. He also conducted notable research in Mycetoma. (Excerpts from a short profile by El-Moghraby family for establishing El-Moghraby Prize in Surgery in Faculty of Medicine, University of Khartoum).

[332] The founding members of SSTMH were Professor Ahmed Mohamed El-Hassan, Professor Sami Ahmed Khalid, Professor Suad Mohamed Sulaiman, Mr. Ahmed Hassan Fahal, and Dr Daa El-Din El-Naeim, among others.

-
- [333] Intensive work has been put into the writing of this documents by Administrative Reforms Directorate and Sudan Medical Association. Khartoum Teaching Hospital has been taken as a model. The author of this book has been the leading author.
- [334] The health insurance is financed by a premium of 10% from employees' salary, of which 60% is the employer's contribution while 40% is equivalent to employee's share. Various government programs and charities cover the premiums for the poor and the other categories. Insured individuals are registered at a health centre that they should contact firstly when they demand health services. While consultation, laboratory investigations and surgical procedures are free, yet insured persons should purchase medicines at government pharmacies paying 25% of the cost.
- [335] Guidelines for Ethical Conduct of Research Involving Human Subjects. Directorate of Research, Federal Ministry of Health, Second Edition 2017.
- [336] *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1908, (Third Report); *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1911, (Fourth Report). The Wellcome reports were and still are classical documentation of the work carried out in the first two decades of the 20th century.
- [337] D'Arcy, Patrick Francis. *Laboratory on the Nile: A History of the Wellcome Tropical Research Laboratories*. The Haworth Press, Binghamton, New York, 1999: 281 pages.
- [338] Bell, Heather. *Frontiers of Medicine in the Anglo-Egyptian Sudan, 1899-1940*. Clarendon Press, Oxford, 1999: 261 pages.
- [339] Dr. Ahmed El Safi is founding Executive Director, and Professor Suad Mohammed Sulaiman is Research Director. Tele/Fax +249-183230689. Address P.O. Box 6780 (Integration office), Khartoum 1113. HQ: Flat 2 Plot 4, Block 1G, Geraif West, Khartoum, Sudan.
- [340] Karti, FMoH, 2000, unpublished reports.
- [341] Guideline for 2017
- [342] Health System Profile-Sudan. WHO. EMRO. 2006.
- [343] Ahmed El Safi. Museum of the History of Medicine and Health Culture in Sudan. Proposal memorandum presented by Traditional Medicine Research Institute, National Council for Research, Khartoum to UNESCO 1985.
- [344] An herbarium is a collection of well-identified, dried and pressed plants that are mounted on paper and arranged in

cases in some type of retrieval scheme. The label on each specimen has information such as the plant name, the name of the person who collected the plant, and when and where it was collected. Often, information on the plant community it was growing in (such as grassland, forest, etc.), the soil type, pollinators, or plant uses are also noted on the label.

[345] El-Hassan, AM. Rationale for establishing a clinical research centre at SobaUniversityHospital (2005). (Text in SMHF Archives, Khartoum).

[346] Document. 2008. Sudan Currency Press. 86 pages.

[347] Urgent Needs, UN Work Plan for 2005.

[348] Ministry of Health 25-Year Health Care Strategy (2005).

[349] World Bank (2003), WHO (2003).

[350] Federal Ministry of Health. Post-Conflict Sudan Needs Assessment & Policy Options, draft, May 28, 2004, Khartoum.

[351] Group for Alternative Policies for Sudan (GAPS), Office of African Studies, the American University of Cairo: Second Health Workshop 26-27, December, 2003; British American Friends of Southern Sudan (BAFOS), Sudan Studies Centre Initiative.

[352] A National Poverty Eradication Strategy Concept Note. September 9, Nairobi.

[353] CPA by the GOS and SPLA/M January 9, 2005.

[354] Sudan Interim Constitution, 2005.

[355] SPLM HIV/AIDS Policy and Control Strategies for the New Sudan, 2001.