Association Between ACE 2 / TMPRSS 2 Gene Polymorphisms and Disease Severity During Covid-19 and Tuberculosis co-infection in Cameroon.

Kameni Mary Ngongang[1, 2], Tchoupe Eric Berenger [2, 6], Assam Assam Jean Paul[1,3], Taya Jean Bosco[1, 2], Nzuno Marie Christine[2, 5], Severin Donald Kamdem[2, 8] and Palmer Masumbe Netongo [2,4,6]

1. Department of Micriobiology, Faculty of Science, University of Yaounde I; 2. Molecular Diagnostic Research Laboratory, Biotechnology Center, University of Yaounde I; 3. Laboratory for Tuberculosis Research and Pharmacology, Biotechnology Centre, University of Yaounde I; 4.School of Science, Navajo Technical University, Crownpoint, USA ; 5. Department of Medical Laboratory Science, Faculty of Health Science, University of Buea, Cameroon ; 6. Department of Biochemistry, Faculty of Science, University of Yaounde I; 7. Faculty of Medicine and Biomedical Sciences, University of Yaoundé 1, Yaoundé, Cameroon; 8. School of Medecine University of UTAH, Salt Lake City, USA.

BACKGROUND

- Covid-19 and Tuberculosis (TB) share same pathogenesis and clinical presentation. Upon entry into the host, SARS-CoV 2 and *Mycobacterium tuberculosis* (MTB) induce pro-inflammatory cytokines which could lead to the cytokine storm.
- SARS-CoV2 depends on Angiotensin Converting Enzyme 2 (ACE 2) (receptor for entry into the host cell) and TMPRSS2 (for spike protein priming) to replicate. Interestingly, *MTB* infection increases the expression of ACE 2.
- A genetic change in ACE 2 and TMPRSS2 could influence susceptibility to these infections. We therefore hypothesized that genetic changes in ACE 2 and TMPRSS2 gene polymorphisms leads to increase disease severity in Covid-19 /TB co-infected patients.

OBJECTIVE

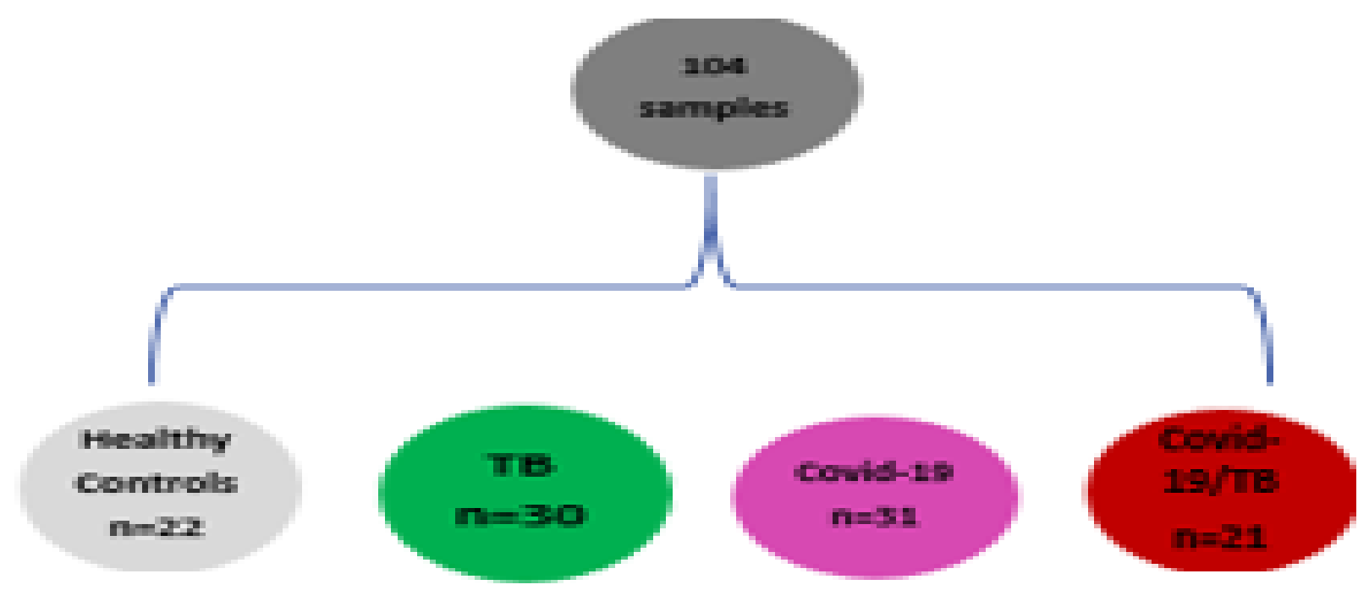
Determine the association between frequencies of ACE 2 /TMPRSS 2 gene polymorphisms and disease severity during Covid-19 and TB co-infections in Yaounde, Cameroon.

List of abbreviations

Angiotensine Converting Enzymes (**ACE 2**), Transmembrane Serine Protease 2 (**TMPRSS2**),Single Nucleotide Polymorphism (**SNP**), Alanine amino transferase (**ALT**), Aspartate amino transferase (**AST**), Creatinine (**CREA**), Interleukine (**IL**), Severe acute respiratory syndrome (**SARS-CoV2**).

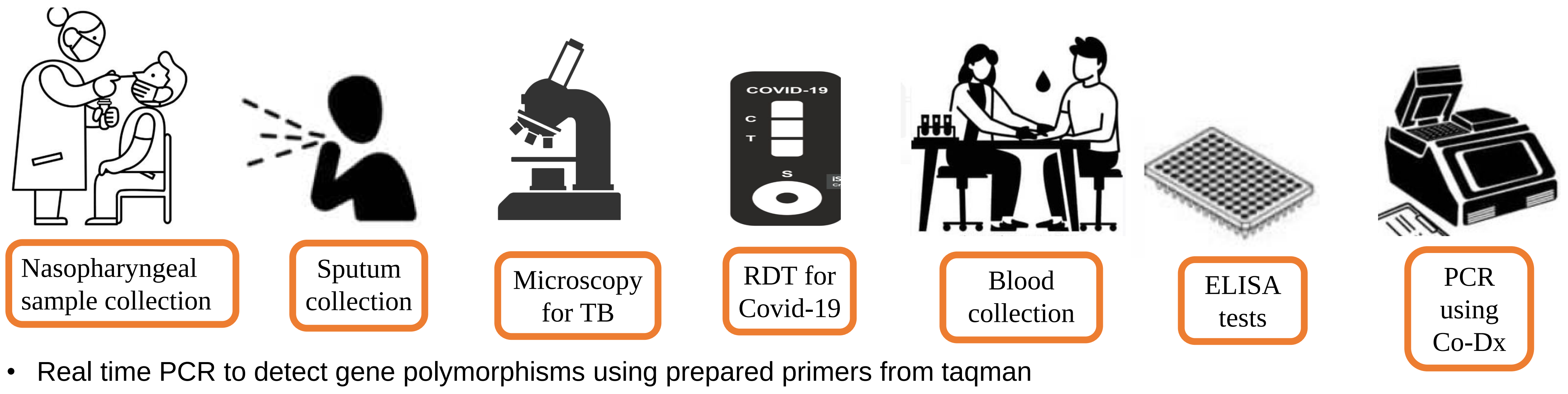
METHODOLOGY

- **Study procedure :** A cross sectional prospective study was carried at six hospital facilities in Yaoundé.
- **Study population :**

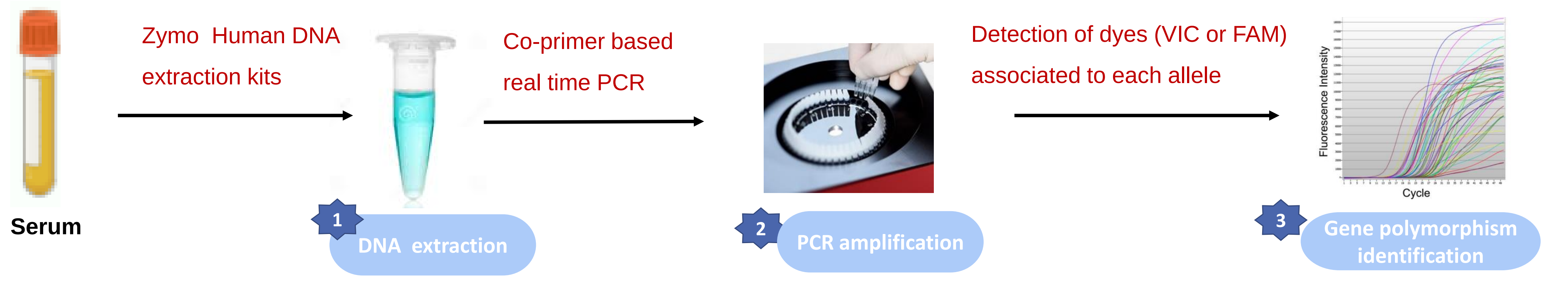


- **Laboratory procedures :**

- Real-time PCR using SARAGENE kits detecting IS 6110 and MPB 64 genes from *MTB* complexe and Logix smart ABC kits detecting Influenza A/B, SARS-CoV2.



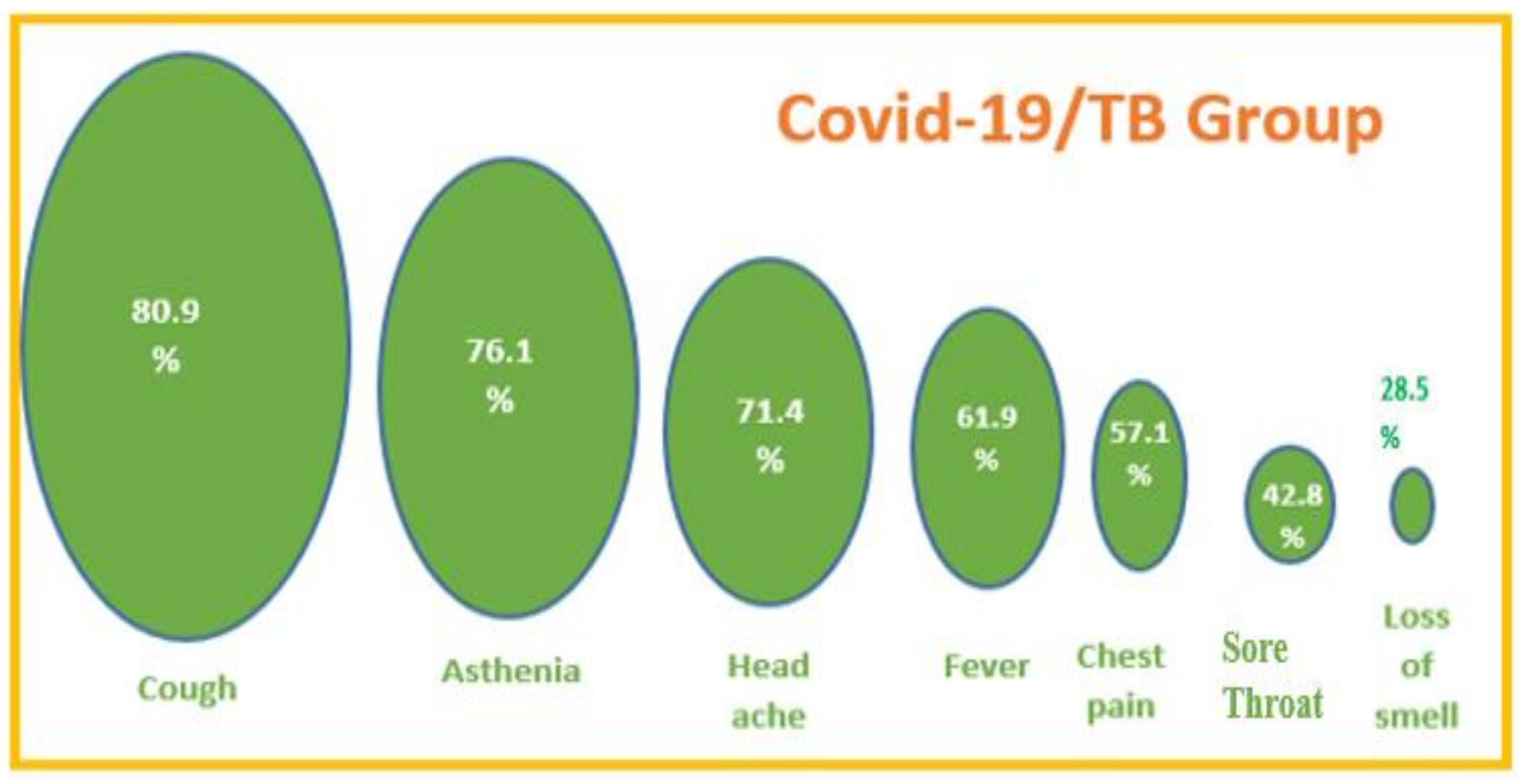
- Real time PCR to detect gene polymorphisms using prepared primers from taqman



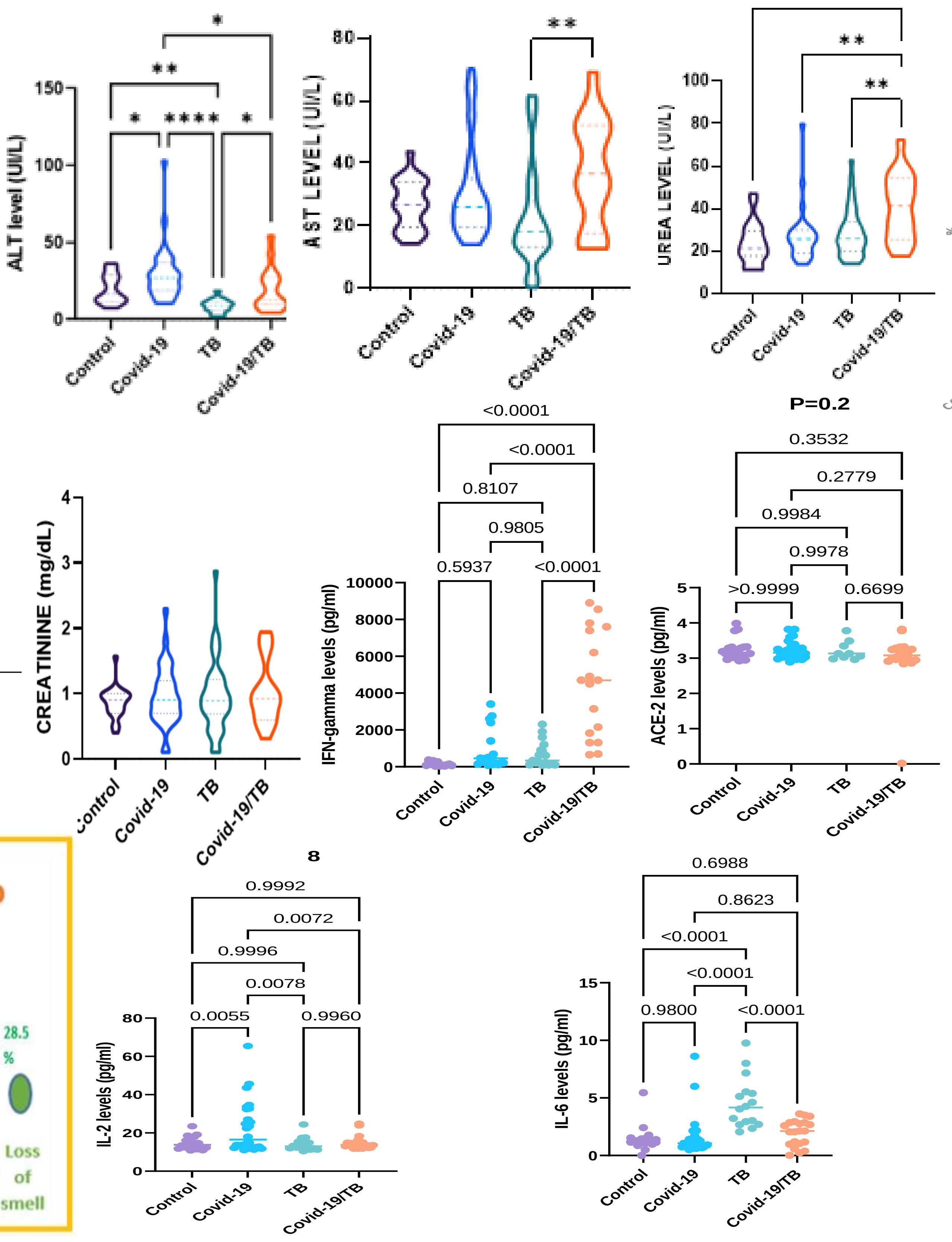
RESULTS

1: Age range (45-54 years) and males were more susceptible to Covid-19/TB co-infection.

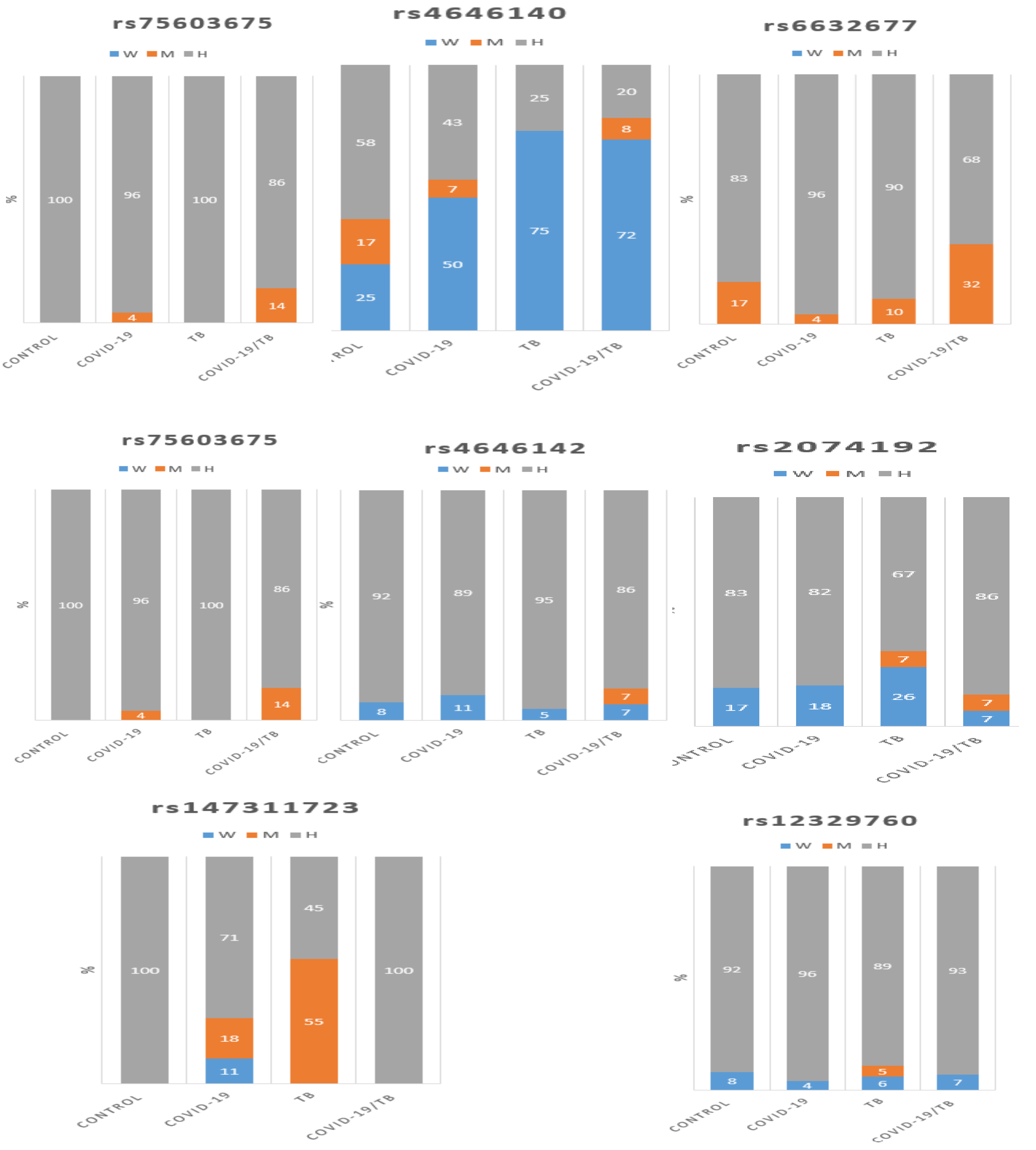
N=104 Socio-demographic factors	Frequency (%)	Negative control N= 22 (21%)	Covid-19 N=31(29 %))	TB N= 30 n (28%)	Covid-19/TB N=21 (20%)
Age range (in years)					
(15-24)	19 (18.2)	5 (22.7)	5 (16.1)	4 (13.3)	5 (23.
(25-34)	32 (30.7)	12 (54.5)	9 (29)	8 (26.7)	3 (14.
(35-44)	17 (16.3)	3 (13.6)	6 (19.3)	5 (16.7)	3 (14.2)
(45-54)	26 (25)	2 (1.9)	8 (25.8)	7 (23.3)	9 (42.8)
(55-64)	6 (5.7)	0 (0)	2 (6.4)	3 (10)	1 (4.7)
Above 65	4 (3.8)	0 (0)	1 (3.2)	3 (10)	0 (0)
Gender					
Male	57 (55)	11 (50)	15 (48)	18 (60)	13 (62)
Female	47 (45)	11 (50)	16 (52)	12 (40)	08 (38)



2 : Increased expression of some markers of disease severity in Covid-19/TB patients.



3: Higher frequency of genetic variations in ACE 2/TMPRSS2 among Covid-19/TB co-infected cluster.



CONCLUSION

Alteration of kidney and liver functions as well as increased inflammatory response in Covid-19/TB subjects in this study show the synergetic effects of these two diseases**.** Despite the higher frequency of ACE 2 and TMPRSS2 gene polymorphisms among co-infected patients, some variations of these polymorphisms were observed across our study population indicating the need for further genotypic characterization of ACE 2 and TMPRSS2 variants among the Cameroonian population.

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