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Identification of Sars Covid-19 Infection among Khartoum State Resident-2021

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ABSTRACT

Background: The corona virus disease 2019 (COVID-19) epidemic in China was caused by the extreme acute respiratory syndrome corona virus 2 (SARS-CoV-2), December 2019. The clinical manifestations and management of COVID-19 patients remain largely unexplored. However, successful detection is necessary for the diagnosis of SARS-CoV-2 infection. For SARS-CoV-2-infected patients, aiming at evaluating antibodies-based and nucleic acid-based test results.

Patients and Method: A cross-sectional retrospective laboratory based study was implemented at Khartoum state 2021. Residents attend to test covid-19 were included by the other hand patients infected with other pneumonic disease were excluded. Blood sample collected from each participant after informed consent and matched inclusion criteria the test proceeded to identify SARS-CoV-2 IgM-IgG antibody test and real-time reverse transcriptase PCR (RT- PCR) for SARS-CoV-2 nucleic acid in COVID-19 suspected respondents. For statistical analysis, version 23 of the Statistical Package for Social Sciences (SPSS) was used. The Crossbat test was used to assess the significance of the discrepancies. The statistical significance was defined at $P < 0.05$.

Results: By using Polymerase Chain Reaction (PCR), 52 of 100 specimens were reactive for covid-19, whereas 48 were non-reactive. Using a snibe machine for antibody detection, the results showed that 18 specimens were reactive for IgM antibodies, 24 were reactive for IgG antibodies, 30 were reactive for both IgM and IgG antibodies, and 28 were non-reactive.

Conclusion: According to the current study, residents in Khartoum state had a high prevalence of SARS-CoV-2 antibodies.

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Covid-19: Corona Virus Disease 2019
CLIA: Chemiluminescence immunoassay
IgG: Immunoglobulin G
IgM: Immunoglobulin M
SARS–CoV-2: Severe Acute Respiratory Syndrome Corona Virus-2
RT-PCR: Real Time Polymerase Chain Reaction

Introduction

Pneumonia cases were reported in a hospital in Wuhan, China, on December 29, 2019. On investigating throat cultures from patients, the Chinese Center for Disease Control and Prevention concluded that these cases were caused by a new type of beta-coronavirus [1].

The coronavirus disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). From an epidemic outbreak in Wuhan, China, the year 2019 (COVID-19) has suddenly noticed into a global pandemic that has infected over

1 million individuals [2]. Measures of social distancing and the pandemic's systemic effects influence billions of people. SARS-CoV-2 infects host human cells by binding to the angiotensin-converting enzyme 2 (ACE2) receptor, which is about 80% related to SARS-CoV. COVID-19 is primarily manifested as a respiratory tract virus, however new evidence indicates that it should be regarded a chronic illness affecting multiple systems, including the cardiovascular, respiratory, gastrointestinal, neurological, hematopoietic, and immune systems [2]. Several studies have examined the impact of COVID-1 on routine hematology parameters in a variety of countries [3-5].

Although the actual mode of disease propagation is mysterious, recent evidence suggests that it is spread from person to person. Droplet and contact-based transmission routes are assumed to be the most probably. Serologic studies are conducted on clinical specimens such as blood, saliva, or even tears, in addition to molecular detection. Antibodies to SARS-CoV-2, such as IgA, IgM, and IgG, are detected by COVID-19 serologic assays. They're frequently focused on enzyme-linked immunosorbent assays, which are less complicated than molecular experiments. On December 31, 2019, the People's Republic of China announced a cluster of unexplained pneumonia cases to the World Health Organization (WHO) [6]. This outbreak was caused by a new coronavirus categorized as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that was also accounted for the Corona Virus Disease 2019. (COVID-19). It has had an effect on over 200 countries and territories all over the world. More than 26 million people have been contaminated and almost 1000,000 have died as of mid-May 2020. The primary objective of this study was to determine COVID 19 sero-prevalence in Khartoum.

Patients and Methods

Study design, period & area

Cross-sectional retrospective laboratory based study was carried out during the period from October to December 2020. This study was conducted in Khartoum. Executive capital of Sudan, just south of the confluence of the Blue and White Nile rivers. It has bridge connections with towns, Khartoum North and Omdurman, with which it forms Sudan's largest conurbation.

Study population, inclusion & exclusion criteria

Residents attend to Speed Medical Laboratories a private pathologist managed laboratories for testing covid-19 during study period. Participant who came to investigate Covid-19 were included in the study. Patients infected with other pneumonic disease were disqualified.

Data collection tool, analysis & Sample size

Personal data will obtain by direct interviewing questionnaire including personal information's as well as laboratory investigations. The statistical package of social sciences (SPSS) was used for statistical analysis version 23. Significance of differences was determined using Crossbat test. Statistical significance was set at $P < 0.05$.Handred participants selected randomly depending into similar study.

Laboratory work

Sample collection

5 ml of venous blood was pulled back from patients after decontamination of the area using 70 percent alcohol, the blood specimens were left for 30 minutes to clot and then centrifuged at 3000 r.p.m for 10 minutes, the serum then was segregated into plain container and stored at -20 until examined.

Method

Using Polymerase Chain Reaction for detection of nucleic acid (CoWin Biotech Co.Ltd.China) and Snibe device model Maglumi 800 (MAGLUMI® 800) for detection of antibodies.

Ethical consideration

Study participants were instructed of the research objectives and their authorization were gained before any specimens were gathered.

Results

By Polymerase Chain Reaction (PCR), fifty two of hundred were reactive for covid-19, while 48 were non-reactive. Antibody detection using a snibe machine disclosed the following results: 18 samples were reactive for IgM antibodies, 24 samples were reactive for IgG antibodies, 30 samples were reactive for both IgM and IgG antibodies, and 28 samples were non-reactive. Table1

The age was categorized into four groups (25-40), (41-51), (52-61), and (61 and above), with the majority of the groups being between the ages of (25 and 40) and (52-61) and also being more affected age groups.Table2

According to gender male was the most frequent (69%) than female (31%). As per residency, Khartoum and Bahri accounted for 34% of the study population, followed by Omdurman (32%). The majority of respondents (71%) had traveled before, while the remainder had not (29 %). The majority of the surveyed populations (73%) were symptomatic for covid-19, while the reset were asymptomatic. Table 3

Table 1: Distribution of PCR, IgG, IgM of covid-19 among study respondents

Lab result			Frequency	Percent	p-value
PCR		Reactive	52	52	0.000
		Non-reactive	48	48	
	IgG& IgM		30	30	0.000
Rapid test	IgM	Reactive	24	24	
	IgG		18	18	
		Non-reactive	28	28	

Table 2: Distribution of PCR, IgG, and IgM of covid-19 according to age categories

Age category	PCR		IgG & IgM		IgG		IgM	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
25-40	5	2	3	4	1	6	2	5
41-50	13	19	11	21	10	22	4	28
51-60	22	18	10	30	9	31	8	32
61 and above	12	9	6	15	4	17	4	17
Total	52	48	30	70	24	76	18	82

Table 3: Distribution of PCR according to gender, residency, travelling history and respiratory symptoms

Parameter	Variables	Positive	Negative	p-value
Gender	Male	38	31	0.323
	Female	14	17	
	Total	52	48	
Residency	Khartoum	14	20	
	Bahri	17	17	
	Omdurman	21	11	
	Total	52	48	
Traveling history	Yes	38	35	
	No	14	13	
	Total	52	48	
Respiratory symptoms	Yes	37	36	
	No	15	12	
	Total	52	48	

Discussion

The SARS-CoV-2-caused pneumonia outbreak is rapidly spreading, posing a clear challenge to people's lives and health, which has now become a major concern worldwide. In our study, a total of 100 sample conducted for serologic tests and nucleic acid detection for compare and to estimate the prevalence of SARS-CoV-2 infection in Khartoum state. Our findings demonstrate that by using Polymerase chain reaction of the valid samples, 52 were reactive for covid-19 while 48 were non-reactive.

By using snibe machine for detection of antibodies, the study revealed there was 18 sample reactive for IgM antibodies, 24 were reactive for IgG, 30 were reactive for both IgM and IgG, and 28 were non-reactive. Most of non-reactive patient by serological test were positive by using Polymerase chain reaction, it could mean patient are infected but have not yet reached the stage of immunoglobulin reaction.

Our findings contradicted those of another report 70 of the 191 samples tested positive for IgM and IgG based on PCR, while 34 tested positive for both Another report in China, which distinguishes from ours, was published by Out of 133 samples, 65% were positive by PCR, whereas 79% were positive by serological examination [7,8].

This report disputed a Brazilian study, which had a sample size of 3045 people, 347 of whom tested positive for IgM and 218 for IgG [9]. The small size of the study sample contributes to a significant part of the discrepancy between this study and its counterparts in many countries. This may also be attributable to climatic and environmental variability, as well as variations in immune system efficiency, or even compliance to quarantine protocols, which many countries around the globe enforced differently.

The current study was reported that more than forty years of age are at high risk of corona virus which was in line with that was reported elderly and younger patients with corona virus disease have some common CT features, but older patients are more likely to have extensive lung involvement [10]. By the other hand our finding was not agree with who documented that older than 65 years had a significantly lower risk of being seropositive than those aged 20–49 years, This may be attributable to the reality that Switzerland is one of the countries that prioritizes human welfare, especially the health of the elderly, and was obliged to pay much more attention after the corona pandemic [11].

Conclusion

The study revealed a high prevalence of SARS-CoV-2 antibodies was found among Khartoum state resident [12].

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