

IgM and IgG Antibodies Status in Suspected Patients of Covid-19 in Khyber Pakhtunkhwa, Pakistan

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Covid-19

Sajid Ali¹, Noor Muhammad², Jehanzeb Afridi², Tariq Mehar³, Nourin Mehmood¹ and Ziauddin⁴

ABSTRACT

Objective: To implement a new screening method in Pakistan's Khyber Pakhtunkhwa (KPK) province, increase testing capability, alleviate the burden on the PCR facility, and learn more about the infected population's herd immunity.

Study Design: Descriptive study

Place and Duration of Study: This study was conducted at the Department of Biotechnology, Real Time PCR Laboratory Dabgari garden Peshawar from April, 2020 to June, 2020.

Materials and Methods: A total of 200 individuals between the ages of 20 and 60 were included in the study. Immunochromatographic Technique was used to screen both of these patients for IgM and IgG levels (AMP, Australian).

Results: Antibodies were detected in 92 (46%) of the subjects (IgM and IgG). IgM and IgG positive patients reported for 7 (8%) and 85 (92%) of the 92 positive patients, respectively. There were 72 (51%) male and 20 (3%) female positive subjects, respectively. The 20-30 age group was the most affected, followed by the 30-40 age group, and the >60 age group was the least affected. Temperature was the most common symptom associated with suspicious subjects (85%), followed by body aches (80%), dry cough (77%) and sore throat (70%).

Conclusion: The prevalence of antibodies, IgM, and IgG positivity was very high (46%) among the suspected patients, and the most affected age group was 20-30, with temperature symptoms being the most common.

Key Words: Covid-19, IgM, IgG, Immunochromatographic technique (ICT), Polymerase chain reaction (PCR)

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INTRODUCTION

World is facing a novel pandemic Corona virus. World Health Organization (WHO) confirmed it an emergency and named it COVID-19 on 11 February 2020. COVID-19 stands for Corona virus disease 2019 and is caused by extreme acute respiratory syndrome corona virus-2 (SARS-CoV2). The word Corona is originated from Latin which means 'crown or holo' because of its shape.

¹. Department of Biotechnology, Abdul Wali Kahn University Mardan, Pakistan

². Peshawar Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan

³. Medical B ward, Hayatabad Medical Complex, Peshawar, Khyber Pakhtunkhwa, Pakistan

⁴. Medical C Ward, Lady Reading hospital Peshawar, Khyber Pakhtunkhwa, Pakistan

Correspondence: Dr. Sajid Ali Associate Professor of Biotechnology, Abdul Wali Khan University, Mardan.
Contact No: 0346-9144693
Email: sajid@awkum.edu.pk

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Under electron microscopy it appears club shaped and surrounded by spikes peplomers.¹ The genome size of Corona viruses is larger than RNA viruses, ranges from 27 to 34 kbs.²

COVID-19 is related to the Corona virus family named Coronaviridae and sub family ortho coronavirinae with genus Alpha corona virus and genus Beta corona virus (zoonotic); in 1930s Corona viruses were reported to cause liver, neurological and gastrointestinal diseases in poultry animals. These are enveloped positive-sense single stranded RNA viruses.³ About 7 strains of Corona viruses are believed to have its hands in infecting human, among these 4 Corona viruses which are Alpha corona virus strains NL63 and 229E along with Beta corona virus strains HKU1 and OC43 can only cause common cold like symptoms while the remaining 3 are Beta corona virus strains which are zoonotic and are believed to have transmitted from Bat⁴ can cause severe respiratory infection and deadly pneumonia in human; SARS, MERS, SARS-CoV2 are Beta corona virus strains.⁵

SARS was epidemic, caused by SARS-CoV and was first encountered in November 2002 in Guangdong province of China, later it spread to 30 countries. It affected more than 8000 and killed more than 700 individuals. Middle East respiratory syndrome is caused

by the MERS Corona virus and is known as MERS (MERS-CoV), it was first detected in September 2012 in Saudi Arabia. Till now it has affected 2500 with more than 800 deaths.

Covid-19 or SARS-CoV2 was first detected in Wuhan China on 31 December. It was a severe and deadly pneumonia which was noted on December 1st later all these patients were linked with the Hunan seafood market.⁶ The disease spread rapidly even doubled in every 7 days. The disease is spread to 204 countries already and had affected more than 6 million individual and this deadly pandemic has killed more than 0.1M people worldwide. In Pakistan more than 0.13Millions individuals are suffering from Covid-19 and more than 2000 are died, among these more than 14 thousands are confirmed cases in KPK while more than 600 are killed by this deadly pandemic.

Symptoms of Covid-19 may vary, some patients show mild symptoms while some show acute respiratory illness. Common symptoms are chill, Fever (99%), dry cough (59%), Fatigue (70%), sputum, nausea, vomiting, diarrhea, anorexia, lethargy, myalgias, headache and dyspnea.⁷ The disease may be severe in the median age or if there is any medical issue already; diabetes, cancer etc.

The genetics analysis of COVID-19 sited it in genus Beta corona virus which shows its link with the Corona virus of Bat named Bat CoV RaTG13.⁸ Which suggests that virus was initially transmitted from bat to human. Further transmission occurs through direct contact from infected person to healthy person. Respiratory droplets can carry the infection, contaminated surfaces can also play a role in the spreading of disease, and the viral particles may remain for 72 hours on the surfaces. The incubation periods may vary from 1 to 14 days. An infected person has 97.5% chances to transmit the disease while a person who is asymptomatic have less chance to transmit the disease.

Early diagnosis of Covid-19 is very much important for the future prevention of the disease. The diagnosis of infection can be done by detecting the virus/Antibody. As the culturing of SARS-CoV2 is insensitive and much difficult, the RT PCR is much more working and sensitive and standard techniques for the viral detection⁹ but at a same time RT PCR is an expensive technique and depends upon the availability of equipment and expertise. So we did qualitative IgM and IgG tests to screen and detect the Covid-19, because it was readily available and less expensive technique, also it takes less time as compare to RT PCR. Secondly PCR cannot eliminate the individuals who have already recovered and developed antibody. As today everyone is demanding for PCR kits and we did not get any actual data and disease burden just because all institutions have great shortage of kits and this is too risky as may an infected individual be there in society and is readily transmitting the disease. If instead an

easy option of screening is there, then definitely timely screening and timely quarantine will be highly effective in prevention of transmission and possible disease burden.

MATERIALS AND METHODS

This study was done at Real Time PCR laboratory, Dabgari garden Peshawar. Only those patients were included who were suspicious and either were referred by physicians or by themselves wanted to screen for Covid-19 exposures. Majority of the patients had particular symptoms like dry cough, temperature and body aches. Age range was from 20 to more than 60 years. 1 ml blood was taken from all of the suspected cases with their informed consents in subject to proper safety guidelines. Proper record was noted using a proforma. Blood samples were centrifuged and tests were performed using Immunochromatographic Technique (ICT) (Amp, Australia). 10ul liter serum was added to the wells of device and waited for 30 minutes. All of the three bands that is control, IgM and IgG were noted. The data was entered and analyzed through SPSS-25.

RESULTS

Antibody (IgM and IgG1) positivity was found in 92 (46%) of the subjects (Table 1). IgM and IgG positive patients accounted for 7 (8%) and 85 (92%) of the 92 positive patients, respectively. Male and female subjects made up 72 (51%) and 20 (3%), respectively, of the overall positives.

In the current study, Covid-19 has affected all age groups of population and the 20-30 age group was the most affected, followed by the 30-40 age group, and the >60 age group was the least affected (Table 2). Temperature was the most common symptom associated with suspected subjects (85%), followed by body aches (80%), dry cough (77%), loss of taste (70%) and sore throat and change in test results (70%). Beside these some other symptoms were also observed like loss of smell (40%) (Fig. 1).

Table No.1: IgM and IgG status in male and female suspected subjects

Gender	No.	IgG & IgM +ve	IgG +ve	IgM +ve
Male	140	72 (51%)	68 (94%)	4 (6%)
Female	60	20 (3%)	17 (85%)	3 (15%)
Total	200	92 (46%)	85 (92%)	7 (8%)

Table No.2: Antibody status in different age groups

Age (subjects)	Positive subjects
20-30 (50)	24
30-40 (45)	22
40-50 (35)	18
50-60 (32)	16
>60 (38)	12
Total (200)	92 (46%)

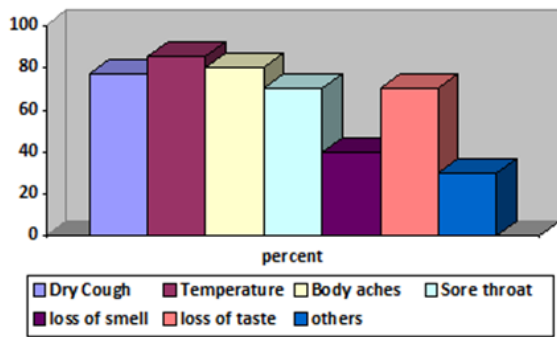


Figure No.1: Percent of subjects having associated symptoms

DISCUSSION

Covid-19 has adopted an alarming position worldwide, has almost affected 7M people and killed more than 0.3M people. In Pakistan, infection also increases day by day and almost has affected all provinces of Pakistan. In KPK province of Pakistan the total number of affected individuals increased to more than 17 thousands.¹⁰

This study reflects IgG and IgM status, that most of the patients have already developed IgG (Table 1). This means that most of the patients have already cleared the infection and leading toward the herd immunity. It can be predicted that most of the population if infected with such ratio will develop herd immunity very rapidly. So far no study has been conducted nationally as well as internationally regarding antibody status in suspected subjects having corona virus infection. As mortality rate is low as compared to recovery¹⁰, that's why it can be predicted that our study is in similar fashion to the already existing data of WHO.

In the current study, Covid-19 has affected all age groups of population and especially age group of 20-30 was more affected (Table 2) followed by age group of 30-40. Our age group involvement is almost in agreement with the study conducted in China.¹¹ According to that study, more cases were found in age group of 30 and above. This might be possible as these groups of population seem more active and might be more exposed to transmission of infection. Secondly, male subjects are mostly affected as compared to female (Table.1). Our study is in agreement to already data available conducted in China.¹¹ The reason is obvious and possibly might be more involvement in social activities by male. All of the enrolled subjects were noted with signs and symptoms and these were recorded in proforma. According to the data, different symptoms were associated with suspected patients. Temperature was the most common symptom associated with suspicious subjects (85%), followed by body aches (80%), dry cough (77%) and sore throat (70%). Beside these some other symptoms were also observed like loss of smell (40%) and loss of taste

(70%) [Fig. 1]. Majority of the studies are in favor of our study, as most of the studies indicated that covid-19 patients have symptoms of fever, body aches and dry cough (6, 7, 8). As this is the first study and in past no such studies have been done in Pakistan and especially in KPK. Therefore, prevalence of antibody in suspected patients, either it is high or low cannot be confirmed but according to our knowledge and patients history, enrolled population have developed both separate and even mixed antibodies against Covid-19.

Although this was a report and single centered so limitations are there. Hence need exist to explore such studies at large scale and multicentre points may be involved. Secondly as this is ICT based base study hence this should be confirmed through ELISA.

CONCLUSION

The IgM/IgG antibody positivity ratio was very high (46%) among the suspected patients, and the most affected age group was 20-30, with the most common symptoms being fever, body aches, and dry cough.

Author's Contribution:

Concept & Design of Study:	Sajid Ali
Drafting:	Noor Muhammad, Jehanzeb Afridi
Data Analysis:	Tariq Mehar, Nourin Mehmood, Ziauddin
Revisiting Critically:	Sajid Ali, Noor Muhammad
Final Approval of version:	Sajid Ali

Conflict of Interest: The study has no conflict of interest to declare by any author.

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