

DISAPPEARANCE OF ANTIBODIES IN COVID-19 MYTHS OR REALITY

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ABSTRACT

Objective: To explore the disappearance of neutralizing antibodies from patients, their myths, and facts.

Study Design: Cross-sectional study.

Place and Duration of Study: Combined Military Hospital Multan Pakistan, from Jul 2021 to Aug 2021.

Methodology: A total of 100 blood samples were collected from 100 COVID-19 patients. These 100 patients were followed up for a period of 3 months. Antibodies were determined with the modified neutralization assay method and enzyme-linked immuno-sorbent assay (ELISA).

Results: The antibody level by NA and ELISA peaked on days 30-35 then decreased slightly. In multivariate analysis, patients aged 25-35, 36-56, and 57-84 years had a higher neutralizing antibody level than those aged 10-21 years. The patient with the worst clinical manifestation had a higher neutralizing antibody titer. In serum samples, IgG was undetectable at 18.3% and 11% and the geographical mean reciprocal titers dropped from 244 at 3-month period and neutralizing antibodies, the geographical mean reciprocal titers dropped from 874 at 3 months.

Conclusion: All COVID-19 patients were seropositive and significantly neutralizing antibody response. Neutralizing antibody levels depend on the time after the onset of symptoms, age, and severity of the disease.

Keywords: Antibodies, COVID-19, Disappearance, Myths, Reality.

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INTRODUCTION

Since the beginning of December 2019 at least 40 classified cases as pneumonia of unknown etiology were reported in Wuhan city.^{1,2} One Chinese scientist Li Wenliang working in Wuhan Central Hospital received a diagnostic report of one suspected SARS patient, the diagnostic report got shared on media, and Li later himself got the illness by himself on February 7, 2020. On December 31, 2020, an epidemic occurs with unexplained lower respiratory tract infection was reported in the WHO country office in china.³ Centre for Disease Control and Prevention organized an intensive outbreak investigation program including a team of physicians, scientists, and epidemiologists.⁴ It was named as novel corona virus-2019 and in past 20 years, two additional CoV epidemics have occurred. SARS-CoV spread resulting in large-scale epidemic and engulfing around 24 countries with around 8000 cases of fatalities. MERS-CoV began in Saudi Arabia and hit approximately 2500 cases. This new novel coronavirus is contagious and had spread globally very quickly.⁵

People of all ages reportedly get infected from coronavirus and literature review supported that state-

ment, children under nine years of age are less likely to get infected with coronavirus and have a milder disease because of a high level of angiotensin-converting enzyme 2 (ACE-2) which protected children from inflammatory disease.⁶

METHODOLOGY

Myths and Facts Relating to COVID-19

The novel coronavirus is a respiratory virus that spread through a droplet of saliva or nasal discharge generated during sneezing and coughing. One should avoid close contact with anyone who is coughing or sneezing. Evidence suggested that the novel coronavirus has not been transmitted through mosquito bites or flies. The droplets on a surface by a person can still transmit the virus by acting as fomites.

By trying out different experiments the virulence nature could not be transmitted by paper, wood, and cloths. However, it was found to be more useful on glass surfaces, stainless steel, and plastics from up to 7 days.⁷

Use of Soap or Hand Sanitizers

Except for using hand soaps and hand sanitizers which weakens the virucidal action. Washing hands with soap for 30 seconds helps in preventing the infective agents from clinging on to the skin. It is also a

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simple and effective method of preventing infection of COVID-19.⁸An exposure time of 1 minute 62-71% ethanol is required, 0.1-0.5% sodium hypochlorite solution and 0.5-2.5% of hydrogen peroxide are effective in virucidal action. Evidence suggested that contact with the influenza virus in more than 5 seconds can transmit 31% viral load to the human hands.⁹

Myths and Facts About Diagnosis

Evidence suggested that people of all ages have a probability of getting infected with the COVID-19 virus but children under nine years old are less susceptible to COVID-19 infection.^{10,11} In studies, there has been no evidence of getting infection directly but familial cluster from close contact was found. Elderly patients have more risk of developing severe illness.¹² The most common symptoms of COVID-19 are dry cough, malaise, tiredness, and fever since these symptoms are non-specific. International travel history especially to the areas where COVID-19 spread out is important. Loss of smell and taste was another emerging symptom of COVID-19 infection. Although no study strengthens the argument that COVID-19 cause anosmia and ageusia symptoms. These types of symptoms are usually seen in post-symptomatic individuals in initial phase.¹³

Ocular symptoms are rare and usually limited to conjunctivitis, patients who presented with fever and ocular symptoms were diagnosed to be COVID-19 positive cases but there is no evidence in the context of tear swab test for viral detection. Cardiovascular complications such as thrombo-embolic manifestation, stroke, and renal, hepatic failure are possibly causing complications.¹⁴

A broncho-alveolar sample has the highest COV-2 RNA yield on RT-PCR. Repeat sample is collected on day 14 to eliminate the false-negative test, this can happen due to inadequate quality of specimens, improper handling, and transportation of sample. The current population, specimen was collected on admission and day 14. According to the recommended guidelines should have been done at least 2-4 days until there are two consecutive negative results.¹⁵

From strict hard lockdown government of Pakistan is focusing on strategies aimed at containing the community spread by means of personal protection and hygiene, these are all done without compromising daily routine. Center for Diseases Control and Prevention summarizes some dos and don'ts to be followed for personal hygiene.

The majority of the patients revealed that the use of soaps and wearing a mask can prevent the transmission of the virus.

RESULTS

This study collected samples from a 100 confirmed recovered COVID-19 patients to asses for IgG and neutralizing antibodies over a period of 3 months. Fifty eight were from male and 42 from female of which 12 were pregnant females in the third trimester.

According to the study higher titers of antibodies was directly corelated to severity of the disease and age of the individual being above 25 years. Samples from all age group and both genders peaked on day 30-35 and then declined afterwards.

Currently there is no evidence that suggests link of intrauterine COVID-19 transimission from mother to fetus in late pregnancy.

Hand washing with soap and water is 96% effective in preventing the spread of the infection followed by the use of masks which is 88% effective.

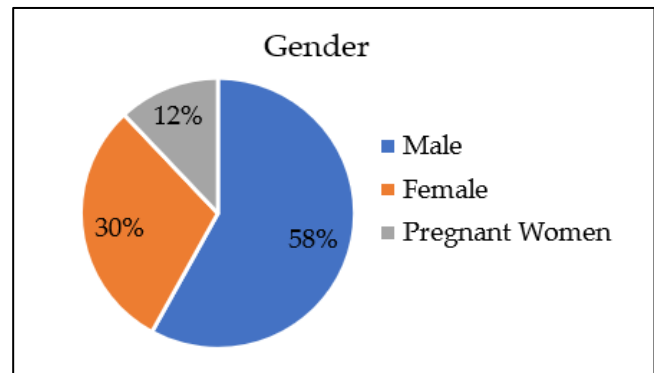


Figure: Gender distribution.

Table-I: Presenting symptoms of COVID-19 infection.

Symptoms of COVID-19	Cases
Fever	65
Headache	43
Dry cough	34
Loss of smell	38
Loss of taste	56
Conjunctivitis	10

Table-II: Effectiveness of hygiene & personal protection.

Hygiene & Personal Protection	n (%)
Avoidance of touching of nose, mouth, eyes	05 (5%)
Use of mask	88 (88%)
Use of alcohol base sanitizer	65 (65%)
Use of soap for handwash	96 (96%)
Shower after coming home	21 (21%)

DISCUSSION

Patients who had recovered from COVID-19 virus antibodies were measured. A total of 100 patients who were positive for serum IgG and had neutralizing antibodies against COVID-19 at the time of recovery were included in the study. Patients were followed up for 3 months to assess the titers of IgG and neutralizing antibodies. In serum samples, IgG was undetectable at 18.3% and 11% and the geographical mean reciprocal titers dropped from 244 at 3-month period and neutralizing antibodies, the geographical mean reciprocal titers dropped from 874 at 3 months. There was no significant difference in the kinetic of the specific antibodies according to the severity of the illness, hospital stay, and comorbidities associated with the patient. However, 13 patients had significantly lower neutralizing antibodies due to diabetes than non-diabetes patients. The antibody level by NA and ELISA peaked on days 30-35 then decreased slightly. In multivariate analysis, patients aged 25-35, 36-56 and 57-84 years had a higher neutralizing antibody level than those aged 10-21 years.

Experiments in animals indicated that IgG and neutralizing antibodies along with T-cell mediated immunity are effective in protection against viruses. This study suggested that immunity changes overtime, as demonstrated in patients infected with COVID-19.^{16,17}

Information gathered from this study can be further used to study the period of immunity provided to infected individuals from reinfections. It can also be used to compare antibody formation by vaccination and the length of time vaccination immunity lasts. This study also explores the effectiveness of several different hygiene and preventive methods which should be made known to the general population to limit the spread of COVID-19.

CONCLUSION

Currently, there is no reliable therapeutic option for critically ill COVID-19 patients. Convalescent plasma transfusion (CPT) may reduce the risk of mortality in critically ill COVID patients, neutralizing antibodies titers increases, cause disappearance of COVID-19 RNA and influence clinical symptoms. Based on the literature present, Convalescent plasma transfusion (CPT) is safe and clinically effective.

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LIMITATION TO STUDY

There are several limitations to the study one of them being the limited sample size. Blood sample of only 100 patients was analyzed. More samples from children should have been included but due to limited blood samples in this age group, this was not possible.

Conflict of Interest: None

Author's Contribution

MR: Conceptualization, write-up, data collection, statistical analysis, proof reading, MAR: Data collection, data entry and analysis, DEAC: Literature search, write up, MAC: Data collection, data entry and analysis, AR: Literature search, proof reading, SWK: Data collection.

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