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Sero-Prevalence of Sarscov-2 Specific Antibodies (Coronavirus Disease 19 Pakistan)

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Abstract: Approaching the eve of the year 2019 in the province of the Hubei China a cluster of pneumonia was detected and the world was hit by the another epidemic which was then called 'Novel coronavirus outbreak' referring to a cause by a virus of unknown origin, after research done by scientists in China the disease was known to cause by a Virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), later on 12 March 2020 the disease caused by said virus was named as Corona Virus Disease 19(COVID-19) . The aim of this study is to determine the SERO-prevalence of COVID-in the residents of Pakistan

Methodology: The study will be a quantitative descriptive cross-sectional population-based method is used in this study.

Results: This SERO--prevalence study revealed thet 9.3 % of the population was SERO--positive for COVID-19 and 36 percent were asymptomatic persons which is very high. The research also indicated that males and middle- and older-aged people were most impacted. Also, the study resulted in that the prevalence of COVID-19 in contacts of a confirmed positive case was 18 percent

Conclusion: The conclusion of this study implies to Pakistan's small province rural setting still it can be served as useful insights for guiding public health planning, practices and for installation of policies to decrease COVID-19 related human and economic losses. It is very important to mention that further research and studies are very much required in this purpose to find the true disease burden of COVID-19 as every study or research adds new information to the past experiences and also due to the nature of this pandemic as it comes in high and low phases during the whole years.

Keywords: COVID-19, SERO-prevalence, SARS CoV-2

CHAPTER 1

1.1. Introduction

Approaching the eve of the year 2019 in the province of the Hubei China a cluster of pneumonia was detected and the world was hit by another epidemic which was then called the 'Novel coronavirus outbreak' referring to a caused by a virus of unknown origin, after research done by scientists in China the disease was known to cause by a Virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), later on, 12 March 2020 the disease caused by the said virus was named as Corona Virus Disease 19(COVID-19). Soon in days and weeks, this outbreak which was limited inside China then started to hit the other countries and has become one of the biggest health issues to date. The first reported case of this new unknown etiology was recorded to be on 1st December 2019 in Wuhan city China, soon after that, a series of similar cases started coming with pneumonia. The majority of these cases of the atypical pneumonia cases had the same history of visiting the local sea food market, which suggested and suspected them to have an animal or zoonotic origin. Also, it was established that the spread of this novel virus was fast (Cureu, 2020)

In no short time after the laboratory examination of the genome confirmed that the virus was determined to be a Beta coronavirus and named severe acute respiratory syndrome corona virus 2, SARS CoV-2, formerly called 2019 novel coronavirus. Several genetic analyses of this virus confirmed that the virus is originated from the bat corona virus and very nearly linked to the pangolin corona virus, which places this virus may have originated from animal origin (Xiao K, 2021)

The history of coronavirus is not new. It was discovered in the 1960s and is a single-stranded RNA (ribonucleic acid) virus. As for as the morphology is concerned this virus is considered the largest amongst the RNA virus, with genome size ranging from 27 to 34 kilo bases. It is called coronavirus due to its crown-like structure on the outer surface. Up to date now about seven human pathogenic strains have been identified since their discovery in this family. Amongst that alphacoronavirus and beta coronavirus are transmissible to humans and beta coronavirus is thought to be originated from the bat. Some strains of alpha corona virus and baculoviral caused very mild symptoms and are thought to be mild in nature but other strains from beta coronavirus cause severe acute respiratory distress, those are severe acute respiratory syndrome corona virus (SARS- CoV), middle east respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome virus 2 (SARS CoV-2) (Woo PCY, 2007) (4).

The main route of transmission of this virus is person to person through droplets and particles via respiratory routes and also direct transmission is also established with contacts to surfaces where the viruses reside for a long time. The droplets or particles which contain the virus from an infected person can easily be transmitted to another person when the infected person exits the droplets, and the other person is in close contact with another person through the mouth nose, and ears. Therefore, it is very important, safety protocol to to take a distance of at least 6 feet or 2 meters to avoid the transmission of the virus. Due to the heavy weight of the coronavirus as compared to other RNA viruses, the transmission is minimal through the air at far distances. The virus may reside on surfaces for up to 72 hours so in short, the virus can spread mainly by three primary means that are breathing in a closed space with an infected person who breathe out small droplets and air particles which contains the SARS-CoV-2, through splashes or sprays for example cough which contains the SARS-CoV-2 which land on mouth, ears, and nose thereby entering the body and by directly touching the hands contaminated with SARS-CoV-2 to mouth, ears, and nose (Gao, 2022)

1.2. Aims and Objectives

- **Aim:** This study aims to estimate the SERO-prevalence of the COVID-19 infection in Pakistan
- **Objectives:**

To determine the prevalence of antibodies against the COVID-19 (SERO-prevalence) among the resident Pakistan.

CHAPTER 2

2.1. LITERATURE REVIEW

Coronavirus disease 19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was identified in China in December of 2019, formerly named Novel coronavirus due to the unknown structure and details of the virus. Soon after two months after the outbreak, the World Health Organization (WHO) declared it to be a pandemic.

The virus has a faster transfer rate as compared to the other viruses. This is the reason, within a very short period, spread to the other parts of the world and turned into a pandemic. The first reported case of this new unknown etiology was recorded to be on 1st December 2019 in Wuhan city China, soon after that, a series of the similar cases started coming with pneumonia, and as a consequence, hundreds of cases were reported from the epicenter of the outbreak till 31st December 2019 with the majority of the patients complaining of respiratory symptoms and bilateral pneumonia in consequent, The majority of these cases of the atypical pneumonia cases had the same history of visiting sea food market, that suggested and suspected them to have an animal or zoonotic origin. Also, it was established that the spread of this novel virus was fast. In no short time after the laboratory examination of the genome confirmed that the virus was determined to be a Beta coronavirus and named severe acute respiratory syndrome corona virus 2, SARS CoV-2, formerly called 2019 novel coronavirus (Diana Canetti 1, 2020).

Further deep laboratory analyses of this virus confirmed that the virus is originated from the bat corona virus and very nearly linked to the pangolin corona virus, which places this virus may have originated from animal origin. Coronavirus as a virus and its pathology is not novel to us. Firstly, It was discovered in the 1960s and the viral genome is made up of a single-stranded RNA (ribonucleic acid). As for as the morphology is concerned this virus is considered the largest amongst the RNA virus, with genome size ranging from 27 to 34-kilo bases. The name coronavirus is due to its crown-like structure on the outer surface. Up to date now about seven human pathogenic strains have been identified since their discovery in this family. Amongst that alphacoronavirus and beta coronavirus are transmissible to humans and beta coronavirus is thought to be originated from the bat. Some strains of alpha corona virus and baculovirus caused very mild symptoms and are thought to be mild in nature but other strains from beta coronavirus cause severe acute respiratory distress, those are severe acute respiratory syndrome corona virus (SARS- CoV), middle east respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome virus 2 (SARS CoV-2) (Xiao K, 2021).

The main route of transmission of this virus is person to person through droplets and particles via respiratory routes and also direct transmission is also established with contacts to surfaces where the viruses reside for a long time. The droplets or particles which contain the virus from an infected person can easily be transmitted to another person when the infected person exits the droplets, and the other person is in close contact with another person through the mouth nose, and ears. Therefore, it is very important for safety to be taken at a distance of at least 6 feet or 2 meters in order to avoid the transmission of the virus. Due to the heavy weight of the coronavirus as compared to other RNA viruses, the transmission is minimal through air at far distances. The virus may reside on surfaces for up to 72 hours so in short, the virus can spread mainly by three primary means that are breathing in a closed space with an infected person who breathe out small droplets and air particles which contain the SARS-CoV-2, through splashes or sprays for example cough which contains the SARS-CoV-2 which land on mouth, ears, and nose thereby entering the body and by directly touching the hands contaminated with SARS-CoV-2 to mouth, ears, and nose(5,6). The incubation period is a very important factor in any infectious disease or illness. The incubation period of SARS-CoV-2 or COVID-19 is varied but it ranges from 1-day up to 2 weeks. the median of the incubation period for COVID-19 appears to be 5 days (95% confidence interval [CI]: 4.5-5.8 days), with 97.5% of those who develop symptoms doing so within 11. days (95% CI: 8.2-15.6 days) of infection. The risk of spread from an asymptomatic case is probably low but it is still possible that a symptomless individual can transmit the COVID-19 to another. the number of cases that can have the virus from a

primary case that is cases generated from one case is estimated to be between 2 to 4.8 also known as the basic reproduction number (Lauer SA, 2020).

The clinical presentation of Coronavirus disease 19 (COVID-19) is complex. This disease has a vast variety of the symptomology and variety of clinical presentations. It has a wide variety of signs and symptoms specific to the respiratory system to very general symptoms, as far as respiratory symptoms are concerned it starts from the upper respiratory tract infection presentation which includes sneezing, sunny nose, nasal obstruction loss of taste, loss of smell and others (Chughtai OR, 2020 Jul).

Lower respiratory symptoms include productive cough, dyspnea, chest pain, and others. Fever is of the most common symptoms of COVID-19. Other symptoms include a sore throat. Symptoms of coronavirus disease 19 (COVID-19) varies person to person and this disease causes a range of symptoms from asymptomatic to mild and severe diseases including fever, cough, fatigue, body aches, generalized pain, and vomiting, diarrhea weight loss arthralgia and others. Majority of the cases of COVID-19 present with mild symptoms like shortness of breath, headache, sore throat, fatigue, loss of taste or smell, nausea, vomiting, weight loss, and diarrhea as well as some cases present with no symptoms. whereas some individuals develop more severe forms of disease such as multilobe pneumonia, and superinfections pneumonia, which then into organ failure, from lungs to the heart to kidneys up to all organs. The underlying disease may cause more complications, as well as the older age, is another risk because old age people are having less immunity as well as the have high chance of underlying diseases and they are prone to infections and in subsequent multiorgan failure occurs and then the most severe form comes the death. This induvial with severe form or with complications requires immediate hospitalization and intensive care unit (ICU) admission. In severe cases, complications such as acute respiratory distress syndrome, sepsis, septic shock, and organ failure as well as others have been reported (Khan M, 2020 Aug)

The official data sources of many countries and WHO depict glaring data of how the virus has spread to the world as more than 35 million people around the world have been infected and more than 1.3 million have lost to this viral pandemic globally. However, the recovery rate is high and the fatality rate is low, yet it is highly contagious (WHO, 2021)

In 1965 the first human coronavirus was identified by microbiologists from the nasal secretions. There are four main families of coronaviruses namely alpha, beta, gamma, and delta. The alpha and beta coronavirus origin is from mammals mainly while others are identified from pigs and birds. In terms of the clinical manifestation of the COVID-19 is concerned. The clinical manifestation ranges from asymptomatic carriers or infections to mild and moderate symptoms up to the severe manifestation of the disease which sometimes results in multiorgan failure and consequently death. Symptoms are as follows as described in confirmed cases; fever (99%), chills, dry cough (59%), lethargy, arthralgia, myalgia (35%), fatigue (70%), headache, dyspnea (31%), nausea, vomiting, anorexia (40%), sputum production (27%), and diarrhea (Younas A, 2020 Dec)

Asymptomatic infections and carrier virus spreading is a big challenge to infection control moreover individuals with mild and unspecific symptoms are difficult to identify and quarantine. SARS-CoV-2 RT-PCR-based RNA detection in respiratory samples is the main specific diagnostic test to confirm the COVID-19 virus infection. It has played a very pivotal role in the detection of patients infected with SARS-CoV-2. But at the very initial phase of the outbreak in China due to its fast and early spread and difficulty in sampling and management of the big populations viz a viz other technical issues at point cases were registered as positive by only seeing radiological findings in the lungs of the infected individuals and counted as confirmed cases and control measure activities started thereafter. Now simple ELISA kits for detection of IgM and IgG antibodies against COVID-10(SARS-CoV-2) have also been available more recently. This has made a specific diagnosis of ongoing and past infection possible easily and timely (. Gorbalenya AE, . 2020 Mar 2).

Based on the SERO-logical test(anti-SARSCOV-2), a study showed, that the positivity rate was 13% in asymptomatic,4% in individuals with mild symptoms, and 82% in those with severe disease(20). This represents that asymptomatic and pre-symptomatic infected persons, as well as asymptomatic

recovered persons, contribute a lot to the burden of the disease if they are identified in a simple and cost-effective approach.

The reliability and validity of the SERO-logical test are disputed in terms of its use in the confirmation of the diagnosis of the COVID-19 infection at the individual level. However, the use of the SERO-logical test to estimate the SERO-prevalence of COVID-19 at the population level is so crucial due to the nature (clinical presentation) of the disease as earlier discussed, and also the SERO-logical antibodies persist for a longer period even after the disease is over. This may contribute to true prevalence or at least doesn't underestimates the overall disease burden which helps us to understand the real spread of the COVID-19 locally and globally and also predict future spikes of the COVID- (13).

Another study in USA California showed the same results, the prevalence of antibodies against SARS-CoV-2 was 4.65% which was compared to confirmed cases counts was too high (Sood N, 2020)

An Español study shows the majority of the Spanish population is SERO-negative to SARS-CoV-2 infection, even in hotspot areas. Most PCR-confirmed cases have detectable antibodies, but a substantial proportion of people with symptoms compatible with COVID-19 did not have a PCR test and at least 33% of infections determined by SERO-logy were asymptomatic. These results emphasize the need for maintaining public health measures to avoid a new epidemic wave (Pollán M, 2020 Aug;)

A Swiss study showed a SERO-prevalence of 4·8% (95% CI 2·4–8·0, n=341) to 10·8% (8·2–13·9, n=775) in a different period in Geneva. The results suggest that most of the population of Geneva remained uninfected initially despite the high numbers of cases reported in the first 3 months of the pandemic. These results also inform us considering the easing of restrictions aimed at curbing transmission if the SERO-prevalence is low but also indicate to us that if the antibodies contribute well to the immunity since the SERO-prevalence of the antibodies against the COVID-19 is low in the community there is a possible risk of another wave soon if we do not take measures of control and proper community interventions (Stringhini S, 2020 Aug)

COVID-19 in Pakistan caused by SARS-CoV-2 was confirmed to have reached Pakistan on 26 February 2020, when two cases were recorded in Karachi. On 18 March, cases had been registered in all four provinces of the country and by 17 June, each district in Pakistan had recorded at least one confirmed case of COVID-19 (WHO, 2021)

Another study in Pakistan in Lahore revealed that among the policemen performing their duties in the high-risk areas during the pandemic the prevalence was around 16 % and all were asymptomatic. Furthermore, the study reported that only a percent of the participants who were exposed to confirmed cases were reactive to IgG (Chughtai OR, 2020 Jul)

In Pakistan, a study was conducted in June and July 2020 on the blood donors in Karachi. A comparative analysis for the SERO-prevalence was done which revealed that during June the prevalence among the blood donors was calculated as 15 % as compared to July 2020 which was around 38 %. The study concluded that around 40 % of the blood donors were SERO-converted for COVID-19 when the pandemic was at its peak (Younas A, 2020 Dec)

A serial household survey in Karachi Pakistan revealed that the SERO-prevalence in the general population was 0.4 % during the first phase to 22 % in the 3rd phase and around 93% of the participants were asymptomatic. This study also adds that the prevalence of antibodies in healthcare workers is 13 percent and in workers of the industry is around 2 percent and the overall period prevalence was determined as 36 percent (Zaidi S, 2020)

In Gilgit Baltistan Skardu is the second largest city of Gilgit-Baltistan, a province of Pakistan. The first case of COVID-19 was identified on 2nd March 2020 imported case from Iran who went for pilgrimage to the holy cities of Iran and Iraq like hundreds of others. The health ministry quarantined them with all others at Taftan for 14 days subsequently they were transported to Skardu by road and tested again in Skardu where they tested positive for COVID-19. PCR methods were used for every

travel case and if come negative they were released to their homes. 1st case of local transmission occurred on 18 April thereafter public health interventions were applied and now the cases are declining. as of October, more than 1000 cases were recorded from the city (PCR test). but still in the city and in the Baltistan region, we are unaware of the SERO-prevalence of the population therefore, this study aims to provide a population-based SERO-prevalence survey of COVID-19 at the UC of Pakistan. so that it may help to depict a less biased picture of the infection of COVID-19 in the region so that it may help decision-makers by providing them a less biased picture of the infection's amplitude at the time thereby enabling to take a decision about the different activities such as the opening of lock downs, closing, specific rates like age-wise can tell us which are the main affected groups like others. Also, this may help to estimate the timing and extent of the future waves of the infection in specific geography or age group and it also helps to measure the impact of any intervention applied such as social distancing and vaccination or the use of mask including others (. Gorbalenya AE, . 2020 Mar 2).

CHAPTER 3:

3.1. Data and Methodology

The study is a quantitative descriptive cross-sectional population-based study to measure and determine the SERO--prevalence of antibodies specific to COVID-19 among the residents of Pakistan. All data of this study was primary, collected through self-administered questionnaires. The selective district through random sampling of Pakistan like Sakrdu, Islamabad, Lahore hydra bad Quetta the study population.

3.2. Sampling technique

Two-stage cluster sampling followed by a Systematic sampling technique will be used for this survey. Five Big Cities of Pakistan will be selected through random sampling technique in this study. Boundaries of all these areas will be identified using a map. A total of 10 clusters will be taken each cluster with a total of 74subjects would be selected using a sample interval of 850 (Sampling Interval= Total Pop of all 5 areas / Total Number clusters required = 8900/10 = 890)

Table 1: SAMPLING DETAILS

S.No	Name of the areas	Total estimated population
1	Islamabad	4.5 Million
2	Sakrdu	26023
3	Lahore	121.8 Million
4	Hydra Abad	17.32 Million
5	Quetta	1.001 million

3.3. Sample size calculation

With a prior prevalence of 50% for coronavirus infection with a 5% precision and design effect of 2, a total of 740 subjects was considered for sample size.

Sample size $n = [DEFF * Np(1-p)] / [(d2/Z21-\alpha/2 * (N-1) + p * (1-p)]$

Where: n is sample size, DEFF is 2, N is total population size (Hussain Abad population estimated of 8900 individuals), p is hypothesized frequency of outcome in population (50%), d is Margin of Error (5%).

3.4. Study Variables

- **Dependent Variable**: SERO-prevalence of COVID-19(SARS-COV-2)
- **Independent Variables**: Consists of Age, Gender, sign, and symptoms contact history travel history, etc. Data analysis

All the information and data collected through the questionnaire were processed and line listing was done using micros soft excel and the data was analyzed using SPSS software and EPI INFO. Diagrams and other figures were made using specified programs like MS Excel, Word, and SPSS for

data analysis. Basic descriptive statistical analysis was done including frequency, means, median, standard deviation, and proportions. Overall SERO-prevalence will be determined using the test results. An overall estimate of the prevalence of COVID-19 was determined using SERO-prevalence.

CHAPTER 4

RESULTS

The study was conducted on the five big cities of Pakistan. The objective of the study was to determine the prevalence of antibodies against the COVID-19 virus (SARS-COV 2) among the resident Pakistan. A quantitative cross-sectional population-based study was designed, and data were collected after calculating the 2-stage cluster sampling. The sample size was calculated as 736 but to be on the safe side a total of 740 study participants were enrolled in this study. Data collected from the pretested questionnaire was analyzed by Microsoft Office EPI-info and SPSS version 28.

Following results were yielded from the data collected on the questionnaire and Laboratory test results.

4.1. Sociodemographic Characteristics

A total of 740 participants were enrolled in the study with a mean age of 36 years ranging from 3 years to 88 years. out of the 740 participants majority 17.2 percent(n=127) belonged to age group 50-59) , seventeen percent(n=125) were from the age group 10-19 followed by age group 40-49 with 16.4 percent (n=121) , age group 30-39, 14.3 percent (n=106) , 13.6 percent(n=102) were of the age group 20-29, 8.4 percent(n=62) of the participants were from the age group 60-69, 8.2 percent(n=61) from the age group 1-9 , 3.4 percent (n=25) of the participants were from the age group 70-79 and only 11 participants(1.5 percent) belonged to age group 80-89(Figure 1).

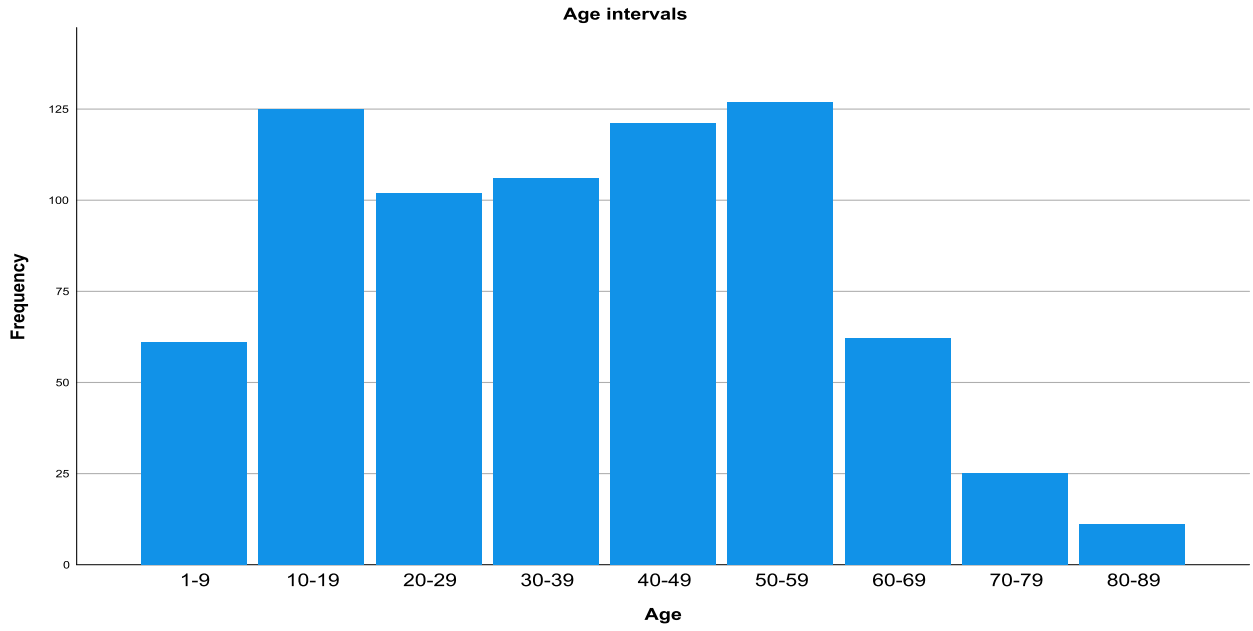

Figure 1:Age groups (n= 740)

The majority 390(52 percent) participants out of the 740 participants enrolled in the study were male gender and 48 percent(n=350) were female (Figure 2)

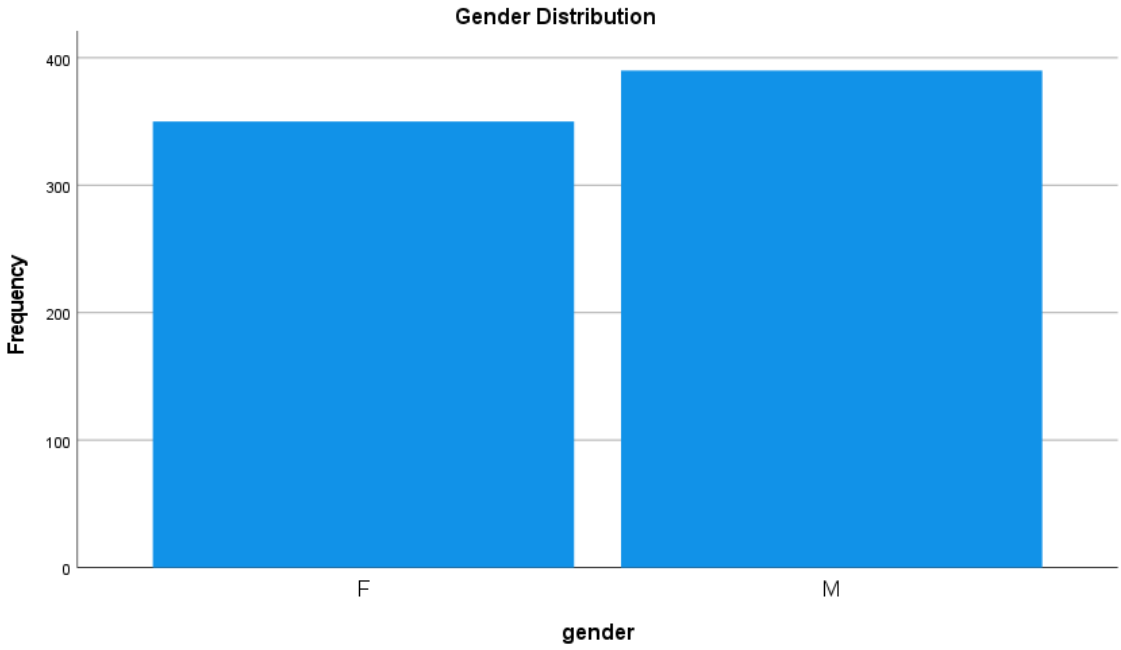

Figure 2: Gender distribution of the Participants (n=740)

Occupation reported from the participants were Govt Servant(n=47), health care staff (n=11), Housewife(n=77) Labor(n=24) retired personnel (n=51) Shopkeepers(n=48) Student (n=173) Teacher(109) and 157 did not mention their occupation(Figure 3) .

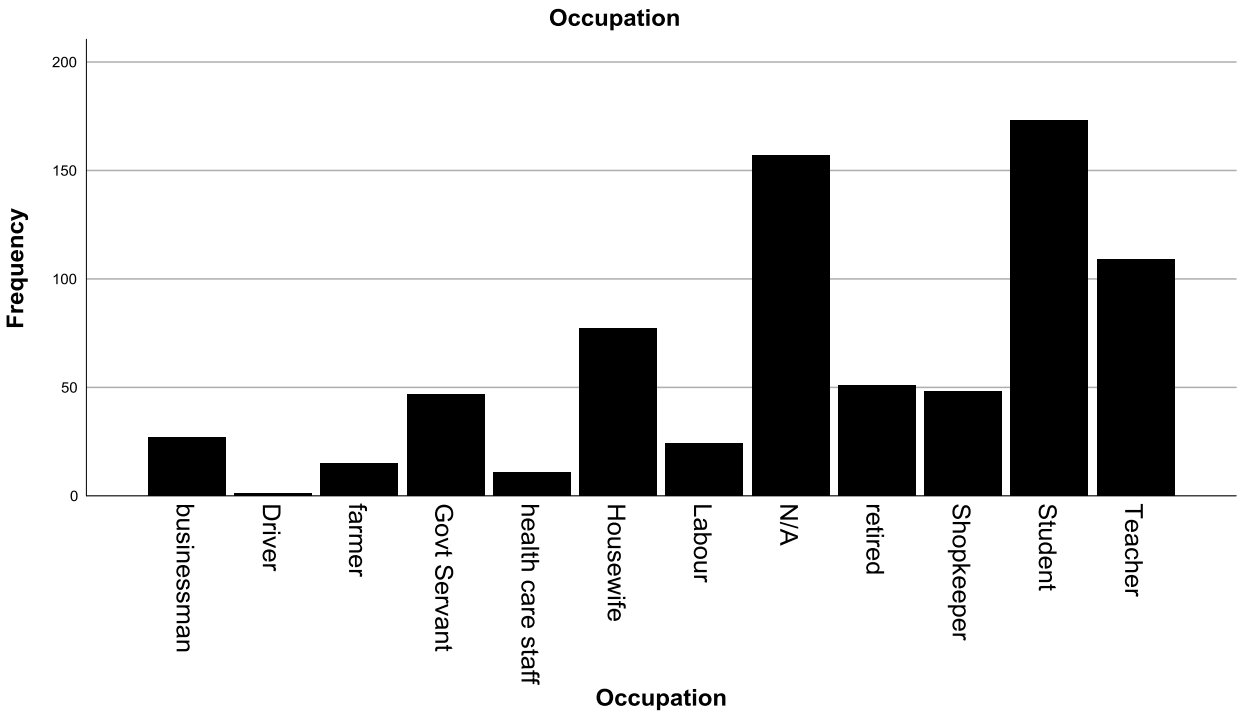

Figure 3: Occupations reported by participants(n=740}

4.2. Symptoms and factors reported

Amongst the participants the overall most frequent reported symptoms was diarrhea (n=317) and fever (n=237) beside cough(n=6) ,dyspnea(n=86) wight loss(n=8) , body ache (n=20) are amongst the other symptoms report in the participants(Figure 4).

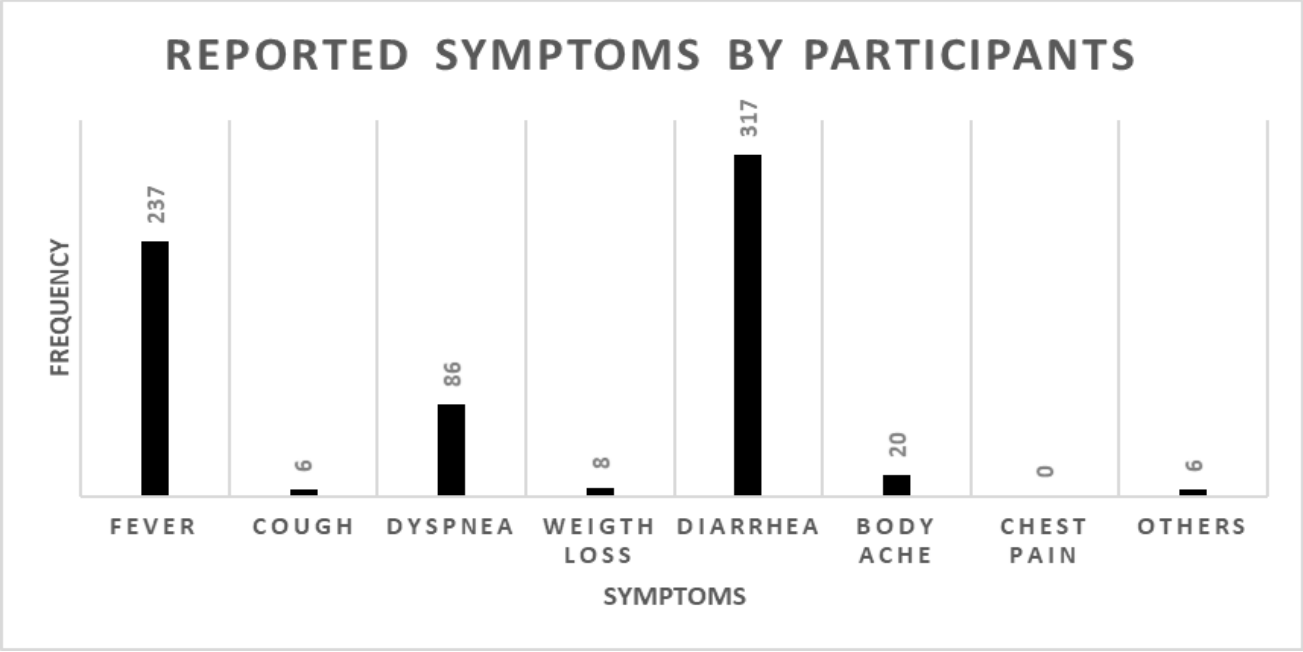

Figure 4: Symptoms reported by the participants (n=740)

Contact with a known confirmed case of COVID-19 was one of the factors included in the questionnaire tool. The analysis showed that 96(12.8%) participants had known contact with a confirmed case of COVID-19 while 445(59.2 %) participants did not know if they have any contact with any confirmed case and 199(26%) participants were in the opinion that they did not have any contact with a confirmed case recently (Figure 4).

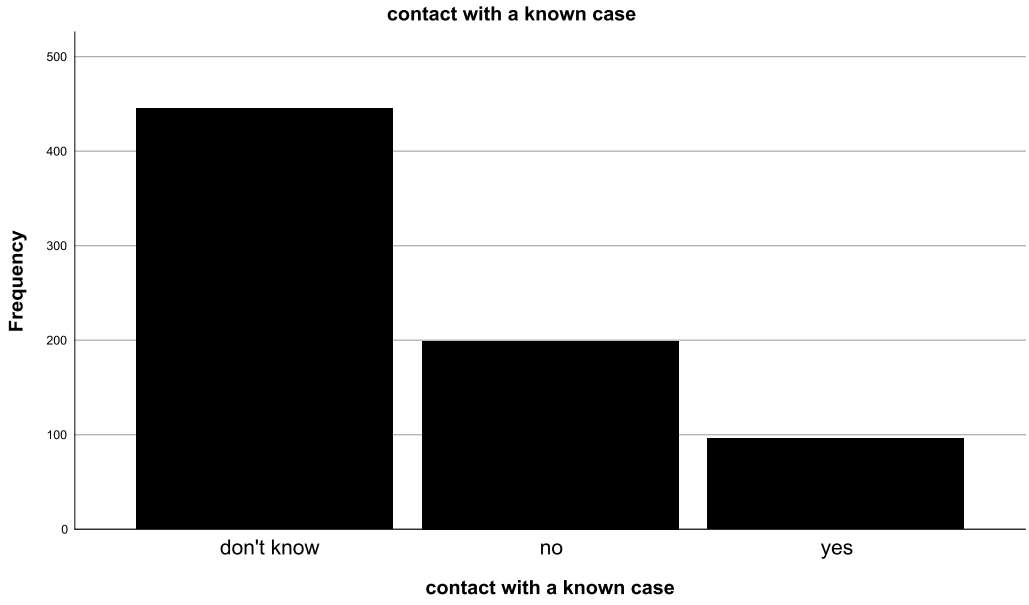

Figure 5: Participants' recent contact history with a confirmed case of COVID-19(n=740)

4.3. Laboratory results and SERO-prevalence

Laboratory results of the samples (n=750) showed that there were 5 cases discarded during the process, 6 samples showed a repeat result which means to be repeated to get the results.

A total of 69 positive results out of 740 means an overall SERO-prevalence of 9.2 percent of COVID-19(SARS Cov2)in the community of Pakistan Gilgit Baltistan which is considered to be high. There were 69 positives (9.2%) results and 660(88%) negative results. (Figure 5).

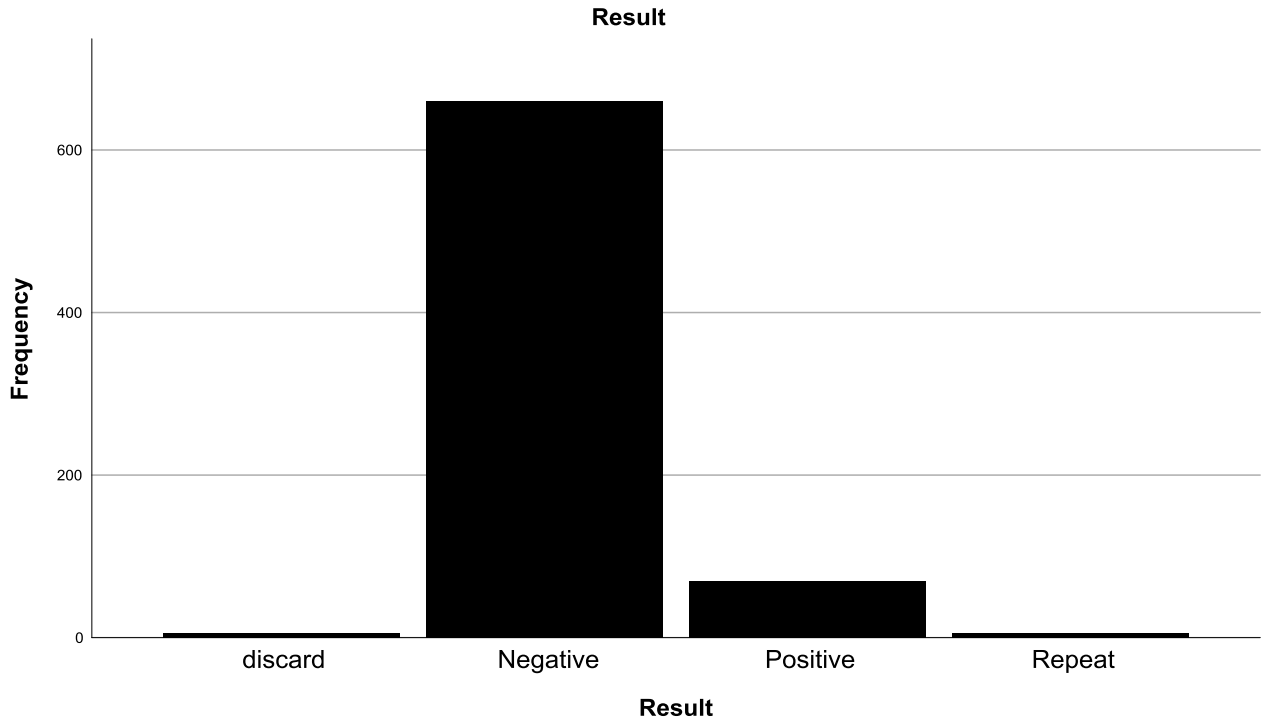

Figure 6: Laboratory results of the blood samples tested (n=750)

Out of these 69 positive cases, 36 percent(n=25) of the cases did not report any symptoms, only 43 percent (n=30) of the cases had a recent fever, and 30 percent of the cases reported having more than two symptoms while only 12 percent had only one symptom.

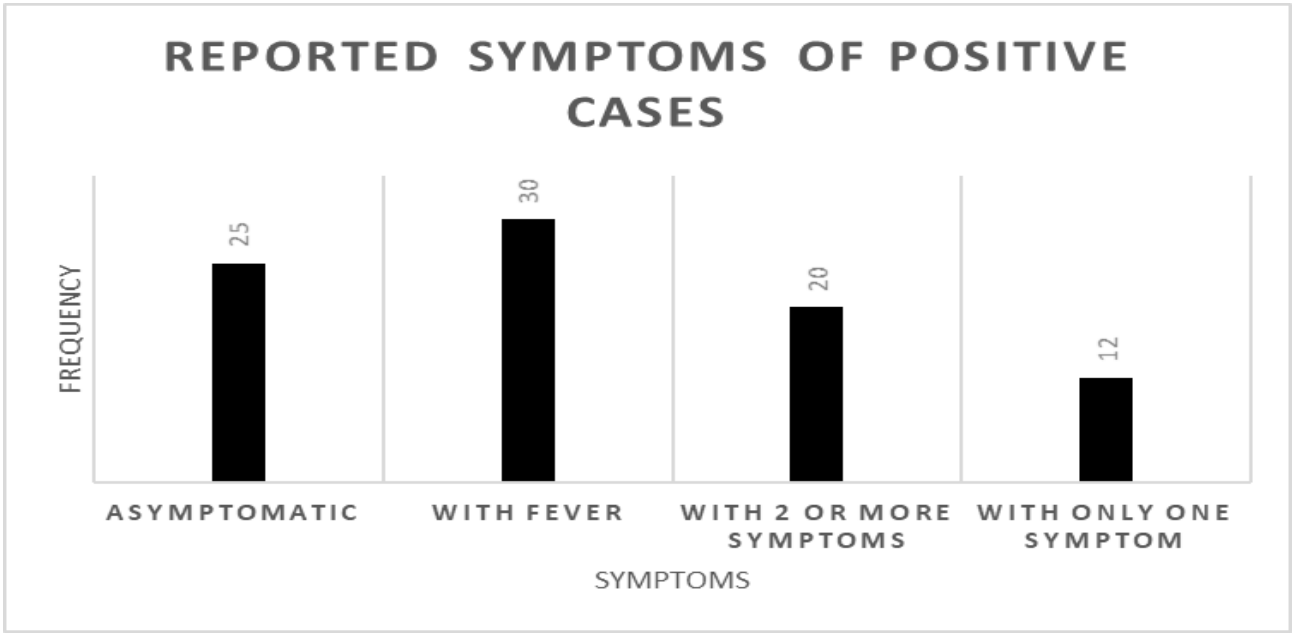

Figure 7: Symptoms reported by the positive cases (n=69)

The overall SERO-prevalence was 9.32 percent. The most affected age group was 80-89 years. The SERO-prevalence in the age group 80-89 was 45.45 percent followed by 20-29 years (13.73%) and 30-39 years (12.26%). SERO-prevalence of age group 1-9 was 8.2 %,60-69 years was 8.06 percent followed by 70-79 years as 8 percent. the age group where the least SERO-prevalence was determined was the age group 50-59 years with 6.30 percent. Other age groups were 40-49 6.61 percent and 10-19 years, age group, 7.20 percent (Table 2).

Table 2: Age-segregated SERO--prevalence

Age group (years)	positive	Total samples	SERO-prevalence
1-9	5	61	8.20
10-19	9	125	7.20
20-29	14	102	13.73
30-39	13	106	12.26
40-49	8	121	6.61
50-59	8	127	6.30
60-69	5	62	8.06
70-79	2	25	8.00
80-89	5	11	45.45
Total	69	740	9.32

The male gender was affected more than the female gender with a SERO-prevalence of 10 percent as compared to 8.5 percent SERO-prevalence of the female gender (Table 3).

Table 3:Gender-wise SERO-prevalence (n=740)

Gender wise SERO-prevalence			
	Positive cases	Total samples	SERO--prevalence(%age)
Female	30	350	8.5
Male	39	390	10
Total	69	740	9.3

The overall SERO-prevalence was 9.32 percent. The area hydra bad which were highly affected was with a prevalence of 24.21percent (N=23 positive cases) likewise SERO-prevalence Sakrdu was 9.46 percent in Sakrdu. The SERO-prevalence was 7.95 percent and in Quetta 7.43 percent. The lowest SERO-prevalence was in Islamabad where a total of 261 samples were tested, fourteen positives results were found and SERO-prevalence was 5.36 percent (Table 4).

Table 4: SERO-prevalence in respect to geographical location(n=740)

Areas	positive	Total samples tested	SERO-prevalence(%age)
Islamabad	14	261	5.36
Sakrdu	14	148	9.46
Lahore	11	148	7.43
Hydra Abad	23	95	24.21
Quetta	7	88	7.95
Total	69	740	9.32

The prevalence of COVID-19 was as high as 17 percent in the cases who reported as contact cases of the known case as compared to non-contacts as low as 9 percent.

Table 5: SERO-prevalence comparison in contact group (n=295)

contact with a known case			
Contact cases	positive	samples	SERO-prevalence
no	17	199	9%
yes	16	96	17%
Total	33	295	11%

CHAPTER 5

DISCUSSION

Severe Acute respiratory syndrome coronavirus 2 was first time detected in China at the end week of December 2019. After a cluster of pneumonia cases was confirmed in the Wuhan city. Primarily this was thought as the majority of cases visited the seafood market and possible eating of the seafood

may cause the infection and the main source of infection was suspected to be eating seafood thereby transmitting the virus to the humans. Later analysis revealed that there were other people involved who never visited the affected area. after detailed contact tracing of the contact, cases were done, and the person-to-person transmission was confirmed. Soon at that time, there was a festival going on due to which the virus spread in no time and soon after that, in months 180 countries of the world confirmed the outbreak in their territory and it became an epidemic to a global pandemic in no time. In only 2 months in the March 2020 World health organization declared it to be the global pandemic (Lu H, 2020 Apr 1).

This virus causes multiple presentations from the asymptomatic presentation to severe level clinical presentation including multiorgan failure and even deaths. The burden of this infection cannot be alone estimated with the gold standard PCR method due to its high financial requirement of PCR logistics as well as the laboratory of that level. For that reason, SERO-logy is primarily used for the real burden of the disease at the population level. SERO-logical surveys are a very important tool as said at the community level to determine the extent of an outbreak or that of COVID-19, given the possibility of asymptomatic cases as well as less viability and access to diagnostic PCR tests. A study in Spain to estimate the overall burden of the disease was done although the SERO-prevalence of antibodies was found very low in the study as compared to this current study Pakistan (9.3 percent) it revealed an adequate portion of asymptomatic positive cases which is very crucial and important in order to know that how the burden of COVID-19 is underestimated (. Pollán M, 2020 Aug 22).

Another study of Italy in a hospitalized setting revealed that the antibody or SERO-prevalence are very reliable as they found very better results, as the results of RT-PCR negative may be much dependent on the technique of oral or nasal samples vice versa in this case the rapid test for antibodies are good as they also detect real positive cases which may be missed due to the nasal or oral samples in the RT-PCR test. That study also confirmed by analyzing that all the positive samples were retested for RT PCR and found very similar results likewise the time of antibody detection in the blood is another question, in this study like many others also reveals that the antibodies are not traceable during the first day of infection but keep increasing as the days past and both the antibodies IgM and IgG may persist up to 11 weeks. So, the rapid method or the SERO-logy is again very important in this respect. in this respect our study has limitations may be due to its weak sensitivity of the diagnostic tool in the initial days of infection for that purpose we exclude in our samples the person who was hospitalized for any other reason than COVID-19 because the rate of infection in the hospital setting of District Skardu in the study days was very high and, in that case, we may miss any initial phase case (Diana Canetti 1, 2020)

A study from China also supports that SERO-logical test helps in a very better way in estimating the real picture of the burden of disease of Covid 19 in respect to what happened in Wuhan city before opening the long term lockdown they found about 10 percent cases of covid-19 were asymptomatic as compare to this study which we are in a totally different setting in the north of Pakistan(District Skardu) 36 percent (n=25)of the positive case were found asymptomatic (. Wu X, 2020)

A SERO-prevalence estimation study estimated from SERO--surveillance data in the United States of America had an overall prevalence estimate of 14.3 percent as compared to 9.3 percent of the current study which is higher and another study from Pakistan shows that prevalence was ranging from 0.2% to 21% in low and high transmission areas from phase 1 to phase 3 which supported our SERO-prevalence of 9.3% which lies in this range. Similarly, another study from the urban population of Pakistan shows a prevalence of 17.3 percent, that study also revealed that currently the burden of disease on PCR method surveillance data is highly underestimated (Angulo FJ, 2021).

Conclusion

This SERO-prevalence study revealed thet 9.3 % of the population was SERO-positive for COVID-19 and 36 percent were asymptomatic persons who are very high. While the study also revealed that the most affected gender was the male gender, and the most affected group was the middle and old age group where the prevalence was found high. Also, the study resulted in that the prevalence of

COVID-19 in contacts of a confirmed positive case was 18 percent. Although these results from the study imply to Pakistan's small province rural setting still it can be served as useful insights for guiding public health planning, and practices and for the installation of policies to decrease COVID-19 related human and economic losses. It is very important to mention that further research studies are very much required for this purpose to find the true disease burden of COVID-19 as every study or research adds new information to the past experiences and also due to the nature of this pandemic as it comes in high and low phases during the whole years.

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