

# Relationship of Clinical Symptoms, Comorbidities and Treatment Options along with Disease Outcomes in Individuals Tested for COVID-19 in Pakistan: A National Survey



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## Abstract

**Background:** This web-based survey is done to collect and assess data from people tested for COVID-19 with PCR in Pakistan.

**Methods:** This 3-month study is a cross-sectional online survey, conducted by Pakistan Islamic Medical Association (PIMA), Health Research Advisory Board (HealthRAB) and National Institute of Health (NIH). Data collection was done using Google Forms. People who were tested for COVID-19 using Polymerase Chain Reaction (PCR) were included in the study. The sample size of the study was 1,537. SPSS version 22 was used for data analysis.

**Results:** Majority of the respondents belonged to the age group 20 - 39 years. The most common symptoms found were fever 633 (41%), cough 534 (34%), generalized body aches 432 (28%) and sore throat 392 (25%). The mean COVID-19 mental health score was 3.59 (SD: 5.808, range: 0-18). Treatment with antibiotics and painkillers had a strong correlation ( $p$ -value  $< 0.05$ ) with the disease outcomes. The disease outcomes had moderate correlation ( $p$ -value  $< 0.05$ ) with anti-allergy, steroids, plasma and oxygen therapy, and weak correlation ( $p$ -value  $< 0.05$ ) with Antiviral and Antimalarial therapy. Out of the total respondents, 561 (36.1%) were cured from COVID-19, 14 (0.9%) were expired during/after hospitalization, 15 (1%) were still infected and 962 (62%) were not infected.

**Conclusion:** Pakistani population has a better cure rate than some of its neighboring countries. However, further research in this area is required to draw a definite conclusion.

**Keywords:** Novel Corona virus, SARS-CoV-2, pandemic, web-based survey, polymerase chain reaction

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## Introduction

The 2019–20 COVID-19 pandemic is considered as the biggest public health challenge the world has faced in the last 100 years as more than 62 million people have been infected by this virus globally. (1) On 30 January 2020, the World Health Organization (WHO) classified COVID-19 pandemic as a Public Health Emergency of International Concern (PHEIC). (2) On 26th February 2020 the first two cases of COVID-19 were reported by the Federal Health Minister of Pakistan. (3) As of December 02, 2020, approximately 5.3 million suspected samples have been tested and the number of positive cases has reached 0.38 million as reported by the Government of Pakistan. (4)

COVID-19 is caused by Severe Acute Respiratory Syndrome-2 (SARS-CoV-2) which can cause various respiratory, gastrointestinal, and neurological symptoms etc. (5) The most common COVID-19 symptoms include fever, generalized body ache, dry cough, dyspnea and lethargy. (6-7) However, the clinical presentation differs with varying gender and ages. (6) It has been reported that COVID-19 pandemic might have a psychological impact on the infected patients having no prior history of psychological disorders. (8) Majority of infected patients recover, however, older patients with

comorbidities including diabetes, hypertension, renal disorders and cancer etc. may have worse prognosis. (6,9-10) To date, there is no specific treatment for COVID-19 and early diagnosis, isolation and supportive treatment are the only primary measures to control this virus. (11) A few COVID-19 vaccines are now getting widely available. (12)

Globally, research on COVID-19 is being conducted to understand this virus, but there is much that is still unclear. Therefore, the purpose of this web-based survey is to collect and assess data from people tested for COVID-19 with PCR in Pakistan. This survey will help us to understand the symptomatology of this disease in relation to gender, age and comorbidities, the psychological impact of COVID-19 and the ultimate outcome of the disease.

## Methodology

This 3-month study is a cross-sectional online survey, conducted by Pakistan Islamic Medical Association (PIMA), Health Research Advisory Board (HealthRAB) and National Institutes of Health (NIH), Pakistan. People who were tested for COVID-19 using PCR were included in the study. Symptomatic people who were not tested with PCR were excluded. The study was approved by the Institutional Review Board (IRB) of NIH.

A pilot study was initially conducted for the validation and modification of the questionnaire. The sample size of the study was 1,537 and 1,552 responses were collected by the time the google form was disabled.

Google forms were used for the data collection. Between July 08, 2020, to October 22, 2020, the links of the survey were shared with the practicing physicians of PIMA, HealthRAB, and NIH who later shared it with their patients. A list of people tested for COVID-19 using PCR was provided by NIH. A dedicated health worker also called these people for data collection. The survey links were also disseminated to the students at various colleges and universities across Pakistan.

Participants were requested to give consent before entering the survey and they had the choice to withdraw at any time before the submission of their responses. Average time to fill the survey was 12 minutes. Specific checks were placed in the online questionnaire to minimize missing data entries. The survey collected data on the respondent's demographics, symptoms, comorbidities, current pregnancy and psychological symptoms. Diagnostic tests for COVID-19 along with other investigations, treatment, and their outcomes were also analyzed. Mental health score of "1" was assigned to the respondents having mental health symptoms and "0" to those without mental health symptoms. The questionnaire was also translated into Urdu language for better understanding of the participants.

The questionnaire was directly linked to the Google Sheets, which after data collection was downloaded as Excel Sheet. Urdu responses were first translated into English and were then merged with English responses for data cleaning and analysis. SPSS version 22 was used for data analysis.

Chi-Square: Phi/Cramer's V test was applied to measure the independence of variables, and association of gender, age, symptom, and comorbidities, with the outcomes. Same test was applied to assess the association between PCR results with laboratory investigations, and treatment options with the outcomes. Mental health score between age groups and gender was measured using two-sample t-test and one-way ANOVA. Multiple linear regression was applied to assess the factors associated with poor mental health scores. The impact of mental health score on disease outcomes was measured using multinomial logistic regression. The significance level for all statistical tests was set as < 0.05.

## Results

Out of 1552 responses collected, 803 (52%) were females and 749 (48%) were males. Majority of people (71.5%) belonged to the age group 20 - 39 years. Significant association was found between all COVID-19 symptoms and outcomes (p-value <0.05). A strong association was seen between symptoms including fever (Cramer's V = 0.631, p-value <0.05), generalized body aches (Cramer's V = 0.512, p-value <0.05) and no symptoms (Cramer's V = 0.615, p-value <0.05) with the outcomes of COVID-19. (Table: 1).

**Table: 1 Demographics and baseline characteristics of people tested for COVID-19**

Characteristics\ Outcome	Cured	Expired	Still Infected	Not Infected	Phi\ Cramer's V	P-value
	561 (36.1%)	14 (0.9%)	15 (1%)	962 (62%)		
<b>Gender</b>						
Male	335 (44.7%)	7 (0.9%)	4 (0.5%)	403 (53.8%)	0.176	0.001* **
Female	226 (28.1%)	7 (0.9%)	11 (1.4%)	559 (69.6%)		
<b>Age</b>						
Less Than 10	4 (5.71%)	0 (0%)	0 (0%)	3 (4.2.9%)	0.262	0.001* **
10 - 19	21 (53.8%)	0 (0%)	1 (2.6%)	17 (43.6%)		
20 - 29	133 (20.4%)	0 (0%)	5 (0.8%)	515 (78.9%)		
30 - 39	159 (34.8%)	2 (0.4%)	5 (1.1%)	291 (63.7%)		
40 - 49	127 (60.2%)	1 (0.5%)	2 (0.9%)	81 (38.4%)		
50 - 59	75 (60.5%)	3 (2.4%)	1 (0.8%)	45 (36.3%)		
60 or more	42 (68.9%)	8 (13.1%)	1 (1.6%)	10 (16.4%)		
<b>Symptoms</b>						
Sore Throat	274 (69.9%)	6 (1.5%)	10 (2.6%)	102 (26%)	0.433	0.001* **
Cough	349 (65.4%)	11 (2.1%)	11 (2.1%)	163 (30.5%)	0.471	0.001* **
Runny Nose	145 (69.7%)	3 (1.4%)	7 (3.4%)	53 (25.5%)	0.302	0.001* **
Fever	449 (70.9%)	11 (1.7%)	14 (2.2%)	159 (25.1%)	0.631	0.001* **
Rash	46 (79.3%)	0 (0%)	4 (6.9%)	8 (13.8%)	0.221	0.001* **
Generalized Body Ache	314 (72.7%)	10 (2.3%)	12 (2.8%)	96 (22.2%)	0.512	0.001* **
Shortness of Breath	227 (81.7%)	12 (4.3%)	7 (2.5%)	32 (11.5%)	0.498	0.001* **
Chest Pain	114 (70.8%)	5 (3.1%)	4 (2.5%)	38 (23.6%)	0.274	0.001* **
Loss of Smell	210 (87.9%)	5 (2.1%)	8 (3.3%)	16 (6.7%)	0.488	0.001* **
Palpitations	140 (75.7%)	5 (2.7%)	7 (3.8%)	33 (17.8%)	0.342	0.001* **
No Symptoms	31 (4.5%)	2 (0.3%)	0 (0%)	659 (95.2%)	0.615	0.001* **

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

Out of the total female respondents, 167 (7.8%) were pregnant, and 13 (7.8%) had positive PCR results. All comorbidities were found to have significant association with the outcomes of COVID-19 i.e. (p-value <0.05) except cancer i.e. (p-value = 0.235 > 0.05). From the total respondents, 257 (17%) were suffering from hypertension, and 236 (91.80%) out of these hypertensive patients were on antihypertensive therapy, 163 (11%) were diabetics, out of which 142 (87%) were taking hypoglycemic agents.

Out of the total 1552 respondents, the PCR result of 564 (36.3%) was positive. Of these total respondents, 563 (36%) had PCR test due to disease symptoms, 286 (18%) due to contact with a confirmed COVID-19 case, 593 (38%) due to preoperative COVID-19 testing and air travel (declared mandatory by Ministry of Health) and 110 (7%) were caregivers of positive COVID-19 patients. Out of 292 (19%) respondents tested for COVID-19 antibodies, 163

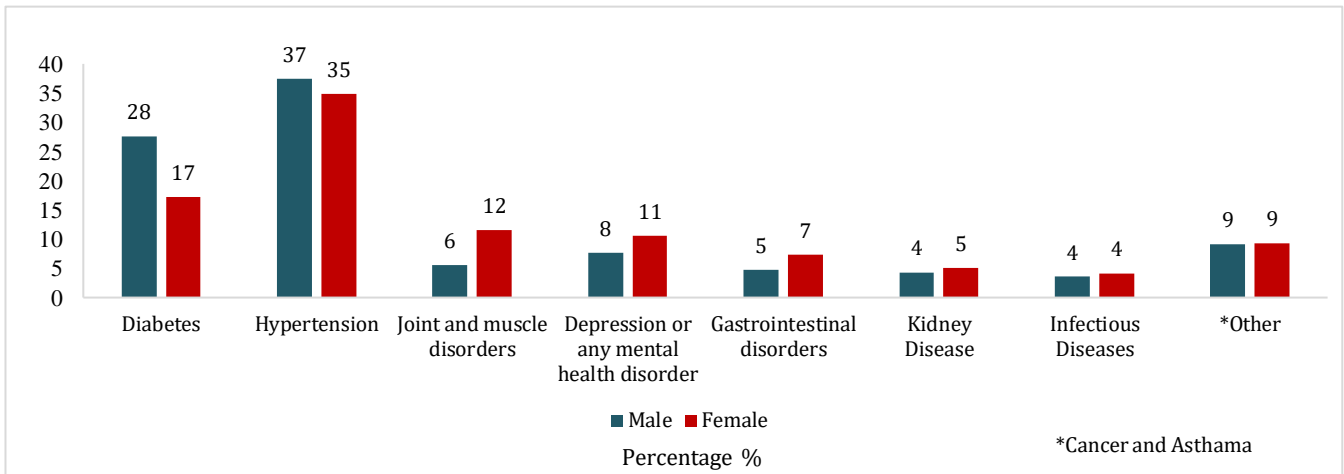


Figure 1: Comorbidities reported by people tested for COVID-19 (%)

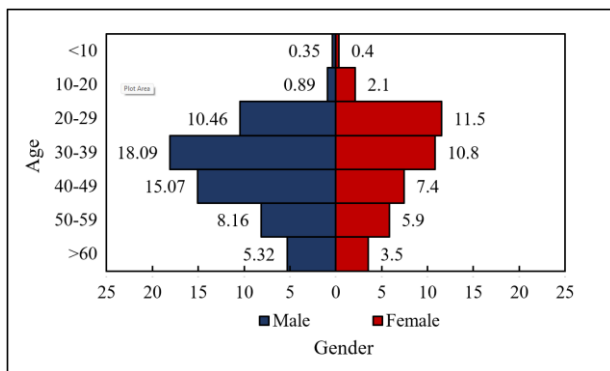


Figure 2: Age and Gender Correlation of PCR Positive Cases (%)

Antibiotic therapy (69.9%), and pain killers (70.7%) were the most common treatment options used. All other treatment options were significantly associated with the outcome of COVID-19 i.e. (p-value <0.05). Consultation with allopathic doctor, use of herbal medicines and proper diet were moderately correlated with the outcome of disease i.e. (Cramer's V > 0.3, p-value < 0.05). All remaining other treatment options had a weak correlation with the disease outcomes (Cramer's V < 0.3, p-value < 0.05) (Table 2)

The mean COVID-19 mental health score for people tested for COVID-19 was 3.59 (SD: 5.808, range: 0-18). The respondents with a high mental health score were found to be suffering from more mental health problems during COVID-19 pandemic than those having a low mental health score.

Multinomial logistic regression analysis found that mental health score (OR: 1.160, p <0.001) was significantly associated in cured patients than those who were not infected. Likewise, the mental health score (OR: 1.174, p <0.001) was significantly correlated for the ones expired due to COVID-19 than those who were not infected. The mental health score (OR: 1.189, p <0.001) was also significantly associated for those who were still infected during the study period than those who were not infected. (Table 3)

Table 2: Treatment and Outcome of people tested for COVID-19

Outcome	Cured	Expired	Still Infected	Not Infected	Phi\ Cramer's V	P-value
	561 (36.1%)	14 (0.9%)	15 (1%)	962 (62%)		
<b>Treatment</b>						
Antibiotic Therapy	446 (69.9%)	13 (2%)	11 (1.7%)	168 (26.3%)	0.614	0.001* **
Pain Killers	386 (70.7%)	10 (1.8%)	12 (2.2%)	138 (25.3%)	0.558	0.001* **
Anti-Allergy	336 (69%)	10 (2.1%)	10 (2.1%)	131 (26.9%)	0.489	0.001* **
Steroids	187 (84.6%)	9 (4.1%)	4 (1.8%)	21 (9.5%)	0.449	0.001* **
Oxygen Therapy	83 (80.6%)	11 (10.7%)	3 (2.9%)	6 (5.8%)	0.391	0.001* **
Antiviral Therapy	79 (84.9%)	2 (2.2%)	2 (2.2%)	10 (10.8%)	0.266	0.001* **
Antimalarial Therapy	75 (77.3%)	2 (2.1%)	3 (3.1%)	17 (17.5%)	0.238	0.001* **
Plasma Therapy	13 (65%)	5 (25%)	2 (10%)	0 (0%)	0.326	0.001* **
<b>Other Treatment options</b>						
Consulted Allopathic Doctor	401 (60.6%)	12 (1.8%)	12 (1.8%)	237 (35.8%)	0.466	0.001* **
Supplication/Prayers	385 (39.1%)	8 (0.8%)	12 (1.2%)	580 (58.9%)	0.09	0.005
Proper Diet	376 (56.7%)	8 (1.2%)	13 (2%)	266 (40.1%)	0.391	0.001* **
Followed Social Media Advice	236 (51.3%)	4 (0.9%)	5 (1.1%)	215 (46.7%)	0.206	0.001* **

Self-Medication	161 (52.4%)	3 (1%)	6 (2%)	137 (44.6%)	0.181	0.001* **
Used Herbal Medicine	138 (75%)	2 (1.1%)	5 (2.7%)	39 (21.2%)	0.311	0.001* **
Used Homeopathic Medicine	40 (67.8%)	0 (0%)	4 (6.8%)	15 (25.4%)	0.183	0.001* **
Consulted Homeopathic Doctor	33 (71.7%)	0 (0%)	4 (8.7%)	9 (19.6%)	0.197	0.001* **
Consulted Herbalist	30 (73.2%)	1 (2.4%)	2 (4.9%)	8 (19.5%)	0.152	0.001* **

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

**Table 3: Results of multiple linear regression for factors associated with poor mental health of people tested for COVID-19**

Characteristics	Coefficient	Standard Error	p-value
<b>Gender</b>			
Female vs. Male	0.313	0.262	0.232
<b>Age Groups (Years)</b>			
Less Than 10 vs. 60 or more	8.638	2.039	0.001***
10 - 19 vs. 60 or more	3.397	1.073	0.002**
20 - 29 vs. 60 or more	0.302	0.748	0.686
30 - 39 vs. 60 or more	0.909	0.745	0.222
40 - 49 vs. 60 or more	0.825	0.764	0.281
50 - 59 vs. 60 or more	1.685	0.8	0.035*
<b>Symptoms</b>			
Sore Throat (Yes vs. No)	0.768	0.379	0.043*
Cough (Yes vs. No)	-0.452	0.371	0.224
Fever (Yes vs. No)	0.892	0.368	0.016*
Generalized Body Aches (Yes vs. No)	1.429	0.419	0.001**
Shortness of Breath (Yes vs. No)	0.454	0.43	0.292
Loss of Smell (Yes vs. No)	0.541	0.534	0.311
Loss of Taste (Yes vs. No)	0.79	0.531	0.137
Fatigue (Yes vs. No)	3.229	0.438	0.001***
<b>Comorbidity</b>			
Diabetes (Yes vs. No)	-0.009	0.498	0.986
Blood Pressure (Yes vs. No)	-0.403	0.422	0.34
Depression (Yes vs. No)	2.989	0.673	0.001***
<b>Treatments</b>			
Steroids (Yes vs. No)	0.256	0.456	0.575
Oxygen Therapy (Yes vs. No)	0.138	0.622	0.824

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

## Discussion

The results indicate that the prevalence of COVID-19 is more common in men than women accompanied by a few other studies. (12-14) A Canadian study concluded that men have a higher rate of getting a positive PCR result than women. This might be due to the fact that men are more prone to alcohol consumption and tobacco smoking during the stress contributing to high prevalence of COVID-19 infection. (13) Waris et.al also reported similar findings, (14) which might be because the Pakistani men worked outside their homes

and interacted with other people for work even during the quarantine phase leading to a high level of exposure. (15) On the other hand, females who worked during the quarantine phase had lesser chances of exposure (15) as female workers in Pakistan are mostly teachers (16) and they conducted virtual classes during the quarantine phase. Majority of females in Pakistan are housewives and they mostly stay at home. Staying at home during the pandemic was the major advice given by the WHO to avoid the spread of the virus, and this could be one of the reasons that the majority of women in Pakistan remain unaffected. (15)

Most of the respondents were between the age group of 20 - 49 years, the working age group, who went outside for work during the pandemic.

The most common symptoms were found to be fever, cough, generalized body aches, sore throat, headache, and lethargy. These findings are somehow similar to the study conducted in Hainan. (17)

Antibiotic, pain killers, anti-allergy and oxygen therapy were the most commonly prescribed treatment. The less common treatments prescribed were antimalarial, antiviral and plasma therapy. There is still an urgent need for newer or redeveloped medicines that can combat COVID-19 virus. (18) Globally, at present various researchers are working to repurpose an existing medicine or to develop a new drug to cure this disease. (19)

The most common comorbidities reported were diabetes, hypertension, joint and muscle disorders, depression, and GI disorders which are similar to the study conducted in Portugal. (20) The results also suggest that due to their weaker immune functions the respondents suffering from one or more comorbidities were more prone to getting COVID-19 infection than people without comorbidities. (17)

The results indicated that younger people had a significant effect on high mental health scores. A Canadian study also reported similar findings that people above 60 years have a less significant impact on high mental score as compared to younger people. (21) Older people are expected to be more distressed during this pandemic as they are more likely to be suffering from underlying comorbidities and are advised stringent personal protective measures as compared to the younger people. (21) These older people have had also experienced and have possibly survived previous pandemics resulting in high resilience. One of the possible reasons for high mental scores in the younger age groups could be that they feel their financial, occupational, educational, and social prospects may be threatened by the pandemic. (21)

The data from this study showed that out of the total positive PCR patients, 89% were cured. However, a study conducted in the China reported a cure rate of 41.5% (11) and a study from India reported a cure rate of 60.86% respectively. (22) This indicates that Pakistani population has a better cure rate than some of its neighboring countries.

## Conclusion

Our study concluded that men have a higher chance of contracting COVID-19 as compared to women. Also, patients suffering from one or more comorbidities may have worse prognosis for COVID-19. Therefore, self-protective measures including wearing of face mask and frequent hand

washing/ sanitizing hands, etc. should be adopted to avoid contracting this virus.

It was also concluded from this study that Pakistani population has a better cure rate than some of its neighboring countries. However, further research and investigation in this area are required to draw a definite conclusion.

### Limitation

The study was limited to people who knew how to use smartphones/ tablets and PC as Google forms were used for the data collection. It mostly represented the population who had smart devices and cannot be generalized to the whole population.

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