

# A retrospective study on epidemiological and clinical characteristics of COVID-19 in Baluchistan (Pakistan) and its future perspectives

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## Author's Contribution

<sup>1</sup> Planning, data collection and analysis, manuscript

<sup>2</sup> Planning, literature review, data collection, manuscript

<sup>3</sup> Planning, methodology, data collection, manuscript

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## Article Info.

Conflict of interest: Nil

Funding Sources: Nil

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**Cite this article as** Sabir S, Sabir N, Mushtaq A, Gull M, Khan MJ. A retrospective study on epidemiological and clinical characteristics of COVID-19 in Baluchistan (Pakistan) and its future perspectives. *JSTMU*. 2023; 6(1):38-44.

## A B S T R A C T

**Background:** The rise of a viral respiratory sickness was recognized in China and later known as COVID-19. The current study reports the epidemiological and clinical attributes of COVID-19 in Baluchistan.

**Objective:** This study aimed to investigate the epidemiological parameters and route of transmission of COVID-19 positivity that will help the health department develop future strategies to handle deadly pandemics.

**Methodology:** This study was performed by gathering information from patients with their socioeconomics, epidemiological status, history of comorbidity, and clinical signs of the disease. The data was collected from the COVID-19 dashboard. A correlation test was applied to evaluate the connection between clinical pathological parameters.

**Results:** A sum of 3999 clinical records was analyzed. Total 70.8% of patients were positive, and 29.2% were negative. The most affected group was aged 22-42, however, disease severity increased with age. Most positive patients had a high fever, severe cough, sore throat, body ache, shortness of breath and comorbidity on clinical pathological grounds. The earliest reported cases of the infection were connected to travelers returning to Pakistan from Iran. The spread among men was higher as compared to women.

**Conclusion:** This report will display a linkage between the studies of disease transmission and clinical features which thus can be helpful to forestall the local transmission of similar infections in future. The epidemiological literature on this topic from Baluchistan is scarce.

**Keywords** COVID-19, SARS-CoV-2, Comorbidities, Epidemiology, Baluchistan, Real-time PCR

## Introduction

In December 2019, the first case of a novel pathogen with respiratory side effects was diagnosed at the medical clinic in Wuhan, China. The infectious agent was identified and named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It is an RNA virus that belongs to the COVID family and is classified in the beta genus.<sup>1,2</sup> The

potential onset of SARS-CoV-2 from bats could be illustrated by its proximity (88% indistinguishable) to two other SARS-like CoVs derived from bats, namely bat-SL-CoVZC45 and bat-SL-CoVZXC21.<sup>3</sup> The COVID-19 infection spread worldwide, affecting every mainland and sparking a global health crisis. On March 11, 2019, the

World Health Organization (WHO) declared the outbreak of COVID-19 a pandemic.

By January 23, 2023, 13,156,047,747 vaccine doses had been administered, and on January 31, 2023, WHO reported 753,479,439 confirmed cases of COVID-19, including 6,812,798 deaths.<sup>4</sup> On March 10, 2020, the COVID-19 National Command and Operation Cell (NCO) of Baluchistan confirmed the first case of COVID-19 in a person returning from Iran. From January 3, 2020, to January 31 2023, WHO reported 1,576,235 confirmed cases of COVID-19 and 30,640 deaths in Pakistan. As of January 21 2023, 333,085,477 vaccine doses have been administered.<sup>4</sup> These statistics show that COVID-19 is still active, and its vulnerability cannot be denied. The COVID-19 infection transmits from person to person via actual contact, respiratory droplets produced by sneezing, and vertical transmission from mother to child has also been suggested.<sup>5, 6</sup>

Generally, it is categorized from mild asymptomatic infection to dangerous complications. Common symptoms of COVID-19 are headache, fever, shortness of breath and fatigue. Other less common symptoms include diarrhoea, migraines, and the development of sputum. Under critical conditions, this results in intense respiratory disease (ARDS), acute cardiovascular injury (ACI), auxiliary contamination, cardiovascular collapse (HF) and various organ failures.<sup>3, 7</sup> At the end of December 2022, the new COVID-19 variant was identified in China, devastatingly affecting the people. Later on, the same variant was identified in Pakistan. These flare at different time span exactly explain the contagious nature of SARS-CoV-2. An unexpected pandemic attack in developing countries has been challenging to deal with.

In the current study, we retrospectively analyzed the transmission design and clinical characteristics of patients with COVID-19 in the Baluchistan region. Therefore, the study investigates which gender is more affected by viruses based on their clinical attributes. The focus of the study is to help the government find successful countermeasures and control procedures.

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## Methodology

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### Study Design

A retrospective cohort study of all test screenings of COVID-19 was conducted at Provincial Public Health

Laboratories Quetta. The study was designed as a situation report and was approved by Public Health Laboratory, Baluchistan Health Department, Pakistan (IRB: 1/COVID/727).

### Data Collection

Coronavirus information was compiled by the Baluchistan Coronavirus Dashboard Health Department, including time span, number of test screenings, number of confirmed cases, and socio-demographic characteristics, including gender and age, etc. Data were recorded from June 2021 to September 2021, and the patients were not vaccinated.

### Variables Included

Basic clinical features of patients with travel histories to China and Iran or people who had close contact with COVID-19 patients were included in the analysis. Common symptoms included fever, headache, body aches, sore throat, breathing difficulties and comorbidity.

### Statistical analysis

Results were reported as numbers and rates. One-way ANOVA and linear regression tests were used to find a relationship among all clinical parameters. The  $p < 0.05$  was considered statistically significant. All statistical analyses were performed by programming SPSS Insights 20.

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## Results

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A total of 3999 suspected cases were collected and used for the investigation. Each 3999 cases were screened, and 70.82 % (2833) were confirmed with COVID-19 positive. However, 29.15 % (1166) were negative. RT-PCR confirmed all suspected cases. Among 3999 patients, 70 % were positive, mainly in the 22-42 age group. The youngest patient was one year old, but the oldest was 84 (Figure 1).

Adults represented the most dynamic cases of COVID-19 and mostly lay in the 22-42 years age group; the second most affected age group was 1-21 years old; the third group ranked 43 to 63 years old, and patients above 64 account for a minimum number of cases as depicted in figure 2. One of the women was pregnant and tested positive for COVID-19, although she remained asymptomatic with no reported complications. Most males were found positive for COVID-19 compared to females.

**Table 1: Association of COVID-19 infection with clinical parameters**

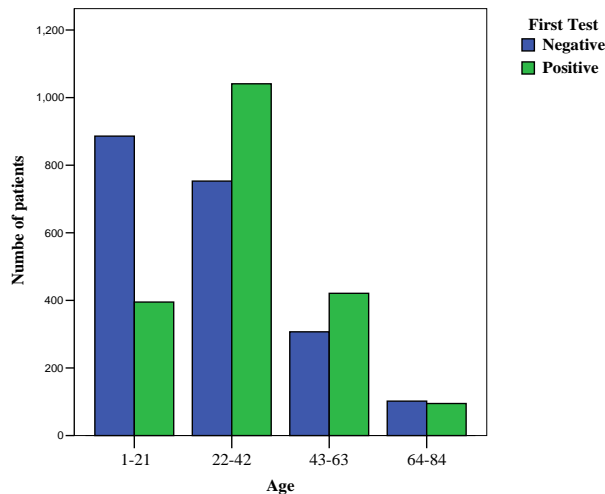
Parameters		N	Mean	Std. Deviation	p-value
Age	Positive	2833	0.96	.81290	0.26
	Negative	1166	0.937	.88789	
	Total	3999	0.960	.83548	
First test	Positive	2833	0.497	.50008	0.05*
	Negative	1166	0.464	.49891	
	Total	3999	0.487	.49992	
Cough	Positive	2833	0.899	.30132	<0.01*
	Negative	1166	0.857	.34958	
	Total	3999	0.887	.31667	
Sore throat	Positive	2833	0.907	.29025	<0.01*
	Negative	1166	0.937	.24236	
	Total	3999	0.916	.27745	
Fever	Positive	2833	0.999	.01879	0.52
	Negative	1166	1.00	.00000	
	Total	3999	0.999	.01581	
Body ach	Positive	2833	0.810	.39202	<0.01*
	Negative	1166	0.699	.45853	
	Total	3999	0.778	.41551	
Shortness of breath	Positive	2833	0.536	.49878	0.01*
	Negative	1166	0.493	.50017	
	Total	3999	0.523	.49950	
Comorbidity	Positive	2833	0.510	.49997	0.03*
	Negative	1166	0.473	.49951	
	Total	3999	0.499	.50006	

**Table 2: Correlations among all clinical characteristics**

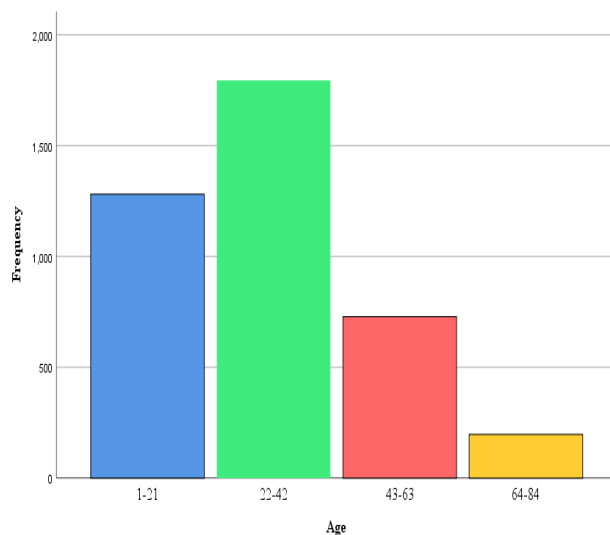
Correlation	Gender	Age	First test	Fever	Cough	Sore throat	Body ache	Shortness of breath	Comorbidity
Gender	-	0.018	0.031	0.01	.059**	.050**	.121**	.039*	.034*
Age	0.02	-	.176**	0.02	.044**	0.013	.116**	.179**	.179**
First test	0.03	.176**	-	0.015	.348**	.296**	.521**	.931**	.976**
Fever	0.01	0.02	0.015	-	.044**	.052**	0.03	-0.015	0.016
Cough	.059**	.044**	.348**	.044**	-	.376**	.458**	.316**	.357**
Sore throat	.050**	0.013	.296**	.052**	.376**	-	.123**	.262**	.303**
Body ache	.121**	.116**	.521**	0.03	.458**	.123**	-	.515**	.534**
Shortness of breath	.039*	.179**	.931**	0.015	.316**	.262**	.515**	-	.954**
Comorbidity	.034*	.179**	.976**	0.016	.357**	.303**	.534**	.954**	-

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).



**Figure 1: Distribution of age in years among total COVID-19 positive and negative cases**



**Figure 2: Distribution of age in years among COVID-19 patients**

In the current consensus, a linear regression test was performed among all clinical parameters and a strong positive association was observed among all clinical parameters, e.g., sore throat, cough, body aches and shortness of breath and comorbidity. However, both men and women lacked a positive association with fever. The correlations\*\* were highly significant at the 0.01 level, whereas the correlations\* were significant at the 0.05 level (Tables 1 and 2). The test results correlated significantly with cough, sore throat, body aches, shortness of breath and comorbidity. Comorbidity correlated strongly with the patients' first test and shortness of breath.

## Discussion

It was suggested that SARS-CoV-2 was passed from a bat to a human when it was consumed as food, thus making it a zoonotic illness with potential human-to-human transmission through coughing and nasal droplets.<sup>8,9</sup> Due to these factors, it quickly spread across the globe, disregarding borders. The first case in the US was reported on January 19, 2020, and France reported its first on January 24, 2020. However, the first case in Pakistan was reported later than many other countries, on February 24, 2020.<sup>10,11</sup>

Despite the global pandemic, the public authority of Pakistan took positive steps to prevent the spread of COVID-19, which may account for the lower number of cases and deaths in the country. Furthermore, this may be partially attributed to environmental factors or the innate immunity of the people. Additionally, the timely availability of higher medication dosages may help protect the population, thus contributing to a lower morbidity and mortality rate.<sup>12</sup> SARS-CoV-2 is a highly pathogenic strain it spreads all over Pakistan. However, the Baluchistan region reported fewer cases than other thickly populated areas of Pakistan. One possible reason could be the lower testing limit of Baluchistan compared to the rest of Pakistan.

The authors believe the total number of COVID-19 cases is probably higher yet under-reported because of the troubles in recognizing mild and asymptomatic cases present locally. COVID-19 can cause hospitalization and even death in young and middle-aged adults. It has caused the most severe health problems in adults over 60 and a higher mortality rate in patients over 80. Comorbidities, e.g., diabetes, hypertension, heart disease or other chronic conditions, can cause more intense manifestations and complications of the disease. Also, older people are more susceptible to infections due to gradually losing immunity. According to our findings, people over 60 were the most vulnerable age group, as documented by other studies.<sup>13,14</sup> Children and young adults were less susceptible to disease, whereas the middle age group with the highest community exposure appeared severely affected. With increasing age, the severity of infection stepped up.

According to a global investigation, females and kids are less prone to infection than males. Similar findings

were reported in our study because in Pakistan, mainly males have more public exposure than females and kids. Likewise, reports from China and Italy demonstrate that females and kids were less affected, particularly in severe cases.<sup>14</sup> The actual cause of this deviation is not known yet. However, research was conducted to investigate the association of gender with infection. Both male and female mice were exposed to SARS-CoV and MERS-CoV, which showed that male mice were more susceptible to infection than female mice.<sup>15</sup>

To date, there is no reliable evidence of the influence of gender on disease vulnerability. Further investigations are required to determine the actual cause. Our results indicated that most patients with COVID-19 in Baluchistan were asymptomatic. It could be risky as the asymptomatic patients infect many people without identification. Another research conducted in Iceland found that 43% of members have positively reported no symptoms.<sup>16, 17</sup> According to the WHO, more than 70,000 early cases of COVID-19 in China were identified as having the same symptoms as SARS-CoV and MERS-CoV, including fever (88%), dry cough, sore throat (68%), fatigue (38%) and diarrhoea (4%).<sup>18, 19</sup> SARS-CoV2 usually attacks the respiratory system and can cause severe shortness of breath, heart damage, or chronic bacterial infections. The current consensus also reported the same results.

Fever, cough, fatigue, sore throat, shortness of breath, comorbidities, and body aches were among the most frequently found symptoms, and all these factors have a strong positive association with gender. Previous research has also documented similar results. The clinical side effects of 100 patients admitted to an emergency clinic in Karachi showed the same symptoms as dry cough, fever, comorbidity, sore throat and shortness of breath.<sup>20, 21</sup> Other studies also demonstrated similar signs and symptoms.<sup>22, 23</sup> Total of 4.12% of subjects remained asymptomatic. Shockingly, 6.70% of patients showed a lack of sense of smell and taste with varying side effects, and this is a strong indicator of COVID infection.<sup>24, 25</sup>

There may be a connection between the Coronavirus and the human population and animals. Some animals were documented positive for SARS-CoV-2, but the Coronavirus did not affect chickens and ducks under test conditions. Interspecies transmission of the Coronavirus

has been persistent and should be addressed after various investigative studies.<sup>26</sup>

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## Conclusion

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COVID-19 is not only a health crisis but also an economic threat. It has been moving like a wave that has caused multiple deaths and devastated the world economy. In Baluchistan, the highest morbidity rate was observed in men than in women and children; the mortality rate was higher in older people. Strict measures must be taken to avoid the plausible effects of a future deadly epidemic in Baluchistan. We must improve diagnostic and therapeutic strategies according to standard protocols to do this.

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## Recommendations

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Countries with poor health infrastructure and unreadiness to deal with this pandemic faced enormous hurdles. The main obstacles hampering Pakistan's ability to respond to the current pandemic are the country's poor infrastructure and financial constraints. The government should establish contact with the private sector to finance public health measures. The biosafety protocols have been completely revised in line with the new WHO Laboratory Biosafety Manual.

SARS-CoV-2 must be processed under controlled measures as it is a highly pathogenic human pathogen of risk group 3 (RG3). To maintain biosafety and biosecurity, the WHO and the United States CDC (Center for Disease Control and Prevention) have proposed BSL3 laboratories for COVID-19. Unfortunately, Baluchistan lacks BSL3 laboratories, so the work is carried out in BSL2+ facilities, and the Baluchistan government deserves credit for its efforts during the pandemic. However, to cope with such a deadly epidemic in the future, more significant steps are required, so upgrading the laboratories to the BSL3 level is urgently needed. To help the administration of Baluchistan, national and international organizations must come forward.

Numerous small compounds and antiviral drugs have been shown to block the effects of COVID-19 and MERS-CoV in preclinical testing, but human clinical trials have yielded disappointing results. Repurposing currently available drugs to treat this pandemic is one possibility, as all coronaviruses, including SARS-CoV-1, MERS-CoV,



and SARS-CoV-2, share structural and genetic similarities. On the other hand, antibody, mRNA, protease and replicate targeting drugs, viral glycoprotein, and receptor targeting therapies are some of the emerging methods for the prevention and treatment of SARS-CoV-2.

However, testing and developing novel therapeutic approaches takes much time. The ongoing study is one of the primary investigations to depict the epidemiological picture of the Coronavirus in Baluchistan to draw the attention of higher authorities to preliminary strategies for all types of COVID-19 strains and virus outbreaks. As a country with lower wages in the middle, Pakistan faces many relocations, from inadequate health facilities to poor socio-economic conditions. Our study can help to identify and develop a response that can alleviate the rapid onset of the disease.

Further research is required in the diagnostics, vaccines and therapeutics section to stop the spread of infection and advance treatment strategies most productively. The coronavirus pandemic is a test for the world and Pakistan. It is essential to learn the lesson and develop preparedness further to anticipate any deadly pandemics in the future. In the future, more skillful use of technology and artificial intelligence could be used to predict and demonstrate disease spread. The need of the hour is the more special order of preparedness, scientific advice from time to time, and response to infectious disease flare-ups, accompanied by a significant increase in funds.

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