

# Determination of Factors that may Lead to Acquisition and Transmission of New SARS-CoV-2 Variant VUI-202012/01 in Pakistan- A Multicenter Cross-Sectional Survey

<sup>1</sup>Yusra Shafquat, <sup>2</sup>Riyasat Ahmed Memon, <sup>3</sup>Hira Shafquat Memon, <sup>4</sup>Muhammad Rahil Khan, <sup>5</sup>Ikram Din Ujjan and <sup>6</sup>Faisal Imran

<sup>1</sup>Assistant Professor, Department of Pathology, Bilawal Medical College for Boys, Liaquat University of Medical and Health Sciences, Jamshoro, <sup>2</sup>Senior Lecturer, Department of Pathology, Bilawal Medical College for Boys, Liaquat University of Medical and Health Sciences, Jamshoro, <sup>3</sup>Women Medical Officer, Liaquat University of Medical and Health Sciences, Jamshoro, <sup>4</sup>Assistant Professor, Department of Pathology, Liaquat University of Medical and Health Sciences, Jamshoro, <sup>5</sup>Pro-Vice Chancellor, Liaquat University of Medical and Health Sciences, Jamshoro, <sup>6</sup>Quality Manager, Diagnostic and Research Laboratory, Liaquat University of Medical and Health Sciences, Jamshoro

## ABSTRACT

**Introduction:** COVID-19 has become a major public threat. Implementation of no strict preventive measures would increase the cases unless the local community has knowledge of disease and its preventive measures. Emergence of variants and mutant strains is expected with the introduction of mass vaccination and validated treatment, hence making preparedness against them is essential. In this study we have determined the attitude of local population to COVID-19 and its prevention, and the factors associated with compliance with preventive measures. The data will help in estimating the expected increase in disease burden and measures that need to be taken to stop the spread of new SARS-CoV-2 variant VUI-202012/01.

**Methodology:** This cross-sectional survey was performed by the Department of Pathology, Bilawal Medical college for boys and Liaquat University of Medical and Health sciences and included residents of Hyderabad, Jamshoro and Mirpur Khas, from 1<sup>st</sup> December to 31<sup>st</sup> December 2020, using a questionnaire on telephone. Knowledge about the disease and the preventive measures were analyzed. Factors associated with compliance with preventive measures were determined using logistic regression.

**Results:** 1020 participants were included. 94.5% frequently washed hands, 89.2% wore masks and 31.6% practiced social distancing. On logistic regression, those with high school education and belonging to occupations of teaching and shopkeepers showed statistically significant association with adherence to precautionary measures. 15.3% participants had taken chloroquine or hydroxychloroquine.

**Conclusion:** Our survey shows most of the participants were not following the recommended preventive measures. Appropriate education of preventive measures and strict reforms are imperative, to stop transmission of new SARS-CoV-2 variant VUI-202012/01.

**Keywords:** new SARS-CoV-2 variant VUI-202012/01, COVID-19, preventive measures, local population.

## Introduction

COVID-19 has become a major public health threat <sup>1,2</sup>. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; previously called 2019-nCoV), has been known to cause pneumonia like illness (now known as COVID-19)<sup>3</sup>.

### CORRESPONDING AUTHOR

**Dr. Yusra Shafquat**

Assistant Professor, Department of Pathology, Bilawal Medical College for Boys, Liaquat University of Medical and Health Sciences, Jamshoro

Email: [yusra.shafquat@gmail.com](mailto:yusra.shafquat@gmail.com)

The disease could be asymptomatic or may present as mild upper respiratory tract illness or severe pneumonia leading to respiratory failure and death <sup>3,4,5</sup>. It is also known to cause gastrointestinal symptoms<sup>1</sup>. The pathophysiology of this highly virulent and contagious disease is unknown, but cytokine storm is known to be predominant pathology<sup>5</sup>.

It is known to be responsible for the current pandemic affecting around 197 countries globally, resulting in around 171,292,827 confirmed cases of COVID-19 and 3,687,589 deaths, thus mandating stringent containment measures (6). World health organization (WHO) suggests certain public health and preventive measures to ensure the decrease in transmission of

disease which includes frequent handwashing, cough etiquette, social distancing, wearing of masks and disinfection of frequently touched surfaces<sup>7-8</sup>. Since vaccine is available in some countries and no specific drug regimen has been devised for SARS-CoV-2 infection, these preventive strategies will aid in decrease of transmission of disease and development of new cases<sup>7</sup>.

In a study reported from Lahore, Pakistan it was shown that most of the people of Pakistan believe that herbal medicines work more against a disease than the synthetic ones. Also, they are cheaper, easily available and with lesser side effects, so people start taking them for cure and prevention of diseases<sup>9</sup>. For diseases like COVID-19 where cure and vaccine with 100% efficacy are not available, people resort towards such alternatives.

Before lockdown exit (which is normalizing and restoring societal activities along with standard operating procedures for prevention of disease), more than 277,402 cases of COVID-19 had been reported in Pakistan, with Sindh being the most affected province with having around 120,052 cases<sup>10</sup>. Being a resource limited country with a mediocre health care system and less than 58% literacy rate, prevention of disease is imperative<sup>11</sup>. After the lockdown exit, the spread of disease during the second wave has markedly increased, with around 495,075 cases until now. It can only be prevented, if the local population has knowledge of disease and shows compliance to preventive measures<sup>12</sup>.

A new variant, labelled as VUI-202012/01, reported for the first time in late September in United Kingdom, where it has been known to be responsible for disease in around 1108 cases till December. This strain carries 17 mutations, important of which is N501Y present in spike protein that aids in binding to receptors. So far it has been known to be transmitted more rapidly than the parent strain, resulting in more positive cases<sup>13</sup>.

The emergence of variants and mutant strains is expected after introduction of mass vaccination and validated treatment and that would wreak havoc in the current scenario. Especially with the isolation of the two cases of the new SARS-CoV-2 variant VUI-

202012/01 in Pakistan<sup>14-15</sup>, preparedness for these emerging strains has become essential. In this study, we have determined the attitude of local population of Hyderabad, Jamshoro and Mirpur Khas, to COVID-19 and its prevention and the factors associated with compliance to preventive measures. The data will aid in predicting the rate of disease progression and in formulating the steps to prevent its spread.

## Methods

**Study design:** It is a prospective cross-sectional survey in which 1020 participants belonging to middle to lower socioeconomic background and different occupations were included.

## Participants

This cross-sectional survey was performed from 1<sup>st</sup> December to 31<sup>st</sup> December 2020, during and following the lockdown exit in Pakistan. Considering the risks associated with exposure to disease, it was not possible to perform community based national sampling and the participants mainly belonged to lower to middle class families with limited access to internet, so this survey was conducted using a telephone. The telephone numbers were chosen randomly from telephone directory of city Hyderabad, Jamshoro and Mirpur Khas targeting people with lower to middle socioeconomic status.

## Questionnaire

According to the COVID 19 guidelines by the Ministry of National Health Services, Government of Pakistan, a questionnaire was developed by the authors<sup>16</sup>. The questionnaire comprised of 13 questions related to attitude and preventive measures to COVID-19, along with age, marital status, occupation, education, number of family members, willingness to wear a mask and reuse of masks (Table 1). Belief that the disease exists and can be prevented by precautionary measures was taken as a marker for compliance with preventive measures.

**Table 1: Questionnaire of knowledge, attitude and preventive measures taken by the participants**

Questions	Options
Where did you hear about COVID-19?	Social media, newspaper, news, from other people
Do you wash your hands frequently for 20 seconds?	Yes, no
Do you wear a mask?	Yes, No
If yes, then which one?	N95 or KN95, Surgical mask, cloth mask
Do you wear gloves?	Yes, No
If yes, then when do you change them?	Once, More than one time
Do you disinfect high touch surfaces at home?	Yes, No
Do you practice social distancing and avoid crowded places?	Yes, No
Did you take hydroxychloroquine/chloroquine?	Yes, No
Other preventive measures?	Yes, No
Did you take any of these measures for prevention?	Steam inhalation, drink green tea, take sena herb, take nigella seeds
Do you believe that the disease exists and can be prevented by adapting precautionary measures?	Yes, No

**Table 2: Demographic Characteristics of Participants**

	Characteristics	Number of Participants N (%)
<b>Gender</b>	Male	834 (81.7)
	Female	186 (18.3)
<b>Age group</b>	18-34 years	457 (44.8)
	35-60 years	475 (46.5)
	>60 years	88 (8.63)
<b>Marital status</b>	Married	778 (76.3)
	Unmarried	242 (23.7)
<b>Education</b>	Uneducated	204 (20)
	Secondary education	93 (9.1)
	Higher education	111 (10.8)
	Bachelor's degree	243 (23.8)
	Master's degree	369 (36.2)
<b>Occupation</b>	Education	232 (22.7)
	Retail food (Food stores, eating and drinking establishments) 258 (25.3)	258 (25.3)
	Transportation, utility, repair, and other trades	144(14.1)
	Health (includes pharmacist, laboratory technologist and medical receptionist)	115 (11.3)
	Finance, insurance, real estate, and business (management and sales)	185 (18.1)
	Safety and security services	14 (1.37)
	Others (includes housewives)	72 (7.05)
<b>Have elderly or children at home</b>		649 (63.6)

**Table 3: Results of multiple binary logistic regression analysis on factors significantly associated with practices towards COVID-19**

Variables	Univariate analysis		Multivariate analysis	
	OR (95% CI)	P Value	OR (95% CI)	P Value
Heard about COVID-19	5.2 (0.5-51.2)	0.162		
Gender				
Male (used as reference)				
Female	0.6 (0.3-1.6)	0.358		
Age group				
18-30 years (used as reference)				
31-42 years	1.1 (0.4-2.9)	0.893		
43-54 years	0.5 (0.1-1.5)	0.204		
> 54 years	1.2 (0.4-3.5)	0.706		
Marital status				
Married (used as reference)				
Unmarried	1.8 (0.7-4.5)	0.194		
Education				
Secondary education (Used as reference)				
Uneducated	0.3 (0.1-1.4)	0.128		
Higher education	2.3 (1.0-5.1)	0.041	2.1 (0.9-4.7)	0.044
Bachelor's degree	0.4 (0.09-2.0)	0.302		
Master's degree	2.5 (0.7-9.0)	0.161		
Occupation				
Transportation, utility, repair, and other trades (used as reference)				
Retail food (Food stores, eating and drinking establishments)	18.0 (2.9-110)	0.002	18.5 (3.2-120)	0.004
Education	5.6 (1.7-17.9)	0.003	6.3(1.7-23.3)	0.005
Health	0.6 (0.05-7.2)	0.688		
Finance, insurance, real estate, and business (management and sales)	2.3 (0.4-13.7)	0.338		
Safety and security services	7.2 (1.0-51.4)	0.049	6.9 (1.0-53.1)	0.072
Others	9.0 (0.3-206)	0.169		
Have elderly or children in family	1.5 (0.5-4.3)	0.415		

**Institutional review board approval and consent to participate:** Our study protocol and consent procedures were approved by the Institutional review board of Liaquat University of Medical and Health Sciences, before the formal survey was performed. Participants had to verbally confirm their willingness to

participate voluntarily. After which the participant was asked the questions of the survey.

**Statistical Analysis:**

The data obtained were entered into the statistical software SPSS version 19.0 (SPSS, Inc., Chicago, IL). For descriptive analysis, mean and standard deviation of continuous variables such as age were computed.

Frequencies and percentages of gender, knowledge, attitude, and practices were calculated. Association of factors with compliance with preventive measures was determined using binomial logistic regression to obtain odds ratios with 95% confidence intervals (95% CI). A *P*-value less than 0.05 was considered significant on univariate and multivariate analysis.

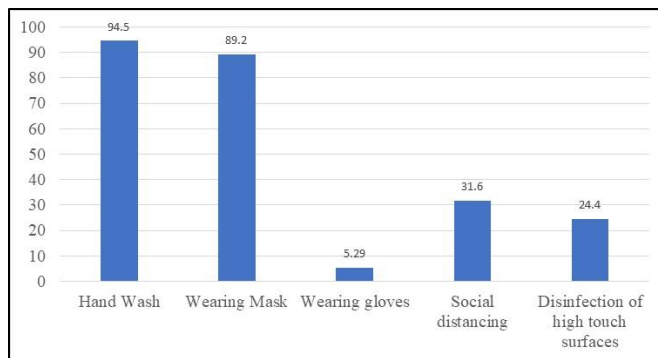
## Results

A total of 1020 participants were included in this survey. Mean age was 38.4 years. 81.7 % of the participants were male. 76.3% of the participants were married (Table 2). 96.3% participants had heard about COVID 19. 75.4% heard about it on social media, 66.3% through news, 34.5% through newspaper and 92.7% from other people.

### Preventive measures taken by participants:

Taking preventive measures as important factor for mitigating the spread of the disease, 964/1020 (94.5%) of the participants were washing their hands frequently for 20 seconds. 910/1020 (89.2%) were wearing a mask. Sadly, 30% were only wearing them as part of their workplace standard operating procedure (SOP). 67.8% wore surgical masks, 9.6% N95 or KN95 and 29.9% wore cloth masks. 20% of the participants reused disposable masks. 54/1020 (5.29%) were wearing gloves, most of which were bankers and technologists but all of them were wearing the same pair of gloves all day rather than changing them, thus increasing the risk of transmission of disease. 323/1020 (31.6%) were practicing social distancing and avoiding crowded places. 249/1020 (24.4%) of them were disinfecting their household surfaces with disinfectants like quaternary compounds and phenols (Figure 1).

**Figure 1: Prevention measures taken by participants before Lockdown Exit**



### Factors significantly associated with compliance of prevention measures:

Logistic regression was performed to better understand the factors that led to compliance of local population with preventive measures. Results of multiple binary logistic regression analysis showed that high school education had statistically significant association with adherence to precautionary measures (*P*-value: 0.044). Interestingly, people with much higher education showed no significant association (*P*-value 0.161). However, students and teachers showed compliance (*P*-value: 0.05). Also, food and fruit vendors (*P*-value: 0.004) showed significant association. (Table 3).

### Use of chloroquine/hydroxychloroquine and herbal medicines:

157/1020 (15.3%) of the participants had taken chloroquine or hydroxychloroquine as prophylaxis with the belief that they will not get the disease. Interestingly most of them were pharmacists. 324/1020 (31.8%) of the participants were taking Sena herb (also called sanna makki) and 292/1020 (28.6%) were taking Nigella seeds (Kalonji seeds). 80% of the participants were regular users of social media and had heard about these preventive measures from there. 221/1020 (21.6%) of the participants were taking steam and green tea daily for prevention.

## Discussion

In this study we have determined the perspective of residents of three cities of Sindh province, Pakistan about COVID-19 and its prevention and the steps taken by them to prevent the disease. We also determined the factors associated with compliance to preventive measures.

Our study showed despite knowledge of disease through various sources, the participants failed to take all preventive measures. Also, some of the participants took herbal medicines and chloroquine for prevention. On logistic regression, secondary education and participants related to occupations such as education and retail food (food stores, eating and drinking establishments) showed statistically significant association with adherence to precautionary measures (Table 3).

Guidance regarding wearing of a mask varies globally<sup>17</sup>. However, most of the guidelines worldwide suggest that population at moderate-high risk of disease are supposed to wear facial masks<sup>17</sup>. This recommendation is made to save PPE for healthcare professionals and for population at risk<sup>17</sup>. Many of the

participants of our study did not wear masks or reused facial masks, which has also been observed in countries like Thailand and Japan<sup>17</sup>. Literature shows lack of compliance of republicans and residents of Italy to social distancing<sup>18-19</sup>. Sadly, our study participants exhibited the same.

In contrast to our study, studies reported from China and India showed more than 95% compliance to wearing masks and practising social distancing<sup>20-21</sup>. Also, the people with higher education degrees such as masters showed more compliance in these studies<sup>20</sup>.

The role of chloroquine and hydroxychloroquine for prevention and treatment of disease is debateable. The drug has been tested previously as treatment of viruses such as HIV, Influenza, and Dengue with inconclusive results. Invitro studies showed that it inhibits the replication of SARS-CoV-2<sup>22-23</sup>, suggesting its use, but World Health Organization has stopped its testing in solidarity trial, as it is known to cause mortality and heart arrhythmias in COVID-19 patients<sup>24</sup>. We did not find any evidence in literature regarding the use of herbal medicines for its treatment and prevention.

One of the limitations of our study is its shorter duration, however, the target population belong to low-middle socioeconomic status with more chances of getting and transmitting the disease as they show low compliance to precautionary measures, live in small houses with overcrowded rooms and areas with low hygiene measures. To the best of our knowledge, this is the first study conducted in Pakistan, targeting this population regarding the perspective and compliance with preventive measures.

## Conclusion

In summary, our study showed low adherence of local population to COVID-19 preventive measures. Some of the participants had taken herbal medicines and chloroquine as prophylaxis. The data shown in our study will help in preparedness against the emerging strains. Surveillance, education, and strict laws to maintain adherence to preventive measures is essential to prevent the transmission of emerging, more fatal variants and mutant strains of COVID-19 and to reduce the fatality and complications associated with disease.

## Declarations

Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interest:** The authors declare that they have no competing interests.

**Funding:** None

## References

1. Rothan HA et al. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of autoimmunity*. 2020 Feb 26;102433.
2. Cascella M et al. Features, evaluation, and treatment of coronavirus (COVID-19). *StatPearls*. 2021 Apr 20.
3. Zhou F et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet*. 2020 Mar 11. 28;395(10229):1054-62.
4. Heymann D et al. COVID-19: what is next for public health? *The Lancet*. 2020 Feb 22;395(10224):542-5.
5. Huang C et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*. 2020 Feb 15;395(10223):497-506.
6. WHO. Coronavirus disease (COVID-19) dashboard [EB/OL] (2021-6-4) <https://covid19.who.int/>
7. World Health Organization. Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance, 19 March 2020. World Health Organization; 2020. [https://apps.who.int/iris/handle/10665/331498?locale\\_attribute=ar&utm\\_source=transaction&utm\\_medium=email](https://apps.who.int/iris/handle/10665/331498?locale_attribute=ar&utm_source=transaction&utm_medium=email)
8. World Health Organization. Coronavirus disease 2019 (COVID-19): situation report, 72. [www.who.int](http://www.who.int)
9. Kanwal H et al. Herbal medicine: Trend of practice, perspective, and limitations in Pakistan. *Asian Pacific Journal of Health Sciences*. 2017 Dec 30;4(4):6-8.
10. Pakistan: COVID-19 - Situation Report (As of 30 July 2020) <https://www.humanitarianresponse.info/en/operations/pakistan/document/pakistan-covid-19-situation-report-30-july-2020>
11. Ahmad Z et al. Comparison of Knowledge, Attitudes, and Practices of Educated and Uneducated Adults Regarding Human Immunodeficiency Virus in Karachi, Pakistan. *Cureus*. 2017 Jun;9(6).
12. Pakistan: COVID-19-Situation report (30th December 2020) <https://covid.gov.pk/stats/pakistan>
13. Wise J. Covid-19: New coronavirus variant is identified in UK. *BMJ* 2020;371:m4857
14. Umair M, Ikram A et al. Importation of SARS-CoV-2 variant B.1.1.7 in Pakistan. *Journal of Medical Virology*. 2021 May 1.
15. Rahimi F et al. Implications of the Emergence of a New Variant of SARS-CoV-2, VUI-202012/01. *Archives of Medical Research*. 2021 Jan 22.
16. COVID-19 Guidelines: Ministry of National Health Services Regulations and coordination, Government of Pakistan <http://www.nhs.gov.pk/Detail/NWYyMzg2MGMtM2ZmOC00YThLTgyZmMtN2QxYTZjMjE3YzQz>
17. Feng S et al. Rational use of face masks in the COVID-19 pandemic. *The Lancet Respiratory Medicine*. 2020 May 1;8(5):434-6.

18. Painter M et al. Political beliefs affect compliance with covid-19 social distancing orders. Available at SSRN 3569098. 2020 Apr 5.
19. Briscese G et al. Compliance with covid-19 social-distancing measures in Italy: the role of expectations and duration. National Bureau of Economic Research; 2020 Mar 27.
20. Zhong BL et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. International journal of biological sciences. 2020;16(10):1745.
21. Roy D et al. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. Asian Journal of Psychiatry. 2020 Apr 8:102083.
22. Touret F et al. Of chloroquine and COVID-19. Antiviral research. 2020 Mar 5:104762.
23. Cortegiani A et al. A systematic review on the efficacy and safety of chloroquine for the treatment of COVID-19. Journal of critical care. 2020 Mar 10.
24. Mahase E. Covid-19: WHO halts hydroxychloroquine trial to review links with increased mortality risk. BMJ 369, DOI: 10.1136/bmj. m2126 (2020)

<b>HISTORY</b>	
Date received:	15-04-2021
Date sent for review:	19-05-2021
Date received reviewers comments:	25-05-2021
Date received revised manuscript:	09-06-2021
Date accepted:	09-06-2021

<b>CONTRIBUTION OF AUTHORS</b>	
<b>Author</b>	<b>Contribution</b>
Yusra Shafquat	A,B,C
Riyasat Ahmed Memon	A,B,C
Hira Shafquat Memon	A,B,C
Muhammad Rahil Khan	B,C
Ikram Din Ujjan	B,C
Faisal Imran	B,C

**KEY FOR CONTRIBUTION OF AUTHORS:**

- A. Conception/Study/Designing/Planning
- B. Active Participation in Active Methodology
- C. Interpretation/ Analysis and Discussion