

# Comparative Study of Impact of Vaccination on Adherence to COVID-appropriate Behavior, Psychiatric Comorbidities and Quality of Life amongst Postvaccinated Individuals in Urban and Rural Bengaluru

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## ABSTRACT

**Introduction:** Coronavirus 2019 (COVID-19), pandemic has increased mental illnesses. Vaccination was the preferred method of protection and there is sparse knowledge regarding the impact of vaccination on mental health status. Awareness, availability, and accessibility to healthcare vary between urban and rural settings.

**Aim:** This study compared the adherence to COVID-appropriate behavior, psychiatric illnesses, and quality of life (QOL) among post-vaccinated individuals in urban and rural populations.

**Materials and methods:** A comparative cross-sectional study was done on 606 vaccinated individuals of both urban and rural Bengaluru. Data was collected through a self-structured questionnaire which incorporated a sociodemographic profile, depression anxiety, and stress scale (DASS-21), and QOL and was analyzed using Statistical Package for Social Sciences (SPSS) version 23.

**Results:** In both urban and rural population, majority followed COVID-appropriate behaviors. It was found that anxiety was significantly high in the rural, whereas QOL was low in both urban and rural areas. Individuals with high scores on depression, anxiety, and stress (DAS) were found to have a negative correlation with QOL.

**Conclusion:** In addition to vaccination, adhering to COVID-appropriate behavior is necessary to eradicate the disease. Appropriate mental health care should be provided even in the rural setting to address COVID-related anxiety and depression.

**Keywords:** Coronavirus protocols, Coronavirus vaccination, Psychiatric comorbidities, Quality of life

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## INTRODUCTION

At present, the entire world is anguished with COVID-19 which has been declared a pandemic by World Health Organization (WHO).<sup>1</sup> It was a novel disease that affected the human respiratory system.<sup>2</sup> The lack of confirmatory information regarding its spread, factors influencing the severity of illness as well as the fact that there were no specific treatments or vaccine to prevent or cure the disease, the WHO proposed measures like social distancing, using a face mask, handwashing with soap and water, or alcohol based hand rubs and avoiding contact with mucous membranes which were based on the evidence acquired from the past epidemics and pandemics.<sup>3</sup> Various restrictive measures like lockdown, case detection, isolation, and quarantine were found to be the only efficient measures to control the spread of it along with appropriate behavioral habits.<sup>4</sup>

The lockdown imposed nationwide had both positive and negative impacts on biological and behavioral changes.<sup>3</sup> According to a study major proportion of the population had difficulty regarding sleep and physical activities whereas nutrition showed a favorable outcome among the Indian population.<sup>5</sup> COVID-19 had also been disseminated to the rural areas, due to reduced quality of health care, poor infrastructure, and lack of awareness the rural population felt the brunt of the pandemic.<sup>6</sup> Along with the various medical complications and loss of life there was a negative impact on mental health, with a significant number of anxiety

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and depression cases.<sup>7</sup> Mental health conditions like adjustment disorders and phobias had increased tremendously whereas Depression, anxiety, stress, and insomnia increased to a lesser extent due to the COVID-19 crisis.<sup>8</sup>

Quality of life (QOL) is an individual's feelings of well-being in terms of satisfaction with important aspects of life. It was observed that after the pandemic QOL had significantly influenced individuals both in the urban and rural populations at a personal and interpersonal level affecting all the domains, that is, physical, psychological, social, and environmental.

To curb the pandemic, WHO and other national and international health regulators concluded that immunization via vaccination was the preferred method of protection against infection in the public health sector and passive immunity had been enhanced in individuals with the help of vaccination with an average efficacy rate of 70%.<sup>9,10</sup> Vaccination status had its impact on the adherence to COVID-appropriate behavior as what it meant, for each of us was unique and different depending on our sociodemographic—cultural, and educational background.

The primary aim of this study was to investigate the difference in the effects of vaccination on the adherence to COVID-appropriate and health related behavior among adults in urban and rural populations.

## OBJECTIVES

- To estimate the adherence to COVID-appropriate behavior after vaccination.
- To study the mental health status among individuals in the course of COVID-19.
- To assess the QOL among the population during the pandemic.
- To compare the changes in lifestyle and the above parameters between the urban and rural settings.

## Inclusion Criteria

- All COVID-vaccinated adults of both genders aged 18 years and above.

## Exclusion Criteria

- Subjects in altered sensorium.
- Subjects who are physically and mentally ill, and unable to participate.

## MATERIALS AND METHODS

A community based cross sectional comparative study was conducted over a period of 6 months among the adults of both urban and rural regions of Bengaluru. Institutional Ethics Committee approval was obtained and consent was taken from adult residents of both urban and rural areas. Subjects were chosen randomly by random sampling technique. They were subjected to a questionnaire to study the behavioral changes in vaccinated individuals. The self-designed study specific questionnaire comprising two divisions including the sociodemographic profile and postvaccination behavior was used to assess them. Standardized questionnaires like the DASS-21,<sup>11</sup> WHO QOL questionnaire<sup>12</sup> were used to assess the mental status and their QOL.

The sample size for the study was 343 in urban and 263 in rural populations obtained using the formula  $n = P(1-P)Z^2/D^2$  where  $n$  is the sample size,  $P$  is the population percentage who has been vaccinated (27.7%)<sup>13</sup>

$$(1-p) = 0.723$$

D-precision level (5%), and

Z-confidence level (95%) = 1.96.

The data collected were analyzed using descriptive and inferential statistics by statistical software SPSS version 23 and MS Excel. Descriptive statistics data were summarised using frequencies and percentages. For inferential statistics, all behavioral changes with respect to postvaccination in urban and rural populations were compared between one interval and two groups. All statistical

analysis was carried out at a 5% level of significance and a  $p$ -value of  $<0.05$  will be considered significant.

## DISCUSSION

Coronavirus 2019 (COVID-19) has interfered with the normal lives of people all over the world leaving a large proportion of people both in an urban and rural settings with incessant stress and trauma leading to mental ill-health. A study in New York by Raina et al.<sup>14</sup> showed that behavioral measures suggested by WHO helped to reduce the incidence of cases to a greater extent. The incidence in the number of cases with vaccination was 3,424,822, and with mask + social distancing it declined to 4,419 and further reduced with vaccination + mask + social distancing to 4,405.

From the above study, it was observed that nonpharmacological interventions with vaccination benefited in controlling the pandemic. Another study by Yuan et al.<sup>15</sup> showed a slightly greater awareness of preventive behaviors and improvement in mental health among post vaccinated individuals. When compared to individuals in the prevaccination group, moderate but statistically significantly lower scores regarding mental health were observed in the postvaccination group. There were higher scores of preventive behaviors in post vaccinated individuals after COVID-19 vaccination. Similarly in our study, it was revealed that among the vaccinated individuals in the urban population, 73.2% wore masks only outdoors, 24.5% wore masks both indoors and outdoors and 2.3% did not wear a mask at all. Among the vaccinated rural population, 73% used masks outdoors, 19% wore both indoors and outdoors whereas 8% of the population did not wear a mask at all. 90.4% maintained social distancing and 91.3% practiced handwashing and using sanitizer in the urban population whereas 78.7 and 81.7% in the rural population respectively (Table 1). Indicating that both urban and rural residents were adherent to covid behaviors, even after vaccination, the use of television, social media, and other methods to propagate the utility of preventive measures has paid rich dividends.

A study done by Njingu et al.<sup>16</sup> among Cameroonians showed that there was a gross variation among the people living in urban and rural areas, where the rural dwellers were less likely to avoid crowded places, wear face masks outdoors, and practice hand hygiene. It inferred that the rural dwellers had less knowledge, attitude, and practices related to the COVID-19 pandemic. The findings from our study (Tables 1 to 4) are contrary to this, where adherence towards maintaining COVID-appropriate behavior postvaccination in both urban and rural settings was not significantly different (Fig. 1).

**Table 1:** The above results deduce that people belonging to both urban and rural population were compliant towards the COVID-appropriate measures as suggested by WHO with no significant difference between the two

<i>Comparison on adherence to COVID behavioral protocols based on location of residence using Chi-squared test</i>		
<i>Variables</i>	<i>Urban</i>	<i>Rural</i>
Wearing mask outdoors	73.2%	73%
Wearing mask outdoors and indoors	24.5%	19%
Did not wear mask at all	2.3%	8%
Social distancing	90.4%	78.7%
Handwashing and sanitization	91.3%	81.7%

**Table 2:** The above data inferred that anxiety, stress, and depression was high among the rural population. But a significant difference was observed in terms of anxiety which was 27.7 and 48.8% in urban and rural population respectively with a  $p$ -value of 0.00001%

*Comparison of distribution of psychiatric illnesses post-COVID vaccination among the urban and rural population using Chi-squared test*

Variables	Urban	Rural
Depression	47.7%	57.6%
Anxiety	27.7%	48.8%
Stress	47.4%	55.3%

**Table 3:** Comparison of mean QOL scores between the urban and rural vaccinated participants using Mann–Whitney test

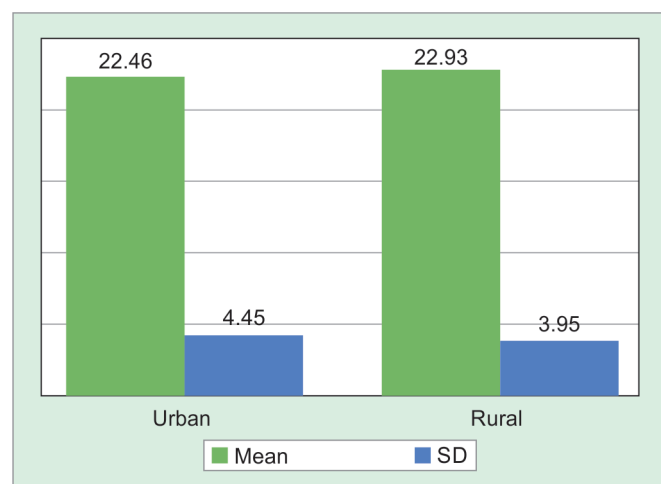
Locality	N	Mean	Standard deviation	$p$ -value
Urban	343	22.46	4.45	0.1768
Rural	263	22.93	3.95	

**Table 4:** Where the negative coefficients are denoted by 'p' and the minus sign denotes negative correlation. Hence it could be concluded from the above data that as DAS increases, QOL decreases, and was statistically significant

*Spearman's correlation test to estimate the relationship between DAS and QOL scores based on the locality*

Vaccination status	Variable	WHO QOL		
		Urban	Rural	Total
Vaccinated individuals	DAS	-0.26	0.21	-0.25
		<0.001	<0.001	<0.001*

\*, Statistically significant



**Fig. 1:** The above graph implied that the QOL among urban population was 5.3 and 4.19% in the rural population with no significant differences among the two

A cross-sectional study done by Chen et al.<sup>17</sup> on US citizens in an urban setting to assess the mental health outcomes after severe acute respiratory syndrome coronavirus vaccination—among 52.2% of the vaccinated participants, 26.5 and 20.3% of them reported anxiety and depression respectively. In comparison, we found postvaccination, 47.7% of the urban population and 57.6% of the rural population were

depressed similarly 49.4% of the urban population and 55.3% of the rural population were under stress with no significant differences between the two 27.5% of urban population who were vaccinated, had anxiety symptoms and 48.8% of the rural population respectively with high significance ( $p$  0.00001%). Significant results of anxiety and fear regarding the vaccine, safety standards, side effects, needle phobia, or misinformation provided by social media and religious organizations could have led to an increase in anxiety among the rural population.

A study conducted among the Malaysian population showed a significant negative association between depression, anxiety, stress, and perceived QOL. Similarly, in our study, there was a decline in the QOL, that is, of 5.3% in the urban setting and 4.19% in the rural setting which showed that as DAS increased, QOL reduced and it implied that the pandemic had affected the overall living of both the rural and urban residents.

To conclude, DAS increased among the rural population, however, there was a significant difference only in anxiety between urban and rural populations. A significant decline in QOL was observed in both communities with no variance. It was also inferred that DAS had a significant negative correlation with the QOL of both rural and urban people.<sup>18,19</sup>

## Strength

This study helped in assessing the current mental health status of post vaccinated individuals in an urban and rural settings. Since there were no similar studies conducted on mental health among the post-vaccinated individuals in rural India, it helped in establishing baseline values as well as creating awareness of mental health in the rural population.

## Directions for Future Use

Since the pandemic's erratic nature, adhering to COVID-appropriate behavior, nonpharmacological interventions with immunization would be necessary to eradicate the disease. As a result, it is necessary to promote accessibility, availability, affordability, and acceptability of mental health issues and care in rural settings.

## LIMITATIONS

As the study was quantitative, the confounding relationship between dependent and independent variables was unavoidable. These results may not be generalized to the other regions of urban and rural localities and must be validated by further studies.

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## REFERENCES

- Dinakaran D, Manjunatha N, Naveen Kumar C, et al. Neuropsychiatric aspects of COVID-19 pandemic: a selective review. *Asian J Psychiatr* 2020;53:102188. DOI: 10.1016/j.ajp.2020.102188
- Husain W, Ashkanani F. Does COVID-19 change dietary habits and lifestyle behaviours in Kuwait: a community-based cross-sectional study. *Environ Health Prev Med* 2020;25(1):61. DOI: 10.1186/s12199-020-00901-5
- Corona. Coronavirus Disease (COVID-19) - events as they happen [Internet]. *Who.int*. 2021 [cited 29 June 2021].
- Khanna RC, Cicinelli MV, Gilbert SS, et al. COVID-19 pandemic: lessons learned and future directions. *Indian J Ophthalmol* 2020;68:703–710. DOI: 10.4103/ijo.IJO\_843\_20

5. Soni P. Effects of COVID-19 lockdown phases in India: an atmospheric perspective. *Environ Dev Sustain* 2021;23(8):12044–12055. DOI: 10.1007/s10668-020-01156-4
6. Nelson BW, Pettitt A, Flannery JE, et al. Rapid assessment of psychological and epidemiological correlates of COVID-19 concern, financial strain, and health-related behavior change in a large online sample. *PLoS One* 2020;15(11):e0241990. DOI: 10.1371/journal.pone.0241990
7. Lakhan R, Agrawal A, Sharma M. Prevalence of depression, anxiety, and stress during COVID-19 pandemic. *J Neurosci Rural Pract* 2020;11(4):519–525. DOI: 10.1055/s-0040-1716442
8. Kharshiing KD, Kashyap D, Gupta K, et al. Quality of life in the COVID-19 pandemic in India: exploring the role of individual and group variables. *Community Ment Health J* 2021;57(1):70–78. DOI: 10.1007/s10597-020-00712-6
9. Ramasamy MN, Minassian AM, Ewer KJ, et al. Safety and immunogenicity of ChAdOx1 nCoV-19 vaccine administered in a prime-boost regimen in young and old adults (COV002): a single-blind, randomised, controlled, phase 2/3 trial. *Lancet* 2021;396(10267):1979–1993. DOI: 10.1016/S0140-6736(20)32466-1
10. Mishra SK, Tripathi T. One year update on the COVID-19 pandemic: where are we now? *Acta Trop* 2021;214:105778. DOI: 10.1016/j.actatropica.2020.105778
11. Parkitny L, McAuley J. The depression anxiety stress scale (DASS). *J Physiother* 2010;56(3):204. DOI: 10.1016/s1836-9553(10)70030-8
12. Development of the World Health Organization WHOQOL-Bref quality of life assessment. The WHOQOL group. *Psychological Med* 1998;28:551–558. DOI: 10.1017/s0033291798006667
13. [Internet]. COVID-19 India. 2021 [cited 30 June 2021]. Available from: <https://www.covid19india.org/state/KA>.
14. Raina MacIntyre C, Costantino V, Chanmugam A. The use of face masks during vaccine roll-out in New York City and impact on epidemic control. *Vaccine* 2021;39(42):6296–6301. DOI: 10.1016/j.vaccine.2021.08.102
15. Yuan Y, Deng Z, Chen M, et al. Changes in mental health and preventive behaviors before and after COVID-19 vaccination: a propensity score matching (PSM) study. *Vaccines (Basel)* 2021;9(9):1044. DOI: 10.3390/vaccines9091044
16. Njingu AE, Jabbossung FE, Ndip-Agbor TE, et al. Comparing knowledge, attitudes and practices regarding COVID-19 amongst Cameroonians living in urban versus rural areas. *Pan Afr Med J* 2021;38:234. DOI: 10.11604/pamj.2021.38.234.25964
17. Chen S, Aruldass AR, Cardinal RN. Mental health outcomes after SARS-CoV-2 vaccination in the United States: a national cross-sectional study. *J Affect Disord* 2022;298(Pt A):396–399. DOI: 10.1016/j.jad.2021.10.134
18. Rossinot H, Fantin R, Venne J. Behavioral changes during COVID-19 confinement in France: a web-based study. *Int J Environ Res Public Health* 2020;17(22):E8444. DOI: 10.3390/ijerph17228444
19. Kumar A, Rajasekharan Nayar K, Koya SF. COVID-19: challenges and its consequences for rural health care in India. *Public Health in Practice* 2020;1:100009. DOI: 10.1016/j.puhip.2020.100009