Journal of Harbin Engineering University
ISSN: 1006-7043

Vol 44 No. 12
December 2023

An Evaluation of COVID-19 Impacts on Mental Health of Public in India

M. H. Lohgaonkar
Associate Professor & Head,
Department of Statistics,
Shri Chhatrapati Shivaji Mahavidyalaya, Shrigonda.

Abstract

Introduction: The global outbreak of the coronavirus infection, designated as a pandemic, has triggered widespread concern and psychological challenges across diverse populations. The pandemic has induced various mental health issues, impacting individuals of all ages, including children adapting to new learning methods, working professionals facing job insecurities, and the elderly coping with unique challenges. Recognizing the diverse mental health implications, this article focuses on assessing the impact of the pandemic on the mental well-being of the Indian population, utilizing a proposed COVID-19 Mentality Index.

Objectives: The primary objective of this study is to evaluate the mental health effects of the pandemic on Indian individuals. Specifically, it aims to understand the nuances of mental health challenges experienced by different demographic groups, including gender, age, occupation, income, and the level of depression. The study also seeks to contribute to the development of a comprehensive understanding of the mental health landscape during these unprecedented times.

Methods: From November 2020 to January 2021 (over 92 days), an online survey was conducted among 1,130 Indian citizens. The survey aimed to capture a diverse sample across various demographic parameters. However, it is essential to acknowledge the limitation that the survey was conducted exclusively on social media platforms, potentially introducing biases in the results. The proposed COVID-19 Mentality Index served as a tool to measure and assess the mental health impact.

Results: The research findings indicate a significant gender disparity in the mental health impact of the pandemic, with women in all age groups experiencing more pronounced effects compared to men. Notably, individuals aged 76-90 among women and 61-75 among men reported more substantial impacts on mental health. Geographically, those residing in urban areas exhibited higher confidence in discussing mental health issues with family members (86.74%) compared to semi-urban (75.56%) and rural areas (76.62%).

Conclusions: This study provides valuable insights into the mental health dynamics of the Indian population during the COVID-19 pandemic. The identified factors influencing mental health, including gender, age, occupation, income, and depression levels, can inform clinicians in implementing effective mental health interventions across India. The findings underscore the importance of addressing mental well-being in the Indian population during these challenging and unprecedented times.

Keywords: Lockdown, Pandemic, Depression, Mental Health, Median test.

1. Introduction

Since December 2019, the novel coronavirus illness 2019 (COVID-19), which is caused by the SARS coronavirus 2, has swiftly spread to every country (Dong and Bouey 2020). The 2003 SARS pandemic is a public health concern. Following their SARS illness, people who survived by receiving the recommended medical care reported symptoms of depression and post-traumatic stress disorder (PTSD) (Maunder, 2009). A coronavirus infection that originated in Wuhan, China, is thought to have become a global pandemic (Phiri et al., 2021). Around the world, the COVID-19 poses a number of mental health and financial problems. The way that the public and government cope with COVID-19 infection is significantly altered (Cheung et al., 2001; Jones et al., 2021). Since COVID-19 originated in China and spread to other countries, lockdowns and pandemics have had a negative impact on many

countries' mental health. Given that the illness was discovered in India on March 15, 2020, this could result in a number of mental health problems. The World Health Organization (WHO) implemented a number of preventive measures, including as lockdowns, frequent hand washing, place sanitization, and others, to address this pandemic crisis. Individuals and society are impacted by the pandemic and lockdown, which has a detrimental psychological effect on the general mental health of the populace. Additionally, it causes other issues like low self-esteem, disturbance, tension, worry, and stigma. In 2020, Torales et al.; Kumar and Nayar 2020).

In accordance to the UN World Happiness Report, which was created during the pandemic, the majority of European nations are still at the top of the happiness list for 2021, with the Scandinavian area coming in first (Helliwell et al., 2021). India has achieved the 139th position in it. This gives the clear impression that most Indians have mental health issues during pandemics and lockdowns. The Government of India enforced a nationwide lockdown on March 24, 2020 in compliance with WHO guidelines. This was followed by a second phase of lockdown from April 14 to May 3, 2020, a third phase from May 4 to May 17, 2020, and numerous other such periods. lockdowns while the COVID-19 pandemic. During these lockdowns, supermarkets, small businesses, malls, eateries, movie theaters, etc. are closed. These imposed restrictions drastically impacted each family's financial burden. Lots of mental health and psychological interventions have been made for people of different ages, genders, professions, etc. as a result of this. Everybody experiences various mental health problems.

Many people in India who were afflicted by the coronavirus suffered from a shortage of medication, hospital beds, medical oxygen, and timely medical attention. All of this is causing a lot of mental strain. Throughout the pandemic, numerous people have been crying for assistance in the hospital parking lot. This has traumatized volunteers, doctors, nurses, and relatives of those afflicted by the coronavirus, among other people. Many coronavirus-affected patients in India were receiving treatment in the hospital parking lot, and family members were sobbing for their loved ones. People transport bodies to the ambulance nearly every day. That left people's minds traumatized. During this worsening pandemic, a number of professionals—both working and unemployed—volunteered their services. These volunteers assert that "the impact of COVID-19 on mental health is real" and that the pandemic's psychological toll is being grossly underestimated. They've actually gone through it. They were experiencing trauma. Neurosurgeons claim that these are PTSD symptoms. "Everyone has their own mechanism to deal with mental pain," they added. During the outbreak, these volunteers—students, nurses, working professionals—face a variety of mental health challenges. In order to evaluate the mental health of the Indian populace as a whole, a questionnaire that draws inspiration from existing literature has been created and disseminated via social media platforms.

Research from previous epidemics, such as SARS in 2003, equine influenza in 2014, and Ebola in 2020 (Dong &Bouey 2020; Hawryluck et al., 2004), has shown that the epidemic and quarantine caused more psychological distress. During the COVID-19 outbreak, Cheung et al., 2021 addressed mental health nursing issues in Hong Kong among individuals who primarily worked in hospitals. The impact of the SARS-COV-2 pandemic on the mental health of students enrolled in higher education programs worldwide is evaluated by de Oliveira Araújo et al. in 2020. Studies conducted during previous epidemics such as SARS in 2003, equine influenza, and Ebola in 2014 (Dong &Bouey 2020; Hawryluck et al., 2004) found increased psychological distress as a consequence of the epidemic and quarantine. During the COVID-19 outbreak, Cheung et al., 2021 addressed mental health nursing problems in Hong Kong among people mostly working in hospitals. de Oliveira Arajo et al., 2020 examine the impact of the SARS-COV-2 pandemic on the mental health of students in higher education throughout the world. Furthermore, Sanghera et al., 2020 carried out research exclusively for healthcare providers in a hospital setting. 2020 Kumar and Nayar talked about COVID-19 and its long-term effects on mental health. As stated by Javed et al. (2020), there is a serious impact of pandemic on the mental health of the general public. Self-isolation

and quarantine possess an adverse effect on mental health too.

Liu et al., 2020 conducted a mental health survey among Chinese medical students using a methodically constructed questionnaire during the pandemic wave. Johnson et al., 2021, evaluated the effects of the pandemic and lockdown on mental health care and mental health service users during the COVID-19 outbreak. Via the created questionnaire, cross-sectional data from mental health care providers in the UK were gathered online. Jones et al.'s 2021 study examined the pandemic's effects on the mental health of HIV-positive Americans. Using an online questionnaire, Mazza et al., 2020 examined mental health concerns affecting the general public for those aged 18 and above. in Italy during a pandemic. Australia's adult population's mental health during the first month of the pandemic was investigated by Fisher et al. in 2020. Pierce et al. (2020) adopted a general health questionnaire to evaluate the mental health of 16-year-old and older members of the UK public before and during lockdown. Using the snowballing principle, Varshney et al. (2020) conducted an online survey on the psychological impact of the COVID-19 outbreak among Indian residents. González-Sanguino et al., 2020 used the snowball sampling method in an online survey to evaluate the effects of mental health on the Spanish population during the early stages of the COVID-19 pandemic.

2. Objectives

Assessing Mental Health Impact: The primary objective is to understand the mental health impact of the COVID-19 pandemic on the general public in India.

Developing a Mental Health Index: The study aims to develop a COVID-19 Mentality Index (CovM) based on factors such as the effect of lockdown, depression levels, quality time spent with family, social life disruption, fear of the pandemic, and others.

3. Methods

The study involved an online survey conducted from November 2020 to January 2021, spanning 92 days. The survey targeted Indian citizens, and social networks were the primary platforms for distributing the questionnaire.

The final sample consisted of 1,130 individuals. Of these, 520 (46.02%) were male, and 610 (53.98%) were female. Participants were required to respond to all the questions in the online survey for their responses to be included in the statistical analysis.

Table 1 Descriptive statistics of participants of the survey

Variable	Group	Frequency (%) (N = 1130)
Age (in years)	1-15	44 (3.89 %)
	16-30	547 (48.41 %)
	31-45	205 (18.14 %)
	46-60	178 (15.75 %)
	61-75	107 (9.47 %)
	76-90	49 (4.34 %)
	Mean ±SD	36.72 ±18.74
Occupation	Government Job	78 (6.90 %)
	Private Job	168 (14.87 %)
	Self business	112 (9.91 %)
	Other	772 (68.32 %)
Annual income (in INR)	< 1 Lakh	247 (21.86 %)
	Between 1 to 5 Lakh	298 (26.37 %)
	Between 5 to 10 Lakh	337 (29.82 %)
	Between 10 to 15 Lakh	161 (14.25 %)
	> 15 Lakh	87 (7.70 %)
	Mean ±SD	6,02,389.4 ±4,99,803.8
Level of depression	Mild depression	324 (28.67 %)
	Moderate depression	264 (23.36 %)
	Severe depression	168 (14.87 %)
	No affect	374 (33.10 %)
Enjoyed some me time	Yes	657 (58.14 %)
	No	150 (13.27 %)
	Maybe	323 (28.58 %)
Financial crisis	Slight loss	456 (40.35 %)
	Huge loss	226 (20.00 %)

	No loss	448 (39.65 %)

Note: SD-Standard deviation

Participants in our study, including their demographics, living conditions, and changes in behavior during the COVID-19 lockdown. Here's a breakdown and summary of the key points:

[i] Demographics: The study involved a total of n=1130 participants. All participants voluntarily responded to an online survey and indicated their informed consent within the survey. Students (n=438, 38.76%) constituted the largest group, followed by working individuals (n=347, 30.71%) and nonworking individuals (n=345, 30.53%).

[ii] Residential Areas: Most participants are from urban areas (n=543, 48.05%), followed by semi-urban areas (n=356, 31.5%), and rural areas (n=231, 20.44%).

[iii] Family Size: The available family members with the respondents during the pandemic were categorized as up to 5 members (n=635, 56.19%), 6 to 10 members (n=345, 30.53%), 11 to 15 members (n=116, 10.27%), and 16 to 20 members (n=34, 3.01%).

Social Networking and Screen Time: Before lockdown, males spent an average of 4.36 hours for social networking and during lockdown, this increased to 8.53 hours. Females spent an average of 3.99 hours before lockdown and 7.79 hours during lockdown. Before lockdown, males spent an average of 8.04 hours at home, which increased to 16.13 hours during lockdown. Females spent an average of 10.17 hours at home before lockdown and 17.80 hours during lockdown.

2.2 Study instrument

The study aims to explore the impact of the pandemic on the mental health of the general public in India through various demographic and mental health data. An anonymous online questionnaire with 21 questions categorized into demographic and mental health data. Demographic data were collected on sex, age, residence, current status, occupation, income, family members, and changes in time spent at home and on social networking sites. Mental health of people was measured using various independent factors such as quality time with family, the effect of the lockdown on mental health,

COVID-19 Mentality Index (CovM):

For the development of *CovM* index, following independent factors in the survey are considered:

F1: How much lockdown affected you mentally?
F2: Did lockdown really help you to spend quality time with your family members?
F3: Are you depressed during lockdown?
F4: How much obstruction to your social life affected you mentally?
F5: Were you scared of pandemic situation?
F6: Were you confident about your ability to handle your personal problems?
F7: Did you enjoy having some me time?
F8: Are you comfortable talking to your family members regarding mental health problems?

F9: Did your family face any financial crisis?

F10: Did you lose your motivation towards your career during this period?

Using Eq. 1 normalized *CovM* index is computed.

$$CovM = \left(\frac{1}{Range}\right)\left(\frac{1}{m}\sum_{i=1}^{m} F_i\right) * 100\% \quad (1)$$

Development: CovM is a normalized index based on factors like the mental impact of the lockdown, depression, social life obstruction, pandemic-related fear, confidence in handling personal problems, me-time enjoyment, and more.

Calculation: Computed using a formula (Eq. 1) and categorized into mild, moderate, and severe depression.

Reliability: Cronbach's alpha for the factors is reported as 0.38.

3.0 Statistical Analysis:

3.1 Univariate Analysis:

Age and gender-wise distribution of CovM index.Indicates that as age increases, the impact of the pandemic becomes more severe. Participants, on average, face moderate depression.

Table 2 Descriptive statistics of *CovM*index across each group of the collected sample

Characteristic	Group	*CovM* index			
		Mean ±SD	Skewness	Correlation	P-value
Gender	Male	59.53 ±7.57	0.0235	0.0847	0.00438*
	Female	60.86 ±7.92	-0.0795		
Current status	Student	58.46 ±7.03	0.0178	0.0613	0.03925*
	Working	58.68 ±7.33	-0.0300		
	Non-working	62.66 ±8.03	-0.1566		
Area of residence	Urban	59.76 ± 7.60	0.1408	-0.0124	0.6781
	Semi urban	61.49 ± 7.68	-0.0767		
	Rural	59.47 ± 8.18	-0.2488		
Occupation	Private job	57.86 ± 7.48	-0.0161	0.0880	0.00306*
	Self business	60.00 ± 6.73	0.0057		
	Government job	61.15 ± 7.56	0.0359		
	Not applicable	60.71 ± 7.93	-0.0511		
Annual income (INR)	< 1 Lakh	57.60 ± 7.75	-0.1595	0.1963	2.82e-11*
	1 to 5 Lakh	59.07 ± 7.45	0.0865		
	5 to 10 Lakh	62.08 ± 7.42	-0.0708		
	10 to 15 Lakh	61.96 ± 8.01	0.1962		
	> 15 Lakh	61.52 ± 7.25	-0.1776		
Level of depression	Mild	56.23 ± 7.09	-0.0214	0.3327	2.2e-16*
	Moderate	62.27 ± 7.65	0.1887		
	Severe	59.72 ± 7.51	-0.1845		
	No impact	62.54 ± 7.15	-0.1384		
Enjoyed some me time	Yes	58.65 ± 7.51	0.0060	0.2633	2.2e-16*
	No	60.65 ± 7.82	-0.2167		
	May be	63.32 ± 7.39	-0.0088		

Note: * = Statistically significant correlations

Age and Gender-wise Distribution of CovM Index

It shows that as age increases, the CovM index increases, indicating a more severe impact of the pandemic. Participants, on average, face moderate depression during the pandemic (Mean (SD) CovM index = 60.25 (7.79)). Males (59.53 ± 7.57) have a lower average CovM index compared to females (60.86 ± 7.92). Statistically significant difference (p = 0.00438). Non-working individuals (62.66 ± 8.03) have a higher CovM index compared to students (58.46 ± 7.03) and working individuals (58.68 ± 7.33). Statistically significant differences (p = 0.03925). In area of residence no significant correlation with CovM index. Private job holders (57.86 ± 7.48) have a lower CovM index compared to those with self-business (60.00 ± 6.73), government job (61.15 ± 7.56), and not applicable (60.71 ± 7.93). In occupation statistically significant differences (p = 0.00306). A clear trend of increasing CovM index with higher income levels.Statistically significant differences between income groups (p < 0.05). Participants with moderate depression (62.27 ± 7.65) have a higher CovM index compared to those with mild (56.23 ± 7.09) and severe depression (59.72 ± 7.51).

Statistically significant differences ($p < 0.05$). Participants who answered "Yes" (58.65 ± 7.51) have a lower CovM index compared to "No" (60.65 ± 7.82) and "May be" (63.32 ± 7.39). In enjoyed some me time Statistically significant differences ($p < 0.05$).

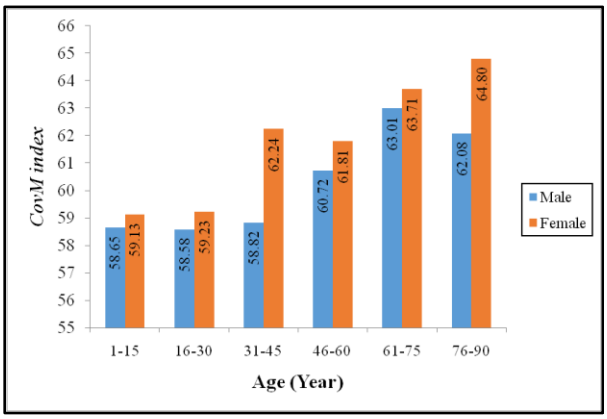

Figure 1 Variation of *CovM* index according to age and gender

Females in the age group 76-90 face the most significant mental health challenges, followed by the age group 31-45. For males, the impact on mental health is more in the age group 61-75, followed by the age group 76-90. Females in the age group 31-45 face more mental health challenges than males in the same age group. The effect of the pandemic on the mental health of females is consistently more severe than males across all age groups.

3.2 Median Test

The normality of the CovM index is assessed through the Shapiro-Wilk test, yielding a p-value of 8.21e-07. The rejection of the null hypothesis indicates that the assumption of normality for the index is not met. This observation is further supported by the graphical representation in Fig. 2, where the probability density curve overlaps with the histogram of the CovM index, signifying a deviation from a normal distribution.

The graphical representation in Fig. 2 illustrates that the probability distribution of the CovM index does not follow a normal distribution. This deviation is crucial in understanding the impact of the pandemic on the mental health of the general public in India. The variation observed in the CovM index across different levels of depression suggests a severe impact of the pandemic on mental well-being, as depicted in Fig. 3.

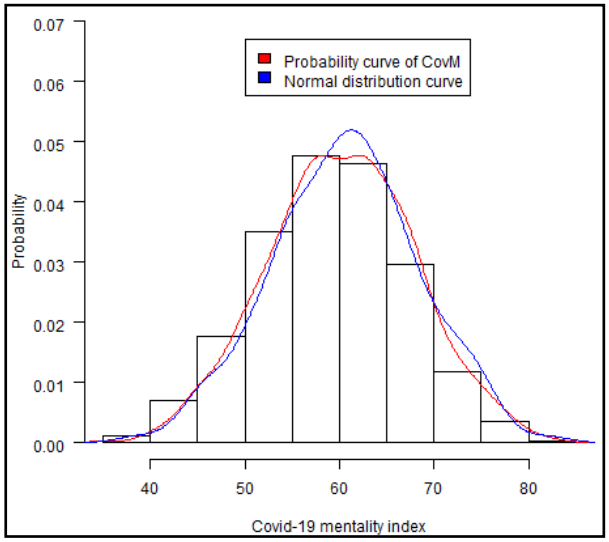

Figure 2 Probability curve of *CovM* index

The probability curve of the CovM index is depicted in Figure 2. From this representation, it is evident that the probability distribution of the CovM index across each level of depression deviates from a normal distribution.Since the normality assumption for the index is not satisfied, a median test is employed for further analysis (Siegel & Castellon, 1988). This non-parametric test is designed to compare medians across two or more independent groups. The test is conducted using the CovM index as the dependent variable, considering factors such as gender, area of residence, current status, occupation, age, level of depression, and annual income.

The results of the median test indicate significant p-values for all the characteristics considered. Significance in this context implies that the median CovM across the groups is not the same.

Subsequently, post-hoc analysis is performed to identify specific groups that exhibit significant differences from one another (refer to Table 3).For area of residence, the median CovM across semi-urban and urban areas is observed to be different. Similarly, in terms of occupation, the median CovM across government and private jobs differs significantly. Additionally, regarding the level of depression, only the moderate and no-impact categories share the same median CovM (refer to Table 3).

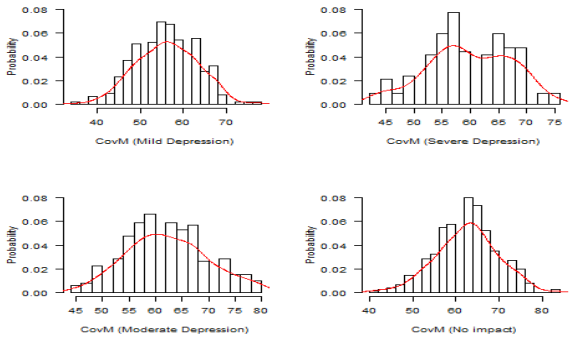

Figure 3 Distribution of *CovM* index according to level of depression

Table 3 Results of Mood's median test for checking equality of median across groups

Characteristic	(groups)	Test statistic	*P*
Gender	(Male and female)	5.980	0.0145*
Area of residence	Post-hoc analysis :	8.6868	0.0129*
	Rural - Semi urban		0.1004
	Rural – Urban		0.4357
	Semi urban – Urban		0.0033*
Current status	Post-hoc analysis :	42.898	4.84e-10*
	Student – Non working		7.32e-10*
	Student – Working		0.4264
	Non-working – Working		2.91e-06*
Occupation	Post-hoc analysis :	13.630	0.0086*
	Government Job - Private Job		0.0427*
	Government Job - Self-business		0.5805
	Government Job - Not applicable		0.8941
	Private Job - Self-business applicable		0.1100
Age (years)	Post-hoc analysis :	27.877	3.847e-05*
	(1 – 15) – (61 – 75)		0.0235*
	(1 – 15) – (76 – 90)		0.0034*
	(16 – 30) – (61 – 75)		0.0001*
	(16 – 30) – (76 – 90)		0.0004*
	(31 – 45) – (61 – 75)		0.0029*
	(31 – 45) – (61 – 75)		0.0032*
(For all other age groups there is an insignificant difference in the median values)			
Level of depression	Post-hoc analysis :	87.558	< 2.2e-16*
	Mild – Severe depression		0.0011*
	Mild - Moderate depression		1.18e-12*
	Severe - Moderate depression		0.0474*
	Mild depression - No impact		1.81e-19*
	Severe depression - No impact		0.0474*
	Moderate depression - No impact		0.5013
Annual income	Post-hoc analysis :	31.832	2.07e-06*
	(< 1) – (6 to 10) Lakh INR		4.62e-06*
	(< 1) – (11 to 15) Lakh INR		0.0002*
	(< 1) – (> 15) Lakh INR		0.0003*
	(1 to 5) – (6 to 10) Lakh		0.0012*

	INR		
	(1 to 5) – (11 to 15) Lakh INR		0.0101*
	(1 to 5) – (> 15) Lakh INR		0.0081*
(For all other income groups there is an insignificant difference in the median values)			

Note: * = Statistically significant *P*-values.

3.3 Multiple Linear Regression Analysis

A linear regression model without an intercept term is developed, with the CovM index serving as the dependent variable. The model identifies several significant predictors:

Sex: β=8.23, SE=0.57, P-value: < 2e-16

Area: β=4.72, SE=0.36, P-value: < 2e-16

Occupation: β=2.98, SE=0.21, P-value: < 2e-16

Age: β=0.22, SE=0.017, P-value: < 2e-16

Level of depression: β=4.95, SE=0.24, P-value: < 2e-16

Annual income: β=4.74e-06, SE=6.62e-07, P-value: < 2e-16

Each predictor is found to be statistically significant in predicting the CovM index for the general public in India, with relatively low standard errors (SE) of β. Other characteristics of the model include an F-statistic of 6087 on 6 and 1124 degrees of freedom, with a highly significant p-value of <2.2e-16. The adjusted R-squared value is 0.97, indicating a high degree of explanatory power.The assumption of normality of residuals is established through the Shapiro-Wilk test, resulting in a p-value of 0.3195. Consequently, the fitted regression model is deemed significant for predicting the mental health of the general public in India using the specified predictors.

Results

This study addresses a critical gap in existing research by comprehensively assessing the impact of the COVID-19 pandemic on the mental health status of the general population in India. Emphasizing both risk factors and protective factors, the study aims to contribute valuable insights to the understanding of mental health dynamics during this unprecedented global crisis.

Utilizing an online survey, data were collected from a diverse range of participants spanning various age groups, states, and union territories in India. The study introduces the COVID-19 Mentality (CovM) index, a numerical measure positively associated with the mental health of the general public. Significant associations were identified between the CovM index and key factors such as sex, current status, occupation, annual income, level of depression, and the experience of personal time during the pandemic.

The findings highlight the significance of factors such as level of depression, underscoring their high positive correlation with the CovM index. It is crucial to recognize that India's diverse cultural landscape requires careful consideration, and the study acknowledges the limitation of using a global language in survey responses.

This research contributes to the potential enhancement of mental healthcare systems in India, providing valuable insights for government authorities and healthcare professionals. By focusing on the psychological well-being of the Indian population, this study aims to inform targeted interventions and support mechanisms during these challenging times.

Looking ahead, future research endeavours could explore the development of new mental health indices incorporating additional factors such as anxiety, fear, and vulnerability. Continued efforts in this direction will contribute to a more comprehensive understanding of mental health dynamics and inform strategies to address the evolving needs of the population during and beyond the pandemic.

Discussion

The unprecedented challenges posed by the COVID-19 pandemic have had profound implications for the mental health of various segments of the population, including students, working professionals, and non-working individuals. In an effort to comprehensively assess the impact of the pandemic on the general public in India, a numerical measure was developed, representing the severity of mental health issues. The size of this index is positively correlated with the mental health status of the public, categorized into levels of mild depression, moderate

depression, and severe depression. The developed index, crucial for understanding the nuanced impact of the pandemic, does not adhere to the normality assumption of ANOVA. As a robust alternative for assessing significant differences among independent groups, the median test was employed. Post-hoc analysis of the median test yielded statistically significant results, shedding light on specific trends and variations within the data. Key findings from the results indicate that females, particularly in higher age groups, have experienced more severe impacts on their mental health during the pandemic. Additionally, a noteworthy proportion of the general public has reported experiencing some personal time during the COVID-19 pandemic. Conversely, individuals have also faced slight losses during this challenging period.

This discussion underscores the multifaceted nature of the mental health challenges posed by the pandemic and emphasizes the need for tailored interventions and support mechanisms, especially for vulnerable groups. The utilization of a numerical index and robust statistical tests provides a quantitative basis for understanding and addressing mental health issues within the context of a global crisis.

References:

[1] Cheung, T., Fong, T.K.H., &Bressington, D., (2021). COVID-19 under the SARS cloud: Mental Health Nursing during the pandemic in Hong Kong, *Journal of Psychiatric and Mental Health Nursing, 28 (2),*115-117.https://doi.org/10.1111/jpm.12639.

[2] De Oliveira Araújo, F.J., de Lima, L.S.A., Cidade, P.I.M., Nobre, C.B., &Neto, M.L.R., (2020). Impact of Sars-Cov-2 and its reverberation in global higher education and mental health. *Psychiatry Research, 288*, 112977.https://doi.org/10.1016/j.psychres.2020.112977

[3] Dong, L., &Bouey, J., (2020). Public mental health crisis during COVID-19 pandemic, China. *Emerging Infectious Diseases, 26 (7)*, 1616. https://doi.org/10.3201/eid2607.200407

[4] Fisher, J.R., Tran, T.D., Hammarberg, K., Sastry, J., Nguyen, H., Rowe, H., Popplestone, S., Stocker, R., Stubber, C., &Kirkman, M., (2020). Mental health of people in Australia in the first month of COVID-19 restrictions: a national survey. *Medical Journal of Australia, 213 (10)*, 458-464. https://doi.org/10.5694/mja2.50831

[5] González-Sanguino, C., Ausín, B., Castellanos, M.Á., Saiz, J., López-Gómez, A., Ugidos, C., & Muñoz, M., (2020). Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain, Behavior, and Immunity, 87*, 172-176. https://doi.org/10.1016/j.bbi.2020.05.040

[6] Helliwell, J.F., Huang, H., Wang, S., & Norton, M., (2021). World happiness, trust and deaths under COVID-19. *World Happiness Report 2021*, 13-57.

[7] Hawryluck, L., Gold, W.L., Robinson, S., Pogorski, S., Galea, S., &Styra, R., (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases, 10 (7)*, 1206. https://doi.org/10.3201/eid1007.030703

[8] Javed, B., Sarwer, A., Soto, E.B., &Mashwani, Z.U.R., (2020). Impact of SARS-CoV-2 (coronavirus) pandemic on public mental health. *Frontiers in Public Health, 8*, 292. https://doi.org/10.3389/fpubh.2020.00292

[9] Jones, D.L., Ballivian, J., Rodriguez, V.J., Uribe, C., Cecchini, D., Salazar, A.S., Cassetti, I., &Alcaide, M.L., (2021). Mental health, coping, and social support among people living with HIV in the Americas: A comparative study between Argentina and the USA during the SARS-CoV-2 pandemic. *AIDS and Behavior*, 1-9. https://doi.org/10.1007/s10461-021-03201-3

[10] Johnson, S., Dalton-Locke, C., San Juan, N.V., Foye, U., Oram, S., Papamichail, A., Landau, S., Olive, R.R., Jeynes, T., Shah, P., & Rains, L.S., (2021). Impact on mental health care and on mental health service users of the COVID-19 pandemic: a mixed methods survey of UK mental health care staff. *Social Psychiatry and Psychiatric Epidemiology, 56*

(1), 25-37. https://doi.org/10.1007/s00127-020-01927-4

[11] Júnior, J.G., de Sales, J.P., da Silva, F.C.T., de Deus QuirinoFilho, J., Cavalcanti, R.D.C.P.B., Landim, J.M.M., Lima, N.N.R., de Matos Neto, F.F., Cardoso, F., &Neto, M.L.R., (2021). Analysis of the prison population's mental health in Sars-Cov-2 pandemic: Qualitative analysis. *Psychiatry Research, 296*, 113669. https://doi.org/10.1016/j.psychres.2020.113669

[12] Kumar, A., &Nayar, K.R., (2020). COVID 19 and its mental health consequences. *Journal of Mental Health, 180 (6),* 817-8. https://doi.org/10.1080/09638237.2020.1757052

[13] Liu, J., Zhu, Q., Fan, W., Makamure, J., Zheng, C., & Wang, J., (2020). Online mental health survey in a medical college in China during the COVID-19 outbreak. *Frontiers in Psychiatry, 11*, 459.https://doi.org/10.3389/fpsyt.2020.00459

[14] Lung F. W., Lu, Y.C., Chang, Y.Y., &Shu, B.C., (2009). Mental symptoms in different health professionals during the SARS attack: a follow-up study. *Psychiatric Quarterly, 80 (2)*, 107-116. https://doi.org/10.1007/s11126-009-9095-5

[15] Maunder, R.G., 2009. Was SARS a mental health catastrophe? *General Hospital Psychiatry, 31 (4)*, 316. https://doi.org/10.1016/j.genhosppsych.2009.04.004

[16] Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., & Roma, P., (2020). A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors. *International Journal of Environmental Research and Public Health, 17 (9)*, 3165. https://doi.org/10.3390/ijerph17093165

[17] Moghanibashi-Mansourieh, A., (2020). Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian Journal of Psychiatry, 51*, 102076. https://doi.org/10.1016/j.ajp.2020.102076

[18] Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., Wessely, S., McManus, S., & Abel, K.M., (2020). Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *The Lancet Psychiatry, 7 (10),* 883-892. https://doi.org/10.1016/S2215-0366(20)30308-4

[19] Phiri, P., Ramakrishnan, R., Rathod, S., Elliot, K., Thayanandan, T., Sandle, N., Haque, N., Chau, S.W., Wong, O.W., Chan, S.S., & Wong, E.K., (2021). An evaluation of the mental health impact of SARS-CoV-2 on patients, general public and healthcare professionals: A systematic review and meta-analysis. *E Clinical Medicine, 34*, 100806. https://doi.org/10.1016/j.eclinm.2021.100806

[20] Rajkumar, R.P., 2020. COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry, 52*, 102066. https://doi.org/10.1016/j.ajp.2020.102066

[21] Sanghera, J., Pattani, N., Hashmi, Y., Varley, K.F., Cheruvu, M.S., Bradley, A., & Burke, J.R., (2020). The impact of SARS-CoV-2 on the mental health of healthcare workers in a hospital setting-A Systematic Review. *Journal of Occupational Health, 62 (1),* e12175. https://doi.org/10.1002/1348-9585.12175

[22] Siegel, S., & Castellon, N.J., (1988). Nonparametric statistics for the behavioral sciences, *McGraw-Hill*.

[23] Torales, J., O'Higgins, M., Castaldelli-Maia, J.M., &Ventriglio, A., (2020). The outbreak of COVID-19 coronavirus and its impact on global mental health. *International Journal of Social Psychiatry, 66 (4)*, 317-320. https://doi.org/10.1177/0020764020915212.

[24] Varshney, M., Parel, J.T., Raizada, N., &Sarin, S.K., (2020). Initial psychological impact of COVID-19 and its correlates in Indian Community: An online (FEEL-COVID) survey. *PloS One, 15 (5),* e0233874.https://doi.org/10.1371/journal.pone.0233874