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ASSESSMENT OF DEPRESSION IN THE COMMUNITY DURING THE COVID-19 PANDEMIC IN INDIA: A WEB-BASED CROSS-SECTIONAL STUDY

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Abstract
Background: The rapid outbreak of the novel coronavirus and the resulting pandemic placed unprecedented stress on the world's population. The crisis was compounded in the developing world due to several psychosocial factors such as widespread poverty, poor public health infrastructure, and the existing widespread depression and mental health challenges within the communities. **Objective:** This study assesses depressive symptoms amongst the study population during COVID-19 pandemic using an online version of the Patient Health Questionnaire (PHQ-9). **Methods:** The study employed a cross-sectional survey design to target population aged 18-65 years in India. A total 423 participants participated in the study. Data collection was carried out over a five-month period when the pandemic peaked around April to September 2020.
Results: Study results indicated that 46% of the participants reported moderate to a high level of depressive symptoms during the COVID-19 pandemic. The prevalence rates of depression amongst male participants were reportedly higher than females at moderate to high levels. While considering age differential a comparatively higher scores for common depressive disorders were seen amongst the younger age groups than the older age group. Overall, a substantial percentage of the participants indicated moderate to high level of depressive symptoms during the COVID-19 pandemic.
Conclusion: There is a greater need for addressing mental health issues by the policymakers during the pandemic period and beyond by investing more in life-saving mental health programmes, that include utilizing technology such as telemedicine and tele-behavioural health to target communities with the greatest need.

Keywords: Depression, Mental Health, COVID-19, PHQ-9, Psychosocial Stress, Social Isolation and Lockdown.

Introduction

The COVID-19 (Coronavirus disease) pandemic has had an unprecedented global impact on the population. The journey from its first detection in the Wuhan province of China in 2019 to being declared as a global pandemic by the World Health Organization in 2020 was rapid and unprecedented. Ever since Coronavirus cases are growing exponentially during the peaks in the world and posing greater socio-economic, public health and mental health challenges. The global data presents a grim scenario; as of 22nd July 2021, there were 191,773,590 confirmed cases of COVID-19, including 4,127,963 deaths, as reported by the World Health Organizations. As per the report of 19 July 2021, a total of 3.69 billion vaccine doses had been administered.[1] As on 23rd July 2021, India reported 405513 active COVID-19 cases, out of which 30,468,079 (94.59%) cases had recovered and 42,34,17,030 individuals were vaccinated. India has reported 4.19 Lakhs (1.34%) death toll in the country.[2]

As the Coronavirus crisis worsened, most countries including India implemented stringent lock down and work-from-home policies, stay-at-home orders, closing educational institutions, businesses, public spaces, social gatherings, domestic and international travels. The long hard 68 days of the lockdown negatively impacted individuals and communities particularly the vulnerable populations like the migrant workers, elderly, women, children and people with comorbidities, at the same time they were also at risk of depression, anxiety and substance use, loneliness and domestic violence.[3]

The psychosocial impact due to the pandemic is long lasting and represents a public health emergency for all nations.[4] There is a critical need at this time to broadly understand how people feel and how COVID-19 pandemic is impacting the population.

India adopted rigorous public health strategies such as case detection, contact tracing, isolation, home quarantine and treatment of the infected to control the virus outbreak. The outbreak of the disease is associated with a higher prevalence of comorbidities. Specifically, depression, post-traumatic stress disorder (PTSD) and substance use disorders among quarantined persons experiencing isolation, with varying responses and coping strategies has been reported.[5] Recent research confirmed that the pandemic is associated with negative mental health symptoms across all age groups, and those four in ten adults aged 18 and over (40%) reported increased depression and anxiety. Despite the fact that older adults (aged over 65 years reported lower rates of depression and anxiety (24%) since the pandemic started in March 2020, this is particularly important as symptoms among older are often secondary to social

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isolation, bereavement and there is an increased risk for premature death.[6] The leading cause of stressors across all age groups include longer duration of quarantine, fears of infection, helplessness, frustration, boredom, inadequate supplies, inadequate information, financial loss and stigma. With regard to gender differences, women reported significant higher PTSD in the domains of re-experiencing, negative alterations in cognition or mood due to the pandemic in recent research in China.[7] However, there is scope of further research in the areas of differences in the impact of COVID-19 based on gender. The present study administered the Patient Health Questionnaire (PHQ-9) [8] to assess depressive symptoms among the study population during the COVID-19 pandemic in India. The instrument is a brief self-report questionnaire widely used in the community-based health settings and well validated for diagnosis of depression. [9] As discussed, the lives of people were drastically affected with continuous lock-downs, economic uncertainty, isolation, fears of infection, transmission, death and global spread. Hence, this study attempted to assess the depressive symptoms due to negative impact of COVID-19 among the study population. The results could be beneficial for policy makers and practitioners in formulating comprehensive intervention plans in primary, secondary health care settings as well as at the community level in India.

Study Design and Study Population

A cross-sectional survey design was employed to assess the depression during the first wave of COVID-19 in the study sample in India. The data was collected during COVID-19 first wave from 7th April to 27th September 2020 using an online platform as part of the psychosocial support and counselling initiative offered during the pandemic in India. During abovementioned period a total of 1430 respondents had availed the online services and provided consent to participate in the study. In this study, online self-reported PHQ-9 questionnaire with a consent form was used. Out of the total respondents, a sample size of 423 participants was included in the study after sample size calculation with 95 per cent of CI and a 4 per cent margin of error. All the study participants had provided their consent to voluntarily participate in this web-based study.

Some of the recent research studies on the pandemic employed online cross-sectional surveys on social media platforms to quickly assess the public concerns and reactions about COVID-19, including the ability to access health care, use of online medical consultation, and lifestyle changes associated with social distancing.[10] In this study all potential adult participants who had access to Internet, demonstrated the appropriate level of reading and comprehension skills and wished to avail psychosocial support services which were advertised on social media.

Instruments

The Patient Health Questionnaire [11] is a self-administered 9-item instrument used to identify common mental disorders in the community, and it evaluates each of the nine DSM-IV criteria for depression with those scoring high coinciding with Major Depressive Episode (MDE). It can also be used to assess the severity of depression by identifying from mild to severe cases.[12] The depression module scores each of the 9 DSM-IV criteria as “0” (not at all), “1” (several days), “2” (More than half the days) and “3” (nearly every day). Internal consistency of the PHQ-9 was assessed during COVID-19 pandemic period, and Cronbach's Alpha was found to be high at .89. Pearson correlations were significant ($p<0.01$). The instrument captured how often the participants were affected by the pandemic in their daily lives. The total scores ranged from 0 to 27, with greater scores equating to high level of depression. The severity of depression scale is categorized as mild (0–4), moderate (5–9), moderately severe (10–14), severe (15–19) and very severe (20–27). The cut off score of 10 indicated a possible diagnosis of depressive disorder.

Ethical Considerations

All ethical guidelines were followed and human subject protocols were approved. All participants were informed about the objective, purpose of the study; an informed consent form was displayed on the first page of the online survey of the instrument. Those participants who provided consent were 18 years or older, and subsequently the participants had completed the PHQ-9. In order to maintain confidentiality and anonymity of the participants, no data pertaining to their personal identification was collected. Participants were assured that the collection of the data was for research and referral to free counselling services only. Confidentiality was maintained and the identity of the participants were protected in accordance with the ethical requirements of the human subjects’ review board and the study was approved by the IIHMR, Delhi ethical review committee.

Statistical Analysis

The collected data were coded and analysed using IBM SPSS Statistics for windows, version 24. First, descriptive statistics were presented. Second, Pearson’s Chi-square tests were performed to calculate the association between the independent and dependent variables. Bivariate correlations were then calculated to find the association between socio-demographic variables and PHQ-9 severity scores. The significance level was set at $p<0.05$ with a confidence interval of 95%.

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Results

A total of 423 study participants' data was analysed, the large majority n=317 (74.9 %) of the participants were male and n=106 (25.1%) were females. The associations of PHQ-9 scores with demographic characteristics are shown in Table 1. The maximum (49 percent) participants were found to be in the younger age range of 18-25 years, followed by 33 percent between the ages of 26-33 years (mean age 29.09 years [SD=9.21]). However, the mean and SD values were found close to each other, the normality distribution of the dataset was also carried out. The following Table 1, indicated that there is not much difference between mean and median analysis.

Table 1: Demographic characteristics and associations with PHQ-9 scores

	N= 423 (%)	**PHQ-9 score Mean (S.D.)**	**PHQ-9 score Median (IQR)**	**Group Differences * P value**	**Cohen's d, # effect-size**
Gender				P≤.001	-1.20
Male	317 (74.9)	10.65 (**7.5**)	10.00 (13)		
Female	106 (25.1)	8.75 (6.5)	7.00 (9)		
Age groups/Yrs.				P≤.001	1.44
18-25	208 (49.2)	10.50 (7.02)	9.00 (12)		
26-33	141 (33.3)	11.85 (7.49)	11.00 (9)		
34-41	22 (5.2)	4.91 (2.95)	6.00 (5)		
42-49	25 (5.9)	9.88 (8.18)	8.00 (15)		
50-57	20 (4.7)	1.55 (2.03)	0.00 (3)		
58-65	7 (1.7)	8.86 (**8.55**)	2.00 (16)		

*Group differences were performed using χ2 test, Mann–Whitney U test, and Kruskal-Wallis test (Pb.001).
#Cohen's defined effect sizes as follows: "small, d=.2", "medium, d=.5", and "large, d=.8".
**The bolded means in the table represent the subgroups with the highest mean score.

Statistically significant gender and age differences in the respondents were associated with a higher PHQ-9 score [p= ≤.001]. The subgroups for each variable with the highest and lowest mean scores were considered calculating the value of Cohen's d, which represented the difference between means divided by standard deviation.[13] As indicated in the Table-1, the calculated total scores of common depressive disorders were low amongst females (Mean 8.75, S.D. 6.5) and high amongst the male (Mean 10.65, S.D. 7.5) participants. On other hand, higher scores for common depressive disorders were seen amongst the younger age groups e.g., 49 percentage in the age groups of 18-25 years and 33 percentage amongst the 26-33 years (Mean 10.50, S.D. 7.02) was 33 percentage (Mean 11.85, S.D. 7.49).

The following Table-2 presented the prevalence rates of depressive syndromes at different level between genders. The severity levels of depressive symptoms yielded a noteworthy difference in gender distribution within the representative sample. The prevalence rates for moderate scores (10-14) on the PHQ-9 for men were significantly higher (89%) compared to women (11%), Overall, 46% of the participants had indicated moderate to high level of depressive symptoms during the COVID-19 pandemic.

Table 2: Prevalence rates of depressive syndromes (Kroenke et al., 2010)

PHQ-9 Score	**Total sample**		**Male**		**Female**	
	N	%	N	%	N	%
Minimal (PHQ-9 score ≤ 5)	133	31.4	91	68.42	42	31.58
Mild (PHQ-9 score 5–9)	98	23.2	65	66.33	33	33.67
Moderate (PHQ-9 score 10–14)	71	16.8	63	88.73	8	11.27
High (PHQ-9 score 15–27)	121	28.6	98	80.99	23	19.01

Bivariate analysis (Table- 3) indicated that there were significant correlations between the PHQ-9 items and age of male participants. There is an increased severity of mental health impact among the male participants as compared to the females and a negative association between depression and age of male respondents, symptoms were more severe among higher age groups.

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However, scores showed that there was negative correlation of PHQ-9 items with age of the female participants, and there were lower severity scores compared with males.

Table 3: Bivariate Analysis: Coefficient Correlation of PHQ-9 indicators with Age, Sex

		Age	Sex	Age (Male)	Age (Female)
1. Little interest or pleasure in doing things.	Pearson Correlation	**-.163**	-.025	**-.219**	.181
	Sig. (2-tailed)	.001	.605	.000	.063
2. Feeling down, depressed, or hopeless.	Pearson Correlation	**-.137**	**-.117**	**-.192**	.049
	Sig. (2-tailed)	.005	.016	.001	.619
3. Trouble falling or staying asleep, or sleeping too much.	Pearson Correlation	**-.215**	.054	**-.246**	-.045
	Sig. (2-tailed)	.000	.267	.000	.645
4. Feeling tired or having little energy.	Pearson Correlation	**-.162**	-.050	**-.185**	-.124
	Sig. (2-tailed)	.001	.309	.001	.204
5. Poor appetite or overeating.	Pearson Correlation	**-.220**	-.019	**-.271**	.080
	Sig. (2-tailed)	.000	.690	.000	.418
6. Feeling bad about yourself - or that you are a failure or have let yourself or your family down.	Pearson Correlation	**-.173**	-.075	**-.234**	.075
	Sig. (2-tailed)	.000	.126	.000	.445
7. Trouble concentrating on things, such as reading the newspaper or watching television.	Pearson Correlation	**-.141**	**-.226**	**-.247**	**.231**
	Sig. (2-tailed)	.004	.000	.000	.017
8. Moving or speaking so slowly that other people could have noticed? Or the opposite- being so fidgety or restless that you have been moving around a lot more than usual.	Pearson Correlation	**-.161**	**-.161**	**-.236**	.101
	Sig. (2-tailed)	.001	.001	.000	.302
9. Thoughts that you would be better off dead or of hurting yourself in some way.	Pearson Correlation	**-.224**	**-.136**	**-.282**	-.129
	Sig. (2-tailed)	.000	.005	.000	.188
	N	423	423	317	106

Discussion

India has witnessed many outbreaks of pandemic over the last three decades such as SARS, Bird Flu, Swine flu, Plague, Dengue, Chikungunya, Encephalitis, and the Nipah Virus but none of these diseases were as threatening and widespread as the COVID-19 pandemic. Due to lack of awareness of the health risks, public health preparedness, social stigma and psychosocial consequences, it adversely affected the mental well-being of the population in most affected countries.

The purpose of the current study was to explore mental health situation particularly depression amongst the study population during the COVID-19 pandemic. The results indicate an emergent need to upscale the healthcare system in India by integrating facilities like universal screening for depression and mental health for all persons seeking care including those currently being treated in acute medical facilities and community-based clinics for symptoms related to the COVID-19 virus. Early identification of specific risk factors for depression will assist in comprehensive interventions including pharmacotherapies, and telehealth needs to reach underserved populations to address co-morbid mental health conditions in medical and community mental health settings. This study provided evidence that the PHQ-9 is a reliable and valid self-report measure for depression in community settings. The result of PHQ-

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9 indicators highlighted that COVID-19 has significant mental health impact on the community, especially the male participants who were found to have a higher rate of depression than the female participants during COVID-19 period. Results indicated mild to high range scores for depression amongst males which could be due to the fear of infection, death in the family, loss of income, medical expenses, unemployment and other associated psychosocial factors.

In the traditional Indian family model, there is a change in gender role, however, during the pandemic male participants seem to have reported higher level of depressive symptoms may be due to inability to care for their families. The pandemic exacerbated mental health issues and depression for both male and female participants equally.[14] Moreover, several studies indicated that women demonstrated great resilience than men during the time of crisis and confronting critical issues of life. Men and women both experience depression but their presentation of symptoms can be very diverse. Contrary to the extant literature, depression affects a large number of men. [15] Compared with a previous study [7] reported contrary findings where women had significantly higher levels (7%) of post-traumatic stress symptoms (PTSS) a month after the COVID-19 pandemic in the hardest-hit areas in China.

The onset of lockdown had a major psychological impact in India as the affected population experienced moderate to severe level of stress with symptoms of anxiety, anger, irritability and loneliness due to the uncertainty and the risk of fatality. Similar to the findings of the current study the influence of pandemic on depressive symptoms are found to be moderate to severe. Another study also corroborated the estimated prevalence of depression, anxiety and stress among the Indian population during lockdown period reported for example 25.1% as moderately, 28% as extremely, and 11% as severely depressed and anxious.[16] During the COVID-19 pandemic researchers in India reported increasing severity of depression and anxiety amongst the population.

Limitations

The sample was limited to a study population of participants that had access to mobile phones, computers with internet access, and their ability to read and write English. Additionally, there was a large number of males participants, compared to female participants. The gender differences in response rates have implications for further research, and factors associated with the impediments to participation by gender in India need to be evaluated given the current trends of findings. Despite the limitations, this study provided the first cross sectional data that assessed depression among community during the COVID-19 pandemic. However, a caveat that the findings do not generalize by gender, to the larger population in India.

Conclusion

Mental health issues associated with coronavirus disease are connected with a number of severe direct and indirect challenges that confront all communities today, and they may continue even in the post-pandemic world unless the global community takes affirmative action. As the findings of the study illustrated, it was established that depression is a common mental health problem among the population particularly during this unprecedented Coronavirus pandemic. This finding when juxtaposed with the fact that the essential mental health services around the world were interrupted in situations when it is required most raises concern about availability and accessibility. Thus, there is a greater need for addressing mental health issues by the policy makers during the pandemic period and beyond by investing more in life-saving mental health programmes. This includes utilizing technology such as telemedicine and tele-behavioural health to target communities with the greater need. The Government of India and some private institutions had initiated 24-hour COVID-19 helplines to provide psychosocial support by the mental health professionals in the country. Early identification of specific risk in the community for depression, trauma, anxiety and substance misuse along with integrated care systems with appropriate interventions and pharmacotherapies could effectively address the co-morbid depression and mental health conditions during a pandemic. Lack of adequate mental health care and trained professional are tangible challenges in the mental healthcare delivery systems. Front line health workers in the community, medical and para medical staff should be trained and engaged to detect and counsel the people with mental health needs. These measures could help in managing future course of the pandemic and even direct programmatic action in future because mental wellbeing is unquestionably a vital component of total health and wellbeing.

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