Demography India
Vol. 49, Special Issue (2020), pp. 140-152 ISSN 0970-454X

A study of depression, anxiety and insomnia during COVID-19 lockdown in India

Kirti Gaur[1], Kunal Keshri[*2], Avinash Sharma[3] and Hariom Pachori[4]

Abstract: Few empirical studies on mental morbidity during the COVID-19 lockdown have been carried out in India. The present study improves upon methodological limitations of earlier ones and aims to provide prevalence of depression, anxiety and insomnia among general population and examines the determining factors during lockdown in India. This study utilized data from an online survey during April 24 to May 07, 2020 using a bi-lingual questionnaire with a countrywide sample of 1015. Results show high prevalence of depressive (12.7%), anxiety (9.0%) and insomnia (21.0%) symptoms using PHQ-9, GAD-7 and ISI-7; comparatively higher than the pre-COVID-19 period in India. Respondents living in metros and non-metros were at greater risk of experiencing anxiety and insomnia. Single/married individuals not currently co-habiting with their spouse experienced 2-3 fold higher risks of mental morbidity. Those concerned about losing their livelihood or reduced earnings, had significantly higher risk of experiencing all three outcomes of interest. Risk of depression among Scheduled Caste/Scheduled Tribes was nearly twice compared to higher castes. Mental illness history was an important risk factor for depression and anxiety symptoms. Findings call for allocation of adequate resources for mental health service delivery in the current scenario, ensuring delivery to those identified at greater risk.

Keywords: Mental Health, COVID-19, Validated scales, Psychosocial determinants, Online survey, India.

Introduction

The novel coronavirus disease 2019 (COVID-19) caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was declared a pandemic by the World Health Organization on March 12, 2020, within three months of its first appearance in Wuhan, China (Chen et al., 2020; WHO, 2020). It has spread across the world rapidly; there were 11,669,259 infected cases with a total of 539, 906 deaths world-wide as on July 8, 2020 (WHOa, 2020). India is among the top three contributors to these numbers, with 742,417 confirmed cases and 20,642 deaths as on July 8, 2020 (MoHFW, 2020). To halt the spread of the outbreak, the Government of India was compelled to impose several containment measures such as travel restrictions, social distancing and lockdown (Pulla, 2020). These measures have affected the economy along with taking a toll on the social and mental well-being of individuals and society as a whole.

Although much research has been done to assess the psychological impact of COVID-19 across the globe, very few empirical studies have been carried out in the Indian setting (Chatterjee et al., 2020; Grover et al., 2020; Roy et al., 2020; Varshney et al., 2020). Some of

*Corresponding Author
[1] ICSSR Post Doctoral Fellow, G. B. Pant Social Science Institute, Prayagraj, India, Email: gaurk.iips@gmail.com
[2] Assistant Professor, G. B. Pant Social Science Institute, Prayagraj, India, Email: kunalkeshri.lrd@gmail.com
[3] Assistant Professor, Department of Psychiatry, Central Institute of Psychiatry, Ranchi, India, Email: ashsamar@gmail.com
[4] Statistician, Central Institute of Psychiatry (CIP), Ranchi, India, Email: hariom.iips@gmail.com

these studies have mainly focused on a particular state/province, some have carried out surveys using only the English version of questionnaires, while others have not been representative of the general population, as majority of the respondents were healthcare workers and residing in urban settings. In one study (Grover et al, 2020), scales used were translated into 11 Indian languages, however, the psychometric properties of these translated scales are unknown as the translation methodology and process of validation of these scales have not been explicitly stated. Similarly, other Indian studies have utilized questionnaires designed by the authors themselves (Chakraborty and Chatterjee, 2020; Roy et al., 2020) rather than having used local language versions of well-validated scales. Moreover, no attempts have been made to determine the impact of pertinent psychosocial variables, for e.g. social support, income, place of residence and caste, on the mental state, which might reasonably be assumed to be culturally relevant in relation to the mental health of the Indian population.

The present study has tried to address some of the shortcomings of previous studies by using a bilingual questionnaire, incorporating validated Hindi translation of scales used to identify depression, anxiety and insomnia. Also, psychosocial variables that are relevant to examining common mental health problems in the Indian settings have received due consideration. Overall, this study has attempted to obtain, in the context of the current COVID-19 pandemic, a snapshot of the prevalence of common mental health disorder symptoms during the lockdown amongst various socio-economic strata of the population, cutting across urban and rural settings, and its associated factors.

Materials and Methods

This cross-sectional study utilized primary data collected through an online survey carried out between April 24 to May 07, 2020, mostly during the second lockdown in India. Several studies across the globe, including India (Chakraborty and Chatterjee, 2020; Du et al., 2020; Grover et al., 2020; McFadden et al., 2020; Roy et al, 2020), have used this emerging methodology. Snowball sampling was used to conduct this Google-form based survey. A consent form[5] with a brief description of the aim of study preceded the online structured questionnaire, with the questionnaire becoming accessible only after respondents consented to participate. It was made explicitly clear that no personal information would be collected, ensuring anonymity of the data[6]. The web link of the survey form was circulated amongst individuals aged ≥18 using highly accessed social media platforms like WhatsApp and Facebook (Indian Express, 2019; Investopedia, 2019). Respondents were requested to further circulate the questionnaire to their contacts. To get a nationally representative response the questionnaire was prepared in two major languages, viz. Hindi and English. The former is the most spoken language (44 percent) among general population (RGI, 2011; TOI, 2018) while the latter is understood by a majority of the educated class across India. The response rate was 98.9 percent, covering almost all the States and Union Territories of the country. The final sample size of our study was 1015 after excluding 13 participants who did not complete the questionnaire.

[5] Consent form states that "We are conducting a survey to study the psychological outcomes of the outbreak of Corona Virus disease (COVID-19) on the general population of India. This survey is for the persons, who are 18 years or above. Kindly provide your consent to participate in this survey".

[6] To maintain anonymity any personal information (viz. name, e-mail Id or mobile number of the respondents) has not been collected in the online survey.

The outcome variables were common mental health problems, viz. depression, anxiety and insomnia, screened using self-administered questionnaires[7]. Depression was measured using the nine item Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001). The total score for the nine items ranges from 0 to 27 with strong psychometric properties and acceptable internal consistency (α=0.83). Similarly, anxiety was measured utilizing the seven item Generalized Anxiety Disorder Scale (GAD-7) (Spitzer et al., 2006), with scores ranging from 0 to 21 with Cronbach α=0.88. Insomnia was measured through the seven item Insomnia Severity Index (ISI-7), with scores ranging from 0 to 28 and Cronbach α=0.91 (Bastien et al., 2001). In accordance with earlier studies, a cut-off score of 10 or greater was considered for detecting depression (Hakim et al., 2017; Kroenke et al., 2001), anxiety (Hakim et al., 2017; Rakesh et al., 2012; Spitzer et al., 2006) and insomnia (Morin et al., 2011). All the scales used were validated in English and Hindi languages (Ingle et al., 2017; Kochhar et al., 2007; Lahan and Gupta, 2011). The reference period was two weeks prior to the survey.

The main predictors included marital status and living arrangement categorized into 'married living with spouse', 'married, living without spouse but with other family members', 'single living with other family members', and 'married/single living alone'. Worried about losing income or earning lesser than usual were categorized into 'not worried at all', 'worried over earning lesser than usual', and 'worried over both'. Self and family histories of mental illness were categorized into having and not having a history of mental illness. Place of residence was categorized into rural, urban and metropolitan cities ($\geq$5,000,000 population as per Census of India) which included Greater Mumbai, Delhi, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad, and Pune. The other control variables included regions, change in usual place of residence[8], caste (other caste, other backward classes (OBCs) and scheduled castes (SCs)/scheduled tribes (STs)), religion (Hindu, Muslim, others, and those not following any religion), sex (male and female), age (18-29, 30-44, 45-59, 60+) and whether the respondents were aware of the government's mental health helpline (yes or no). Logistic regression analyses were used to explain the risk factors associated with depression, anxiety and insomnia (Cameron and Trivedi, 2008). The adjusted Odds Ratio (OR) and 95% confidence interval (CI) were estimated. All the analyses were performed using STATA 13 (Statacorp, 2013).

Results

Majority of the respondents belonged to Central region of India (45%) (Table1). Around 60% resided in the urban non-metros. Five percent each changed their usual place of residence due to COVID-19 related reasons and other reasons. Majority of the respondents (61%) were from other castes and were Hindus (80%). Male respondents constituted 64% of the sample. More than 40% of the respondents belonged to 18-29 and 30-44 age-group each. One-half of the respondents were married and living with spouse. Sixty-five percent of the respondents had attained a post-graduate or higher education. One-third of them were engaged in private jobs (33%), followed by salaried/retired government jobs (24%). Nearly one-fifth of them did not earn (23%), and almost a similar percentage earned around INR 20,000-50,000 per month.

[7] Details available from authors on request

[8] Categorized as staying at usual place of residence, changed usual place of residence due to situation arising out of COVID-19, changed usual place of residence due to other reasons.

Table 1: Sample characteristics of respondents

Sample characteristics	Percentage	N
Region		
North	14.7	149
Central	46.0	467
East	17.0	172
North-East	4.0	41
West	8.9	90
South	9.5	96
Place of residence		
Rural	20.0	203
Urban- non-metro	60.3	612
Urban- metro	19.7	200
Usual place of residence (UPR)		
Staying at UPR	89.5	908
Changed UPR-other reasons	5.1	52
Changed UPR-due to COVID-19	5.4	55
Caste		
Others	60.7	616
OBCs	27.8	282
SCs/STs	11.5	117
Religion		
Hindu	80.0	812
Muslims	3.6	36
Others	5.1	52
Do not follow any religion	11.3	115
Sex		
Female	35.7	362
Male	64.3	653
Age group		
18-29	41.4	420
30-44	45.5	462
45-59	11.3	115
60 or more	1.8	18
Marital status		
Married living with spouse, with/without other family members	49.3	500
Married living without spouse but with other family members	4.3	44
Unmarried/single living with family members	29.2	296
Married/unmarried living alone	17.2	175
Education		
Up to High school	3.5	35
Intermediate	4.5	46
Graduate	27.2	276
Post-graduate	64.8	658
Occupation		
Daily wage workers	1.5	15
Business/Self Employed	10.5	107
Salaried/retired government job	23.5	238
Private job	33.3	338
Students	22.7	230
Others	8.6	87
Income		
No income	22.5	228
Up to 10,000	9.9	100
10,000-20,000	7.6	77
20,000-50,000	22.9	232
50,000-1,00,000	16.4	166
More than 1 lakh	8.4	85
Did not want to answer	12.5	127
Total	**100.0**	**1015**

Source: Authors' calculation from the data collected during April 24 to May 07, 2020 using online survey.

Table 2a: Reported severity of depression, anxiety and insomnia symptoms among general population

Outcome variables	Percent	N
Severity of depression- PHQ-9 scale (range)		
None/minimal (0-4)	66.2	672
Mild (5-9)	21.1	214
Moderate (10-14)	8.5	86
moderately Severe (15-19)	2.4	24
Severe (20-27)	1.9	19
Severity of anxiety- GAD-7 scale (range)		
None/minimal (0-4)	73.1	742
Mild (5-9)	17.8	181
Moderate (10-14)	5	51
Severe (15-21)	4	41
Severity of insomnia- ISI-7 scale (range)		
Absence of insomnia (0-7)	72.7	738
Sub-threshold insomnia (8-14)	19.6	199
moderate insomnia (15-21)	6.2	63
Severe insomnia (22-28)	1.5	15
Overall prevalence		
Percentage of responders reporting PHQ score>=10	12.7	1015
Percentage of responders reporting GAD score>=10	9.1	1015
Percentage of responders reporting ISI score>=10	21.0	1015

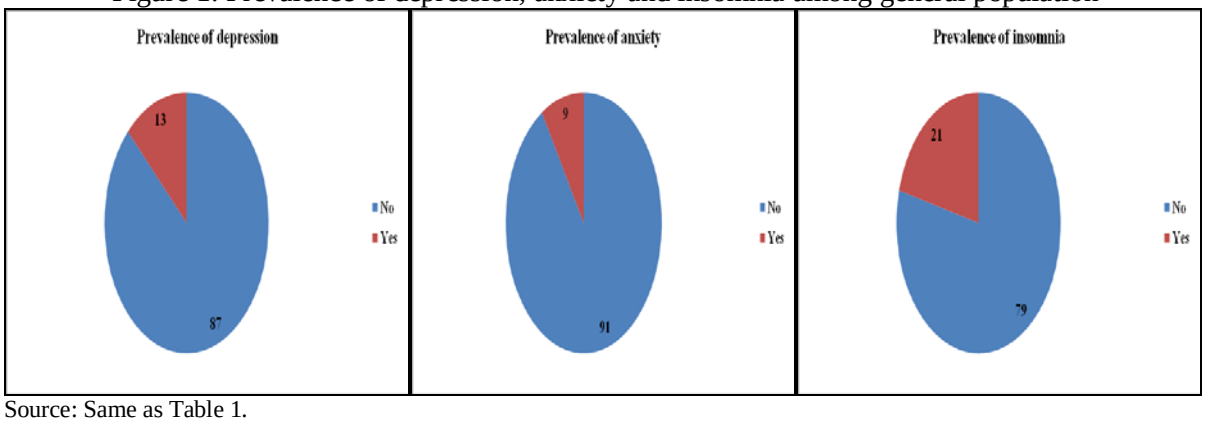
Source: Same as Table 1.

Table 2b: Mean (Standard Deviation) and median of reported depression, anxiety and insomnia symptoms among general population

Outcome variables (range)	Mean (SD)	Median
PHQ-9 (0-27)	4.15 (4.83)	3.0
GAD-7 (0-21)	3.27 (4.41)	2.0
ISI-7 (0-28)	5.07 (5.59)	3.0

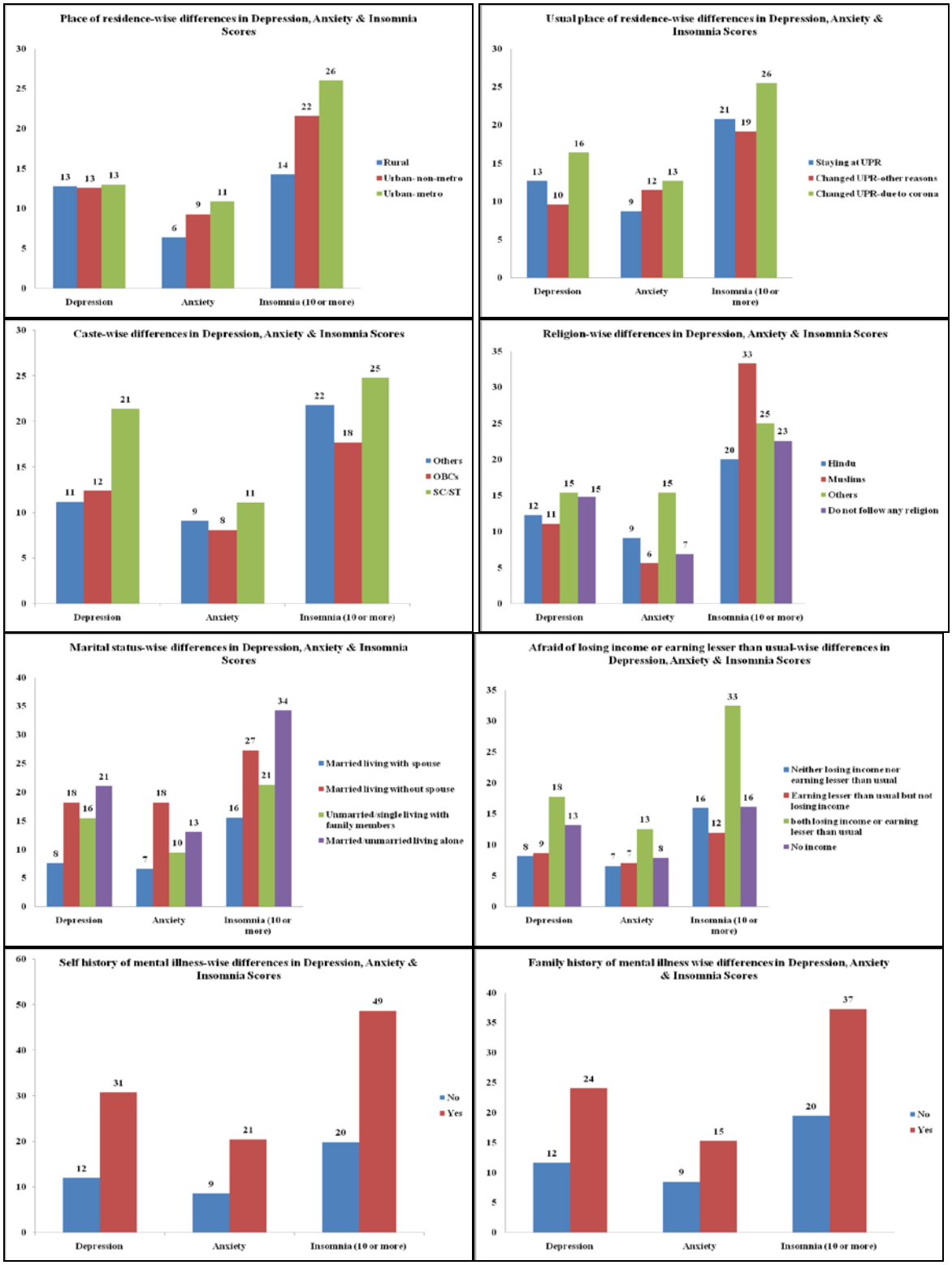
Source: Same as Table 1.

Figure 1: Prevalence of depression, anxiety and insomnia among general population



Source: Same as Table 1.

Figure 2: Prevalence of depression, anxiety and insomnia across various socio-economic characteristics among general population



Data Source: Same as Table 1.

Table 2(a) and Table 2(b) show that mean PHQ‑9 score of the participants was 4.15 with around one-fifth reporting mild depressive symptoms and a small proportion reported moderate (8.5%) and moderate-to-severe depression (4.3%). The mean GAD‑7 score was 3.27 and about one-fifth participants (18%) reported mild anxiety. The mean ISI-7 score was

5.07 and one-fifth of the participants reported sub-threshold insomnia and 7.7% had moderate-to-severe insomnia. The prevalence of depression, anxiety and insomnia were 13%, 9% and 21%, respectively (Figure 1). The prevalence of anxiety and insomnia was considerably higher among people residing in metros (11% and 26% respectively) whereas it was least among rural residents (6% and 14% respectively) (Figure 2). The differentials across depression were miniscule. Persons who reportedly changed their place of usual residence (defined as the place where individuals were working or studying or where they were staying for more than 6 months) due to COVID-19 had higher depression (16%), anxiety (13%) and insomnia (26%) compared to those who did not.

The prevalence of depression, anxiety and insomnia was comparatively higher among the respondents belonging to the STs/SCs (21%, 11% and 25%). The prevalence of depression and anxiety was higher among people of other religion (15%) whereas insomnia was higher among Muslims (33%) than their counterparts. Males reported a higher percentage of depression (13%) while anxiety and insomnia were higher among females (10% and 22% respectively).

Table 3: Results of Logistic Regression showing risk factors associated with depression (PHQ-9), anxiety (GAD-7) and insomnia (ISI-7)

Background characteristics	Depression	Anxiety	Insomnia
Place of residence (Rural®)			
Urban- non-metro	1.19 [0.68-2.07]	1.68 [0.84-3.36]	1.98** [1.2-3.26]
Urban- metro	1.27 [0.6-2.67]	2.20* [0.92-5.29]	1.74* [0.94-3.25]
Usual place of residence (Staying at UPR®)			
Changed UPR-other reasons	0.7 [0.26-1.92]	1.47 [0.57-3.77]	1.03 [0.47-2.24]
Changed UPR-due to COVID-19	1.36 [0.6-3.08]	1.81 [0.73-4.51]	1.63 [0.8-3.31]
Marital status (Married living with spouse, with/without other family members®)			
Married living without spouse but with other family members	3.1** [1.24-7.74]	3.33** [1.32-8.4]	1.93 [0.87-4.26]
Unmarried/single living with family members	2.44** [1.27-4.66]	1.7 [0.81-3.56]	1.58* [0.93-2.69]
Married/unmarried living alone	3.29*** [1.77-6.09]	2.12** [1.05-4.27]	2.48*** [1.5-4.08]
Afraid of losing or earning lesser income than usual (Neither losing nor earning lesser income®)			
Earning lesser than usual but not losing income	1.27 [0.62-2.6]	1.22 [0.56-2.66]	0.8 [0.45-1.45]
Both losing income or earning lesser than usual	2.66*** [1.43-4.93]	2.21** [1.13-4.36]	2.89*** [1.79-4.65]
No income	1.11 [0.51-2.42]	1.06 [0.44-2.59]	0.91 [0.47-1.76]
History of mental illness- self (No®)			
Yes	2.38** [1.06-5.35]	1.75 [0.69-4.41]	2.57** [1.23-5.37]
History of mental illness- other family member (No®)			
Yes	1.79* [0.97-3.32]	1.46 [0.72-2.98]	1.79** [1.04-3.07]

Source: Same as Table 1

Notes: Models controls for regions, caste, religion, sex, age group, education, occupation, awareness regarding mental health helpline number.

The prevalence of depression was almost three times among respondents who were living alone compared to those who were married and living with spouse (21% vs 7%). Similarly, prevalence of anxiety (13% vs 7%) and insomnia (34% vs 16%) were almost twice among those living alone compared to those staying with a spouse. Those who reported concerns about losing livelihoods and reduced earnings had almost twice higher prevalence of depression, anxiety and insomnia compared to those who reported no such concerns. Further, the prevalence of depression, anxiety and insomnia were noticeably higher among those who themselves had a history of any mental illness (31%, 21% and 49% respectively); prevalence was around 24%, 15% and 37%, respectively among those whose family members had a history of mental illness. Almost half of the respondents (47%) were not aware of the Government's mental health helpline number.

Risk Factors Associated with Depression, Anxiety and Insomnia

The results of logistic regression models are reported in Table 3. The likelihood of depression and insomnia was higher among respondents in metros (OR 2.20, CI 0.92-5.29, and OR 1.74, CI 0.94-3.25, respectively) and urban non-metros (OR 1.68; CI 0.84-3.36 and OR 1.98; CI 1.20-3.26) compared to those in rural areas. Respondents, who were worried about both losing income and reduced earnings, were two times more likely to suffer from depression (OR 2.66, CI 1.43-4.93), anxiety (OR 2.21, CI 1.13-4.36) and insomnia (OR 2.89, CI 1.79-4.65). Furthermore, the chances of depression and anxiety were significantly higher among respondents living alone (depression: OR 3.29, CI 1.77-6.09; anxiety: OR 2.12, CI 1.05-4.27) and married respondent staying away from spouse (depression: OR 3.10, CI 1.24-7.74; anxiety: OR 3.33, CI 1.32-8.40). Self and family history of any mental illness was a risk factor for depression and insomnia but not for anxiety.

Discussion and Conclusion

This cross-sectional online study with 1015 respondents found a high prevalence of mental health symptoms during the COVID-19 lockdown. Using recommended cut-off scores of validated scales, the prevalence of depressive, anxiety and insomnia symptoms were found to be 12.7%, 9.0% and 21.0% respectively. The only comparable study (Grover et al., 2020) from India during lockdown using similar scales for depression and anxiety found a comparable prevalence of depressive symptoms (10.5%), however, prevalence of anxiety was considerably larger than in the present study (38.16% vs 9.0%). This is due to the lower cut-off score of five used for defining anxiety in their study. Had Grover et al (2020) also used a GAD-7 cut-off score of 10, which has shown optimum sensitivity and specificity (Hakim et al, 2017; Spitzer et al, 2006), the prevalence of anxiety would have been 14.4%, a little closer to the prevalence found in our study. The National Mental Health Survey of India (NMHS) found a prevalence of 2.7% for depressive disorders (Gururaj et al., 2016). Additionally, a meta-analysis of psychiatric epidemiological studies in India, pre-COVID-19, found a prevalence of 5.8% for GAD (Reddy and Chandrashekhar, 1998). Our findings, thus, suggest that the prevalence of depression and anxiety symptoms during the lockdown period in India was higher than the prevalence found in pre-COVID-19 studies. This discrepancy may likely be explained by the psychosocial factors that have eventuated due to the COVID-19 pandemic rather than any methodological differences between the studies, as the scales used in the present study have robust psychometric properties.

We could not find any Indian study looking into the prevalence of insomnia since the lockdown commenced. A study conducted in China, examining mental health outcomes among health care workers exposed to COVID-19, found that the prevalence of insomnia was

34% (Lai et al, 2020). A study of general population in south India by Panda et al (2012) had found a prevalence of 18.6% for insomnia. The present study, however, found a prevalence of 21%, which is higher than the study in the general population, but much lower than the figure reported in the study from China. The higher prevalence in China may be attributed to the study having focused exclusively on the healthcare workers working in fever clinics and COVID-19 wards, who were under greater risk of exposure to the virus than the general population, who were at home during lockdown. Previous population-based studies have found GAD, but not depression, is associated with insomnia (Khan et al., 2018). Hence, it is likely that higher prevalence of anxiety symptoms during the lockdown period is linked to the greater than usual insomnia found in the present study. The higher prevalence of insomnia among Muslims (33%) may be attributed to the survey period falling during the holy month of Ramadan. Previous studies have also noted effects of Ramadan on sleep patterns (BaHamman et al., 2013; Msaad et al., 2016).

Studies in the pre-COVID period established that members of the SC/ST groups had comparatively higher risk of depression than higher castes (Gupta and Coffey, 2020; Mathias et al., 2015). Our study too found that the risk of depression in this group was nearly twice compared to the higher castes. Persisting social exclusion and discrimination (Deshpande and Spears, 2016) together with the superadded stressor of economic hardship brought about by the pandemic is likely contributing to raise risks of depression in this vulnerable group. Those in salaried private jobs were surprisingly at lesser risk of experiencing depressive symptoms than salaried government employees. This may be partly due to the fact that the majority of this sub-group in the study sample comprises of the salaried private employees who were engaged in comparatively more regular jobs and had the benefit of work from home. On the other hand, a majority of salaried government servants of the sample belonged to various essential services (doctors and police personnel), who being front line workers during the pandemic, faced extended work-hours and possibly had concerns of getting infected or bringing infection home.

Gururaj et al. (2016) found a higher prevalence of mental morbidity in urban rather than rural settings in India. Our study found that respondents living in urban settings (metro and non-metro) were at greater risk of experiencing anxiety and insomnia. To our knowledge, no study in India till date, has examined such a difference based on place of residence during the lockdown period. Putative reasons for higher prevalence in urban settings include breakdown of support systems, fast-paced lifestyle, economic instability etc. (Gururaj et al., 2016). Over and above these reasons, stress associated with most hotspots of COVID-19 being detected in urban metropolitan rather than rural settings might have contributed to our finding. Mass exodus of labourers was observed from urban India during the lockdown (Guru, 2020). Migrant labourers along with families walked hundreds of kilometers towards their native places. These extraordinarily stressful circumstances are bound to affect the coping capacities of even well-adjusted individuals (Singh, 2020). Our results too suggest that persons who reportedly changed their place of usual residence due to COVID-19 have higher rates of depression (16%), anxiety (13%) and insomnia (26%) compared to their counterparts.

Being married and co-habiting acted as a protective factor against all the outcomes of interest; respondents who were either single or married but not currently living with their spouse experienced 2-3-fold greater risks of suffering from these mental health problems. This is unsurprising as being married has long been known to have salutary effects on both mental and physical health (Lindström and Rosval, 2012; Ross, 1995). Marriage affords

social and emotional support as well as greater economic resources (Ross, 1995).There is a significant relationship between economic crises and psychopathology (Horowitz, 1984; Zivin et al., 2011) and various studies, using different designs and indicators have shown this connection (Dooley and Catalano, 1984). Our study too found that respondents who were concerned about losing their livelihood or reduced earnings, had significantly higher risk of experiencing all three outcomes of interest.

Finally, self and family histories of mental illness too were found to increase the risk of both depressive and anxiety symptoms. The imposition of the lockdown led to practical difficulties for people in accessing mental healthcare as travel was restricted. This would have placed individuals at greater risk of experiencing a relapse (Mak et al., 2009; McAlonan et al., 2007). Interestingly, nearly half (47%) of the respondents were unaware of the mental health helpline being run by the government even a month after it was launched. This highlights the need for adopting more effective means of disseminating information to the public like displaying helpline numbers and short videos with general psychosocial counseling through popular TV channels the advertisement breaks during the prime-time. In conclusion, the psychological morbidity during the ongoing pandemic is significant. Resources need to be mobilized to address the scope of the problem, with need to ensure delivery to those identified at greater risk of mental morbidity. The psychological health of the individual and of society should not be compromised as psychological resilience of its people will help the country combat COVID-19.

Limitations of the Study

This study has some limitations which need to borne in mind while interpreting the results. Since this was a cross-sectional survey, causal attributions cannot be made. The survey was restricted to only smart phone users who may not be representative of the lower socio-economic strata of society, affecting generalizability of the findings.

Acknowledgements

Authors sincerely acknowledge all the respondents for participating in the online survey. We acknowledge G. B. Pant Social Science Institute's Director Prof. Badri Narayan for allowing us to share the survey link on Institute's social media platforms for wider circulation. Authors wish to thank Prof. R.B. Bhagat, International Institute for Population Sciences, Mumbai for providing inputs during the preparation of the questionnaire.

References

BaHamman, AS., Alaseem, AM., Alzakri, AA., et al., 2013, The effects of Ramadan fasting on sleep patterns and daytime sleepiness: an objective assessment. *Journal of Research in Medical Sciences,* 18(2): 127-131.

Banerjee, D., 2020, The COVID-19 outbreak: crucial role the psychiatrists can play. *Asian Journal Psychiatr,* doi: 10.1016/j.bbi.2020.04.062 [Epub ahead of print].

Bastien, CH., Vallières, A., Morin, CM., 2001, Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine,* 2(4): 297-307. doi:10.1016/s1389-9457(00)00065-4.

Breslau, J., Marshall. GN., Pincus, HA., et al., 2014, Are mental disorders more common in urban than rural areas of the United States? *Journal of Psychiatric Research,* 56: 50-55.

Cameron, C., Trivedi, PK., 2009, Microeconometrics Using Stata, Original Edition, Stata Press, 692.

Chakraborty, K., Chatterjee, M., 2020, Psychological impact of COVID-19 pandemic on general population in West Bengal: A cross-sectional study. *Indian Journal of Psychiatry*, 62: 266-272.

Chatterjee, SS., Bhattacharyya, R., Bhattacharyya, S., et al., 2020, Attitude, practice, behavior, and mental health impact of COVID-19 on doctors. *Indian Journal of Psychiatry*, 62: 257-265.

Chen, N., Min Zhou, Xuan Dong., et al., 2020, Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *The Lancet*, 395: 507-513.

Deshpande, A., Dean Spears, D., 2016, Who is the identifiable victim? Caste and charitable giving in modern India. *Econ. Dev. Cult. Change*, 64(2): 299-321.

Dooley, D., Catalano, R., 1984, Barbara Snell Dohrenwend memorial lecture. The epidemiology of economic stress. *Am J Community Psychol*, 12(4): 387-409.

Du, J., Dong, L., Wang, T et al., 2020, Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. *Gen Hosp Psychiatry*, 10.1016/j.genhosppsych.2020.03.011

Gupta, A., Coffey, D., 2020, Caste, religion, and mental health in India. *Popul. Res. Policy. Rev*, https://doi.org/10.1007/s11113-020-09585-9.

Guru, Gopal., 2020, Reason of the State and COVID-19. Editorial. *Econ. Political Wkly*, 55(3): 9.

Gururaj, G., Varghese, M., Benegal, V., et al., 2016, National Mental Health Survey of India, 2015-16: Mental Health Systems. Bengaluru: National Institute of Mental Health and Neuro Sciences, NIMHANS Publication No. 130.

Hakim, A., Tak, H., Nagar, S., et al., 2017, Assessment of prevalence of depression and anxiety and factors associated with them in undergraduate medical students of Dr. S. N. Medical College, Jodhpur. *Int J Community Med Public Health*, 4(9):3267-3272.http://www.ijcmph.com.

Indian Express, 2019. WhatsApp more popular than Facebook app. https://indianexpress.com/article/technology/tech-news-technology/whatsapp-app-more-popular-than-facebook-app-annie-report-5544100/, accessed May 1, 2020.

Ingle VK, Pandey I, Singh AR, et al., 2017, Screening of patients with chronic medical disorders in the outpatient department for depression using handheld computers as interface and patient health questionnaire-9 as a tool. *Int J Appl Basic Med Res*, 7(2):129-133. doi:10.4103/2229-516X.205809

Investopedia, 2019, Facebook now has more users in India than any other country. https://www.investopedia.com/news/facebook-now-has-more-users-india-any-other-country/, accessed May 1, 2020.

Khan, IW., Juyal, R., Shikha, D., et al., 2018, Generalized anxiety disorder but not depression is associated with insomnia: a population-based study. *Sleep Sci.*, 11(3): 166-173. doi:10.5935/1984-0063.20180031.

Kochhar, PH., Rajadhyaksha, SS., Suvarna, VR., 2017, Translation and validation of brief patient health questionnaire against DSM-IV as a tool to diagnose major depressive disorder in Indian patients. *J Postgrad Med.*, 53(2): 102-107. doi:10.4103/0022-3859.32209.

Kroenke K, Spitzer RL, Williams JB, 2001, The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*, 16(9): 606-613. doi:10.1046/j.1525-1497.2001.016009606.x

Lahan, V., Gupta, R., 2011, Translation and validation of the insomnia severity index in Hindi language. *Indian J Psychol Med*, 33(2): 172-176. doi:10.4103/0253-7176.92060.

Lai J, Ma S, Wang Y, et al., 2020. Factors associated with mental health outcomes among health care workers exposed to Coronavirus Disease 2019. *JAMA Netw Open*, 3(3): e203976. doi:10.1001/jamanetworkopen.2020.3976

Lindström, M., Rosvall, M., 2012, Marital status, social capital, economic stress, and mental health: A population-based study. *Soc. Sci. J.*, 49(3): 339-342.

Mak, IW., Chu, CM., Pan PC., et al., 2009, Long-term psychiatric morbidities among SARS survivors. *Gen Hosp Psychiatry*, 31(4): 318-326.

Mathias, K., Goicolea, I., Kermode, M., et al., 2015, Cross-sectional study of depression and help-seeking in Uttarakhand, North India. *BMJ Open*, 5(11).

McAlonan GM, Lee AM, Cheung V., et al., 2007, Immediate and sustained psychological impact of an emerging infectious disease outbreak on health care workers. *Can. J. Psychiatry*, 52: 241-247, 10.1177/070674370705200406

McFadden, SM., Malik, AA., Aguolu, OG., et al., 2020, Perceptions of the adult US population regarding the novel coronavirus outbreak. *PLoS ONE*, 15(4): e0231808. https://doi.org/10.1371/journal.pone.0231808.

Ministry of Health & Family Welfare, Government of India, 2020, COVID-19 India: Real Time Update. Ministry of Health and Family Welfare, Government of India: New Delhi. Available at: https://www.mohfw.gov.in/, accessed on July 03, 2020.

Ministry of Health & Family Welfare, Government of India, 2020b, Addressing Social Stigma Associated with COVID-19. Available at:https://www.mohfw.gov.in/pdf/AddressingSocialStigmaAssociatedwithCOVID19.pdf, accessed on May 1, 2020.

Ministry of Health & Family Welfare, Government of India, 2020c, Telemedicine Practice Guidelines. Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine. https://www.mohfw.gov.in/pdf/Telemedicine.pdf, (April 4, 2020).

Ministry of Home Affairs, Government of India, 2020, Order: May 1, 2020. Ministry of Health and Family Welfare, Government of India: New Delhi. Available at:https://www.mha.gov.in/sites/default/files/MHA%20Order%20Dt.%201.5.2020%20to%20extend%20Lockdown%20period%20for%202%20weeks%20w.e.f.%204.5.2020%20with%20new%20guidelines.pdf, accessed on May 10, 2020.

Ministry of Home Affairs, Government of India, 2020a, Order: April 29, 2020. Ministry of Health and Family Welfare, Government of India: New Delhi. Available at:https://www.mha.gov.in/sites/default/files/MHAordernew_29042020.PDF, accessed on May 10, 2020.

Morin, CM., Belleville, G., Bélanger, L., et al., 2011, The insomnia severity index: psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep*, 34(5): 601-608.

Msaad, S., Kotti, N., Adid, S., et al., 2016, Influence of Ramadan observance on sleep pattern and wakefulness at work among medical trainers in Tunisia. *J Sleep DisordTher*, 5(2): 1-8.

Panda, S., Taly, AB., Sinha, S., et al., 2012, Sleep-related disorders among a healthy population in South India. *Neurol India*, 60 (1): 68-74.

Plummer, F., Manea, L., Trepel, D., et al., 2016, Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic meta-analysis. *Gen Hosp Psychiatry*, 39: 24-31.

Pulla, P., 2020, Covid-19: India imposes lockdown for 21 days and cases rise. *Br. Med. J.* 368. doi: https://doi.org/10.1136/bmj.m1251.

Rakesh, PS, Ramesh R, Rachel P, et al., 2012, Quality of life among people with epilepsy: a cross-sectional study from rural southern India. *Natl Med J India*, 25(5): 261-264.

Reddy, VM., Chandrashekar, CR., 1998, Prevalence of mental and behavioural disorders in India: a meta-analysis. *Indian J Psychiatry*, 40(2): 149-157.

Registrar General of India, 2011. Paper 1 of 2018 Language India, States and Union Territories, Paper 1 of 2018, (Tale C-16), Office of Census Commissioner and Registrar General of India, Government of India, New Delhi. Available at https://censusindia.gov.in/2011Census/C-16_25062018_NEW.pdf

Ross, C. E., 1995, Reconceptualizing marital status as a continuum of social attachment. *J. Marriage Fam.*, 57(1): 129-140.

Roy, D., Tripathy, S., Kar, SK., et al., 2020, Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic [published online ahead of print, 2020 Apr 8]. *Asian J Psychiatr*, 51, 102083. doi:10.1016/j.ajp.2020.102083

Ruscio, AM., Hallion, LS., Lim, CCW., et al., 2017, Cross-sectional comparison of the epidemiology of dsm-5 generalized anxiety disorder across the globe. *JAMA Psychiatry*, 74(5): 465-475.

Singh, OP., 2020, Mental health of migrant laborers in COVID-19 pandemic and lockdown: Challenges ahead. *Indian J Psychiatry*, 62: 233-234.

Spitzer, RL., Kroenke, K., Williams, JB., et al., 2006, A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*, 166(10): 1092-1097. doi:10.1001/archinte.166.10.1092

StataCorp., 2013, Stata: Release 13. Statistical Software. College Station, TX: StataCorp LP.

Times of India, 2018. Hindi mother tongue of 44% in India, Bangla second most spoken. Available at: https://timesofindia.indiatimes.com/india/hindi-mother-tongue-of-44-in-india-bangla-second-most-spoken/articleshow/64755458.cms, accessed May 1, 2020.

Varshney, M., Parel, JT., Raizada, N., et al., 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

World Health Organization, 2020, Coronavirus disease 2019 (COVID-19) Situation Report-01. Geneva: World Health Organization. Available at https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4, accessed on April 03, 2020.

World Health Organization. 2020c, Coronavirus disease 2019 (COVID-19) Situation Report – 170. Geneva: World Health Organization. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200708-covid-19-sitrep-170.pdf?sfvrsn=bca86036_2, accessed on July 09, 2020.

Zivin, K., Paczkowski, M., Galea, S., 2011, Economic downturns and population mental health: research findings, gaps, challenges and priorities. *Psychol Med.*, 41(7):1343-1348.