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Prevalence of depression, anxiety and stress symptoms and their association with quality of sleep and loneliness in the general population during the COVID-19 pandemic in India

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ABSTRACT

The impact of mental health due to coronavirus infection caused by SARS -2 COVID -19 is severe. The spread of the virus has been reported not only in India but also in many countries worldwide. The lockdown amid the recent COVID-19 widespread has brought about a change in the way of life in most people. The self-isolation and social distancing measures may result in individuals becoming more anxious, angry, stressed, disturbed and depressed. The aim of our study is to assess the prevalence of depression, anxiety and stress and their association with quality of sleep and loneliness in the general population during the Covid 19 pandemic. The study design was a cross-sectional study, and information and data were collected through an online questionnaire using Google forms. A total of 726 participants had completed the online questionnaire from which socio-demographic details, Depression, Anxiety & Stress (DASS 21), Insomnia (ISI) and Loneliness (UCLA) were assessed. The overall prevalence rate of depression, anxiety, stress, insomnia and loneliness was 27%, 24.9%, 12.1, 16.9% and 8.8%, respectively. Age, education, occupation and living status had a strong association with depression. Concerning anxiety, age, marital status, living status and past history of medical illness were positively correlated. Stress had a strong association with education. Insomnia was significantly associated with depression, anxiety, stress and loneliness. Anxiety, stress and insomnia had a strong association with loneliness. This study shows that the psychological impact of the COVID-19 pandemic in the general population is very high. Since loneliness and insomnia have been shown to be associated with psychological symptoms, screening for and addressing them can help in reducing the psychological impact of COVID-19.

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INTRODUCTION

The novel coronavirus SARS 2 (COVID-19) created a pandemic situation, wherein initially, a small number of atypical cases of pneumonia were reported in December 2019, and the causative virus CoV-2 were similar with SARS-CoV from the 2003 SARS outbreak. On February 12, 2020, the World Health Organization officially named the disease caused by the novel coronavirus as coronavirus disease 2019 (COVID-19). On March 11, 2020, the WHO announced the outbreak as a worldwide pandemic which has created a lot of threat to human lives both

physically and mentally.

India is the second most populated nation in the world, with a population of 1.3 billion individuals spread over different states having vast financial, social and health imbalances, which posed an extraordinary challenge in this period of the COVID-19 pandemic. India reported its first case on January 30, 2020 (Reid, 2020). The common symptoms include fever, cough, and myalgia, with diarrhoea, with or without the subsequent development of dyspnea and transmission of Covid 19 infections occurred through infected secretions, droplets and direct contact. To reduce the spread of COVID-19, the Indian Government announced a complete lockdown for 21 days from March 25, 2020. The lockdown was further extended, and many other restrictions were put in place to curtail disease spread. Many aspects of this disease prevention, including social distancing, decreased means of travel, closure of workplace and educational institutions, resulting in individuals being separated from family, friends, colleagues or co-students. These have the potential to cause loneliness, anxiety, and depression. Many previous studies during outbreaks or epidemics have reported a high prevalence of psychiatric symptoms in the general population (Sim and Chua, 2004; Tzeng *et al.*, 2020). Even during the current pandemic, a few studies have reported the psychological impact of COVID-19 among the general population (Wei *et al.*, 2020; Pan *et al.*, 2020) and among healthcare workers (Chew *et al.*, 2020; Rossi *et al.*, 2020; Santarone *et al.*, 2020).

Some studies have attempted to analyse the correlates of psychological symptoms like depression and anxiety during the COVID-19 pandemic. In a study by Smith et al., it was concluded that female sex, student status, chronic physical illness, and low socioeconomic status were altogether related to a significant psychological impact and higher levels of stress, anxiety, and loneliness (Smith *et al.*, 2020). Extensive utilisation of social media by youth and grown-ups between 18 and 35 years of age is connected with a raised tendency to create decreased interaction and disturbance of day to day activities. The COVID-19 situation and the lockdown also resulted in altered work pattern and the closure of educational institutions. In such a case, people are also likely to have varying sleep pattern. A few studies have looked for the quality of sleep and the prevalence of insomnia during the COVID-19 pandemic (Deng *et al.*, 2020; Gupta *et al.*, 2020; Sinha *et al.*, 2020). They have reported a high prevalence of sleep problems in the general population during the COVID-19 pandemic. Many factors were attributed to the increase in sleep problems, including increased screen time, altered work timings, altered working habits like working from home and closure of workplaces and educational institutions. Hence we conducted this study to find the prevalence of depression, anxiety and stress symptoms and their association with loneliness and insomnia in the general population during the COVID-19 pandemic.

MATERIALS AND METHODS

Study design and procedure

In this study, the design was a cross-sectional epidemiological study. We collected data through an online survey questionnaire, mainly targeting the general population in India. The survey was conducted by distributing forms through Google link to known friends and passing it on to their groups through snowball sampling technique within India. The study was done after getting approval from the ethical committee of the institution. The responses were collected for 3 months, from April to June 2020. Out of 740 participants, 726 had completed their forms; hence final sample size in this study was 726. All participants aged between 18 to 65years of age were included after obtaining informed consent. They were instructed to withdraw at any time if they felt any discomfort and we have informed the purpose of the study to all participants through the same form.

Measures

Socio-demographic measures included age, sex, address, education, occupation, marital status, family status, living status, student status, past history of medical illness and past history of psychiatric illness.

DASS-21

Psychological status was measured using the scale - DASS 21. The DASS-21 is a 21-item validated tool that has been extensively used to measure psychiatric symptoms of depression, anxiety and stress (Ng *et al.*, 2007). DASS-21 has also been used to assess the psychological impact of COVID-19 in previous studies (Odriozola-González *et al.*, 2020). It contains 3 scales, each containing 7 items which are further divided into subscales having the same content. The scale contains 4 options, namely 0,1,2,3. 0 meant that "it did not apply to me at all", whereas 3 meant "applied to me very much or most of the time ". Based on which option suited them over the past week, the participant had to choose one of the four options. The sum of the scores was calculated separately for depression, stress and anxiety and then multiplied by 2 to determine the

final score. For depression, a score of 0-9 was considered normal, 10-13 mild, 14-20 moderate, 21-27 severe and 28+ was extremely severe. For anxiety, a score of 0-7 was taken to be normal,8-9 mild,10-14 moderate,15-19 severe, and 20+ was extremely severe. For stress, a score of 0-14 was considered normal,15-18 mild,19-25 moderate,26-33 severe and 34+ extremely severe. In line with previous studies, we took only moderate and above scoring to represent each of the evaluated symptoms of depression, anxiety and stress (Santamaría *et al.*, 2020; Tee *et al.*, 2020). Mild scoring was ignored and was not taken to represent depression, anxiety or stress symptoms.

Insomnia Severity Index

The quality of sleep was assessed using the Insomnia severity index scale. The Insomnia Severity Index (ISI) is a brief instrument that is designed to assess the severity of insomnia. It is used as a metric of treatment response in clinical research. Its psychometric properties and its validity has been previously established (Gagnon *et al.*, 2013; Veqar and Hussain, 2017).

In the scale, 7 questions are asked, which are related to: difficulty falling asleep, difficulty staying asleep, problem waking up too early, satisfaction with sleep pattern, distress about sleep, noticeability of sleep problems by others and interference of sleep difficulties with daytime functioning. A 5-point Likert scale is used to rate each item (e.g., 0 = no problem; 4 = very severe problem), yielding a total score ranging from 0 to 28. The total score is interpreted as follows Categories,

0–7 = No clinically significant insomnia

8–14 = Sub-threshold insomnia

15–21 = Clinical insomnia (moderate severity)

22–28 = Clinical insomnia (severe). (Charles M Martin).

UCLA Loneliness Scale

For loneliness measurement, the UCLA loneliness scale was used. The validity and reliability of the scale and its application in the Indian context has been established in previous studies (Russell, 1996; Shettar *et al.*, 2017). It is a 20-item scale designed to measure one's subjective feelings of loneliness as well as feelings of social isolation. Participants rate each item as either O ("I often feel this way"), S ("I sometimes feel this way"), R ("I rarely feel this way"), N ("I never feel this way"). Scoring: Make all O's =3, all S's =2, all R's =1, and all N's =0.

Statistical analysis

Data was analysed using SPSS statistics, and we ran descriptive analysis and frequency distribution for all information. The association between variables was measured using the Chi-square test. P value < 0.05 was considered as significant value.

RESULTS

In the total sample of 726, 274 participants belonged to 18 -35 years, 286 were aged 36-50years, 166 were in the age group of 51-65 years. The majority of the participants were females (385). In educational status, most were school going students (424). 559 were unmarried, and more participants were from a semi-urban background (285). 515 had no past history of medical illness, and 681 were not affected by any previous psychiatric illness. This study showed the overall prevalence of depression 27% (196), anxiety 24.9% (181), stress 12.1 % (88), Insomnia 16.9% (123), and Loneliness 8.8% (64) (Table 1) & (Figure 1).

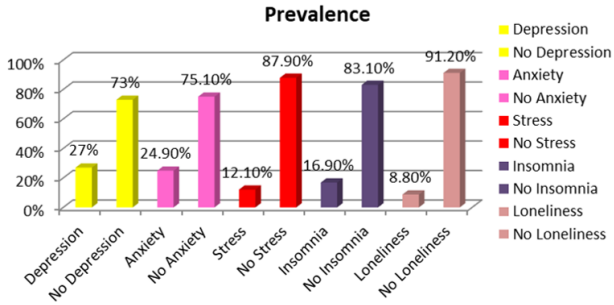

Figure 1: Prevalence of Depression, Anxiety, Stress, Insomnia and Loneliness

Using DASS 21, in depression, 14.3% (104) of participants had moderate, 9.5% (69) Severe and 3.1% (23) extreme severe depression. In anxiety, 11.3% (86), 8.3% (63), and 4.4% (32) were found to have moderate, severe and extreme severe anxiety, respectively. Similarly, 5.8% (42), 4.8% and 1.5% (11) of participants had the moderate, severe and extreme type of stress (Table 2).

Socio-demographic variables and their association with depression

Pearson's chi-square test was used to determine the socio-demographic variables with depression, anxiety, stress, insomnia and loneliness. Younger age group, school going, being unemployed and living alone were associated with more prevalence of depression (Table 3).

Socio-demographic variables and their association with anxiety

Younger age, being unmarried, living alone and a past history of medical illness had a strong association with more prevalence of anxiety (Table 4).

Table 1: Prevalence of Depression, Anxiety, Stress, Insomnia and Loneliness

Parameter	Present (N)	Percentage	Absent (N)	Percentage
Depression (Mod+Severe+Ext)	196	27	530	73
Anxiety (Mod+Severe+Ext)	181	24.9	545	75.1
Stress (Mod+Severe+Ext)	88	12.1	638	87.9
Insomnia (severe+clinical MOD+subthreshold)	123	16.9	603	83.1
Loneliness (O & S)	64	8.8	662	91.2

Table 2: Severity of Depression, Anxiety, Stress, Insomnia and Loneliness

Parameter	Frequency	Percentage
Depression		
Normal	336	46.3
Mild	194	26.7
Moderate	104	14.3
Severe	69	9.5
Extreme	23	3.1
Anxiety		
Normal	402	55.4
Mild	143	19.7
Moderate	86	11.9
Severe	63	8.3
Extreme	32	4.4
Stress		
Normal	471	64.9
Mild	167	23.0
Moderate	42	5.8
Severe	35	4.8
Extreme	11	1.5
Insomnia		
No	603	83.1
Subthreshold	61	8.4
Clinical MOD	49	6.7
Severe	13	1.8
Loneliness		
O	9	1.2
S	55	7.6
R	86	11.8
N	576	79.3

Table 3: Socio-demographic variables and their association with depression

Variable	Depression					P-value
	Present N=196	%	Absent N=530	%	Total N=726	
Age group						
18-35 years	104	37.96	170	62.04	274	<0.0001
36-50 years	52	18.18	234	81.82	286	
51-65 years	40	24.10	126	75.90	166	
Sex						
Male	77	22.58	264	77.42	341	0.0116
Female	119	30.91	266	69.09	385	
Address						
Rural	65	27.43	172	72.57	237	0.5341
Semiurban	71	24.91	214	75.09	285	
Urban	60	29.41	144	70.59	204	
Education						
School	162	38.21	262	61.79	424	<0.0001
Diploma	15	16.48	76	83.52	91	
UG	16	11.85	119	88.15	135	
PG	3	3.95	73	96.05	76	
Occupation						
Employed	75	21.13	280	78.87	355	0.0005
Unemployed	121	32.61	250	67.39	371	
Marital						
Unmarried	31	20.53	120	79.47	559	0.0442
Married	163	29.16	396	70.84	151	
Divorced	2	12.50	14	87.50	16	
Family type						
Nuclear	159	25.60	462	74.40	621	0.0397
Joint	37	35.24	68	64.76	105	
Living alone						
Yes	66	58.93	46	41.07	112	<0.0001
No	130	21.17	484	78.83	614	
Past history of medical illness						
Yes	72	34.12	139	65.88	211	0.0056
No	124	24.08	391	75.92	515	
Past history of psy illness						
Yes	17	37.78	28	62.22	45	0.0925
No	179	26.28	502	73.72	681	

Table 4: Socio-demographic variables and their association with anxiety

Variable	Anxiety					P-value
	Present N=181	%	Absent N=545	%	Total	
Age group						
18-35 years	98	35.77	176	64.23	274	<0.0001
36-50 years	51	17.83	235	82.17	286	
51-65 years	32	19.28	134	80.72	166	
Sex						
Male	83	24.34	258	75.66	341	0.7290
Female	98	25.45	287	74.55	385	
Address						
Rural	59	24.89	178	75.11	237	0.9728
Semiurban	70	24.56	215	75.44	285	
Urban	52	25.49	152	74.51	204	
Education						
School	119	28.07	305	71.93	424	0.0821
Diploma	19	20.88	72	79.12	91	
UG	31	22.96	104	77.04	135	
PG	12	15.79	64	84.21	76	
Occupation						
Employed	85	23.94	270	76.06	355	0.5474
Unemployed	96	25.88	275	74.12	371	
Marital						
Unmarried	82	54.30	69	45.70	559	<0.0001
Married	96	17.17	463	82.83	151	
Divorced	3	18.75	13	81.25	16	
Family type						
Nuclear	160	25.76	461	74.24	621	0.2066
Joint	21	20.00	84	80.00	105	
Living alone						
Yes	51	45.54	61	54.46	112	<0.0001
No	130	21.17	484	78.83	614	
Past history of medical illness						
Yes	79	37.44	132	62.56	211	<0.0001
No	102	19.81	413	80.19	515	
Past history of psy illness						
Yes	13	28.89	32	71.11	45	0.5263
No	168	24.67	513	75.33	681	

Table 5: Sociodemographic details and their association with stress

Variable	Stress					P-value
	Present N=88	%	Absent N=638	%	Total	
Age group						
18-35 years	30	10.95	244	89.05	274	0.7498
36-50 years	37	12.94	249	87.06	286	
51-65 years	21	12.65	145	87.35	166	
Sex						
Male	39	11.44	302	88.56	341	0.5949
Female	49	12.73	336	87.27	385	
Address						
Rural	31	13.08	206	86.92	237	0.8387
Semiurban	34	11.93	251	88.07	285	
Urban	23	11.27	181	88.73	204	
Education						
School	79	18.63	345	81.37	424	<0.0001
Diploma	2	2.20	89	97.80	91	
UG	5	3.70	130	96.30	135	
PG	2	2.63	74	97.37	76	
Occupation						
Employed	37	10.42	318	89.58	355	0.1701
Unemployed	51	13.75	320	86.25	371	
Marital						
Unmarried	27	17.88	124	82.12	559	0.4435
Married	60	10.73	499	89.27	151	
Divorced	1	6.25	15	93.75	16	
Family type						
Nuclear	72	11.59	549	88.41	621	0.2900
Joint	16	15.24	89	84.76	105	
Living alone						
Yes	15	13.39	97	86.61	112	0.6538
No	73	11.89	541	88.11	614	
Past history of medical illness						
Yes	21	9.95	190	90.05	211	0.2518
No	67	13.01	448	86.99	515	
Past history of psy illness						
Yes	3	6.67	42	93.33	45	0.2470
No	85	12.48	596	87.52	681	

Table 6: Association of insomnia with Depression, Anxiety and Stress

Variable	Insomnia						P-value
	Present N=123	%	Absent N=603	%	Total	%	
Depression							
Present	77	62.6	119	19.7	196	27.0	<0.0001
Absent	46	37.4	484	80.3	530	73.0	
Anxiety							
Present	80	65.0	101	16.7	181	24.9	<0.0001
Absent	43	35.0	502	83.3	545	75.1	
Stress							
Present	35	28.5	53	8.8	88	12.1	<0.0001
Absent	88	71.5	550	91.2	638	87.9	
Loneliness							
Present	31	25.2	33	5.5	64	8.8	<0.0001
Absent	92	74.8	570	94.5	662	91.2	

Table 7: Association of Loneliness with Depression, Anxiety, Stress and Insmonia

Variable	Loneliness						P-value
	Present N=64	%	Absent N=662	%	Total	%	
Depression							
Present	19	29.7	177	26.7	196	27.0	0.6116
Absent	45	70.3	485	73.3	530	73.0	
Anxiety							
Present	35	54.7	146	22.1	181	24.9	<0.0001
Absent	29	45.3	516	77.9	545	75.1	
Stress							
Present	25	39.1	63	9.5	88	12.1	<0.0001
Absent	39	60.9	599	90.5	638	87.9	
Insomnia							
Present	28	43.8	95	14.4	123	16.9	<0.0001
Absent	36	56.3	567	85.6	603	83.1	

Socio-demographic details and their association with stress

In contrast to depression and anxiety, stress had a strong significant association only with education with more stress found in school-going children (Table 5).

Association of insomnia with Depression, Anxiety and Stress

Insomnia had a statistically significant association with depression, anxiety, stress and loneliness (Table 6).

Association of Loneliness with Depression, Anxiety, Stress and Insmonia

Anxiety, stress and insomnia had a statistically significant association with loneliness. But there was no significant association between depression and loneliness (Table 7).

DISCUSSION

This study was conducted in the Indian adult population during the lockdown period due to the Covid-19 pandemic. The main aim of this study was to determine the prevalence of depression, anxiety and stress and their association with insomnia and loneliness among the study population.

Prevalence of Depression, Anxiety and Stress during the pandemic

Our study showed a high prevalence of depression, anxiety and stress among the general popu-

lation during the COVID-19 pandemic. To account for various factors and in line with previous studies, we omitted milder forms of depression, anxiety and stress and took only moderate and above severity to represent the presence of a psychological symptom. Despite that, we found a high prevalence of depression, anxiety and stress. Our study showed that 27%, 24.9% 12.1 % were depressed, anxious and stressed, respectively. Increased prevalence of psychiatric symptoms has been observed during previous epidemics. Taylor et al., in H1N1 SARS outbreak in Australia reported 34% high psychological distress compared to levels of around 12% in the general Australian population (Taylor *et al.*, 2008). A study on the Middle East respiratory syndrome (MERS) epidemic by Jeong and colleagues (2016) reported that 7.6% of 1,656 patients in Korea had anxiety symptoms, and 16.6% of them were distressed (Jeong *et al.*, 2016). Studies done during the COVID-19 pandemic have also reported a high prevalence of psychiatric morbidity in the general population. In a study by Wang and associates, out of the 1211 members, 53.8% evaluated the mental effect of the outbreak as direct or serious; 28.8% reported moderate to severe anxiety symptoms; 16.5% showed moderate to severe depressive symptoms; 8.1% reported moderate to severe stress levels (Wang *et al.*, 2020). Another study in India showed similar results using DASS 21, where 28.8% reported moderate to severe anxiety symptoms; 16.5% showed moderate to severe depressive symptoms; 8.1% reported moderate to severe stress levels (Verma and Mishra, 2020). A study conducted in China appeared that those who are at the greatest chance for mental health impact are youths, health care professionals, and individuals who spend a part of their time around patients in the pandemics (Huang and Zhao, 2020). Some previous research found that the prevalence of overall stress was between 8.1% to over 81.9%. (Mazza *et al.*, 2020; Wang *et al.*, 2020).

Sleep and Loneliness

In our study, the prevalence of overall insomnia was 16.9%, in that sub-threshold was 8.4%, 6.7% of participants had moderate insomnia, and 1.8% study group had a severe form of insomnia. In a study by Gupta et al., it was found that compared to the pre lockdown period, there was a shift to a later bedtime and waking time, with a reduction in nighttime sleep and an increase in daytime napping (Gupta *et al.*, 2020). In the study, 23.4% reported that sleep quality had worsened. In 8.4%, it had improved, and in others, it had remained similar to the pre lockdown state. In a study, Voitsidis et al. reported that sleep problems were detected in 37.6% of the participants (Voitsidis *et al.*, 2020). He also concluded that sleep deprivation inside the Greek people was a function of loneliness, instability, depression, and COVID 19 related stresses with a genuine commitment from two components which were depression and uncertainty. Other components that were said to impact sleep patterns were screen time, which increased after lockdown. Longer time on screen is related to shorter sleep and lesser quality of sleep.

Association with Socio-Demographics

In this study population, younger age group, school going, being unemployed and living alone were associated with more prevalence of depression. This result was similar to previous research, which showed that people less than 40 years old displayed more psychological impact during the pandemic (Huang and Zhao, 2020). The study by Smith et al. had also reported younger age group were associated with higher levels of poor mental health (Smith *et al.*, 2020). Age, marital status, living status and past history of medical illness had a strong association with anxiety. Stress was associated only with education. In a study by Özdin et al., it was found that individuals with previous psychiatric illness, individuals living in urban areas and those with an accompanying chronic disease have more psychological distress (Özdin and Özdin, 2020).

Association of psychological symptoms with Insomnia and Loneliness

In our study, we found that all the psychological symptoms, including depression, anxiety and stress, had a strong positive association with insomnia. This association can reflect either a causative role of insomnia producing psychological symptoms, or insomnia can also be an easily observable symptom of the psychological impact of COVID-19. Though we cannot establish causation, we can say that evaluation or screening for insomnia would help to identify those with psychiatric disturbances. Also, people may be more forthcoming answering questions related to insomnia as a screening tool rather than answering a screening questionnaire related to psychological symptoms because of the associated stigma. Our study found a positive association between loneliness and the psychological symptoms of anxiety and stress, but there was no statistically significant association between loneliness and depression. This was in contrast to a previous study that showed that loneliness was the leading risk factor for depression (Palgi *et al.*, 2020).

Strengths

This study offers information on the mental health issues of the Indian population during the ongoing

COVID-19 pandemic lockdown. The data suggest that there is an increased prevalence of anxiety and depressive symptoms and psychological distress in the Indian population related to the continuing pandemic.

Limitations

There are a few limitations to this study that should be considered. The study is of cross-sectional design, which has its own set of constraints. Also, selection bias is possible in this study, as an online survey was used to collect the information. Thus the section of the population without access to internet facility has not been included in this study. Therefore the inferences cannot be extrapolated to the entire population.

CONCLUSION

In conclusion, our study revealed a high prevalence of psychological symptoms of depression, anxiety and stress in the general population during the COVID-19 pandemic. Also, a high prevalence of insomnia and loneliness was observed. Younger age, being unmarried, school going, being unemployed and living alone were some of the factors associated with more psychological symptoms. Psychological symptoms were also associated with loneliness and insomnia. This study brings out the significant psychological impact of COVID-19 into the light. Developing screening methods with a focus on the established associations in this study can help for early detection and management of psychological symptoms.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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