



# Early psychosocial predictors of mental health among Indians during coronavirus disease 2019 outbreak

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## ABSTRACT

**Introduction:** This paper fulfills an identified need to study the mental health status of the population under situations like lockdown, thereby helping fill a persistent gap in Indian research on this issue, and present research on the impact of lockdown on mental health during epidemics is limited, especially in India. This study aims to scale the association between anxiety and sociodemographic factors during the coronavirus disease 2019 lockdown among the general Indian population.

**Methods:** A descriptive cross-sectional nationwide study designed to enroll the general population. The inclusion criteria for this study were Indian citizens aged 18 years and above. The study was conducted from March 29, 2020, to April 12, 2020, using an online google questionnaire. The anxiety among respondents was detected and measured using a Generalized Anxiety Disorder (GAD) Scale, which consists of seven questions (in English), that is, GAD-7.

**Results:** Responders were 392, and from these participants, the prevalence of anxiety was 25.3%. The predictors of anxiety were gender, religion, occupation as business/self-employed, marital status, family size, health status, and sleep deprivation based on the bivariate logistic regression analysis.

**Conclusion:** This study reports the early prevalence of anxiety among the Indian population who were grounded at their homes during lockdown due to coronavirus pandemic in the country.

**Keywords:** Anxiety; Generalized Anxiety Disorder-7; Lockdown; COVID-19; India

## INTRODUCTION

As the increase in stringent measures to keep people apart through lockdown to slow the spread of the coronavirus disease 2019 (COVID-19)

pandemic (1) comes the anticipation of a profound, disturbing effect on all aspects of society, including mental health and physical health (2). Anxiety is the most common mental health disorder in the general population and can characterize by feelings of tension and worrying thoughts (3). The core symptoms of anxiety include excessive and uncontrollable worries, sleep disturbances, and difficulty concentrating (4). Evidence suggests that people with anxiety disorders are at higher risk of developing several chronic medical conditions

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(5). The prevalence of anxiety differs from social and cultural factors, as well as in different classes of ethnic groups (6).

In previous literature, psychological outcomes of quarantine were evaluated during outbreaks of severe acute respiratory syndrome, H1N1 flu, Ebola, and other infectious diseases and found that people experienced both short-term and long-term mental health problems (7). For instance, another study compared quarantined versus non-quarantined individuals during an equine influenza outbreak, reporting a higher level of anxiety and depression (34%), and during the outbreak compared with only 12% in non-quarantined individuals (8).

A recent study in India found that more than 70% of respondents felt worried during the lockdown in the COVID-19 pandemic (9). The prevalence of anxiety has also been previously reported among isolated people due to the Middle East respiratory syndrome (10). Social factors and psychological aspects of an individual's life can act as predictors for health outcomes such as mental health (11). Higher psychological impact during COVID-19 predicted with younger age (12), female gender (12,13), comorbid physical illness (12), and fear of financial loss (9). During disease outbreaks, community anxiety can rise following the first death, increased media reporting, and an escalating number of new cases (14). Furthermore, changes in social activity due to forced lockdown correlate with the increased use of mobile (15) and changes in sleep habits (16).

India is the second most populated country in the world, and currently, more than 1.3 billion people are in lockdown since the 25<sup>th</sup> of March. The government took this step in fear for an outbreak in the country since it is densely populated, the result could have been catastrophic (17), if not taken timely and followed strictly. However, these measures are the largest of their kind in the world. They risk heaping further hardship on the quarter of the population who live below the poverty line and the 1.8 million homeless (18) and a large proportion of the poorer Indian population earning a daily wage, the imposed lockdown threatens their very existence. Furthermore, a heightened level of stress may likely be experienced in those who have a

larger family, and this is a point we intend to explore as part of the current study.

As a whole, India is facing lockdown for the 1<sup>st</sup> time in its history. To date, there is no profound evidence showing how quarantine affects anxiety among the general population during self-isolation in India. Hence, there is an urgent need for studies to investigate the impact of lockdown during outbreaks like coronavirus on mental health (19). Since India is a country with diverse culture, many religious groups with clear divisions in sociodemographic status, education, income, marital status, and number of family members as well as health status can be a useful tool in assessing mental health. We hypothesized that gender and self-reported health status would be an independent predictor of anxiety. This study also tries to explore the differences in anxiety among gender as well as religion. This study is a small step taken to analyze the effect of lockdown among the Indian population. It envisioned highlighting the importance of research in the area of isolation and mental health, which is among the less touched issues in India. Thus, the current study was designed to provide a valuable addition to the epidemiology of psychological stress among the general population across India.

The study's objectives were to (1) estimate the prevalence and (2) explore sociodemographic and health-related correlates of anxiety disorders among Indians during the COVID-19 lockdown.

## METHODS

This study adopted a descriptive, cross-sectional questionnaire-based survey. During the time of lockdown, the only method for data collection possible was online. Thus, the present study used an online survey that includes quantitative research methods. This online survey has the advantage of using the internet to provide researching from a distance (20); in addition, it saved time and cost (21).

A non-random convenience sampling method was used. Participants were selected from the contact list of the first researcher, being invited by WhatsApp and email to complete the online survey. The online survey lasted for two weeks, from March 29, 2020, to April 12, 2020. The inclusion criteria were a citizen of India and age greater than 18 years. The consent

form included in the online survey tool regarding their participation in the study. The distribution of the questionnaire extended to the whole country, in Uttar Pradesh, to where the first researcher belongs. The response was also received from Indians staying abroad at present and facing lockdown.

The prevalence of anxiety disorders was 3.6%, according to National Mental Health Survey (22) in the general population in India, while the prevalence of anxiety, according to the Global Burden of Study, was 3.3% (23). However, these studies were not conducted at the time of an emergency, when anxiety among people is considered to be at a peak. Thus, to calculate sample size, we selected the maximum sample size, which comes at  $p = 0.5$ . Subsequently, the sample size was determined using the formula  $Z^2pq/d^2$  (" $p$ " is the prevalence of anxiety, which is taken as 0.5, " $Z$ " is the type 1 error at 5%, and " $d$ " is the absolute error). Therefore, based on sample size calculations ( $p = 0.5$ ,  $q = 1-p$ ,  $Z = 1.96$ , and  $d = 0.05$ ), the requisite random and representative sample size was 384. However, surveys were collected from 392 participants.

The current research was conducted after reviewing the literature available on the mental health of a population in isolation. The Google Forms are used for designing and developing web-based questionnaires that are automatically hosted through a unique URL. This URL link gave people round the clock access from anywhere in the world. The responses were secured using the "Cloud" database, where the data were automatically sorted, scaled, and scored by custom Excel formulae. The researcher could download real-time questionnaire responses in multiple formats (e.g., excel), which analyzed with statistical software of choice. The free availability of the tool and automatic recording of user responses in its spreadsheet had made data collection and analysis simple. In a country like India, where the internet user base is increasing day by day, web-based survey tools became an obvious choice for survey research (24,25). The survey questionnaire included sociodemographic variables such as age, gender, place, education, occupation, religion, family income, marital status, and the number of family members. Any change in the amount of sleep and use of mobile during lockdown was recorded. Health-related variables such as self-reported health

status with three-point scale and response options were "poor," "average," and "good." Since the literature suggests that anxiety is more extensive in the low religiosity subgroup than in the high or no religiosity subgroup (26), questions related to religiosity were asked, with a four-point scale with options as "not at all," "somewhat," "very," and "extremely." These questions were "How much do you participate at a religious ceremony," "How much do you turn to the higher presence (e.g., Allah, God)," and "How much do you read religious/Spiritual Books" (27).

### Outcome variables

Generalized anxiety disorder (GAD) is one of the most common mental disorders, and it often remains undetected (28). Thus, several screening instruments have been developed to measure anxiety. One of these instruments is the GAD Scale GAD-7. The 7-item GADs Scale (GAD-7) was developed as a screener for GAD in primary health care settings (29). Psychometric evaluations of the GAD-7 suggest that it is a reliable and valid measure of GAD symptoms in the general population (28,30) as well as individuals isolated due to the risk of infection (10). The GAD-7 has demonstrated good psychometric properties, including sensitivity and specificity for diagnosing GAD (29). The present study has used the English version of the GAD-7 and internal consistency was assessed by using Cronbach's  $\alpha$ . The internal reliability of the present study was found to be 0.87. For each of 7 items, subjects were asked about how frequently they felt each one during the lockdown period. The 4-point Likert scoring system was used as follows: Not at all (0 points), several days (1 point), more than half the days (2-point), and nearly every day (3-point). Higher scores implied more significant anxiety symptoms. We use a GAD cutoff score of >10 for performing the binary logistic regression analyses to identify predictors of high anxiety (10).

### Data analysis

The data recorded in the spreadsheet were exported to SPSS Version 23. Descriptive and inferential statistics were used for the analysis. The odds ratios and their 95% confidence interval (CI) were calculated.  $p \leq 0.05$  was considered to be statistically significant.

## Ethical consideration

Permission to conduct the study was obtained from the Institutional Ethics Committee of the Career Institute of Medical Sciences and Hospital, Lucknow. Personal identification such as Name, contact number, and email id was not asked due respect of participant's privacy. Participation in this survey was entirely voluntary, and participants can withdraw at any time before the completion of the survey.

## RESULTS

A total of 392 of 407 participants completed the whole items in the GAD-7 questionnaire. Nine were excluded from the data analysis due to incomplete data, and six were due to not fulfilling the inclusion criteria. The study included 392 Indians from 24 states in the country and ten from abroad as well (Table 1). The participants' ages ranged from 18 to 71 years, with a mean age of 30.3 (SD 9.28) years. About 61% were below 30 years of age and 47% were female. More than 90% were graduated, and about 64% followed Hinduism as their religious belief, 30% were Muslims, and 6% included other religions. About 42% of respondents were students, followed by private job holders (25%), government job holders (17.6%), and business/self-employed (8%). About 59% were never married, and 54% of the respondent's family was four or less. Nineteen percent of respondents self-reported health status

were poor and scored six or less in religiosity score (Table 2). About 15% of the respondents reported a lack of sleep during the lockdown, and 60% reported increased mobile use.

Table 3 presents the prevalence of anxiety with background characteristics. The respondents' prevalence of anxiety was 25.3%, based on the cutoff point of 10 and above on the GAD-7 scales. A total of 99 participants were found facing anxiety in this study. Occupation, monthly income, marital status, family size, self-reported health status, and sleep were found associated with anxiety. However, age, gender education, religiosity, and mobile use were not found to be associated with anxiety in the bivariate analysis.

Table 4 displays the predictors of anxiety. After adjusting for other factors in the bivariate logistic regression model, the male gender was negatively associated with anxiety (OR = 0.50, 95% CI: 0.287–0.883,  $p < 0.05$ ). Muslim participants had a 2.48 times higher risk of developing anxiety as compared to Hindu participants (OR = 2.48, 95% CI: 1.371–4.517,  $p < 0.01$ ). The results also showed that participants who reported occupations as business/self-employed were 3.75 times higher risk of developing anxiety than those who said their occupation as students. The odds of developing anxiety were almost 40% lower among ever married participants compared to never-married participants. Participants who reported average health status (OR = 0.457, 95% CI: 0.239–0.873,  $p < 0.01$ ) and good health status (OR = 0.402, 95% CI: 0.190–0.847,  $p < 0.01$ ) were at lower risk of anxiety compared to those who reported poor health status. Loss of sleep was significantly associated with anxiety. Participants who reported a loss of sleep had 1.97 times higher risk of anxiety (OR = 1.98, 95% CI: 1.012–3.889,  $p < 0.05$ ).

**TABLE 1.** Participants geographical location

Location	n	%
Central	17	4.3
East	31	7.9
North-East	8	2.0
North	235	59.9
South	13	3.3
West	78	19.9
Outside India	10	2.6
Total	392	100.0

Central – Madhya Pradesh, Chhattisgarh; East – Bihar, Jharkhand, Orissa, West Bengal; North East – Assam, Meghalaya, Manipur, Sikkim; North – Jammu and Kashmir, Delhi, Haryana, Punjab, Uttar Pradesh, Uttarakhand; South – Karnataka, Kerala, Tamil Nadu; West – Gujarat, Goa, Maharashtra, Rajasthan; Outside India – Saudi Arabia, Hungary, Thailand, Brazil, Oman, Italy

## DISCUSSION

People stressed due to longer quarantine duration as well as infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, stigma (7), and anxiety, which may turn into depression and high perceived stress (3).

The results in this study indicate that 25.3% of the participants are facing anxiety, which is lower

**TABLE 2.** General characteristics of the respondents (n=392)

Background Characteristics	n	%
Age		
≤30	237	60.5
>30	155	39.5
mean±SD	30.3±9.28	
Gender		
Female	185	47.2
Male	207	52.8
Education		
Intermediate and less	32	8.2
Graduate	168	42.9
PG and more	192	49.0
Religion		
Hindu	252	64.3
Muslim	118	30.1
Other	22	5.6
Occupation		
Students	162	41.3
Private salaried	99	25.3
Government salaried	70	17.9
Business/self-employed	31	7.9
Other	30	7.7
Monthly family income (in INR)		
≤20,000	52	13.3
20,000-50,000	94	24.0
50,000-1,00,000	102	26.0
1,00,000-5,00,000	91	23.2
>5,00,000	53	13.5
Marital status		
Never married	232	59.2
Ever married	160	40.8
Family size		
≤4	212	54.1
>4	180	45.9
mean±SD	4.72±2.1	
Self-Reported health status		
Poor	76	19.4
Average	179	45.7
Good	137	34.9
Religiosity		
≤6	226	57.7
>6	166	42.3
mean±SD	6.2±2.0	
Lack of sleep		
No	333	84.9
Yes	59	15.1
Uses of mobile increases		
No	155	39.5
Yes	237	60.5
Total	392	100.0

Source: Online primary survey

**TABLE 3.** Prevalence of anxiety with background characteristics

Background Characteristics	Prevalence n, (%)	$\chi^2$ , p-value
Age		
≤30	63 (26.6)	
>30	36 (23.2)	0.55, 0.455
Gender		
Female	53 (28.6)	
Male	46 (22.2)	2.13, 0.144
Education		
Intermediate and less	9 (28.1)	
Graduate	48 (28.6)	
PG and more	42 (21.9)	2.28, 0.320
Religion		
Hindu	48 (19.0)	
Muslim	46 (39.0)	
Other	5 (22.7)	16.9, 0.000
Occupation		
Students	44 (27.2)	
Private salaried	20 (20.2)	
Government salaried	15 (21.4)	
Business/self-employed	15 (48.4)	
Other	5 (16.7)	12.15, 0.016
Monthly family income (in INR)		
≤20,000	15 (28.8)	
20,000-50,000	27 (28.7)	
50,000-1,00,000	21 (20.6)	
1,00,000-5,00,000	30 (33.0)	
>5,00,000	6 (11.3)	10.45, 0.033
Marital status		
Never married	68 (29.3)	
Ever married	31 (19.4)	4.95, 0.026
Family size		
≤4	40 (18.9)	
>4	32.8 (59)	9.97, 0.002
Self-reported health status		
Poor	31 (40.8)	
Average	43 (24.0)	
Good	25 (18.2)	13.42, 0.001
Religiosity		
≤6	54 (23.9)	
>6	45 (27.1)	0.524, 0.469
Sleep decreased		
No	77 (23.1)	
Yes	22 (37.3)	5.32, 0.021
Increased uses of mobile		
No	38 (24.5)	
Yes	61 (25.7)	0.074, 0.785
Total	99 (25.3)	

Source: Online primary survey

**TABLE 4.** Bivariate logistic regression analyses for predicting anxiety

Background Characteristics	Unadjusted OR, 95% CI	Adjusted OR, 95% CI
Age		
≤30 <sup>®</sup>		
>30	0.836 (0.522,1.338)	1.462 (0.620,3.347)
Gender		
Female <sup>®</sup>		
Male	0.712 (0.451,1.124)	0.503 (0.287,0.883)*
Education		
Intermediate and less <sup>®</sup>		
Graduate	1.022 (0.441,2.368)	1.240 (0.478,3.215)
PG and more	0.716 (0.308,1.663)	1.277 (0.466,3.501)
Religion		
Hindu <sup>®</sup>		
Muslim	2.715 (1.671,4.412)**	2.489 (1.371,4.517)**
Other	1.250 (0.439,3.556)	1.197 (0.386,3.707)
Occupation		
Students <sup>®</sup>		
Private salaried	0.679 (0.372,1.238)	0.858 (0.406,1.811)
Government salaried	0.731 (0.375,1.426)	1.408 (0.555,3.568)
Business/self-employed	2.514 (1.147,5.512)*	3.754 (1.373,10.261)**
Other	0.536 (0.193,1.488)	0.524 (0.154,1.776)
Monthly family income (in INR)		
≤20,000 <sup>®</sup>		
20,000-50,000	0.994 (0.470,2.100)	0.987 (0.421,2.313)
50,000-1,00,000	0.640 (0.297,1.379)	0.558 (0.229,1.359)
1,00,000-5,00,000	1.213 (0.577,2.548)	1.293 (0.547,3.058)
>5,00,000	0.315 (0.111,0.891)*	0.315 (0.098,1.008)
Marital status		
Never Married <sup>®</sup>		
Ever married	0.580 (0.357,0.940)*	0.399 (0.173,0.920)*
Family size		
≤4 <sup>®</sup>		
>4	2.097 (1.318,3.334)**	1.597 (0.940,2.713)
Self-reported health status		
Poor <sup>®</sup>		
Normal	0.459 (0.259,0.813)**	0.457 (0.239,0.873)*
Good	0.324 (0.173,0.609)**	0.402 (0.190,0.847)*
Religiosity		
≤6 <sup>®</sup>		
>6	1.185 (0.749,1.874)	1.054 (0.601,1.849)
Sleep decreased		
No <sup>®</sup>		
Yes	1.977 (1.100,3.552)*	1.984 (1.012,3.889)*
Increased uses of mobile		
No <sup>®</sup>		
Yes	1.067 (0.669,1.703)	1.019 (0.594,1.749)

OR: Odds ratio; CI: Confidence interval; <sup>®</sup>Reference category. Source: Online primary survey \*Significant at  $p < 0.05$

\*\*Significant at  $p < 0.01$



than the recent study on Indian (12), where it was found 33%. The study of the mental health status of isolated people due to Middle East respiratory syndrome (MERS) in South Korea saw the prevalence of anxiety using GAD-7 to be 7.6%, which is one-third of the prevalence in this study (10). In another study of psychological distress among a population affected by highly infectious Equine influenza in Australia, the anxiety was reported to be 34% (8). The reason behind the high prevalence of anxiety among Indians could be because it is the first encounter of this type of lockdown. Besides, this pandemic is impacting a population already facing challenges in their lives such as unemployment, family issues, and various other changes like lifestyle, which included as a significant reason for anxiety (19).

The current study determines a lower rate of anxiety among males or higher among females. Recent research in India (12) and China (13) also shows a similar finding. Globally, the prevalence of anxiety disorders was almost double in females (5.2%), as compared to males (2.8%) estimated using 272.2 million people in 2010 (31). One explanation of why women tend to be more prone to stress is because they ruminate about life stressors, which can increase their anxiety. At the same time, men engage more inactive and problem-focused coping (32). In India, it is common for females to serve the family, and during the lockdown, females are managing household chores and office work at home. They have to keep up with the demands of all the family members regularly, such as food and cleaning, as well as home-schooling children, who are also not able to get their regular education due to the lockdown. Thus, rendering females physically and mentally exhausted, which may contribute to higher anxiety levels. Other reasons may be that women are more likely to experience physical and mental abuse than men, and abuses of any kind found to link to the development of anxiety disorders (32).

Occupations such as business/self-employed also found to be predictors of anxiety in the present study. At present, industries such as tourism, textile, and agriculture, along with the employment generated through this, are at higher risk (33). In total, about 100 million and more Indians' jobs are at risk during and beyond the COVID-19 lockdown.

Retailers of non-food items have closed their outlets, and food retailers are also expecting loss (34). One of the risk factors of anxiety among isolated people in South Korea due to MERS was financial loss (10). Fear of economic loss was higher among businessmen or self-employed individuals.

In the present study, Muslims were found to be at a higher risk of anxiety compared with Hindus. One reason could be that about half of the Indian Muslims are self-employed (35), so they are at higher risk of financial loss than their counterparts. At present, Muslims in India are at a disadvantage with regard to their psychological health compared with other religious groups in India. One possible reason for this may be because of the repeated hate crimes in recent years against them, and during the COVID-19 lockdown, the government repeatedly blamed an Islamic seminary group gathering for spreading the coronavirus resulting in a spree of anti-Muslim attacks across the country (36). There is evidence from the study indicated a strong positive relationship between sociocultural adversities and psychological distress (37). Although more research is needed to confirm these results with different samples of Muslims, the present study sheds important light on a topic that has not previously been examined.

In earlier studies, marital status appeared not to influence levels of anxiety (38), but our study showed that unmarried people have more anxiety than ever-married people. Similar findings were also registered in Western Australia, New South Wales (39), and the USA (40). Economic down-turn affects adult unemployment as well as education, and this could be a contributing factor as to why unmarried people experience a higher level of anxiety. The total participants were made up of 42% of students, and most of them were unmarried. Students are likely to be anxious and worried about their education, especially their exams, and their careers since the economy has taken a downturn.

This study evaluated the low presence of GAD among those who reported their health status as either average or good. The thought of being in poor health (41) likely makes them more prone to anxiety. This lends credence to prior studies that suggest close associations between health status and anxiety (40). Poor self-reported health status may

give rise to sleep disturbances, fatigue, and pain that may trigger worry and anxiety. The inverse association between anxiety and health status also raises the possibility that anxiety may cause poorer health status. We postulate that the presence of anxiety may be associated with lower compliance with medical treatments, thus undermining health (40). Furthermore, anxiety among our sample may be because patients are facing problems in accessing health services amid lockdown (42).

Our study reported higher anxiety issues in those who reported sleep deprivation. Similar findings were also reported in Germany (28) and Italy (16). During the lockdown, the sleep pattern of people altered, possibly due to routine changes and increased usage of digital media near bedtime (16). The reduced time spent outside in different activities such as the office, parks, and shopping malls which have been temporarily closed during lockdown most likely influence the routine at home, for instance, time of awakening and sleeping and time of a meal. Many people may feel more fatigue related to the mental workload associated with COVID-19, and this fatigue can also cause psychological states such as stress and anxiety (43). The pandemic has made people confused and uncertain and given some a sense of trepidation. All these feelings may lead to poor sleep quality, which in turn can make people more tired and anxious (40).

Our study has some limitations, including sampling strategy, which is non-random sampling limiting the generalizability. Another limitation was that the causality relationship could not entirely be ascertained because the study's design was cross-sectional. Further studies with a larger sample size may shed more light on this issue. Other limitations pertain to the study's dependent measure, that is, anxiety. The cut-point used in the present study may have misclassified a certain percentage of individuals.

Despite the limitations mentioned above, this study is an essential step in this type of research and has policy implications. The findings suggest a need for more research to better understand the epidemiology of anxiety among people during emergence. In addition to epidemiologic investigations on prevalence and risk factors of anxiety, concerted efforts are needed to be put forth into developing

evidence-based healthy coping techniques and problem-solving skills for people at risk. Furthermore, future studies can explore the psychological impact of lockdown on individual categories of people, for example, primarily focusing on self-employed people.

## CONCLUSION

The present study was able to determine the early psychological impact of COVID-19 lockdown on the Indian population. This study was made with the sight to collect mental health-related data among the Indian community during lockdown amid disease outbreak, and it may have done for the first time in the current scenario. Study findings indicate that the Indian population under lockdown is affected by heightened psychological distress and thus a higher prevalence of anxiety. Statistical analysis showed that certain groups were more vulnerable to anxiety; specifically, females, Muslims, self-employed, never married, reported poor health, and reported poor sleep. The current research highlights how vulnerable individuals and communities within India are at a higher risk of mental health problems and the need for practical steps to be taken by the government to avoid worsening health conditions.

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