

Research Paper

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

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ABSTRACT

COVID-19 is global threat both on physical and mental health since its outbreak. On 24 March 2020, the Government of India ordered a nationwide lockdown with potential consequences on day-to-day life, mental and physical health and this study aims to explore the impact of COVID-19 on mental health institutionally quarantined subjects. Methods: A cross-sectional study was conducted between 9th July and 30th September 2020 among 305 subjects in 12 quarantine centers. Data was collected by physical interview after obtaining informed consent. Descriptive analysis and bivariate linear regression were performed to examine the association of variables. Results: 40.3% were found to not have depression, 59.7% were mild to extremely severely depressed. On the anxiety subscale, 37.7% did not have anxiety, while 62.3% had mild to extremely severe anxiety. On the stress subscale, only 22.6% reported in the normal range, while the rest 77.4% reported experiencing some degree of stress. Female participants showed statistically significant higher degrees of depression, anxiety and stress. Additionally, fear of infection, inadequate supply of essential items, financial uncertainty had significant association with stress, anxiety, depression and post-traumatic symptoms. Conclusion: Quarantine can be a necessary preventive measure during an outbreak of Pandemic situation like COVID-19, however quarantine is often associated with a negative psychological effect.

Keywords: Depression, Anxiety, Corona Virus, Pandemic, Stress, Psychological Impact, Quarantine

The coronavirus pandemic rapidly spread across the world and created an atmosphere of fear, uncertainty, worry and concern. This public health emergency is challenging coping capacity of the public¹. This is also applicable to individuals who are kept in quarantine for a long time during a lockdown or due to travel from an affected area. This Pandemic has affected people of all nations, races, gender, age and socioeconomic groups. It began as a viral outbreak in Wuhan, China in December 2019¹, within a span of

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Received: February 26, 2021; Revision Received: March 02, 2021; Accepted: March 23, 2021

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

ten months it has spread to 190 countries affecting 41 million people and causing almost 1.1 million deaths (ECDC) and was officially declared as Pandemic on 11th March 2020². This pandemic has devastated the economy, healthcare system, social network and psychological coping systems of people of even the world's most secure countries³. Reports suggest that this pandemic has caused intense psychological distress among the people all around the world.

The first case of COVID-19 was detected in Assam on 31st March 2020 and since then the situation is worsening with hundreds of deaths⁴. Till date .2 million cases have been reported with 906 deaths⁵. The virus significantly affects the mental health of the general public⁶.

Newness of the disease, unknown prognoses, probable shortages of resources, confusion regarding route of infection, imposition of unknown public health measures (quarantine), growing financial losses, loneliness, information overload in media are among the major stressors that undoubtedly have contributed to widespread emotional distress. The various associated preventive measures like isolation are also an established risk factor for adverse psychological consequences⁷.

In SARS-CoV-1 epidemic where people who were affected by quarantine had late onset psychiatric symptoms⁸, late onset psychiatric symptoms after SARSCoV-2 (COVID-19) should not be overlooked.

The major psychological concerns after the pandemic may include the following: a) emerging mental problems like posttraumatic stress disorder, anxiety disorder and loneliness, b) exacerbation of pre-existing mental health issues, c) psychosocial issues such as loss of job. While formulating any strategy the focus should be on possible susceptible groups of people such as elderly persons, children, homeless persons, those who are infected, those who have recovered, frontline healthcare workers and caregivers of patients. It is also important to address possible risk factors with respect to these groups, e.g., misinformation in children and medical comorbidities in elderly persons⁹.

Quarantine has been used as a preventive measure in controlling the spread of infectious diseases such as flu, cholera and plague in the past¹⁰. Quarantine is the separation and restriction of movement of people who have potentially been exposed to a contagious disease for reducing the risk of them infecting others in the community¹¹.

On 24 March 2020, the Government of India ordered a nationwide lockdown for 21 days, limiting movement of the entire 1.3 billion population of India as a preventive measure against the COVID-19 pandemic in India¹². On 14 April, Prime minister Narendra Modi extended the nationwide lockdown until 3 May. On 17 May, the lockdown was further extended till 31 May by the National Disaster Management Authority.¹³

In every district there were facility quarantine centres run by district administration for housing people who are suspected to have come in contact with a confirmed case or who have travelled from an area with known covid-19 cases. The recommended duration of quarantine for Covid-19 based on available information is up-to 14 days from the time of exposure¹⁴. Many residents of such centres complained regarding food quality, poor hygienic conditions etc while other residents also complained of discrimination and stigma

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

of being in the quarantine centres. There were reports of people fleeing such centres and even committing suicide¹⁵.

On this background the District Health Society of Cachar launched a programme named 'AASTHA' which means 'TRUST' to address the psychological issues related to quarantine. The Cachar district administration launched this programme on 7th July 2020 at Maharshi Vidya Mandir to destigmatize and allay fears, stress and anxiety among those kept in the quarantine centres¹⁶. A team of Psychiatrist and Psychologist from Silchar Medical college and Health department visited total twelve quarantine centres till 30th September 2020.

MATERIALS AND METHODS

Study design and participants

This study was a cross-sectional survey in which data were collected from individuals in institutional quarantine. The team consisting of psychiatrists and psychologists visited 12 quarantine centres for the purpose of reaching out to people kept in institutional quarantine. There were two to three visits at each quarantine centre. During the first visit, a group session was held with all the people staying at that particular quarantine centre to remove the stigma associated with COVID 19 disease, allay their worries and encourage them to seek help on a one-to-one basis from the mental health team members. On the second and third day, the mental health professionals held one-to-one counselling sessions with the people quarantined in these centres who reached out, as well as collected data for this study from the people willing to participate, after explaining the purpose of the study. Informed consent was obtained prior to collecting data from the willing participants in this study. All the participants were over 18 years and came from different parts of the country. No identifying information was asked from any of the participants. Data collection was conducted from 7th July 2020, to 30th September 2020. Out of 366 people quarantined at these 12 centres, 305 agreed to participate in the survey.

MEASURES

Sociodemographic data. Sociodemographic data collected from the participants included age, gender, religion, domicile, marital status, level of education, occupation and socioeconomic status. It was also asked if they were the breadwinner of the family. The period for which they had been quarantined at the time of the interview was also noted.

Scales used

1. Depression Anxiety Stress Scale (DASS-21) Mental health of the participants were assessed using Depression Anxiety Stress Scale (DASS-21). It is a modified version of 42-item self-reported DASS. It contains 21 items to measure 3 negative emotional states. Three subscales containing seven items each measure depression, anxiety and stress in the participants.¹⁷ Responses ranged from 0 to 3 with 0 indicating 'did not apply to me at all'; 1 indicating 'applied to me to some degree, or some of the time'; 2 indicating 'applied to me to a considerable degree or a good part of time'; and 3 indicating 'applied to me very much or most of the time'. The scores range from minimum of 0 to maximum of 63. Higher score indicated greater level of depression, anxiety and stress. The scale asks the participants to respond how they felt over the last week. It was slightly modified to ask for their feelings since the start of the institutional quarantine. Multiple studies in India have used DASS-21 and it has been shown to have high internal consistency.^{18, 19, 20}

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

The scores obtained on each of the three subscales of DASS-21 were summed and multiplied by 2. Sum scores ranged from 0 to 126, and for each subscale it ranged from 0 to 42. Sum scores of 0–9 for depression, 0–7 for anxiety and 0–14 for stress were considered as normal. Sum scores of 10–13 for depression, 8–9 for anxiety and 15–18 for stress were considered as mild. Sum scores of 14–20 for depression, 10–14 for anxiety and 19–25 for stress were considered as moderate. Finally, sum scores of 21–27 for depression, 15–19 for anxiety and 26–33 for stress were considered as severe. Any scores above these were considered as extremely severe.

2. Impact of Event Scale - Revised (IES-R) – The impact of the quarantine on the individual has been measured using the Impact of Event Scale - Revised (IES-R). The IES-R is a 22-item self-report questionnaire that computes subjective suffering due to traumatic events. The IES-R has seven questions in addition to the 15 questions of the original IES scale,²¹ to account for the hyper-arousal symptoms of PTSD. Respondents are asked to identify a specific stressful life event and then indicate how much they were distressed or bothered during the past seven days by each "difficulty" listed.²²

Items are rated on a 5-point scale ranging from 0 ("not at all") to 4 ("extremely"). The IES-R yields a total score (ranging from 0 to 88) and subscale scores can also be calculated for the Intrusion, Avoidance, and Hyper-arousal subscales.

On this scale, scores of 24 or more indicate that PTSD is a clinical concern.²³ Partial PTSD or at least some of the symptoms will be present in the persons who have scored this high. A score of 33 or above represents the best cut-off for a probable diagnosis of PTSD.²⁴ The total IES-R score was divided into 0–23 (normal), 24–32 (mild psychological impact), 33–36 (moderate psychological impact), and >37 (severe psychological impact). It has been suggested that a score of 37 or more in the IES-R scale indicate an impact of the particular event on the individual that can manifest as a suppression of the functioning of the immune system for a significant period after an impact event.²⁵

Analysis of Data

Data was collected and tabulated and appropriate statistical analysis was applied wherever required. The Statistical Package for the Social Sciences (SPSS v 23) was used for analysis of the collected data. Descriptive statistics was used to summarise the data. Group differences for sample characteristics were examined Fisher's exact test. Pearson's correlation was done to see any correlation between various clinical variables. The significance was determined at $p < 0.05$.

RESULTS

Sociodemographic and clinical data

Out of 305 total participants, 267 (87.5%) participants were males and 38 (12.5%) were females. Mean age of the participants was 37.59 ± 10.6610 years. Majority of the participants belonged to 30–39 years old (38.0%), followed by 40–49 years (24.9%), 18–29 years (23.3%), 50–59 years (10.5%) and 60–70 years (3.3%). Majority of the respondents had studied up to higher secondary (28.2%), were servicemen by occupation (19.7%), belonged to an upper middle socioeconomic class (49.5%), and were breadwinners for their family (56.7%). Majority of the participants (73.4%) were married. Only 67 (22%) were unmarried, 10 (3.3%) were separated/divorced and 4 (1.5%) were widow/ widowers (Table 1). 163 (56.7%) of the participants had a duration of quarantine more than 10 days, while 142 (43.3%) had a duration of quarantine of less than 10 days (Table 2).

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

Table 1: Sociodemographic data

Variables	Number (N=305)	Percentage
Age		
18-29 years	71	23.3
30-39 years	116	38.0
40-49 years	76	24.9
50-59 years	32	10.5
60-70 years	10	3.3
Gender		
Male	267	87.5
Female	38	12.5
Religion		
Hindu	227	74.4
Muslim	72	23.6
Christian	6	2.0
Domicile		
Urban	151	49.5
Rural	154	50.5
Family Type		
Nuclear	168	55.1
Joint	137	44.9
Education		
Illiterate	24	7.9
Primary	70	23.0
High school	52	17.0
Higher secondary	86	28.2
Graduate and above	73	23.9
Occupation		
Unemployed	24	7.9
Unskilled worker	24	7.9
Daily labourer	58	19.0
Skilled worker	46	15.1
Businessman	46	15.1
Professional	29	9.5
Serviceman	60	19.7
Student	10	3.3
Retired	8	2.6
Socioeconomic status		
Lower class	28	9.2
Lower middle class	32	10.5
Middle class	44	14.4
Upper middle class	151	49.5
Higher class	50	16.4
Marital status		
Unmarried	67	22.0
Married	224	73.4
Divorced/separated	10	3.3
Widow/widower	4	1.3
Breadwinner		
No	132	43.3
Yes	173	56.7

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

Table 2: Duration of quarantine

Variable	Number (N=305)	Percentage
Duration of quarantine		
<10 days	142	46.6
>10 days	163	53.4

Depression, anxiety, stress and impact of events

Among the participants, 40.3% were found to not have depression, 27.9% were mildly depressed, 23.3% were moderately depressed, 7.5% were severely depressed and 1.0% were extremely severely depressed. On the anxiety subscale, 37.7% did not have anxiety, while 23.9% had mild anxiety, 22.6% had moderate anxiety, 9.2% had severe anxiety and 6.6% had extremely severe anxiety. On the stress subscale, only 22.6% reported in the normal range, while the rest 77.4% reported experiencing some degree of stress. Most of them were mildly stressed (30.8%), followed by moderately stressed (30.5%). (Table 3 and Figure 1)

On the Impact of events–revised (IES-R) scale, the mean score was 17.24 ± 10.544 . Among the participants 62.6% had a score in the normal range. Scores indicating clinical concern for PTSD was seen in 34.8%. Eight participants (2.6%) had IES-R scores indicating a definite PTSD.

It was seen that a highly significant positive correlation exists between duration of quarantine, depression, anxiety, stress and IES-R scores. (Table 4)

Table 3: Percentage-wise distribution of degrees of depression, anxiety and stress among the participants

Variable	Depression	Anxiety	Stress	IES-R category	
Normal	123 (40.3%)	115 (37.7%)	69 (22.6%)	Normal	191 (62.6%)
Mild	85 (27.9%)	73 (23.9%)	94 (30.8%)		
Moderate	71 (23.3%)	69 (22.6%)	93 (30.5%)	Clinical concern	106 (34.8%)
Severe	23 (7.5%)	28 (9.2%)	36 (11.8%)	Definite PTSD	8 (2.6%)
Extremely severe	3 (1.0)	20 (6.6%)	13 (4.3%)		

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

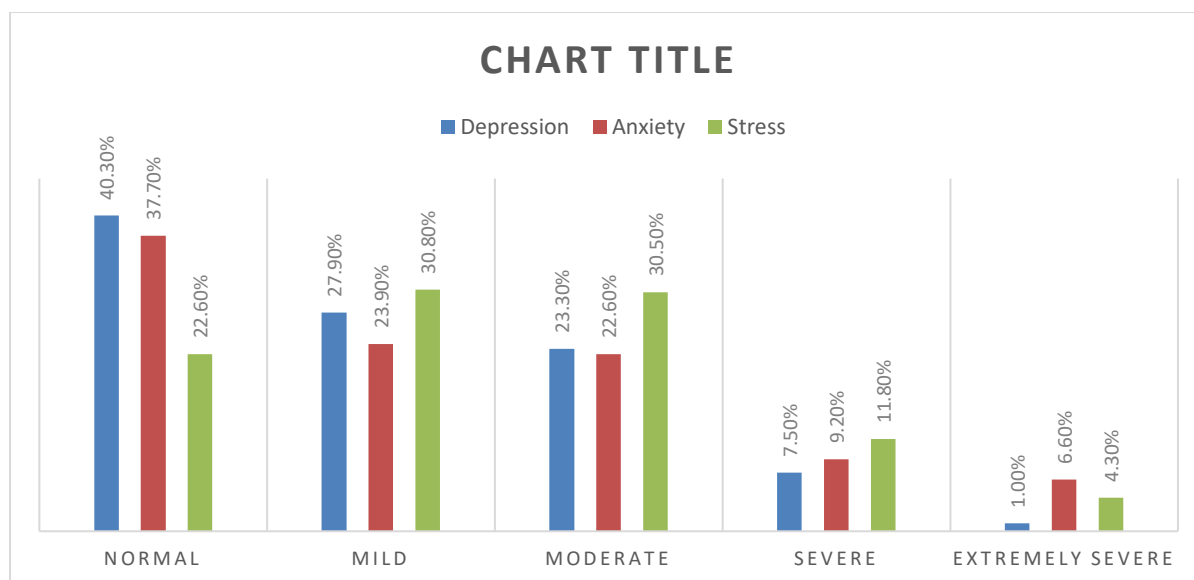


Figure 1 shows Percentage-wise distribution of degrees of depression, anxiety and stress among the participants

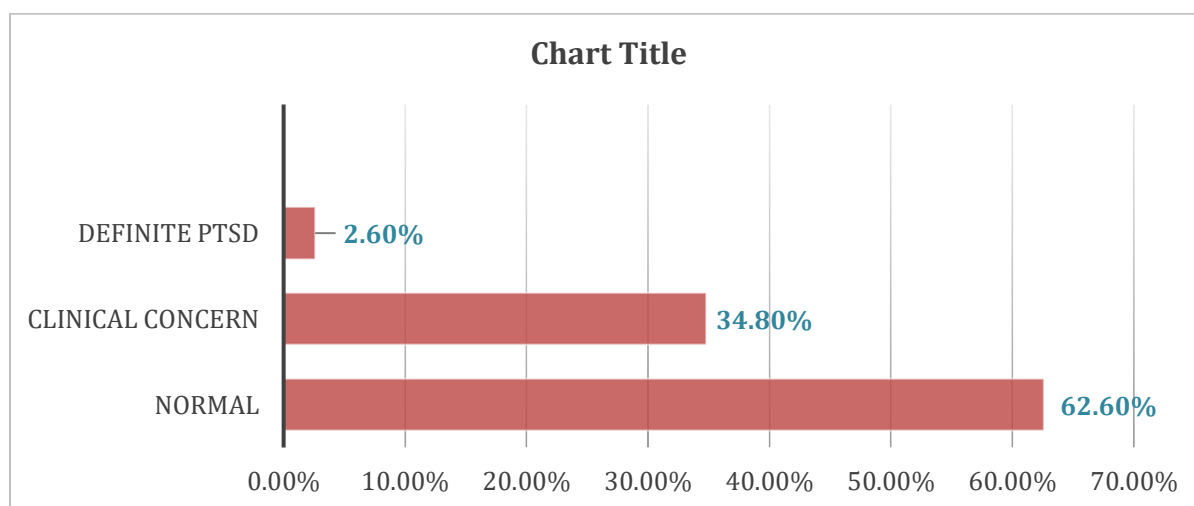


Figure 2 shows Percentage-wise distribution of categories of IES-R among the participants

Table 4: Correlation between duration of quarantine, depression, anxiety, stress and IES-R score among quarantined individuals

Variable	Breadwinner	Duration of quarantine	Depression	Anxiety	Stress	IES-R score
Breadwinner	1	0.246 ^a	0.244 ^a	0.179 ^b	0.348 ^a	0.358 ^a
Duration of quarantine		1	0.353 ^a	0.319 ^a	0.457 ^a	0.484 ^a
Depression			1	0.868 ^a	0.800 ^a	0.741 ^a
Anxiety				1	0.793 ^a	0.722 ^a
Stress					1	0.895 ^a
IES-R score						1

^a = significant at 0.001, ^b = significant at 0.01

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

Association of psychological impact with perceived social stressors

We identified four perceived social stressors namely fear of getting infected with Covid-19, financial uncertainty, concerns about supply of essential commodities, and concerns about family members prevalent in the participants at the quarantine facilities. We then analysed their association with the psychological impact as measured by the DAS scale and IES-R scale. It was found that in the regression model there was a significant strength of association of these stressors collectively on psychological impact. As shown on table 5, these perceived social stressors collectively had a statistically significant ($p < 0.001$) role in determining each factor in the DASS-21 as well as impact of event assessed by IES-R.

Table 5: R^2 and adjusted R^2 values in the linear regression model for strength of association between perceived social stressors with psychological impact

	Depression	Anxiety	Stress	IESR category
R^2	0.374	0.318	0.422	0.334
Adjusted R^2	0.366	0.309	0.414	0.325
p-value	<0.001	<0.001	<0.001	<0.001

While analysing the contribution of the perceived social stressors individually it was found that fear of infection followed by concerns about supply of essential commodities had highly significant contributions to psychological impact. Concerns about family members had significant but lesser contributions while financial uncertainty had the least contribution among the four identified stressors.

Table 6: Standardized beta coefficients of the individual perceived social stressors

	Standardized Beta			
	Depression	Anxiety	Stress	IESR
Fear of getting infected	0.438 ^a	0.411 ^a	0.477 ^a	0.415 ^a
Financial uncertainty	0.116 ^c	0.090	0.089 ^c	0.031
Concerns about supply of essential commodities	0.228 ^a	0.214 ^a	0.248 ^a	0.228 ^a
Concerns about family members	0.174 ^a	0.150 ^b	0.174 ^a	0.193 ^a

^a= significant at $p < 0.001$

^b= significant at $p < 0.01$

^c= significant at $p < 0.05$

Association of gender of quarantined individuals with depression, stress and anxiety

As shown in table 7 and figure 2, it was found that the female participants showed statistically significant higher degrees of depression with higher proportion of females showing moderate (34.2%) and severe (28.9%) depression than males (21.7% and 4.5% respectively). Similarly, females displayed higher rates of severe and extremely severe anxiety (26.3% in each category) than the males (6.7% and 3.7% respectively) [table 8, figure 3]. For stress as well, as seen in table 9 and figure 4, the female propensity to have severe and extremely severe stress (21.1% and 10.5% respectively) was higher than that in male participants (10.5% and 3.4% respectively). A lesser significant (at $p < 0.05$) higher impact of event was seen in the females as seen in table 9 and figure 4.

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

Table 7: Association of gender with depression in quarantined individuals

Depression	Male		Female		Fisher's exact	p-value
	N	%	N	%		
Normal	113	42.3	10	26.3	27.530	<0.001
Mild	81	30.3	4	10.5		
Moderate	58	21.7	13	34.2		
Severe	12	4.5	11	28.9		
Extremely severe	3	1.1	0	0.0		
TOTAL	267	100.0	38	100.0		

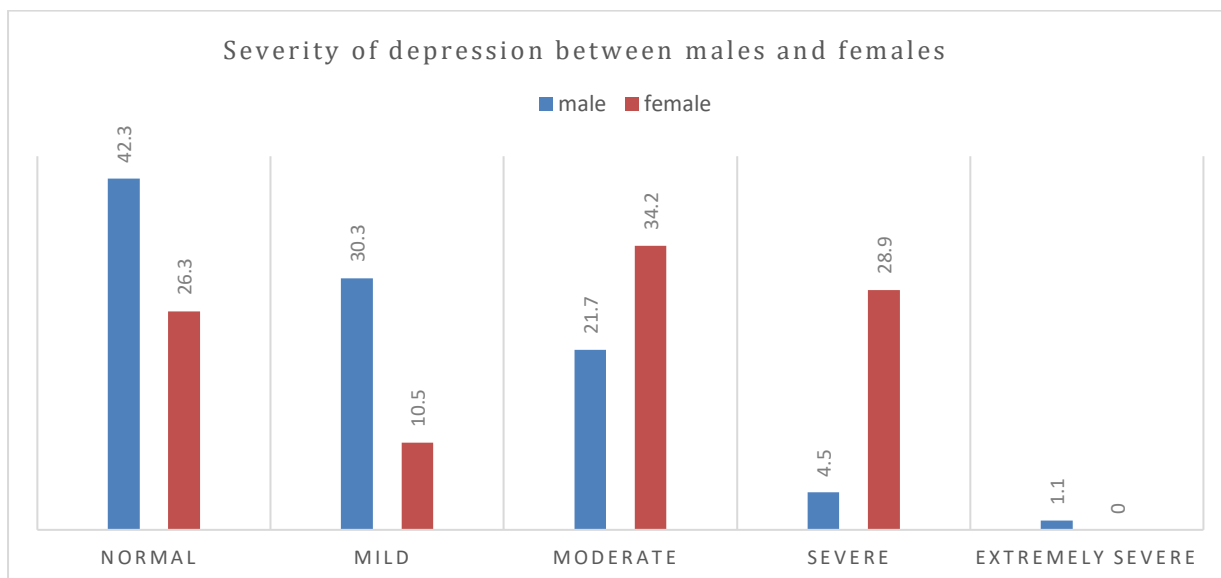


Figure 2 shows comparison of percentage-wise distribution of severity of depression between male and female gender

Table 8: Association of gender with anxiety in quarantined individuals

Anxiety	Male		Female		Fisher's exact	p-value
	N	%	N	%		
Normal	105	39.3	10	26.3	35.930	<0.001
Mild	68	25.5	5	13.2		
Moderate	66	24.7	3	7.9		
Severe	18	6.7	10	26.3		
Extremely severe	10	3.7	10	26.3		
TOTAL	267	100.0	38	100.0		

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

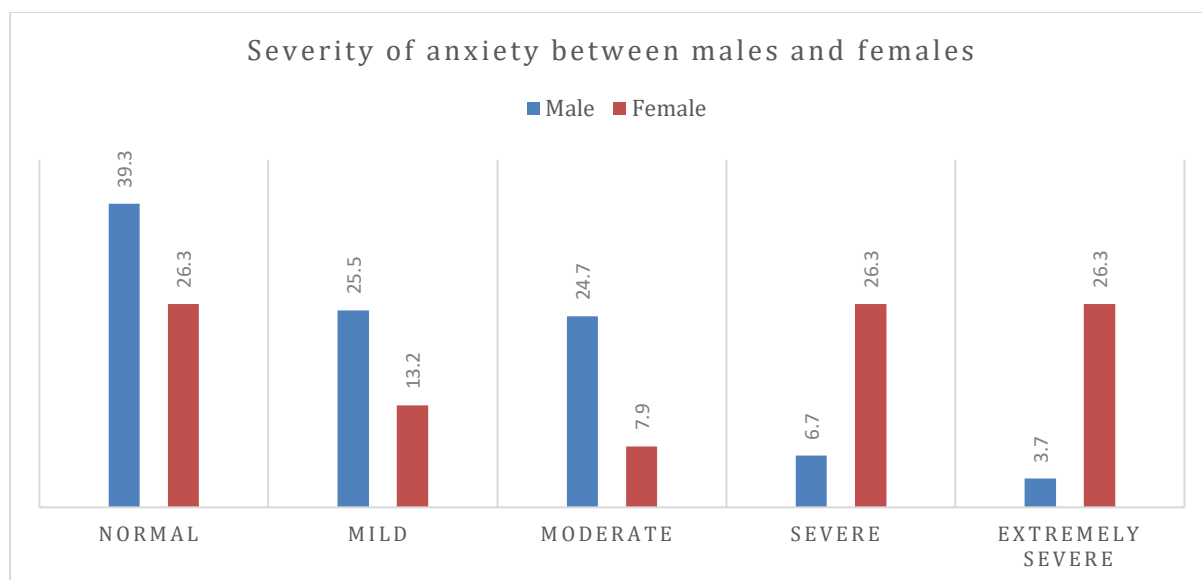


Figure 3 shows comparison of percentage-wise distribution of severity of anxiety between male and female gender

Table 9: Association of gender with stress in quarantined individuals

Stress	Male		Female		Fisher's exact	p-value
	N	%	N	%		
Normal	59	22.1	10	26.3	19.833	<0.001
Mild	92	34.5	2	5.3		
Moderate	79	29.6	14	36.8		
Severe	28	10.5	8	21.1		
Extremely severe	9	3.4	4	10.5		
TOTAL	267	100.0	38	100.0		

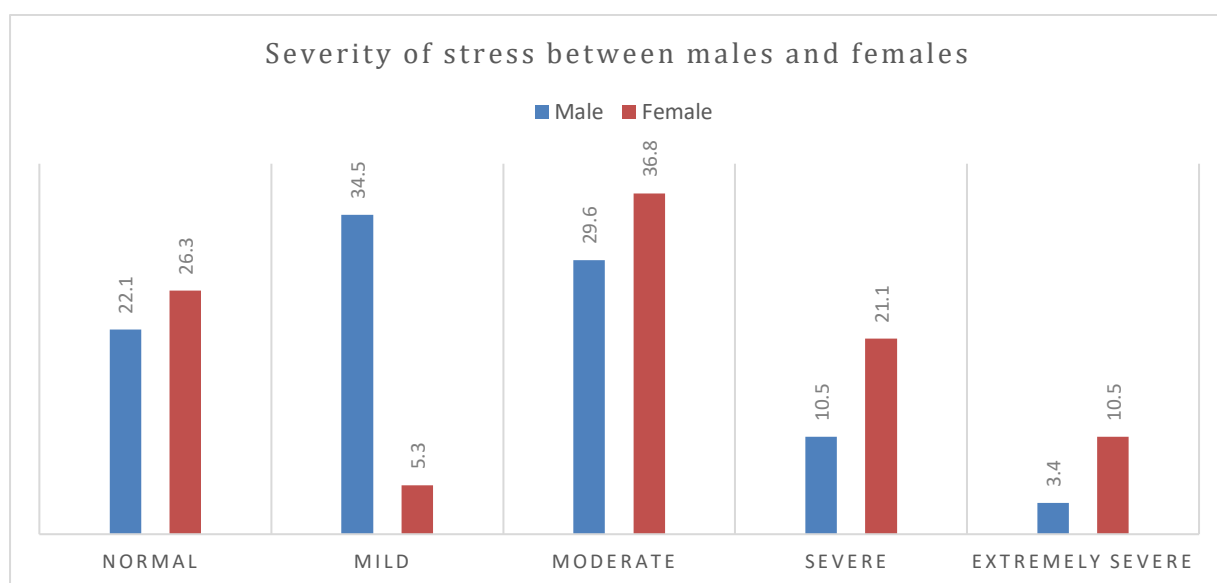


Figure 4 shows comparison of percentage-wise distribution of severity of stress between male and female gender

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

Table 10: Association of gender with IES-R category in quarantined individuals

IES-R category	Male		Female		Fisher's exact	p-value
	N	%	N	%		
Normal	174	65.2	17	44.7	6.179	0.038
Clinical concern	86	32.2	20	52.6		
Definite PTSD	7	2.6	1	2.6		
TOTAL	267	100.0	38	100.0		

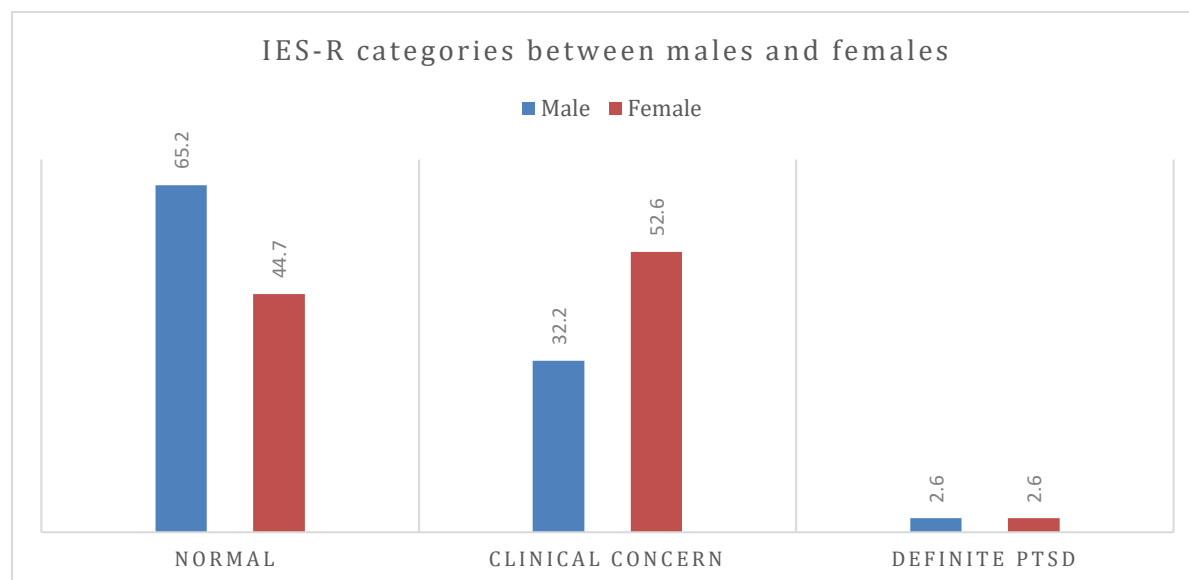


Figure 4 shows comparison of percentage-wise distribution of IES-R categories between male and female gender

DISCUSSION

The mankind is facing an unprecedented threat to survival due to the current pandemic of COVID-19²⁶. The nationwide “lockdown” was declared starting from midnight of March 24, 2020 initially for 21 days as a preventive measure²⁷.

Quarantine has been used effectively as a preventive strategy to control major infectious diseases outbreaks such as cholera and plague in the past²⁸.

There are reasons to explore the mental health of quarantined persons during this outbreak. There's a pressing need to explore the impacts of this worldwide unprecedented pandemic on mental health. It is more important in low- and middle-income countries (LMICs), such as India, which has a limited resource to tackle the various mental health issues that emerge from the outbreak. There have been studies of the epidemic's psychological effects on the general population, doctors, medical professionals, children and older adults^{29,30}. But, there is a paucity of research that evaluated the mental health concerns during this pandemic, especially in India among quarantined subjects.

Quarantine is often an unpleasant experience for those who undergo it. Separation from loved ones, the loss of freedom, uncertainty over disease status, and boredom can, on

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

occasion, create dramatic effects. There have been reports of Suicide³¹, lots of anger, and filing of lawsuits³² following the imposition of quarantine.

In our study population; almost 90% were males, majority were young adults, belonged to upper socioeconomic status, higher educational status, were married and had a duration of quarantine of more than ten days. Abid Hasan Khan et al³³ in their study on the impact of COVID-19 on mental health among quarantined subjects in Bangladesh also reported that; majority of the subjects were – male, young adults, from upper socioeconomic status and were studying in universities.

It was found in our study that majority of the subjects (56.7%) had a quarantine period of more than ten days. One previous study by Hawryluck et al³⁴ showed that those quarantined for more than 10 days showed significantly higher post-traumatic stress symptoms than those quarantined for less than 10 days.

Our study suggests that 59.7% subjects reported mild to extreme level of depression. Abid Hasan et al³³ found that 46.92% quarantined students in Bangladesh reported mild to extremely severe depression levels. It was found in our study that, 31.8% subjects had moderate to severe levels of anxiety and 42.3% subjects had moderate to severe levels of stress. In one study done in China during the early stages (January 2020) of the pandemic by Wang et al³⁵; 1210 subjects from general population across 194 cities in China were assessed for the psychological consequences. It was found that;28.8% reported moderate to severe anxiety symptoms; and 8.1% reported moderate to severe stress levels. Another study done in mid-april in Bangladesh reported higher prevalence of both anxiety and stress in quarantined subjects; 21.79 % students reported moderate to severe anxiety levels and 19.4% students reported moderate to severe stress levels³³. The possible explanation for relatively higher incidence of anxiety and stress in our study are - our study subjects were staying in institutional quarantine centers and were separated from their family members; whereas in both the previous studies done by Abid Hassan et al and Wang et al the subjects were staying in home quarantine, our study was conducted during the peak phase of the pandemic but the earlier two studies of Abid Hasan et al and Wang et al were done in the early phase of the Pandemic.

This study suggests that approximately 34.8% subjects had mild psychological impact and 2.6% had moderate psychological impact. This finding is inconsistent with a study³⁵ conducted on general population of China; where 24.5% reported minimal psychological impact, 21.7% rated mild psychological impact and 53.8% reported a moderate or severe psychological impact.

In our study we found that four stressors – Fear of infection, uncertainty regarding supply of essential items, financial uncertainty and concern about family members collectively had a statistically significant association with all the factors of DASS and IES-R scales. When analyzing individual stressors, it was found that fear of infection and concerns about supply of essential commodities had most significant contributions to psychological impact. Concerns about family members had significant but lesser contributions while financial uncertainty had the least contribution among the four identified stressors.

Participants of multiple earlier studies reported fears about their own health or fears of infecting others^{34,36,37,38,39} and were more likely to fear infecting family members than those

Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

not quarantined³⁶. They also became particularly worried if they experienced any physical symptoms potentially related to the infection³⁸ and fear that the symptoms could reflect having the infection continued to be related to psychological outcomes several months later³⁹.

Irregular and inadequate supply of essential items (food, water, clothes, or accommodation) during quarantine was a source of frustration^{40,41}. Earlier studies found that supplies from public health authorities were insufficient. Participants complained that food, water, and other items were only intermittently distributed⁴²; and food supplies took a long time to arrive⁴³.

Gender was significantly associated with COVID-19 related psychological distress in our study. Female participants showed statistically significant higher degrees of depression, higher rates of severe and extremely severe anxiety, higher rates of severe and extremely severe stress. This finding is consistent with a study conducted on general population of China³⁵ suggesting males having significant associations with stress, anxiety and depression. These findings correspond to previously extensive epidemiological studies which found that women were at higher risk of depression, anxiety and stress⁴⁴.

CONCLUSION

Quarantine can be a necessary preventive measure during an outbreak of Pandemic situation like COVID-19, however quarantine is often associated with a negative psychological effect. Longer duration of quarantine is associated with poorer psychological outcomes; the length of quarantine should be same as the known duration of incubation period of the disease. Authorities should ensure supplies of essential items to quarantine centers ideally in advance, with reallocation plans established to ensure resources do not run out. Having a working mobile phone is very necessary to keep in touch with family members. The ability to communicate with one's family and friends is of utmost importance. Subjects who are at institutional-quarantine centers following lockdown measures for protecting their physical health, needs to pay attention to their mental health as well. Authorities need to identify the immediate psychological needs of the persons staying away from their home at quarantine centers. Health professionals should take the opportunity to provide resources for psychological support and interventions for those who present with symptoms anxiety, depression and stress. Government and health authorities should provide accurate health information during the epidemic to reduce anxiety and stress amongst general public.

Strength and Limitations of the Study

Most of the studies done till date were either online survey or telephonic survey; our study is unique in the sense that the participants were interviewed face to face. We did not follow up the subjects after their discharge from the quarantine centers to assess their psychological health in the long run. Past history of psychiatric illness and coping skills were not assessed in the present study. However, findings from our study can be used to formulate psychological interventions to improve mental health and psychological resilience during an epidemic.

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Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

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Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India

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Acknowledgement

The author appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author declared no conflict of interest.

How to cite this article: Ghosh P., Gogoi A., Ghosh A., Verma P. & Hussain A. (2021). Psychological consequences of COVID-19 pandemic among persons residing at institutional quarantine centers in India. *International Journal of Indian Psychology*, 9(1), 891-906. DIP:18.01.095/20210901, DOI:10.25215/0901.095