



## PSYCHOLOGICAL IMPACT OF COVID-19 LOCKDOWN (PHASE 2) AMONG INDIAN GENERAL POPULATION: A CROSS-SECTIONAL SURVEY

### Community Medicine

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### ABSTRACT

COVID-19 has caused unprecedented disruption of all spheres of life, including health, financial, and socio behavioral. Given the rampant nature of the pandemic, several nations, including India has instituted stringent public health measures, with one being nationwide lockdown, to mitigate COVID-19 transmission. Previous studies reported increased stress and anxiety levels among general population during phase 1 (complete) lockdown, however, the effect of extended lockdown (phase 2) on mental health outcomes remains the subject of investigation till today. Therefore, this cross-sectional study endeavors to assess the psychological outcomes among general population during phase 2 lockdown. The online questionnaire surveyed 627 individuals from the general population using a non-probability snowball sampling technique. Descriptive statistics, including the frequency distribution, mean and standard deviations were generated. Mean differences across groups were analyzed through independent-samples- t and analysis of variance tests. Consistent with previous studies, our results indicated a higher mean score of anxiety and stress among females compared to males. Young adults aged between 21-39 years had the highest mean stress and anxiety scores compared to other categories. The mean anxiety score increased from retired (M=3.96, SD=4.76, to students (M=7.04, SD=7.11), to unemployed (M=9.0, SD=6.53) occupation groups. The findings of this study highlight the need for designing psychosocial regulatory frameworks and suitable interventions to address the needs of those being mentally traumatized by the pandemic and associated lockdowns. The study also advocates for establishing psychological health monitoring and telepsychiatry systems for identifying and treating mental health problems.

### KEYWORDS

COVID-19, lockdown, anxiety, stress, psychological health, mental disorders

### INTRODUCTION

COVID-19 is the newly discovered coronavirus disease known to be associated with SARS-CoV-2 virus (Rothan & Byrareddy, 2020). Corona viruses (CoVs) belong to a group of viruses, which cause respiratory infections. Reportedly, CoVs are the sources of major historical outbreaks, including Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) (Rothan, & Byrareddy, 2020; Testino & Pellicano, 2020). According to the Centers for Disease Control and Prevention [CDC, 2020], individuals may exhibit a variety of mild or severe symptoms in a span of 2-14 days, following an exposure to SARS-CoV-2 virus. The symptoms of COVID-19 typically include fever or chills, cough, shortness of breath, fatigue, muscle or body aches, headache, loss of taste or smell, sore throat, runny nose, nausea, vomiting and diarrhea (CDC, 2020; Singhal, 2020; World Health Organization [WHO], 2020; Xu et al., 2020). COVID-19 is highly contagious compared to other CoVs, and possess a relatively greater reproductive number (R0) ranging from 2 to 4 (Liu et al., 2020). This indicates that a COVID-19 infected individual can transmit this disease to 2-4 individuals at a time (Liu et al., 2020). The outbreak of COVID-19 was first originated in Wuhan (China) in December 2019 (Du Toit, 2020; WHO, 2020, Testino & Pellicano, 2020). The spread of the virus was extensive with the cases spiraling up to nearly 1,35,000 in March, which led to COVID-19 being designated as a pandemic by World Health Organization on 11 March 2020. As of today (July 23), a total of 15,012,731 confirmed COVID-19 cases with 619,150 deaths have been reported worldwide (WHO, 2020). In India alone, there are currently 1,238,635 COVID-19 cases with 29,861 deaths reported (WHO, 2020). Given these trends, the likelihood of this outbreak being contained remains questionable in the foreseeable future. With no vaccines and definitive treatments available, non-pharmacologic measures, such as social distancing, encouraging use of face coverings, and promoting good hygiene practices took precedence (Mesa Vieira, Franco, Gómez Restrepo, & Abel, 2020).

To limit the spread of COVID-19, Governments across the globe implemented strict measures, such as staying at home orders, school and business closures, ban on mass gatherings, mandatory quarantine for regions with a high number of active cases, and national lockdown directives (Atalan, 2020; Wilder-Smith & Freedman, 2020). Likewise, Indian government responded to the surging COVID-19 trends by instituting immediate national lockdown on 24 March 2020

(Gettleman & Schultz, 2020). Per the lockdown guidelines (issued by Government of India), all businesses, schools, and travel (international, national, and interstate) were closed with a few exemptions applied to some emergency and essential services. These included groceries, hospitals, pharmacies, fuel, telecom and postal services (Gettleman & Schultz, 2020). This lockdown was first instituted for 21 days as a part of phase 1, which was later progressed to phase 2 (April 15- May 3), with some conditional relaxations applied while adhering to the social distancing protocols established by the government (Bhaskar, 2020). Previous studies assessed the psychological impact on general population subsequent to initial yet stringent phase- 1 lockdown and found that restrictions, such as closure of schools and businesses, commercial activities and social activities, resulted negative psychological outcomes, such as stress, anxiety, and depression (Lolwal, 2020; Mesa et al., 2020; Rehman et al., 2020; Rosi et al., 2020; Roy et al., 2020; Wang et al., 2020; Zhang et al., 2020). Our study extends the assessment of psychological outcomes to phase 2 of the national lockdowns imposed in India to understand the variations in the anxiety and stress levels among population after they already spent 21 days in the initial lockdown while living under the shadow of pandemic. Authors of this paper acknowledge that the lockdown measures were instrumental in protecting the physical health of the populations, however, long-term consequences related to psychological outcomes warrants a detailed assessment. Given innumerable changes already happened to our daily lives due to pandemic, it is critical to monitor the psychological impact, especially in the light of the uncertainties surrounding phased approach of lockdown. Therefore, this study aims to examine the perceived stress and anxiety among general population in India during the (extended) phase 2 lockdown imposed in India.

### Methods

#### Study design and study population

This cross-sectional analysis was conducted among Indian population from April 19, 2020 to May 5, 2020. The study period corresponds with the phase 2 of the national lockdown in India. Participants who were 18 years or above, with a current residency status in India, and those with the ability to provide informed consent and comprehend English, were included. Individuals with any status, including students, workers, retired, self-employed, general public were included. Minors, and non-resident Indians were excluded from this study.

### Data collection

A web-based survey was developed through Google forms. All participants were requested to sign a voluntary informed consent prior to the data collection. Informed consent included a detailed information related to aim and significance of the study, so participants will make informed choices about whether to participate or withdraw at any time if they wished. The survey link was disseminated through emails and different social media platforms such as WhatsApp groups, Facebook, Messengers etc. among the contacts of investigators. A chain referral sampling or snowball sampling was used to recruit participants from different regions of India. The survey link was primarily distributed by researchers to a group of participants, who then propagated it to future subjects from among their acquaintances. Survey instruments and variables Survey instruments and variables is a heading needs to be distinct from the previous paragraph. Please give some space between the preceding para and the heading.

The online survey questionnaire had three sections: (1) socio-demographic information (2) questions related to symptoms of anxiety, (3) questions related to perceived stress.

Beck Anxiety Inventory (BAI) tool measures the anxiety levels and has a good internal consistency with a reported Cronbach alpha of 0.92 (Beck et al., 1988). BAI is a 21 items survey tool, which includes questions related to common symptoms of anxiety. The levels of anxiety are categorized as low (score 0-21), moderate (score 22-35), and severe ( $\geq 36$ ) levels (Beck et al., 1988). The Perceived Stress Scale (PSS) was used to measure the stress perception, consists of 10 items related to feelings and thoughts during the last month (Cohen, Kamarck, & Mermelstein, 1983). The PSS has been tested by several international studies and has a good internal reliability with a Cronbach alpha ranging from 0.78-.91 (Cohen et al., 1983; Cohen & Janicki-deverts, 2012). The maximum possible score of stress was 40, with categories of low stress (score 1-13), moderate stress (score 14-26), and high stress (score 27-40).

### Statistical analysis

Participants' responses, from Google forms, were exported to Microsoft Excel, and then imported to IBM SPSS version 26.0 (IBM Corp. Armonk, NY, USA). Descriptive statistics, including the frequency distribution, mean and standard deviations were generated. Proportions of individual responses for each item were generated first to compute composite proportions of that response in the anxiety and stress survey questionnaire. To analyze the differences in perceived stress and anxiety scores across groups, independent-samples- t test and analysis of variance were utilized. Prior power analysis and sample size determination was done by G power (version 3.1). P-values less than 0.05 were considered statistically significant and data were reported as 95% confidence intervals.

### Results

#### Sample size justification

G power software (version 3.1) was used to perform priori power analysis (Lenth, 2001; Faul, Erdfelder, Buchner, & Lang, 2009). The priori power analysis was conducted to ascertain the required sample size for a test with a predetermined alpha and beta (power) level. Power was ascertained separately for t and ANOVA tests by using Cohen's effect size conventions (effect size = 0.5 for t- tests; effect size =0.25 for ANOVA) (Cohen, 1988). The total sample size estimated with a power of .95 for was 210 and 252 for t test and ANOVA test respectively. The sample size with the greatest value (n=252) was considered appropriate since it satisfies the minimum requirement of all the statistical tests used.

#### Demographic characteristics

A total of 627 responses were recorded during the survey period. The demographic profile of the respondents shows that 310 (50.3%) respondents were males and 317 (49.2%) were females (Table 1). Nearly 1/3rd of the study population (30.2%) were entrepreneurs by profession. Over 70% of the sample population were the residents of Rajasthan. The predominant age groups in the sample include young (20-29 years), and middle-aged (40-49 years), constituting approximately 50% of the sample population (Table 1). Most participants reported no use of smoke (89.3%) and alcohol (73.5%). Over 25% of the population reported to be engaged in physical activity

for at-least 2-3 days/week (Table 1).

### Anxiety

About 3 out of 10 entrepreneurs experienced low anxiety (29.5%, Table 2). Nearly 1/4th of employed population reported to experience low anxiety (23.3%, Table 2). Among age groups, 24.8% of people in the 40-49 years had low anxiety (Table 2). Notably, 8 out of 10 individuals without preexisting conditions experienced low-level anxiety (79.5%, Table 2). Among the symptoms of anxiety, numbness (66%), wobbling in the legs (41%), heart pounding (40%), and feeling of choking (38%) of mild type were among the most commonly reported symptoms by the study participants (Table 3). Mild fear of dying was reported by 25% of the participants (Table 3). On an average, nearly 31% symptoms reported were of mild type in the anxiety survey (PC2; Table 3). The mean anxiety scores were higher among female participants (M=6.77, SD=6.8) than males (M=5.12, SD=5.6), with a statistically significant mean difference,  $M = -1.65$ , 95% CI [-2.62, -.67],  $p < 0.001$ , (Table 4). Individuals with single status had a higher mean anxiety score (M=7.06, SD= 7.8) than those being married (M=5.65, SD=6.0), with a statistically significant mean difference,  $M=1.41$ , 95% CI [.11, 2.71],  $p < 0.034$ , (Table 4). The mean anxiety score increased from retired (M=3.96, SD=4.76), to entrepreneur (M=5.29, SD=5.13), to employed (M=6.46, SD = 6.67), to students (M=7.04, SD=7.11) to unemployed (M=9.0, SD=6.53) occupation groups, in that order, and the differences between these occupation groups were statistically significant,  $F = 2.565$ ,  $p = .02$  (Table 4). The mean difference in anxiety scores between different age groups was statistically significant ( $F=7.082$ ,  $p < 0.001$ , Table 4). The mean anxiety scores were higher among 20-29 (M=7.16, SD=5.9) and 30-39 age groups (M=8.17, SD=9.2).

**Table 1: Demographic characteristics of the study population (N=627)**

Variables	Groups	Frequency (N)	Proportion (%)
Gender	Female	317	49.2
	Male	310	50.3
State <sup>a</sup>	Rajasthan	458	73.0
	Maharashtra	84	13.3
	Others <sup>a</sup>	85	14.0
Profession	Consultant	35	5.7
	Employed	154	24.6
	Retired	71	11.3
	Entrepreneur	189	30.2
	Student	118	18.7
	Unemployed	20	3.2
	Others	40	6.3
Age (in years)	20 – 29	154	24.4
	30 – 39	120	19.2
	40 – 49	158	25.2
	50 – 59	78	12.4
	60 – 69	85	13.7
	70 and above	32	5.0
Marital status	Single	172	27.6
	Married	455	72.4
Preexisting medical conditions	Yes	108	17.3
	No	519	82.7
Living with children	Yes	360	57.5
	No	267	42.5
Smoking	Never	560	89.3
	Sometimes	42	6.6
	<10 cigarettes/day	17	2.7
	>10 cigarettes/day	8	1.2
Alcohol use	Never	461	73.5
	Seldom	114	18.1
	Often	35	5.6
	Almost everyday	17	2.7
Physical activity	Never	101	16.1
	1 day	73	11.6
	2-3 days/week	182	29.0
	>4 days/week	271	43.2

<sup>a</sup>. Delhi, Karnataka, Kerala, Madhya Pradesh, Gujrat, Haryana, Punjab, Jammu and Kashmir, Jharkhand, Odisha, Bihar, Uttar Pradesh

**Table 2: Distribution of anxiety across demographic groups**

Variables	Groups	Anxiety Levels <sup>a</sup>						Total
		Low		Moderate		High		
		N	%	N	%	N	%	
Gender	Female	302	47.9	13	2.1	2	0.3	317
	Male	302	47.9	8	1.3	0	0	310
Profession	Consultant	34	5.6	0	0	1	0.2	35
	Employed	146	23.3	7	1.1	1	0.2	154
	Retired	69	11.0	2	0.3	0	0	71
	Entrepreneur	185	29.5	3	0.5	1	0.2	189
	Student	111	17.6	7	1.1	0	0	118
	Unemployed	19	3.0	1	0.2	0	0	20
	Others	39	6.2	1	0.2	0	0	40
Age (in years)	20 – 29	143	22.7	11	1.7	0	0	154
	30 – 39	114	18.3	3	0.5	3	0.5	120
	40 – 49	155	24.8	3	0.5	0	0	158
	50 – 59	77	12.2	1	0.2	0	0	78
	60 – 69	85	13.7	0	0	0	0	85
	70 and above	29	4.6	3	0.5	0	0	32
Marital status	Single	162	26.0	9	1.4	1	0.2	172
	Married	441	70.2	12	1.9	2	0.3	455
Preexisting medical conditions	Yes	104	16.7	3	0.5	1	0.2	108
	No	499	79.5	18	2.9	2	0.3	519
Living with children	Yes	349	55.7	8	1.3	3	0.5	360
	No	254	40.5	13	2.1	0	0	267

a. The levels of anxiety are categorized as low (score 0-21), moderate (score 22-35), and severe ( $\geq 36$ ) per Beck Anxiety Instrument (BAI) criteria

**Table 3: Individual responses and composite proportions scores of anxiety questionnaire**

Question	Not at all		Mildly, but it didn't bother me much		Moderately – it wasn't+ pleasant at times		Severely – it bothered me a lot	
	N	P1(%)	N	P2 (%)	N	P3 (%)	N	P4 (%)
Q1: Numbness or tingling	0	0	120	66	48	27	12	7
Q2: Feeling hot	220	59	110	30	33	9	8	2
Q3: Wobbliness in legs	61	39	64	41	25	16	5	3
Q4: Unable to relax	190	57	107	32	32	10	7	2
Q5: Fear of worst happening	306	68	112	25	28	6	7	2
Q6: Dizzy or lightheaded	98	50	69	35	23	12	5	3
Q7: Heart pounding / racing	67	48	56	40	12	9	4	3
Q8: Unsteady	56	45	39	31	23	19	6	5
Q9: Terrified or afraid	191	67	61	21	27	10	5	2
Q10: Nervous	180	63	75	26	28	10	4	1
Q11: Feeling of choking	28	44	24	38	10	16	2	3
Q12: Hands trembling	24	40	18	30	15	25	3	5

Q13: Shaky / unsteady	16	34	15	32	13	28	3	6
Q14: Fear of losing control	66	55	36	30	15	12	4	3
Q15: Difficulty in breathing	38	57	19	28	7	10	3	4
Q16: Fear of dying	87	67	32	25	8	6	2	2
Q17: Scared	186	73	47	19	17	7	4	2
Q18: Indigestion	150	66	65	28	11	5	3	1
Q19: Faint / lightheaded	36	61	13	22	7	12	3	5
Q20: Face flushed	17	39	13	30	9	20	5	11
Q21: Hot / cold sweats	78	57	35	26	17	12	7	5
Composite proportional score	-	52 [Pc <sup>1</sup> ]	-	31 [Pc <sup>2</sup> ]	-	13 [Pc <sup>3</sup> ]	-	4[Pc <sup>4</sup> ]

P1: Item proportion of respondents who answered “not at all”  
 P2: Item proportion of respondents who answered “mildly, but it did not bother me much”  
 P3: Item proportion of respondents who answered “moderately, it was not pleasant at times”  
 P4: Item proportion of respondents who answered “severely, it bothered me a lot”

PC<sub>1</sub> = Composite proportion who responded “not at all” for each item = (P1\_Q1 + P1\_Q2 + P1\_Q3 + P1\_Q4 + P1\_Q5 + P1\_Q6 + P1\_Q7 + P1\_Q8 + P1\_Q9 + P1\_Q10 + P1\_Q11 + P1\_Q12 + P1\_Q13 + P1\_Q14 + P1\_Q15 + P1\_Q16 + P1\_Q17 + P1\_Q18 + P1\_Q19 + P1\_Q20 + P1\_Q21)/21

PC<sub>2</sub> = Composite proportion who responded “mildly, but it did not bother me much” for each item = (P2\_Q1 + P2\_Q2 ..... + P2\_Q21) /21

PC<sub>3</sub> = Composite proportion who responded “moderately, it was not pleasant at times” for each item = (P3\_Q1 + P3\_Q2 ..... + P2\_Q21) /21

PC<sub>4</sub> = Composite proportion who responded “severely, it bothered me a lot” for each item = (P4\_Q1 + P4\_Q2 ..... + P4\_Q21)/21

**Table 4: Mean scores of anxiety and perceived stresses among demographic groups**

Variable	Groups	Anxiety		Stress	
		Mean ± SD	P value	Mean ± SD	P value
Gender	Female	6.77±6.8	0.001*	14.67±6.44	0.002*
	Male	5.12±5.6		13.10±6.35	
Profession	Consultant	6.22±8.10	0.02**	14.89±6.39	0.001**
	Employed	6.46±6.67		13.75±5.73	
	Retired	3.96±4.76		9.94±5.66	
	Entrepreneur	5.29±5.13		13.46±6.00	
	Student	7.04±7.11		17.40±6.49	
	Unemployed	9.0±6.53		14.30±6.90	
	Others	5.68 ±6.26		12.10±7.03	
Age (in years)	20 – 29	7.16± 6.9	<0.001**	17.30±6.20	0.001**
	30 – 39	8.17±9.2		14.61±6.36	
	40 – 49	5.26±5.12		13.35±5.84	
	50 – 59	5.06±4.93		11.83±5.49	
	60 – 69	3.46±3.37		10.60±5.53	
	70 and above	5.84±7.27		11.34±7.37	
Marital status	Single	7.06 ± 7.87	0.034*	16.23±6.58	0.001*
	Married	5.66±6.10		13.02±6.17	
Preexisting medical conditions	Yes	6.41±5.84	0.1*	12.92±6.95	0.11*
	No	5.86±6.36		14.09±6.32	
Living with children	Yes	5.83±6.20	0.7*	13.44±6.12	0.045*
	No	6.13±6.37		14.51±6.81	

\*- Independent-samples-t-test

\*\* Analysis of variance

**Table 5: Distribution of perceived stress across demographic groups**

Variables	Groups	Perceived Stress Levels*							
		Low		Moderate		High		Total	
		N	%	N	%	N	%	N	%
Gender	Female	145	23.1	162	25.8	10	1.6	317	
	Male	154	24.6	152	24.2	4	0.6	310	
Profession	Consultant	13	2.1	22	3.5	0	0	35	
	Employed	79	12.6	74	11.8	1	0.2	154	
	Retired	54	8.6	16	2.6	1	0.2	71	
	Entrepreneur	88	14.0	98	15.6	3	0.5	189	
	Student	30	4.8	80	12.8	8	1.3	118	
	Unemployed	9	1.4	11	1.8	0	0	20	
	Others	26	4.1	13	2.1	1	0.2	40	
Age (in years)	20 – 29	41	6.5	104	16.6	9	1.4	154	
	30 – 39	51	8.1	66	10.5	3	0.5	120	
	40 – 49	79	12.6	79	12.6	0	0	158	
	50 – 59	50	8.0	27	4.3	1	0.2	78	
	60 – 69	59	9.4	26	4.1	0	0	85	
	70 and above	19	3.0	12	1.9	1	0.2	32	
Marital status	Single	56	8.9	108	17.2	8	1.3	172	
	Married	243	38.8	206	32.9	6	1.0	455	
Preexisting medical conditions	Yes	56	8.9	50	8.0	2	0.3	108	
	No	243	38.8	264	42.1	12	1.9	519	
Living with children	Yes	178	28.4	178	28.4	4	0.6	360	
	No	121	19.3	136	21.7	10	1.6	267	

a. Score 1-13 low stress; Score 14-26 moderate stress; Score 27-40 high stress

**Table 6: Individual responses and composite proportions score of stress questionnaire**

Questions	Never		Almost Never		Someti mes		Fairly Often		Very Often	
	N	P1 (%)	N	P2 (%)	N	P3 (%)	N	P4 (%)	N	P5 (%)
Q1: In the last month, how often have you been upset because of something that happened unexpectedly?	0	0	161	19	542	63	99	12	52	6
Q2: In the last month, how often have you felt that you were unable to control the important things in your life?	78	10	158	20	428	54	85	11	41	5
Q3: In the last month, how often have you felt nervous and "stressed"?	76	10	136	18	409	55	85	11	38	5
Q4: In the last month, how often have you felt confident about your ability to handle your personal problems?	28	4	54	7	322	43	168	23	171	23
Q5: In the last month, how often have you felt that things were going your way?	34	3	77	7	495	46	224	21	248	23
Q6: In the last month, how often have you found that you could not cope with all the things that you had to do?	106	14	188	24	393	50	65	8	28	4
Q7: In the last month, how often have you been able to control irritations in your life?	25	3	61	7	398	44	213	23	211	23

Q8: In the last month, how often have you felt that you were on top of things?	37	3	80	7	552	47	252	21	260	22
Q9: In the last month, how often have you been angered because of things that were outside of your control?	146	15	208	21	492	50	90	9	39	4
Q10: In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	77	12	139	21	342	52	70	11	30	5
Composite proportion	-	15[ <sup>P</sup> <sub>C<sup>1</sup></sub> ]	-	21[ <sup>P</sup> <sub>PC<sup>2</sup></sub> ]	-	51[ <sup>P</sup> <sub>PC<sup>3</sup></sub> ]	-	9[ <sup>P</sup> <sub>PC<sup>4</sup></sub> ]	-	4[ <sup>P</sup> <sub>C<sup>5</sup></sub> ]

P1: Item proportion of respondents who answered "never"  
 P2: Item proportion of respondents who answered "almost never"  
 P3: Item proportion of respondents who answered "sometimes"  
 P4: Item proportion of respondents who answered "fairly often"  
 P5: Item proportion of respondents who answered "very often"

PC<sub>1</sub> = Composite proportion who responded "never" for each item = (P1\_Q1 + P1\_Q2 + P1\_Q3 + P1\_Q4 + P1\_Q5 + P1\_Q6 + P1\_Q7 + P1\_Q8 + P1\_Q9 + P1\_Q10)/10  
 PC<sub>2</sub> = Composite proportion who responded "almost never" for each item = (P2\_Q1 + P2\_Q2 ..... + P2\_Q10)/10  
 PC<sub>3</sub> = Composite proportion who responded "sometimes" for each item = (P3\_Q1 + P3\_Q2 ..... + P3\_Q10)/10  
 PC<sub>4</sub> = Composite proportion who responded "fairly often" for each item = (P4\_Q1 + P4\_Q2 ..... + P4\_Q10)/10

**Stress**

Results indicate that nearly 1/4<sup>th</sup> of females perceived moderate stress (25.8%, Table 5). Approximately, 15% of entrepreneurs, 16.6% of individual <30 years, and 32% of those being married perceived moderate stress (Table 5). Feelings of being upset with some things happen unexpectedly (63%), nervousness (55%), inability to control things in life (54%), failure to cope up (50%), and being at the top of the things (47%) over the last month, were commonly reported to happen "sometimes" by the participants (Table 6). On an average, over 50% stress related thoughts and feelings perceived by participants were reported to happen "sometimes" (PC3; Table 6). Similar to anxiety, the mean stress scores were higher among female participants (M=14.67, SD=6.4) than males (M=13.10, SD=6.35), with a statistically significant mean difference, M = 1.58, 95% CI [ .58, 2.58], p<0.002, Table 4). Individuals with single status had a higher stress score (M=16.23, SD= 6.57) than those being married (M=13.01, SD=6.17), with a statistically significant mean difference, M=3.22, 95% CI [2.12, 4.34], p<0.001, Table 4). The mean stress score increased from retired (M = 9.94, SD = 5.66), to entrepreneur (M = 13.46, SD = 6.0), to employed (M = 14.30, SD = 6.90), to students (M = 17.4, SD = 6.49) among occupation groups, in that order, and the differences between these occupation groups were statistically significant, F= 12.220, p = .001. The mean difference in stress scores between different age groups was statistically significant (F=18.614, p<0.001, Table 4). The mean anxiety stress scores were the highest among 20-29 (M = 17.30, SD=6.20) and 30-39 age groups (M = 14.61, SD=6.36, Table 4).

**DISCUSSION**

The study assessed the perceived stress and anxiety levels among the general population in India during lockdown phase 2, in which previously imposed restrictions were lifted with some business-related activities being progressively resumed. Determining psychological impact during these times is vital in understanding how the Indian civilians adjusted with the "new normal" amidst surging trends of COVID-19 cases. The findings of the study indicate that females experience the higher levels of stress and anxiety compared to males (Table 2 & Table 5). These findings were consistent with previous reports published during phase 1 lockdown (Moghaniabashi-Mansourieh, 2020; Wang et. al., 2020). The gender differences in anxiety and stress levels may be attributed to the higher sensitivities



among females towards stressful events and their inability to regulate negative emotions (Campbell-Sills et al., 2006; Maeng & Milad, 2015). According to the American Psychiatric Association (2013), more than 50% of the cases of generalized anxiety disorders and preexisting mental disorders comprised of females. Moreover, females were reported to be twice likely to have anxiety disorders compared to males (Tolin & Foa, 2008). Interestingly, the mean stress and anxiety scores of married couples and those living with children were lower compared to those being unmarried and living without children (Table 4). This may be explained on the premise that being surrounded by the loved ones result in reassurance and helps in buffering against the feelings of vulnerability and inability to control (Chin et al., 2017; Ta et al., 2017).

The results also indicate that the mean scores of anxiety and stress were the highest among 20 to 29- and 30-39-years' age groups (Table 4) and the findings were consistent with previous reports (Ahmed et al., 2020, Huang and Zhao, 2020; Shingemura et al., 2020). While the evidences supporting this finding remains equivocal, we believe that it may be associated with the employment status of the individuals in these age groups. Majority of them were students, employees or entrepreneurs. In context of Covid-19 situation, these individuals perceive themselves to be high risk of employment loss compounded with career uncertainties. Undoubtedly, COVID-19 has disrupted the global economic ecosystem and generated uncertainties across job and financial sectors, which brought changes in business practices. Fear associated with job loss, business closures, academic delays, tuition fee related issues have emerged during COVID-19 and exacerbated financial hardships among young adults (Akkermans, Richardson, & Kraimer, 2020; Cao et al., 2020; Feizi, Aliyari, Roohafza, 2012; Majumdar et al., 2020; Moghanibashi-Mansourieh, 2020).

### Strengths

This study offers a unique perspective to understand the psychological impact of extended lockdowns among general population, who have already lived in the shadow of pandemic with subsequent lockdowns for 21 days. To our knowledge, this is the first study to report the anxiety and stress at the point of transition from stringent lockdown to conditional or partial lockdown after some economic activities being resumed. Additionally, the current study extends the observations to the population across different demographic dimensions, which will serve as baseline data for determining the extent of the long-term consequences of COVID-19 pandemic and to assess the effectiveness of the psychological interventions in the future.

### Limitations

This study has a few limitations, which merit discussion. First, the sample of the study was not nationally representative, which limits the generalizability of these results to other populations. Second, our psychological investigation was only limited to self-reported anxiety and stress symptoms; the post-traumatic stress disease symptoms were not investigated.

### Conclusions and public health implications

COVID-19 has taken a significant toll on mental health of the general population. National lockdowns were helpful in limiting the spread of COVID-19, however, effects on mental health were among unintended consequences. Anxiety and stress levels were higher among some demographic groups, which may have stemmed from the fear of losing loved ones, job insecurity, and social disconnectedness etc. These are important predictors, which warrant further elucidation. The study highlights the importance of establishing psychological services for helping individuals to combat stress generated after unprecedented obstruction that arose without warning. In addition, the study advocates for the establishment of career and counselling services in India to help those being hurt economically. The findings of this study highlight the need for designing psychosocial regulatory frameworks and suitable interventions to address the needs of those being mentally traumatized by the pandemic and associated lockdowns. The study also advocates for establishing psychological health monitoring and telepsychiatry systems for identifying and treating mental health problems.

### REFERENCES

- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub.
- Ahmed MZ, Ahmed O, Aibao Z, Hanbin S, Siyu L, Ahmad A. Epidemic of COVID-19 in China and associated Psychological Problems [published online ahead of print, 2020 Apr 14]. *Asian J Psychiatr*. 2020;51:102092. doi:10.1016/j.ajp.2020.102092

- Akkermans, J., Richardson, J., & Kraimer, M. (2020). The Covid-19 crisis as a career shock: Implications for careers and vocational behavior. *Journal of vocational behavior*, 119, 103434. Advance online publication. <https://doi.org/10.1016/j.jvb.2020.103434>
- Atalan, A. (2020). Is the lockdown important to prevent the COVID-9 pandemic? Effects on psychology, environment and economy-perspective. *Annals of Medicine and Surgery*. <https://doi.org/10.1016/j.amsu.2020.06.010>
- Bangasser D, Valentino R.( 2014). Sex differences in stress-related psychiatric disorders: neurobiological perspectives. *Front Neuroendocrinol* 35:303–319.
- Bhanskar, U. (2020). India to remain closed till 3 May, economy to open up gradually in lockdown 2.0. *Livemint*.
- Beck, A.T., Epstein, N., Brown, G., & Steer, R.A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, 56, 893-897.
- Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Acceptability and suppression of negative emotion in anxiety and mood disorders. *Emotion*, 6(4), 587-595. <https://doi.org/10.1037/1528-3542.6.4.587>
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research*, 287, 112934. <https://doi.org/10.1016/j.psychres.2020.112934>
- Chin, B., Murphy, M., Janicki-Deverts, D., & Cohen, S. (2017). Marital status as a predictor of diurnal salivary cortisol levels and slopes in a community sample of healthy adults. *Psychoneuroendocrinology*, 78, 68–75. <https://doi.org/10.1016/j.psychneuen.2017.01.016>
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Retrieved from <http://utstat.toronto.edu/~brunner/oldclass/378f16/readings/Cohen Power.pdf>
- Cohen, S., & Janicki-deverts, D. (2012). Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 20091. *Journal of Applied Social Psychology*, 42(6), 1320-1334. doi:10.1111/j.1559-1816.2012.00900.x
- Du Toit, A. (2020). Outbreak of a novel coronavirus. *Nature Reviews. Microbiology*, 18(3), a.123.
- Feizi A, Aliyari R, Roohafza H. (2012) Association of perceived stress with stressful life events, lifestyle and sociodemographic factors: a large-scale community-based study using logistic quantile regression. *Comput Math Methods Med*. 2012;151865. doi:10.1155/2012/151865
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160. Retrieved from [http://www.psychologie.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche\\_Fakultaet/Psychologie/AAP/gpower/GPower31-BRM-Paper.pdf](http://www.psychologie.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche_Fakultaet/Psychologie/AAP/gpower/GPower31-BRM-Paper.pdf)
- Georgiou, N., Delfabbro, P., & Balzan, R. (2020). COVID-19-related conspiracy beliefs and their relationship with perceived stress and pre-existing conspiracy beliefs. *Personality and individual differences*, 166, 110201. <https://doi.org/10.1016/j.paid.2020.110201>
- Gettleman, J., & Schultz, K. (2020, March 24). Modi Orders 3-Week Total Lockdown for All 1.3 Billion Indians. *The New York Times*.
- Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry research*, 288, 112954. <https://doi.org/10.1016/j.psychres.2020.112954>
- Lenth, R. V. (2001). Some Practical Guidelines for Effective Sample Size Determination. *The American Statistician*, 55(3), 187-193. doi: 10.1198/000313001317098149. Retrieved from <https://www.tandfonline.com/doi/abs/10.1198/000313001317098149>
- Liu, Y., Gayle, A. A., Wilder-Smith, A., & Rocklöv, J. (2020). The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of travel medicine*, 27(2), taaa021. <https://doi.org/10.1093/jtm/taaa021>
- Lolwal, M. (2020, March 31). 20% increase in patients with mental illness since coronavirus outbreak: Survey. <https://www.indiatoday.in/india/story/20-per-cent-increase-inpatients-with-mental-illness-since-coronavirus-outbreaksurvey-1661584-2020-03-31>
- Maeng, L. Y., & Milad, M. R. (2015). Sex differences in anxiety disorders: Interactions between fear, stress, and gonadal hormones. *Hormones and behavior*, 76, 106–117. <https://doi.org/10.1016/j.yhbeh.2015.04.002>
- Majumdar P, Biswas A, Sahu S. (2020) COVID-19 pandemic and lockdown: cause of sleep disruption, depression, somatic pain, and increased screen exposure of office workers and students of India [published online ahead of print, 2020 Jul 13]. *Chronobiol Int*; 1-10. doi:10.1080/07420528.2020.1786107
- Mesa Vieira, C., Franco, O. H., Gómez Restrepo, C., & Abel, T. (2020). COVID-19: The forgotten priorities of the pandemic. *Maturitas*, 136, 38-41. doi: 10.1016/j.maturitas.2020.04.004. Retrieved from <https://www.science direct.com/science/article/pii/S0378512220302346>
- Moghanibashi-Mansourieh A. (2020). Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian journal of psychiatry*, 51, 102076. Advance online publication. <https://doi.org/10.1016/j.ajp.2020.102076>
- Ratten V. (2020). Coronavirus and international business: An entrepreneurial ecosystem perspective. *Thunderbird International Business Review*, 10.1002/tie.22161. <https://doi.org/10.1002/tie.22161>
- Rehman, U., Shahnazaw, M. G., Khan, N. H., Kharshing, K. D., Khurshed, M., Gupta, K., ... Uniyal, R. (2020). Depression, anxiety and stress among Indians in times of COVID-19 lockdown. *Community Mental Health Journal*. doi:10.1007/s10597-020-00664-x
- Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., ... Di Lorenzo, G. (2020). COVID-19 pandemic and lockdown measures impact on mental health among the general population in Italy. An N=18147 web-based survey. doi: 10.1101/2020.04.09.20057802
- Rothan, H. A., & Byrreddy, S. N. (2020). The epidemiology and pathogenesis of coronavirus a disease (COVID-19) outbreak. *Journal of Autoimmunity*, 109, 102433. doi:10.1016/j.jaut.2020.102433.
- Roy, D., Tripathy, S., Kar, S. K., Sharma, N., Verma, S. K., & Kaushal, V. (2020). Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian Journal of Psychiatry*, 51, 102083. doi:10.1016/j.ajp.2020.102083
- Singhal, T. (2020). A review of coronavirus disease-2019 (COVID-19). *Indian Journal of a.Pediatrics*, 87(4), 281-286. doi: 10.1007/s12098-020-03263-6.
- Shigemura J, Ursano R.J., Morganstein J.C., Kurosawa M., Benedek D.M. (2020) Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: mental health consequences and target populations. *Psychiatry clin. Neurosci*.
- Ta, V.P., Gesselman, A.N., Perry, B.L., Fisher, H.S., & Garcia, J.R. (2017). Stress of Singlehood: Marital Status, Domain-Specific Stress, and Anxiety in a National U.S. Sample. *Journal of Social and Clinical Psychology*, 36, 461-485.
- Testino, G., & Pellicano, R. (2020). Alcohol consumption in the COVID-19 era. *Minerva a.Gastroenterologica e Dietologica*, 66(2), 90-92. doi: 10.23736/S1121-

- 421X.20.02698-7.
36. Tolin, D. F., & Foa, E. B. (2008). Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. *Psychological Trauma: Theory, Research, Practice, and Policy*, *S*(1), 37-85. <https://doi.org/10.1037/1942-9681.s.1.37>
  37. Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph17051729>
  38. World Health Organization (2020). WHO Coronavirus Disease (COVID-19) Dashboard.  
a. <https://covid19.who.int/>
  39. Wilder-Smith, A., & Freedman, D. O. (2020). Isolation, quarantine, social distancing and a community containment: Pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *Journal of Travel Medicine*, *27*(2). pii: taaa020. doi: 10.1093/jtm/taaa020.
  40. Xu, Z., Shi, L., Wang, Y., Zhang, J., Huang, L., Zhang, C., Liu, S., Zhao, P., Liu, H., Zhu, L., Tai, Y., Bai, C., Gao, T., Song, J., Xia, P., Dong, J., Zhao, J., & Wang, F. S. (2020). Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *The Lancet. Respiratory medicine*, *8*(4), 420-422. [https://doi.org/10.1016/S2213-2600\(20\)30076-X](https://doi.org/10.1016/S2213-2600(20)30076-X)
  41. Zhang, Y., Wang, J., Zhao, J., Tanimoto, T., Ozaki, A., Crump, A., Chen, W., Wang, J., Chen, L., Yu, J., & Jiang, Q. (2020). Association Between Quarantined Living Circumstances and Perceived Stress in Wuhan City During the COVID-19 Outbreak: A Rapid, Exploratory Cross-Sectional Study. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3556642>