



To ameliorate the effect of COVID-19 pandemic on mental health issues and behavioural consequences among Indians

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Abstract

Background: On 25th March 2020, the Government of India enforced and announced the nationwide lockdown to control the severe viral infection and to reduce physical and social contact with infected and exposed COVID-19 person. People were isolated and home quarantined with limitations in every outdoor activities. Previous studies have postulated that this type of isolation create a negative impact on the psychological aspect on those who have infected with novel coronavirus and their families, which may lead to sleep disturbances and post-traumatic stress. **Aim:** We aim to assess neuro psychological impact on sleep quality and sleeping habits and other mental health issues in Indian population due to the COVID-19 pandemic. **Methods:** This study is an online survey on college student's friends, colleagues and others to enlarge our sample size to assess the effects of covid-19 on sleeping habits using PSQI, WHOQOL, DASS-21 questionnaires. **Results:** 1147 participants filled the questionnaire 64.1% participants have some knowledge and 35.9% have full knowledge about COVID-19. We found a significant difference in the WHOQOL & DASS-21 between the male and female participants ($p=0.0001$) and age (18-39 years & 40-64 years) ($p=0.0001$). There was significant difference in the WHOQOL ($p=0.0002$) & DASS-21($p=0.0001$) with education level (bachelors and above or without bachelors) and occupation (government job/ private job) WHOQOL ($p=0.0001$) DASS-21(0.0001). There was no significant difference between the average monthly family income groups ($p > 0.05$). Participants of majority and other religious groups showed a significant difference in WHOQOL ($p=0.0001$) and DASS-21 score ($p=0.0001$). 50% students reported delay in bedtime, 36% reported increase in number of minutes to fall asleep. Usual getting up time was delayed in 47%, Number of hours of sleep per night was increased in 43%. Despite increase in number of hours of sleep we found that the proportion of poor sleepers (i.e., PSQI > 5) increased from 28% to 38%. **Conclusion:** We conclude that effective psychological interventions are needed which may be helpful in curing these deteriorations in sleep quality and to maintain daytime productivity in students.

Key words: Corona Virus, COVID-19, Pandemic, Mental Health, Psychological issues, Anxiety, Depression, Stress, Public health, sleep.

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Introduction

In 2019 World Health Organization (WHO) declared COVID-19 as a pandemic with 766 million confirmed cases and 6.9 million deaths worldwide as of April 2023 ⁽¹⁾. To contain the severe spread of acute respiratory syndrome corona virus 2(SARS-CoV-2) across the world, several International, national and local authorities implemented sudden restrictions as a precautionary health measure. Consequently, the pandemic has not only led to budding SARS-CoV-2 exposure, contagion, and diseases but also to a wide range of policies and strategies which consist of physical distancing, mask requirements, lockdowns, quarantines, and closure of non-essential goods and services, with unprecedented environmental, economic and societal consequences⁽²⁾. This post-traumatic to stress disorder (PTSD) turned out an immense impact on most of the individuals' behaviour and on their personalities which decreases their quality of life as an active Human being.

As the globe is slowly gaining control over COVID-19, it is appropriate and timely to ask how the pandemic has damaged global mental health. The pandemic may have affected mental health in India in many ways (Figure1):

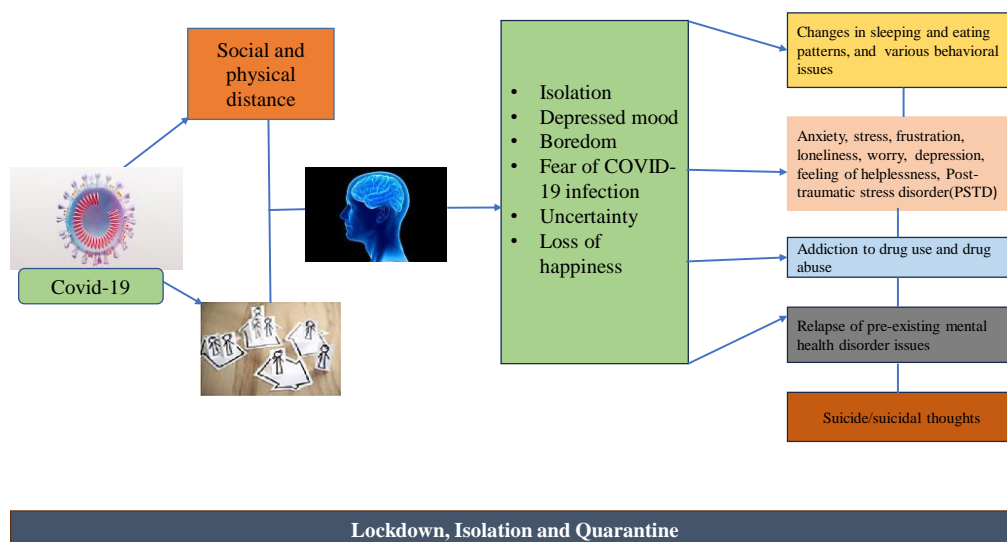


Figure 1: Impact of covid-19 pandemic on mental health of patients

Stress level and anxiety increased: The uncertainty surrounds the viral infection, which results the economic fallout, increased anxiety and heightened stress among the Indian population. Fear of viral infection and concerns about the well-being of near and dear ones further contributed to the mental health challenges across community.

Mental isolation and loneliness: Social distancing and lockdown measures were taken to control the spread of the viral infection which have led to increased social isolation and loneliness across Indian Population. For most of the people, the lack of social interactions have negatively impact their mental well-being.

Loss of life: The covid-19 has caused significant loss of lives, loss of family members, friends, or colleagues. The grief associated with such loss of life have lasting effects on mental health of the Indian population.

Outburst of the mental health services: The covid-19 pandemic has strained total healthcare system, including mental health services. People have faced several challenges to access mental health support due to inundated resources or fear of visiting healthcare departments during the pandemic.

Financial distress: The economic burden and financial toxicity have increased due to COVID-19, like loss of jobs loss, more financial needs, increased illness cost have lead to more stress, anxiety, and depression across the Indian Population.

Disruptions in education system: School and college closures, along with the shift to online learning mode, has affected students' mental health due to uncertainties about future prospects, academics and the loss of socialization.

Discrimination and stigma: Stigmatization of COVID-19 survivors or patients has led to morel stress and mental health issues for affected population and their families.

Mental health of healthcare workers': Frontline healthcare workers have been under tremendous stress, facing long working hours, witnessing severe illness conditions, and tremendous death toll. This has put them at highest risk of experiencing more mental health issues.

Many Indirect effect includes stress-evoking and troublesome societal changes, which may harmfully affect mental health in the general public. Direct effects include SARS-CoV-2-mediated acute and long-lasting neuropsychiatric sequelae in affected persons that occur during primary infection or as a part of Post-Acute COVID Syndrome (PACS) involving multiple organs, including the brain⁽³⁾. In this study we will explore both the indirect and direct effects of COVID-19 on mental health of the patients. First, we summarize empirical findings of data on how the COVID-19 pandemic has impacted human population and its mental health, through mental health WHO-Quality of life scale, DASS-21 scale, PSQI. Studies conducted on mental health and COVID-19 confirmed the role of both medical impacts of the infection and psychological impact, like anxiety, depression, panic attacks poor quality of life or complex syndromes like Post Traumatic Stress Disorder (PTSD)^(8,9). An extensive outbreak of pandemic diseases like COVID-19 may be adjuvant with behavioural aspects like Anxiety, Stress, Deviancy, Insomnia, Depression, Self harm, Hypermania, Mania, Irrational behaviour etc (Figure2). Keeping this objective in our mind we investigate the Quality of Life, Depression, Insomnia, Anxiety, Stress levels in the Indian Population to focus more on the mental health which has affected due to the COVID-19 Pandemic. We conclude with a discussion of the lessons which have learned and identified knowledge gaps that need to be further addressed.

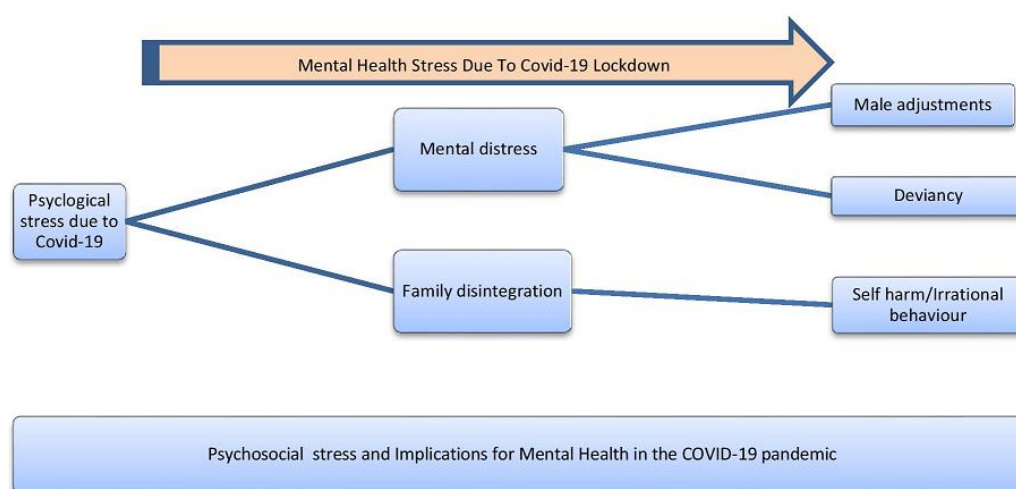


Figure 2: Effect on mental health stress due to covid-19 lockdown

Impact of the COVID-19 pandemic on community mental health

Irrespective of the pandemic, mental illness and its disorder are known to be prevalent globally and cause a very high disease burden⁽⁴⁻⁶⁾ Many known mental disorders (includes anxiety disorder, depressive disorder, and alcohol substance abuse disorder), environmental stressors play a vital etiological role. Troublesome and unpredictable pandemic coincidentally increased distress levels in many human societies, at least temporarily. Notwithstanding, it should also be noted that the pandemic not only resulted in negative stressors but also in positive and potentially shock absorber changes for some, including a better work-life balance, improved in family dynamics and enhanced feeling of togetherness⁽⁷⁾. Awareness of the potential mental health impact of the COVID-19 pandemic is reflected in the more than 40,000 papers published on this topic. Although, this rapid research output comes with a cost: conclusions from most of the publication limited due to a small sample size, convenience sampling with imprecise generalizability implications and lack of a pre-COVID-19 comparison. Most reliable estimates of the pandemic on mental health impact comes from longitudinal studies or time-series designs that include a pre-pandemic comparison and self-reported mental health problems. A lot of studies⁽¹¹⁻¹³⁾ have examined the impact of pandemic on mental health which used online data collection methods to measure self-reported common indicators, such as mood swings, anxiety or general psychological distresses. Pooled prevalence estimates of clinically relevant high levels of anxiety and depression symptoms during the COVID-19 pandemic range widely from 20% to 35%⁹⁻¹²—but are difficult to elucidate due to large methodological and sample heterogeneity. It is also important to note that very high levels of self-reported mental health illness identify increased vulnerability and signal an increased risk for mental health disorders, but they do not equally clinical cases level, which are generally much lower.

The aim of the present study is to explore the mental health issues and insomnia during covid-19 pandemic.

Materials and Methods

We conducted this cross-sectional study after lockdown. We used the proliferative approach to spread the Questionnaire online on social media platforms via Email or WhatsApp to the friends, students, colleagues and others to enlarge our sample size and select the participants on the bases of Inclusion and Exclusion criteria to assess the effects of covid-19 on sleeping habits and sleep quality. They were asked if they agree to participate in this online survey anonymously. They also need to agree to the informed consent form available online. This web-based survey was conducted from April 2022 to January 2023.

Inclusion criteria

1. Willing to participate in the study and able to give Informed Consent.
2. Must be an Indian Citizen.
3. Age between 18 to 64 years.
4. Should be physically and mentally fit with no history of psychiatric illness or treatment.
5. Must be able to read and understand English or Hindi computer-based questionnaire.
6. Should have regular family monthly income before covid 19.

Exclusion criteria

1. Unwilling to participate in the study or unable to give Informed Consent.
2. Age less than 18 years or more than 64 years.
3. History of any psychiatric treatment or illness.
4. Unable to read and understand English or Hindi computer-based questionnaire.
5. No regular family monthly Income.
6. History of any substance of abuse or alcohol etc.
7. Not an Indian citizen.
8. He /She already participated in any such study during the lockdown.

Experimental parameters

A. Quality of Life Assessment Scale-(WHOQOL) Scale

The WHOQOL-BREF is a multi-dimensional concept/scale that includes domains related to mental, emotional, physical, and social functioning. It has four domains with each domain consist of multiple items. The four domains were-

1. physical health domain (7 items)
2. psychological health domain (6 items)
3. social relationships domain (3 items)
4. environmental health domain (8 items)

The scale also has QOL (one item) and general health (one item) 13 Score for each of the above item which can vary from 1 to 5 on a five-point ordinal scale ^(14,15).

B. Depression, Anxiety and Stress Scale- (DASS- 21)

The DASS-21 is a set of 3 self-report scale designed to measure the emotional states of stress, anxiety, and depression. Each of the three DASS-21 scales contains seven items, divided into subscales with similar content ⁽¹⁶⁾.

C. Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a questionnaire for evaluating sleep quality over the previous month. The original PSQI questionnaire comprised of 19 questions, out of which Question 10 of the PSQI was removed from the questionnaire based on the advice of copyright owner of PSQI. All participants were asked to complete the English version of Pittsburgh Sleep Quality Index (PSQI)⁽¹⁰⁾ Participants were asked to fill the PSQI questionnaire based on their memory for the month before lockdown and after one month of lockdown.

Data Analysis

Statistical analysis and its interpretation were done by using SPSS version 20 and its values were expressed in mean (M) and standard deviation (SD). Unpaired t-test was done for the comparison of two groups before and after covid 19.

Results

Out of 10,000 group of population size, 1147 Participants were enrolled in this study based on the Inclusion and Exclusion criteria. Out of 1147 Participant, 284 females (24.70%) and 863 males participated in this study, none of the participant preferred not to answer about gender. The mean age of the participant were 46 years, and 61.63% participants held a graduation/bachelor's degree or above. Participants were grouped as 18- 39 years participants who are young, vibrant and leading an active lifestyle (534 participants) and 40-64 years (613 participants) with relatively more responsible, aged, poor in physical activity and chronic health problems. 723 participants (63.03%) were self-employed or were in private companies and 424 participants (36.96%) were students or in government sector (relatively under less stress for job security, and subsistence). 39.78% of the participants has an average monthly family income of less than Rs 20,000 before lockdown were enforced and 60.24% were earning >Rs 20,000 monthly before the announcement of the national lockdown. 76.37% of the participant was from the religious majority of Indian demography and 23.62% were from other religious faith or groups(Figure 3 & Table 1).

S.No	Variables	Categories	Samples (1147)	Percentage %
1	Gender	Male	863	75.20%
		Female	284	24.70%
2	Age	18-39 years	534	46.50%
		40-64 years	613	53.44%
3	Educational Level	Less than bachelor's degree	440	38.36%
		Bachelor's degree or above	707	61.63%
4	Occupation	Private job or business	723	63.03%
		Student or govt jobs PSU	424	36.96%

Average Monthly				
5	Family Income (RS)	<20,000/-	456	39.75%
		>20,000/-	691	60.24%
6	Religion	Religious Majority	876	76.37%
		Religious Minority	271	23.62%

Table 1: Demographic data of the Participants (n = 1147)

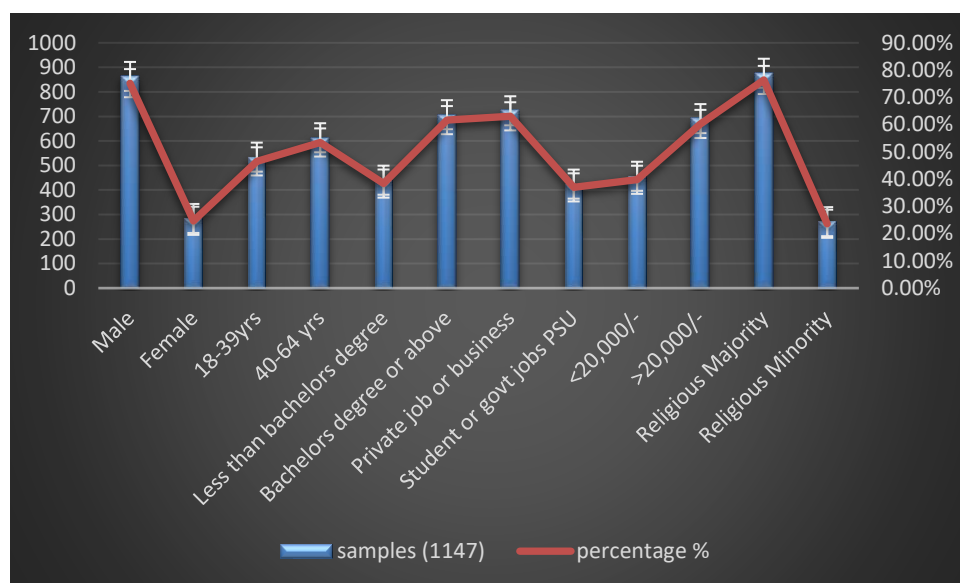


Figure 3: Graphical representation of the demographic details of the participants

Quality of Life (WHQOL) and Depression Anxiety Stress (DASS-21)

English and Hindi version of the questionnaire was used to assess the knowledge of participants about covid-19, Quality of life (WHQOL) and Depression, Anxiety and Stress (DASS- 21). An unpaired t-test reported a significant difference in the WHOQOL & DASS-21 between the female and male participants ($p=0.0001$) and age ($p=0.0001$) also, has a significant effect on these variables. 40-64 years age group in comparison to the young persons (18-39 years) has significantly higher score $p \leq 0.05$ (Figure 3, Table 2, 3). The comparison between the participants holding graduation/bachelor or above degree and those without graduation's degree has a significantly higher score than the other groups $p=0.0002$ in WHOQOL Scores and $p=0.0001$ for DASS-21 score (Figure 5, Table, 4). Profession also has a significant effect on WHOQOL ($p=0.0001$) DASS-21 (0.0001). In the case of business or private sector job profile participants have significantly higher score $p \leq 0.05$

than other job profiles participants in the WHOQOL score and DASS-21Score (Figure 8, Table 3, 4). However, it does not differ significantly between the average monthly family income or earning groups ($p > 0.05$). (Figure 7, Table 3, 4). The population of the majority religion of demography in comparison to other religions groups showed a significant difference in WHOQOL ($p=0.0001$) and DASS-21 score ($p=0.0001$) (Figure 9, Table 3, 4). 61.9% of the participants reported some psychological problems like stress, depression, anxiety and insomnia whereas, 36.1% have reported poor Quality of life due to COVID-19 lockdown.

S.no	Variables	Categories	WHOQOL		P-value
			(Mean)	S. D	
1	Gender	Male	46.9	±3.8	0.0001
		Female	54.1	±4.5	
2	Age	18-39yrs	59.2	±3.4	0.0001
		40-64 years	40.8	±3.8	
3	Educational Level	Less than bachelor's degree	53.96	±4.8	0.0002
		Bachelor's degree or above	46.04	±3.1	
4	Occupation	Private job or business	47.9	±3.7	0.0001
		Student or govt jobs PSU	51	±3.5	
5	Average Monthly Family Income(RS)	<20,000/-	35.6	±4.6	0.33
		>20,000/-	64.4	±4.4	
6	Religion	Religious Majority	61.2	±4.4	0.00001
		Religious Minority	49.2	±3.1	

Table 2: Comparison of the World Health Organization Quality of Life (WHOQOL) scale in different demographic groups.

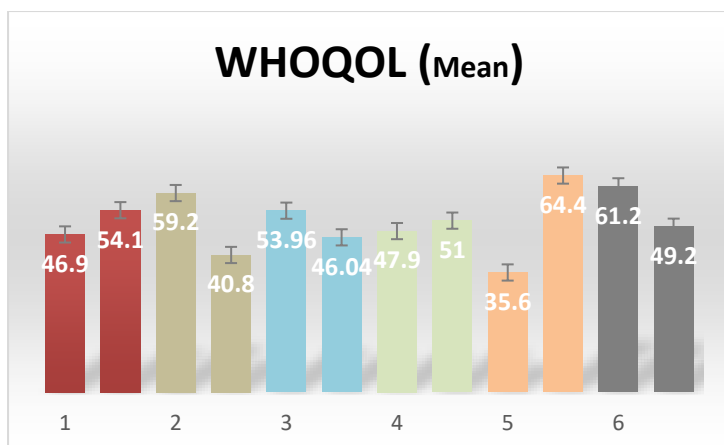


Figure 4: Graphical representation of mean WHO quality of Life scale of the participants.

S.no	variables	categories	DASS-21		P-value
			(Mean)	S.D	
1	Gender	Male	39	±3.4	0.0001
		Female	42.1	±4.2	
2	Age	18-39yrs	43	±3.2	0.0001
		40-64 years	46.1	±3.6	
3	Educational Level	Less than bachelor's degree	50.2	±4.1	0.0001
		Bachelor's degree or above	42	±3.2	
4	Occupation	Private job or business	37.9	±3.5	0.0001
		Student or govt jobs PSU	42.3	±3.7	
5	Average Monthly Family Income (RS)	<20,000/-	39.5	±3.9	0.051
		>20,000/-	40.1	±4.8	
6	Religion	Religious Majority	45.5	±3.1	0.0001
		Religious Minority	51.2	±3.2	

Table 3: Comparison of Depression Anxiety Stress Scales (DASS) in different demographic groups

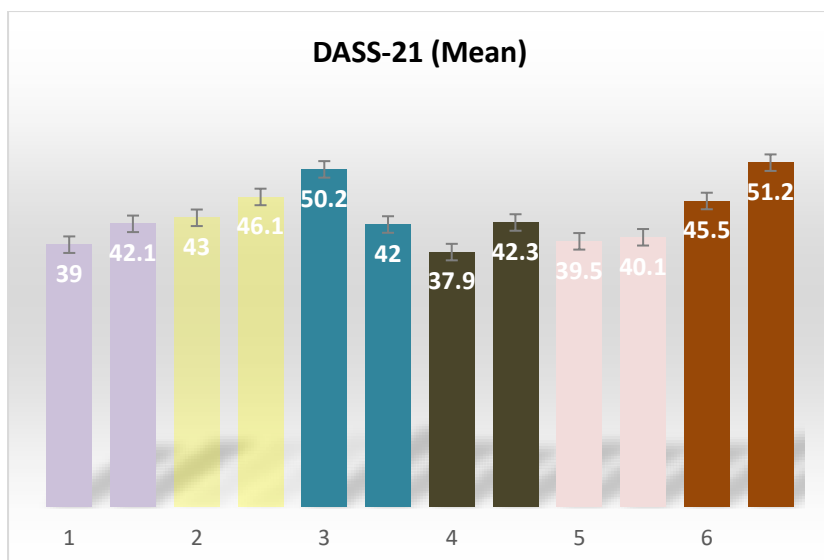


Figure 5: Graphical representation of mean Depression, Anxiety and Stress Scale- (DASS-21) of the participants.

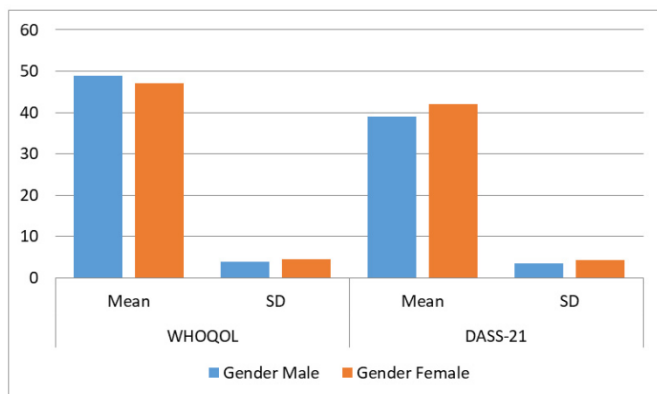


Figure 6: Comparison of WHOQOL* & DASS-21** in male and female participants.

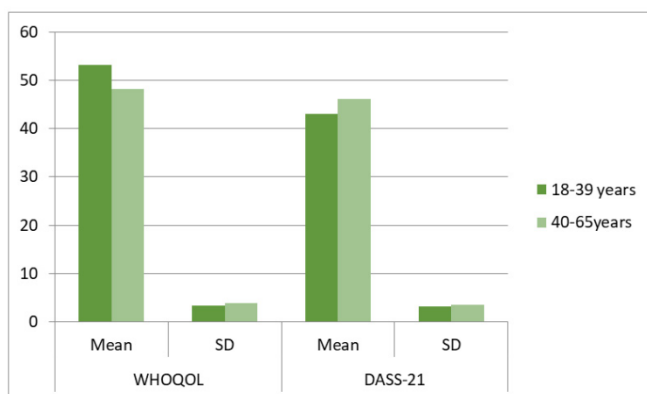


Figure 7: Comparison of WHOQOL* & DASS-21 with the age of participants in each group.**

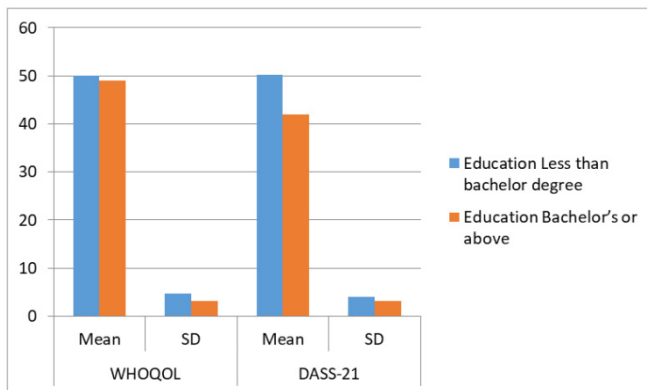


Figure 8: Comparison of WHOQOL* & DASS-21 with education level of participants in each group.**

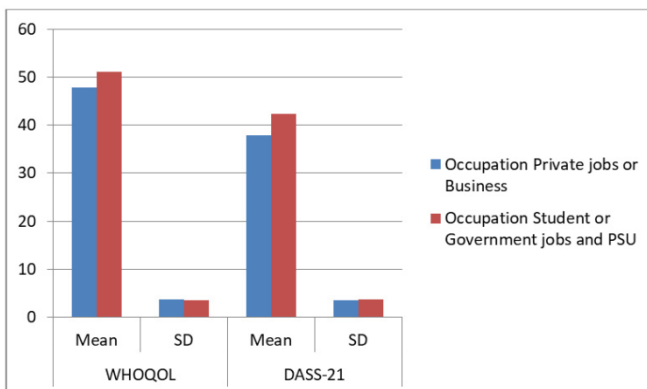


Figure 9: Comparison of WHOQOL* & DASS-21 with the occupation of participants in each group.**

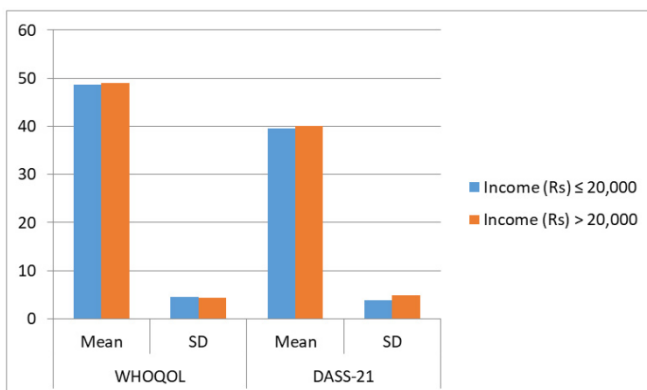


Figure 10: Comparison of WHOQOL* & DASS-21 with the income of participants in each group.**

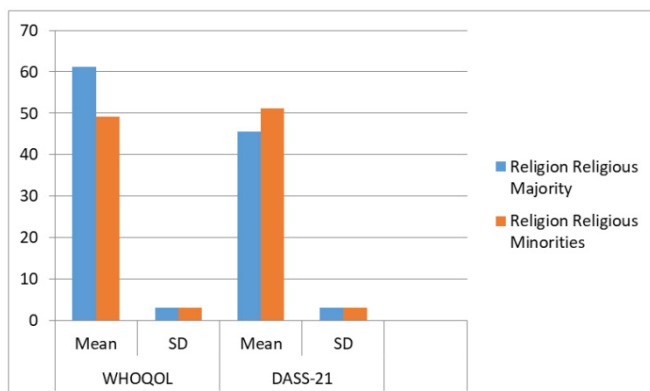


Figure 11: Comparison of WHOQOL* & DASS-21 with the religion of participants in each group.**

s.no	Sleeping habits	Participants reporting no change during covid-19	Participants reporting change in sleeping habits during covid-19
1	Bed time	36%	64% (delayed 50% earlier 14%)
2	Number of minutes to fall asleep	48%	52%(increased 36% decreased 16%)
3	Usual getting up time	39%	61%(delayed 47% earlier 14%)
4	Number of hours of sleep per night	49%	51% (increase 43%decrease 8%)

Table 4: Comparison of sleep habits before and during lockdown in different demographic groups.

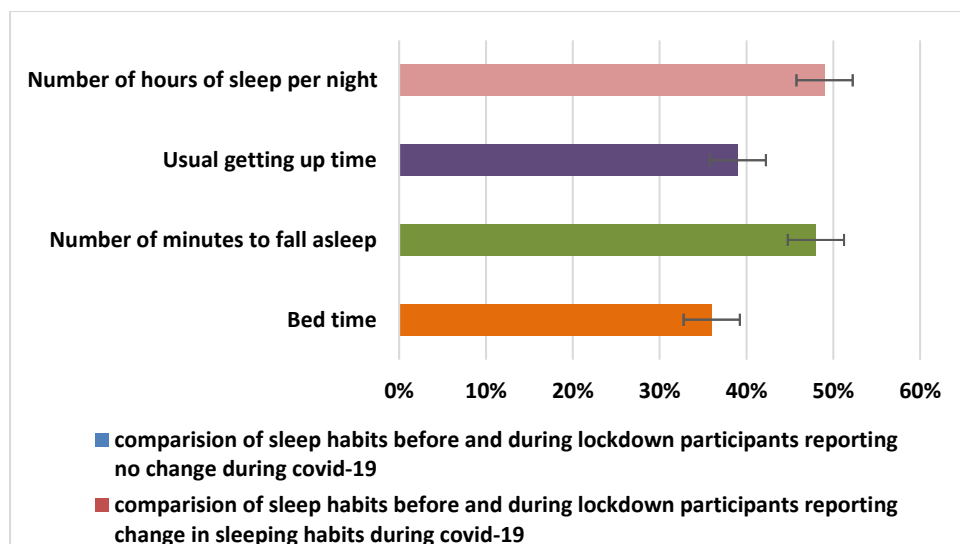


Figure 12: Graphical representation of comparison of sleep habits before and during lockdown.

Table 5: Component scores before and after covid-19

S.No.	Component Score	Before Covid-19 (mean±SD)	After Covid-19 (mean±SD)	P value
1	subjective sleep quality	1.11± 0.78	1.32 ±0.87	<0.0001
2	sleep latency	1.10 ±0.84	1.48 ±0.97	<0.0001
3	sleep duration	0.76 ±0.78	0.94 ±0.83	0.0003
4	Habitual sleep efficiency	0.56 ±0.87	0.77 ±0.89	0.0001
5	sleep disturbances	0.98± 0.46	1.21 ±0.57	<0.0001
6	use of sleep medication	0.08 ±0.38	0.13 ±0.46	0.054
7	daytime dysfunction	0.85 ±0.68	1.03 ±0.80	<0.0001

Table 5: Component score before and after covid-19.

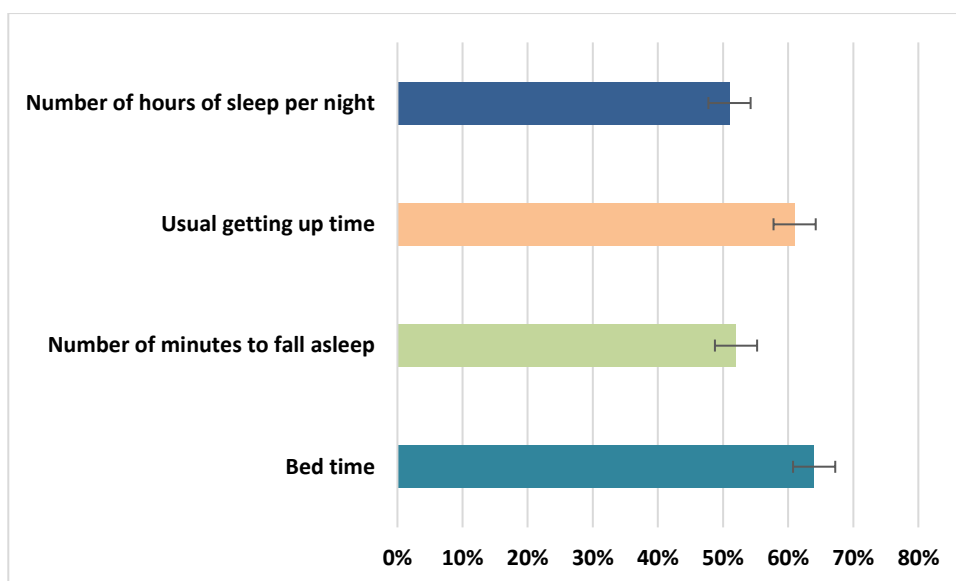


Figure 11: Graphical representation of participants reporting change in sleeping habits during covid-19.

Usual bedtime: Usual bedtime was considerably delayed, and 50% participant reported delayed bedtime. The average delay in bedtime for all the participant during lock down was 38 minutes. [Table 4] Number of minutes to fall asleep: Number of minutes to fall asleep was increased in 36% during lockdown from an average of 24 mins before lockdown to 44 mins average time to fall asleep during lockdown. [Table 4] Usual getting up time: Usual getting up time is delayed in 47%, an average delay of 30 mins during lockdown. [Table 4] Number of hours of sleep per night: 43% participants reported an increase in the number of hours of sleep per night while 8% reported decreased hours of sleep per night. [Table 4]

Component Scores (Table 5): Responses to PSQI questionnaire were combined into 7 clinically derived component scores, range for each score is from 0-3. Almost all the component scores showed significant difference in sleep components before and during lockdown ($p \leq 0.05$). Use of sleep medication didn't show significant difference in students sleep medication ($p=0.0540$).

Global PSQI score:

Global PSQI score is derived from the combined score of the seven components. Range for global PSQI score is from 0-21, where 0 indicates no difficulty in sleeping and 21 score means severe difficulty in all areas of sleeping. There was a significant difference in the PSQI score of students before and during lockdown. Percentage of students who showed higher Global PSQI score increased from 14.7% to 16.8%. We observed a significant increase of the PSQI score under the restriction, the average global PSQI score increased from 5.6 to 6.5. The proportion of poor sleepers (i.e., PSQI > 5) increased from 28% to 38%.

Discussion

In this cross-sectional study, we investigated the factors that have influenced the behavioural or psychological issues among the Indian population due to COVID-19. Nearly 61.9% of the participants reported having psychological problems like Depression, insomnia. Anxiety, stress whereas 36.1% have reported Poor Quality of life due to COVID-19, leading to various mental health problems.⁽¹⁷⁾

It was found that none of the participants was without any knowledge of covid-19, 35.9% of participants have full knowledge about COVID-19, whereas 64.1 % of participants had some knowledge about COVID-19⁽¹⁸⁻²⁰⁾. This study has shown the huge public awareness and concern related to COVID-19 which also played an important role in the prevention of the spread of this disease. Media have also played an important role in spreading the awareness and control of this pandemic⁽²²⁾.

The results of this study have shown that Men's score on WHOQOL is slightly higher but their DASS-21 score is also higher than female scores ($p = 0.0001$) this difference may be due to family responsibilities which are primarily taken care of by men traditionally in Indian. Men are more stressed and anxious but females have a poorer quality of life due to their domestic responsibilities they are fatigued lack adequate sleep, lack of freedom physical and financial security. We found that higher age group people were more prone to have psychological problems (WHOQOL, DASS-21 $p = 0.0001$) in comparison to other studies.⁽¹⁸⁻²⁰⁾

In a similar study in 2009, Rubin have also conducted a similar study during the swine flu outbreak in U.K 37.8% of participants and have reported change in behaviour due to swine flu⁽²¹⁾ Mihashi conducted a study during the SARS period and he also found that 26.2% of participants have reported Psychological problems.⁽²²⁾ Finding of our study have shown slightly more psychological problems (61.9%) in comparison to other studies because this is the first time in this century that Indian's were under complete lockdown and the people were not prepared, leading to more mental trauma, Anxiety, Depression, stress. This study was conducted just after the 3 times continuous lockdown in India. Moreover, COVID-19 is still spreading, increasing the number of daily positive cases, rise in mortality due to covid-19, creating more concern. Regarding educational level lower education participants have shown more behavioural problems in comparison to other groups (WHQOL p=0.0002, DASS-21 p=0.0001) It may be due to the negative coping style, lack of knowledge to maintain a healthy lifestyle. On comparing job profiles, private-sector employees and self-employed businessmen have a significantly higher score in comparison to other group's (WHQOL, DASS-21 p=0.0001) it may be due to concern of loss of savings, fear of losing jobs, loss in the business and stress of getting infected at the workplace when lockdown opens. Quality of life was slightly better in higher monthly family income group but didn't make any significant difference in the quality of life and depression, anxiety, stress scale (WHQOL, DASS-21 p≥.05) quality of life is a subjective perception and probably the lower income group It has been found that outbreak of infectious disease is associated with psychological distress.⁽¹¹⁾ People under quarantine, even if they don't suffer from the infectious disease, still they suffer from post- traumatic disorder symptoms. Severity of post traumatic symptoms increases with longer duration of quarantine.⁽²³⁾ Post traumatic symptoms include multiple psychiatric illness like depression, stress and sleep disorder.⁽²⁴⁾ The PSQI is a questionnaire for evaluating sleep quality over the previous month.⁽²⁵⁾ Yu in their study on Hong Kong population reported sleep disturbance and attributed it to the stock of mask but in India the probable concern of students was more for uncertain future, jobs placements, year loss and college fees.⁽²⁶⁻²⁸⁾ We observed that the sleep quality have become poorer during lockdown, 38% participants reported deterioration in their global PSQI score. 40 % participants reported an increase in sleep latency during lockdown. Our findings were similar to the findings of Cellini et al 2020, who also found a significant change in the

sleeping pattern in Italian population during lockdown.⁽³⁰⁾ They also found a delay in bed time as well as wakeup time, we also found an increase in sleep latency which may be due to decreased physical activity and smart phone use in bed which is very common in students.⁽³¹⁾

Conclusion and future directions

It is suggested that the Indians were living with psychological distress leading to behavioural issues during the COVID-19 pandemic. We also concluded that men have more psychological problems in comparison to the women, lower education and lower socio-economic people are more prone to mental issues leading to behavioural change. Our results emphasize that the government should take necessary preventive measures to control the situation by understanding the ground reality and fulfil the basic needs of the poor and needy.

We conclude that sleep in younger population is also affected by this covid-19 pandemic, so effective psychological interventions are needed which may be helpful in curing these deteriorations in sleep quality and to maintain daytime productivity.

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Informed Consent

Proper Informed Consent was taken from all participants before initiation of the study and Confidentiality was maintained.

Declaration of Competing Interest

The authors declare that there are no conflicts of interest.

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Contribution of the Authors

1. Conception and design of the study, or acquisition of data, or analysis and interpretation of data,
2. Drafting the article or revising it critically for important intellectual content,
3. Proofreading, manuscript writing, and data collection.

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