Original Research Article

To study the effect of COVID -19 pandemic on sleep and mental health in population

Nidhi Yadav[1*], Richa Srivastav[2], Nisha Yadav[3], Anurag Yadav[4], Shubhangi Goel[5]

[1]Assistant Professor, Department of Physiology, SNMC, Agra, Uttar Pradesh, India
[2]Assistant Professor, Department of Physiology, SNMC, Agra, Uttar Pradesh, India
[3]Assistant Professor, Department of Anatomy , UP UMS, Saifai, Uttar Pradesh, India
[4]Assistant Professor, Department of Physiology, UP UMS, Saifai, Uttar Pradesh, India
[5]Senior Resident, Department of Physiology, SNMC, Agra, Uttar Pradesh, India

Received: 28-09-2021 / Revised: 30-10-2021 / Accepted: 13-12-2021

Abstract

Background & Objective: The novel corona virus pneumonia outbroke in Wuhan, China in December 2019 and spread rapidly throughout the world. Public health emergencies during epidemic / pandemic like severe acute respiratory distress syndrome , middle east respiratory virus syndrome and Ebola outbreak were associated with increased psychological distress in the affected population. **Material &Method:**It is a web based survey done in April 2021 during the time of second wave of COVID pandemic in India to assess magnitude of impact of this Corona pandemic on Depression , Generalized Anxiety , Stress and Sleep Quality on adults . Assessment of Depression,Anxiety , Sleep Quality and Stress done by Patient Health Questionnaire -9 scale , Generalized Anxiety Disorder -7 and Pittsburg Sleep Quality Index and Perceived Stress Scale -4 respectively.**Results:**The mean age of the study participants in the study was 24± 16.33 years with a range from 18 to 60 years. There were 55.93 % males and 44.07 % females. Depression was 47.46 %, anxiety 52.55% and sleep disturbance 13.55% and low stress in 28.82% , moderate in 65.42% and high stress in 5.76% found among study participants . **Conclusion:**These psychological problems may be related to consequences of disease, severity of illness and contagiousness of the disease. Therefore in this present pandemic situation it is very important to raise awareness among population regarding preventive measures and other aspects of this disease and also measures should be taken by health authority of time to time surveillance for psychological and mental health problems among population during pandemic.

Keywords: COVID-19, Depression, Anxiety, Sleep Disturbance, Stress.

Introduction

In December 2019, an outbreak of the novel strain severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in China, and rapidly spread worldwide. [l] The new condition was named coronavirus disease 2019 (COVID-19) by the World Health Organization (WHO) and was declared a pandemic on the 11th of March 2020. [2] In India, the first COVID-19 case was reported in Kerala on January 30, 2020, and by 19 May 2020, the number of cases had crossed one hundred thousand. The rapid spread of the virus forced many government around the world to issue measures such as lockdown to avoid further spreading. COVID -19 pandemic and lockdown has brought about a sense of fear and anxiety and affected daily life in many ways. There are dramatic changes in physical activity, sleep ,utilisation of time and mental health.Public health emergencies during epidemic / pandemic like SARS, MERS and Ebola outbreak were associated with increased psychological distress in the affected population. [3,4,5] Maladaptive behaviors, emotional and defensive reactions were some of the psychological responses to pandemic.[6] Social isolation was found to be strongly associated with anxiety, depression, self-harm, and suicidal tendencies.[7]

Studies indicated that social distancing for a longer duration could affect the mental health negatively .[8] Isolation, boredom, frustrations, worries about contracting the infection, lack of freedom, concerns for family/friends are some of the factors that could affect mental well-being during quarantine .[9] Poor sleep quality and increased psychological distress were also well-documented during earlier pandemics.[10,11] In particular, poor sleep was associated with negative emotions, depressive symptoms and increased risk of mental illness.[12,13,14,]Therefore this study was planned to assess impact of COVID-19 pandemic on mental health and sleep quality in general population .

Materials and Methods

It is a web based survey done in April 2021 during the time of second wave of COVID-19 pandemic in Agra,India City of India to assess magnitude of impact of this Corona pandemic on generalized anxiety , stress and sleep Quality on population of 18-60 years. This web-based questionnaire was completely voluntary. The 315 participants were of more than 18 years age , residing in Agra,India City in India .The project was approved by the Research Ethics Committee of Institution and all participants were invited to participate after informed consent.Data were collected according to a predesigned and pre-tested proforma gathering sociodemographic characteristics, comorbidity, and assessment of Depression, Anxiety and Sleep Disturbance and Stress done by Patient Health Questionnaire -9 scale (PHQ-9), Generalized Anxiety Disorder -7 (GAD-7) and Pittsburg Sleep quality Index (PSQI) and Perceived Stress Scale -4 (PSS-4) respectively.

PHQ-9 Scale: This scale is 9 question instrument used for assessment of presence and severity of depression. The range of PHQ-9 score is 0 to 27, as response of each of the 9 question will be scored from 0 (not at all) to 3 (nearly every day). If score 0-4 then no depression ,

*Correspondence
Dr.Nidhi Yadav
Assistant Professor, Department of Physiology, SNMC, Agra, India.
E-mail: dr25nidhi@gmail.com

5-9 mild depression, 10-14 moderate depression ,15-19 moderately severe depression and score 20-27 taken as severe depression.[15] Generalized Anxiety Disorder -7 Scale: The range of GAD-7 score is 0 to 21, as response of each of the question will be scored from 0 (not at all) to 3 (nearly every day). If score 0-5 none (no anxiety) , 6-10 mild , 10-15 moderate and 16-21 score labelled as severe anxiety.[16]Assessment of sleep disturbance was done by Pittsburg Sleep Quality Index (PSQI).This index used to assess sleep quality in the previous month . It has 19 self-rated questions which are combined in to seven components as sleep quality, sleep duration, sleep latency, habitual sleep efficiency, sleep disturbance, use of sleeping medicine, daytime dysfunction. Response to each of the component can be scored from 0 (no difficulty) to 3 (severe difficulty) so the range of total score (Global score) of these seven components can be 0 to 21. In this study score>7 was taken for determination of sleep disturbance.[17]Assessment of stress was done by PSS-4 scale . It is an simple psychological instrument to administer ,comprehend and score .It measures the degree to which situations in one's life over past one month are appraised as stressful. It is self report instrument with five point scale and scoring will be done as- 0 = never,1 = almost never , 2=sometimes ,3= fairly often ,4 = very often . The score ranges from 0 to16 and score 0-4 considered as low stress , 5-8 moderate stress and 9-16 considered as high stress.[18,19]The data were analysed using SPSS software, version 25 (IBM Corp., Chicago, USA). Chi square test was used to establish the relationship among different variables and $p<0.05$ was considered statistically significant.

Results and Observations

The mean age of the participants in the study was 24± 16.33 years with a range from 18 to 60 years. There were 49.83 % of subjects found in the age group of 18-29 years which was most common age group.Out of 295 subjects , there were 55.93 % males and 44.07 % females. There were 8.1 % smoker, 4.7 % alcoholic and 3 % smoker and alcoholic both in the study . In this study we found diabetes in 4.40%, hypertension in 3.30%. There were 54.23 % students , 22.33% teachers ,10.16 % housewives , 11.86 % health workers and unemployed were 3.33%. (Table 1)

Table 1: Demographic Profile of Study Participants

S.No.	Variable name	Sub groups	Total n=295(100%)
1.	Age Group (Years)	18—29	147 (49.83)
		30-39	87 (29.49)
		40-49	45 (15.25)
		50-60	16(5.42)
		Mean ±SD	24±16.33
2.	Gender	Male	165 (55.93)
		Female	130 (44.06.)
3.	Occupation	Student	160 (54.23)
		Teacher	60(22.33)
		Housewife	30(10.16)
		Healthcare worker	35(11.86)
		Unemployed	10(3.33)
4.	Behavioural Factors	Smoker	24(8.1)
		Alcoholic	14(4.7)
		Smoker and Alcoholic	09(3.0)
5.	Presence of Co-morbidity	Diabetes	13(4.40)
		Hypertension	10(3.30)

In this study depression was found among 140 (47.46%) adults and anxiety was found in 155 (52.54%) adults and sleep quality disturbance in 40 (13.55 %) adults and stress in 295(100%) adults.(Figure 1)

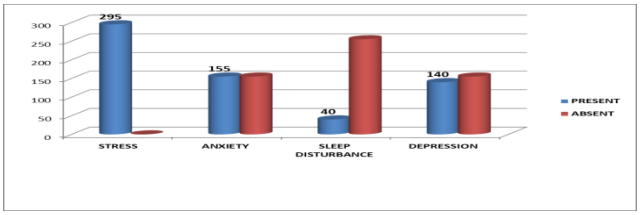

Fig 1: Distribution of Stress , Anxiety , Sleep Quality and depression

Depression among Study Participants:Table 2, depicts the various association of depression with age group, gender, occupation behavioral factors, and presence of comorbidity. We found these associations were not statistically significant.

Table 2: Association of Depression among Study Participants

S.No.	Variable Name	Sub groups	Depression(%)N= 140(100%)	Chi-Square (P value)
1.	Age Group (Years)	18-29	68(48.57)	1.22(0.748)
		30-39	38(27.85)	
		40-49	30(21.4)	
		50-59	4(50.0)	
2.	Gender	Male	80(57.14)	0.09(0.763)
		Female	60(42.85)	
3.	Occupation	Student	68(48.57)	5.645 (0.227)
		Teacher	41(29.28)	
		Housewife	12(8.57)	
		Healthcare	15(10.71)	

		worker		
		Unemployed	4(2.8)	
4.	**Behavioural Factors**	Smoker	10(7.14)	0.238(0.971)
		Alcoholic	06(4.28)	
		Smoker and Alcoholic	02(1.42)	
5.	**Presence of Co-morbidity**	None		0.435 (0.805)
		Diabetes	06(4.28)	
		Hypertension	04(2.85)	
6.	**Severity Of Depression**	Mild	83 (59.28)	
		Moderate	37(26.42)	
		Moerately Severe	13(9.28)	
		Severe	07(5)	

In this study low stress in 85 (28.81%) , moderate stress in 193 (65.42%) and high stress 17(5.76%) found among adults . Table 3.depicts the various association of stress with age group, gender, occupation , behavioral factors, and presence of comorbidity. We found this association statistically significant with age group ,occupation and presence of comorbidity ($p<0.05$) while it was not statistically significant with, gender, behavioral factors.

Table 3: Association of Stress among Study Participant

S. No.	Variable name	Sub groups	Stress n=295(100%)	Chi-Square (P value)
1.	**Age Group (Years)**	18--29	147 (49.83)	17.6444**(0.007)**
		30-39	87 (29.49)	
		40-49	45 (15.25)	
		50-60	16(5.42)	
2.	**Gender**	Male	165 (55.93)	2.064(0.356)
		Female	130 (44.06.)	
3.	**Occupation**	Student	160 (54.23)	26.636**(0.001)**
		Teacher	60(22.33)	
		Housewife	30(10.16)	
		Healthcare worker	35(11.86)	
		Unemployed	10(3.33)	
4.	**Behavioural Factors**	Smoker	24(8.1)	4.857(0.562)
		Alcoholic	14(4.7)	
		Smoker and Alcoholic	09(3.0)	
5.	**Presence of Co-morbidity**	Diabetes	13(4.40)	17.250**(0.002)**
		Hypertension	10(3.30)	
6	**Stress**	Low	85(28.81)	
		Moderate	193(65.42)	
		High	17(5.76)	

Table 4. depicts the various association of anxiety with age group, gender, occupation behavioral factors , and presence of comorbidity. We found this association statistically significant with occupation ($p<0.05$) while it was not statistically significant with age group, gender, behavioral factors and comorbidity .

Table 4: Association of Anxiety among Study Participants

S.No.	Variable Name	Sub groups	Anxiety (%) N=155	Chi-Square (P value)
1.	**Age Group(Years)**	18-29	75(48.38)	1.1715(0.634)
		30-39	42(27.09)	
		40-49	33(21.29)	
		50-59	05(3.2)	
2.	**Gender**	Male	89(57.41)	0.002(0.968)
		Female	66(42.59)	
3.	**Occupation**	Student	69(44.51)	14.835**(0.005)**
		Teacher	45(29.03)	
		Housewife	16(10.32)	
		Healthcare worker	20(12.90)	
		Unemployed	5(3.20)	
4.	**Behavioural Factors**	Smoker	13(8.38)	0.257(0.968)
		Alcoholic	08(5.71)	
		Smoker and Alcoholic	04(2.58)	

5.	**Presence of Co-morbidity**	Diabetes	05(3.22)	1.157(0.561)
		Hypertension	03(1.94)	
6.	**Severity of Anxiety**	Mild Moderate Severe	116(74.83) 27(17.41) 12(7.74)	

In this study sleep quality disturbance was found in 40 13.55 % adults. Table 5. depicts the various association of Sleep Quality disturbance with age group, gender, occupation , behavioral factors , presence of co morbidity. These associations were not statistically significant.

Table 5:Association of Sleep Quality among Study Participants

S/N	Variable	Sub groups	Sleep Disturbance (%) N=40	Chi-Square (P value)
1.	**Age Group (Years)**	18-29	18(48.38)	0.766(0.858)
		30-39	12(27.09)	
		40-49	08(21.29)	
		50-59	02(3.2)	
2.	**Gender**	Male	23(57.41)	0.218(0.641)
		Female	17(42.58)	
3.	**Occupation**	Student	18(44.51)	8.94(0.062
		Teacher	8(29.03)	
		Housewife	8(10.32)	
		Healthcare worker	4(12.90)	
		Unemployed	2(3.20)	
4.	**Behavioural Factors**	Smoker	5(8.38)	3.077(0.380)
		Alcoholic	03(5.71)	
		Smoker & Alcoholic	02(2.58)	
5.	**Presence of Co-morbidity**	Diabetes Hypertension	02(3.22) 01(1.94)	0.537(0.764)

Discussion

Depression was found 47.46 % in this study , among depression 59.28% % cases of mild depression, 26.42 % cases of moderate depression and 9.28 % cases of moderately severe depression and 5% cases of severe depression were found. In our study male have more depression than female (57.14 %vs 42.85 %). In previous studies prevalence of depression was reported 8.3 to 48.3% in China,[20-21] 25% in India and 15.4 to 17% in Italy among general population. [22,23] In this study we found anxiety in 52.55 % cases among there were 57.41 % male and 42.59% were female. Among anxiety 74% mild, 17.41 % moderate and 7.74% severe anxiety cases in the study. The association of anxiety with occupation ($p < 0.05$) was found to be statistically significant. Xiao et al. found high levels of anxiety in their study done on medical staff in China. [24] The prevalence of anxiety was reported in general population in China 2 to 37% and in India prevalence of anxiety was reported ~28%. [20-26] Anxiety was found as predominated manifestation of emotion in the study done by Lima et al.2020. [24]

In this study sleep quality disturbance was found in 40 (13.55 %) subjects, out of male were 23 (57.41%) and 17 (42.58%) were female . However in recent studies the prevalence of insomnia was reported in China ranged from 18.2 to 23.2% . [20,26]B.Y.-M. Yu et al. found that about 30-40% people reported that their sleep quality, sleep initiation, and sleep duration had worsened since the outbreak of COVID-19.[27] Laura Pérez-Carbonell et al. found that disrupted sleep in 42.30% and difficulty in falling sleep in 30.9% among adults in their study.[28] In this study low stress in 85 (28.81% ,moderate stress in 193(65.42%) and high stress 17(5.76%) found among subjects. However in previous study the prevalence of stress, , as a result of the pandemic in the general population, are 29.6%.[29]

Conclusion

Psychological problems among general population is a very important aspect of health during any pandemic. In this study we found that depression was 47.46 %, anxiety 52.55% and sleep disturbance 13.55% and low stress in 28.82% ,moderate stress in 65.42% and high stress in 5.76% among study participants . Stress was statistically significant associated with age group, occupation and presence of comorbidity ($p<0.05$). Anxiety was statistically significantly associated with occupation. However Depression and Sleep disturbance were not statistically significantly associated with age group, gender ,occupation and presence of comorbidity.

These psychological problems may be related to consequences of disease, severity of illness and contagiousness of the disease. Therefore in this present pandemic situation it is very important to raise awareness among population regarding preventive measures and other aspects of this disease.

Limitations: This study was limited to COVID-19 outbreak, and we used a web-based survey method to avoid possible

infections, causing the sampling of our study was voluntary and conducted by online system. Therefore, the possibility of selection bias should be considered. Third, due to the sudden occurrence of the disaster, we were unable to assess an individual's psychological conditions before the outbreak. Therefore further research should be done regarding evaluation of psychological problems among population in this COVID- 19 pandemic.

References

1. Pérez-Carbonell, L., Meurling, I. J., Wassermann, D., Gnoni, V., Leschziner, G., Weighall, A., Ellis, J., Durrant, S., Hare, A., &Steier, J. Impact of the novel coronavirus (COVID-19) pandemic on sleep. Journal of Thoracic Disease, 2020;12: 163–175.
2. Available online: https://www.who.int/news-room/ detail/27-04-2020-who-timeline---Covid-19 (accessed June 7, 2020).
3. Lee AM, Wong JG, McAlonan GM, Cheung V, Cheung C, Sham PC, Chu C-M, Wong P-C, Tsang KW, Chua SE. 2007. Stress and psychological distress among SARS survivors 1 year after the outbreak. Canadian Journal of Psychiatry .2007;52(4):233–240.
4. Lotsch F, Schnyder J, Goorhuis A, Grobusch MP. Neuropsychological long-term sequelae of Ebola virus disease survivors: a systematic review. Travel Medicine and Infectious Disease.2017; 18:18–23.
5. Batawi S, Tarazan N, Al-Raddadi R, Al Qasim E, Sindi A, Johni SA, Al-Hameed FM, Arabi YM, Uyeki TM, Alraddadi BM. Quality of life reported by survivors after hospitalization for Middle East respiratory syndrome (MERS). Health and Quality of Life Outcomes.2019; 17(1):1–7.
6. Taylor, S.E., Klein, L.C., Lewis, B.P., Gruenewald, T.L., Gurung, R.A.R., Updegraff, J.A. Biobehavioral responses to stress in females: tend-and-befriend, not fight-orflight. Psychol. Rev. 200;107: 411–429.
7. Matthews T, Danese A, Caspi A, Fisher HL, Goldman-Mellor S, Kepa A, Moffitt TE, Odgers CL, Arseneault L. Lonely young adults in modern Britain: findings from an epidemiological cohort study. Psychological Medicine .2019; 49(2):268–277.
8. Reynolds DL, Garay J, Deamond S, Moran MK, Gold W, Styra R. Understanding, compliance and psychological impact of the SARS quarantine experience. Epidemiology & Infection.2008; 136(7):997–1007.
9. Brooks, S.K., Webster, R.K., Smith, L.E., et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020; 395, 912–920.
10. Chen R, Chou K-R, Huang Y-J, Wang T-S, Liu S-Y, Ho L-YJ. Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep quality: a longitudinal survey. International Journal of Nursing Studies.2006; 43(2):215–225 .
11. Johal SS. Psychosocial impacts of quarantine during disease outbreaks and interventions that may help to relieve strain. New Zealand Medical Journal.2009; 122(1296):47–52
12. Agargun MY, Kara H, Solmaz M. Sleep disturbances and suicidal behavior in patients with major depression. Journal of Clinical Psychiatry .1997;58:245–251.
13. Tao S, Wu X, Zhang Y, Zhang S, Tong S, Tao FJ. Effects of sleep quality on the association between problematic mobile phone use and mental health symptoms in Chinese college students. International Journal of Environmental Research and Public Health 2017; 14(2):185 5.
14. Saraswathi I, Saikarthik J, Senthil Kumar K, Madhan Srinivasan K, Ardhanaari M, Gunapriya R. 2020. Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: a prospective longitudinal study. PeerJ .2020; 8: 10164.
15. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 2001;16:606-13.
16. Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder. Arch Inern Med. 2006;166:1092-1097.
17. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ .The Pittsberg Sleep Quality Index :a new instrument for psychiatric practice and research .Psychiatry Res 1989;28:193-213.
18. Cohen, S., Kamarck, T., &Mermelstein, R. (1983). A global measure of perceived stress. Journal of Health and Social Behavio 1983; 24: 385-396.
19. Cohen, S., and Williamson, G. "Perceived stress in a probability sample of the United States," in The Social Psychology of Health, eds S. Spacapan and S. Oskamp (Newbury Park, CA: Solid Action on Globalization and Environment). 1988; 31–68.
20. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Res 2020;288:112954.
21. Gao J, Zheng P, Jia Y, et al. Mental health problems and social media exposure during COVID-19 outbreak. PLoS One 2020;15(4):e0231924.
22. Verma S, Mishra A. Depression, anxiety, and stress and socio-demographic correlates among general Indian public during COVID-19. Int J Soc Psychiatry 2020;66(8):756–762.
23. Ozamiz-Etxebarria N, Dosil-Santamaria M, Picaza-Gorrochategui M, Idoiaga-Mondragon N. Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain. Cad SaudePublica 2020;36(4):e00054020.
24. Xiao H, Zhang Y, Kong D, Li S, Yang N. The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. Med SciMonit. 2020;26:e923549.
25. Roy D, Tripathy S, Kar SK, Sharma N, Verma SK, Kaushal V. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population

during COVID-19 pandemic.Asian J Psychiatr 2020;51:102083.
26. Zhou SJ, Wang LL, Yang R, et al. Sleep problems among Chinese adolescents and young adults during the coronavirus-2019 pandemic. Sleep Med 2020;74: 39–47.
27. Yu BY, Yeung WF, Lam JC, Yuen SC, Lam SC, Chung VC, Chung KF, Lee PH, Ho FY, Ho JY. Prevalence of sleep disturbances during COVID-19 outbreak in an urban Chinese population: a cross-sectional study. Sleep Medicine 2020; 74 :18-24.
28. Pérez-Carbonell, L., Meurling, I. J., Wassermann, D., Gnoni, V., Leschziner, G., Weighall, A., Ellis, J., Durrant, S., Hare, A., &Steier, J. Impact of the novel coronavirus (COVID-19) pandemic on sleep. Journal of Thoracic Disease. 2020; 12: 163–175.
29. Nader Salari, Amin Hosseinian-Far, RostamJalali, AliakbarVaisi-Raygani, Shna Rasoulpoor , Masoud Mohammadi , Shabnam Rasoulpoor and Behnam Khaledi-Pa veh. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Globalization and Health 2020; 16:57.

Conflict of Interest: Nil
Source of support:Nil