Research Paper

Correlation between sleep quality and anxiety among young adults during COVID lockdown

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ABSTRACT

Several lockdowns have been imposed by governments across the world to mitigate the spread of the Coronavirus infection (COVID-19), confining many individuals to their homes, thus disrupting normal life routine and the circadian rhythm, and inevitably inducing a sense of uncertainty and insecurity. The purpose of this study is to assess whether there is a significant relationship between the quality of sleep and its effect on one's mental well-being, predominantly Anxiety. A web-based Cross-Sectional Survey was conducted using Random Sampling Technique among young adults between the ages of 20 and 29 in India. Data was collected from a total of 281 respondents, including 182 females, 98 males and 1 participant who chose not to reveal the gender. The PSQI (Pittsburgh Sleep Quality Index) and GAD-7 (Generalized Anxiety Disorder-7) scales were used. Using Pearson Product Coefficient, the Correlation Coefficient (ρ) of sleep quality and anxiety obtained was 0.48. This indicates that there is a substantial or marked relationship between the two variables, which shows that the pandemic lockdown has induced a considerable amount of Psychological distress, which has taken a toll on the quality of sleep among young adults.

Sleep plays a vital role in maintaining mental as well as physical health and well-being. It performs several important functions in adolescents and young adults like promoting growth, cognitive development as well as immunity. Poor quality sleep during adolescence and young adulthood may result in persistent sleep disturbances. Sleep quality is defined as one's satisfaction of the sleep experience, integrating aspects of sleep initiation, sleep maintenance, sleep quantity, and refreshment upon waking up. Young adults are more vulnerable to chronic sleep deficiency and recurrent circadian disruption than older adults (Zitting, K., Munch, M.Y., Cain, SW. et al., 2018). The main reason being the change in the two processes that are involved in sleep regulation; the intrinsic circadian timing system and the homeostatic sleep-wake system. Research shows that some form of sleep disruption is present in nearly all psychiatric disorders. Epidemiological surveys indicate

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that 15-35% of the adult population complain of frequent sleep quality disturbance, such as difficulty falling asleep or difficulty maintaining sleep (Karacan, I. et al., 1979).

It is important to note that there is often a bidirectional relationship between sleep and health. Factors relating to anxiety and stress are one of the most important concomitants of sleep complaints in the general population (Karacan, I. et al., 1979). The American Psychological Association (APA) defines Anxiety as an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure. One out of every seven Indians suffers from mental health issues like anxiety. 24.4% young adults in India and 65-70% young adults all around the world have anxiety-related issues (Sahoo, S., 2010). Recent studies conducted on the relationship of sleep and mental disorders suggest that sleep deprivation may cause mental health conditions such as Depression, Post-Traumatic Stress Disorders (PTSD), Bipolar Disorder and Anxiety Disorders (ADAA- Anxiety and Depression Association of America).

Sleep and Anxiety during Covid-19

The declaration of Novel Corona Virus (COVID-19) as a Global Pandemic by the World Health Organization induced a considerable degree of fear, worry and concern in the population at large. In public mental health terms, the main Psychological impact to date is elevated rates of stress and Anxiety (WHO). Sleep is another major concern during this trying time with several people anecdotally reporting sleep problems, including difficulty falling asleep, trouble staying asleep and vivid dreams. Research indicates that anxiety and pre-sleep rumination may affect rapid eye movement (REM) sleep, which involves the most vivid dreaming. Anxiety may provoke more disturbing dreams and create a higher likelihood of sleep disruptions. Sleep and mental health are interconnected in the manner that the neurochemicals that are responsible for a good night's sleep helps manage our mood. Hence sleep is an essential part of our lives when it comes to maintaining our mental health. According to Dr. M. S. Kanwar, Pulmonologist and Sleep expert, Advanced Sleep Disorder Institute, New Delhi, "There is a common association between anxiety and sleep disturbances. Ever since the lockdown, we have been getting a lot of phone calls about irregular sleep and vivid dreams. People are showing excess anxiousness because of the uncertainty about the future, their job security, their savings, and their loved ones in different cities. There are also people who are 'hooked' to COVID-19 news alerts and statistics." He also added that "The stress from thinking about all this reflects in our quality of sleep. When you have an anxiety overlay, the kind of sleep that gets most disturbed is the third phase of sleep- Non-Rapid Eye Movement sleep".

The aim of the study was to explore whether there is a correlation between sleep quality and anxiety among young adults during the pandemic lockdown, equipping two different scales for the two variables, the Pittsburgh Sleep Quality Index (PSQI) and the Generalized Anxiety Disorder-7 (GAD-7).

METHODOLOGY

Research Design and Sample

This study was based on quantitative research design and to avoid the spread of Coronavirus (SARS-CoV-2) a web-based questionnaire based on empirical study was created that was sent through various social media platforms among young adults in the city of Bangalore, Karnataka. This web-based questionnaire was completely voluntary and non-commercial. Participants responded to the standardized questionnaires on Sleep Quality and Generalized Anxiety Disorder from 7th to 8th of June, 2020. In order to ensure the quality of survey, an

age range was set for responses from 20-29 years. The participants who completed the survey were also asked to forward the survey further so as to have a snowball effect. The data was collected through Random Sampling Technique from 281 participants, with informed consent to participate in the study. The response rate involved 182 females, 98 males and one participant who chose not to reveal the gender.

Research Tools

Sleep quality was measured using the PSQI (Pittsburgh Sleep Quality Index) inventory was used, which was designed by Daniel J. Buysse, Charles F. Reynolds III, Timothy H. Monk, Susan R. Beman and David J. Kupfer. It contains 19 self-rated questions and 5 questions rated by the bed partner or roommate (only the self-rated questions are included in the scoring). It measures 7 different components related to sleep, which are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction. Each of these questions have a range of 0-3 points, where "0" indicates no difficulty, while a score of "3" indicates severe difficulty. The seven component scores are then added to yield one global PSQI score that ranges from 0 to 21, with higher scores indicating more severe sleep disorder (Buysse et al., 1989). A global PSQI score greater than 7 points indicates poor sleep quality.

GAD-7 (Generalized anxiety disorder-7) scale developed by Robert L. Spitzer, Janet B. Williams and Kurt Kroenke was used to assess subject's anxiety symptoms. It is a practical self-report anxiety questionnaire that proved valid in primary care (Löwe, B., 2008). The questionnaire is gauged with 7 items assessing the frequency of anxiety symptoms over the past two weeks on a 4-point Likert-scale ranging from 0 (never) to 3 (nearly every day). The total score of GAD-7 ranged from 0-21, with increasing scores indicating more severe functional impairments as a result of anxiety (Spitzer et al., 2006). For the purpose of this study we defined a GAD-total score of 9 points or greater as the presence of anxiety symptoms (Wang et al., 2018).

Data Analysis

Descriptive Statistics and Pearson Product Correlation was used to find out the Correlation Coefficient (ρ) for the statistical analysis to determine the strength of relationship between sleep quality and anxiety among young adults during COVID Lockdown.

Hypothesis

H1: There is a significant relationship between the sleep quality and levels of anxiety among young adults during COVID lockdown.

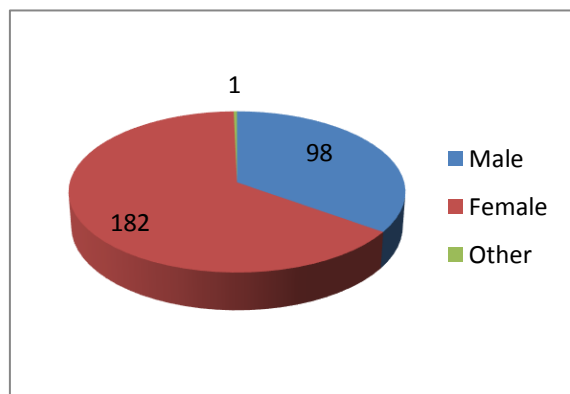## RESULTS

Demographic Details
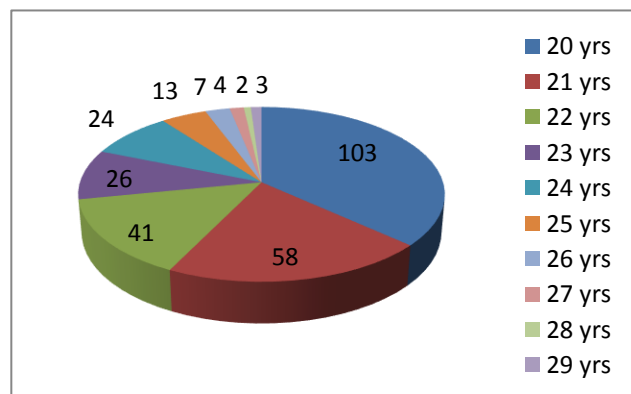

Fig 3.1: Showing the Gender Ratio   *Fig 3.2: Showing the Age Distribution*

Correlation between sleep quality and anxiety among young adults during covid lockdown

The sample is comprised of 281 young adults, out of which, 182 participants were females, 98 participants were males and 1 participant chose not to disclose the gender. An age range from 20-29 years was set for responses in order to ensure the quality of survey.

Descriptive Statistics
Table 1 Showing classification of Sleep Quality among participants in the present research

| CLASSIFICATION	FREQUENCY	PERCENTAGE
Severe	14	4.98%
Moderate	114	40.56%
Mild	148	52.66%
Nil	5	1.77%

Table 2 Showing classification of Anxiety among participants in the present research

CLASSIFICATION	FREQUENCY	PERCENTAGE
Severe	55	19.57%
Moderate	79	28.11%
Mild	130	46.26%
Nil	17	6.04%

Table 3 Showing the frequency of high scores in the seven component areas of Pittsburgh Sleep Quality Index

COMPONENTS		FREQUENCY	PERCENTAGE
C1	Subjective Sleep Quality	24	8.54%
C2	Sleep Latency	55	19.57%
C3	Sleep Duration	25	8.89%
C4	Habitual Sleep Efficiency	57	20.28%
C5	Sleep Disturbances	5	1.77%
C6	Use Sleeping Medication	8	2.84%
C7	Day Time Dysfunction	42	14.96%

Graph 1 Showing the frequency of high scores in the seven component areas of Pittsburgh Sleep Quality Index
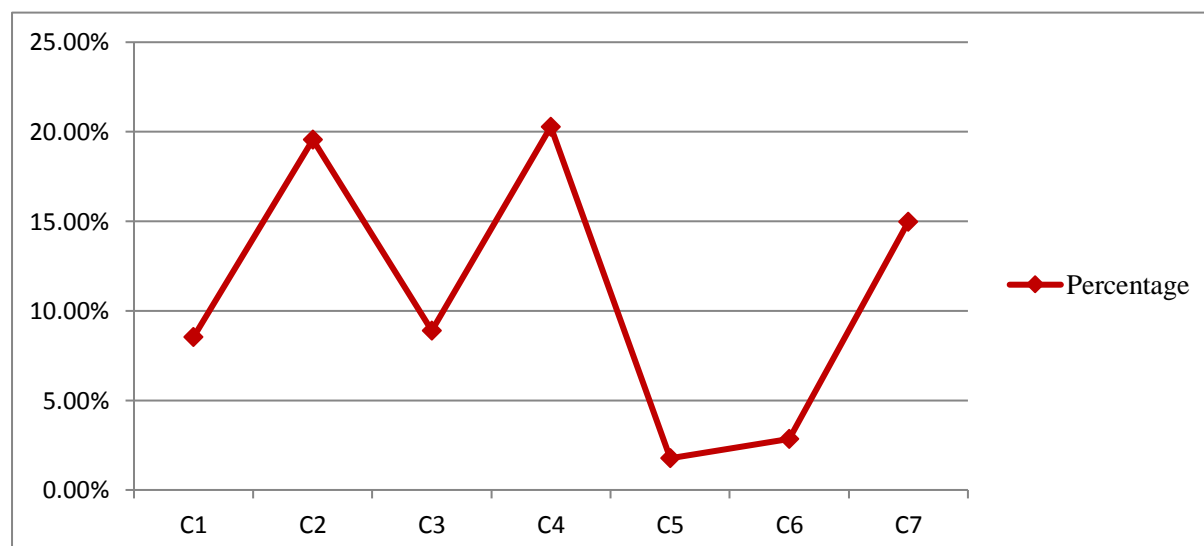
Graph 2 Showing the total sum scores in PSQI scale (red) and GAD-7 scale (blue) independently in the seven areas
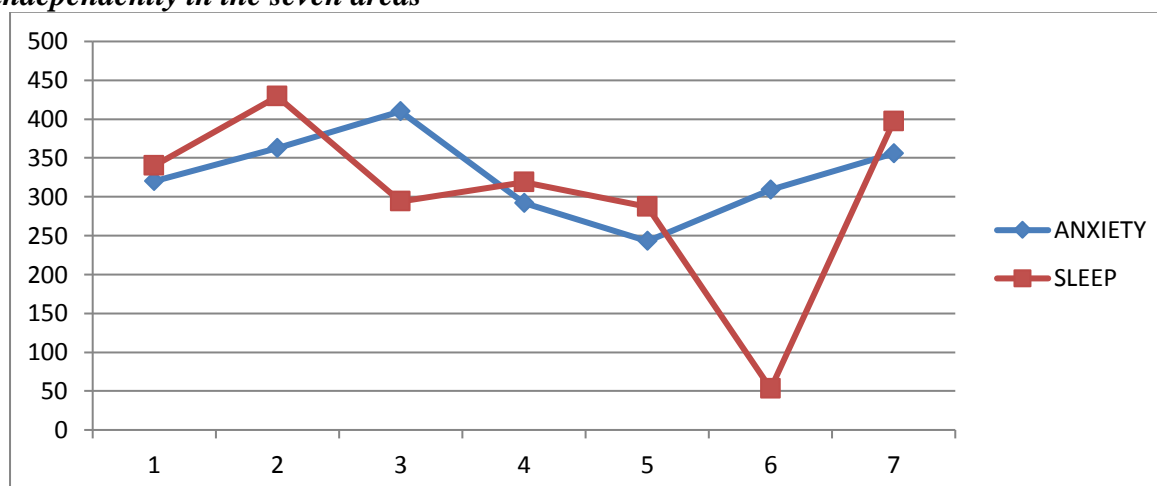

Table 4 Showing statistical values of sleep quality in relation to the pandemic as per the current research

SLEEP QUALITY	STATISTICAL SCORES
Mean	7.540925267
Median	7
Mode	6
Standard Error	0.223827776
Standard Deviation	3.752037237

Table 5 Showing statistical values of anxiety in relation to the pandemic as per the current research

ANXIETY	STATISTICAL SCORES
Mean	8.516014235
Median	7
Mode	6
Standard Error	0.357933151
Standard Deviation	6.000052957

Correlation

Sleep Pattern	Pearson Product Correlation	Correlation Coefficient (ρ)
Anxiety Score		0.48

DISCUSSION

The main aim of the present research was to explore the influence of lockdown on the levels of psychological distress (anxiety) and the disturbance caused in sleep quality among young adults (aged between 20-29) and thus, the correlation between the two variables, as a response to the COVID-19 pandemic. The present web-based is one of the very few that have been conducted in India and the results indicate moderate prevalence of GAD and poor sleep quality in the Indian population during the COVID-19 outbreak. The findings provided data support for accurately understanding the source of public's panic during the pandemic lockdown. The data in this study suggested that the young adult's levels of anxiety-related symptoms as well as sleep disturbance increased considerably with the onset of a major

infectious disease and the lockdown. The possible reason for this could be related to "Hypochondriac Concerns" (worry about being infected) (Furer et al., 1997) and feared that the epidemic was hard to control.

According to the obtained responses in PSQI, among the 281 participants, 14 participants showed Severe Sleep Issues (a score of 15-21), which is about 4.98% of the total participants, 114 participants showed Moderate Sleep Issues (a score of 8-14), which is about 40.56% of the total participants, 148 participants showed Mild Sleep Issues (a score of 1-7), which is about 52.66% of the total participants and only 5 participants showed No Sleep Issues, which is about 1.77% of the total participants. The Statistical Analysis of the data produced by the responses to PSQI scale gave a Mean of 7.54; a Median of 7; a Mode of 6; a Standard Error of 0.223827776 and a Standard Deviation of 3.752037237.

The PSQI data also indicated that 8.45% of the participants showed severe issues in Subjective Sleep Quality, 19.57% of the participants showed severe issues in Sleep Latency, 8.89% of the participants showed severe issues in Sleep Duration, 20.28% of the participants severe issues in Habitual Sleep Efficiency, 1.77% of the participants showed severe Sleep Disturbances, 2.84% participants used Sleeping Medication and 14.96% of the participants showed severe Day Time Dysfunction. Thus, we can say that a significant number of people reported worsened Sleep Quality due to the pandemic lockdown.

The data from GAD-7 inventory indicated that in the sample size of 281 participants, 55 participants showed Severe Anxiety (a score of 15-21), that is 19.57% of the total participants, 79 participants showed Moderate Anxiety (a score of 8-14), that is 28.11% of the total participants, 130 participants showed Mild Anxiety (a score of 1-7), that is 46.26% of the total participants and only 17 participants showed No Anxiety, that is only 6.04% of the total participants. The Statistical Analysis of the data produced by the responses to GAD-7 scale gave a Mean of 8.51; a Median of 7; a Mode of 6; a Standard Error of 0.357933151 and a Standard Deviation of 6.000052957.

According to Pearson's Product Correlation between the PSQI scores as well as the GAD-7 scores produced the Correlation Coefficient (ρ) of 0.48 indicating that there is a substantial or marked relationship between Sleep Quality (PSQI) and Anxiety (GAD-7) among young adults during the COVID lockdown.

A recent study reporting on citizens' well-being during the COVID-19 outbreak in China showed that those who scored higher on a measure of social participation and a sense of belonging also reported better sleep quality (Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N., 2020). A lack of regular social interaction can enhance stress and negatively affect sleep quality, although this relationship is usually intermediated by depression and stress due to loneliness (McHugh, J. E., & Lawlor, B. A., 2013; Wakefield, J. R., Bowe, M., Kellezi, B., Butcher, A., & Groeger, J. A., 2020). Another recent study from a Greek population reported that nearly 38% of participants had clinical insomnia after the COVID-19 outbreak. This could be a function of loneliness, uncertainty, depression, and COVID-19-related worries with a major contribution from two factors-depression and uncertainty. Perception of uncertainty and anxious feelings are influenced by a number of factors, for example, age, religious beliefs, availability of family support, to name a few (Voitsidis et al., 2020).

Home confinement is known to produce such effects due to disruption in circadian rhythm and the homeostatic factors that regulate sleep and this disruption may cause anxiety

(Altena, E., 2020). Other causal factors could be overthinking about the uncertainty of the current times, over-worrying and screen time, which increased immensely post lockdown. Longer time on screen is associated with shorter sleep and lesser sleep efficiency (Christensen, M.A., 2016). This could trigger a state of mental hyper-arousal, frequently marked by worry, which has been identified as a key factor behind insomnia. People with anxiety disorders are inclined to have higher sleep reactivity, which means they are much more likely to have sleeping problems when facing stress. Distress about falling asleep can itself complicate matters, creating a sleep anxiety that reinforces a person's sense of dread and preoccupation. These negative thoughts about going to bed induce a type of anticipatory anxiety and can create challenges to healthy sleep schedules and routines.

This study has potential limitations. The inventories used (PSQI and GAD-7) were not specifically designed for young adults aged between 20-29 years of age. The result of our survey relies on self-reported behaviour and thus may be exaggerated or biased- social desirability bias. The responses are marked on a set Likert scale which lacks flexibility and constraint. Due to the sudden manifestation of the virus, the respondent's psychological conditions before the outbreak were not assessed. The sample size used was not extensive and nor was the male to female gender ratio equal, which may have affected the results.

Notwithstanding these limitations, the findings observed in this study are important and warrant further investigation in this area of research.

CONCLUSION

This research study was conducted so as to achieve an insight on whether COVID-19 lockdown has affected sleep and one's mental well-being, specifically anxiety among young adults in India using a random sampling technique through an online survey. Despite the limitations and the individual data suggesting mild to moderate anxiety and sleep problems, the statistical results obtained through Pearson's Product Correlation produced the Correlation Coefficient (ρ) of 0.48 indicating that there is a substantial or marked relationship between Sleep Quality and Anxiety. Hence, the Hypothesis that there is a significant relationship between the sleep quality and levels of anxiety among young adults during COVID lockdown is accepted.

REFERENCES

Zitting, K. M., Münch, M. Y., Cain, S. W., Wang, W., Wong, A., Ronda, J. M., & Duffy, J. F. (2018). Young adults are more vulnerable to chronic sleep deficiency and recurrent circadian disruption than older adults. *Scientific Reports*, 8(1), 1-14.

Karacan, I., Beutler, L.E., Thornby, J.I. (1979). Psychological Variables in the Diagnosis of Insomnia. In. Williams, R. L., and Karacan, I., eds. *Sleep Disorders: Diagnosis and Treatment*. New York: John Willy and Sons. pp. 61-100.

American Psychological Association (APA) (1994) *Diagnostic and Statistical Manual of Mental Disorders 4th Ed.* Washington DC: American Psychological Association.

Sahoo, S., & Khess, C. R. (2010). Prevalence of depression, anxiety, and stress among young male adults in India: a dimensional and categorical diagnoses-based study. *The Journal of Nervous and Mental Disease*, *198*(12), 901-904.

World Health Organisation (WHO). (2001). *Mental health and COVID-19.* WHO Regional Office Europe.

Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research. *Psychiatry research*, *28*(2), 193-213.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical care*, 266-274.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097.

Wang, W., Zhu, N., Zhang, D., Li, X., Yang, B., Song, J., Zhao, X., Huang, B., Shi, W., Lu, R., Niu, P., Zhan, F., Ma, X., Wang, D., Xu, W., Wu, G., Gao, G.F., Tan, W. (2020). A novel coronavirus from patients with pneumonia in China, 2019. *New England Journal of Medicine*.

Furer, P., Walker, J. R., Chartier, M. J., & Stein, M. B. (1997). Hypochondriacal concerns and somatization in panic disorder. *Depression and Anxiety*, *6*(2), 78-85.

Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020). 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. Medical science monitor: international medical journal of experimental and clinical research, 26, e923549-1.

McHugh, J. E., & Lawlor, B. A. (2013). Perceived stress mediates the relationship between emotional loneliness and sleep quality. British journal of health psychology, 18(3), 546-555.

Wakefield, J. R., Bowe, M., Kellezi, B., Butcher, A., & Groeger, J. A. (2020). Longitudinal associations between family identification, loneliness, depression, and sleep quality. British Journal of Health Psychology, 25(1), 1-16.

Voitsidis, P., Gliatas, I., Bairachtari, V., Papadopoulou, K., Papageorgiou, G., Parlapani, E., & Diakogiannis, I. (2020). Insomnia during the COVID-19 pandemic in a Greek population. *Psychiatry Research*, 113076.

Altena, E., Baglioni, C., Espie, C. A., Ellis, J., Gavriloff, D., Holzinger, B., & Riemann, D. (2020). Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *Journal of Sleep Research*, e13052.

Christensen, M. A., Bettencourt, L., Kaye, L., Moturu, S. T., Nguyen, K. T., Olgin, J. E., & Marcus, G. M. (2016). Direct measurements of smartphone screen-time: relationships with demographics and sleep. *PloS one*, *11*(11), e0165331.