RESEARCH ARTICLE

Relationship of perceived sleep quality and stress among university students: An online survey during the COVID-19 pandemic

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ABSTRACT

Background: Several factors cause mental stress during a pandemic where academic life is uncertain. This stress may cause a change in healthy behavior. Sleep is one of the important aspects and is deranged with physical or mental stress.

Aim and Objectives: With this background, we conducted this study with university students to know the level of stress and sleep pattern and to find any correlation between them.

Materials and Methods: This cross-sectional observational online survey study was conducted in Bhubaneswar, Odisha with 100 university students during the second wave of the COVID-19 pandemic. The stress was assessed with the COVID-19 Student Stress Questionnaire (CSSQ) and subjective sleep was assessed by Pittsburgh Sleep Quality Inventory (PSQI). Both the questionnaires were in English and were having Likert-type response options. The survey data were analyzed by Statistical test by GraphPad Prism 6.01 software package.

Results: Among the participants, 66% had high stress, 24% had moderate stress, and 10% had low stress. The sleep quality analysis showed that 76% of students were having poor sleep and 24% had good sleep. There was a positive correlation between the CSSQ and PSQI score ($r = 0.45, P < 0.0001$). This indicates a strong correlation between stress and sleep quality.

Conclusion: During a pandemic like the current COVID-19 pandemic, university students suffer from a high level of stress and disturbed sleep. Hence, to restore the wellbeing of the students, a proper sleep hygiene practice should be promoted that may eventually help reduce stress. On the other hand, proper information regarding academic progress and defined assessment methods may help reduce academic stress and promote good sleep.

KEY WORDS: COVID-19; Universities; Sleep Hygiene; Pandemics; Sleep Quality; Students; Odisha

INTRODUCTION

Stress is an intrinsic element of today’s urban life. Furthermore, the stress in the rural population is increasing. Mental stress is also seen among school and university students.¹ There are multiple factors behind the increasing stress among the students that including a sense of competition and career uncertainty due to huge unemployment in the country.² Without a question, stress has become the most commonly cited obstacle to academic success.³ Although, some amounts of stress can be beneficial to our health since the appropriate sort of stress can sharpen our minds and reflexes while also encouraging us to evolve and grow. However, prolonged mental stress can damage physical health.⁴

The World Health Organization states that stress is a natural phenomenon during a pandemic situation. Hence, stress and fear of COVID-19 epidemic is reasonable in population.⁵ Students around the world are facing challenges due to a sudden shift from offline to online education, delayed examinations, and further progression of their careers during...
this COVID-19 pandemic. These challenges are reflected by the finding of stress among students reported by several previous studies.

Sleep is a normal physiological phenomenon to refreshes our nervous system. Previously, it was thought to be a passive process. However, now, it is known that sleep is an active process where centers in the central nervous system actively suppress the center that makes us awake. An optimum level of sleep is required to maintain a normal social life. People with poor sleep cannot concentrate on their studies and work. Hence, maintaining good sleep behavior is of utmost importance for a normal life. However, various stressors can hamper the normal sleeping pattern of a person.

With this context, we conducted this study to find the level of stress among university students and to assess their sleep quality during the second wave of the COVID-19 pandemic. We further wanted to evaluate the relationship between the level of stress and sleep quality among the students.

MATERIALS AND METHODS

This was a cross-sectional online survey study where we assessed the stress and sleep pattern by self-administered questionnaire through an online platform (Google Forms), and the study was conducted from 22 May to 5 June 2021 with students from Bhubaneswar, Odisha.

All the students were adults and provided online consent which is equivalent to written consent. Umost care was taken to keep the data confidential. Any students in the Utkal University were eligible to participate in the study. However, students with acute or chronic illnesses, especially neurological disorders were excluded from the study. The participants were recruited as a snowball sampling method. The survey link was shared in social media groups with a request to share the link with their peers. The survey was an anonymous one; hence, students could participate without divulging their identity.

The online survey contained four segments. The first one was informed consent. Agreeing the consent would send the user to the survey proper. The second part collected data about the gender, age, degree program, year of study. The next segment contained the 7-item COVID-19 Student Stress Questionnaire (CSSQ). The final segment was Pittsburgh Sleep Quality Index (PSSQI) questionnaire.

The CSSQ questionnaire has been developed to assess stress of university students during the COVID-19 pandemic. The questionnaire was validated to have a good psychometric property and was previously used. It consists of 7 questions or items with 5-point Likert-type response options. The scale ranges from 0 to 4 where 0 indicates “Not at all stressful” and 4 indicate “Extremely stressful”.

The Pittsburgh Sleep Quality Inventory (PSQI) is a validated questionnaire that is used to assess perceived sleep quality. It is one of the most widely used questionnaires and has been translated into several regional languages. The questionnaire collects data on the subjective sleep quality for 1 month period. This is the major limitation of this questionnaire is that it collects data for the last 1 month. Hence, recall biases may be present.

Statistical Analysis

Data were first analyzed with descriptive statistics and expressed in number, percentage, mean and standard deviation. Pearson correlation was computed between the stress score and PSQI score. For the study, a $P < 0.05$ was fixed as a statistical significance. We used the Microsoft Excel® 2010 (Microsoft Inc, USA) and GraphPad Prism 6.01 (GraphPad Software, CA, USA).

RESULTS

A total of 100 students (male = 63, female = 37) participated in this study. The age of the participants was 23.34 ± 3.46 years. Among the students, the majority of the students (66%) were suffering from a high level of stress. Approximately, one-fourth (24%) had moderate stress (Chi-square test $P < 0.0001$). Students with a low level of stress were minimal 10% only. The stress level according to the number of students is shown in Table 1. Table 1 also shows the number of students having good and poor sleep assessed by PSQI. The majority of the students (76%) were having poor sleep and 24% had good sleep (Binomial test $P < 0.0001$). Gender-wise stress and sleep quality are shown in Table 2. There

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<th>Table 1: Perceived stress and sleep quality among university students ($n=100$)</th>
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*Statistically significant test of Chi-square test, †Statistically significant test of Binomial test

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<th>Table 2: Gender-wise comparison of stress and sleep score</th>
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<td>Scores</td>
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$P$-values are of unpaired $t$-test
was no statistically significant difference in stress (unpaired t-test $P = 0.33$) and sleep quality (unpaired t-test $P = 0.18$) between males and females. There was a significant positive correlation between the CSSQ and PSQI score ($r = 0.45, P < 0.0001$). This indicates a strong correlation between stress and sleep quality [Figure 1].

**DISCUSSION**

With an aim to find the stress level and sleep quality among the university students, we found that majority of the students are suffering from a high level of stress and having poor sleep. The underlying reasons may be both academic uncertainties in the COVID-19 pandemic and generalized stress factors of the pandemic. There was no gender difference in stress and sleep quality. The stress and sleep quality score showed a positive correlation. This relationship does not have any direction. Either increment of stress may cause poor sleep or poor quality of sleep may be the cause of stress.

A study in Jamnagar city revealed that medical students are struggling to combat anxiety, depression, and stress as they are not attending the colleges during the lockdown phases in the current pandemic. A previous study by Panda et al. conducted a study in Bhubaneswar among university students and found young adults are suffering from stress and anxiety, and there was no difference among rural or urban residents. This scenario is evident across the border and Son et al. showed that students in the United States of America are having mental health issues that need to be tackled with appropriate steps from the stakeholders. A similar picture is seen in China also. Post-traumatic stress disorders are on the rise due to pandemic situations. Masters and doctoral students are facing issues due to fear of infection, suddenly developed online curriculum, and peer support. Our study supports these studies.

Not only healthcare workers, the general population including young adults and students are facing sleep problems due to sudden lifestyle changes. Students now find difficulty with active physical activity, peer interaction is primarily online, and the academic environment is not there at home. Approximately, 40% of people are facing disturbed sleeping patterns in the current pandemic. Sleep quality among the students of Nepal during the pandemic became a major health issue. In the study, it was also found that females are having more sleep-related problems. A similar picture is also seen in Italy that the university students are having stress and there is poor sleep. In our study, we found that 76% of university students are having poor sleep quality. However, there was no gender difference in sleeping patterns.

**Limitation of the Study**

This study used a non-probability snowball sample from single university students. The questionnaire was distributed online with an assumption of fair response. However, if there is any recall bias associated, that could not be detected. Social desirability is another bias that is beyond our control. However, this problem is also present in the offline survey. Furthermore, stress and sleep both are perceived and we did not conduct any quantitative tests like polysomnograph to assess the sleep quality. In future studies, these can be considered.

**CONCLUSION**

University students are suffering from a high level of stress during the current COVID-19 pandemic. Their sleep patterns are also disturbed and a majority of them are not having a good quality of sleep. Hence, to restore the wellbeing of the students, a proper sleep hygiene practice should be promoted that may eventually help reduce stress. On the other hand, proper information regarding academic progress and defined assessment methods may help reduce academic stress and promote good sleep.

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