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Exploring Sleep Patterns and Quality Among Pharmacy Students in Dehradun, Uttarakhand: PSQI Scale.

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ABSTRACT:

Introduction: Understanding sleep habits and their impact on overall sleep quality is essential for promoting better health outcomes. This study investigates the relationship between sleep habits & sleep quality as measured by the Pittsburgh Sleep Quality Index (PSQI). The PSQI is a standardized tool used to evaluate sleep quality & disturbances over a one-month period. By analysing the sleep patterns of a diverse sample population, we aim to identify common factors contributing to poor sleep quality and to examine how various lifestyle habits impact these outcomes.

Methods: This cross-sectional study was conducted in Dehradun, Uttarakhand, using a self-rated online survey form with 340 pharmacy students selected through multistage random sampling. Data were collected via Google Forms, and sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), which includes seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The total score of these components provides a global sleep score, with a score greater than 5 representing poor sleep quality.

Result: In this study involving 340 students (72.4% male, 27.6% female) with a mean age of 20 years ($SD \pm 1.88$), revealed significant insights into their lifestyles and sleep patterns. Sleep quality varied, with 46.5% reporting good subjective sleep quality and 43.5% experiencing poor sleep quality. Additionally, 67.1% of participants fell asleep within 15 minutes, and 45% slept for 5-6 hours. Sleep efficiency was high for most, with 76.5% maintaining over 85% efficiency. The mean GPSQI score was 4.5794 ($SD \pm 2.61$), with 49.1% scoring above 5, indicating generally good sleep quality among the participants.

Conclusion: The study on pharmacy students' sleep habits revealed that a slight majority experienced good subjective sleep quality, though nearly as many reported poor sleep quality. Most students fell asleep within 15 minutes and slept for 5-7 hours, maintaining high sleep efficiency. Few used sleep medications or had significant daytime dysfunction. The mean Global Pittsburgh Sleep Quality Index (GPSQI) indicated a balanced split between good and poor overall sleep quality.

Key words: Sleep disturbance, PSQI: Score, Health-assessment, Pharmacy, Students, Sleep quality

INTRODUCTION

Sleep is a vital physiological function crucial for maintaining the body's circadian rhythm. As people age, sleep disturbances become more common due to a variety of psychological and biological factors [1]. Older adults often experience initial insomnia, wake up earlier than usual, spend more time in bed, wake up during the night, nap more frequently, and have a reduced total sleep duration compared to younger individuals [2]. Proper and timely sleep is essential for optimal body function; its deficiency can weaken immune function, harm general well-being, and contribute to psychiatric conditions [3]. In the elderly, both excessive and insufficient sleep can indicate poor quality of life & health. Understanding the burden of sleep disorders & their socio-demographic and clinical determinants is crucial to mitigate the adverse effects of poor sleep quality [4]. Therefore, this study aims to assess the quality of sleep among pharmacy students and identify the factors influencing it. When young adults transition from high school to university, they face significant psychological challenges and adjustments [5]. This period marks a shift towards greater independence, presenting students with numerous choices regarding their academic pursuits, social interactions, and personal habits. Often, crucial aspects of their lives, such as sleep hygiene, are neglected [6]. When confronted with frustration or significant life changes, many students struggle to employ effective coping mechanisms, leading to potential adverse effects that can impact both their academic performance and future adult life. Adequate sleep is essential for maintaining overall health [7], well-being throughout life. The National Sleep Foundation advises that individuals aged 18–25, which includes many university students, should aim for 7–9 hours of sleep each night [8]. Prolonged sleep deprivation in animals leads to death. Rats without sleep perish within 2–3 weeks, and early research shows similar fatal results in dogs [9]. Studies on mice and rats indicate that extended sleep loss negatively affects various bodily systems, with noticeable changes in endocrine, metabolic, and immune functions. Initially, sleep-deprived rats show increased energy use, resulting in weight loss despite eating more, lower thyroid hormone levels, higher plasma norepinephrine due to metabolic stress, and a weakened immune system.

While human studies on long-term sleep deprivation are not feasible, evidence over the past few decades links both short & long sleep durations to higher mortality rates [10]. The exact mechanisms are unclear, but the adverse physiological effects of insufficient sleep can lead to health issues like cardiovascular disease, diabetes, and obesity, which are linked to increased mortality. Healthy young adults experiencing partial sleep restriction exhibit impaired glucose

tolerance, elevated evening cortisol levels, altered sympathetic nervous system activity, lower leptin levels, and higher ghrelin levels [11].

Sleep health encompasses a range of sleep-wake abilities tailored to personal, social, and environmental needs, contributing to overall physical health & mental health well-being. Ideal sleep health includes subjective satisfaction, proper timing, adequate duration, high efficiency, & alertness during wakefulness. This definition, applicable to both healthy individuals and those with sleep disorders, emphasizes measurable sleep-wake traits rather than specific disorders [12]. It is particularly suited for adults but can be modified for infants, children, and teenagers. Sleep health is seen as a positive quality and can be assessed through self-reports, behaviour, and physiological measures, and even at cellular and genetic levels. It acknowledges the importance of individual and contextual factors in determining what constitutes good sleep health. Figure 1 illustrates that there are several factors affecting sleep, which result in poor quality sleep.

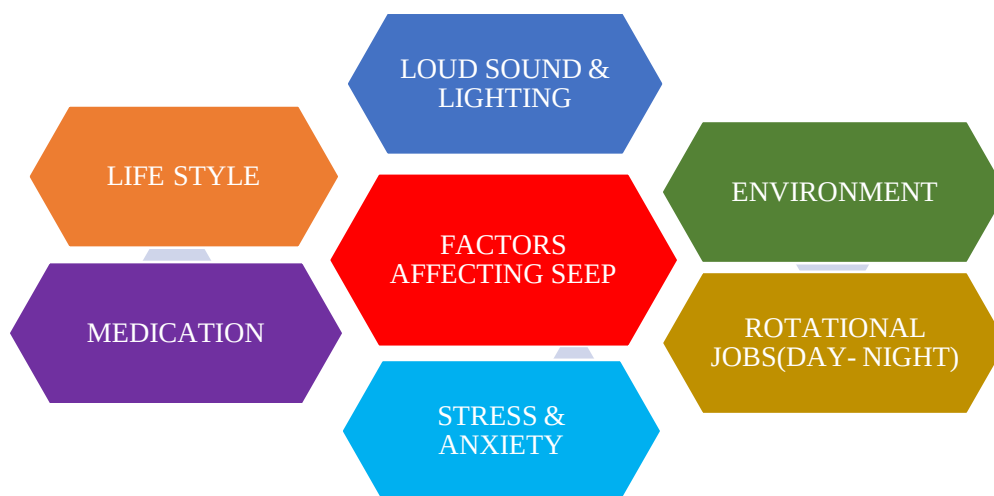


Fig. 1 factors affecting sleep quality

Primary sleep disorders are increasingly recognized as a public health issue, and they are most accurately diagnosed using polysomnography (PSG) [13]. However, PSG availability is often limited, leading to the use of sleep health questionnaires as an initial evaluation tool. The Epworth Sleepiness Scale (ESS) and the Pittsburgh Sleep Quality Index (PSQI) are commonly used tools for evaluating sleep [14]. The PSQI, a reliable self-report questionnaire, assesses sleep quality over the past 30 days, identifying poor sleep quality with a global score greater

than 5. The PSQI is specifically designed to evaluate overall sleep quality and is commonly recommended for assessing global sleep and insomnia symptoms [15].

METHOD AND MATERIAL

This study was a cross-sectional study and performed in Dehradun, Uttarakhand using a self-rated online questionnaire. A total of 340 subjects were included in the study. The sample size was determined using multistage random sampling. There are so many institutions and multiple universities. This study included only pharmacy students, gave consent to participate. All data collected by online mode (google form). Sleep quality measure with the help of tool (Pittsburgh Sleep Quality Index). Pittsburgh Sleep Quality Index having seven components and each component define different parameters: component-1(subjective sleep quality), component-2(sleep latency), component-3 (sleep duration), component-4 (habitual sleep efficiency), component-5 (sleep disturbances), component-6 (use of sleeping medication, and component-7 (daytime dysfunction) [16]. The global sleep score, derived from seven components, is assessed through a self-rated questionnaire evaluating sleep quality over a month. A PSQI score above 5 indicates poor sleep quality.

Inclusion criteria: Those individuals willing to participate and only pursuing pharmacy courses: diploma, graduation and post-graduation

Exclusion criteria: Those individuals not willing to participate, and those suffering with any acute or chronic psychologic health problems. Those individuals who not studying pharmacy courses.

Study tool and Statistical analysis: The Pittsburgh Sleep Quality Index (PSQI) is a tool for assessing sleep quality and patterns in pharmacy students. It distinguishes between good and poor sleep by evaluating seven components: component-1(subjective sleep quality), component-2(sleep latency), component-3 (sleep duration), component-4 (habitual sleep efficiency), component-5 (sleep disturbances), component-6 (use of sleeping medication, and component-7 (daytime dysfunction). Each component is scored from 0 (no difficulty) to 3 (severe difficulty), and the scores are summed to produce a global score ranging from 0 to 21. A total score of 5 or higher indicate poor sleep quality[17]. The SPSS was used in this study for assessments of sleep quality [18].

Scale Approval: To conduct the study, we utilized the PSQI scale for result analysis. Prior permission was obtained for the use of this scale.

RESULTS

The present prospective observational study was done at Department of Pharmacy students for a period of 01 months. Total number of subjects participated were 340 subjects confirmed with study were collected and analyzed as per the inclusion criteria.

Demographic Analysis: 246 were male (72.4%) and 94 were female (27.6%) participated in this study. Mean age of respondents was 20.00 years ($SD \pm 1.88$). Out of 340 subjects, 8 (2.4 %) subjects were married and while 332 (97.6 %) subjects unmarried. 276 (81.2%) subjects were regularly involved in some kind of physical activity, while 64 (18.8%) subjects did not participate in physical activity. The study examined the distribution of social habits among the subjects. It found that 12 individuals (3.5%) were exclusively smokers, while 3 individuals (0.9%) were solely alcohol consumers. Additionally, 6 individuals (1.8%) engaged in both smoking and drinking. There were also 11 individuals (3.2%) who used other substances. The majority, comprising 308 individuals (90.6%), reported having no social habits.

Out of the total participants, 183 individuals (53.8%) adhered to a vegetarian diet, while 157 individuals (46.2%) followed a non-vegetarian diet. Specifically, 15 participants (4.4%) consumed a diet consisting of 95% or more meat or heavy foods in the past month. Additionally, 49 participants (14.4%) reported that 75% of their diet was heavy in the past month. For 93 participants (27.4%), 50% of their diet was heavy, and for 183 participants (53.8%), 25% or less of their diet was considered heavy over the last month.

S. No.	Demographic Variables	Frequency (%)
1.	Age (years) < 20 years > 20 years	209 (61.5%) 131 (38.5%)
2.	Gender • Male • Female	246 (72.4%) 94 (27.6 %)
3.	Marital status • Married • Unmarried	8 (2.4 %) 332 (97.6 %)
4.	Food Habits • Vegetarian • Non vegetarian	183 (53.8 %) 157 (46.2 %)

5.	Percentage of regular diet consists of meat/ heavy diet • 95% or more • 75% • 50% • 25% or less	15 (4.4%) 49 (14.4%) 93 (27.4%) 183 (53.8%)
6.	Health Problem • Yes • No	33 (9.7%) 307 (90.3%)
7.	Social History • Smoking • Drink • Smoking & Drink • Any Others	12 (3.5%) 3 (0.9%) 6 (1.8%) 11 (3.2%)
8.	Physical Activity • Yes • No	276 (81.2%) 64 (18.8%)

Table -1 Demographic and Behavioral perspectives of study population

Table 2 presents an evaluation of the seven components of the PSQI among the elderly. The results indicate that 158 individuals (46.5%) reported having fairly good subjective sleep quality, while 148 (43.5%) experienced fairly poor sleep quality. Additionally, 26 participants (7.6%) rated their sleep quality as fairly bad, and 8 (2.4%) as very bad. Regarding sleep latency, 228 participants (67.1%) fell asleep within 15 minutes. In comparison, 88 individuals (25.9%) took between 15-30 minutes to fall asleep, 13 (3.8%) took between 31-60 minutes, and 11 (3.2%) took longer than 60 minutes. When it comes to sleep duration, 143 elderly individuals (42.1%) slept for about 7 hours, 153 (45.0%) slept for 5-6 hours, and 31 (9.1%) slept for less than 5 hours. In terms of habitual sleep efficiency, 260 participants (76.5%) maintained an efficiency of over 85%, 49 (14.4%) had an efficiency of 75-84%, 18 (5.3%) had an efficiency of 65-74%, and 13 (3.8%) had an efficiency below 65%. Notably, only 0.3% of the participants had used sleep medication in the past month. Furthermore, just 7 individuals (2.1%) reported experiencing the highest level of difficulty in daytime functioning. The mean GPSQI was found to be 4.5794 and (SD± 2.61). In the study, 49.1% of participants had an overall score exceeding 5, indicating good sleep quality, while 50.9% had scores below 5.

S. No.	PSQI: Components	Frequency (%)
1.	Subjective sleep quality • Very Good • Fairly Good • Fairly Bad • Very Bad	158 (46.5%) 148 (43.5%) 26 (7.6%) 8 (2.4%)
2.	Sleep latency • < 15 minutes • 16-30 minutes • 31-60 minutes • > 60 minutes	228 (67.1%) 88 (25.9%) 13 (3.8%) 11 (3.2%)
3.	Sleep duration • 7 hours • 6-7 hours • 5-6 hours • < 5 hours	143 (42.1%) 153 (45.0%) 31 (9.1%) 13 (3.8%)
4.	Sleep efficiency • 85% • 75-84% • 65-74% • < 65%	260 (76.5%) 49 (14.4%) 18 (5.3%) 13 (3.8%)
5.	Sleep disturbance • Not during past month • Less than once a week • Once or twice a week • Three or more times a week	44 (12.9%) 210 (61.8%) 84 (24.7%) 2 (0.6%)
6.	Use of sleep medication • Not during past month • Less than once a week • Once or twice a week • Three or more times a week	339 (99.7%) 1(0.3%) 0 (0) 0 (0)
7.	Daytime dysfunction • Zero disturbance (0) • Low disturbance (1-2) • Moderate disturbance (3-4) • High disturbance (5-6)	176 (51.8%) 113 (33.2%) 44 (12.9%) 7 (2.1%)
8.	Global PSQI Score • Less than 5 • 5 or more than 5	173 (50.89%) 167 (49.11%)

Table -2 Respondent Profiles Based on Pittsburgh Sleep Quality Index Components**DISCUSSION**

The present study utilized the Pittsburgh Sleep Quality Index (PSQI), a reliable and validated self-administered questionnaire, to assess sleep quality over a 30-day period among participants in Dehradun, Uttarakhand. Our findings shed light on the sleep patterns and the prevalence of sleep disturbances in this population, revealing notable trends and associations with various demographic and lifestyle factors [19].

The PSQI results indicated that the majority of participants exhibited good sleep quality, with 50.9% (n=340) falling into this category. Conversely, 49.1% (n=340) of participants experienced poor sleep quality. This nearly equal distribution highlights the high prevalence of good sleep quality among the study population, which is consistent with trends observed in similar studies conducted among students and other demographic groups [20]. The overall mean PSQI score for our participants was 4.58 (SD±2.61), falling below the cut-off score (>5) indicative of poor sleep quality. Our findings contrast slightly with those from a study conducted in Dehradun, which reported a 64.5% prevalence of poor sleep quality and a higher mean PSQI score of 5.6 (SD±1.9) [21]. This discrepancy may be attributed to differences in sample characteristics, environmental factors, and lifestyle habits between the two study populations. The lower prevalence of poor sleep quality in our study suggests potential regional or contextual influences on sleep behaviours that warrant further investigation[22].

The study revealed significant variations in sleep habits across different demographic variables. The sample comprised 72.4% male (n=340) and 27.6% female (n=340) participants. Both genders reported notable levels of sleep disturbances, a finding corroborated by prior research. Gender disparities in sleep quality may be influenced by a range of factors, including hormonal differences, societal roles, and stress levels, which tend to differ between men and women[23].

Smoking was prevalent among male participants and was significantly associated with poor sleep quality [24]. This finding aligns with existing literature that identifies smoking as a risk factor for sleep disturbances due to its stimulating effects and potential to disrupt circadian rhythms. Additionally, while some participants reported occasional alcohol consumption, its relationship with poor sleep quality was not found to be significant in this study. Physical activity levels also played a crucial role in determining sleep quality [25]. Women, who were generally less physically active than men in this study, exhibited poorer sleep quality. The

lower physical activity among women may contribute to their higher prevalence of sleep disturbances.

These findings underscore the need for targeted public health interventions to improve sleep quality in India. Strategies should focus on raising awareness about the importance of sleep hygiene, reducing smoking rates, and promoting physical activity, particularly among women [26]. Educational campaigns could emphasize the benefits of regular physical activity and the adverse effects of smoking on sleep [27].

CONCLUSION

The study on sleep habits among Department of Pharmacy students revealed key findings. This study provides a comprehensive overview of the demographic, social habits, dietary preferences, and sleep patterns among the participants. The majority of the subjects were male, unmarried, and physically active, with a notable proportion adhering to a vegetarian diet. The data also highlighted the limited prevalence of smoking, alcohol consumption, and other substance use among the participants, with most reporting no such social habits.

Sleep quality and patterns emerged as significant findings, with nearly half of the participants reporting good subjective sleep quality. However, a considerable proportion experienced poor sleep quality, and a small percentage faced challenges in sleep duration and efficiency. Despite these challenges, the use of sleep medication was minimal, and only a few participants reported severe difficulties in daytime functioning.

These findings underscore the importance of addressing lifestyle factors, such as diet, physical activity, and sleep habits, in promoting overall health and well-being. The study also suggests the need for targeted interventions to improve sleep quality among those experiencing poor sleep. Future research could further explore the underlying factors contributing to these patterns and their potential impact on long-term health outcomes.

LIMITATIONS AND FUTURE DIRECTIONS

Limitations of the study include its cross-sectional design, which hinders establishing cause-and-effect relationships. Moreover, relying solely on self-reported data introduces potential response bias. Future research should integrate objective measures such as actigraphy or polysomnography to enhance data reliability. Longitudinal studies are also recommended to track sleep patterns over time, offering deeper insights into how these patterns influence health outcomes among diverse populations in Uttarakhand, India.

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