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Original Research Article

Burden of poor sleep quality, stress, anxiety, and depression among staff nurses working in tertiary hospitals of Puducherry: a pilot study

Yogeswaran Nehru S.[1], Prahankumar R.[1]*, Avudaiappan S.[2], Kripa Angeline A.[3]

[1]Department of Community Medicine, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth, Puducherry, India
[2]Department of Psychiatry, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth, Puducherry, India
[3]Department of Medical Surgical Nursing, Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry, India

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***Correspondence:**
Dr. Prahankumar R.,
E-mail: prahankumarr@mgmcri.ac.in

ABSTRACT

Background: Sleep deprivation and psychological distress have emerged as occupational health issues among staff nurses. Poor sleep quality is mostly combined with increased stress, anxiety, and depression, all of which can adversely affect personal well-being and professional performance in the health system. The aim of the pilot study assessed the prevalence of poor sleep quality, stress, anxiety, and depression among staff nurses working in tertiary hospitals of Puducherry.
Methods: A descriptive pilot study was conducted among 30 staff nurses aged 18 to 60 working in Puducherry tertiary care hospitals. One tertiary hospital was randomly selected, and participants were recruited through systematic random sampling. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), whereas psychological distress from common mental disorders was assessed using the depression, anxiety, and stress scale-21.
Results: The mean age of the participants was 47.13±7.47 years. About half of the participants (56.7%) have shown poor sleep quality (Global PSQI score>5). Among PSQI components, 16 (53.33%) participants had limited 5-6 hours of sleep, and 15 (50%) exhibited moderate to high sleep latency. 22 (73.33%) participants were found with good sleep efficiency. Regarding psychological distress, 20% of participants with stress, 36.7% revealed varying degrees of anxiety, and 16.7% showed symptoms of depression.
Conclusions: The study highlights a burden of poor sleep quality, stress, anxiety, and depression among staff nurses in tertiary care settings. These findings underscore the need for further large-scale studies, early identification and intervention strategies to support mental health and improve sleep hygiene among nursing professionals.

Keywords: Sleep quality, Nurses, Stress, Anxiety, Depression, PSQI

INTRODUCTION

Sleep deprivation is the epicentre of many health risks and is often referred to as a 'Public health epidemic'.[1] Sleep disturbances are not less common in modern society, and this can risk people's mental as well as physical health.[2] Adequate sleep is critical for the optimum health of human beings. Sleep quality is defined as 'an individual's self-satisfaction with all aspects of the sleep experience that can be measured by the following variables: Sleep efficiency, sleep latency, Wake after sleep onset, and sleep architecture measures' by Nelson et al in their study.[3] Female nurses suffered from sleep disturbances compared to women in general due to their frequent exposure of

frequently facing stressful work.[4] Work shifts themselves impact the sleep quality, specifically, the morning shift nurses show poor sleep quality and higher stress.[5] Shift work and its effect on circadian misalignment led to the major domains of health, such as metabolic, mental, cardiovascular, and cancer, by inducing sleep deficiency, inflammation, sympathovagal and hormonal imbalance, impaired glucose metabolism, and dysregulated cell cycle.[6] Healthcare workers are mainly affected by poor sleep quality, and its impact on their health and performance may jeopardize the patient safety taken care of by them and is detrimental to the healthcare system.[7]

The prevalence of sleep disturbances among the general population globally ranges from 8.3% to 45%.[8] Among nurses, sleep quality is a significant concern, with studies finding a high prevalence of poor sleep. A study in Manipur found 43% of nurses had poor sleep quality.[9] Similarly, a study in Taiwan found that 68.9% of female nurses had poor sleep quality, with depression being linked to sleep disturbances than anxiety.[10] A recent meta-analysis found that the prevalence of poor sleep quality among nurses worldwide was 61.0% across regions.[8] Chronic diseases such as hypertension, diabetes, and cardiovascular disease are more prevalent among people who suffer from sleep deprivation.[11–13] Previous studies have denoted various factors that influence sleep disturbances among nurses, such as sociodemographic variables, work status, psychological distress, and sleep status.

Stress can be defined as a state of worry or mental tension caused by a difficult situation. [14] Studies by Dong et al. and Kunzweiler et al. found that nurses with more occupational stress have shown sleep disturbances.[15,16] In addition, excessive anxiety and severe depression among nurses are accompanied by disturbed sleep.[17,18] Anxiety is an emotion characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure.[19] It is considered normal for an individual, and may turn into a disorder if the fear and worry are intense and extensive.[20] Depression is a common mental disorder characterized by a loss of interest or pleasure in activities.[21]

A study by Kaushik et al. in 2021 revealed that 79.1% of the nurses suffered from at least one among stress, anxiety and depression.[22] Specifically, stress, anxiety, and depression among staff nurses have shown the prevalence of 50.8%, 74%, and 70.8%, respectively.[22] The optimum amount of sleep is required for daily cognitive processes. Indeed, poor sleep efficiency and sleep fragmentation are linked with poor executive function.[23]

Shift workers, especially those in healthcare, have a higher risk of facing mental health issues like stress, anxiety, and depression. This is due to various personal and professional factors. Research indicates that a high prevalence of poor sleep quality exists among nurses, which is closely associated with stress, anxiety, and depression. In Ethiopia, 75.5% of nurses experienced poor sleep quality, and factors such as female gender, stress, anxiety, depressive symptoms, and alcohol consumption were significantly associated with poor sleep quality.[24] Sleep Deprivation and poor sleep hygiene practices are the major preventable factors associated with the mental health of Staff nurses. Nurses who spend long hours caring for patients find it challenging to schedule treatments for their mental health. Several international studies have explored the prevalence and cause of various common mental disorders among nurses and even evaluated potential interventions. Research on the common mental disorders of nurses, especially in the context of COVID-19, is abundant, but only a few studies in India have explored sleep quality along with stress, anxiety, and depression among nurses in tertiary hospitals.

The aim of the study was to measure the prevalence of poor sleep quality and common mental disorders such as stress, anxiety, and depression among nurses in public and private tertiary hospitals and to recommend a large-scale study and suggest possible intervention strategies for improving the common mental disorders of staff nurses.

METHODS

A descriptive pilot study was carried out among staff nurses for the purpose of validation of the main study, which was conducted on nursing professionals working in the tertiary hospitals in Puducherry to explore the burden of poor sleep quality, stress, burnout, anxiety, and depression. The study population comprised staff nurses between the age group of 18 to 60 years working in tertiary care settings, which included 8 medical college hospitals and 2 government tertiary care hospitals in the region. The study was conducted over a period of three months, from October 2024 to December 2024. Exclusion criteria include pregnant or lactating nurses, those undergoing treatment with known mental disorders, those diagnosed with musculoskeletal conditions, and those unwilling to provide consent. The objectives of the pilot study were to assess the feasibility and reliability of the research instruments, as well as to identify any methodological challenges that could arise during the full-scale study. This study recruited a total of 30 subjects through systematic random sampling from the list of nurses obtained from one tertiary hospital to ensure randomization.

Data collection

The data were collected through standardized tools such as the Pittsburgh sleep quality index (PSQI) for the measurement of sleep quality and the depression, anxiety, and stress scale-21 (DASS-21) for measuring psychological distress. Necessary permissions were obtained from the authorities, and informed consent was obtained from all participants. The data collected were analyzed to refine the methodology based on preliminary findings.

Study procedure

The list of tertiary hospitals in Pondicherry was obtained, and staff nurses from one tertiary hospital were selected based on systematic random sampling.

Participants were recruited till achieving an appropriate sample size was achieved and assessed through various questionnaires like PSQI and DASS to measure the prevalence of poor sleep quality, stress, anxiety, and depression. The results of the pilot study informed minor modifications to the study instruments and procedures, enhancing the overall rigour and feasibility of the main study.

Measures

Pittsburgh sleep quality index

It consists of 19 questions to assess sleep quality over 1 month. It has seven components to deduce one global score, such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep-promoting medications, and daytime dysfunction due to sleepiness. A global score of more than 5 is considered poor sleep quality.[25]

Depression, anxiety, and stress scale 21 (DASS-21)

It is a widely used tool to assess and differentiate stress, depression, and anxiety among different population groups.[26]

Statistical analysis

The quantitative data collected was entered in Microsoft Office Excel (2019) and analyzed using standard software, Statistical Package for the Social Sciences (SPSS) (v16.0; IBM Corp, Armonk, New York) software.[27] Missing data and invalid responses were excluded before the analysis. The data was presented in the form of numbers and percentages for qualitative variables and mean and standard deviation (SD)/median, and interquartile range (IQR) for quantitative variables. Cronbach's Alpha was used for the reliability analysis of two validated scales.

RESULTS

A descriptive pilot study was conducted among staff nurses in tertiary care hospitals within Puducherry. Participants were recruited from any one of the ten institutions, including eight medical colleges with attached hospitals and two government tertiary care hospitals. The results below describe the demographic characteristics of the study participants.

Participant age and area of residence

The mean age of the participants involved in the study was 47.13 years, with a standard deviation of 7.47 years. Almost all of the study participants were from urban areas, while the rest of them were from rural areas. The frequency of the distribution of participants is depicted in Figure 1.

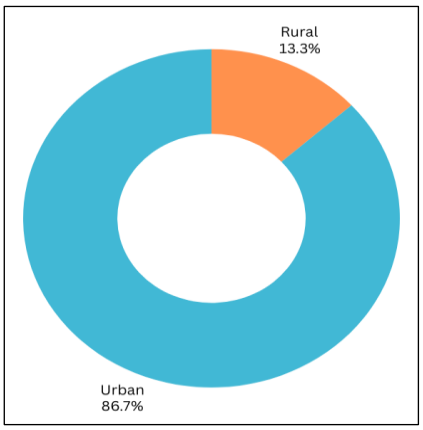

Figure 1: Distribution of participants by area of residence.

Type of family

Among the 30 staff nurses who participated in the study, the majority were from nuclear families (63.3%); the remaining 36.7% were from joint families. The distribution of the participants according to the family type is tabulated in Table 1.

Table 1: Distribution of participants based on type of family.

Type of family	Frequency	Percent (%)
Joint family	11	36.7
Nuclear family	19	63.3
Total	30	100.0

Pittsburgh sleep quality index

Sleep quality assessment

The measurement of sleep quality was done through the PSQI, which reflects seven components on which the subjects were questioned (Figure 2**)**. The analysis is based on responses from a total of 30 participants. For subjective sleep quality, 8 participants reported their sleep as very good, 16 as fairly good, and 6 were fairly bad. Regarding sleep-onset latency, 5 participants defined it as a non-issue, whereas 10 had slight latency, 11 had moderate, and 4 had severe latency classification. During analysis of sleep duration, it was indicated that only 2 participants slept for over 7 hours, 11 slept 6.00-6.99 hours, 16 slept 5.00-5.99 hours, and 1 had sleep of less than 5 hours. For habitual sleep efficiency, 22 participants had good efficiency, while 2 had fair, 4 had poor, and 2 had very poor efficiency. Regarding sleep disturbances, 5 reported no disturbances, while 17 reported low-level disturbances, moderate disturbances were reported by 7 participants and severe

disturbances were reported by 1 participant. Few sleep-inducing medications were taken, as 26 participants reported never taking them, 1 participant reported taking them 3 or more days a week, and 3 participants reported taking them less than once a week. For daytime dysfunction, 14 participants indicated no dysfunction, 13 indicated mild, 2 indicated moderate, and 1 indicated severe daytime dysfunction. These components indicate a comprehensive understanding of participants' sleep patterns and also show a few problem areas, primarily sleep duration and latency, where quality appears at risk.

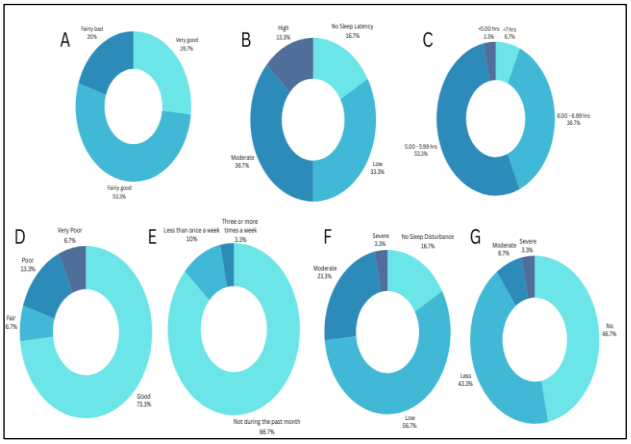

Figure 2: Distribution of responses across the seven components of the PSQI (A) subjective sleep quality, (B) sleep latency, (C) sleep duration, (D) habitual sleep efficiency, (E) sleep disturbances, (F) use of sleep-promoting medications, and (G) daytime dysfunction.

To assess sleep quality, PSQI includes 19 items grouped into 7 components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep-promoting medications, and daytime dysfunction, which were scored and combined to provide each participant with a global PSQI score. PSQI of more than 5 was deemed as poor-quality sleep.

Using that scoring, participants were classified into good sleep or poor sleep quality. This is summarized in Table 2.

Table 2: Distribution of participants by PSQI category.

PSQI category	Frequency	Percent (%)
Good sleep quality	13	43.3
Poor sleep quality	17	56.7
Total	30	100.0

Levels of depression, anxiety, and stress

DASS-21 was employed in this assessment of the psychological well-being of the participants. This differentiates and determines the severity of depression, anxiety, and stress based on four categories: 'normal', 'mild', 'moderate', and 'severe'.

The proportion of sample participants who fall within the categories has been summarized in Figure 3. Most of the participants scored within normal limits for depression (83.3%) and stress (80.0%), while a fairly larger number showed anxiety to some extent, including mild, moderate, or severe symptoms (36.7%).

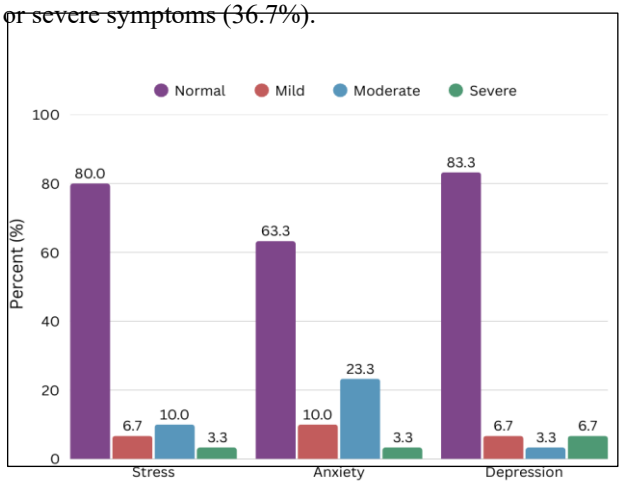

Figure 3: Distribution of participants by DASS-21 categories.

Reliability analysis of PSQI and DASS-21

Two scales were used for reliability analysis: PSQI and DASS-21. Cronbach's alpha values for the two scales were above 0.80, indicating strong internal consistency (Table 3).

Table 3: Reliability analysis of validated scales.

Scale	Cronbach's alpha	No. of items
PSQI	0.84	14
DASS-21	0.898	21

DISCUSSION

This pilot study was undertaken to assess the prevalence of poor sleep quality, depression, anxiety, and stress among nurses working in a tertiary care hospital in Puducherry, using standardized and validated tools- the PSQI and DASS-21. The findings contribute valuable insights into the mental and emotional well-being of frontline healthcare professionals in the Indian context and offer comparative perspectives with similar international studies.

Sleep quality among nurses

In the present study, more than half of the nurses (56.7%) were found to have poor sleep quality. This shows that sleep-related problems are quite common in the nursing profession, where long hours, night shifts, and high-stress levels are part of everyday work life. Our findings reflect a concerning pattern that has been observed in many parts of the world. For example, studies conducted by Zhou et

al. in China and Minjeong et al. in Korea reported that 87.9% and 84% of nurses, respectively, had poor sleep quality.[28,29] These numbers are much higher than what we observed in our study and may be due to differences in hospital policies, patient loads, shift patterns, or support systems available for healthcare workers in those countries.

Compared to a study done in similar surroundings by Kayaroganam et al in Puducherry, our results present a slightly higher scenario, with 42.8% of nurses undergoing poor sleep.[30] Their results may be very different from ours because of the type of hospital, work environments, support systems from colleagues, personal resilience, or whether the post-COVID-19 study was carried out before or after. Here, we came across similar results from Turkey, where Tarhan et al. and Tosun et al. showed 61.9% and 64.8% of nurses reported sleep problems, respectively.[31,32] This leads us to infer that sleep problems among nurses are an issue widespread in almost all countries and healthcare systems.

Nurses' poor sleep hygiene not only affects their health and well-being, but it also impairs their concentration and ability to make clinical decisions and manage emotional stress. As a result, this culture can lead to burnout for nurses and can also threaten the care and safety of patients. The results of our study stress the urgency with which hospitals and health institutions must begin addressing this issue. Enacting flexible schedules, guaranteeing adequate rest between shifts, training on sleep hygiene, and reducing environmental stressors in the workplace should assist in improving nursing staff sleep quality and overall health.

Depression among nurses

In our study, 16.7% of the nurses were diagnosed to have symptoms of depression. This prevalence falls somewhere in between that reported in other worldwide studies. For instance, Kaur et al in India, and Luo et al., in China, found lower rates of depression (9.2% and 10.4%) as compared with higher rates, such as Hu's at al study (33.9%) and Maqbali et al (42.2%).[33-36]

These protective factors could include strong social support from family and friends, cultural or religious beliefs that aid coping, or positive work environments characterized by good teamwork and support from supervisors. Nevertheless, depression is capable of affecting nurses' performance, decreasing job satisfaction, and increasing the chances of burnout and turnover. It is possible that many nurses underreported their symptoms due to the fear of being judged or facing consequences at work.

Anxiety among nurses

The study reported that 36.7% of nurses showed anxiety symptoms, the second most common psychological problem after insomnia. The percentage was higher than Kaur et al (13.7%) and Luo et al (9.9%) study but lower than Maqbali et al (47.6%) and Chueh et al. (56.3%) ones.[10,33,34,36] These differences may be attributed to differences in particular work conditions, hospital settings, or the tools for measuring anxiety used in different studies.

Many factors may cause the high anxiety levels documented in this study. The pressure of performance where nurses usually work is extremely high - they can experience a feeling of dread of making a mistake in their work, mostly with critical patients. Irregular night duty, coupled with the lack of quality sleep, can also raise the level of anxiety to stress. Sometimes, general job insecurity or inadequate opportunities for career development, or exposure to high emotional situations such as those in emergency rooms or ICU, can aggravate things.

Anxiety, unlike depression, is more immediate and often tied to events currently taking place in the workplace. It means that changes introduced in work culture, support systems, and self-care practices can have tangible impacts. Strategies like continuous mindfulness training, availability of psychiatric services, peer networking to strengthen support, and provision of mental health resources at the workplace should be greatly considered in combating anxiety in nursing.

Stress levels among nurses

In this study, 20.0% of the nurses admitted to feeling stress, which is comparable to Shahadan et al. (23.8%) and Kaur et al (18.9%). However, the figure is significantly lower than that reported by Zhou et al (43.2%) and Maqbali et al. (77.4%).[28,33,36,37]

The reasons for the relatively lower levels of stress seen in our study may imply the existence of a robust coping culture. These coping means may include family support, religious or spiritual beliefs, and acceptance of their daily life challenges by nurses. Furthermore, the hospitals in this study may be the ones with a balanced workload and favourable work environments, for example, better nurse-to-patient ratios and stronger support systems from the administration, especially from tertiary care. Nonetheless, it needs to be remembered that even moderately stressful situations, if not addressed, can lead to burnout, emotional exhaustion, absenteeism, and poorer quality of patient care. Routine mental health assessments at the workplace are, therefore, of paramount importance.

Though our findings suggest comparatively better outcomes with respect to stress and depression as opposed to a certain subset of international studies, the nurses still face mental health challenges due to the high prevalence of poor sleep quality and anxiety. This calls for enhanced mental health support and monitoring, especially for an area with a high working demand, such as nursing. Our study adds to the few existing findings from South India using validated tools such as PSQI and DASS-21 that will

allow testing for meaningful comparisons among different regions.

Reliability analysis of PSQI and DASS-21

The internal consistency of PSQI in this study was 0.84, which is higher than the study conducted by Manzar et al., 2015, with the Cronbach's Alpha of 0.736.[38] Similarly, The DASS 21 have been found with a good reliability of 0.898, which is supported by the other study conducted by Nada et al., in 2022 with reliability scores in range between 0.850 to 0.923.[39] Also, the value in this study being lesser than 0.95 indicates that the scale has lesser redundancy. By considering this, both tools are appropriate for assessing mental health and sleep issues within the Indian Context.

Limitations

Like any research, this study has a few limitations to consider. Being a pilot study, the research was confined to just one tertiary care hospital. Other factors that were not looked into but might have an important influence on psychological outcomes include department, marital status, and years of experience. Causal inference is limited because of the cross-sectional nature of the study; therefore, there is a need for longitudinal studies.

CONCLUSION

This pilot study indicates sleep difficulties and mental health problems among nurses, but with different patterns compared to worldwide trends. Stress and depression appear well under control, while anxiety and sleep disturbances stand out as major concerns in need of intervention. Hospitals should treat mental health as vital to workplace well-being. Mental support systems for hospitals ought to embrace regular checkups on mental health, stress management programs, and easy access to counselling. Given that nurses still face various challenges following the pandemic, this study strongly suggests that better health policies be promptly enacted for the protection of frontline workers. The high internal consistency of both PSQI and DASS-21 confirms these measures have good reliability and can be used effectively to assess sleep quality and an individual's mental health, and should continue to be used in clinical and research settings in an Indian population. Future studies should aim to include some qualitative components for better contextual understanding. Regardless, these findings provide some useful insight into nurses' mental health and provide a valuable lead for future research and workplace enhancement.

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