Research Paper
Stress Management Intervention for Nursing Students Working Night Shifts

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A B S T R A C T

Background: Clinical training on shift duty is critical to nursing education and practice. Stress in night shift duties is a common issue in the nursing field, potentially harming the well-being and academic performance of nursing students. The current study examined the effect of a targeted stress management intervention on self-reported stress levels and stress-related symptoms among night shift nursing students.

Methods: A quasi-experimental one-group with a pre-test, post-test design was adopted, with 60 students chosen from Krishna Vishwa Vidhyapeeth, Krishna Institute of Nursing Sciences, Maharashtra, Karad, India, using a non-probability convenience sampling method. The perceived stress scale (PSS-10) and a self-structured questionnaire were used to measure stress and its influence on nurses' health. The intervention consists of four 30-minute sessions delivered on alternate days of the week through a range of teaching modalities. Following each session, the students received video links and were encouraged to apply one of the appropriate stress-reduction techniques with a weekly follow-up for one month. After 30 days, a post-test was administered. Data analysis was conducted using descriptive and inferential statistics. To test the research hypothesis, a paired t-test was used in InStat 3 software. The significance level was set at P<0.05.

Results: Pre-intervention, 36 students (60%) experienced moderate stress, followed by 16 (26.66%) experiencing mild stress, and 8 (13.33%) experiencing severe stress after the night shift. In contrast, 39 students (65%) reported mild stress and 21 (35%) reported moderate stress following the intervention. The paired t-test value was 29.854, with a P value of <0.01, which was significantly higher than the tabulated t value. After a night shift, nursing students experienced stress-related symptoms such as insomnia, loss of appetite, fatigue, decreased attention, headache, and leg discomfort, which were significantly alleviated after the intervention (P<0.05).

Conclusion: Stress management interventions were effective in reducing stress levels; however, students must be continually motivated to engage in these exercises daily.

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Highlights

● Working night shifts and disrupted sleep patterns can have severe effects on the physical and psychological health of nursing students who have recently entered the profession.

● It is essential to incorporate structured stress management interventions into nursing education to enhance the health and academic performance of nursing students exposed to night shifts.

● Selective stress management interventions significantly reduced stress levels and related symptoms among night shift nursing students.

Plain Language Summary

Nursing is universally acknowledged as a high-stress profession, with night shifts posing additional challenges. Night shift duties are integral to nursing education and practice, but they can also elevate stress levels, potentially impacting nursing students' well-being and academic performance. Night shifts disrupt natural sleep-wake cycles, leading to long-term health issues such as gastrointestinal problems, cardiovascular risks, and behavioral changes, alongside impaired academic performance and mental health concerns. By equipping students with tools such as yoga, meditation, pranayama, muscle relaxation, and music therapy, they can manage stress more effectively and enhance their overall well-being. Importantly, the study highlights the need for ongoing encouragement and support to ensure that students consistently practice these interventions.

Introduction

Shift work, particularly in occupations requiring 24-hour service, has become increasingly common (Shrivastava et al., 2024). Shift work refers to working hours that differ from the typical 9 AM to 5 PM schedule. Healthcare workers, including nurses and doctors, often work shifts to provide continuous care (Savic et al., 2019; Pepłońska et al., 2019). Nursing, one of the largest healthcare professions, is focused on nurturing and supporting patients throughout their healthcare experiences. Nurses play a crucial role in the healthcare system, providing round-the-clock care, offering comfort, advocating for patients, and supporting them through various health challenges (Hassmiller, 2021). However, the demands of night shifts can significantly disrupt sleep patterns and cause stress, which can adversely affect nurses' health and quality of life (Alfonsi et al., 2021; Al-Hrinat et al., 2024).

Nursing is a challenging and demanding profession that requires managing stressful situations, including emergencies and dealing with death. Nurses must stay alert during their shifts, provide independent patient care, handle emergencies, and remain calm under pressure while offering support to patients and their families. This situation makes nursing globally recognized as an inherently stressful profession (Phuke et al., 2022b).

Nursing students, in particular, are vulnerable to sleep problems, with 30% reporting poor sleeping habits and one in four suffering from insomnia (Gallego-Gómez et al., 2021; Angelone et al., 2011). Night shifts can disrupt meal times and lead to long-term gastrointestinal issues, which can impact physical health and overall well-being. Shift work, particularly night shifts, disrupts the natural sleep-wake cycle, which can lead to significant health issues (Madian et al., 2019; Wangsan et al., 2022). These sleep disorders can impair academic performance and contribute to mental health issues such as anxiety, depression, and burnout (Bahramirad et al., 2020; Michael et al., 2022; Mushtaq et al., 2021; Phuke et al., 2022a). Humans are naturally diurnal, inclined to sleep at night and be active during the day. Night shifts disrupt the body's exposure to natural light, interfering with circadian rhythms and altering sleep patterns. This disruption hinders nurses' ability to perform effectively at night, thereby increasing the risk of occupational accidents and injuries (Bahramirad et al., 2020; Okechukwu et al., 2023). Chronic stress, exacerbated by the demands of nursing, has detrimental effects on physical, psychological, and behavioral health (Phuke et al., 2022a; Phuke et al., 2022b; Phuke et al., 2022c). Nursing students face various stressors, including conflicts with patients and colleagues, caring for patients in pain or near the end of their lives, and the fear of making mistakes in clinical practice. These stressors can lead to personal challenges like depression, anxiety, and strained relationships, ul-

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timately impairing critical thinking, decision-making, and academic performance (Hui-xiu Liao et al., 2023; Bsharat, 2023). The long hours and stress associated with night shifts can have serious medical, psychological, and social consequences for nursing students. These consequences include increased heart rate, high blood pressure, headaches, anxiety, low self-esteem, and unhealthy behaviors like smoking and drinking. The impact on student nurses' health, safety, and academic progress is profound (Zheng et al., 2022a; Zheng et al., 2022b).

Understanding the stressors in clinical settings is crucial for implementing interventions that help nursing students develop healthy coping mechanisms, reduce stress, and enhance their clinical learning. Effective stress management requires ongoing efforts to maintain balance in the face of various challenges. Experimental studies have shown that interventions such as respiration techniques, guided meditation, relaxation exercises, massage therapy, music therapy, aromatherapy, and educational sessions can positively impact stress reduction (Zaki et al., 2018; Zheng et al., 2018). Recognizing the challenges faced by nursing students, the researcher is interested in investigating their stress experiences and exploring ways to assist them in coping with it. This study investigated the effect of a targeted stress management intervention on self-reported stress levels and stress-related symptoms among night-shift nursing students.

Materials and Methods

Design, setting, and sample

This research employed a quasi-experimental study with a one-group pre-test, post-test design. The study was conducted at the Krishna Institute of Nursing Sciences, Karad. The institute offers a range of programs, including a diploma-level nursing course regulated by the Indian Nursing Council, a post basic BSc program, a nurse practitioner in critical care program, postgraduate diploma courses, and a PhD program. About 700 students are learning in the college. BSc nursing students are getting the night shift from their third year of clinical posting. Students from this college gain clinical experience at Krishna Hospital and Medical Research Centre, which is a 1100-bed hospital.

A non-probability, convenience sampling strategy was used to recruit 60 third-year BSc nursing students with experience of working night shifts.

The inclusion criteria for the study were that third-year undergraduate students were willing to participate in the research and had worked the night shift at least 4-6 times to ensure they were sufficiently exposed to the stressors of this shift. Additionally, participants were required to report no mental health issues and no use of psychotropic drugs, as confirmed by them. Students who did not implement the interventions or did not complete the questionnaires completely were excluded from the study. According to the study by Damodaran and Paul (2015) on stress management, the sample size was estimated by using the Equation 1:

$$1.\ n = \frac{4SD^2}{(X^- \times E)^2} = \frac{4 \times 0.34^2}{(7.94 \times 0.01)^2} = 74$$

Although 80 students were initially selected due to the possibility of sample attrition, 20 participants were excluded from the study because of non-compliance with the interventions and failure to complete all the questions on the scales. Then, the study proceeded with 60 samples. Patel had previously conducted a quasi-experimental study with 30 staff nurses to examine their stress levels (Patel, 2014).

Study instruments

Three instruments were used for data collection. The researcher developed a questionnaire that asked participants about their age, gender, religion, type of family, residential area, monthly family income, ability to manage personal stress, and daily stress relief activities.

The English version of the perceived stress scale (PSS-10) (Cohen et al., 1983), with 10 items, was used to assess the level of stress among night shift nursing students. It is a 5-point Likert scale tool, ranging from 0 (never) to 4 (very often). The total score ranges from 0 to 40. A score of 0-13 indicates mild stress, while a score of 14-26 suggests moderate stress, and a score of 27-40 indicates severe stress. Baik et al. (2019) have reported that the PSS-10 exhibits good internal consistency reliability (α=0.87) and adequate convergent validity, based on associations with measures of physical and mental health.

To investigate the influence of stress on nurses' health, a 12-item, 4-point Likert scale was used to assess the signs and symptoms that nurses may experience following stressful life events. The scale was developed by the researcher based on a review of the literature in the English language and validated by five experts in the field. To establish the reliability of the tool, the test, re-test reliability method was used. Six four-year nursing un-

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dergraduate students (10% of the total sample) were selected for reliability analysis and then excluded from the study. The correlation coefficient calculated between the two sets of data was 0.78, which was acceptable and satisfactory. A 4-point Likert scale, ranging from 0 (never) to 3 (extreme), was used to rate the items. The total score of the scale ranges from 0 to 36. On this scale, a score of 0 indicates that students have never experienced these signs/symptoms following stressful life events, a score of 1-12 suggests that nurses sometimes have the signs/symptoms, a score 13-24 indicates frequent experience of the symptoms, and score above 25-36 indicates having serious symptoms due to stress.

Study intervention

To select the most suitable and appropriate interventions for this study, a comprehensive approach was used, which included a review of literature from various research journals (Patel. 2014; Zheng. 2018), interactions with students, personal experience as a staff nurse, and consultations and discussions with experts in nursing, education, research, and statistics—the stress management intervention comprised four 30-minute sessions given on alternate days of the week. A total of four sessions were held, with 10 to 15 students attending each session. The pre-test was administered on the first day, and the first session of stress management intervention was held utilizing a PowerPoint presentation on stress, its causes, symptoms, and various stress management techniques. The second session focused on the importance of yoga and meditation treatment, with demonstrations using web videos. The third video-assisted session focused on pranayama (breathing technique) and muscle relaxation therapy, while the last session emphasized the value of music therapy. All of these strategies help students lessen the stress they experience as a result of the night shift. After each session, students were instructed to use one of the provided interventions daily (at least 5 days a week) for 4 weeks, with a 20-minute session duration, to reduce stress. Students were encouraged to do the exercises in a quiet and relaxed environment. A practice log sheet was provided, on which they had to make a tick mark after performing each exercise. Follow-ups were also conducted weekly to ensure that the exercises were being performed in a timely and correct manner. A post-test was administered after 30 days. Students had clinical daily practice in shifts; therefore, they practiced these exercises in their rooms in groups during their free time. However, not all students performed each intervention on a daily basis. The majority of students regularly practiced pranayama and music therapy, as they were already familiar with these techniques. After watching a video demonstration, many students began incorporating muscle relaxation exercises into their routines. A smaller group of students consistently practiced yoga for at least 30 minutes, five days a week. In addition to these interventions, students utilized other coping strategies introduced in the first session, such as seeking social support, taking breaks, laughing, using humor, maintaining a balanced diet, and ensuring 6 to 8 hours of sleep.

Data analysis

The study utilized InStat software, version 3 for statistical analysis, aligning with its objectives through both descriptive and inferential statistical methods. Data were systematically organized into a master sheet and analyzed for sociodemographic patterns using frequencies and percentages. Stress levels among nursing students were categorized as mild, moderate, or severe, while the health effects of night shift stress were classified into four categories: never, occasional, frequent, and extreme symptom experiences. A comparative analysis of pre- and post-intervention results was conducted using the Mean±SD, the chi-square test, and paired t-test. The significance level was set at $P<0.05$.

Results

Table 1 shows that the majority of respondents (58.3%) are in the 22-24 age group. Women make up the majority of respondents, accounting for 68.3% of the sample, and the religious distribution is nearly equal among Hindus, Muslims, Christians, and other religions. The majority (56.7%) are from nuclear families, and 55% are from metropolitan areas. Additionally, 28.3% have a monthly household income of over 20000 rupees. One striking finding is that 78.3% of respondents reported difficulties in managing their stress. Among the various stress relief methods, music therapy is notably popular, with 53.3% of respondents turning to it as their primary means of alleviating stress.

The effectiveness of a specific stress management intervention on the degree of stress among night shift nursing students

Figure 1 illustrates the distribution of study subjects according to their level of stress.

Figure 1 reveals that the majority of nursing students (60%) have experienced moderate stress before intervention followed by (26.66%) experiencing mild stress and (13.33%) experiencing severe stress after night shift,

Table 1. Demographic variables of the nursing students

Demographic Variables		No. (%)
Age (y)	19-21	22(36.7)
	22-24	35(58.3)
	25-27	3(5)
Gender	Male	19(31.7)
	Female	41(68.3)
Religion	Hindu	16(26.7)
	Muslim	12(20)
	Christian	17(28.3)
	Other	15(25)
Type of family	Nuclear family.	34(56.7)
	Joint family (extended family)	26(43.3)
Residential area	Urban	33(55)
	Rural	27(45)
Monthly family income in Rupees	5000-10000/-	16(26.7)
	10000-15000/-	13(21.7)
	15000-20000/-	14(23.3)
	>20000/-	17(28.3)
Do you consider yourself competent in managing personal stress?	Yes	13(21.7)
	No	47(78.3)
Are you engaging in any of the following activities to alleviate stress?	Meditation	10(16.7)
	Music therapy	32(53.3)
	Deep breathing and muscle relaxation therapy	12(20)
	Yoga	6(10)
	No any	0

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whereas (65%) reported mild stress and (35%) reported moderate stress following the intervention.

Table 2 shows that there is a statistically significant difference in the mean stress scores before and after the stress management intervention among night shift students (P<0.01).

Table 3 reveals significant improvements in stress-related symptoms among night shift nursing students after the intervention.

Discussion

The findings of this study provide compelling evidence that the selected stress management intervention can significantly improve reported stress levels among night shift nursing students. In the present study, a dramatic change is observed in mild, moderate, and severe levels of stress and stress-related symptoms following stress management intervention. Similar outcomes were observed in another study (Phuke et al., 2023), which reported that 61% of nurs-

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Table 2. Comparing students' level of stress before and after the intervention

| Test		Mean±SD	Paired t	P
Intervention	Before	17.93±6.847	29.854	<0.01
	After	11.28±6.112		

es had experienced moderate stress, 17.7% experienced severe stress, and 21.3% mild stress before the intervention; while after the intervention, 52% of nurses had experienced moderate stress and 48% mild stress. The present study reported that students suffer from stress related symptoms such as headache, fatigue, backache, leg pain and so on that may be due to long standing nature of work and lack of rest and sleep because of the dual responsibility of work and education, erratic meal times, missing meals and continuous tensing of muscles. After the intervention, night shift nursing students showed significant improvements in stress-related symptoms. Books et al. (2020) revealed similar findings on fatigue and related illnesses, acknowledging that sleep deprivation resulting from night shift work has adverse health consequences.

Understanding stress and its coping strategies can aid in changing one's views, responses, or approach to stressful situations, thereby reducing stress. Yoga, meditation, and deep breathing exercises lead to the release of endorphins, making the person feel calmer and helping to control emotions, avoid conflict, accept circumstances, and feel more energized (Phuke et al., 2022).

Most students who performed specific exercises, such as muscular relaxation techniques, deep breathing exercises, yoga, and meditation, indicated that they did not experience these symptoms after their night shift last month. Phuke et al. (2023) confirmed similar findings, stating that targeted interventions are considerably beneficial in reducing stress levels among nurses. Similarly, stress management has a positive impact, as Rantanasiripong et al. (2015) found in their study that meditation and biofeedback are effective in reducing stress and anxiety levels among nursing students. Stinson et al. (2020) discovered that mindfulness meditation helps to alleviate anxiety among nursing students.

This study is suggested to be repeated with a larger sample size from different colleges, along with a control group, to generalize the findings to all pupils. Instead of utilizing only self-report measures to assess stress level, its conjunction with physiological measurements may provide additional useful insights. This study offers evidence-based interventions for managing stress, which is essential for maintaining the mental and emotional well-being of nursing students. By exploring interventions
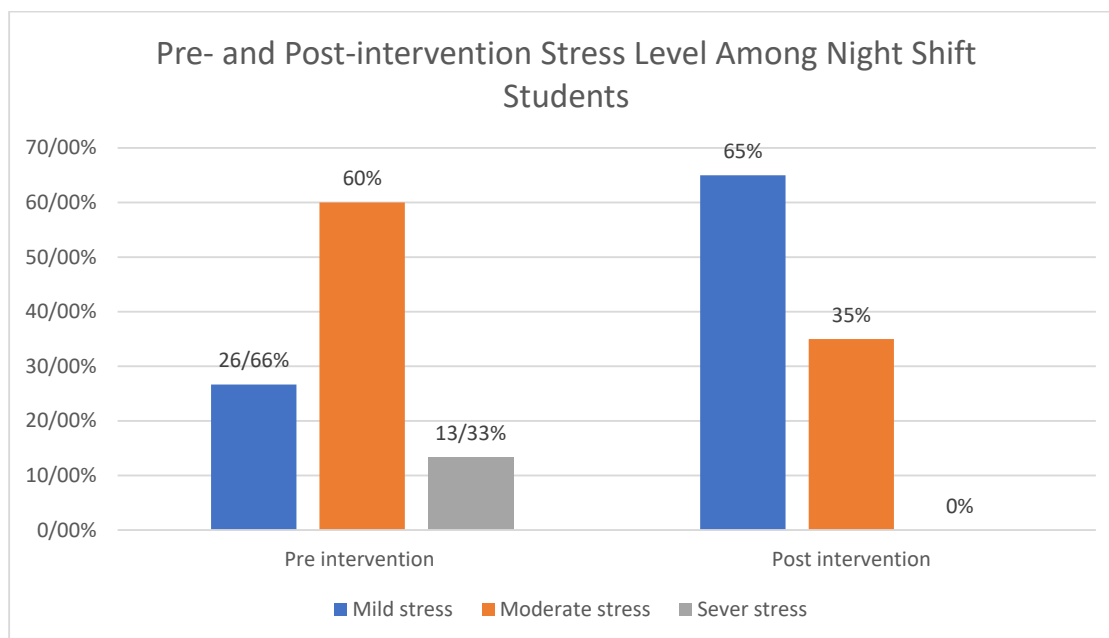
Figure 1. Distribution of study subjects based on their level of stress

Table 3. Comparing the effects of night shift stress on nursing students' health before and after the intervention (n=60)

Signs and Symptoms	No. (%)								Chi-square	P
	Before the Intervention				After the Intervention					
	Never	Occasional	Frequent	Extreme	Never	Occasional	Frequent	Extreme		
Headache	0	51(85)	6(10)	03(5)	36(60)	24(40)	0	0	54.720	<0.01
Feeling tired constantly	3(5)	47(78.33)	9(15)	1(1.66)	40(66.66)	18(30)	2(3.33)	0	50.230	<0.01
Nausea	1(1.66)	54(90)	4(6.66)	1(1.66)	20(33.33)	40(66.66)	0	0	24.276	<0.01
Pain in the lower back	3(5)	48(80)	7(11.66)	2(3.33)	40(66.66)	18(30)	2(3.33)	0	50.251	<0.01
Insomnia	2(3.33)	45(75)	10(16.66)	3(5)	35(58.33)	25(41.66)	0	0	48.147	<0.01
Pain in the lower leg	2(3.33)	52(86.66)	4(6.66)	2(3.33)	45(75)	15(25)	0	0	65.773	<0.01
Constipation	1(1.66)	55(91.66)	4(6.66)	0	16(26.66)	43(71.66)	1(1.66)	0	16.505	0.03
Burning in the chest	2(3.33)	55(91.66)	02(3.33)	1(1.66)	38(63.33)	20(33.33)	2(3.33)	0	49.733	<0.01
Tiredness of the eyes	6(10)	45(75)	6(10)	3(5)	40(66.66)	17(28.33)	3(5)	0	41.776	<0.01
Impaired concentration	1(1.66)	47(78.33)	7(11.66)	5(8.33)	29(48.33)	26(43.33)	3(5)	2(3.33)	35.452	<0.01
Loss of appetite	2(3.33)	42(70)	10(16.66)	6(10)	30(50)	21(35)	6(10)	3(5)	33.500	<0.01
Fatigue	1(1.66)	47(78.33)	8(13.33)	4(6.66)	33(55)	25(41.66)	2(3.33)	0	44.440	<0.01

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that help manage the unique stressors associated with night shift work, the study contributes to understanding how to better support nursing students in achieving a healthier work-life balance.

Conclusion

The prevalence of mild to moderate stress was highest among nursing students working the night shift. Stress management interventions, such as pranayama, yoga, muscle relaxation treatment, music therapy, meditation, and deep breathing exercises, were effective in reducing stress levels and stress-related symptoms among night shift nursing students. However, nursing students are gaining clinical experience on shift duty, and as a result, they are unable to find fixed scheduling for exercise, causing discontinuity to occur more frequently. Students must be continually motivated to undertake these exercises daily.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Krishna Institute of Nursing Sciences, Karad, India (Code: 05/04/2021 with permission number IEC/02/2021 and protocol number 288/2020-202). Participants received a thorough explanation of the study before providing their signed informed consent. This process ensured participant autonomy and well-being throughout the investigation.

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Authors' contributions

Data collection, data analysis and drafting the manuscript: Manda Phuke and Mayuri Mane; Supervising and editing: Vaishali Mohite; Final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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