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THE EFFECTS OF SLEEP DEPRIVATION ON WORK PERFORMANCE AMONG NURSES WORKING IN INTENSIVE CARE UNITS OF BAHAWALPUR'S TERTIARY CARE HOSPITALS

Sadia Faiz[*1], Afra Siyab[2], Muhammad Raza[2a], Madiha Arooj[3], Kausar Parveen[3a], Muhammad Danish[4], Habib Ullah Riaz[5]

*[*1,4]BSN Generic Student, Shahida Islam Nursing College, Lodhran, Punjab, Pakistan.*
[2]Nursing Officer, Infection Preventionist, Shalamar Hospital Lahore, Punjab, Pakistan.
[2a]Nursing Officer, Clinical Resource Nurse, Shalamar Hospital Lahore, Punjab Pakistan.
[3]Nursing Manager, Social Security Hospital, Multan Road Lahore, Punjab, Pakistan.
[3a]Nursing Instructor, College of Nursing, Allama Iqbal Medical College, Jinnah Hospital, Lahore, Punjab, Pakistan.
[5]Senior Nursing Instructor, Shahida Islam Nursing College, Lodhran, Punjab, Pakistan.

[*1]sadiaf032@gmail.com, [2]afrasiyab246@gmail.com, [2a]mr2708985@gmail.com, [3]madihaarooj676@gmail.com, [3a]kaznal20012001@gmail.com, [4]hmdanishaltaf2000@gmail.com, [5]jabtakhaijan786786@gmail.com

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Corresponding Author: *
Sadia Faiz

Abstract

Background: *Sleep deprivation is a prevalent and under-addressed issue among nurses, particularly those working in high-acuity environments such as Intensive Care Units (ICUs). The demands of shift work, long hours, and high-stress conditions contribute to disrupted sleep patterns, impairing cognitive functions crucial for patient care. Existing literature highlights a strong link between sleep deprivation and diminished nursing performance, increased medical errors, and emotional exhaustion.*

Aim and Objective: *This study aimed to assess the impact of sleep deprivation on the performance of ICU nurses in a tertiary care hospital in Bahawalpur, Pakistan. Specific objectives included examining its effects on psychomotor skills, memory, emotional well-being, and decision-making, and exploring whether interventions such as napping during shifts could mitigate these effects.*

Methodology: *A descriptive cross-sectional design was employed. A total of 73 registered ICU nurses from both public and private hospitals in Bahawalpur were selected through non-probability convenience sampling. Data were collected using a structured, closed-ended questionnaire focusing on sleep patterns, cognitive performance, and error frequency. Descriptive statistics were analyzed using SPSS version 27.0.1.*

Results: *Most participants (86.3%) were between 21–30 years old, with nearly equal gender distribution. A significant number (60.3%) reported attention or memory lapses due to fatigue, and an equal proportion admitted to making or nearly making errors at work. Approximately 61.1% acknowledged that lack of sleep adversely affected their performance. Emotional exhaustion was reported by 90.4% at varying frequencies. Only 4.1% rated their sleep quality as excellent, while 37% rated it poor or very poor.*

Conclusion: *Sleep deprivation significantly compromises ICU nurses' cognitive*

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and psychomotor performance, decision-making, and emotional health. Addressing sleep hygiene, implementing regulated shift patterns, and supporting fatigue mitigation strategies are essential to enhance nursing performance and ensure patient safety.

INTRODUCTION

Sleep deprivation, also known as sleep insufficiency or sleeplessness, refers to the condition of having inadequate duration and/or quality of sleep necessary to maintain optimal alertness, health, and performance. This can be either acute or chronic and can significantly impact both physical and mental well-being (Al Maqbali, Al Sinani et al. 2021). For nurses, especially those working in high-pressure settings like the Intensive Care Unit (ICU), sleep deprivation can compromise essential cognitive skills such as attention, memory, and decision-making—skills vital for patient care and safety (Stimpfel, Sloane et al. 2012). The nature of nursing work, including rotating shifts and extended hours, disrupts normal sleep patterns, increasing vulnerability to fatigue, stress, anxiety, and even depression (Geiger-Brown, Rogers et al. 2012). Shift work is considered one of the primary contributors to sleep disruption among nurses, affecting their performance and posing risks to patient outcomes (Matheson, O'Brien et al. 2014).

Research by (Linton, Kecklund et al. 2015) demonstrated that ICU nurses who experienced chronic sleep deprivation had significantly higher error rates and reduced clinical judgment accuracy. Similarly,(Rosen, Kilcullen et al. 2024) emphasize that any compromise in cognitive abilities due to insufficient sleep may lead to serious medical errors, including adverse drug events, documentation mistakes, missed treatments, and procedural mishaps. Despite growing evidence of its impact, sleep deprivation remains an under-addressed issue within hospital systems (Gómez-García, Ruzafa-Martínez et al. 2016).

Interventions like scheduled napping during breaks have shown promise in reducing fatigue and enhancing performance, though the risk of sleep inertia after naps longer than 30 minutes must be considered (Owens 2007);(Ruggiero and Redeker 2014). Moreover, the dynamic amplitude of low-frequency fluctuation (DALFF) method has been used to assess local brain activity and cognitive decline among night shift nurses, revealing significant impairments in memory-related brain regions due to sleep deprivation (Li, Cao et al. 2014). Additionally, a study by (Øyane, Pallesen et al. 2013) found a strong correlation between night-shift schedules and impaired sleep quality, further validating the need for sleep hygiene awareness in healthcare settings.

Problem Statement:

Both the nurses' cognitive function and the security of patient care are seriously threatened by sleep deprivation in intensive care units (ICUs). Long hours, night shifts, and alternating schedules are commonplace for intensive care unit nurses, all of which interfere with regular sleep cycles and exacerbate chronic fatigue. The high-stress, high-acuity nature of intensive care units necessitates continuous attention, precise judgement, and sophisticated psychomotor abilities—all of which are severely hampered by sleep deprivation.

In many clinical settings in Pakistan, the problem of sleep deprivation is still not well addressed, despite the increasing amount of foreign studies showing its detrimental consequences on medical personnel. In order to reduce the hazards associated with exhaustion, hospitals frequently lack standardised regulations or supportive treatments, such as regular rest times, controlled shift rotations, or teaching on good sleep hygiene. This oversight can lead to increased medical errors, communication breakdowns, emotional weariness, and poor job satisfaction among nurses.

According to preliminary results from a study done in Bahawalpur, a sizable percentage of intensive care unit nurses had trouble sleeping, had memory and focus problems, and had near-miss or real medical errors related to exhaustion. Additionally, it was common for nurses to be physically and emotionally exhausted, especially those who worked rotating or night shifts. These results highlight the pressing need

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to look into how sleep deprivation affects nursing performance in this particular geographic setting.

In order to inform evidence-based treatments to improve nurse well-being and patient safety, this study aims to investigate the degree to which sleep deprivation impacts the clinical competence, decision-making, and general performance of intensive care unit nurses in Bahawalpur.

LITERATURE REVIEW

Sleep deprivation has long been recognized as a major occupational hazard in healthcare, especially among nurses working in intensive care units (ICUs), where constant vigilance and decision-making are required. Nurses in ICUs are particularly vulnerable to sleep-related fatigue due to shift work, high patient acuity, and extended work hours. According to (Geiger-Brown, Rogers et al. 2012), a majority of nurses report inadequate sleep, which directly impacts their alertness, decision-making, and overall performance. Shift work disrupts the circadian rhythm and sleep homeostasis, contributing to chronic sleep deficits among night shift workers (Stimpfel, Sloane et al. 2012).

Evidence suggests that sleep deprivation impairs cognitive function, memory retention, and psychomotor performance, making nurses more prone to errors (Owens 2007). These errors may include medication mistakes, missed care interventions, and improper documentation, all of which can jeopardize patient safety. Despite growing recognition of these risks, many healthcare institutions still lack formal policies or interventions to address sleep-related fatigue in nursing staff. (Rosen, Kilcullen et al. 2024) highlight that short naps during long shifts can reduce fatigue and improve performance, yet such interventions are not consistently implemented. Furthermore, emerging neuroimaging techniques such as dynamic amplitude of low-frequency fluctuation (dALFF) have revealed that sleep-deprived nurses experience decreased activity in cognitive control networks, indicating impaired memory and concentration (Díaz-Alonso, Smith-Plaza et al. 2018).

There are still considerable gaps in the current literature. Many studies focus on general nursing populations, while few have investigated ICU nurses specifically. Most existing research is conducted in developed countries, with limited studies from developing regions like Pakistan. Moreover, variables such as cultural norms, workload differences, and healthcare infrastructure in local contexts are often overlooked. These gaps indicate a need for region-specific research that assesses the extent and consequences of sleep deprivation among ICU nurses.

The present study aims to investigate the impact of sleep deprivation on the performance of nurses working in ICUs in a tertiary care hospital in Bahawalpur, Pakistan. Given the high-stress environment of intensive care units, nurses are required to maintain consistent cognitive and physical performance throughout their shifts. However, due to inadequate sleep—often caused by irregular working hours and insufficient rest periods—nurses may experience fatigue, reduced alertness, and increased likelihood of clinical errors.

This project will examine how sleep deprivation affects key areas of nursing performance, such as communication, critical thinking, decision-making, and technical skills in an ICU setting. It will also assess contributing factors such as shift patterns, duration of work, and pre-shift sleep quality. Additionally, the study will explore whether institutional policies or environmental conditions may be exacerbating the issue. The goal is to gather empirical data specific to the Bahawalpur context to better understand the relationship between sleep patterns and performance outcomes in ICU nurses.

Based on the current gaps and limited regional data highlighted in the literature, this study is designed to fill a crucial void by focusing on the ICU nurses of a tertiary care hospital in Bahawalpur. The primary goal is to evaluate the relationship between sleep deprivation and nursing performance in a high-acuity environment. By identifying the specific challenges faced by these nurses, the study seeks to inform hospital management and policymakers about the need for practical interventions, such as regulated shift scheduling, rest breaks, and education on sleep hygiene

METHODOLOGY

A cross-sectional descriptive study was conducted to provide a comprehensive snapshot of the impact of sleep deprivation on nursing performance among

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ICU nurses. The study was carried out over a two-month period, from January 1, 2024, to March 1, 2024, in both public and private sector hospitals of Bahawalpur, specifically targeting registered nurses working in Intensive Care Units.

A non-probability convenience sampling technique was employed to select a sample of 73 registered ICU nurses. Data were collected using a structured, closed-ended questionnaire designed to assess various dimensions of nursing performance in relation to sleep deprivation. Key performance indicators included attention to detail, clinical decision-making, response time, communication with patients and colleagues, and adherence to clinical protocols. Responses were quantified and converted into performance scores for analysis.Ethical considerations were strictly observed. Written informed consent was obtained from all participants, ensuring anonymity, confidentiality, and the voluntary nature of participation. Participants were fully informed about the study's purpose, assured of no associated risks, and reminded of their right to withdraw at any stage without any consequences.

The primary variables of the study were sleep deprivation (independent variable) and nursing performance (dependent variable). Performance scores were categorized into four levels: Excellent (>80%), Good (65–80%), Average (50–65%), and Poor (<50%).

Data were analyzed using descriptive statistics with IBM SPSS Statistics version 27.0.1.

RESULTS

Demographic Characteristics

As given in table 1, A total of 73 nurses participated in the study. The majority (86.3%) were aged between 21–30 years, followed by 11% aged 31–40 years, and only 2.7% aged 41–50 years. The gender distribution was nearly equal, with 49.3% males and 50.7% females.

Table 01: Demographic Characteristics of Participants (N = 73)

Variable	Category	Frequency (n)	Percentage (%)
Age (Years)	21–30	63	86.3
	31–40	8	11.0
	41–50	2	2.7
Gender	Male	36	49.3
	Female	37	50.7
ICU Experience (Years)	1 Year	44	60.3
	2 Years	18	24.7
	3 Years	11	15.1
Shift Duration	8 Hours	21	28.8
	12 Hours	22	30.1
	Other	30	41.1
Work Schedule	Day Shift	24	32.9
	Night Shift	30	41.1
	Rotating Shifts	19	26.0

Regarding ICU experience, 60.3% of participants had 1 year of experience, 24.7% had 2 years, and 15.1% had 3 years of experience. In terms of shift duration, 28.8% reported working 8-hour shifts, 30.1% worked 12-hour shifts, and 41.1% had other shift lengths. Most participants (41.1%) worked night shifts, while 32.9% were on day shifts and 26% had rotating schedules.

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Sleep Patterns and Quality

The findings show that a significant percentage of ICU nurses (31.7%) sleep fewer than 6 hours, although the majority (31.5%) sleep between 6 and 8 hours. Only 4.1 percent of respondents said their sleep was of exceptional quality, with the majority rating it as fair (31.5%) or good (27.4%). Only "sometimes" did nearly half of the participants (47.3%) say they felt rested after sleeping. Regarding work behaviour, 26% of nurses utilised sleep aids, while 42.5% of nurses napped during shifts. Most (61.1%) reported that weariness caused them to lose focus or memory throughout their shifts, and 60.3% admitted to making or almost making mistakes as a result of fatigue.

Variable	Categories	Frequency (n)	Percentage (%)
Daily Sleep Duration	< 4 hours	11	15.1
	4–6 hours	16	21.9
	6–8 hours	23	31.5
	> 8 hours	20	27.4
	Missing/Unclear (4.00)	3	4.1
Sleep Quality	Excellent	3	4.1
	Good	20	27.4
	Fair	23	31.5
	Poor	16	21.9
	Very Poor	11	15.1
Feeling Rested After Sleep	Always	18	24.3
	Often	14	18.9
	Sometimes	35	47.3
	Rarely	3	4.1
	Never	4	5.5
Naps During Shifts	Yes	31	42.5
	No	42	57.5
Use of Sleep Aids	Yes	19	26.0
	No	54	74.0
Attention/Memory Lapses Due to Fatigue	Yes	45	61.1
	No	28	38.9
Errors/Near Errors Due to Tiredness	Yes	44	60.3
	No	29	39.7
Frequency of Exhaustion at Work	Always	19	26.0
	Often	16	21.9
	Sometimes	31	42.5
	Rarely	5	6.8
	Never	2	2.7
Sleep Deprivation Affects Performance	Strongly Agree	23	31.5
	Agree	21	28.8
	Neutral	22	30.1
	Disagree	5	6.8
	Strongly Disagree	1	1.4

Table 2: Summary of Results: Sleep Patterns, Work Behavior, and Performance Impact (N = 73)

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42.5% of respondents said they felt fatigued "sometimes," while 26% said they felt exhausted "always." Notably, 60.3% of respondents agreed or strongly agreed that lack of sleep has a detrimental effect on their ability to function and make decisions.

Overall Sleep Deprivation Symptoms

73 intensive care unit nurses' responses were analysed, and the results showed that lack of sleep had a major negative influence on mental and physical health. Headaches (55.6%), mood fluctuations (45.8%), and anxiety or depression (43.1%) were the most commonly reported side effects. Furthermore, 27.8% of individuals reported drinking more coffee and being less satisfied with their jobs. These results highlight the need for interventions to control fatigue among healthcare professionals by showing that sleep deprivation not only affects health but also changes behaviour and outlook linked to one's job.

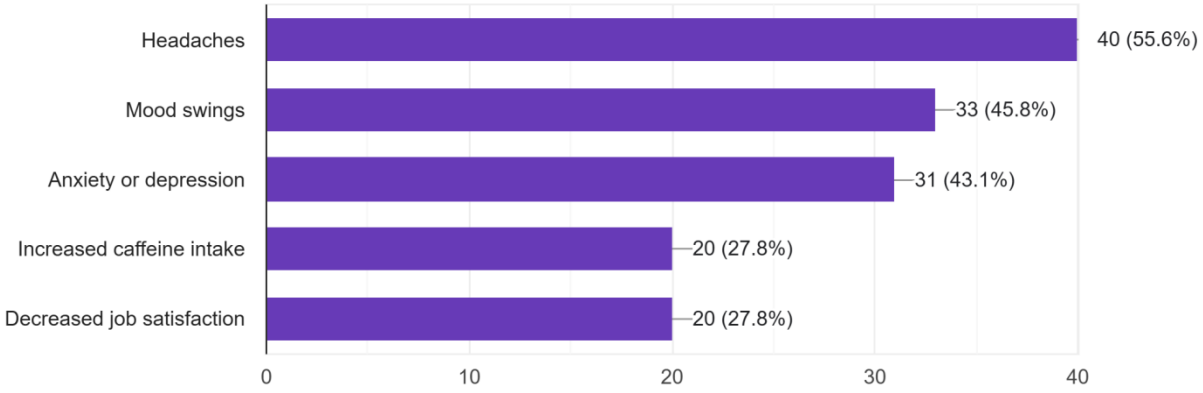


Figure 01: Effects of Sleep Deprivation

DISCUSSION

The findings of this study indicate a significant impact of sleep deprivation on nursing performance among ICU nurses. A majority of participants (60.3%) reported experiencing lapses in memory and attention during their shifts due to fatigue, while an equal percentage admitted to making or nearly making errors at work as a result of tiredness. This demonstrates a clear connection between sleep quality and the cognitive functions essential for safe and effective nursing care. These results are consistent with those of (Barger, Cade et al. 2005), who concluded that nurses suffering from sleep deprivation were more likely to experience performance decline and medical errors during clinical practice.

Additionally, the study revealed that most nurses (31.5%) reported sleeping 6–8 hours daily, while 37% of participants were sleeping fewer than 6 hours, which indicates a high risk of chronic fatigue. Poor sleep quality was also common, with only 4.1% of respondents rating their sleep as excellent, whereas a combined 37% rated it as poor or very poor. This aligns with the findings of (Geiger-Brown, Rogers et al. 2012), who highlighted that nurses, especially those working night and rotating shifts, often suffer from insufficient rest and impaired sleep quality, which negatively impacts their clinical judgment and emotional stability.

This study also identified a correlation between shift timing, work schedule, and sleep deprivation. Nurses working night shifts (41.1%) and those on rotating schedules (26%) reported greater sleep disruption compared to those working fixed day shifts. These results are supported by the work of (Stimpfel, Sloane et al. 2012), who found that long shifts and irregular schedules were strongly associated with increased fatigue, burnout, and reduced patient safety.

Moreover, emotional and physical exhaustion was prevalent, with 90.4% of participants stating that they felt exhausted at least sometimes, and 26%

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experiencing exhaustion always. This reflects similar conclusions drawn by (Aiken, Clarke et al. 2002), who emphasized the high emotional burden carried by nurses in critical care environments, often leading to burnout, job dissatisfaction, and compromised care quality.

Interestingly, 61.1% of the participants agreed or strongly agreed that sleep deprivation negatively affected their decision-making and performance. This self-awareness among nurses regarding the influence of fatigue on their professional functions supports the findings of (Lockley, Barger et al. 2007), who documented that sleep deprivation diminishes alertness, reaction time, and accuracy, even among experienced professionals.

CONCLUSION

This study emphasises how sleep deprivation significantly affects ICU nurses' performance. Research indicates that insufficient sleep and poor sleep quality are linked to higher levels of weariness, attentional lapses, poor decision-making, and decreased productivity at work. Even while nurses' sleep habits varied, many of them acknowledged that their clinical effectiveness was impacted by their physical and emotional exhaustion.

This study highlights the substantial impact that sleep deprivation has on the performance of intensive care unit nurses. High levels of fatigue, attentional lapses, poor decision-making, and decreased productivity at work have all been related to inadequate sleep and poor sleep quality, according to research. Although nurses' sleep patterns differed, many of them admitted that their emotional and physical fatigue affected their clinical efficacy.

RECOMMENDATIONS

- Develop fair rotation policies to minimize the strain of consecutive night shifts.
- Collaborate with hospital administrators and educators to promote awareness of sleep deprivation risks.
- Regularly evaluate staffing ratios and shift allocations to prevent overburdening nurses and reduce the risk of chronic exhaustion.

Conduct further studies across different healthcare settings to explore sleep-related challenges and guide evidence-based policy and practice improvements.

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