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The Effect of Shift Length on Nurse Performance and Patient Safety

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Abstract: This study investigated the impact of shift duration on nurse performance and patient safety, focusing on comparing 8-hour versus 12–16-hour shifts. Through an anonymous online survey of 150 nurses in Saudi Arabia, the research examined fatigue levels, decision-making abilities, and quality of patient care across different shift lengths. Results revealed that 82.7% of nurses reported diminished decision-making abilities after 16-hour shifts, compared to 38.6% after 12-hour shifts. Nearly 90% of participants indicated they could not provide optimal care during 16-hour shifts, with 67.7% reporting that extended shifts negatively impacted patient care. Common issues included increased fatigue, slower work pace, decreased concentration, and emotional strain. Additionally, 24.4% of nurses admitted to cutting corners during extended shifts, implementing strategies such as clustering patient care and reducing patient interaction. The findings suggest that limiting shift length to 8 hours may enhance nurse performance and patient safety by reducing fatigue-related errors and maintaining higher quality care standards. The study highlights the need for healthcare organizations to implement more sustainable scheduling practices that prioritize both nurse well-being and patient safety.

Keywords: Nurse fatigue; shift length; patient safety; healthcare quality; work schedules; nurse performance; decision-making; extended shifts; workplace safety; nursing management.

INTRODUCTION

Shift-work systems and flexible work schedules are two developments that have already been included into the healthcare sector. Health care staff operate on diverse shift schedules, including 8, 9, 10, or 12-hour shifts, to ensure continuous 24-hour care. Most shiftwork schedules partition a 24-hour day into two (12-hour) or three (8-hour) shifts [1]. In response to the global nursing crisis, hospitals worldwide have begun to introduce solutions to mitigate the adverse effects of this shortfall on patient care, including the adoption of 12-hour shifts for nurses. They implemented this method with the assumption that continuity of care would improve with a reduced number of nurses [2, 3]. The discourse persists in nursing literature to consolidate and assess the evidence concerning the good and negative effects of shift duration on nurses, organizations, and patients. Numerous research investigated the effect of shift duration on nurses' satisfaction, while a limited number evaluated its influence on nurses' health and welfare. Nonetheless, owing to the variances in work hour restrictions across various nations and healthcare environments, the results regarding the influence of shift duration on nurses' outcomes were inconsistent [4, 5]. Furthermore, there is a paucity of studies investigating the influence of shift duration on turnover intention, as well as perceptions of safety and quality of treatment. This study seeks to evaluate the effects of shift duration on nurses' fatigue levels, quality of life, intent to resign, perceptions of care quality, job satisfaction about shifts, and the incidence of safety incidents among nurses.

The global nursing shortage, estimated at 5.9 million nurses prior to the Covid-19 pandemic, has led healthcare organizations to implement strategies aimed at preserving care quality and mitigating the challenges associated with staffing deficiencies. One of the strategies implemented is the adoption of varying shift lengths, which serves to optimize nursing resources and ensure continuous patient care [1]. A significant amount of research has examined the advantages and disadvantages of various shift lengths, primarily concentrating on 12-hour and 8-hour shifts, which are the most frequently analyzed in the literature [1, 4, 5]. Shift work inherently subjects nurses to daily stressors, including inadequate sleep and fatigue, which can lead to circadian rhythm disruptions and potentially result in chronic health problems [1, 6]. Nurses experience a heightened risk of health issues relative to other shift workers, attributable to prolonged physical exertion, complex patient cases, extended working hours, and elevated stress levels [1, 6].

Fatigue, a prevalent outcome of prolonged work hours, is recognized as a critical issue among nurses, adversely affecting job satisfaction and quality of life [5]. According to the Registered Nurses' Association of Ontario, fatigue is defined as a state of exhaustion that affects both physical and mental well-being, ranging from feelings of tiredness to complete exhaustion, and consequently impacting cognitive and physical functioning. An integrative review by Min, Min [7] revealed varied results concerning the associations between work schedule characteristics and nurse fatigue. Inconsistencies are evident when

comparing fatigue levels between nurses on 8-hour and 12-hour shifts, as indicated by multiple studies [8–10]. Some studies suggest a correlation between extended shift hours and increased fatigue, whereas others report reduced fatigue levels among nurses working 12-hour shifts. The current evidence regarding the impact of 8- or 12-hour shifts on nurse fatigue is inconclusive. Nevertheless, common factors contributing to nurse fatigue include rapid returns to work and being summoned to work on days off [7]. Identifying the factors that lead to heightened fatigue in nurses is essential, given its clear link to reported incidents like medication errors, declining care performance, incorrect patient identification, and needlestick injuries, which pose risks to patient safety, as indicated in studies by [1, 5].

The duration of shifts affects not only the well-being of individual nurses but also the overall quality of life within the nursing profession. Research indicates that individuals engaged in 12-hour shifts frequently report enhanced quality of life, often linking this preference to financial savings and improved work-life balance, particularly among nurses with caregiving duties at home [1]. Findings from [7] indicated no significant differences in sleep parameters, fatigue, quality of life (QOL), and patient safety incidents between nurses working 12-hour and 8-hour shifts. The positive impact of 12-hour shifts on nurses' quality of life is linked to enhanced patient care. Extended working hours for nurses have demonstrated advantages, including higher employment rates and improved efficiency within healthcare organizations, which ultimately results in fewer occurrences of missed nursing care [11].

Recent studies have primarily concentrated on the objective evaluation of nurses' performance during 12-hour shifts, providing limited insights owing to the lack of comparative analysis [12, 13]. These studies indicate a potential increase in errors and a decline in cognitive performance during consecutive extended shifts. However, a pilot study involving 28 nurses comparing cognitive errors between 8-hour and 12-hour shifts revealed no statistically significant difference in cognitive performance [14]. The evidence is weak due to the absence of comprehensive objective data on shifts and outcomes, despite the probable potential for increased performance impairments during 12-hour shifts related to fatigue and sleep effects. Some nurses contend that extended shifts enhance continuity of care; however, observational studies present mixed results, and empirical evidence does not establish a definitive connection between long shifts and improved quality of care regarding error reduction. Regarding intention to leave, working 12-hour shifts has been suggested as a successful retention strategy due to high job satisfaction and significance. However, a notable finding is that nurses working longer hours are more likely to express job dissatisfaction and a desire to quit, indicating the multifaceted nature of turnover intention at individual, unit, and organizational levels [4–6].

METHODS

The study focuses on whether limiting nurses to 8-hour shifts reduces their likelihood of making patient care errors compared to those working 12–16-hour shifts. The research employed a qualitative design with descriptive data collected through an anonymous online survey distributed via social media platforms like Facebook.

SETTING AND PARTICIPANTS

The study was conducted online using purposive sampling to gather responses from nurses in Saudi Arabia. Participants were required to be nurses aged 18 or older with experience in patient care. The survey attracted a minimum of 10 participants of various educational backgrounds and work experiences.

MEASUREMENT INSTRUMENTS

A custom-designed questionnaire served as the primary instrument for data collection. It included 10 Likert-scale questions, two open-ended questions, and demographic inquiries. The survey aimed to measure fatigue levels, hours worked, and the likelihood of making patient care errors. Approval for the questionnaire was obtained from the Institutional Review Board (IRB) at Anna Maria College, ensuring the study met ethical standards. A pilot test validated the questionnaire’s clarity and relevance.

PROCEDURE

Data collection spanned several weeks, with the survey distributed online through social media platforms frequented by nurses. Responses were anonymized to ensure participant confidentiality. The survey’s open-ended format allowed participants to express their experiences and perspectives.

DATA ANALYSIS

The analysis was organized into three parts:

1. **Demographic Data:** Charts displayed participant details like age, years of experience, and educational level.

2. **Trends in Responses:** Responses to open-ended questions were coded to identify common themes such as fatigue, reduced care quality, or coping mechanisms.
3. **Significant Likert Scale Findings:** Quantitative data from Likert-scale questions were visualized in graphs to highlight trends, such as the correlation between long shifts and increased fatigue or reduced decision-making clarity.

RESULTS

The findings of the study, derived from the anonymous online survey completed by 127 nurses of varying experience levels, ages, and educational backgrounds. The data are organized into three main sections: demographic details, coded responses to open-ended questions, and significant results from Likert-scale questions. Visual aids such as pie charts and graphs complement the textual analysis.

DEMOGRAPHIC DATA

The participants included nurses aged 18 and older with patient care experience. Of the respondents, 24.4% had 0–2 years of experience, 38.6% had 3–10 years, and smaller percentages represented longer-tenured nurses. Regarding age, the majority (63%) fell between 26 and 45 years. Most participants were registered nurses (RNs, 72.4%), with smaller groups holding LPN or BSN qualifications. This demographic distribution highlights a diverse sample of nurses across various career stages.

RESPONSES TO OPEN-ENDED QUESTIONS

Participants provided detailed answers to two interview questions regarding their experiences with long shifts and fatigue.

1. **Mandated Shifts and Impact on Care**

Nearly half (48.8%) of respondents reported being mandated to work 12- or 16-hour shifts. Among these, 67.7% indicated that patient care was negatively affected, citing fatigue, slower work pace, decreased concentration, emotional strain, and reduced compassion. Several participants expressed concerns about their ability to maintain safe and effective care, with some describing instances of working in an "autopilot" mode due to exhaustion.

2. **Cutting Corners**

Approximately 24.4% admitted to cutting corners when anticipating long shifts. Common strategies included clustering patient care, pre-preparing medications, reducing patient interaction, or limiting documentation. These behaviors were often described as attempts to conserve energy, although they were acknowledged to potentially compromise patient safety and care quality.

LIKERT SCALE RESULTS

The Likert-scale questions revealed significant patterns:

- **Fatigue and Decision-Making:** After working 12 hours, 38.6% of participants disagreed or strongly disagreed with their ability to make accurate, clear decisions. This figure rose sharply to 82.7% after 16-hour shifts.
- **Impact on Care Quality:** Nearly 90% of respondents disagreed or strongly disagreed that they could provide the best possible care during a 16-hour shift.
- **Perceived Safety:** A majority (78%) felt unsafe practicing while fatigued, and over half (54.3%) agreed that working more than 8 hours heightened fatigue levels.

The data consistently pointed to a correlation between longer shifts and increased fatigue, negatively impacting patient care. Participants highlighted various coping mechanisms but acknowledged their limitations in addressing the root causes of fatigue. Emotional strain, slower performance, and diminished quality of care were recurring themes. The chapter emphasizes the critical role of fatigue in influencing nurses' performance and patient care outcomes. It provides robust evidence that extended work hours correlate with heightened fatigue, compromised decision-making, and reduced care quality. These findings underscore the need for interventions to mitigate the adverse effects of long shifts on nurses and their patients (Table 1).

Table 1: Nurse Fatigue and Its Impact on Care Quality

Category	Findings	Details
Demographics		
Years of Experience		
	24.4% (0–2 years)	
	38.6% (3–10 years)	
	6.5% (11–15 years)	
	7.1% (16–20 years)	
	13.4% (21+ years)	
Age		
	15% (18–25 years)	
	33.9% (26–35 years)	
	29.1% (36–45 years)	
	15.7% (46–55 years)	
	6.3% (56+ years)	
Education Level		
	6.3% LPNs	
	72.4% RNs	
	20.5% BSNs	
	0% MSNs	
Mandated Shifts		
Mandated Shifts	48.8% had worked 12- or 16-hour shifts	
Negatively Affected Care	67.7% reported patient care was negatively impacted	Fatigue, slower work pace, and decreased concentration were commonly cited issues.
Emotional Strain	11.3% experienced negative emotional effects	Reported irritability and loss of compassion toward patients.
Patient Safety Concerns	4.7% expressed direct concerns for patient safety	Felt unsafe and unable to maintain high standards of care.
Cutting Corners		
Cutting Corners	24.4% admitted to cutting corners	
Strategies for Cutting Corners	Clustering care (9.7%)	These strategies were aimed at conserving

		energy but often reduced care quality.
	Reducing patient interaction (12.9%)	
	Pre-preparing medications (9.7%)	
Documentation Changes	9.7% altered documentation behavior	Limited charting was noted as a coping mechanism.
Likert Scale Results		
Decision-Making After 12 Hours	38.6% disagreed or strongly disagreed with their ability to make accurate decisions	
Decision-Making After 16 Hours	82.7% disagreed or strongly disagreed with their ability to make accurate decisions	
Care Quality After 16 Hours	89.8% disagreed or strongly disagreed that they could provide the best care	
Fatigue Levels	54.3% agreed or strongly agreed they felt greater fatigue after working more than 8 hours	
Safety While fatigued	78% agreed or strongly agreed they felt unsafe when fatigued	

DISCUSSION

The findings of this study underscore the critical impact of long working hours on nurses' fatigue levels, decision-making abilities, and the quality of patient care. The data reveal that extended shifts significantly increase fatigue, leading to compromised safety and performance in healthcare settings. This discussion examines the implications of these results, comparing them with existing literature and identifying potential strategies to address the issues. The study highlights a substantial decline in nurses' decision-making accuracy after prolonged shifts. Nearly 83% of participants reported reduced clarity in decisions after 16 hours, compared to 39% after 12 hours. This aligns with prior research, such as Thompson's (2019) findings, which demonstrate cumulative fatigue and decreased cognitive performance over consecutive shifts. The reduced ability to make accurate decisions compromises patient safety, as nurses often manage critical care tasks requiring precision and alertness [15].

The results show that almost 90% of participants believe their ability to provide optimal care diminishes after 16-hour shifts. Nurses reported slower performance, emotional detachment, and reduced interactions with patients, often resorting to cutting corners as a coping mechanism. These behaviors align with Ball et al.'s (2017) findings that longer shifts correlate with poorer care quality and increased instances of care left undone. These patterns suggest a clear need for interventions targeting nurse workload and shift management. The study reveals that a significant portion of nurses felt unsafe practicing while fatigued, with 78% expressing this concern. Additionally, 4.7% directly associated long shifts with potential patient safety risks. These results support Di Muzio et al.'s (2019) conclusion that prolonged work hours exacerbate the risk of medical errors, particularly in high-pressure environments [16].

Participants admitted to modifying their workflow to manage the demands of extended shifts. Strategies such as clustering care, pre-preparing medications, and limiting documentation highlight the struggle to balance efficiency with quality. However, these practices often undermine patient care and safety. While clustering care and documentation shortcuts may reduce immediate fatigue, they can contribute to long-term inefficiencies and increased error risks. The results align with existing studies that

emphasize the negative implications of nurse fatigue on patient safety and care quality. This study complements previous research by offering qualitative insights into nurses' lived experiences and coping mechanisms during extended shifts. However, unlike many studies, this research highlights the psychological toll of prolonged shifts, including emotional strain and reduced compassion, providing a broader perspective on the issue.

This study's limitations include the small sample size, reliance on self-reported data, and the absence of a control group. Future research should explore interventions to reduce fatigue, such as flexible scheduling, the impact of additional staff support, and the effectiveness of fatigue management programs. A larger and more diverse sample would enhance the generalizability of findings. This study reinforces the critical role of limiting shift lengths in reducing nurse fatigue and enhancing patient safety. By addressing the root causes of fatigue, healthcare organizations can improve care quality, reduce errors, and support the well-being of nursing staff. These findings should serve as a foundation for actionable strategies aimed at creating safer and more sustainable working conditions in healthcare.

CONCLUSION

The findings of this study demonstrate a clear correlation between extended shift lengths and decreased nurse performance, compromised patient safety, and reduced quality of care. The evidence strongly suggests that shifts longer than 8 hours significantly impair nurses' decision-making abilities, with particularly concerning effects observed in 16-hour shifts. The high percentage of nurses reporting fatigue-related issues, coupled with the admission of cutting corners and modified work practices during extended shifts, raises serious concerns about current scheduling practices in healthcare settings.

The research reveals that the impact of extended shifts extends beyond physical fatigue to affect emotional well-being and professional performance, potentially compromising both nurse and patient safety. The study's findings emphasize the urgent need for healthcare organizations to reevaluate their scheduling practices and implement more sustainable working patterns that prioritize both staff well-being and patient care quality. Future research should focus on developing and testing interventions to better manage nurse fatigue, including the implementation of flexible scheduling systems and additional staff support mechanisms. Healthcare organizations should consider these findings when designing work schedules, with particular attention to limiting shift lengths and ensuring adequate recovery time between shifts. The implementation of such changes could lead to improved patient outcomes, enhanced nurse satisfaction, and a more sustainable healthcare workforce.

REFERENCES

[1] Hong J et al (2021) Comparison of Fatigue, Quality of Life, Turnover Intention, and Safety Incident Frequency between 2-Shift and 3-Shift Korean Nurses. Int J Environ Res Public Health 18(15):7953
[2] Saville C, Dall'Ora C, Griffiths P (2020) The association between 12-hour shifts and nurses-in-charge's perceptions of missed care and staffing adequacy: a retrospective cross-sectional observational study. Int J Nurs Stud 112:103721
[3] Shin YH et al (2018) Comparison of work-life balance, fatigue and work errors between 8-hour shift nurses and 12-hour shift nurses in hospital general wards. J Korean Clin Nurs Res 24(2):170–177
[4] Banakhar M (2017) The impact of 12-hour shifts on nurses' health, wellbeing, and job satisfaction: A systematic review. J Nurs Educ Pract 7(11):69–83
[5] Dall'Ora C et al (2015) Association of 12 h shifts and nurses' job satisfaction, burnout and intention to leave: findings from a cross-sectional study of 12 European countries. BMJ open 5(9):e008331
[6] Rosa D et al (2019) Systematic review of shift work and nurses' health. Occup Med 69(4):237–243
[7] Min A, Min H, Hong HC (2019) Work schedule characteristics and fatigue among rotating shift nurses in hospital setting: An integrative review. J Nurs Adm Manag 27(5):884–895
[8] Chae MJ, Choi SJ (2020) Comparison of shift satisfaction, sleep, fatigue, quality of life, and patient safety incidents between two-shift and three-shift intensive care unit nurses. J Korean Crit Care Nurs 13(2):1–11
[9] Chen S et al (2023) Effects of shift work schedules, compensatory sleep, and work–family conflict on fatigue of shift-working nurses in Chinese intensive care units. Nursing in Critical Care, n/a(n/a)
[10] Gifkins J et al (2020) Fatigue and recovery in shiftworking nurses: A scoping literature review. Int J Nurs Stud 112:103710
[11] Dall'Ora C, Ejebu O-Z, Griffiths P (2022) Because they're worth it? A discussion paper on the value of 12-h shifts for hospital nursing. Human Resources for Health, 20(1): p. 1–7
[12] James L et al (2020) Sleep health and predicted cognitive effectiveness of nurses working 12-hour shifts: an observational study. Int J Nurs Stud 112:103667

[13] Wilson M et al (2019) Performance and sleepiness in nurses working 12-h day shifts or night shifts in a community hospital. Accid Anal Prev 126:43–46

[14] Rhéaume A, Mullen J (2018) The impact of long work hours and shift work on cognitive errors in nurses. J Nurs Adm Manag 26(1):26–32

[15] Di Muzio, M., Dionisi, S. Di Simone, E., Cianfrocca, C., Di Muzio, F., Fabbian, F., Barbiero, G., Tartaglini, D., & Giannetta, N. (2019). Can nurses shift work jeopardize the patient safety? a systematic review. *European Review for Medical and Pharmacological Sciences, 2019*(23), 4507-4519. https://www.europeanreview.org/wp/wpcontent/uploads/4507-4519.pdf

[16] Thompson, B. J., (2019). Does work-induced fatigue accumulate across three compressed 12-hour shifts in hospital nurses and aides. *Public Library of Science ONE, 14*(2), 1-15. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0211715