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IMPACT OF EXTENDED WORKING HOURS ON BURNOUT AND FATIGUE LEVELS AMONG NURSING STAFF: A CROSS-SECTIONAL STUDY

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Abstract:
Extended working hours are increasingly common in nursing practice and may negatively affect nurses' well-being, leading to burnout and fatigue, which can compromise the quality of patient care. This study aimed to assess the impact of extended working hours on burnout and fatigue levels among nursing staff. A descriptive cross-sectional study was conducted among 250 registered nurses working in public and private hospitals in Omdurman, Sudan. Convenience sampling was used, and data were collected using a structured questionnaire, the Copenhagen Burnout Inventory (CBI), and the Fatigue Assessment Scale (FAS). Data were analyzed using SPSS version 22, with descriptive statistics and chi-square tests applied at the $p < 0.05$ significance level. Most participants were female (72%) and aged 25–29 years (57.2%). Nurses working 16-hour shifts reported the highest levels of burnout and fatigue compared to those working 12-hour and 8-hour shifts. A statistically significant association was found between shift duration and all dimensions of burnout and fatigue ($p < 0.005$). Extended working hours are significantly associated with increased burnout and fatigue among nursing staff. Implementing regulated shift schedules and ensuring adequate rest periods are essential to improve nurses' well-being and patient safety.

Keywords: Extended working hours, Burnout, Fatigue, Nursing staff, Shift work.

Introduction:
Nursing shift length has long been a topic of debate in healthcare workforce planning, particularly in acute care settings where 12-hour shifts have become the norm. Originally introduced in North America and Europe to reduce staffing costs and provide more days off, the 12-hour shift model is now widespread. However, increasing evidence suggests that prolonged work hours may negatively impact nurse's well-being, job satisfaction, and patient safety. A cross-sectional survey of 873 nurses in the UK and Ireland found that those working 12-hour shifts reported significantly higher levels of burnout and exhaustion compared to their 8-hour shift counterparts—especially in settings with inadequate staffing or where shift length was mandated rather than voluntarily chosen. (Dall'ora et al. 2023) Contrasting findings were reported in a cross-sectional study conducted in Dubai, where 360 nurses were equally divided between 8-hour and 12-hour shifts. Nurses working 12-hour shifts in this context reported lower emotional exhaustion, less depersonalization, and higher personal accomplishment, suggesting that shift outcomes may vary depending on context and implementation. (Livingston Alber et al. 2025)
Fatigue is another critical issue closely linked to extended shifts. A 2023 mixed-methods study in Qatar involving 350 nurses found that 12-hour shifts were associated with increased stress, decreased job satisfaction, and reduced

productivity and focus. Qualitative interviews further revealed emotional strain and health concerns tied to longer work hours. (Varghese et al. 2023) Similarly, a prospective cohort study conducted at a Midwestern trauma-level academic medical center observed fatigue patterns in 80 nurses working 12-hour shifts. Fatigue levels rose throughout the shift, with significantly higher fatigue reported during night shifts, highlighting the compounding effects of shift timing and duration. (Benzo et al. 2022) Supporting this, a cross-sectional study conducted at three tertiary care hospitals in Karachi, Pakistan, involving 100 nurses, reported widespread negative effects of extended shifts on physical and mental health. Participants reported sleep deficits (88%), exhaustion (91%), social disruption (91%), impaired communication (76%), memory problems (69%), and an increased risk of infection (88%), emphasizing the toll of long working hours on nurses' personal well-being and professional performance. (Khan et al. 2023)

Previous studies have shown that long nursing shifts, particularly 12-hour shifts, can negatively impact nurses' health, increase fatigue and burnout, and reduce job satisfaction. Although some advantages have been reported, such as having more days off, the overall evidence raises serious concerns, especially in understaffed environments. Therefore, this study aims to explore the effects of extended working hours on burnout and fatigue levels among nursing staff.

Methodology:

Study Design and Setting:

A descriptive cross-sectional study design was conducted to assess the impact of extended working hours on burnout and fatigue levels among nursing staff. The study was conducted in multiple public and private hospitals across Omdurman, Sudan, across different departments.

Study Population and Sampling

Study Population and Sampling

The study population consisted of registered nurses working in different hospital departments in Sudan. Convenience sampling was used to recruit participants from the selected hospitals.

Inclusion Criteria

- Registered nurses with at least 6 months of clinical experience
- Nurses working 8-hour or more shifts
- Nurses who agreed to participate

Exclusion Criteria

- Nursing interns and students
- Nurses in administrative positions only
- Nurses absent during the data collection period

Sample Size Calculation

Since the total number of nurses in the selected hospitals was large and not clearly defined, the population was considered **infinite**. The sample size was calculated using the formula for an infinite population ($SS = [Z^2p\ (1 - p)]/\ d^2$). While (SS = Sample size, Z = Z-score (1.96 for a 95% confidence level), p = Percentage of population (Assumed as 50% or 0.5), and d = margin of error (0.05).

Data Collection Tools

Data was collected using a structured, self-administered questionnaire composed of three parts:

1. Demographic Data Form: This section collects participants' background information, including gender, age, hospital type, years of nursing experience, and current shift type (8-hour, 12-hour, or 16-hour).
2. Copenhagen Burnout Inventory (CBI): A 19-item self-report instrument used to assess burnout levels. It comprises three subscales:

- Personal Burnout – measuring general physical and psychological fatigue and exhaustion
- Work-Related Burnout – assessing exhaustion attributed to work demands
- Client-Related Burnout – evaluating burnout stemming from interactions with patients

3. Fatigue Assessment Scale (FAS): A 10-item validated tool designed to evaluate both physical and mental fatigue. Participants respond using a 5-point Likert scale, yielding a composite fatigue score.

Data Analysis:

Data were analyzed using **SPSS version 22**. Descriptive statistics (frequencies, means, standard deviations) were used to summarize demographic and response data. Comparative analyses, e.g., independent t-tests, were conducted to assess the effects of extended working hours on burnout and fatigue levels among nursing staff.

Ethical Considerations:

Written informed consent was obtained from all participants after the study's purpose was explained. Participation was voluntary, and nurses had the right to refuse or withdraw from the study at any time without any consequences.

Confidentiality and anonymity of participants were strictly maintained throughout the study, and all collected data were used solely for research purposes.

Results:

Table 1: socio-demographic characteristics of the participants, n=250

Variables	Frequency (%)
Gender	
Male	70 (28)
Female	180 (72)
Age	
19-24	64 (25.6)
25-29	143 (57.2)
Above 30	43(17.2)
Hospital Type	
Public	160 (64)
Private	90 (36)
Years of Nursing Experience	
< 1 year	35 (14)
1–5 years	161(64.4)
6–10 years	34 (13.6)
> 10 years	20 (8)
Shift Type (Working Hours)	
8-hour shift	52 (20.8)
12-hour shift	90 (36)
16-hour or more	108 (43.2)

Table 2: Burnout according to the shift hours

Variable	Level of burnout			p- value
	No burnout	Moderate burnout	High burnout	
Personal relate burnout				
8-hour shift	38 (73.1%)	5 (9.6%)	9 (17.3%)	.000
12-hour shift	31 (34.4%)	35 (38.9%)	24 (26.7%)	
16-hour shift	26 (24.1%)	38 (35.2%)	44 (40.7%)	
Work-related burnout				
8-hour shift	41 (78.8%)	5 (9.6%)	6 (11.5%)	.000
12-hour shift	31 (34.4%)	29 (32.2%)	30 (33.3%)	
16-hour shift	33 (30.6%)	35 (32.4%)	40 (37.0%)	
Client-related burnout				
8-hour shift	48 (92.3%)	4 (7.7%)	0 (0.0%)	.000
12-hour shift	29 (32.2%)	39 (43.3%)	22 (24.4%)	
16-hour shift	30 (27.8%)	44 (40.7%)	34 (31.5%)	

Table 3: Fatigue according to the shift hours

Variable	Level of fatigue			p- value
	No substantial fatigue.	Mild to moderate fatigue.	Severe fatigue.	
Personal relate burnout				
8-hour shift	45 (86.5%)	5 (9.6%)	2 (3.8%0	.000
12-hour shift	31 (34.4%)	33 (36.7%)	26 (28.9%)	
16-hour shift	21 (19.4%)	41 (38.0%)	46 (42.6%)	

Table 1 shows the socio-demographic characteristics of the participants (n=250). The majority were female (72%). Most participants were aged 25–29 years (57.2%), followed by 19–24

years (25.6%) and above 30 years (17.2%). Regarding hospital type, 64% worked in public hospitals and 36% (n=90) in private hospitals. In terms of nursing experience, 64.4% had 1–5 years of experience, 14% had less than 1 year, 13.6% had 6–10 years, and 8% had more than 10 years. Concerning shift type, 43.2% worked >16-hour shifts, 36% worked 12-hour shifts, and 20.8% worked 8-hour shifts.

Table 2 illustrates burnout levels according to shift hours. There was a statistically significant association between shift duration and burnout across all domains ($p < 0.005$). For personal-related burnout, 73.1% of nurses working 8-hour shifts reported no burnout, 9.6% moderate burnout, and 17.3% high burnout. In comparison, among those working 12-hour shifts, 34.4% reported no burnout, 38.9% moderate burnout, and 26.7% high burnout, while among those working 16-hour shifts, 24.1% reported no burnout, 35.2% moderate burnout, and 40.7% high burnout. For work-related burnout, 78.8% of nurses working 8-hour shifts reported no burnout, 9.6% moderate burnout, and 11.5% high burnout. Among those working 12-hour shifts, 34.4% reported no burnout, 32.2% moderate burnout, and 33.3% high burnout, whereas among those working 16-hour shifts, 30.6% reported no burnout, 32.4% moderate burnout, and 37.0% high burnout. For client-related burnout, 92.3% of nurses in 8-hour shifts reported no burnout, 7.7% moderate burnout, and none reported high burnout (0.0%). In contrast, among those working 12-hour shifts, 32.2% reported no burnout, 43.3% moderate burnout, and 24.4% high burnout, while among those working 16-hour shifts, 27.8% reported no burnout, 40.7% moderate burnout, and 31.5% high burnout.

Table 3 shows burnout levels by shift hours. There was a statistically significant association between shift duration and burnout across all domains ($p < 0.005$). For personal-related burnout, 73.1% of nurses working 8-hour shifts reported no burnout, compared to 34.4% and 24.1% among those working 12-hour and 16-hour shifts, respectively. High burnout was reported by 17.3% (8-hour), 26.7% (12-hour), and 40.7% (16-hour). For work-related burnout, no burnout was observed among 78.8% of nurses working 8-hour shifts, compared to 34.4% and 30.6% in 12-hour and 16-hour shifts, respectively, while high burnout was reported by 11.5%, 33.3%, and 37.0%, respectively. For client-related burnout, 92.3% of nurses in 8-hour shifts reported no burnout, and none reported high burnout (0%), whereas 24.4% and 31.5% reported high burnout among those working 12-hour and 16-hour shifts, respectively.

Table 3 presents fatigue levels according to shift hours. A statistically significant association was found between shift duration and fatigue levels ($p < 0.001$). Among nurses working 8-hour shifts, 86.5% reported no substantial fatigue, 9.6% mild to moderate fatigue, and 3.8% severe fatigue. Among those working 12-hour shifts, 34.4% reported no fatigue, 36.7% mild to moderate fatigue, and 28.9% severe fatigue. In contrast, among nurses working >16-hour shifts, only 19.4% reported no fatigue, while 38.0% experienced mild to moderate fatigue and 42.6% reported severe fatigue.

Dissection:

The present study demonstrated that extended working hours are significantly associated with increased levels of burnout and fatigue among nursing staff. These findings are consistent with recent literature highlighting the negative impact of prolonged shifts on nurses' physical and psychological well-being.

The majority of participants in this study were young nurses aged 25–29 years with relatively limited experience (1–5 years). This aligns with global workforce trends, where early-career nurses constitute a large proportion of the clinical workforce. Evidence suggests that younger and less experienced nurses are more vulnerable to occupational stress and burnout due to limited coping strategies and high workload demands. (Bae 2024) Additionally, the predominance of female nurses in this study reflects the gender distribution commonly reported in the nursing profession worldwide. (Majeed et al. 2022; Jarrad et al. 2025)

The findings revealed a clear, statistically significant increase in burnout levels with longer shift durations across all domains (personal, work-related, and client-related). Nurses working 16-hour shifts reported the highest levels of burnout, while those working 8-hour shifts reported the lowest levels. These results are strongly supported by a recent systematic review, which concluded that extended working hours are directly associated with increased burnout, sleep disturbances, and reduced well-being among nurses. (Oner et al. 2025) Similarly, another study reported that long working hours and increased workload significantly contribute to emotional exhaustion and reduced job satisfaction. (Vetbuje 2023)

The progressive increase in moderate burnout observed in this study (especially in 12- and 16-hour shifts) suggests that burnout develops

gradually with prolonged exposure to occupational stressors. This supports the concept that burnout is not an abrupt phenomenon but rather a cumulative process influenced by sustained work demands. (Tan et al. 2020; Lee et al. 2024)

The study also found a significant association between longer shift hours and increased fatigue levels, with severe fatigue being most prevalent among nurses working 16-hour shifts. Conversely, the majority of nurses working 8-hour shifts reported no substantial fatigue.

These findings are consistent with a recent study, which highlighted that work intensification and prolonged working hours significantly increase occupational fatigue and reduce recovery time between shifts. (Güngör and Sönmez 2025)

Conclusion:

This study found that extended working hours are significantly associated with higher levels of burnout and fatigue among nurses. Nurses working 16-hour shifts experienced the highest levels of burnout and fatigue, while those working 8-hour shifts showed the lowest. The findings highlight the need to limit excessive shift durations and to improve staffing policies to protect nurses' health and enhance patient safety.

Author Contributions

The first and second authors contributed equally to the study's conception and design. The first author was responsible for data collection, data analysis, and drafting the manuscript. The second author contributed to the interpretation of results, critical revision of the manuscript, and final approval of the version to be published. Both authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

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