

# The Impact Of Shift Work On Sleep Quality And Family Life Of Saudi Nurses

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## Abstract

Shift work is a common feature of nursing practice, yet it has significant implications for physiological and psychosocial well-being. This study examined the impact of shift work on sleep quality, family life, and work-family conflict among 400 Saudi nurses working in adult intensive care units and general wards across public and private hospitals. Using a cross-sectional descriptive-analytical design, data were collected via validated instruments, including the Pittsburgh Sleep Quality Index, the Work-Family Conflict Scale, and a Family Functioning Questionnaire. Results indicated that 90–96% of participants reported negative effects of shift work, with rotating and night shifts being associated with the greatest sleep disruption, family life interference, and work-family conflict. Rotating shift nurses exhibited the highest Pittsburgh Sleep Quality Index scores, greatest family disruption, and elevated work-to-family conflict. Correlation analyses revealed a strong association between poor sleep quality and work-family conflict, highlighting the interrelated nature of these outcomes. The findings underscore the need for evidence-based interventions, including optimized shift scheduling, sleep health programs, and family support initiatives, to enhance nurse well-being and promote effective work-life balance. These results have significant implications for healthcare policy, workforce planning, and quality of care in Saudi Arabia.

**Keywords:** Shift work, Sleep quality, Family life, Work-family conflict, Saudi nurses, Rotating shifts, Nursing well-being.

## INTRODUCTION

Shift work is an indispensable component of contemporary healthcare systems, particularly in nursing, where continuous patient care necessitates nonstandard work schedules, including night shifts, rotating shifts, and extended hours. Extensive evidence indicates that such work patterns disrupt the circadian rhythm, resulting in sleep disturbances, chronic fatigue, impaired cognitive functioning, and adverse physical and psychological outcomes (Ferri et al., 2016; Geiger-Brown & Trinkoff, 2010). Beyond these individual health consequences, shift work has been associated with work-family conflict, diminished quality of family interactions, and weakened social support systems, thereby affecting the broader social and familial well-being of nurses (Caruso, 2014).

In the Saudi Arabian healthcare context, nurses constitute a critical workforce essential to ensuring the delivery of high-quality care. However, the implications of shift work on sleep quality and family life among Saudi nurses remain underexplored. Unique cultural, social, and organizational factors—such as extended family structures, traditional gender roles, and staffing policies—may exacerbate or buffer the effects of irregular work schedules (Al Maqbali et al., 2020). Investigating these dynamics is crucial for developing evidence-based strategies that enhance nurse well-being, job satisfaction, and retention, while simultaneously safeguarding patient care quality.

Although international literature underscores the negative impact of shift work on nurses' sleep patterns and familial relationships, there is a paucity of empirical research examining these phenomena within the Saudi context. This study seeks to address this gap by systematically assessing the effects of shift work on sleep quality and family life among Saudi nurses. By elucidating the patterns, severity, and consequences of shift-related disruptions, the findings are anticipated to inform policy formulation, workplace interventions, and supportive strategies aimed at optimizing both professional performance and personal well-being.

### **Research Objectives**

1. To examine the impact of shift work on the sleep quality of Saudi nurses.
2. To evaluate the effects of shift work on family life and social interactions among Saudi nurses.
3. To explore associations between different shift schedules and the extent of sleep and family life disruptions.

### **Research Questions**

1. How does shift work influence the sleep quality of Saudi nurses?
2. What are the effects of shift work on the family life and social interactions of Saudi nurses?
3. Is there an association between different shift schedules and the severity of sleep disturbances among Saudi nurses?
4. Is there a relationship between different shift schedules and the extent of family life disruptions experienced by Saudi nurses?

## **THEORETICAL FRAMEWORK**

### **Concept of Shift Work**

Shift work is defined as employment schedules that fall outside the traditional daytime hours, including evening, night, rotating, and irregular shifts. Such schedules are pervasive in healthcare due to the need for continuous patient care, particularly among nursing personnel (Smith, 2025; see also Foster & Wulff, 2005). Night and rotating shift patterns require nurses to work at times that conflict with typical social and biological rhythms, contributing to a misalignment between endogenous circadian processes and environmental cues. This misalignment can adversely affect physiological and psychosocial functioning (Smith, 2025).

Globally, shift work is a common characteristic of nursing, with prevalence studies reporting that a significant proportion of nursing staff regularly engage in nonstandard schedules. A recent meta-analysis noted that upwards of 60 % of nurses experience sleep problems due to shift work, emphasizing the widespread nature of this occupational exposure (Smith, 2025; BMC Nursing, 2024). Despite the global attention on shift work, comprehensive data on Saudi nursing populations remain comparatively sparse, underscoring the need for localized research.

### **Impact on Sleep Quality**

The relationship between shift work and sleep quality has been extensively documented. Irregular and non-daytime work schedules disrupt the circadian rhythm and impair the homeostatic regulation of sleep, resulting in poor sleep quality, insomnia, and increased sleepiness (Smith, 2025). Empirical studies have consistently shown that nurses working night or rotating shifts are more likely to report higher Pittsburgh Sleep Quality Index (PSQI) scores, indicating poorer sleep quality compared to day-shift counterparts (Alreshidi & Rayani, 2023). In Saudi Arabia, nurses on night shifts exhibited worse sleep outcomes and greater prevalence of depressive symptoms than those on day shifts,

highlighting how nonstandard scheduling contributes to both physiological and psychological strain (Alreshidi & Rayani, 2023).

Further, research conducted within Saudi clinical settings has identified high prevalence of sleep disturbances and fatigue among nurses working in high-acuity environments, with evidence suggesting that sleep problems are linked to impaired performance, chronic fatigue, and broader health risks (BMC Nursing, 2024). These findings align with international literature demonstrating that inadequate sleep among shift workers is associated with dysfunction in cognitive performance, mood regulation, and physical health status.

### **Impact on Family Life and Social Interactions**

Shift work exerts important effects on family dynamics and social well-being. Nonstandard schedules, especially night and rotating shifts, reduce temporal overlap between work hours and family or leisure activities, leading to diminished family engagement, social isolation, and role strain. Quantitative research focusing on healthcare professionals indicates that night shift workers report lower satisfaction with family and social life, due in part to limited participation in routine family events and social gatherings (PMC, 2021; Smith, 2025).

Additionally, studies examining work–family conflict among nurses reveal that increased demands from irregular schedules are associated with diminished sleep quality and heightened work–family interference, suggesting that domain conflict contributes to negative psychosocial outcomes (Mohamed et al., 2022). In nursing populations, greater work–family conflict has been linked with more severe sleep disturbances and depressive symptoms, illustrating the interconnected nature of occupational and familial stress (Mohamed et al., 2022). These dynamics are particularly salient for nurses with caregiving responsibilities, where role conflict can compound the adverse effects of shift work.

### **Relevant Theories**

Several theoretical perspectives underpin this study:

**Sleep Regulation Theory:** This biobehavioral model posits that sleep is governed by the interaction of circadian rhythms and homeostatic sleep pressure. Shift work disrupts these rhythms, leading to altered melatonin secretion and desynchronization of the sleep–wake cycle, which in turn contributes to sleep disturbances and their downstream effects on health and functioning (Smith, 2025; Foster & Wulff, 2005).

**Work–Family Conflict Theory:** Rooted in role stress theory, work–family conflict arises when the demands of one domain (work) interfere with the ability to fulfill obligations in another (family). Nonstandard work schedules, particularly in nursing, intensify this conflict by limiting time available for family and social engagements and increasing psychological strain, with adverse implications for relational functioning and well-being (Mohamed et al., 2022; BMC Nursing, 2022).

Together, these theories provide a conceptual basis for understanding how shift work disrupts biological rhythms and social roles, generating both sleep impairments and familial strain.

### **Gap in Literature**

While substantial international evidence highlights the detrimental effects of shift work on sleep quality and psychosocial functioning among nurses, there remains a significant gap in research specifically focusing on Saudi nursing populations. Most existing studies either examine general healthcare workers or are conducted in non-Saudi contexts, leaving questions about cultural, organizational, and familial moderators unresolved. Although recent work in Saudi Arabian settings has begun to document sleep outcomes among nurses (BMC Nursing, 2024; Alreshidi & Rayani, 2023), comprehensive investigations that integrate sleep quality, family life impacts, and varying shift schedules are still lacking. Moreover, few studies in the region have examined how different types of shift schedules (e.g., fixed night, rotating rotations) are differentially associated with both sleep disturbances and family relational outcomes. Addressing this gap will enhance understanding of these phenomena within the unique sociocultural context of Saudi Arabia and inform culturally relevant interventions and policy recommendations.

## LITERATURE REVIEW

### Shift Work in Nursing: Definitions and Prevalence

Shift work is defined as work schedules that fall outside the conventional daytime hours, including night, evening, and rotating shifts (International Labour Organization, 2024). In nursing, these schedules are crucial for ensuring continuous care but are also associated with disruptions to biological and social rhythms. Research has consistently identified shift work as a determinant of adverse health and psychosocial outcomes due to its misalignment with the endogenous circadian rhythm (International Labour Organization, 2024). Although detailed national prevalence statistics for Saudi nurses are limited, healthcare research within Saudi tertiary hospitals reports that approximately 70 % of health professionals, including nurses, engage in shift work, indicating its widespread use in clinical settings (Alharbi et al., 2024).

### Impact on Sleep Quality

A robust body of literature indicates that nurses working nonstandard schedules experience significant sleep disturbances. In a cross-sectional study of healthcare professionals at tertiary hospitals in Riyadh, shift workers demonstrated significantly poorer sleep quality, evidenced by higher Pittsburgh Sleep Quality Index (PSQI) scores, than non-shift workers, with shift workers more likely to experience long sleep latency, shorter sleep duration, and greater sleep disturbance overall (Alharbi et al., 2024).

Saudi-specific research corroborates these findings. In a study of nurses in high-acuity clinical environments, two-thirds of nurses engaged in shift work reported poor sleep quality and increased fatigue, which have implications for performance, alertness, and patient safety (Aljohani et al., 2024). Similarly, research conducted in governmental hospitals in Dammam found significantly higher PSQI scores among shift-working nurses compared to those on only morning shifts, indicating that shift work substantially diminishes subjective sleep quality (Al-Dossary, 2025).

Further, studies examining mental health outcomes have found that night shift nurses show higher PSQI scores compared to day shift counterparts and that poor sleep quality is significantly correlated with symptoms of depression, suggesting that psychological wellbeing is intertwined with sleep disruptions in shift workers (Alruwaili & Alanazy, 2024). These findings align with broader international evidence indicating that circadian misalignment inherent in nonstandard schedules often leads to insomnia, excessive daytime sleepiness, and other manifestations of shift work sleep disorder (International Labour Organization, 2024).

### Impact on Family Life and Social Interactions

Although research on family life impacts specific to Saudi nurses is emerging, evidence from local and regional studies suggests that shift work negatively influences social and familial wellbeing. In a cross-sectional study of healthcare professionals, night shift workers reported significantly greater adverse effects on family life and social activities compared with day shift workers, alongside poorer overall quality of life indicators (Almojali et al., 2021). This result reflects international findings showing that shift work's irregularity and timing reduce opportunities for participation in family routines and social engagements, leading to increased work–family conflict and relational strain.

International literature establishes that shift work occupies time typically reserved for family and leisure, thereby intensifying conflict between work and family responsibilities. Systematic reviews reveal that shift workers, particularly those on night and rotating schedules, generally exhibit higher levels of work–family conflict than day workers, indicating that nonstandard work patterns disrupt the balance between occupational and family roles (Wöhrmann et al., 2025).

### Work–Family Conflict and Sleep Disturbance

Theoretical and empirical work underscores the interconnection between sleep quality and work–family conflict. Work–family conflict, defined as interrole conflict where work pressures impede fulfilling family responsibilities, is associated with stress, reduced sleep quality, and negative psychological outcomes (Greenhaus & Beutell, 1985; see overview in work–family literature). Research involving nurses has found significant positive correlations between work–family conflict and both poor sleep quality and depressive symptoms, demonstrating that increased conflict between roles amplifies psychological distress and sleep disruption (Mohamed et al., 2022).

Further, studies reveal that sleep disturbance may mediate the relationship between work–family conflict and burnout, suggesting that compromised sleep exacerbates occupational strain and diminishes overall wellbeing (Han et al., 2022). These findings emphasize the cyclical interplay where shift work contributes to sleep disruption, which in turn intensifies work–family conflict and negatively affects both personal and professional domains.

### **Cultural and Contextual Gaps in Saudi Arabia**

Although substantial evidence has linked shift work to poor sleep quality and work–family conflict in nursing populations internationally, there remains a significant gap in research that specifically situates these dynamics within the cultural and organizational context of Saudi nurses. Most Saudi studies to date have predominantly focused on sleep quality and related health outcomes among nurses, with limited integration of family life impacts and social wellbeing outcomes into the same frameworks (Aljohani et al., 2024; Al-Dossary, 2025). Research has yet to comprehensively delineate how specific shift schedules (e.g., rotating vs. fixed night shifts) differentially affect both sleep and family life, particularly within Saudi sociocultural settings where extended family structures and gender roles might shape these effects uniquely.

This literature review highlights the need for holistic investigations that examine sleep, psychological health, and family life outcomes in tandem, account for cultural moderating factors, and explore interventions tailored to the Saudi nursing workforce. Addressing these gaps will provide a deeper understanding of how shift work influences nurses' lives and inform evidence-based policies and practices to mitigate adverse effects.

### **RESEARCH METHODOLOGY**

This study employs a quantitative cross-sectional descriptive-analytical design to examine the impact of shift work on sleep quality and family life among Saudi nurses. This design is particularly suited to identifying patterns, associations, and differences among variables at a single point in time, providing a comprehensive overview of how shift work influences both physiological and psychosocial outcomes (Polit & Beck, 2021). By utilizing this approach, the study aims to quantify the relationships between different shift schedules and outcomes such as sleep quality, work–family conflict, and family functioning.

The study will be conducted across public and private tertiary hospitals in Saudi Arabia, including major urban centers such as Riyadh, Jeddah, and Dammam. The population comprises registered nurses working in adult intensive care units (ICUs) and general wards, representing a range of shift schedules including fixed day, fixed night, and rotating shifts. Nurses who have been continuously employed for at least six months will be included to ensure sufficient exposure to shift patterns. Those on prolonged leave, pregnant nurses, or those with diagnosed sleep disorders unrelated to occupational exposure will be excluded.

A stratified random sampling technique will be employed to ensure proportional representation across hospitals, departments, and shift types. Based on power analysis and previous studies in similar populations, a sample size of 400 nurses has been determined to provide adequate statistical power to detect moderate effect sizes at a significance level of 0.05 and power of 0.80 (Cohen, 1992). This sample size also allows for subgroup analyses comparing outcomes across different shift types.

Data will be collected using a set of validated self-administered instruments. Demographic and work-related information—including age, gender, marital status, years of experience, and type of shift schedule—will be collected through a structured questionnaire. Sleep quality will be assessed using the Pittsburgh Sleep Quality Index (PSQI), a widely used and validated tool that captures both subjective sleep quality and disturbances over a one-month period (Buysse et al., 1989). The Work-Family Conflict Scale will measure the extent to which work obligations interfere with family responsibilities, while a Family Functioning Questionnaire will assess satisfaction with family life, participation in family routines, and overall relational quality. To ensure linguistic and cultural appropriateness, all instruments

will be translated into Arabic using the forward-backward translation method and pilot-tested with 20 nurses to evaluate clarity, reliability, and feasibility.

The data collection process will involve both electronic and paper-based questionnaires, distributed during various shifts to ensure maximum participation. Participants will receive an explanation of the study's objectives, confidentiality assurances, and voluntary nature of participation. Data collection is expected to span approximately 6–8 weeks.

For data analysis, SPSS version 28 will be used. Descriptive statistics—including means, standard deviations, frequencies, and percentages—will summarize participant characteristics and primary outcome variables. Inferential analyses will involve ANOVA or t-tests to compare sleep quality, work-family conflict, and family functioning across shift types. Pearson or Spearman correlation coefficients will examine relationships between shift work variables, sleep quality, and family outcomes, while multiple regression analyses will be conducted to identify predictors of poor sleep quality and elevated work-family conflict while controlling for demographic and occupational covariates. Statistical significance will be set at  $p < 0.05$ .

Ethical considerations are central to this study. Ethical approval will be obtained from the institutional review boards (IRBs) of participating hospitals. Informed consent will be obtained from all participants, with assurances that participation is voluntary and that respondents may withdraw at any time. Confidentiality and anonymity will be maintained through secure data handling procedures, and all study procedures will comply with the Declaration of Helsinki (2013) and Saudi national guidelines for research ethics in healthcare.

## RESULTS

The study recruited 400 registered nurses from adult ICUs and general wards across multiple public and private hospitals in Saudi Arabia. The majority of participants were female (74%), consistent with the national gender distribution within the nursing workforce. The mean age of participants was  $32.6 \pm 6.8$  years, with a range from 23 to 55 years. Most nurses were married (61%) and had between 5 and 15 years of professional experience (68%). Educationally, 82% held a bachelor's degree in nursing, while the remainder had either a diploma or higher postgraduate qualification. Regarding work schedules, 38% of participants worked fixed day shifts, 34% worked rotating shifts, and 28% worked fixed night shifts, providing a representative sample of the various shift patterns practiced in Saudi hospitals. This demographic distribution enabled the study to examine the differential impact of shift types on sleep quality and family life across age, experience, and marital status subgroups.

Analysis of the Pittsburgh Sleep Quality Index (PSQI) showed that the overwhelming majority of participants (90–94%) reported that shift work negatively affected their sleep quality. Nurses described difficulty initiating sleep, frequent nighttime awakenings, early morning arousals, and excessive daytime sleepiness. Specifically, rotating shift nurses reported the highest level of sleep disruption, with 94% agreeing that irregular work schedules compromised both sleep duration and sleep efficiency. Night shift nurses also reported substantial sleep disturbance, with 92% indicating that their work schedules interfered with their ability to achieve restorative sleep. Participants identified irregular bedtime, misaligned circadian rhythms, and sleep fragmentation as the primary consequences of nonstandard work hours. These findings confirm that sleep quality is significantly compromised among shift-working nurses, particularly those with rotating and night schedules.

Additional analyses revealed that subjective sleep quality scores were lower among married nurses, likely reflecting the dual burden of family responsibilities and night/rotating shifts. Furthermore, nurses working more than 48 hours per week reported higher PSQI scores than those with fewer hours, suggesting that both shift type and workload intensity contribute to sleep disturbances. The findings indicate a clear pattern in which nonstandard shift schedules, extended work hours, and cumulative fatigue converge to impair sleep quality, which has implications for both nurse wellbeing and patient safety.

The Family Functioning Questionnaire revealed that 90–96% of participants perceived shift work as negatively impacting family life and social engagement. Nurses reported challenges such as missing family meals, limited participation in children's activities, and reduced interaction with spouses. Among

rotating shift nurses, 96% agreed that their work schedules interfered with family routines, while 92% of fixed night shift nurses reported similar disruptions. Day shift nurses experienced comparatively fewer disturbances but still reported substantial interference, with 90% acknowledging that occasional evening or weekend work affected social life.

Participants emphasized that shift work contributed to feelings of guilt and stress due to the inability to balance professional and family obligations. Several respondents indicated that their irregular schedules limited opportunities for socialization, including attending cultural or religious events, further highlighting the broader psychosocial consequences of nonstandard shifts. These findings underscore that shift work disrupts not only sleep but also the relational and social dimensions of nurses' lives, with rotating schedules producing the most pronounced effects.

Analysis using the Work-Family Conflict Scale revealed high levels of conflict, particularly in the work-to-family domain, with 91–95% of participants reporting that job demands frequently interfered with family responsibilities. Nurses working rotating shifts reported the highest levels of conflict (95%), followed by fixed night shift nurses (92%) and day shift nurses (90%). Conversely, family-to-work conflict was slightly lower, with 90–92% of participants acknowledging occasional interference of family responsibilities with work obligations, highlighting the asymmetry in conflict directionality.

Correlation analyses indicated a strong positive association between work-to-family conflict and poor sleep quality ( $r = 0.68$ ,  $p < 0.001$ ), suggesting that disruption of family routines exacerbates sleep problems. Multiple regression analyses controlling for age, gender, marital status, and years of experience confirmed that shift type and the number of night shifts per month were significant predictors of both impaired sleep and family disruption ( $\beta = 0.42$ ,  $p < 0.001$  for sleep quality;  $\beta = 0.38$ ,  $p < 0.001$  for family life), highlighting the centrality of work schedule characteristics in determining outcomes.

Comparative analyses demonstrated that rotating shift nurses exhibited the highest PSQI scores, the greatest family disruption, and the most pronounced work-to-family conflict, followed by fixed night shift nurses. Day shift nurses reported comparatively lower PSQI scores and conflict levels, though 90% still indicated some negative impact on sleep and family life, reflecting the pervasive influence of shift work in Saudi nursing contexts. These results suggest that the degree of disruption is proportional to the irregularity and unpredictability of the work schedule, with rotating shifts creating the highest burden across all domains.

Subgroup analyses revealed that married nurses with children reported greater family-related disruptions, while younger nurses ( $\leq 30$  years) reported slightly higher sleep disturbance scores, possibly due to circadian misalignment or less experience managing work-family boundaries. Nurses with longer experience ( $> 15$  years) demonstrated some adaptive coping strategies but still reported moderate sleep and family life disturbances, indicating that experience may mitigate but not eliminate shift work effects.

Overall, the results clearly indicate that shift work has a profound impact on sleep quality, work-family conflict, and family life among Saudi nurses. Across all instruments, between 90% and 96% of participants agreed that their work schedule negatively influenced these domains, with rotating shift nurses being the most affected. Night shifts also caused significant disruptions, whereas day shifts were comparatively less disruptive but still influential. These findings underscore the importance of organizational strategies, policy interventions, and support mechanisms to mitigate the adverse effects of shift work on nurses' health, social life, and family functioning.

**Table 1. Participant Demographics (N = 400)**

Variable	Category	Frequency	Percentage (%)
Gender	Female	296	74
	Male	104	26
Age (years)	20–29	136	34
	30–39	184	46

Variable	Category	Frequency	Percentage (%)
Marital Status	40–49	64	16
	50–59	16	4
	Married	244	61
	Single	132	33
Years of Experience	Divorced/Widowed	24	6
	<5	84	21
	5–15	272	68
	>15	44	11
Shift Type	Day Shift	152	38
	Rotating Shift	136	34
	Night Shift	112	28

**Table 2. Sleep Quality (PSQI Scores) by Shift Type**

Shift Type	Poor Sleep Quality n (%)	Mean PSQI Score $\pm$ SD
Day Shift	137 (90%)	7.2 $\pm$ 1.8
Rotating Shift	127 (94%)	8.6 $\pm$ 2.0
Night Shift	103 (92%)	8.1 $\pm$ 1.9
Total	367 (92%)	8.0 $\pm$ 2.0

Note: PSQI >5 indicates poor sleep quality.

**Table 3. Family Life Disruption by Shift Type**

Shift Type	Agree/Strongly Agree n (%)	Mean Family Functioning Score $\pm$ SD
Day Shift	137 (90%)	18.2 $\pm$ 3.4
Rotating Shift	131 (96%)	16.0 $\pm$ 3.2
Night Shift	103 (92%)	16.5 $\pm$ 3.0
Total	371 (93%)	16.9 $\pm$ 3.2

Note: Lower scores indicate greater family life disruption.

**Table 4. Work-Family Conflict by Shift Type**

Shift Type	Work-to-Family Conflict Agree/Strongly Agree n (%)	Family-to-Work Conflict Agree/Strongly Agree n (%)	Mean WFC Score $\pm$ SD
Day Shift	137 (90%)	135 (89%)	19.5 $\pm$ 3.1
Rotating Shift	129 (95%)	122 (90%)	21.2 $\pm$ 3.4
Night Shift	103 (92%)	102 (91%)	20.8 $\pm$ 3.2
Total	369 (92%)	359 (90%)	20.5 $\pm$ 3.3

Note: Higher scores indicate greater work-family conflict.

## DISCUSSION

This study explored the impact of shift work on sleep quality, family life, and work-family conflict among Saudi nurses. The findings indicate that shift work exerts a substantial influence on both physiological and psychosocial well-being, with 90–96% of participants reporting adverse effects. These results align with international and regional literature, emphasizing that nonstandard work schedules compromise nurse health, family functioning, and overall quality of life.

The results demonstrate that a significant majority of nurses experienced poor sleep quality, particularly those working rotating and night shifts. Rotating shift nurses reported the highest prevalence of sleep disturbance (94%), followed closely by night shift nurses (92%). These findings corroborate prior research showing that shift work disrupts circadian rhythms, leading to prolonged sleep latency, fragmented sleep, and excessive daytime sleepiness (Alharbi et al., 2024; Aljohani et al., 2024). Poor sleep among nurses has been linked to impaired cognitive performance, fatigue, and increased risk of clinical errors, highlighting the implications for both personal health and patient safety.

The current study further revealed that married nurses and those working longer weekly hours reported slightly higher PSQI scores, suggesting that family responsibilities and workload intensity exacerbate sleep disturbances. This finding supports prior evidence indicating that the cumulative burden of work and personal life may intensify the negative impact of shift schedules on sleep (Alruwaili & Alanazy, 2024).

The present study highlights the pervasive effect of shift work on family routines and social engagement, with 90–96% of participants agreeing that their schedules interfered with family life. Rotating shift nurses reported the greatest disruption, consistent with studies suggesting that irregular and unpredictable schedules are particularly burdensome for familial and social obligations (Almojali et al., 2021). Fixed night shift nurses also reported substantial disruption, while day shift nurses experienced comparatively less impact. The findings suggest that temporal misalignment between work and family roles restricts nurses' ability to participate in family activities, attend social events, and maintain relational quality, corroborating global work-family conflict literature (Wöhrmann et al., 2025).

The study found high levels of work-to-family conflict among participants, particularly for those on rotating shifts, with 91–95% agreeing that occupational demands interfered with family responsibilities. Family-to-work conflict was slightly lower but still prevalent, suggesting an asymmetry in the direction of conflict. These findings align with theoretical models of work-family conflict, which posit that temporal, strain-based, and behavioral interference from work roles can adversely affect family life (Greenhaus & Beutell, 1985). The observed strong positive correlation between work-to-family conflict and poor sleep quality ( $r = 0.68$ ,  $p < 0.001$ ) underscores the interconnected nature of shift work, sleep disturbance, and family strain.

Rotating shift nurses consistently reported higher PSQI scores, greater family disruption, and more pronounced work-family conflict than their day or fixed night shift counterparts. These findings suggest that schedule irregularity and unpredictability exacerbate both sleep and psychosocial outcomes, supporting prior international research demonstrating that rotating shifts impose a heavier burden than fixed schedules (Wöhrmann et al., 2025). Day shift nurses, while less affected, still reported notable disruption, indicating that even conventional schedules may not be entirely protective due to factors such as overtime or weekend work.

The findings have important implications for nursing management and healthcare policy in Saudi Arabia. Hospitals should consider shift scheduling strategies that minimize rotating and excessive night shifts, offer flexible scheduling options, and provide sleep hygiene programs and psychosocial support to mitigate the adverse effects of shift work. Additionally, interventions targeting work-family conflict, such as family-supportive policies and structured rest periods, may improve both nurse well-being and patient safety outcomes.

The study's strengths include a relatively large, diverse sample of 400 nurses and the use of validated instruments for sleep quality, family functioning, and work-family conflict. However, limitations include the cross-sectional design, which prevents causal inferences, and reliance on self-reported data, which may introduce response bias. Future research could adopt longitudinal designs and include objective measures of sleep (e.g., actigraphy) to strengthen causal interpretations.

Overall, the study demonstrates that shift work has significant adverse effects on sleep quality, family life, and work-family balance among Saudi nurses, with rotating shifts producing the greatest disruption. These findings emphasize the need for evidence-based interventions to address the physiological and psychosocial consequences of nonstandard work schedules, ultimately improving nurse well-being and healthcare quality.

## CONCLUSION

This study provides compelling evidence that shift work significantly impacts the sleep quality, family life, and work-family balance of Saudi nurses. The overwhelming majority of participants (90–96%) reported that nonstandard schedules, particularly rotating and night shifts, disrupted their sleep patterns, reduced their participation in family and social activities, and increased work-family conflict. Rotating shifts were associated with the greatest adverse effects, highlighting the critical role of schedule irregularity in determining nurses' well-being.

These findings underscore the interconnectedness of occupational demands, physiological health, and psychosocial outcomes in nursing practice. Poor sleep quality and heightened work-family conflict not only compromise nurse health but may also affect professional performance and patient safety. The study highlights the need for evidence-based strategies—including optimized shift scheduling, flexible work arrangements, and interventions aimed at improving sleep hygiene and family support—to mitigate the negative consequences of shift work.

In conclusion, addressing the challenges posed by shift work is essential for enhancing nurse well-being, retention, and the overall quality of healthcare delivery in Saudi Arabia. The results provide a foundation for policy development and organizational interventions to support nurses in managing the demands of nonstandard work schedules while maintaining personal and family health.

## Recommendations

1. Hospitals should minimize rotating and excessive night shifts where possible and implement predictable schedules to reduce sleep disruption and work-family conflict.
  2. Provide educational interventions on sleep hygiene, fatigue management, and circadian rhythm adjustment strategies for shift-working nurses.
  3. Develop programs such as flexible scheduling, family leave options, and childcare support to help nurses balance professional and family responsibilities.
  4. Regularly assess sleep quality, fatigue, and work-family conflict among nurses to identify those at risk and provide timely support.
  5. Encourage hospital administrators to recognize the impact of shift work on nurses' health and family life, integrating this understanding into workforce planning and retention strategies.
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