

Lack of Sleep and Disorder among Health Care Workers: A Systematic Review

Amna Mohamed Hassan Dreeb¹, Mohammed Hamad Al Saqoor², Dohaiman Hamad M Sagoor³, Hadi Ali Dohaiman Al Yami⁴, Ghaleb Mohammed Ghaleb Almastaner⁵, Hussain Mohammed Hussain Bin Qurayah⁶, Fatimah Thabet Alshahrany⁷, Khalid Abdullah Alabbad⁸, Mohammed Hadi Al Duways⁹, Maryam Mohamed Alhumidan¹⁰

1. Medical Secretariat, Directorate General of Health Affairs in the Eastern Province
2. Pharmacy technician, Najran General Hospital
3. Dental Technician, Najran . Alshebhan Phcc
4. Psychologist, al-amal psychiatric center
5. Technician Health Informatics, Yadmah Hospital
6. Nursing Technician (M), Eradah Complex for mental health in Najran
7. Midwifery, Abha Maternity and Children's Hospital
8. Nursing Technician, Al Yamamah Hospital in Riyadh
9. Forensic Medical Services Center, Information Technology Supervisor, Health Information Technician
10. Nursing Technician, King Fahad Hospital in alHofuf - Diabeter Clinic

ABSTRACT

Introduction: Nurses frequently experience sleep disturbances, leading to significant negative impacts on their well-being. These disruptions not only compromise their health but also the caliber of nursing care they provide, ultimately affecting their overall performance and productivity in the healthcare setting. **Methods:** A comprehensive electronic literature search was conducted within the PubMed and Embase databases to gather relevant studies. Following the removal of unsuitable and repeated articles, a total of 52 studies were selected for inclusion in this analysis. **Results:** The analysis uncovered several key factors contributing to the sleep disturbances experienced by nurses. These include the requirement to work night shifts, the physiological and psychological state of the nurses, and various demographic factors such as age, gender, dietary habits, and alcohol consumption. The period of the COVID-19 pandemic also emerged as a significant contributor to the degradation of sleep quality among nurses. The repercussions of inadequate sleep are far-reaching, affecting cognitive and behavioral functions, increasing the risk of injuries and infections, diminishing the quality of nursing care, and leading to an increase in errors and accidents in the workplace. **Conclusions:** To address these sleep-related challenges, a variety of strategies can be adopted, ranging from instrumental and self-regulatory approaches to avoidant, task-oriented, and emotionally focused coping mechanisms. It is imperative for nurses to be equipped with effective coping strategies to enhance their sleep quality and mitigate the adverse effects associated with the demands of their profession. Among the

Amna Mohamed Hassan Dreeb, Mohammed Hamad Al Saqoor, Dohaiman Hamad M Sagoor, Hadi Ali Dohaiman Al Yami, Ghaleb Mohammed Ghaleb Almastaner, Hussain Mohammed Hussain Bin Qurayah, Fatimah Thabet Alshahrany, Khalid Abdullah Alabbad, Mohammed Hadi Al Duways, Maryam Mohamed Alhumidan

interventions proven to improve sleep quality in nurses are exposure to bright light, strategic napping, modification Of shift schedules, and behavioral adaptations aimed at promoting better sleep hygiene.

KEYWORDS: Sleep Challenges, Nurse Well-being, Work-related Sleep Issues, Healthcare Occupational Health.

1. Introduction

Nurses are pivotal in the healthcare workforce, providing extensive, continuous care directly to patients. Positioned at the forefront of patient interaction within healthcare facilities, they encounter a wide range of physical and psychological stressors [1]. The World Health Organization notes that nurses constitute over half of the healthcare workforce worldwide, highlighting their critical role in the health sector [2].

Their duties require unwavering attention and focus, ensuring readiness for any emergencies or urgent care needs [3]. Research indicates that the shift work inherent in nursing significantly disrupts sleep patterns, leading to detrimental health outcomes, with nurses being particularly susceptible within the healthcare environment [4]. A scoping review focused on enhancing fatigue risk management among healthcare workers pointed out that nurses and midwives, who often work shifts, experience sleep disturbances, fatigue, and consequent impacts on the quality of patient care provided [5].

Healthcare systems are designed to fulfill the health needs of the community, necessitating continuous service provision, often through night shifts and extended duty hours [6]. Nurses frequently in alternating shifts, including night and extended shifts beyond the standard eight-hour workday, with some shifts stretching to twelve or even twenty-four hours [5]. Evidence suggests that such extended working hours are linked to sleep disruption and long-term negative health consequences [4, 7-9]. Additionally, a significant portion of nurses on night shifts report sleep difficulties and associated long-term health issues [5].

2. Methods

To thoroughly investigate the impact of shift work on nurses' sleep patterns and overall health, a detailed web-based search was initiated across PubMed and Embase. The search strategy employed targeted keywords such as "sleep disturbances," "sleep problems," "shift work," "nurses," and "work overload" to capture the breadth of existing research on the topic. This initial search yielded 122 potential studies for consideration. The process continued with a meticulous review of the reference lists from identified articles and reviews, aiming to uncover additional studies pertinent to the subject matter. This step was crucial in ensuring that no relevant research was overlooked.

Following this comprehensive search, the screening process began, focusing on the

relevance and quality of the studies. This involved removing studies that did not directly address the research question, duplicates, and those categorized as review articles rather than original research. After applying these criteria, a final selection of 52 studies remained. These studies were deemed to meet the inclusion criteria effectively and were included in the review for detailed analysis.

This methodological approach was designed to provide a robust and comprehensive overview of the available evidence, facilitating a nuanced understanding of how shift work, particularly night shifts and extended hours, affects the sleep quality and health outcomes of nurses. The review aims to synthesize findings from diverse contexts and study designs, shedding light on the multifaceted challenges faced by nurses and identifying potential strategies for mitigating the adverse effects of their demanding work schedules.

3. Results and discussion

Many previous studies have investigated the sleep patterns and its consequences among nurses and other healthcare providers, one previous study, conducted in Thailand, have documented that 76% of nurses have less than seven hours of daily sleep [10], similar findings were reported from another study, conducted in the United States, which have reflected that the hours of sleep among nurses is in average of less than seven hours a day [11], and the same level was reported by another study conducted in India where the rate of sleep deprivation was among two thirds of nurses working in the hospitals [12]. Furthermore, studies conducted in Saudi Arabia have showed that most of nurses on night shifts experienced sleep problems with physical or physiological consequences [13, 14]. The aim of this literature review is to highlight what is already known about sleep disturbance among hospital nurses and to identify strategies and interventions to solve the problem. In addition, this literature review will identify the influencing factors of sleep disturbance with demographic characteristics of working nurses. Factors influencing sleep patterns among hospital nurses:

Sleep disturbance is a state of lowered alertness and impaired productivity associated with alertness caused by inadequate quantity or quality of sleeping hours [15]. There are several reported influencing factors that could affect the quality of nurses' sleep patterns. It is obvious that nurses working in morning shifts have better sleep patterns compared to those working in night shifts [16, 17]. Furthermore, nurses working in night shifts suffer from lack of sleep and long term negative consequences such as increase body weight, high blood pressure, and psychological issues [18]. Working night shifts in the health sector is a challenging condition but it is sometimes rewarding endeavor. Additionally, it is becoming a standard for healthcare workers to work morning, nights, and weekends or even extended long hours. The American Academy for Sleeping Disorders has reported that nurses who work night, early morning, and rotating shifts for their jobs are at higher risks for shift work sleep disorder [19]. This situation could influence nurses to be sleep deprived and/or excessively sleepy while at work because of the disorder. The negative consequences associated with lack of sleep such as circadian rhythmicity, physiological changes affecting sleep and wake cycles, hormone secretions body temperature and blood

Amna Mohamed Hassan Dreeb, Mohammed Hamad Al Saqoor, Dohaiman Hamad M Sagoor, Hadi Ali Dohaiman Al Yami, Ghaleb Mohammed Ghaleb Almastaner, Hussain Mohammed Hussain Bin Qurayah, Fatimah Thabet Alshahrany, Khalid Abdullah Alabbad, Mohammed Hadi Al Duways, Maryam Mohamed Alhumidan

pressure [20]. In particular, for Saudi Arabian context, the total of nurses was about two thirds of the total healthcare professionals working in the health sectors [21]. At the local level in Saudi Arabia, there are studies that investigating poor sleep among nurses, one of these studies was conducted by Alsharari, 2019 which showed most of hospital nurses have psychological issues related to night shifts [13]. Another study in the country concluded that nurses working night shifts have patient safety issues and other physiological problems [14].

Another factor affecting sleep patterns of nurses is physiological aspect of body; these include body temperature, blood pressure, heart rate [22-24]. These factors could interfere with work status lead to mistakes, errors, lack of sleep, or insufficient nursing care. As a result sleep disturbance could be a recurrent problem among nurses [24]. These factors could also lead to negative outcomes among hospital nurses and low productivity.

The third influencing factor on sleep pattern among nurses is demographic characteristics of nurses [22, 23]. These include age, gender, eating patterns, intake of tea or coffee, social patterns, alcohol intake, and several other factors associated with lack of nurses' sleep. However, some previous studies on Australian healthcare worker not ascertain the association between these factors and sleeping problems [25, 26], other studies have linked these factors with lack of sleep and other negative consequences [16, 18, 27, 28]. It was also reported that alcohol could negatively affect sleep quality of hospital nurses, it was reported from a study conducted on factors influencing sleep patterns of hospital nurses that the alcohol consumption is an influencing factor on nurses' sleep quality if taken before bed time [29]. Furthermore, one previous study reported that the nurses work in shifts, or having bad nutritional habits were highly exposed to shorter sleeping times [30].

The last recent influencing factors in the COVID-19 pandemic and other infectious diseases. As nurses working in the frontline to confront the pandemic they exposed to psychological stress, fatigue, and physiological changes as a response to the stressful situation. It was reported that Omani nurses have experienced lack of sleep during the pandemic [31]. Another study conducted in the United States of America has shown nurses working during the COVID-19 pandemic was reported poor sleep patterns [32]. Effect of sleep disturbance on hospital nurses: It is approved that the negative effects of sleep disturbance on nurses' behavioral and cognitive functions [33-35]. Lack of sleep among nurses lead them to make errors, mistakes, injuries, and lowering patient safety [5, 10] several previous studies have linked the medications administration errors with lack of sleep among working nurses [36]. Additionally, they become more at risk for needle stick injuries, highly risk for blood borne diseases [37] other reports highlighted that nurses will make more human errors and injuries due lack of sleep which certainly decrease quality of provided nursing care [38].

Another negative consequences of lack of sleep include unsafe behavior [39]. Based on the National Sleep Foundation, lack of sleep leads to producing more cortisol in relation to drowsiness and fatigue, irritability, tiredness and possibly even delusion behaviors [40]. The third effect is that less sleeping hours is the main cause for

nurses' burnout, because working as a nurse is the most stressful job compared to other health care professions [41]. It was reported in one study on nurses' burnout and quality of sleep during COVID-19 that burnout levels are associated with nurses' insomnia [42].

Coping strategies with sleep disturbance among nurses:

Sleep disturbance is prevalent among hospital nurses with negative consequences on nurses' physical and psychological health [43]. There are different approved coping strategies used by working nurses to decrease the effect of poor sleep, these include instrumental, avoidant, task oriented and emotion oriented [44-46].

The strategies of coping with stress among hospital nurses is one of the main components of the stress management process. Several studies have documented that appropriate coping strategies decrease the negative adverse effect of sleep deprivation based on several theories [47]. It was approved that coping is mainly applied by two strategies of stress coping including instrumental, or on self-adjustment. The instrumental approach was directed to solve the problem by changing behavior or modifying environment. The self-adjustment process includes control and appropriate modification [44]. Endler and Parker mentioned other three coping strategies include avoidant, task oriented and emotion oriented [45, 46].

There is lack of evidence for appropriate coping strategies used by hospital nurses for lack of sleep, but there are some studies which explored the used coping styles for sleep disturbances by nurses and nursing students. It was noticed that they used emotion oriented strategies for short sleeping hours compared to those with longer sleeping hours [48]. Avoidant is another coping strategies reported by Sadeh and Gruber, who recommended this approach to get enough sleeping hours for shift nurses [49]. The emotion oriented coping strategies for poor sleep is another recommended strategies to bring more physiological arousal and get in sleep faster [50].

4. Conclusions

The sleeping problems among hospital nurses need appropriate interventions to control and mitigate its consequences. Several interventions have been recommended to manage hospital nurses' sleep problems, these may include bright lighting technique, napping, staffing and shift scheduling, or behavioral based interventions.

The first intervention is the bright lighting which is the most common intervention used to improve nurses' alertness during shiftwork and to ensure sleep quality after work. It works by suppressing the production of melatonin after exposure for bright lighting so nurse could have adequate sleeping hours. The second intervention is the brief nap which is approved to be useful for reducing the sleepiness and enhancing sleep needs. The third common intervention for enhancing nurses sleeping patterns is rescheduling of the shifts which was approved technique, which plays a significant role in nurses sleep with distribution of working days and rest days. The last intervention is the behavioral based approach which was approved as one of the effective intervention to minimize insomnia among working nurses because nurses

Amna Mohamed Hassan Dreeb, Mohammed Hamad Al Saqoor, Dohaiman Hamad M Sagoor, Hadi Ali Dohaiman Al Yami, Ghaleb Mohammed Ghaleb Almastaner, Hussain Mohammed Hussain Bin Qurayah, Fatimah Thabet Alshahrany, Khalid Abdullah Alabbad, Mohammed Hadi Al Duways, Maryam Mohamed Alhumidan

exposed for several stressor in working environment. These interventions need further investigation to ensure it consider individual differences among hospital nurses and to be applicable to manage sleeping problems.

Conflict of interests

The authors declared no conflict of interests.

References

- Aljomaie, H.A.H., et al., A scoping review of the healthcare provided by nurses to people experiencing domestic violence in primary health care settings. *International Journal of Nursing Studies Advances*, 2022: p. 100068.
- World Health Organization, *State of the world's nursing 2020: investing in education, jobs and leadership*. 2020.
- Wolf, L.A., et al., "It 'sa burden you carry": describing moral distress in emergency nursing. *Journal of Emergency Nursing*, 2016. 42(1): p. 37-46.
- James, S.M., et al., Shift work: disrupted circadian rhythms and sleep—implications for health and well-being. *Current sleep medicine reports*, 2017. 3(2): p. 104-112.
- Querstret, D., et al., Improving fatigue risk management in healthcare: a scoping review of sleep-related/fatigue-management interventions for nurses and midwives (reprint). *International journal of nursing studies*, 2020. 112: p. 103745.
- Bajraktarov, S., et al., Main effects of sleep disorders related to shift work—opportunities for preventive programs. *EPMA Journal*, 2011. 2(4): p. 365-370.
- Lockley, S.W., et al., Effects of healthcare provider work hours and sleep deprivation on safety and performance. *The Joint Commission Journal on Quality and Patient Safety*, 2007. 33(11): p. 7-18.
- Bannai, A. and A. Tamakoshi, The association between long working hours and health: a systematic review of epidemiological evidence. *Scandinavian journal of work, environment & health*, 2014: p. 5-18.
- Kuppermann, M., et al., Sleep problems and their correlates in a working population. *Journal of general internal medicine*, 1995. 10(1): p. 25-32.
- McDowall, K., E. Murphy, and K. Anderson, The impact of shift work on sleep quality among nurses. *Occupational Medicine*, 2017. 67(8): p. 621-625.
- Stimpfel, A.w., F. Fatehi, and C. Kovner, Nurses' sleep, work hours, and patient care quality, and safety. *Sleep Health*, 2020. 6(3): p. 314-320.
- Liu, K., T. Yin, and Q. Shen, Relationships between sleep quality, mindfulness and work-family conflict in Chinese nurses: A cross-sectional study. *Applied Nursing Research*, 2020. 55: p. 151250.
- Alsharari, A.F., Psychosocial impact of night shift work among nurses in Saudi Arabia. *American Journal of Nursing*, 2019. 7(3): p. 238-247.
- Alsharari, A.F., et al., Impact of night shift rotations on nursing performance and patient safety: A cross-sectional study. *Nursingopen*, 2021. 8(3): p. 1479-1488.
- American Academy of Sleep, M., *International classification of sleep disorders. Diagnostic and coding manual*, 2005: p. 51-55.
- Cilingir, D., S. Hintistan, and O. Ergene, Factors affecting the sleep status of surgical and medical patients at a University Hospital of Turkey. *J Pak Med Assoc*, 2016. 66(12): p. 1535-1540.
- Zencirci, A.D. and S. Arslan, Morning-evening type and burnout level as factors influencing sleep quality of shift nurses: a questionnaire study. *Croatian medical journal*, 2011. 52(4): p. 527-537.

- Chung, M.-H., et al., Sleep and autonomic nervous system changes—enhanced cardiac sympathetic modulations during sleep in permanent night shift nurses. *Scandinavian journal of work, environment & health*, 2009; p. 180-187.
- American Academy of Sleep, M., *The International Classification Sleep 2014*: American Academy of Sleep Medicine.
- FISk, A.S., et al., Light and cognition: roles for circadian rhythms, sleep, and arousal. *Frontiers in neurology*, 2018;9: p. 56.
- Saudi Arabia-Ministry of Health, Yearbook, Statistical, Available online: <https://www.moh.gov.sa/en/Ministry/Statistics/book.Pages/default.aspx> (accessed on 6 November 2019), 2020.
- Chung, M.H., et al., Sleep quality and morningness—eveningness of shift nurses. *Journal of Clinical Nursing*, 2009. 18(2): p. 279-284.
- Aiken, L., et al., The working hours of hospital staff nurses and patient safety. Project HOPE—The people-to-people health foundation. *Health* <https://doi.org/10.1377/hlthaff>, 2004;23: p. 202.
- Ohida, T., et al., An epidemiologic study of self-reported sleep problems among Japanese adolescents. *Sleep*, 2004. 27(5): p. 978-985.
- Zhao, I. and C. Turner, The impact of shift work on people's daily health habits and adverse health outcomes. *Australian Journal of Advanced Nursing*, The, 2008. 25(3): p. 8-22.
- Lohsoonthom, V., et al., Sleep quality and sleep patterns in relation to consumption of energy drinks, caffeinated beverages, and other stimulants among Thai college students. *Sleep and Breathing*, 2013. 17(3): p. 1017-1028.
- Peplofiska, B., P. Nowak, and E. Trafalska, The association between night shift work and nutrition patterns among nurses: a literature review. *Medycyna pracy*, 2019;70.
- Alotaibi, J.s., B. Dharmarajan, and M.R. Rizvi, Influence of nursing care intervention on quality of sleep in hospitalized patients at Riyadh, Saudi Arabia. *Saudi Journal for Health Sciences*, 2022. 11(1): p. 34.
- Shin, S. and S. Kim, Rotating between day and night shifts: Factors influencing sleep patterns of hospital nurses. *Journal of Clinical Nursing*, 2021. 30(21-22): p. 3182-3193.
- Kim, J.-M. and B.-H. Kang, The relationships between dietary behavior and health related factors according to shift work in nurses. *Journal of Nutrition and Health*, 2014. 47(6): p. 416425.
- Al Maqbali, M., Sleep disturbance among frontline nurses during the COVID-19 pandemic. *Sleep and Biological Rhythms*, 2021. 19(4): p. 467473.
- Kim-Godwin, Y.s., et al., Factors influencing sleep quality among female staff nurses during the early COVID-19 pandemic in the United States. *International Journal of Environmental Research and Public Health*, 2021. 18(9): p. 4827.
- Zion, N. and T. Shochat, Cognitive functioning of female nurses during the night shift: The impact of age, clock time, time awake and subjective sleepiness. *Chronobiology International*, 2018. 35(1 1): p. 1595-1607.
- Behrens, T., et al., Decreased psychomotor vigilance of female shift workers after working night shifts. *Plos one*, 2019. 14(7): p. e0219087.
- Ganesan, S., et al., The impact of shift work on sleep, alertness and performance in healthcare workers. *Scientific reports*, 2019. 9(1): p. 1-13.
- Di Muzio, M., et al., Can nurses' shift work jeopardize the patient safety? A systematic review. *Eur Rev Med Pharmacol Sci*, 2019. 23(10): p. 4507-19.
- Ilhan, M.N., et al., Long working hours increase the risk of sharp and needlestick injury in nurses: the need for new policy implication. *Journal of advanced nursing*, 2006. 56(5): p. 563-568.
- Winwood, P.c., A.H. Winefield, and K. Lushington, Work-related fatigue and recovery: the contribution of age, domestic responsibilities and shiftwork. *Journal of advanced nursing*, 2006;56(4): p. 438-449.

- Amna Mohamed Hassan Dreeb, Mohammed Hamad Al Saqoor, Dohaiman Hamad M Sagoor, Hadi Ali Dohaiman Al Yami, Ghaleb Mohammed Ghaleb Almastaner, Hussain Mohammed Hussain Bin Qurayah, Fatimah Thabet Alshahrany, Khalid Abdullah Alabbad, Mohammed Hadi Al Duways, Maryam Mohamed Alhumidan
- Lang, C.J., et al., Sociodemographic and behavioural correlates of social jetlag in Australian adults: results from the 2016 National Sleep Health Foundation Study. *Sleep Medicine*, 2018.51: p. 1331-39.
- Swenson, D.X., D. Waseleski, and R. Hard, Shift work and correctional officers: Effects and strategies for adjustment. *Journal of Correctional Health care*, 2008. 14(4): p. 299-310.
- Lsikhan, V., T. Comez, and M.Z. Danis, Job stress and coping strategies in health care professionals working with cancer patients. *European Journal of Oncology Nursing*, 2004. 8(3): p. 234-244.
42. Sayllan, A.A., N. Kulakac, and S. Uzun, Burnout levels and sleep quality of COVID-19 heroes. *Perspectives in psychiatric care*, 2021.
- Ferri, P., et al., The impact of shift work on the psychological and physical health of nurses in a general hospital: a comparison between rotating night shifts and day shifts. *Risk management and healthcare policy*, 2016. 9: p. 203.
- Folkman, S., et al., Appraisal, coping, health status, and psychological symptoms. *Journal of personality and social psychology*, 1986.50(3): p. 571.
- Endler, N.S. and J.D. Parker, Stress and anxiety: Conceptual and assessment issues. *Stress medicine*, 1990. 6(3): p. 243-248.
- Parker, J.D. and N.S. Endler, Coping with coping assessment: A critical review. *European Journal of personality*, 1992. 6(5): p. 321-344.
- Gatche1, R.J. and I.z. Schultz, *Handbook of occupational health and wellness*. 2012.
- Morin, C.M., S. Rodrigue, and H. Ivers, Role of stress, arousal, and coping skills in primary insomnia. *Psychosomatic medicine*, 2003. 65(2): p. 259-267.
- Sadeh, A. and R. Gruber, Stress and sleep in adolescence: A clinical-developmental perspective. 2002.
- Selye, H., The stress concept: Past, present, and future. *Stress research*, 1983: p. 1-20.