

## EFFECTS OF SHIFT WORK ON SLEEP QUALITY AND MENTAL HEALTH OF NURSES

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### ABSTRACT

The delivery of health care is also associated with shift work and, therefore, patient care can be delivered during the day as well as at night. Abnormal and extended working hours have been reported to cause significant effects on the nursing sleep and psychological health, as these staff members are the workforce behind 24-hour operations of a hospital. The disruptions in the normal circadian rhythms caused by night shifts have the propensity to cause a short duration of sleep, poor quality of sleep, and chronic fatigue. They can result in psychological outcomes such as stress and anxiety, being irritable and depressed due to these physiological disruptions, which ultimately influence the performance and patient safety at work. The stressful nature of the shift rotations also disrupts the social relations and the personal life, which increases the emotional exhaustion and burnout even more. Psychiatric and occupational health publications emphasize the fact that there is an adverse effect of regular exposure to rotating or night shifts on cognitive functioning, decision-making, and emotional stability. Moreover, one of these negative effects is made worse by the lack of organizational support and insufficient time between shifts to rest. To address this, evidence-based scheduling policies, education in sleep hygiene, and workplace interventions to support mental resilience are needed. Facilitating self-care activities, offering counseling services, and maintaining a healthy workload can reduce the harmful effects of shift work. In general, enhancement of nurse' sleeping quality and mental health is not just important for their own health but also for ensuring the quality and safety of patient care in healthcare facilities.

**Keywords:** Shift Work, Sleep Quality, Mental Health, Nurses, Fatigue, Burnout, Work Stress, Circadian Rhythm, And Healthcare Management.

## 1. INTRODUCTION

In the contemporary healthcare system, shift work is an inseparable component of a modern healthcare system to guarantee around-the-clock care and efficiency of work [1]. To provide 24-hours of service delivery, nurses at hospitals and emergency departments frequently work rotating shifts, including night shifts. This schedule system however interferes with the natural circadian rhythm not only to the physiological health but also to the psychological health [2]. The study indicate that shift work in nurses leads to sleep disorders, fatigue, decreased concentration, and increased burnout and mood disorders risks [3]. The growing awareness of such problems have prompted healthcare organizations to consider the flexible scheduling paradigm, e-monitoring systems, and policy-based interventions to reduce health risks and maintain workers productivity [4]. Nurses are an essential component in ensuring continuity and quality of healthcare services since they offer 24-hour patient care. Their 24-hour care means that the patients are provided with the medical care they need in a timely manner, emotional support, and regular checking of their physical and psychological states [5]. The nurses in hospitals act as the main connection between the patient and other healthcare practitioners in coordination of treatments, medication administration and reacting swiftly to any emergency [6]. They are particularly important in night shifts, when they have to care of acute and routine needs, and may have to operate in understaffed conditions [7]. In addition to clinical duties, nurses manage to offer compassion, reassurance and advocacy which help in patient recovery and satisfaction. The need in the constant nursing cover has also grown over the past years as the healthcare systems become more complicated and the number of patients grows. Such vigilance does not only eliminate medical errors but also secures patient safety, minimizes the number of hospital readmissions, and makes the process of healthcare delivery more effective [8]. The adverse effects of irregular and rotating working schedules on the quality of sleep and mental well-being of healthcare providers, especially nurses, has become increasingly popular over the past years [9]. The body is subjected to the continuous shift in the natural circadian rhythm resulting in

lack of sleep and inadequate and low-quality sleep [10]. Sleep deprivation leads to long term chronic fatigue, cognitive impairment and emotional instability [11]. Irregular schedules to be associated with increased anxiety, depression, and burnout in nurses, poor performance in the fields and quality in assisting patients [12]. Unpredictability of the rotations of the shifts also disrupts social and family lives, increasing stress and decreasing the overall levels of life satisfaction [13]. These health implications have become more apparent and led with a new push toward creating balanced scheduling systems, sleep hygiene education, and mental health support programs as healthcare systems become more reliant on 24-hour operations [14]. The need to handle such problems is no longer regarded as critical to the physical and mental health of medical workers, but also the safety and efficiency of patient care.

### 1.1 Concept of Shift Work in Nursing

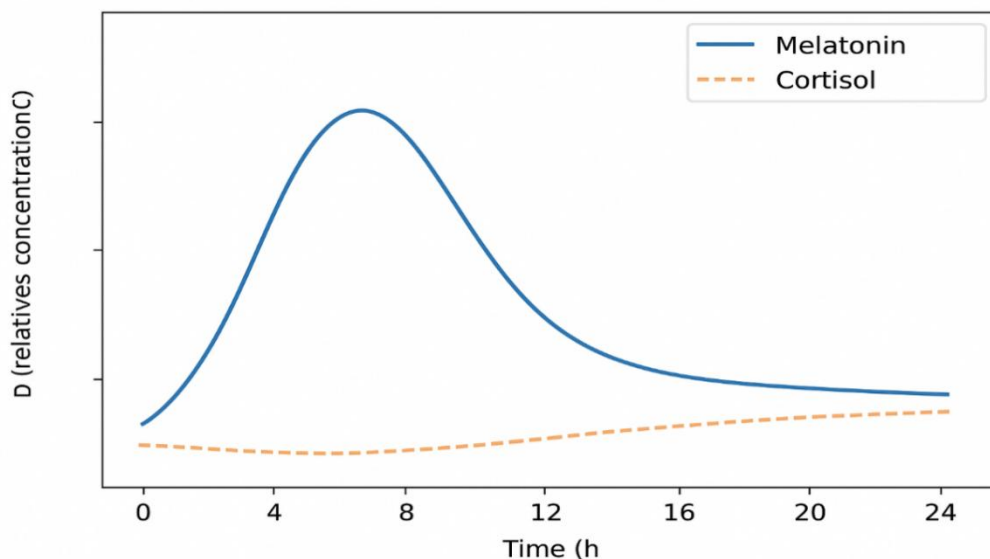
Any work schedule that does not conform to the usual day working hours of say 7 am to 6 pm necessitates employees to work in the evenings, during the nights, or at odd times. Shifting in healthcare is a structural requirement in this way that 24-hour patient care and continuity in operations are assured. It usually involves three broad categories and they are night shifts, rotating shifts and extended shifts [15]. Night shifts are characterized by working mostly at nighttime, which can cause the disturbed body circadian rhythm and low quality of sleep [16]. In Rotating shifts nurses have to work day, evening, and night shifts within a given time, and this becomes even more problematic because the body can hardly adapt to the ever-shifting sleep-wake rhythms [17]. Hospitals have to keep long shifts, usually longer than the regular 8 hours and possibly 12 or more, to fill staffing gaps and emergencies but they result in significant fatigue and stress. Both forms of shifts have different physiological and psychological effects, and the knowledge of shift patterns is essential to create the strategies that would protect the health, performance, and well-being of healthcare workers [18]. The main reasons of shift systems in healthcare are to provide the 24-hour supply of medical care and patient safety in 24/7 environments. Hospitals, emergency departments, and intensive care units need the presence of full time staffing to accommodate unforeseen needs

of patients, handle emergencies and observe critical cases [19]. Shifts work is becoming an essential part of ensuring uninterrupted clinical cover and efficient use of resources in healthcare facilities due to the 24-hour nature of their operation [15]. The shift systems also assist in the equal distribution of labor among the healthcare workers so that each group does not feel overloaded at any given time [20]. They also assist in timely management of medication, postoperative follow-up and monitoring of the patients without interruptions [21]. Medical facilities are adopting the use of shift schedules to maximize operational expenses, improve service provision, and address accreditation or policy needs that require uninterrupted care [22]. The use of shift systems in the teaching hospitals also helps in training the medical staff as they are exposed to various clinical scenarios at various times. Shift work also results in the emergence of a set of problems concerning the well-being of the staff as well as fatigue and mental health, which are getting more and more acknowledged in

contemporary workforce planning [23]. Study suggests that shift work has become a characteristic of the modern nursing practice throughout the healthcare systems [24]. In the local studies of the Asian healthcare systems, nurses frequently work 8-12 hour rotating shifts, and they are not leaving before the end of the contract, thereby creating a sleep debt and fatigue [18].

### 1.2 Physiological Effect of Shift Work

The major physiological impacts of shift work are associated with the disruption of the normal circadian rhythm of the body which controls most key biological processes like the sleep-wake rhythm, hormonal balance, and metabolism [25]. In case people work irregular or night shifts, the rhythm of internal biological clocks with external environmental factors is disturbed, which causes hormonal disorders, oxidative stress, and inflammation [26]. Such derailment may be exemplified by comparing the changed patterns of hormonal secretion among the day-shift and the night-shift nurses as presented in Figure 1.2.



**Figure 1.2** Disruption of normal circadian hormone secretion (melatonin and cortisol) among night-shift nurses compared with day-shift nurses.

This dyscoordination regulates melatonin release, cortisol levels, and glucose breakdown which in combination leads to fatigue, metabolic syndrome, cardiovascular diseases and a higher risk of cancer [27, 28]. Studies have established that circadian disruption modulates gene expression in core clock genes that promote physiological stability, which leads to lasting alterations of metabolic and immune activities [29]. The long-term effects of rotating or night shifts are an increased level of stress hormones,

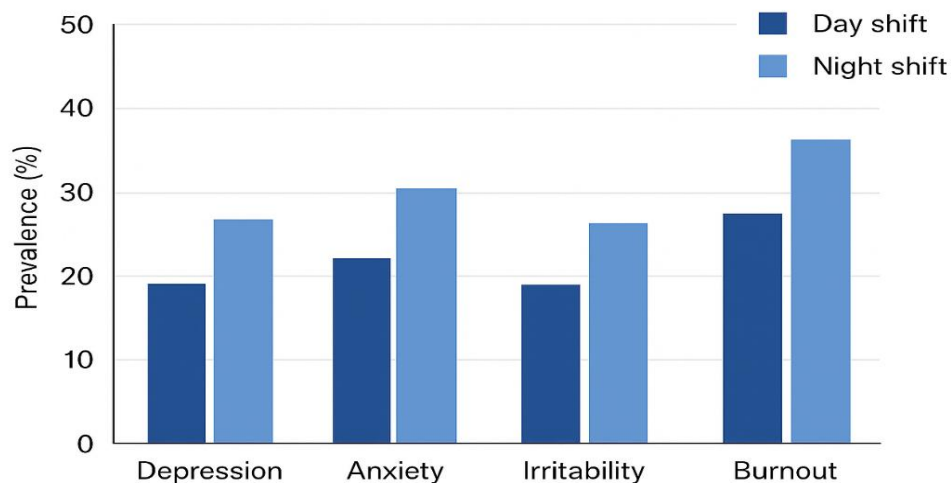
the inactivation of immune processes, and the change in the activity of neurotransmitters in the brain, which causes cognitive fatigue, mood instability [30]. Chronic exposure to artificial light at night has been associated with blocked melatonin synthesis, poor sleep quality, and hormonal imbalances to general health [31]. Study shows that shift work is not a frivolous lifestyle but a significant physiological stressor that interferes with various body systems due to circadian disruption [32]. Shift work greatly

affects the duration of sleep, sleep quality, and fatigue of medical workers, in particular, nurses [33]. The abnormal night rhythm and rotating night shifts destroy the adaptation of the circadian rhythm of the body with the external light-dark cycles, leading to the decrease of total sleep time and discontinuous rest [33]. Studies indicated that nurses in night shifts tended to sleep less and less restfully and their sleep onset latency was high and frequently they were awakened. Sleep deprivation causes long-term fatigue, decreased cognitive speed, and lack of alertness on workplace [34]. This fatigue is chronic in nature with the implication that in addition to its effect on performance and patient safety, it plays a role in [35]. Shift work is a serious physiological and psychological burden as it affects the quality and duration of sleep, which eventually results in constant fatigue and poor occupational performance [36]. Extensive biological effects of shift work include interference with endocrine and metabolic systems of the body that results in hormonal imbalance, metabolic imbalance, and chronic fatigue [37]. Due to the irregular working hours and artificial lighting at night, the regular secretion of melatonin and cortisol, two hormones necessary to control sleep, reaction to stress and metabolism of energy, are disrupted [38]. Melatonin suppression does not only disorient the sleep-wake system but also affects the functions of reproductive and thyroid hormones [39]. It is circadian disorientation that results in the abnormal cortisol rhythms that induce augmented tension, insulin resistance, and hunger malcoordination [40]. The dysfunction of the metabolism is manifested in the long-term effects of the shift work such as low

tolerance to glucose, elevated triglyceride levels, and predisposition to obesity and type 2 diabetes [41]. Research states that circadian rhythm impairment triggers inflammatory activities and oxidative stress, as well as the process of accelerated aging of cells and impaired physical endurance [42]. These biological changes over time tend to form a continuous cycle of fatigue, stress, and metabolic disruptions that affect each other, making the body less resilient and adaptive. Cumulative physiological burden of shift work is in the form of multidimensional disorder which includes hormonal dysregulation, metabolic imbalance and long term persistent fatigue and is a potentially serious long-term health threat to the affected individuals [37].

### 1.3 Mental Health and Psychological Effects

Disturbed sleep patterns due to shift work have far reaching psychological and mental health impacts that are realized in the form of increased levels of stress, anxiety, irritation and depression [43]. The discord between circadian rhythm of the body and the time indicators in the surrounding environment changes the neuroendocrine processes resulting in hormonal changes, which have a direct influence on emotional stability [44]. The disruption of the restorative sleep process in the brain disrupts the normal functions of the brain in processing the effects of stress hormones like cortisol and the influence of neurotransmitters like serotonin and dopamine, which make the brain more prone to anxiety and mood disorders [45]. Empirical data also demonstrates that the level of depression, anxiety, irritability, and burnout among nurses who work in night shifts are much higher than among those working day shifts as observed in Figure 3.



*Figure 1.3 Prevalence of depression, anxiety, irritability, and burnout among day-shift and night-shift nurses.*

Cumulative sleep debt and irregular rest are the most common factors that nurses and other workers on the night shift report increased emotional burnout, irritability, and lack of motivation [46]. Prolonged circadian disruption is also related to depressed prefrontal cortex activity which worsens the decision-making and emotional control, and increases the symptoms of depression [47]. Chronic sleep disturbance is also a contributing factor to an imbalance between sympathetic and parasympathetic nervous activity thus continuing to arouse the physiological system and keeping the mind incomplete [48]. Studies notes that this type of psychological strain does not only impact the well-being but also impairs cognitive functioning, social and overall occupational functioning. Therefore, the broken sleep patterns are an essential mechanism involving shift work and mental health decline over the long term [49]. Changes in circadian rhythms and absence of sleep are the main sources of negative impacts of shift work on emotional regulation, intrinsic motivation, and interpersonal relationships [50]. The absence of regularity in the working and rest patterns affects the emotional stability by hindering the brain functions of the prefrontal cortex which are essential in regulating the mood and impulse response [47]. Sleep deprivation in the long term reduces emotional sensitivity and causes one to be irritable as they find it hard to cope up to stress or react emotionally when dealing with people [51]. Circadian misalignment is also associated with fatigue and hormone

imbalance, which further reduce dopamine activity, one of the main neurotransmitters in the process of motivation and reward [52]. All of that in total proves that shift work does not only affect physiological health but it fundamentally changes the latter. Shift work has always been associated with the burnout and emotional exhaustion especially in people who are related to healthcare and who have to work during the long night shifts or rotating shifts. The constant circadian disruption and the lack of rest between shifts are the causes of chronic fatigue and mental stress that slowly exhaust emotional resources [53]. Recent studies has demonstrated that nurses working on night shifts and other shift employees experience greater emotional exhaustion and depersonalization coupled with a sense of inefficacy than day shift employees [54]. Inadequate rest negatively affects cognitive control and emotional regulation, which puts people at a disadvantage in terms of exposure to stress and inability to cope with difficulties in the workplace [11]. Shift work leads to a vicious cycle of fatigue, poor performance, and lack of emotions that eventually endanger the health of the workers and the quality of care or productivity in the organizations [32]. It has been observed that shift work has severe occupational and cognitive effects most of the time owing to a lack of sleep on a chronic basis and distention of circadian cycle rhythms [55]. The workers on rotating or night shifts tend to have poor attention, slower reaction rates and a decrease in cognitive flexibility and thus cannot

achieve accurate and timely decision-making in high-stake environments [56]. The continuous disturbance of the normal sleep cycles results in cognitive exhaustion, which is reduced working memory, low level of concentration and ability to solve problems [57]. Studies have revealed that circadian desynchronization changes the activity of prefrontal cortex and neurotransmitter regulation which compromises executive functions that control planning, judgment, and emotional control [58]. Emotional exhaustion can easily be correlated with cognitive fatigue, which decreases intrinsic motivation and interest in the workplace [59]. The effect of shift work on job performance and patient safety is significant especially in occupations where alertness and accuracy are paramount such as healthcare. Abnormal working hours and disturbed sleep patterns are a disruption to concentration, memory, and reaction times, which tend to enhance the possibility of clinical errors and accidents [60]. Nurses or other medical personnel working on the night or rotating shifts tend to be cumulatively fatigued and, therefore, have a lower capacity to make correct clinical judgments, administer drugs correctly, and respond to patient needs resolutely [61]. Studies revealed that long shift work is linked to the lack of vigilance, collapse of communication among the team members, and the lack of safety measures. In addition, motivation and task performance are even worse with emotional exhaustion and burnout associated with persistent sleep interruption [60]. The shift work has a serious impact on the social relations, family-life, and the general well-being of the person as the working schedules are not compatible with each other, and sleep disturbances are constant. The abnormal work hours during the night or rotating shifts inhibit family interaction, social activities and leisure time thus resulting to isolation and social withdrawal [62].

## 2. SUPPORTIVE AND PREVENTIVE INTERVENTIONS

Preventative and supportive options have emerged as important issues in the correction of the adverse effects of shift work on the sleeping processes and psychological health of the nurses. The role of interventions has been turned to the ideal schedule of shifts and rotation and more closely tied to the circadian rhythms, as well as the fatigue mitigation and the enhancement of

alertness. The gains in the length of sleep and mental endurance have been high with scheduling models (forward-rotating shift and participatory planning) [63]. It is also important that sleep hygiene and fatigue training are considered because these methods would equip nurses with effective strategies of regulating the sleeping patterns, work-load, and physical health status [64]. Mindfulness meditation, physical activity and diet have been identified as the components of wellness in the workplace, which enhance job satisfaction and emotional stability [65]. Resilience training, peer mentoring, and availability of professional counseling are also imposed to provide the necessary measures in ascertaining the coping mechanisms, to enable nurses to cope with occupational stress effectively [66].

## 3. FUTURE DIRECTIONS

The planned research should focus on devising the holistic interventions that could be implemented to integrate the circadian rhythm control, mental health support, and organizational policy interventions to minimize the unwanted consequences of the shift work among nurses. The longitudinal studies are necessary to deconstruct the general physiological and psychological after-effects of rotating shifts and determine the evidence-based scheduling methods that have the power to enhance the quality of sleep and resilience. Some of the possible technological tools which can be useful in individual fatigue management include wearable sleep watches, AI-aided rostering, and online wellness. In addition, the commitment of the institution to the state of mental wellness through counseling, flexible work hours, and load optimization remain a pivotal point that is either going to keep nurses healthy or keep patients safe.

## 4. CONCLUSION

The work shift remains an inescapable component of the modern healthcare delivery yet the harmful impact it has on the physiological and psychological state of nurses has to be of greater institutional interest. The irregular schedules have been proved to disrupt circadian rhythms, affect the quality of sleep, and cause fatigue, stress, and burnout-Factors which also affect not only the performance of a professional worker but also the safety of the patient. These problems should be addressed in a

multidimensional approach with the evidence-based scheduling, sleep-hygiene education and proactive mental health support. Enhancing organizational policy that fosters rest, emotional well-being, and work-life balance is essential in protecting the well-being of the nurses and ensuring the provision of sustainable and high-quality healthcare services in 24-hours clinical facilities.

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