POOR SLEEP QUALITY AND ITS ASSOCIATED FACTORS AMONG NURSES IN TERTIARY HOSPITALS, KELANTAN

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by

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LIST OF ABBREVIATIONS

aOR	Adjusted Odd Ratio
e.g	exempli gratia/ for example
CI	Confidence Interval
EHR	Electronic health record
ESS-MMalay	Version of Epworth sleepiness scale
HRPZ II	Hospital Raja Perempuan Zainab II
IBM	International Business Machines Corporation
ICC	Intra-class correlations coefficient
ICU	Intensive Care Unit
ILO	International Labour Office
JEPeM-USM	Jawatankuasa Etika Penyelidikan Manusia Universiti Sains Malaysia
MAE	Medication administration errors
MOH	Ministry of Health
NHIS	National Health Intervention Survey
NMRR	National Malaysia Research Registry
OR	Odd ratio
PPE	Personal Protective Equipment
PSQI-M	Malay Version of Pittsburgh Sleep Quality Index Questionnaire
PSS	Probability proportional to size
PTSD	Posttraumatic Stress Disorder
QOL	Quality of Life
REM	Rapid Eye Movement
ROC	Receiver Operating Characteristics
SD	Standard deviation
SPSS	Statistical Package for Social Sciences
T2DM	Type 2 Diabetes Mellitus
US	United State
USM	Universiti Sains Malaysia
WHO	World Health Organization

TIDUR YANG KURANG KUALITI DAN FAKTOR PENYUMBANGNYA DALAM KALANGAN JURURAWAT DI HOSPITAL TERTIARI, KELANTAN

ABSTRAK

Pengenalan: Memahami kepentingan kualiti tidur akan membantu meningkatkan kualiti perkhidmatan penjagaan kesihatan dan meningkatkan keselamatan pesakit. Kajian ini bertujuan untuk menilai kualiti tidur dan faktor penyumbangnya dalam kalangan jururawat di hospital tertier di Kelantan.

Metodologi: Kajian keratan rentas ini melibatkan jururawat dari dua hospital tertier di Kelantan. Jururawat dipilih secara berkadaran dan rawak dari hospital tersebut untuk tujuan kajian. Jururawat yang terlibat adalah yang bekerja di hospital tertier dan mempunyai sekurang- kurangnya dua bulan pengalaman bekerja di jabatan semasa. Kajian ini menggunakan borang soal selidik yang mengandungi 19 item dalam tujuh komponen. Data dianalisa menggunakan SPSS versi 28 dan analisis regresi logistik digunakan untuk mengenal pasti factor-faktor penyumbangnya.

Keputusan: Sejumlah 470 jururawat mengambil bahagian dalam kajian ini. Keputusan menunjukkan prevalens tidur yang kurang kualiti adalah 69.8%. Kajian ini mengenalpasti durasi tidur (aOR 0.291; 95% CI: 0.215,0.393; $p<0.001$), pengalaman kerja (aOR 0.953; 95% CI: 0.924,0.984; $p=0.003$), sejarah terlibat dalam kesalahan pemberian ubat (aOR 2.669; 95% CI: 1.413,5.041; $p=0.002$), dan kemalangan semasa berulang-alik (aOR 1.869; 95% CI: 1.119,3.121; $p=0.017$) sebagai faktor-faktor penyumbang.

Kesimpulan: Kajian ini mendapati bahawa jururawat secara umumnya mempunyai kualiti tidur yang rendah dengan beberapa faktor berkaitan yang signifikan. Untuk meningkatkan kualiti tidur di kalangan jururawat, pendidikan dan latihan berterusan serta mewujudkan persekitaran kerja yang menyokong adalah penting.

Keywords: Kualiti Tidur, Jururawat, Hospital, Faktor Penyumbang

POOR SLEEP QUALITY AND ITS ASSOCIATED FACTORS AMONG NURSES IN TERTIARY HOSPITALS, KELANTAN

ABSTRACT

Introduction: Understanding the significance of good sleep quality will help to improve quality of healthcare services and enhance patient safety. Thus, the purpose of this study was to determine poor sleep quality and its associated factors among nurses in tertiary hospitals in Kelantan.

Methodology: This cross-sectional study examines nurses from two tertiary hospitals in Kelantan, Malaysia. The nurses were proportionately and randomly selected from the hospitals and included in the study. The nurses worked in tertiary hospitals and had at least two months of working experience in current department. The study used self-administered questionnaire with 19 items in seven component scores. The data were analysed using SPSS version 28 and logistic regression analyses were used to identify the associated factors.

Results: A total of 470 nurses participated in this study. The results indicate that prevalence of poor sleep quality among nurses was 69.8%. The study identifies the sleep duration (aOR 0.291; 95% CI: 0.215,0.393; $p<0.001$), working experience (aOR 0.953; 95% CI: 0.924, 0.984; $p=0.003$), history of involvement in medication error (aOR 2.669; 95% CI: 1.413, 5.041; $p=0.002$) and commuting injury (aOR 1.869; 95% CI: 1.119, 3.121; $p=0.017$) as the significant associated factors.

Conclusion: The study found that nurses generally had poor sleep quality with some significant associated factors. To improve sleep quality among nurses, ongoing education and establishing a nurturing work environment are important.

Keywords: Sleep Quality, Nurses, Hospitals, Associated Factor

CHAPTER 1

INTRODUCTION

1.1 Introduction

1.1.1 Role of Nurses in Healthcare System

A nurse is an individual who is responsible for providing medical care to individuals who are sick or injured, especially those who are hospitalised (Cambridge Dictionary, 2020). They receive training in providing medical care and may aid doctors in the treatment of patients. Nurses, with other healthcare workers, provide crucial functions in patient care and the healthcare system. Nurses play essential responsibilities in the healthcare system, doing fundamental duties that are critical for patient care, promoting health, and ensuring the smooth functioning of healthcare facilities.

Nurses administer direct medical treatments to patients in many healthcare facilities, including clinics, community health centres, nursing homes, and hospitals. Their responsibilities include assessing patients' health, monitoring vital signs, dispensing medication, providing therapies, and aiding with daily living tasks to guarantee physical comfort and overall well-being (Barbe *et al.*, 2018). In addition, nurses act as advocates for the rights and welfare of patients, guaranteeing that they receive treatment that is safe, efficient, and compassionate. They serve as intermediates, facilitating communication between patients, families, and medical professionals, empowering individuals to make well-informed decisions about their health and treatment choices (Ribas *et al.*, 2018).

Nurses have a vital role in providing information to patients and their families regarding medical issues, treatment options, preventive measures, and self-care abilities. Their role include offering counselling, guidance, and support to help patients comprehend their diagnosis, handle chronic illnesses, adopt healthy lifestyles, and navigate the healthcare system (Chaboyer *et al.*, 2005). In addition, nurses facilitate the coordination of care among various healthcare facilities and providers to guarantee smooth transitions between different specialties and levels of care. By working together with doctors, social workers, therapists, and other healthcare experts, they create and execute personalised care strategies that are specifically designed to meet the specific needs of each patient (Tang *et al.*, 2013). Nurses in healthcare organisations have the duty of enhancing patient safety and promoting improvements to quality. They follow evidence-based practices, protocols, and participate in clinical audits and quality improvement initiatives to improve patient care.

Nurses actively participate in health promotion programs aimed at preventing diseases, promoting healthy lifestyles, and improving population health outcomes. In order to tackle public health concerns and minimise health inequalities, they carry out screenings, provide immunisations, provide health education programmes, and actively participate in community outreach initiatives (Wright *et al.*, 2013). Through their competence, compassion, and dedication, nurses deliver safe, efficient, and patient-centred healthcare services. This not only enhances health outcomes but also contributes to the well-being of individuals and communities (Marcadelli *et al.*, 2019).

1.1.2 Nurses and Sleep Quality

The quality of nurses' sleep is an essential component of their overall physical and mental health and their ability to execute their job effectively. A significant number of nurses are employed in irregular and demanding work schedules, which often involve night shifts, rotating shifts, and extended periods of work. Shift work disrupts the body's natural circadian rhythms, making it difficult for nurses to develop consistent sleep patterns and get enough sleep. Frequent changes in schedules might result in sleep disturbances, challenges in falling asleep, and altered patterns of sleep and wakefulness (Bukowska-Damska *et al.*, 2017).

Nursing is a demanding profession marked by significant levels of stress and responsibility. Nurses often face job-related stresses, including high workloads, crucial patient care circumstances, emotional stress, and complicated interpersonal dynamics. Prolonged stress can have adverse impacts on the quality of sleep, resulting in insomnia, disruptions in sleep patterns, and an elevated risk of sleep disorders such as sleep apnoea (De Jonge *et al.*, 2012).

Furthermore, nurses frequently participate in physically demanding tasks, including lifting patients, standing for prolonged periods, and executing repetitive movements. Physical discomfort and musculoskeletal pain can disrupt the quality of sleep, leading to discomfort, restlessness, and difficulty in finding a comfortable sleeping posture. Inadequate rest and recovery periods might worsen physical symptoms and contribute to the development of chronic sleep disorders in nurses (Bernal *et al.*, 2015).

Nurses may experience mental health issues such as depression, anxiety, and burnout, which can have a negative impact on their sleep quality. Emotional strain and psychological symptoms can disturb sleep patterns, prolong the time it takes to fall asleep, and result in repeated awakenings during the night. Nurses may experience difficulties in relaxing and unwinding before bedtime due to mental health issues that manifest as excessive worry, contemplation, or intrusive thoughts. Nursing in Poland is regarded as the second most demanding profession, and prolonged exposure to stress among nurses can have adverse effects on their mental well-being, resulting in behavioural issues (Kowalczuk *et al.*, 2022).

Nurses, particularly those working irregular hours or rotating shifts, face considerable difficulties in managing their job commitments alongside personal and family-related commitments. Lack of sufficient time for rest, relaxation, and social interaction can have a negative effect on the quality of sleep and overall sense of well-being. Nurses may encounter difficulties in prioritising a healthy lifestyle schedule, leading to feeling of fatigue, stress, and regrets concerning their work-life balance (Anitha, 2014).

Nurses who have poor sleep quality are at a greater risk of developing chronic health issues, such as diabetes, cardiovascular disease, obesity, and mental health disorders. Lack of sleep weakens the immune system, increasing nurses' susceptibility to infections and illnesses. Persistent sleep disruptions may hamper cognitive function, impair decision-making abilities, and compromise professional performance, hence impacting patient safety and the quality of service provided (Bjorvatn *et al.*, 2012).

The institutions that offer healthcare have a considerable impact on both the quality of sleep that nurses receive and their overall well-being. To mitigate the adverse effects of shift work and enhance nurses' sleep quality, it is feasible to establish policies and protocols that prioritise the well-being and safety of the workforce. The rules and procedures comprise the providing of sufficient periods for rest, the provision of flexible scheduling, and the promotion of a culture that recognises the balance between work and personal life (Mosadeghrad, 2013).

1.1.3 Nurses and Quality of Life

Quality of life (QOL), as defined by the World Health Organisation (WHO), is a subjective measure of an individual's social status within society, considering their cultural and value systems, as well as their personal desires, expectations, standards, and worries. The greatest determinant of employees' quality of life is workplace health (Whoqol, 1998). A significant correlation was found among Brazilian nurses about the association between the quality of their sleep and their overall quality of life. Nocturnal shifts disturb the sequence of individual activities and impact sleep patterns during the nighttime (Palhares *et al.*, 2014).

The nurses' general quality of life is significantly influenced by the quality of their sleep. Optimal physical health relies significantly on obtaining sufficient and refreshing sleep. Insufficient sleep can lead to health problems such as exhaustion, migraines, a compromised immune system, and increased susceptibility to illnesses. Chronic sleep problems can significantly impact the overall health of nurses, perhaps leading to the development of long-term disorders like diabetes, cardiovascular disease, and obesity. There is a strong correlation between the presence of shift work among nurses, which often leads to inadequate sleep quality, and the development of

metabolic syndrome. Metabolic syndrome acts as a substitute indicator for the likelihood of developing cardiovascular disease, especially in female employees (Lajoie *et al.*, 2015). Additionally, poor sleep quality is significantly influenced by the presence of nocturia and Restless Leg Syndrome, both of which are consequences of Type 2 Diabetes Mellitus (Nasir *et al.*, 2022).

The quality of sleep is closely linked to mental health and overall well-being. Nurses who have poor sleep quality exhibit an increased possibility of encountering mental health problems, such as depression, anxiety, and burnout. Inadequate sleep can worsen stress, impair cognitive functions, and have an adverse impact on mood and emotional regulation. These factors can significantly influence the quality of life and job satisfaction of nurses (Huang *et al.*, 2021). Optimal sleep is crucial for maintaining emotional well-being and resilience in the face of adversity. Nurses with poor sleep quality may have a higher susceptibility to mood disorders, irritability, and cognitive exhaustion, which can impair their ability to cope with work-related and personal stressors. Enhancing the quality of sleep and managing sleep-related issues can potentially boost the emotional resilience and overall quality of life for nurses (Caruso, 2014).

Optimal job performance and productivity are dependent upon good sleep quality. Nurses who suffer from insufficient sleep may face challenges in terms of concentration, recall, decision-making, and analytical thinking, thereby impacting their ability to carry out their responsibilities effectively. Furthermore, nurses who experience insufficient sleep are more susceptible to committing errors, errors in calculation, and mistakes, ultimately resulting in insufficient patient care and affecting their job satisfaction and overall well-being.

Commuting accidents, defined as accidents occurring on the regular route between the workplace or work-related training and either the worker's home or secondary residence, as well as the location where the worker usually has meals, or the place where the worker usually receives payment, resulting in death or personal injury, pose a significant concern (ILO, 2010). Commuting injuries among nurses can be particularly concerning due to the unique demands of their profession and the challenges they face while traveling to and from work. In Malaysia, nurses accounted for a significant portion of commuting injuries, representing 53% compared to other healthcare workers, with most accidents occurring after night shift duties (Yaacob *et al.*, 2018).

Quality sleep is essential for maintaining a healthy work-life balance. Nurses experiencing poor sleep quality may struggle to manage their job duties alongside personal and family obligations. Insufficient sleep can result in tiredness, irritation, and less motivation to participate in leisure activities or spend precious moments with loved ones, thereby affecting overall happiness and contentment outside of work. Obtaining work-life balance is a challenging concept that includes making choices between one's lifestyle and work, while also managing the demands of both career and personal life (Anitha, 2014).

Work-life balance is a crucial aspect of overall well-being, particularly for nurses who work in demanding and often high-stress environments. Achieving an optimum work-life balance requires properly organising one's time and strength to meet commitments in both professional and personal life, while also giving importance to self-care and leisure. The association between poor sleep quality among nurses and their work schedule involving shift rotation is consistently related to the alteration of

their usual sleep patterns, which can also impact their personal roles within the family, affecting their capacity to maintain a healthy work-life balance (Nurumal *et al.*, 2017).

Inadequate sleep can also impact nurses' connections with society and support systems. Nurses experiencing inadequate sleep may have lower energy and motivation to participate in social activities, maintain relationships, or provide support to friends and family. This can lead to feelings of loneliness, social exclusion, and disappointment with interpersonal connections, ultimately damaging overall quality of life (QOL).

In summary, nurses' sleep quality is intricately linked to their overall QOL, affecting their physical health, mental well-being, job performance, work-life balance, emotional resilience, and social relationships. Healthcare organizations should prioritize strategies to support nurses' sleep health, such as promoting healthy sleep habits, providing adequate rest breaks, offering support services for stress management, and fostering a positive work environment conducive to quality sleep. By addressing sleep quality issues, healthcare organizations can enhance nurses' QOL, job satisfaction, and ultimately, improve patient care outcomes.

1.1.4 Patient Safety and Quality of Care

The quality of nurses' sleep directly affects patient safety in hospitals. Sufficient sleep is essential for maintaining maximum cognitive performance and concentration. Nurses who experience poor sleep quality or suffer from sleep deprivation may have reduced focus, memory, and decision-making skills. This can lead to errors in medication administration, documentation, and patient assessment, potentially compromising patient safety.

Insufficient sleep among nurses may also result in delayed reaction times, impairing their ability to respond promptly to emergencies or urgent situations. Delayed responses to patient alarms, changes in vital signs, or medical emergencies can lead to adverse outcomes, patient harm, or even fatalities. Additionally, insomnia and exhaustion can adversely affect the job performance of nurses, leading to decreased efficiency, productivity, speed of task execution, and effectiveness in supervision. These effects are exacerbated when nurses work on a twenty-four-hour schedule or have irregular shifts (Giorgi *et al.*, 2018).

Inadequate sleep can contribute to medication errors among nurses. Nurses who struggle with insufficient sleep are more likely to commit mistakes such as administering the wrong medication, incorrect doses, or missing doses entirely. Medication errors can lead to serious implications for patient safety, such as adverse reactions to drugs, treatment distractions, or medication-related complications. The principle of "do no harm" is fundamental in medicine. The World Health Organization defines a near miss as a potentially harmful errors that could jeopardise a patient's well-being but is detected and does not lead to any adverse outcomes (WHO, 2005). A study was conducted among Italian nurses shown a significant association between medication administration errors and poor sleep quality (Di Simone *et al.*, 2020). The expanded duration of nurses' working hours have been found to impact the quality of their sleep, which in turn correlates strongly with patient safety, particularly in terms of patient-centred care (Jarrar *et al.*, 2019).

Lack of sleep may impair communication skills, leading to misunderstandings, misinterpretations, or communication failures among healthcare teams. Effective communication is essential for managing patient care, exchanging vital information,

and preventing errors. Nurses who do not get enough sleep may struggle to communicate effectively, increasing the risk of communication errors that can compromise patient safety. Nurses are known to experience high levels of stress compared to other occupations, often due to exposure to emotional aspects of patient demands, inter-professional conflicts, and interpersonal conflicts (Watanabe *et al.*, 2015). Addressing and mitigating these sources of stress is crucial for promoting nurses' well-being and ensuring the delivery of high-quality patient care.

Nurses who lack sleep may face an increased likelihood of accidents, falls, or injuries while carrying out patient care responsibilities. Fatigue can affect motor coordination, balance, and physical performance, raising the risk of accidents or near-misses. Patient falls and injuries can lead to additional healthcare issues, extended hospital stays, and higher healthcare costs. Poor sleep quality directly impacts nurses as individuals, which in turn affects their performance as healthcare professionals. Poor sleep quality leads to decreased work productivity, reduced job satisfaction, and a decreased overall quality of life, ultimately affecting patient care and safety. Nurses who have low sleep quality are more prone to have higher levels of burnout, which is significantly associated with low job performance and low job satisfaction (Giorgi *et al.*, 2018; Huda, 2018).

Nurses have a crucial function in observing health condition of patients and reacting to any alterations in their health. Nurses who lack sleep may struggle to stay alert and focused while monitoring patients, which can lead to missing minor indicators of deterioration or changes in vital signs. Timely identification and intervention are crucial for minimizing negative consequences and ensuring patient well-being. Nurses who experience inadequate sleep might perform poorly and be less

reliable in their duties. Chronic sleep deprivation can result in reduced job satisfaction, more frequent absences, and higher turnover rates among nursing staff. This can disrupt the continuity of care, increase the burden on remaining personnel, and compromise patient safety due to understaffing and decreased staff morale (Mosadeghrad, 2013).

In summary, nurses' sleep quality directly influences patient safety in hospitals. Healthcare organizations should prioritize strategies to support nurses' sleep health, such as implementing policies to minimize shift work-related fatigue, ensuring sufficient periods for rest, encouraging healthy sleeping habits, and fostering a culture of safety and well-being. By addressing sleep quality issues among nurses, hospitals can enhance patient safety, improve healthcare outcomes, and create a safer and more effective healthcare environment for both patients and healthcare providers.

1.2 Problem Statement and Rationale of Study

Sleep disturbance among nurses is a major concern both internationally and locally. Nurses often have irregular schedules, which might include shifts at night, shifting duties, and extended hours, which can disturb their natural circadian rhythm and result in sleep disturbance. The inadequate sleep quality experienced by nurses not only impacts their personal well-being but also hampers their professional performance, increasing the likelihood of adverse events and compromised safety measures.

Chronic sleep disturbances can result in fatigue, excessive daytime sleepiness, irritability, mood disturbances, and decreased overall quality of life for nurses. These effects extend beyond the workplace and can affect nurses' relationships, mental health, and physical well-being. Poor sleep quality can impair nurses' cognitive

function, attention, decision-making abilities, and psychomotor skills. This can negatively impact their professional performance, resulting in errors in the administration of medication, paperwork, interpersonal interaction, and assessment of patients. Sleep-deprived nurses may struggle to maintain focus, prioritize tasks, and respond effectively to clinical situations, putting both patients and themselves at risk.

Currently, there are limited studies available to look at the poor sleep quality and its associated factors among nurses, especially in Malaysia. Only one local study, conducted in 2012 at Hospital Melaka, has reported and published on this issue. The factors connected with poor sleep quality may differ depending on the study location, participants, and time.

Understanding the sleep disturbance of nurses could improve the quality of work and minimise the chances of undesirable incidents while promoting safety practices. The proposed current study will reveal the prevalence of nurses with poor sleep quality, and it is important because sleep quality is an essential element to the nurses to have better work-life balance. Quality of care to patients are essential and nurses play significant role in patients' care.

Thus, understanding the nurses' sleep pattern could provide data to improve nurses work schedule. Findings of the study on factors associated could give an insight to provide an intervention plan or policy changes in improving sleep quality among nurses and finally will help to increase quality of services in healthcare facilities. The study's findings could be a significant point of reference for future research on the nursing profession, especially in efforts to improve both quality of life and job performance.

1.3 Research Questions

1. What is the prevalence of poor sleep quality among nurses in tertiary hospitals in Kelantan?

2. What are the associated factors of poor sleep quality among nurses in tertiary hospitals in Kelantan?

1.4 Research Objectives

1.4.1 General Objective

To study the prevalence of poor sleep quality and its associated factors among nurses in tertiary hospitals in Kelantan.

1.4.2 Specific Objectives

1. To determine the prevalence of poor sleep quality among nurses in tertiary hospitals in Kelantan.

2. To determine the associated factors of poor sleep quality among nurses in tertiary hospitals in Kelantan.

1.5 Research Hypothesis

There are significant associated factors (sociodemographic and working characteristics) of poor sleep quality among nurses in tertiary hospitals, Kelantan.

CHAPTER 2

LITERATURE REVIEW

2.1 Nurses and Sleep Quality

A nurse serves as the coordinator for all the services and individuals involved in patient care. Their objective is to mitigate the occurrence of illnesses, promote well-being, and to improve the lifespan of both individuals and communities (Bisht *et al.*, 2021). Nowadays, society relies heavily on 24-hour services that necessitate shift work, such as nursing, to maintain continuous service throughout the day. Nurses are assigned to work on rotating schedules. Shifts at the hospital frequently alternate between day and night. Shift work has significantly altered the sleep patterns of nurses. Shift work disturbs the natural sleep rhythms regulated by the circadian and homeostatic systems.

Sleep is a naturally occurring, cyclical state of rest for the body and mind, characterised by the closure of the eyes and a complete or partial loss of awareness. During sleep, there is a reduction in physical activity and a reduced response to external stimuli (Mifflin, 2004). Sleep quality often encompasses a number of sleep-related factors, including the overall duration of sleep, the latency of sleep onset, the effectiveness of sleep, wakefulness length following sleep onset, and the level of drowsiness experienced during the day (Mollayeva *et al.*, 2016).

Circadian rhythms include daily patterns in physiology and behaviour. They control thermoregulation, cardiac rhythm, skeletal muscles, and hormone release throughout the day, as well as the day-night cycle (Altevogt and Colten, 2006). The sleep-wake system is regulated by two primary processes: one that facilitates sleep (process S) and one that sustains alertness (process C). Process S is the homeostatic

drive responsible for regulating sleep. The sleep drive, also known as process S, gradually increases during the day, peaks just prior to bedtime in the evening, and decreases during the night. Process C gradually increases during the day, counteracting process S and promoting wakefulness and alertness (Gillette and Abbott, 2005). After a sufficient amount of sleep, the body's need for sleep lessens, but the natural impulse to stay awake starts to build, initiating the sleep-wake cycle once more. Without process C, the total duration of sleep remains the same, but it occurs at random intervals throughout the day and night. Thus, process C facilitates the categorization of sleep and wakefulness into unique episodes (Altevogt and Colten, 2006).

Nurses often work in rotating shifts, including morning, evening, and night shifts. Constantly changing shift schedules can disrupt their circadian rhythms, as their bodies struggle to adjust to different sleep-wake cycles. Night shifts in particular, can be challenging because they require nurses to be awake and alert during times when their bodies naturally crave sleep. While the shift system is necessary for providing continuous care, healthcare organisations must prioritise the health and well-being of nurses by introducing steps to reduce the adverse impacts of shift work on circadian rhythms and overall health (Bukowska-Damska *et al.*, 2017).

Good sleep quality is an important indicator of physical health, mental wellness, and overall life satisfaction. Shorter sleep latencies, adequate total sleep duration, decreased wakefulness after falling asleep, and daytime alertness are commonly considered as signs of high subjective sleep quality (Hirshkowitz *et al.*, 2015).

2.2 Prevalences of Poor Sleep Quality

According to Van Nguyen and Liu (2022), from 420 nurses in Vietnam, 46.9% of nurses had poor sleep quality. Factors such as age, stress levels, health status, and overall quality of life influenced the occurrence of sleep disturbances. Based on McDowall *et al.* (2017), the occurrence sleep disturbance among nurses was significantly higher in both shifts (78%) and non-shifts (59%). In this study, the only significant correlation identified was between shift work and poor sleep quality.

According to Ghalichi *et al.* (2013) reported that from 925 participants, 43.1% were poor sleep quality. A significant association was found between low sleep quality and being female, divorced, working in shifts, and older age. However, there was no association between sleep quality and education level. As study conducted by Park *et al.* (2018), a large percentage of nurses (79.8%) reported experiencing inadequate sleep quality. A highly significant association exists between nurse productivity and age, shift work, position, insomnia, subjective sleep quality and sleep latency.

Palhares *et al.* (2014) found that 65.1% nurses presented some degree of sleep disturbance. Poor sleep quality was found to be associated with nightshift work and being female. An association was observed between the quality of life and the quality of sleep. While Nazatul *et al.* (2012), showed that 57.8% nurses in Malaysia had sleep disturbances, the main contributing factors to poor sleep quality were shift work, age, marital status, and department of employment.

2.3 Associated Factors of Poor Sleep Quality among Nurses

Good sleep quality is a very important and essential element to the nurses to have a better life and will help to increase quality of services in healthcare facilities. It can be divided into sociodemographic factors and working characteristics.

Sociodemographic are important because they are quantifiable characteristics. Age, marital status, education, and work experience were among the demographic characteristics considered (Rabindarang *et al.*, 2014). Many researchers have utilised demographic variables in their studies throughout the years and the demographic characteristics including age, gender, levels of education, and marital status (Pun, 2021) (Wang *et al.*, 2022). A better emphasis on sociodemographic could provide an insightful finding that represents a broader spectrum of essential concerns for future research.

Organisational commitment is a crucial component that is influenced by various factors with working characteristics being particularly important. Many studies have included working characteristics in their evaluation, such as job position, work experience, and work schedule. These qualities are meticulously selected to align with the research objectives. The following are the contributing factors to the inadequate quality of sleep among nurses in the study:

2.3.1 Age

Age is one of the major factors that influence sleep quality. Younger nurses had a higher prevalence of sleep disturbances. A significant proportion of young nurses are typically assigned to work in shifts, a practice that might result in greater amounts of stress and hence increase the likelihood of experiencing sleep disruptions (Zeng *et al.*, 2020). The prevalence sleep disturbances varied across different age categories,

with middle-aged employees having the highest prevalence (Ghalichi *et al.*, 2013). The study found a negative association between age and sleep disruption among nurses. Specifically, nurses between the ages of 50 and 59 experienced the least amount of sleep disturbance compared to younger nurses (Nazatul *et al.*, 2012).

2.3.2 Gender

Multiple studies have found a greater incidence of sleep issues among females. The cumulative prevalence of sleep disruptions among male nurses was much lower than that of females, with rates of 33.8% and 46.4%, respectively (Qiu *et al.*, 2020). An apparent association was found between gender and sleep quality, with 54.2% of female nurses reporting unsatisfactory sleep quality compared to 45.8% of males (Ali *et al.*, 2020). In a study done in Iran, 47.6% of female nurses reported sleep problems (Ghalichi *et al.*, 2013).

2.3.3 Marital Status

Married nurses are at higher probability encountering sleep difficulties. As study conducted in Singapore, the prevalence of poor sleep quality was higher among married participants, with a rate of 44.3%, compared to single participants (Visvalingam *et al.*, 2020). Same finding also revealed by another study done in Malaysia where married nurses had higher sleep disturbances compared to single nurses (Nazatul *et al.*, 2012).

2.3.4 Number of Children

Nurses who have children were shown to have poorer sleep quality, most likely because of the extra duties and potential conflicts between their family and work obligations (Zakaria *et al.*, 2022). Research has shown that nurses who had married and start a family experience reduced sleep and have less leisure time available.

Engaging in familial and household responsibilities might result in exhaustion or stress which can negatively impact the quality of sleep (Kurumatani *et al.*, 1994).

2.3.5 Educational Level and Job Rank

The sleep quality of workers had been assessed based on their levels of education. Employees that hold the highest levels of education occupy positions of greater authority, assume greater responsibility, and thus demonstrate a higher level of commitment to the company. Therefore, a significant level of commitment may result from an advanced education (Amangala, 2013). The prevalence of poor sleep quality among nurses with a Diploma/Associate degree is 46.2%, whereas it is 48.0% among those with a Bachelor's/Graduate degree (Van Nguyen and Liu, 2022). It showed that nurses with higher level of education better equipped to handle their responsibilities effectively. A strong association discovered between the ranks of nurses and their sleep quality. Specifically, 62.55% of junior staff members had bad sleep quality, while the lowest percentage of poor sleep quality was reported among chief nurses at 6.3% (Ali *et al.*, 2020).

2.3.6 Place of Work

From a few studies, different department showed different sleep disturbances pattern. The nurses in the Intensive Ward experienced the worst level of sleep disturbance, whereas the Ambulatory Ward had the minimal level of sleep disturbance (Nazatul *et al.*, 2012). A study conducted in China found that nurses working in emergency departments reported a greater incidence of sleep problems (Qiu *et al.*, 2020). While a study in Italy, nurses worked in Intensive Care Unit (ICU) reported higher prevalence of sleep disturbances 45.7% compared to Surgical and Medical Unit

(Giorgi *et al.*, 2018). This could be contributed by the setting of the wards or hospitals and possible nurses to patient's ratio.

2.3.7 Working Schedule

Most of the study showed shift nurses had higher risk of having sleep disturbance. Shift nurses had a significantly greater likelihood of experiencing sleep disturbance, with an odds ratio (OR) of 2.30 (95% confidence interval [CI] 1.54, 3.44), compared to non-shift nurses (Nazatul *et al.*, 2012). A research conducted in the United Kingdom found that 78% of shift nurses experienced poor sleep quality (McDowall *et al.*, 2017). The prevalence of inadequate sleep quality among shift nurses in Vietnam was 48.4%, in contrast to non-shift nurses, which was 42.3% (Van Nguyen and Liu, 2022).

2.3.8 Hours of Working per Week

There is a strong association between the hours of working each week and the likelihood of experiencing poor sleep quality. In Korea, the prevalence of sleep problems among nurses who work more than 48 hours per week is 42.1% (Kim and Lee, 2015) where as in Nigeria, 52% of nurses working more than 80 hours a week experienced poor sleep quality (Aliyu *et al.*, 2017).

2.3.9 Working Experiences

A nurse with less than five years of registration has likely had a more demanding and stressful adjustment period to their professional life, which may have resulted in pronounced sleep problems during this transition (Lönnqvist *et al.*, 2023). According to another study, poor sleep quality was most prevalent among nurses who had 5 years or less working experience which is 63% (Aliyu *et al.*, 2017).

2.3.10 Smoking Habit and Alcohol Intake

Alcohol intake and smoking habits also contributing to poor sleep quality in a few studies. The prevalence of sleep disturbance among smokers was 5.5% in a study in Korea (Kim and Lee, 2015). Even after adjusting for variations in educational progress, marital status, and residential areas, smokers exhibited poorer sleep quality compared to nonsmokers (Liao *et al.*, 2019). Healthcare professionals who consumed 30 grammes or more of alcohol per week experienced considerably more sleep disturbances compared to those who abstained from drinking (Hung *et al.*, 2013). Healthcare workers who drink alcohol four to seven times a week are more likely to experience insomnia compared to those who never drink alcohol (Wong and Fielding, 2011).

2.4 Conceptual Framework

According to the review of literature, there were several elements that had an influence on the sleep quality of nurses. These factors include sociodemographic characteristics such as age, gender, marital status, number of children, educational level, smoking habit, alcohol intake. Additionally, working characteristics factors including job rank, working experience, place of work, working schedules and hours of working per week can give impact to quality of sleep.

Nurses in tertiary hospitals in Kelantan

Sociodemographic Factors

- Age
- Gender
- Marital status
- Number of Children
- Educational level
- **Smoking***
- **Alcohol intake***

Working Characteristics

- Job rank
- Working experience
- Place of work
- Working schedules
- Hours of working per week
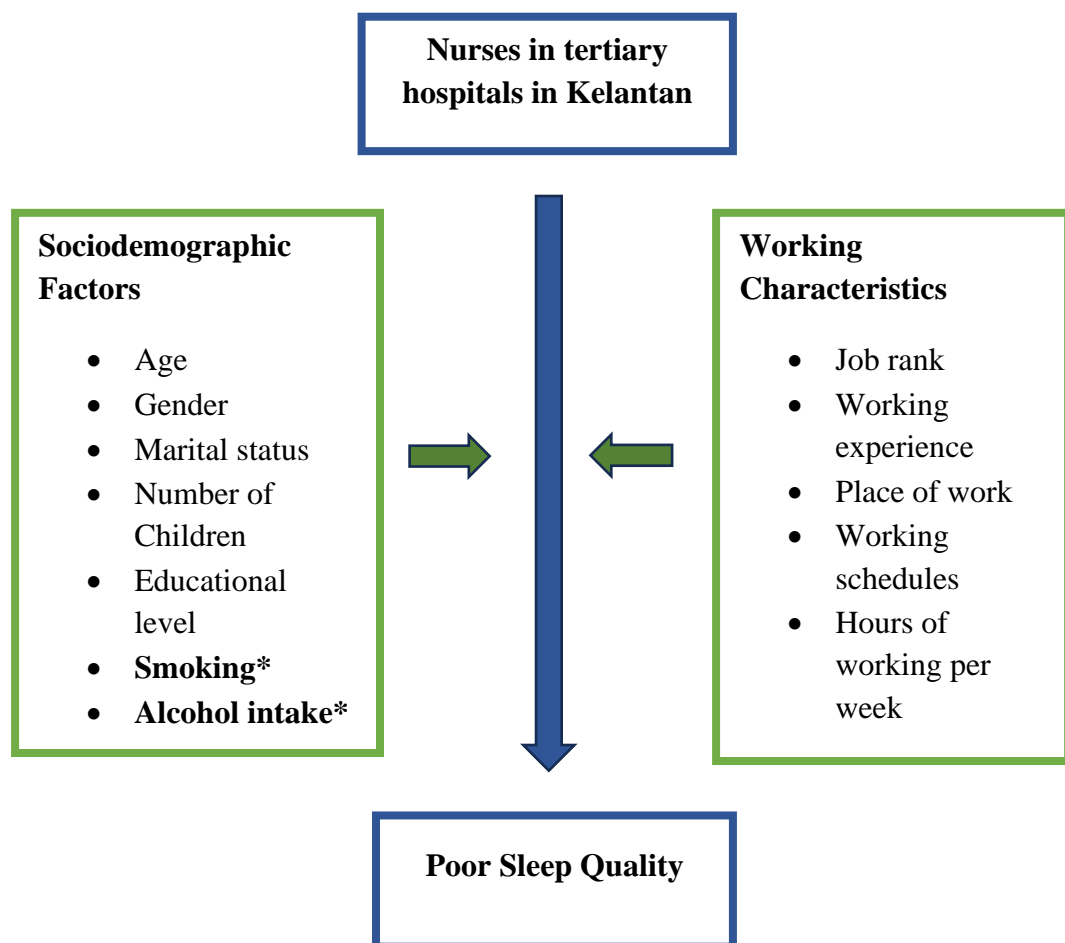
Poor Sleep Quality

*Factors not included in the study

Figure 2.1   Conceptual Framework of Associated Factors of Poor Sleep Quality among Nurses in Tertiary Hospitals in Kelantan

CHAPTER 3

METHODOLOGY

3.1 Study design

A cross-sectional study was conducted using primary data among nurses in tertiary hospitals in Kelantan.

3.2 Study area

The study was conducted at two tertiary hospitals in Kelantan namely:

i. Hospital Raja Perempuan Zainab II (HRPZ II), Kota Bharu.

ii. Hospital Universiti Sains Malaysia (Hospital USM), Kubang Kerian.

3.3 Study population

3.3.1 Reference population

The reference population was registered nurses in Kelantan.

3.3.2 Source population

The source population for the study was the registered nurses working at tertiary hospitals in Kelantan.

3.3.3 Sampling population

The sampling population for the study was the registered nurses working at tertiary hospitals in Kelantan who fulfilled the study criteria.

3.4 Eligible sample

3.4.1 Inclusion criteria

  i. Malaysian citizens.

  ii. Nurses working at any form of work schedule (Nazatul *et al*., 2012).

  iii. Had at least two months of working experience at current hospital (Bhasin, 2020).

3.4.2 Exclusion criteria

  i. Those who were on leave during the study duration.

3.5 Sample Size Estimation

The sample size was determined based on each objective as follow:

3.5.1 Sample Size Calculation (Objective 1)

The sample size calculation to determine the prevalence of poor sleep quality among nurses in tertiary hospitals in Kelantan (Objective 1) was done by using a single proportion formula (Nazatul *et al.*, 2012). Conventionally, the power of the study was set at 80 % and Zα = 1.96, for d = 0.05 while the prevalence of poor sleep quality among nurses in Malaysia from Nazatul *et al.*, 2012 was 0.58. The sample size was calculated as the following.

$$n = \left(\frac{Z_{\alpha/2}}{d} \right)^2 * P(1 - P)$$

P = reference population proportion (from previous study)

Zα = normal deviates that reflects Type I error

d = precision or detectable deviation (how close to the true population proportion)