

SLEEP QUALITY AND ASSOCIATED FACTORS
AMONG ELDERLY IN HOSPITAL UNIVERSITI
SAINS MALAYSIA (USM)

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by

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LIST OF ABBREVIATIONS

PSQI	- Pittsburgh Sleep Quality Index
WHO	- World Health Organization
NREM	- Non Rapid Eye Movement
REM	- Rapid Eye Movement

KUALITI TIDUR DAN FAKTOR BERKAITAN DIKALANGAN ORANG TUA DI HOSPITAL USM

ABSTRAK

Kualiti tidur dalam kalangan orang tua semasa hospitalisasi sering diabaikan kerana dianggap sebagai keadaan normal apabila meningkat usia. Pengabaian ini jelas terbukti apabila ramai orang tua mengadu mempunyai kesukaran untuk tidur apabila berada di hospital bahkan dirumah. Kajian ini bertujuan untuk menilai tahap kualiti tidur dan faktor-faktor yang memengaruhi dalam kalangan orang tua di Hospital USM. Kajian keratan rentas telah dilaksanakan dengan melibatkan 60 peserta melalui persempelan bertujuan (purposive). Soal selidik secara temuduga bersemuka telah digunakan untuk pengumpulan data dari bulan Februari 2020 hingga Mac 2020. Ujian Mann Whitney dan Kruskal Wallis digunakan untuk mengkaji perbezaan purata skor antara ciri socio-demografi terpilih dan kualiti tidur semasa hospitalisasi. Purata umur peserta adalah 68.4 (7.4) tahun, dengan usia antara 60 hingga 89 tahun. Hasil kajian menunjukkan bahawa majoriti 81.7 % mempunyai tahap kualiti tidur yang rendah dalam kalangan orang tua semasa hospitalisasi. Statistik menunjukkan perbezaan purata skor yang ketara antara corak tidur dan kualiti tidur dalam aspek bilangan tersedar dari tidur ($p = 0.02$) dan masa yang diambil untuk tidur ($p = 0.03$). Daripada kajian ini, dapat disimpulkan bahawa kualiti tidur orang tua semasa hospitalisasi adalah rendah. Oleh itu, faktor-faktor yang terlibat perlu dikenalpasti bagi memberikan Pendidikan yang sesuai untuk mendapatkan tidur yang cukup dan berkualiti.

SLEEP QUALITY AND ASSOCIATED FACTORS AMONG ELDERLY IN HOSPITAL USM

ABSTRACT

Sleep quality among elderly during hospitalization is neglected because many think it is an only normal condition when increasing in age. This neglect is evident when many elderly complaints they having difficulty in sleep during hospitalization as well as at home. The aim of this study was to assess the sleep quality and associated factors among the elderly in Hospital USM. A cross-sectional study was undertaken involving 60 participants using purposive sampling. The questionnaire using interview face to face was used for data collection from February 2020 until March 2020. Mann-Whitney and Kruskal Wallis test was used to examine the mean score differences between selected socio-demographic factors and sleep quality during hospitalization. The mean age of the participants was 68.4 (7.4) years between 60-89 years. The findings revealed that the majority 81.7% had poor sleep quality among elderly during hospitalization. A statistically significant mean score differences were observed between sleep pattern and sleep quality in aspects number of awakenings ($p = 0.02$) and sleep latency ($p = 0.03$). Therefore, it can be concluded that the sleep quality of elderly during hospitalization was poor. Factors that associated need to be identified so that the suitable education to get better and quality sleep can be given.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

According to the World Health Organization (WHO, 2016) termed elderly or older adult is referred to as those who age of 60 or above that equivalent to retirement ages in most of the developed countries. In Malaysia, the total population is 25 million and in 1997, 2.3% of the total population is elderly. In 2000, the population increase to 6.2% and it is expected the elderly population in Malaysia by 2020 will increase to 9.5% (Rashid, Ong, & Yi Wong, 2013).

Sleep could be defined as reversible behavioural of perceptual disengagement from the environment. Sleep is usually accompanied by postural recumbence, closed eyes, behavioural quiescence and other sign associates with sleeping (Mary & William, 2011). There are many theories that related to sleep such as restorative that helps in tissue repair, growth and recovery from fatigue as well as restoration of brain's function (Baekeland & Lasky, 1966 & Hartmann, 1978). In summarize, sleep promote the physiological processes that refresh the body and brain (Hartmann, 1978).

Elderly usually require only 5 to 6 hours of sleep per night but they tend to awaken early because of the changes in the circadian rhythm. According to study, an older adult takes more time to sleep, more frequent to awake during the night and sleep is shorter and rapid eye movement sleep (REM) is not frequent (Rashid, Ong, & Yi Wong, 2013). Majority of elderly with sleep problems not seeking for the help maybe because of lack of knowledge about sleep problem (insomnia) or not diagnosed by the health care provider (Rashid, Ong & Wong, 2013). Therefore as stated in Muhammad

Azwan (2016), the prevalence of sleep quality and quality of life among the elderly are poor and the factor associated such as social isolation, environment factor and decrease in health. This is supported by study conducted by Aliabadi et al, (2017) showed that 35.9% of the participant from healthcare in Birjand city, Iran have poor sleep quality due to environmental factors such as noise and lighting.

1.2 Problem Statement

Sleep problems are common among older persons as frequent complaints of poor sleep quality. Many studies have shown the quality of sleep among the elderly in community or hospital setting. Poor sleep quality is a major issue faces by elderly around the world. As shown in other country (Gouthaman & Devi, 2019; Pehlivan, Karadakovan, Pehlivan, & Onat, 2016; Wu, Su, Fang, & Yeh Chang, 2012; Izadi et al, 2009; Kuralay & Kiyak, 2018). Study in Malaysia by Muhammad Azwan et al 2016; Rashid Abdul, Ong, & Wong, 2013 also found similar result that show many elderly facing problem in sleep.

There are many factors affecting sleep quality among elderly such as age, comorbid environmental, gender, cultural, and medication. But this study only focused on age and comorbid as factors that affect sleep among hospitalized elderly. Age-related factor, whereas people grow older they undergo developmental and physiological as well as hormonal system changes. The sleep-wake cycle becomes less coordinated and less consistent during 24 hours/day (Mohd Kamal, 2010).

Comorbid one of the factors that affects sleep quality. Chronic illness such as hypertension, cognitive impairment, heart disease (Rodriguez & Dzierzewski, 2015; D. Foley, Ancoli-Israel, Britz, & Walsh, 2004) , rheumatoid arthritis (Pehlivan et al 2016), and osteoarthritis (Kuralay & Kiyak, 2018) found as the reason that causing poor sleep quality among elderly. In Malaysia, comorbid also one of the factors that lead to poor sleep quality (Rashid Abdul, Ong, & Wong, 2013; Akehsan et al, 2016; Rosdinom Razali et al. 2016).

However, based on literature review shows that limited study exists focusing on the quality of sleep among elderly that hospitalized in Malaysia, particularly in Kelantan context. Therefore, the objective of this study is to determine the sleep quality and associated factors among the elderly in one of the tertiary hospitals in Malaysia. The study was done in medical ward as total population is 250 people that obtained from Record Unit, Hospital USM.

1.3 Research Objective

1.3.1 General Objective

The aim of this study is to determine the sleep quality and associated factors among elderly in Hospital USM

1.3.2 Specific Objectives

- i) To determine the level of sleep quality among elderly in Hospital USM.
- ii) To determine the mean score differences between sleep pattern and sleep quality among elderly in Hospital USM.

iii) To determine the mean score differences between selected socio-demographic factors (age and comorbid) and sleep quality among elderly in Hospital USM.

1.4 Research Questions

- i) What is the level of sleep quality among elderly in Hospital USM?
- ii) What is the mean score differences between sleep pattern and sleep quality among elderly in Hospital USM ?
- iii) What is the mean score differences between selected socio-demographic factors (age and comorbid) and sleep quality among elderly in Hospital USM?

1.5 Research Hypothesis

H₀1: There is no significant mean score differences between sleep pattern and sleep quality among elderly in Hospital USM.

H_A1: There is a significant mean score differences between sleep pattern and sleep quality among elderly in Hospital USM.

H₀2: There is no significant mean score differences between selected socio-demographic factors (age and comorbid) and sleep quality among elderly in Hospital USM.

H_A2: There is a significant mean score differences between selected socio-demographic factors (age and comorbid) and sleep quality among elderly in Hospital USM.

1.6 Definition of Operational Terms

Definitions for the operational terms used in this research proposal are as shown below:

1.6.1 Elderly

According to the United Nation (2007), an elderly or ageing population is defined as a person aged 60 years and above. However, the age of the elderly actually is different depending on the policies in each country itself. Malaysia approved the aged elderly of 60 years old as recommended by Ministry of Health Malaysia as well as agreed in the World Assembly on Ageing at Vienna in 1982. In this study, elderly aged 60 years old or more and hospitalized in Hospital USM will be chosen as a representative of the population

1.6.2 Sleep Quality

Sleep quality is defined as a person's satisfaction of sleep experience integrating aspects of sleep initiation, sleep maintenance and refreshment upon awakening (Springer Link, 2013). In this study, sleep quality refers to subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction.

1.6.3 Sleep pattern

Sleep pattern is time spent asleep during a 24-hour period such as time for going to bed, the time required to fall asleep, a total of sleep time, number of awakenings, time of awakening and daytime napping (Marie Nicole Ouellet, 1995). In this study, sleep pattern refers to elderly's sleep behaviour such as the time for going to bed and time of morning

awakening, total hours of sleep estimated and needed, time required to fall asleep, number of awakenings and daytime sleep during hospitalization.

1.7 Significance of the Study

Elderly patients have a higher possibility of poor sleep quality and sleep problem. The findings of the study were to determine the level of sleep quality among elderly in Hospital USM. Next, to identify the mean score differences between sleep pattern and sleep quality among elderly in Hospital USM. The different sleep pattern during hospitalization might cause sleep disturbance among the elderly. Other than that, the findings also to determine the mean score differences between socio-demographic data and sleep quality among elderly. These findings help in giving best nursing care and management to elderly that having poor sleep quality that required services during hospitalization in the future. Furthermore, the findings of this study also can be used as baseline data for further research in this field.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is a review of the previous literature and studies related to sleep quality and associated factors among the elderly. This will describe the overview of sleep, sleep quality among elderly and factors affecting sleep quality among elderly

2.2 Overview of sleep

According to the National Sleep Foundation (2019), sleep is an active condition in which a lot of important processing, restoration, and strengthening occurs in each person that is essential for optimal daytime function. Sleep duration is depending on the age, with infants sleeping for 16 hours each day. This sleep duration decreases through childhood, reaching 7 to 8 hours in adulthood. The sleep duration decreases from young adulthood into our older years. Sleep in the elderly becomes more fragmented and is usually consolidated through daytime naps that lead to sleep problem (Edwards et al., 2010). Sleep is a reversible behavioural state of unresponsiveness to the surrounding. A condition involving sleep processes also include intrusions of sleep, dream imagery, and muscle weakness (Carskadon & Dement, 2011). Mohd Kamal (2010) state that sleep helps in repair the body tissue and improve the memory function among humans.

2.2.1 Stages of sleep

Sleep consists of two phases which are non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. The human waves during sleep are monitor by electroencephalography (EEG). The first hour of sleep showed that brain waves slow

down or called NREM sleep. NREM sleep consists of 70%- 75% of a complete sleep cycle and have four stages which are N1, N2, N3 and N4 corresponding to increase in depth of sleep. The N3 and N4 involved in the healing process, in this stage, brain and body restored in biological function (Edwards et al., 2010; Mohd Kamal, 2010). Chokroverty (2010) reported that each sleep cycle lasts between 90-110 minutes, usually the first third of sleep is the slow-wave sleep and the last third is dominated by REM. The REM sleep is 25% of the night that occurs 90 minutes after falling asleep and getting longer later in night. Deep sleep or REM sleep is more beneficial to health and well-being although people spend more than 50% in non-REM sleep (Chantra Promnoi, 2016).

Carskadon & Dement, (2011) reported that during NREM sleep, in the normal person begins with N1 that only lasts for a few minutes at the onset of sleep. During this stage, people easily disrupted when there are stimuli. Next in N2, the more intense stimulus needed to produce arousal compared to N1 sleep but no awakening in stage 2 sleep. For N3 in NREM sleep, only lasts in a few minutes in the first cycle before the transition to N4 that show more high voltage slow-wave activity and last in 20 to 40 minutes in the first cycle. The stage N3 and N4 sleep also called as deep sleep and less time in the second cycle and it might disappear in the last cycle of sleep.

The rapid eye movement (REM) sleep is showed by brain activation and muscle paralysis where the procession of memory occurs. Only the muscle involved in respiratory active during REM sleep. It also shows a decrease in responsiveness to stimulation, low voltage fast electroencephalogram (EEG) activities with saw-tooth appearance (Chokroverty, 2010). In REM sleep, human's mental activity is associated

with dreaming that reported approximately 80% of arousal in sleep based on vivid dream recall (Carskadon & Dement, 2011).

In conclusion, the normal stages of sleep consist of two components, which are non-REM sleep and REM sleep. Non-REM sleep divided into four phases which are light sleep (N1 and N2) and deep sleep (N3 and N4).

2.2.2 Circadian Rhythms

In human, the circadian rhythm is generated by circadian pacemaker located in the suprachiasmatic nucleus (SCN) of hypothalamus. Ageing is associated with malfunction of the SCN to environmental cues to regulate the circadian rhythm to 24-hour day/night cycle (Edwards et al., 2010).

Chokroverty, (2010) reported that the circadian system is a physiological and behavioural mechanism that encourages sleep and waking during the daytime. There are two components that regulate sleep-wakefulness, which is homeostatic for sleep and circadian rhythms promote arousal. The homeostatic refers to increase sleepiness to longer periods before awake while circadian factor refers to sleepiness and variations in physiological alertness. Circadian rhythm depends on environment cue as light and dark help to determine when people need to wake and sleep. The eyes send a signal to the hypothalamus when it is dark at night, where the brain give signal to body to release melatonin that makes body feels tired. The circadian rhythm controls the cycle of day and night time but in elderly the cycle change as people getting older that could lead reduce the sleep quality among elderly. As mention by Nightingale in 1912, light and

rhythm of night and day as two main factors in supporting and restoring patient health (Engwall, Fridh, Johansson, Bergbom, & Lindahl, 2015).

2.2.3 Benefit of Sleep

The conservation theory stated that the main function of sleep is to reduce the energy demand of human being during night time. Lavoie, C, Zeidler, M, & Martin J, (2018) reported that, sleep conserve the energy only in terms such as reduce of metabolic rate in human being by 15- 30% during sleep. The individual who sleeps 8 hours per day may have an energy reserve preparing for daily living activities (Phillips, 2018). A function such as protein biosynthesis, intracellular transport, membrane repair, immune function as well as reorganization of memory processing specifically upregulated during sleep compared to wake time that is similar to hibernation (Latifi, Adamantidis, Bassetti, & Schmidt, 2018). Latifi et al., (2018) stated that energy conservation by the behavioral state not only restricted to a single organ or structure, but it occurs at the whole organism. Therefore, sleep-wake cycling increases the total energy saving through resource optimization more than single organ system could achieve.

Meanwhile, sleep is one of the lifestyle factors that related to ageing, good sleep helps in increase the physical and mental energy as during sleep body function are revitalized (Aliabadi et al., 2017). Sleep not only maintain the health of the elderly, it also show a decline in the case of brain dysfunction among elderly. But the arousal during sleep and extended wake episodes can also increase with ageing and it causes sleep problem in elderly (Carskadon & Dement, 2011).

2.3 Sleep quality among elderly

As the ageing process occurs, the sleep pattern is changed. When someone becomes older, there are changes in the cycle of sleep where there is an increase in stage 1 and stage 2 of sleep. While stage 3 and stage 5 become declined by 50%. A certain individual has absented of stage 4 (Rodriguez, Dzierzewski, & Alessi, 2015). As cited in (Chiang, 2018) elderly has decline in growth hormone and increase in cortisol level therefore it affects the percentage of deep, slow wave sleep and decline in rapid eye movement sleep.

Many studies have shown the quality of sleep among the elderly in a community or hospital setting. Muhammad Azwan et al (2016), reported that the majority of older persons in the institution which is at Rumah Seri Kenangan (RSK) have poor sleep quality. There is no significant difference in sleep quality between three groups (normal, mild neurocognitive disorder and dementia). The prevalence of poor sleep quality is higher among residents of non-governmental charity elderly care in Penang that associated with a poor social relationship with others and presence of chronic illness (Rashid Abdul et al., 2013). Pehlivan et al (2016) conducted a study at Turkey's hospital and the result showed that 33% of elderly patients with rheumatoid arthritis have poor sleep quality due to pain. The study was conducted on 90 patients with knee osteoarthritis who came to the physical therapy and rehabilitation outpatient clinic in Turkey showed that 81.1% of patients had poor sleep quality and those with comorbidity had a significantly worse sleep quality (Kuralay & Kiyak, 2018).

Similarly, a study in India, 65.2% had poor sleep quality among elderly in urban population and the factors contributing are a health problem and habitual sleep efficiency. Wu, Su, Fang, & Yeh Chang, (2012) study showed the result for study on

100 community of dwelling elderly people in Taiwan and 49% of the sample reported poor sleep quality with the main factors is a frequent visit to the toilet, loud snoring and nightmare. 47.2% of the elderly from Pusat Perubatan Primer, UKM reported poor sleep quality based on a study by Rosdinom Razali et al. (2016) due to medical illnesses where heart disease as the only one that significantly associated with poor sleep quality.

2.3.1 Measurement of Sleep Quality

Sleep can be measured objectively and subjectively. To determine the sleep quality among elderly in HUSM, a valid tool is needed. The Pittsburgh Sleep Quality Index (PSQI) was chosen in this study as it is more specific and related to the objectives of the study. Buysse et al. (1998) were the people who developed the questionnaire and PSQI is suitable to use in clinical population and was measure different aspects of sleep. This questionnaire is developed to assess sleep quality among psychiatric patients. The domain of PSQI was derived from experience with sleep disorder patients, a review of previous sleep quality questionnaire and clinical experience with the instrument during 18 months of field testing (Buysse et al, 1998). These self-rated questions assess a wide variety of factors related to sleep quality and patterns of sleep in adult people. It also uses to differentiate between poor and good sleep quality. There is 7 domain such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication and daytime dysfunction. Each component scores between 0 to 3 point and the total score is between 0 to 21 with the score equal to 5 or less indicate good sleep while more than 5 indicates poor sleep (Smyth, 2003).

One of the studies in Malaysia by Rashid Abdul et al., (2013) with respondents among residents of an old folk's home used the Pittsburgh Sleep Quality Index (PSQI)

to measure the sleep quality of elderly in institutions in Penang. In addition, the PSQI also used in the study by Gouthaman & Devi, (2019) to know the sleep quality and associated factors among elderly in an urban population of India.

The advantages of using PSQI is the results from the instrument could differentiate between good sleepers and poor sleepers by all component scores. Moreover, this instrument could identify different sleep disorders based on PSQI scores. PSQI had an overall reliability coefficient of 0.83 for all seven component scores and have a high degree of internal consistency. The PSQI scores were compared with polysomnographic results to assess the validity. The T-test showed no significant differences between PSQI and laboratory results for sleep latency (Buysse, D.J., Reynolds, C.F., Monk, T.H., Berman, S.R., & Kupfer, 1998).

2.4 Factor Affecting Sleep Quality among Elderly

There are many factors that affecting sleep in a human being, especially elderly. The factors can be classified according to the component. Firstly, is age-related factor whereas people grow older they undergo developmental and physiological as well as hormonal system changes. The sleep-wake cycle becomes less coordinated and less consistent during 24 hours/day (Mohd Kamal, 2010). the sleep efficiency declines due to high in sleep latency, arousal from sleep and changes in time awake after sleep (Edwards et al., 2010). Elderly is likely to have problem in maintaining sleep that results in early morning awakening. They also spend most of their time in bed and having excessive daytime sleepiness that affects their sleeping patterns (Sleep, Gerontology, & Press, 2010).

Second factors are gender. According to the study by Gouthaman & Devi, (2019), the finding of the study showed that female elderly had significantly poorer sleep quality compared to male. The explanation for this finding may be because of the differences in terms of biological and psychological response to stress for both genders. This is because women have a higher level of anxiety compared to men. Other than that, a study in Norway also reported that the same finding where there is a higher prevalence of insomnia in women compared to men (Uhlig, Sand, Ødegård, & Hagen, 2014). To support this, the study in Spain showed that the prevalence of poor sleep quality in women is higher compared to men these differences could be due to hormonal changes related to menopause symptoms (Madrid-Valero, Martínez-Selva, Ribeiro do Couto, Sánchez-Romera, & Ordoñana, 2017; Xu et al., 2011).

Third factors are sleep pattern and culture. Sleep is a physiological process but the sleep habits are affected by the sociocultural context by an individual's life. In certain European countries, napping is considered as social life that is a normal pattern among young children and older adults. But in North America, it is not common for working adults to take a nap in afternoon (Gleichmann, 1980). According to Domino and colleagues (1985, 1986) as cited in Marie Nicole Ouellet, (1995) found that elderly from the United States sleep less than the elderly from Venezuela and Mexicans. Moreover, the elderly in Mexicans reported more unpleasant dream compared to other countries.

Next, factors are environment factor such as temperature, light, noise that affect sleep. Those are environmental cues to stimulate the rhythms of physiology and behaviour driven by the circadian system. The environment in hospital and nursing

home are not conducive for sleep because of sharing room, noisy alarm and television. A noisy environment can negatively disturb sleep as well as physiological and cognitive function. The noisy due to nursing care routine at hospital and nursing home causing the sleep disturbance (Alessi & Schnelle, 2000). Extreme temperature also affects the sleep among elderly where the condition is too hot or cold, the REM sleep is more sensitive to temperature-related disruption compared to NREM sleep. Based on the research, human being has minimal ability to thermoregulate during REM sleep (Parmeggiani, n.d.). Light is an essential cue to stay awake increase alertness among people. However, many older people in the institutions insufficiently exposed to light and some are not exposed to the light at all. Bright light in the night also affects the sleep quality among elderly (Muhammad Azwan et al., 2016).

Sleep problems in the elderly are prevalent and associated with physical and physiological factors (comorbid). Ahmadi et al (2013) state that one of the common sleep problems in elderly is insomnia that defined as difficulty in falling or staying asleep. In Australia, the study by Almeida & Pfaff,(2005) reported the prevalence of sleep difficulties among general practice patients is 63% of the 1029 participants and participants who reported sleep problems were 3.7 times more likely to be depressed. The decline of health status among elderly due to ageing processes such as cardiovascular disease, hypertension and diabetes that lead to sleep disorder and sleep problem due to pain and discomfort. Pain affects sleep quality that causing disturbing in sleep phases (Rodriguez, Dzierzewski, & Alessi 2015). Elderly have more stage 1 and stage 2 sleep, causing further arousal and disruption in the elderly. A review of literature in study at Amirkola, Iran (2017) showed that 24.8% of elderly had sleep problems. The prevalence of sleep problem in elderly who had chronic pain such as back pain, urinary

incontinence and metabolic syndrome was significantly higher than elderly who did not have any disorders (Hosseini, Saadat, Esmaili, & Bijani, 2018). Furthermore, Alessi & Schnelle,(2000) state that decline in health among the elderly because of aging process. The conditions such as pain from osteoarthritis, nocturnal dyspepsia, chronic obstructive pulmonary disease and nocturia because of medication and urinary incontinence also causing sleep disturbance. The medication that affects sleep such as bronchodilators, cardiovascular medication including beta-blocker and alpha-blocker lead to increase in prevalence of sleep disturbance.

The use of sleep medication to helps in sleep during night may become common in the elderly as their age increasing due to sleep problems. But, according to Gehrman & Ancoli-Israel (2016) use of sleep medication also give harm especially to elderly where long term use of medication cause rebound insomnia, motor incoordination, cognitive impairment as well as a higher chance of falls to occur. The effect of the hypnotics decreases stage 3 and stage 4 of sleep as well as change the REM sleep (Mendelson, 1980).

2.5 Conceptual Framework

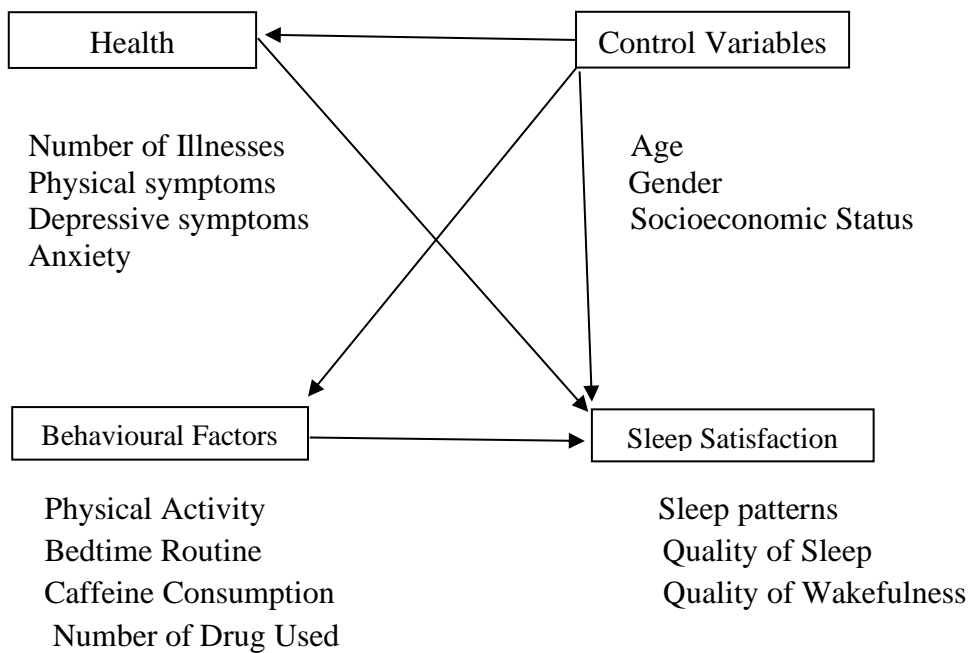


Figure 2.1 Sleep Satisfaction Model

The conceptual framework used to inform this study is adapted from the sleep satisfaction model by Marie Nicole Ouellet, (1995). The major concepts in this model consist of health, behavioural and sleep satisfaction. This model is derived from Webb's theoretical model that proposed an objective behavioural model of sleep that suitable with the restorative and adaptive theory of sleep. Based on this model, it could help to predict some sleep onset, sleep structure, sleep termination and subjective responses of sleep Webb (1988). The Henderson's philosophical assumptions also used in sleep satisfaction model.

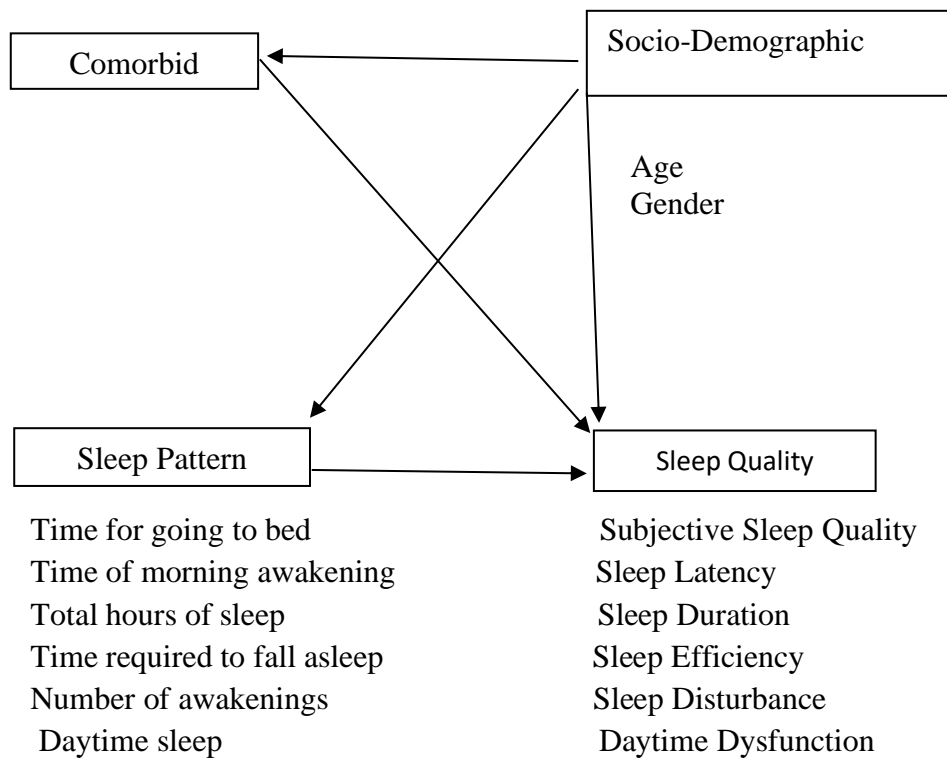


Figure 2.2 Sleep Quality Model (adapted from Marie Nicole Ouellet,1995)

The sleep quality model used as a conceptual framework in this study. The major concepts in this model are comorbid, sleep patterns, demographic variables and sleep quality among elderly. Comorbid is one of the factors that affect sleep quality among elderly, as increasing in age many older people have many illnesses such as respiratory disease, renal problem and cardiovascular problems. During hospitalization, the sleep patterns might change due to the many factors such as environmental stimuli such as noise. The sleep pattern also changes due to excessive daytime sleepiness, especially among hospitalized patients. The demographic variable such as age and gender also affect the sleep patterns among elderly as female have more poor sleep quality compared to men due to the psychological responses to stress. In conclusion, the sleep quality among hospitalized elderly is influenced by many factors such as comorbid, changes in sleep patterns and socio-demographic variable.

CHAPTER 3

METHODOLOGY & METHODS

3.1 Introduction

This chapter explained the suitable approach and rationale used to support the research methodology used in this study. Determining a suitable research design is important to achieve the objectives of the study. This chapter consists of a description of a cross-sectional design and justification of using this approach. Next, is followed by description of study setting, population, participant inclusion and exclusion criteria, sampling plan, sample size determination, instrumentation, ethical consideration right through data collection method. Lastly, the explanation regarding the statistical test used and expected outcome of the study.

3.2 Research Design

The research design selected for this study was cross-sectional design among elderly in Hospital Universiti Sains Malaysia. The reason for using the cross-sectional study is because it was the quick way by requesting the respondents who are elderly and hospitalized at Hospital USM to answer the questionnaire. The data collection has been conducted for one months from February 2019 until March 2020. This study aims to identify the sleep quality and associated factors among elderly in Hospital Universiti Sains Malaysia.

3.3 Population and Setting

The study location was in Hospital Universiti Sains Malaysia, Kelantan. The data collection has been conducted at medical wards (7 Selatan, 7 Utara, and 1 Selatan). The elderly that aged 60 years old or more and hospitalized was chosen as a representative of the population.

3.4 Sampling plan

Targeted participants have been recruited via non-probability purposive sampling. The participant's selection criteria are presented as follows:

3.4.1 Inclusion Criteria

- i) Male and female patients aged 60 years old or more and hospitalized in Hospital Universiti Sains Malaysia, and
- ii) Able to understand and speak in Malay

3.4.2 Exclusion Criteria

Participants will be excluded from the study if they:

- i) Loss of consciousness or having cognitive impairment, or
- ii) Mentally unfit, or
- iii) Not respond to question has been asked by researcher such as having hearing problem or speech impairment.

For exclusion criteria cognitive impairment and mentally unfit, the participant has been chosen by their ability to respond to the question such as their name, place and time. If participant unable to give proper response to the question, they have been excluded. For participant with mentally unfit or that have problem mental health such as having dementia, Alzheimer's or schizophrenia. They have been excluded. Only participant that give full appropriate respond during the interview will be chosen.

3.5 Sampling Method

The research sampling method of this study is purposive sampling that considered the inclusion and exclusion criteria in selecting a sample from population before collecting the data. The participants are collected from medical (7 Selatan, 7 Utara, and 1 Selatan) and the participant aged is 60 years old or more. The participants are 167 for all 3 medical wards. Each ward estimated to have around 60 respondents.

3.5.1 Sample Size Estimation

For the first objective, the total population is 250 people for medical ward that obtained from Record Unit, Hospital USM. According to Raosoft (sample size calculator), the total sample size will be 152 respondents with the confidence level 95% and the margin of error is 5%. For second objective, using the correlation sample size calculation, a webtool available at <http://www.sample-size.net/correlation-sample-size/> with $\alpha = 0.050$, $\beta = 0.2$ and $r = 0.25$. the total sample size is 123.

After the addition of 10% drop out, the total participants are 167 for all 3 medical wards. Each ward estimated to have around 60 respondents.

Table 3.1: Third objective, sample size calculation for selected socio-demographic factor (Gouthaman & Devi, 2019; Adib-Hajbaghery et al, 2012)

variable	Key parameter		n
	Q ₁	P ₀	
Age	79	21	74
Comorbid	72	27	89

3.6 Instrumentation

Instrumentation refers to the tools used to measure variables or the items of interest in the data collection. For this research study, the general socio-demographic questionnaire, PSQI and additional question of sleep pattern will be implemented. The permission to utilize the instrument which is Pittsburgh Sleep Quality Index (PSQI) was obtained from Smyth, (2003). While the additional question of sleep pattern is obtained from Marie Nicole Ouellet, (1995).

3.6.1 Section A

Section A is the demographic data comprising of question including age, gender, marital status, level of education, ethnicity, religions, current occupational status, comorbid, duration of hospitalization and history of hospitalization.

3.6.2 Section B

Section B is consisting of the item for sleep pattern. The respondents were asked about the time for going to bed and time of morning awakening, total hours of sleep estimated and needed, time required to fall asleep, number of awakenings and daytime sleep.

3.6.3 Section C

The Pittsburgh Sleep Quality Index (PSQI), a self-rated questionnaire has been adopted to evaluate the sleep quality and associated factors among elderly. PSQI is an effective instrument used to measure the patterns and quality of sleep in older peoples. It is to identify whether elderly get good or poor sleep. There are 19 items transformed into seven components which are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication and daytime dysfunction. Each component score ranged from 0 to 3, where 0 indicated “no difficulty” and 3 indicated “severe difficulty”. All the components have total score ranging from 0 to 21. A higher score indicated as poorer sleep (Buysse, et al 1998).

3.6.4 Translation of the Instrument.

The questionnaire in section A, B and C are in the English version and it has been translated by forward-backwards translation method. The forward-translated instrument will be then back-translated from Malay to English by the bilingual translator from Language Centre and Literacies, Health Campus Universiti Sains Malaysia. This is to ensure the accuracy of the translation.