



UNIVERSITI PUTRA MALAYSIA

***PERCEIVED STRESS LEVEL AND SLEEP QUALITY AMONG NURSES
DURING COVID-19 IN SERDANG HOSPITAL, SELANGOR, MALAYSIA:
A CROSS SECTIONAL STUDY***

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**BACHELOR OF NURSING
UNIVERSITI PUTRA MALAYSIA**

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**Thesis Submitted to the Faculty of Medicine and Health Sciences,
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Degree of Bachelor in Nursing**

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PERCEIVED STRESS LEVEL AND SLEEP QUALITY AMONG NURSES DURING COVID-19 IN SERDANG HOSPITAL, SELANGOR, MALAYSIA: A CROSS SECTIONAL STUDY

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Background: COVID-19, a coronavirus disease that is highly contagious caused by SARS-CoV-2 has turned into a global pandemic. Along with the COVID-19 outbreak, the situation leads to a massive impact on the health care system such as full intensive care wards, overfilled emergency department and excessive hours of working, as a high number of cases reported, this has greatly escalated the amount of work and psychological pressures for nurses. Psychological stress caused by increased workload and fear of own safety and health greatly affect the quality of sleep among nurses. **Objectives:** The general objective of the study is to determine the perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor. The specific objectives includes: To determine socio-demographic factors to determine perceived stress level among nurses, to determine sleep quality among nurses, and to determine the association between socio-demographic with perceived stress level and sleep quality among nurses. **Methods:** This study is a cross-sectional study with a convenient sampling technique is used. The data will be collected online from March to May 2021 among nurses in Serdang Hospital, Selangor using validated Perceived Stress Scale-10 (PSS-10) by Sheldon Chen and Pittsburgh Sleep Quality Index (PSQI) by Buysse DJ. The questionnaire will be disseminated and share online using Google Form. Hence, the data collected will be analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0. Determining perceived stress level and sleep quality among nurses will be analyzed using Pearson correlation, Independent t-test, and one-way independent ANOVA according to the data. **Results:** A total of 60 nurses had involved in the study. The findings in this study showed the mean $\pm$ SD for the total score of PSS-10 is $21.45 \pm$ SD 5.56 while the mean $\pm$ SD for the total score of PSQI is $7.33 \pm$ SD 2.43. Analysis done had revealed a significant relationship between gender ($p=0.017$), ethnicity ($p=0.002$), and religion ($p=0.002$) with perceived stress among nurses. The analysis also revealed there is a significant relationship between perceived stress level and sleep quality among nurses ($p=0.000$). Meanwhile, there is no significant relationship between socio-demographic factors with sleep quality. **Conclusion:** Perceived stress levels were found to significantly affect the sleep quality among nurses during the COVID-19 outbreak. As a result, interventions, clinical management, effective stress coping system, and adequate sleep satisfaction should be taken among healthcare workers, especially nurses during the COVID-19 outbreak which will further improve the holistic care for the patients.

Keywords: Stress level, sleep quality, nurses, COVID-19

TAHAP TEKANAN DAN KUALITI TIDUR DALAM KALANGAN JURURAWAT SEMASA COVID-19 DI HOSPITAL SERDANG, SELANGOR, MALAYSIA: KAJIAN KERATAN RENTAS

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Pengenalan: COVID-19, penyakit koronavirus SARS-CoV-2 yang sangat menular telah menjadi pandemi global pada hujung tahun 2019. Sepanjang wabak COVID-19, pandemi ini telah membawa kesan besar kepada sistem penjagaan kesihatan seperti wad rawatan intensif dan unit kecemasan yang penuh dengan pesakit dan jam kerja yang berlebihan. Disebabkan oleh kenaikan jumlah kes yang dilaporkan, ini telah meningkatkan tekanan kerja dalam kalangan jururawat. Tekanan yang disebabkan oleh peningkatan beban kerja dan kerisauan akan kesihatan diri telah mempengaruhi kualiti tidur di kalangan jururawat. **Objektif:** Kajian ini adalah bertujuan untuk menilai tahap tekanan dan kualiti tidur di kalangan jururawat semasa COVID-19 di Hospital Serdang, Selangor. **Kaedah:** Kajian ini adalah kajian keratan rentas deskriptif dengan teknik persampelan mudah telah digunakan dalam kajian ini. Data akan dikumpulkan secara dalam talian dari bulan Mac hingga Mei 2021 di kalangan jururawat di Hospital Serdang, Selangor dengan menggunakan Perceived Stress Scale-10 (PSS-10) oleh Sheldon Chen dan Pittsburgh Sleep Quality Index (PSQI) oleh Buysse DJ. Soal selidik akan disebarkan dan dikongsi dalam talian menggunakan Google Form. Oleh itu, data yang dikumpulkan akan dianalisis menggunakan Statistical Package for the Social Sciences (SPSS) versi 22.0. Tahap tekanan dan kualiti tidur di kalangan jururawat akan dianalisis menggunakan korelasi Pearson, ujian-t bebas dan ANOVA bebas sehala mengikut data. **Keputusan:** Sebanyak 60 jururawat telah terlibat dalam kajian ini. Hasil dapatan dalam kajian ini menunjukkan min $\pm$ SD untuk jumlah skor PSS-10 adalah $21.45 \pm SD 5.56$ manakala min $\pm$ SD untuk jumlah skor PSQI ialah $7.33 \pm SD 2.43$. Analisis yang dilakukan telah menunjukkan hubungan yang signifikan antara jantina ($p = 0,017$), etnik ($p = 0,002$) dan agama ($p = 0,002$) dengan tekanan yang dirasakan di kalangan jururawat. Analisis juga menunjukkan terdapat hubungan yang signifikan antara tahap tekanan dan kualiti tidur di kalangan perawat ($p = 0.000$). Sementara itu, tidak ada hubungan yang signifikan antara faktor sosio-demografi dengan kualiti tidur. **Kesimpulan:** Tahap tekanan didapati mempengaruhi kualiti tidur di kalangan jururawat secara signifikan semasa wabak COVID-19. Akibatnya, intervensi, pengurusan klinikal, sistem penekanan tekanan yang berkesan dan kepuasan tidur yang mencukupi harus diambil di kalangan pekerja penjagaan kesihatan, terutama jururawat semasa wabak COVID-19 yang akan meningkatkan lagi perawatan holistik bagi pesakit.

Kata Kunci: Tahap tekanan, kualiti tidur, jururawat, COVID-19

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DECLARATION BY STUDENT

I hereby confirm that:

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LIST OF ABBREVIATIONS

AIDS	: Acquired Immunodeficiency syndrome
CDC	: Center for Disease Control and Prevention
COVID-19	: 2019 novel Coronavirus
CRC	: Clinical Research Centre
Ho	: Null hypothesis
HIV	: Human Immunodeficiency Virus
JKEUPM	: Jawatankuasa Etika Untuk Penyelidikan Melibatkan Manusia
MERS	: Middle East Respiratory Syndrome
MREC	: Medical Research and Ethics Committee
NMRR	: National Medical Research Register
PhD	: Doctor of Philosophy
PPE	: Personal Protective Equipment
PSQI	: Pittsburgh Sleep Quality Index
PSS-10	: Perceived Stress Scale-10
SARS	: Severe Acute Respiratory Syndrome
SARS-CoV-2	: Severe Acute Respiratory Syndrome Coronavirus 2
SPSS	: Statistical Package for the Social Sciences
UPM	: Universiti Putra Malaysia
WHO	: World Health Organisation

CHAPTER 1 INTRODUCTION

1.0 Background

Today, COVID-19, a highly contagious coronavirus disease caused by a newly found coronavirus, SARS-CoV-2 has turned into a global pandemic. A global pandemic can be defined as “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people” (World Health Organization, 2020). It first appeared in Wuhan, China in late 2019 were the first documented contacted group to COVID-19 were the workers in wet livestock and seafood markets in Wuhan. The researcher believed that this virus is commonly found in bats and the wet markets often sell wild and banned species such as bats, raccoon dogs, and anteaters. Therefore, a significant number of COVID-19 cases has started to rise due to occupational exposure (Koh, 2020).

The outbreak spread quickly around the world as it mainly transmit from person to person through droplets, aerosol, and contact. Indeed, the transmission rate of SARS-CoV-2 is high and it's now spreading around the globe. According to World Health Organization (2020), there were 75.5 million confirmed cases and 1.67 million death cases reported from 12 December 2019 until 12 December 2020. Also, Dezan Shira & Associates (2020) updated the coronavirus reported cases in all ten ASIAN countries and other ASIAN nations daily. Based on their report, Malaysia manifested another 1,683 new cases on 18 December 2020, bringing the total cases up to 90,816 cases with total death 432. On the contrary, the first reported cases country, China has manifested total cases of 86,789.

According to World Health Organization, Malaysia has reported 711,006 confirmed cases of COVID-19 with 4,637 deaths from January 2020 to June 2021. In comparison, the total number of reported COVID-19 cases in Malaysia is higher than the Chinese mainland which has only 103,620 reported cases. Therefore, this situation drastically increased the workload and responsibility of health care professionals, especially nurses in Malaysia. As a high number of cases reported, this has greatly escalated the amount of work and psychological pressures for healthcare workers. Indeed, this also increases the exposure risk of health care professionals being infected with COVID-19 (Huh, 2020).

Besides that, the newly discovered disease may cause anxiety, depression, and stress in the general population, especially the health care team (Erdoğan & Hocaoglu, 2020). According to Huang & Zhao (2020), the incidence of poor sleep quality due to stress disorder among health care professionals was high during the COVID-19 outbreak in China. Moreover, Xiao et al. (2020) reported that health care worker who has been responsible to take care of COVID-19 patient experienced low social support, low self-efficacy, and poor sleep quality. Another study also showed the symptoms of post-traumatic stress and bad sleep quality caused by the COVID-19 outbreak was increased over time (Zhang et al., 2020). Hence, awareness of perceived stress levels and sleep disorders during COVID-19 should not be avoided as health care workers, mostly nurses play an important role in delivering care and treatment for ill patients. For this reason, nurses should obtain quality and satisfactory sleep to increase competency during working hours. Thus, this study aimed to identify nurses' perceived stress level during COVID-19, sleep

quality during the outbreak, and the subsequent association between perceived stress levels and sleep quality during the COVID-19 pandemic in Serdang Hospital, Malaysia.

1.1 Problem statement

Along with the COVID-19 outbreak, the situation leads to a huge and massive impact on the health care system such as full intensive care wards, overfilled emergency department, excessive hours of work, overtime shift work to replace colleagues who are absent due to sickness or being quarantined, heat stress and discomfort due to full PPE, low resilience of health care facilities, overwhelming task force, and anxiety due to the fear of getting infected and transmitted to own family (Huang et al., 2020). All of these factors might lead to excessive stress disorder and subsequently affect the sleep quality of workers (Fraher et al., 2020).

During the early outbreak, a retrospective study has done from Wuhan, the study by Wang et al. (2020) reported that approximately 70% of the sample study were health care workers. In addition, the prevalence of health care workers in Italy getting infected by COVID-19 has reached 15,314 cases (10.5%) by April 2020 (Istituto Superiore di Sanità, 2020). Moreover, a total number of 12,393 cases with COVID-19 infection among health care staff in Germany has been reported by July 2020. Indeed, 63.9% of the population is known by infection among nurses, followed by the physician (15.0%) (Nienhaus & Hod, 2020). Also, in a study conducted in Qatar, a total of 1,799 health care staff were tested positive for SARS-CoV-2 and 33.2% of these

were nurses and midwives (Alajmi et al., 2020). According to Malaysia's Ministry of Health, a total number of 1,771 health care workers is infected with COVID-19 by December 2020. Nurses have made up the biggest group of those infected, with 690 cases (39%) reported.

Several studies had proposed the psychological impact of the COVID-19 outbreak. A study was done by Li et al. (2020) reported that psychological stress caused by increased workload and fear of own safety and health greatly affect the quality of sleep and even brings suicidal thoughts. Moreover, the study by Du et al. (2020) reported that mental disorder such as depression and anxiety was found in the frontline health care staff of COVID-19. This significantly increased the risk of infection and transmission of the disease. Thus, nurses are highly exposed to the psychological and mental disturbance caused by stress and poor sleep quality during the pandemic (Gorbalenya et al., 2020).

As we know, nurses play an important role in delivering nursing and holistic care for the ill. Thus, what will happen if nurses have high perceived stress levels and sleep disturbance during this pandemic? Firstly, work-related stress or occupational stress brings damaging effects to nurse's physical and mental health which may directly lead to a low level of productivity and competency during work. According to the American Institute of Stress, almost 80% of work-related injuries are caused by stress (Atkinson, 2004). Moreover, the nursing profession is perceived as a stressful job with high requirements and demands from the public which combined with overwhelming responsibilities and workload and this has been identified as the primary cause of occupational stress (Mark & Smith, 2011). Also, stress from the workplace

significantly affects the nurse's quality of life and subsequently decreases the quality of care delivered. The study showed that stress affects the delivery of nursing care directly or indirectly (Teng, Hsiao & Chou, 2010). Furthermore, Zaree, Nazari, Asghary Jafarabadi & Alinia (2018) has reported that 37.2% of nurses had experienced medication errors that are caused by stress during work. Medical error is more likely to occur during an emergency, especially during a pandemic.

According to Malaysia COVID-19 State Distribution Statistic, Selangor has reported the highest cumulative number of cases at 235,120 on 24th June 2021. Also, Selangor has recorded the highest number of cases daily. Furthermore, the Ministry of Health has listed Serdang, which is a town located under Petaling district as COVID-19 red zone. Based on the data from 24th June 2021, Selangor has achieved 2,072 cases and Petaling has recorded 688 new cases. Batumalai (2021) reported that Serdang Hospital has claimed a great growing number of COVID-19 cases among health care workers since December 2020. Thus, the increased number of COVID-19 in Selangor has brought a great impact on the health system in Serdang Hospital, Selangor especially the health care workforce.

Notwithstanding, based on my literature search, only limited studies in Malaysia that investigate the perceived stress level and sleep quality among nurses during COVID-19 were found. Thus, this study is aimed to fill the research gap and investigate the association between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Malaysia.

1.2 Research objective

1.2.1 General objective

To study the perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor.

1.2.2 Specific objective

- i. To determine the socio-demographic characteristics among nurses during COVID-19 in Serdang Hospital, Selangor.
- ii. To determine the perceived stress level among nurses during COVID-19 in Serdang Hospital, Selangor.
- iii. To determine the sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor.
- iv. To investigate the relationship between socio-demographic characteristics and perceived stress level among nurses during COVID-19 in Serdang Hospital, Selangor.
- v. To investigate the relationship between socio-demographic characteristics and sleep quality during COVID-19 in Serdang Hospital, Selangor.
- vi. To study the association between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor.

1.3 Null Hypothesis

Ho1: There is no significant association between socio-demographic characteristics and perceived stress level among nurses during COVID-19 in Serdang Hospital, Selangor with a p-value greater than 0.05 ($p > 0.05$)

Ho2: There is no significant association between socio-demographic characteristics and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor with a p-value greater than 0.05 ($p > 0.05$)

Ho3: There is no significant association between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor with a p-value greater than 0.05 ($p > 0.05$)

1.4 Definition of Terms

1.4.1 Conceptual Definition

- Nurse

A professional who has to undergo complete courses of nursing education and be authorized by the regulatory authority to carry out care and services such as health promotion, illness prevention, health teaching, research participation, and care for the ill population in the country ("Nursing Definitions", 2020).

- Stress

A feeling or perception of threat that an individual has encountered results in anxiety, tension, difficulty to cope, and discomfort (Fink, 2009).

- Sleep quality

An individual's satisfaction towards sleep experiences concerning the sleep length, sleep maintenance, sleep quantity, and the feeling of refreshment upon awake (Kline, 2013).

- COVID-19

“CO” stands for corona; “VI” stands for the virus and “D” for disease. COVID-19 is a global pandemic of contagious disease caused by a novel coronavirus that featuring human to human transmission mainly through droplets and aerosols. The first case reported in China is in December 2019.

1.4.2 Operational Definition

- Nurse

A professional who has to undergo complete courses of nursing education and be authorized by Nursing Board Malaysia to carry out care and services such as health promotion, illness prevention, health teaching, research participation, and care for the ill population in Serdang Hospital, Selangor.

- Stress

The feeling or perception of threat that nurses in Serdang Hospital have encountered during the COVID-19 pandemic results in anxiety, tension, difficulty to cope, and discomfort.

- Sleep quality

Serdang Hospital nurses' satisfaction towards sleep experiences concerning the sleep length, sleep maintenance, sleep quantity, and the feeling of refreshment upon awake during COVID-19.

1.5 Conceptual framework

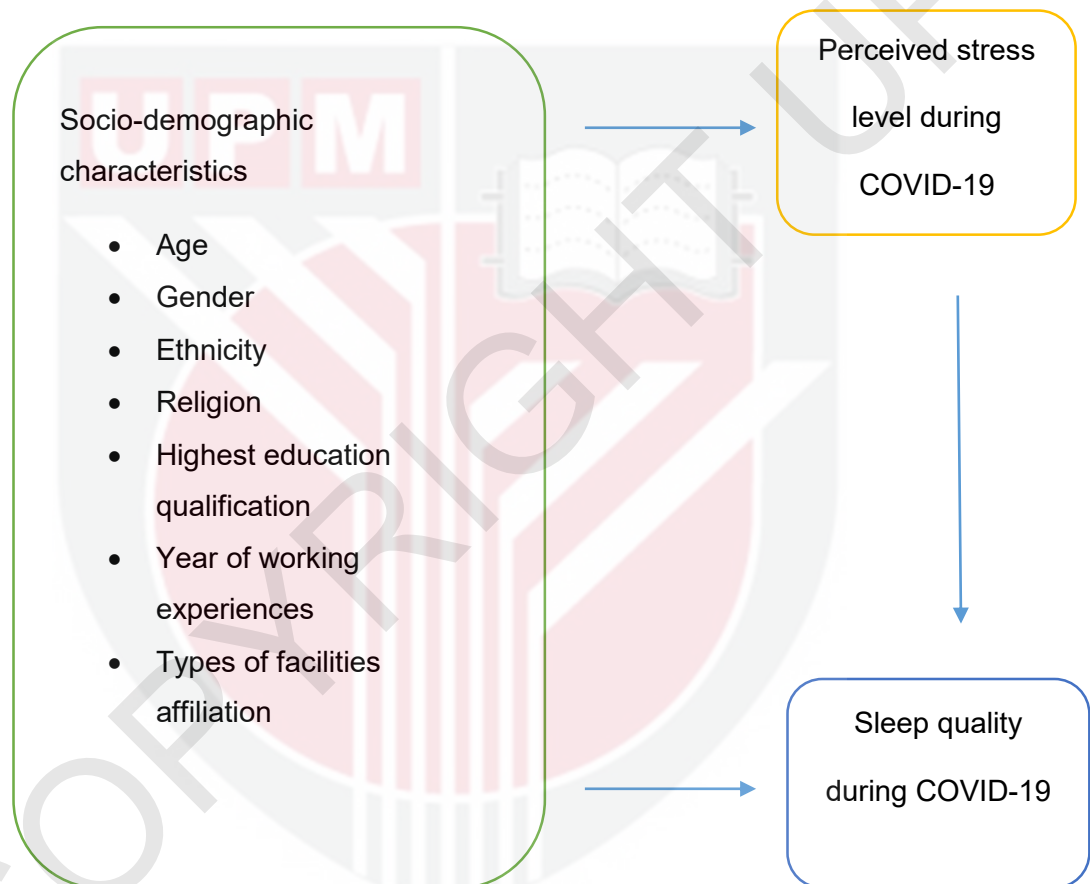


Figure 1: Conceptual framework on the perceived stress level and sleep quality among nurses during COVID-19

The primary independent variable of this study will be perceived stress levels among nurses during the COVID-19 pandemic as it will contribute to the dependent variable, sleep quality among nurses during COVID-19. This study is aimed to investigate the relationship between the perceived stress levels and sleep quality among nurses during COVID-19. Besides that, socio-demographic characteristics of nurses include age, gender, ethnicity, religion, highest education qualification, year of working experiences, and types of facilities affiliation will be counted as potential confounders of the study. Thus, this study will test and determine the relationship among these variables to find out the factors that affect the sleep quality of nurses during COVID-19.

1.6 Significance of the study

This study will focus on determining the perceived stress level and sleep quality among nurses during the COVID-19 pandemic. Based on the result from this study, it could be useful for health care professionals to notice the importance of stress awareness towards sleep quality. During the COVID-19 pandemic, the demand for health care professionals especially nurses has greatly increased, and this boosts up the workload and responsibilities. Suddenly increased workload accelerated work pace, and anxiety feeling towards the newly diagnosed global pandemic contagious disease has developed stress among nurses. As such, this markedly affects the sleep quality of nurses. Long-term perceived stress can threaten the physical and mental well-being of nurses and patients.

Therefore, this study allows health care professionals, not only nurses, but medical doctors, surgeons, and other health departments to increase the awareness of work stress during the pandemic and the following consequence on sleep quality. A good mental status of nurses with good satisfaction of sleep greatly decrease the medical errors, especially communication and medication error. Besides that, having the awareness of stress able to improve the competency of nurses and contributes to a healthy working environment, and develops good relationships and communication among health care workers. Also, understand the process of stress that might cause poor sleep quality and low competency of work helps nurses to identify the sources of stress and manage their ways to relieve stress. Furthermore, this research establishes stress might affect sleep quality among nurses during COVID-19, therefore, management and prevention can be taken earlier to reduce the risk of medical error in the future.

1.7 Summary

In summary, chapter 1 mainly focused on the background, problem statement, and significance of this study. Also, the research objectives and hypotheses have been made in this chapter. A conceptual framework of this study has been provided and well explained. Further information regarding this study will be discussed in the next chapter.

CHAPTER 2 LITERATURE REVIEW

2.0 Introduction

According to the American Psychological Association, stress can be defined as a physical and mental response to inner and outer stressors until the degree where an individual feels overwhelmed and unable to cope. In addition, perceived stress can be expressed as the feeling or emotion that an individual encountered about how much stress they are under at a given time frame (Phillips, 2013). Moreover, according to the National Institute of Health (2014), sleep has been considered as an important part of human activity daily living and it is important as food and water. Sleep quality is often used as a term to describe sleep satisfaction which refers to a collection of total sleep time, sleep onset latency, total wake time, and sleep efficiency. Also, sleep quality can be measured subjectively by questionnaires such as Pittsburgh Sleep Quality Index – PSQI (Buysse, Reynolds, Monk, Berman & Kupfer, 1989).

In this chapter, perceived stress level and sleep quality among nurses during pandemics and COVID-19 will be discussed further.

2.1 Perceived stress level among nurses during the previous pandemic

A pandemic has been described as “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people” (World Health Organization, 2020). However, according to the Centers for Disease Control and Prevention (CDC), an epidemic can be expressed as a suddenly increased number of cases of a disease that is abnormal in that population in that area. The main difference

between a pandemic and an epidemic is pandemic occurs and affects globally which includes a high proportion of the population compared to an epidemic. Furthermore, here is a list of pandemics that happened in history according to the highest death toll to lowest death toll: The Black Death (1347-1351), smallpox (1520), flu pandemic, HIV (1981-present), COVID-19 (2019-ongoing), MERS (2012-present) and SARS (2002-2003) (Nicholas, 2020).

Several studies showed the impact and difficulties of the pandemic on health care workers especially nurses' mental status. A study by Koto & Maharaj (2016) has been conducted to give an insight on health care staffs' perspective and experiences in high HIV prevalence setting in Lesotho, from sub-Saharan Africa, is the place where most affected by AIDS pandemic. The result of the interview showed a high level of perceived stress during work, even leads to burnout of health care workers due to increased number of patient seeking medical help, extra working hours and frightened of the risk of HIV transmission. Also, participants from a study that included registered nurses demonstrated emotional stress and fatigue in taking care of HIV patients because HIV patients demand more time-consuming care of the fact that no cure was found (Smit, 2005). Besides that, a study by Garcia et al. (2011) has been conducted to determine the stress, motivation, and work satisfaction among health care staff in HIV care and the result showed 30% of them strongly agree that they feel demotivated during delivering care to HIV patients.

2.2 Perceived stress level among nurses during COVID-19 pandemic

Several studies have been carried out during this pandemic to determine the perceived stress level and psychological problems of staff nurses. Firstly, Tselebis et al. (2020) reported more than half of the staff nurses experienced moderate to high stress during the COVID-19 outbreak as nurses have a higher exposure risk to COVID-19 patients because they are the ones who are responsible to deliver nursing care to patients. Nurse's burnout is closely related to physiological and psychological health. Aziznejadroshan, Qalehsari & Zavardehi (2020) revealed 17% of nurses had stress, 54% experienced anxiety and 43% had depression.

Moreover, along with the increasing number of COVID-19 cases, this also brings up the pressure and worries of medical staff (Lai et al., 2020). Indeed, heavy workload and responsibilities are also significant associated with excessive stress and mental fatigue to the healthcare workers (Adams and Walls, 2020). This is also supported by Karabulut et al. (2020), the study result showed a positive significant association between perceived stress and anxiety ($r = 0.166$, $p = 0.016$). High perceived stress levels directly increased the anxiety level and negatively affect sleep quality. Alnazly, Khraisat, Al-Bashaireh & Bryant (2021) also reported approximately 35% of respondents encountered extremely severe depression and 40% had moderate to severe depression during this outbreak.

Furthermore, a study conducted by Arnetz, Goetz, Arnetz & Arble (2020) reported nurses' stressful events during the COVID-19 outbreak. Out of 455 participants, 51% of nurses showed anxiety of work-related problems including failure of delivering training and care; 39% of nurses encountered stress of

illness and death of others such as patients, colleagues, and family; 29% of nurses experienced fear of being exposed to COVID-19 and being infected; 22% of nurses felt stressed related to inadequate PPE, the discomfort of wearing PPE, and unclear guidelines towards COVID-19. Thus, exploration of nurse's perception of stress during pandemic provides important information in making the suggestion and further management for workplace adaptations during this pandemic.

2.3 Sleep quality among nurses during COVID-19 pandemic

Sleep is an important biological requirement for humans, as important as food and water to survive. High prevalence of poor sleep quality is common reported in healthcare workers. Studies from Khatony, Zakiei, Khazaie, Rezaei, and Janatolmakan (2020) and Chien et al. (2013) showed almost 75% of nurses have poor sleep quality before the pandemic. Indeed, there are several studies also proved that the sleep quality of nursing staff are significantly been increased during the COVID-19 pandemic. A study done in Greece has investigated the sleep quality, perceived stress, and mental support from family among staff nurses in Greece during this pandemic (Tselebis et al., 2020). Results showed a high prevalence of sleep disorders among staff nurses who are working in specialized COVID-19 hospitals.

Besides that, a recent study in China also reported almost half of the medical staff experienced sleep disorders during this outbreak (Zhang et al., 2020). According to Abbas et al. (2021), the prevalence of poor sleep quality increased to 78.8% during COVID-19 has been reported in the study. The

study conducted by Al Maqbali (2021) has reported that 58.8% of frontline nurses reported poor sleep quality with a mean PSQI score of 7.04. Meanwhile, a study from China with 180 healthcare workers reported sleep disturbances with a mean PSQI score of 8.6 ± 4.6 (Xiao, Zhang, Kong, Li & Yang, 2020). Another study reported 45.5% of health care workers encounter sleeplessness while this percentage increased to 68.3% during the COVID-19 outbreak (Azzez, Abdulah, Piro & Miho Alhakem, 2019). Furthermore, Abbas et al. (2021) reported that participants with bad sleep quality have a greater frequency of encountering medical errors with 82.5% compared to good sleep quality nurses. Indeed, investigation of nurse's sleep quality helps in work management and adaptation during the pandemic.

2.4 Association between socio-demographic characteristic and perceived stress level during COVID-19

A series of socio-demographic factors of nurses include age, gender, ethnicity, religion, highest education qualification, year of working experiences, and types of facilities affiliation seem to be linked to the level of perceived stress during the COVID-19 outbreak. A study performed by Alnazly, Khraisat, Al-Bashaireh & Bryant (2021) described that male respondents demonstrated higher scores for fear, anxiety, and stress compared to female respondents during the COVID-19 pandemic. Also, a study by Moghanibashi Mansourieh (2020) revealed that men experienced lower stress than women because men have better resilience. However, previous studies have found that the anxiety levels of women were higher than those of men (Huang & Zhao, 2020; Lai et al., 2020; Wang et al., 2020; Huang et al., 2020). On a similar line, studies

performed report significant differences in perceived stress between men and women during COVID-19 ($p < 0.001$) where women reported more anxious feelings compared to men during the pandemic (Rodríguez et al., 2020).

According to the literature, there is a significant association between positive religion with perceived stress which indicates having engagement and a secure relationship with God associated with less perceived stress (Arévalo et al., 2008; Peres et al., 2018). Also, Lee (2014) reported a negative correlation between religion with perceived stress. Also, based on the study by Ting, Aw Yong, Tan & Yap (2021) showed that there is a significant difference in religion with perceived stress levels among Buddhists, Christian, and Muslims ($p < 0.001$) which indicates the Buddhist group ($p < 0.001$) scored higher perceived stress level compared to Christian ($p < 0.001$) and Muslim ($p = 0.05$).

The same study also showed participants over 40 years experienced higher levels of fear and stress compared to respondents age less than 40 years (Alnazly, Khraisat, Al-Bashaireh & Bryant, 2021). Also, Rodríguez et al. (2020) reported that perceived stress was significantly lower in the population aged 40 below with ($p < 0.001$). In this regard, Aziznejadroshan, Qalehsari & Zavardehi (2020) disclosed nurses who were age more than 35 years had triple risks of encountering stress compared to nurses who were younger than 35 years. Meanwhile, Gamonal Limcaoco, Mateos, Fernández & Roncero (2020) proposed that older people which more than 45 years showed the lowest level of anxiety. In another word, the population who is age under 45 will experience a higher level of stress, mostly found between 18 to 25 years old.

Likewise, nurses who are with more clinical experiences which more than 20 years revealed higher levels of fear and stress (Alnazly, Khraisat, Al-Bashaireh & Bryant, 2021). Similarly, Aziznejadroshan, Qalehsari & Zavardehi (2020) showed nurses who had more than 10 years of experience were at four times greater risks to feel stressed than the nurses who had less than 10 years of experience. Besides, Rodríguez et al. (2020) found that there are significant differences between education qualifications with perceived stress with $p < 0.01$ which showed higher educational qualifications had a higher mean score of PSS-14.

Another recent study also proved that 84% of frontline healthcare professionals manifested moderate to severe stress during this outbreak (Jahrami et al., 2020). This is also supported by Zhang et al. (2020), most of the participants in this study are young with fewer experienced nurses, they demonstrated high burnout levels due to stress and long working hours as a frontline. However, Marthoenis, Maskur, Fathiarani & Nassimbwa (2021) found that nurses who are working in non-COVID-19 wards experienced significantly higher anxiety with ($p=0.01$) compared to colleagues in the COVID-19 ward.

On the above, the objective of this study is to investigate the differences in perceived stress level in the view of socio-demographic characteristics of the population during the COVID-19 outbreak.

2.5 Association between socio-demographic characteristics and sleep quality during COVID-19

Al Maqbali (2021) reported that poor sleep quality was significantly found mostly among those aged 18-30 years old ($p=0.02$), nurses who have working experiences less than 2 years ($p=0.04$), and nurses who have working experiences between 3 to 5 years ($p=0.04$). The study by Pérez-Fuentes, Molero Jurado, Simón Márquez, and Gázquez Linares (2019) also showed a positive significant relationship between age and sleep quality ($r = 0.13$, $p < 0.001$) which proven that nurses complained of poor sleep as they grow older. Moreover, a previous study reported there is a significant relationship between women who have a poorer quality of sleep compared to men ($p=0.004$), age ($p<0.001$), working experiences ($p<0.001$), and working department ($p=0.022$) (Dong, Zhang, Sun, Sang & Xu, 2017).

Besides, the study by Qi et al. (2020) demonstrated Chinese frontline medical staff who encountered the COVID-19 patients have significantly manifested a high prevalence of insomnia compared to the non-frontline medical worker ($p< 0.001$). This indicates frontlines had poorer sleep disturbance compared to non-frontline units. Further subjective inspection of sleep quality for frontline healthcare workers demonstrated more sleep disturbances, more frequent use of sleep medication, and more low work competency. According to Jahrami et al. (2020), 75% of frontline healthcare workers in Bahrain experienced poor sleep patterns. Besides that, a study in Fangcang Hospital in China has proposed that nurse's sleep quality significantly corresponds with the year of working. Nurses who worked

exceeded for more than 15 years had worse sleep satisfaction compared to fresh graduate nurses with $p < 0.001$ (Huang et al., 2020).

A study performed by Jahrami et al. (2020) reported that there is no significant relationship between age ($p=0.5$), female sex ($p=0.3$), and types of facilities ($p=0.8$) with sleep quality among frontline healthcare workers during COVID-19. Also, logistic regression done by Al Maqbali (2021) showed gender and institution type had no significant effects on poor sleep. This is also supported by Pérez-Fuentes, Molero Jurado, Simón Márquez, and Gázquez Linares (2019) which revealed no statistically significant differences were found between gender and sleep quality which indicates the sleep quality in men and women were similar.

2.6 Association between perceived stress level and sleep quality among nurses during COVID-19

Indeed, increased stress directly affect sleep quality among the healthcare professionals, especially the frontline healthcare worker such as nurses who are taking care and administering treatment for the patients 24 hourly. This is similar to a study from Al Maqbali (2021) that demonstrated a significant association between PSS-10 with PSQI ($p=0.001$). Another study found that the sleep of nurses had significantly affected by stress with a $p < 0.01$ indicated a high prevalence of sleep disturbances was observed among nurses during the COVID-19 pandemic (Tselebis et al., 2020). Moreover, Furthermore, a significant positive association was found between SARS (Stanford Acute Stress Reaction) scores and PSQI (Pittsburgh Sleep Quality Index) scores with

$r=0.457$, $P<0.01$ (Xiao, H et al., 2020). The study explained that one of the factors of sleep disturbances during a pandemic is the stress of getting infected by COVID-19 (Salari et al., 2020) and Zhang et al. (2020) manifested that more than half of the medical workers experienced insomnia together with depressive and anxiety symptoms.

However, Karabulut et al. (2020) found no significant correlation between sleep quality and perceived stress level with $p=0.61$. Also, the study proposed by Jahrami et al. (2020) indicated no significant association between PSS-10 and PSQI which was used to measure perceived stress level, and PSQI for sleep quality measurement using Pearson correlation coefficient with $p=0.3$.

2.7 Summary

In summary, this chapter discussed the perceived stress level and sleep quality during past pandemic history and the ongoing COVID-19 pandemic. Furthermore, the methodology of this study will be discussed in the next chapter.

CHAPTER 3 METHODOLOGY

3.0 Introduction

This chapter summarizes the research methodology that is going to be used in this study of perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Malaysia. The confidentiality and privacy of participants in this study is been protected by ethical consideration measures.

3.1 Study Design

A cross-sectional study has been chosen for this study to determine the perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Malaysia. A cross-sectional study can be defined as an observational study designed for the investigation of a population at one specific point in time where the outcomes and exposure of the study present at the same time (Wang & Cheng, 2020). Besides that, a cross-sectional study enables the researcher to look at various characteristics of participants at once and investigate the association between these variables. Indeed, the prevalence could be estimated based on the study (Setia, 2016). Thus, a cross-sectional study is suitable to assess the stress level among nurses during COVID-19, the sleep quality among nurses during COVID-19, and the association between these variables together with different socio-demographic characteristics of nurses.

3.2 Study Location

This study will be conducted at any general wards: medical ward, surgical ward, pediatric ward, obstetric ward, and critical care units such as emergency department and intensive care units: ICU and CCU in Serdang Hospital, Selangor to give a view of the stress level and sleep quality of nurses during COVID-19 crisis. Serdang Hospital is a government-based hospital were located in Sepang, Selangor, Malaysia. This is a multi-specialty hospital and it is designated as the reference center for cardiology and cardiothoracic surgery. This hospital also served as a teaching hospital for medical students from the Faculty of Medicine and Health Sciences at University Putra Malaysia (UPM). Therefore, Serdang Hospital is chosen as a research location for this study.

3.3 Study Sampling

3.3.1 Study Population

This study will be conducted among nurses who are employed under Serdang Hospital, Selangor.

3.3.2 Study Duration

The duration of this study will start from January 2021 to October 2021, while the data collection period will probably start from March 2021 to May 2021.

3.4 Sampling Method

In this study, a non-probability sampling method, convenient sampling will be used where the sample is selected based on convenience and the inclusion criteria which will be stated in 3.5. According to the Taherdoost (2016), the selected participants from convenient sampling method is the one who is often ready and accessibility. It is commonly used as the researcher is readily approaching the sample and collect data in a quicker time frame and low cost required. Hence, the researcher is using a convenient sampling method in this study to approach the nurses who are under the employment of Serdang Hospital, Selangor.

3.5 Participants' Criteria

3.5.1 Inclusion Criteria

First, the participants selected must be Malaysian. Also, the participants must be a registered nurses under the Malaysian Nursing Board and are employed in Serdang Hospital.

3.5.2 Exclusion Criteria

The exclusion criteria for this study are participants whose age is above 60 years old. Also, participants who are not being on duty or giving health care services at the time of study are being excluded.

3.6 Sample Size

The sample size for this study is calculated using Cochran's formula which was developed in 1977. It allows the researcher to calculate the ideal sample size as this formula is considered appropriate in a study with large populations.

$$\text{Cochran's sample size recommendation, } n_0 = \frac{Z^2 pq}{e^2}$$

Where,

n_0 = Cochran's sample size recommendation

Z = Z selected critical value of the desired level of confidence

p = estimated proportion of the population that has the attribute in question

$q = 1 - p$

e = desired level of precision

The degree of variability of this population is unknown, thus, to give the maximum variability, the estimated proportion will be 50% ($p=0.5$), 95% confidence level with 5% of the level of precision ($e=0.05$). A 95% confidence level gives a 1.96 Z value. Hence,

$$\text{Cochran's sample size recommendation, } n_0 = \frac{Z^2 pq}{e^2}$$

$$n_0 = \frac{(1.96^2)(0.5)(0.5)}{(0.05^2)}$$

$$n_0 = 384.16$$

$$n_0 \approx 384$$

Moreover, there is a modification for the Cochran formula for sample size calculation in smaller populations as the sample size could be decreased

slightly when the estimated sample size is larger than 5% of the actual population. Thus, a modification formula has been proposed.

$$\text{Final sample size, } n = \frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)}$$

Where,

n_0 = Cochran's sample size recommendation

N = population size

n = final sample size

Let's assume the estimated total amount of nurses working in Serdang Hospital, Selangor who will be recruited in this study is 900 which is considered the population size, N . Thus,

$$\text{Final sample size, } n = \frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)}$$

$$n = \frac{384}{1 + \left(\frac{384 - 1}{1309}\right)}$$

$$n = \frac{384}{1.293}$$

$$n = 297.07$$

$$n \approx 297$$

Therefore, the number of participants needed for this study is 297 nurses who met the eligibility criteria from Serdang Hospital, Selangor.

3.7 Study Instrument

3.7.1 Questionnaire

This questionnaire is adopted and modified from two widely known instruments, Perceived Stress Scale-10 (PSS-10) by Sheldon Cohen (Cohen, Kamarck & Mermelstein, 1983) and Pittsburgh Sleep Quality Index (PSQI) by Buysse DJ (Buysse, Reynolds, Monk, Berman & Kupfer, 1989). These instruments have been used commonly to investigate stress levels and sleep quality. These instruments were in the English language and have been translated in Malay Version and validated in previous studies from Malaysian researchers.

It consists of three parts which are Part A, Part B, and Part C. Part A consists of 7 items which include: age, gender, ethnicity, religion, highest education qualification, year of working experiences, and types of facilities affiliation. Meanwhile, part B includes 10 items adopted from PSS-10 for assessment of nurses' stress level and part C will consist of 19 items from PSQI to assess nurses' sleep quality.

3.7.2 Scoring System

Part B: Stress Level during COVID-19

Perceived Stress Scale-10 (PSS-10) was developed by Sheldon Cohen and his fellow by 1983 and it is a commonly used psychological measuring tool to assess the perception of stress (Cohen, Kamarck & Mermelstein, 1983). It consists of 10 items and the questions in this scale ask the participants about their feelings and thoughts during the last month. The participants will answer how often is their feeling or thought occurred during the last month. Score 0

indicates never, score 1 indicates almost never, score 2 indicates sometimes, score 3 indicates fairly often, and score 4 indicates very often. A total of 0-40 score will be obtained and the higher scores indicate higher perceived stress.

- Scores ranging from 0-13 consider as low stress.
- Scores ranging from 14-26 consider as moderate stress.
- Scores ranging from 27-40 consider as high perceived stress.

Part C: Sleep Quality during COVID-19

Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse DJ to investigate sleep disturbance and usual sleep habits during the past month only. It consists of 19 items and scores using 0-3 Likert scale: Scale 0 showed no difficulty to Score 3 showed severe difficulty. The 19-items are divided into 7 components: sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, sleep medication used, and daytime dysfunction due to sleepiness. The total score yields from the questionnaire will be 0 to 21 with the higher total score showing worse sleep quality. Also, the author mentioned that a total score higher than 5 be considered as significant poor sleep quality (Buysse, Reynolds, Monk, Berman & Kupfer, 1989).

3.8 Validity and Reliability

Previous studies have been conducted to assess the validity and reliability of both instruments. A general rule of thumb was used to interpret the reliability where Cronbach's alpha value of 0.7 and above is considered acceptable.

The original English version of PSS-10 has been validated and manifested good reliability with 0.78 of Cronbach's alpha. Meanwhile, according to Al-Dubai, Alshagga, Rampal, & Sulaiman, (2012), the original English version of PSS-10 has been translated and back-translated into Malay version and the translation procedure has been repeated until satisfactory translation was obtained. Regarding the study, the Malay version of PSS-10 has been demonstrated as a reliable and valid instrument among medical students in Malaysia with a Cronbach's alpha coefficient of 0.78 which was acceptable and similar to the original version. Moreover, another study has been conducted to evaluate the validity and reliability of Malay version PSS-10 among medical residents and railway workers and manifested validated and a Cronbach's alpha of 0.70 for medical residents and 0.71 for railway workers (Al-Dubai, Barua, Ganasegeran, Rizal & Rampal, 2014).

Furthermore, the Pittsburgh Sleep Quality Index (PSQI) has been translated in Malay version and the study proved that PSQI-M has acceptable reliability with 0.74 Cronbach's alpha (Farah, Saw Yee & Mohd Rasdi, 2019). Meanwhile, the original PSQI has a Cronbach's alpha value of 0.83 (Buysse, Reynolds, Monk, Berman & Kupfer, 1989). In this study, both the English version and the Malay version of the questionnaire are included in the study instrument.

3.9 Data Collection Procedure

After the ethical approval is obtained, data collection will be collected online by using Google form as the physical data collection shall be minimized during this pandemic situation in Malaysia. The Google form link will be disseminated and share online through WhatsApp among nurses who are currently working in Serdang Hospital, Selangor. A complete Participant Information Sheet (PIS) will be provided on the first page of the online survey form to make sure the participants meet the inclusion criteria of the study. Besides that, the participants will have to click agree after they have read through all the information to provide the willingness in participating the study. Thus, consent will be automatically obtained when the participants click agree and submit the survey. To ensure the confidentiality of the participants, all data collected will only be available for the researcher.

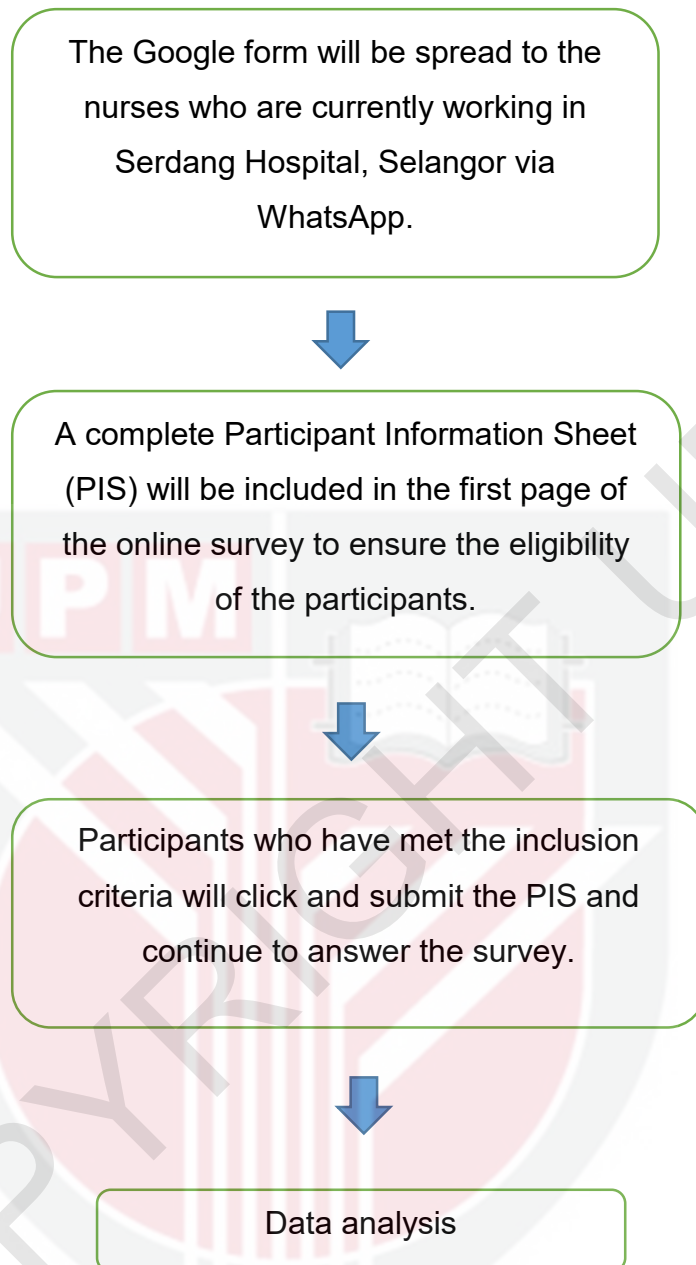


Figure 2: Data Collection Flowchart (Online through Google form)

3.10 Data Analysis

The collected data will first be cleaned and re-check to identify any incomplete, incorrect, and irrelevant parts of data. Then, Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows will be used to analyze the collected data. The result will be presented in the table and attached in Appendix B. Normality test will be performed to determine if the data is normally distributed.

Objectives	Variables	Types of Variables	Statistical Measurements
1. To determine the socio-demographic characteristics among nurses during COVID-19	Socio-demographic characteristics	Categorical: Gender, ethnicity, religion, highest education level, year of working experiences & types of facilities affiliation Continuous: Age	Descriptive analysis, frequency & percentage Mean $\pm$ SD
2. To determine the perceived stress level among nurses during COVID-19	Stress level	Categorical	Descriptive analysis, frequency & percentage

3. To determine the sleep quality among nurses during COVID-19	Sleep quality	Categorical	Descriptive analysis, frequency & percentage
4. To investigate the relationship between socio-demographic characteristics and perceived stress levels among nurses during COVID-19	Independent variable: Socio-demographic characteristics	Categorical: Gender, ethnicity, religion, highest education level, year of working experiences & types of facilities affiliation	Categorical with only two groups: (Gender, Year of working experiences, Types of facilities affiliation) Independent t-test (Normally distributed) Categorical data with more than two groups: (Ethnicity, Religion, Highest education level) One-way Independent ANOVA (Normally distributed)
		Continuous: Age	Pearson correlation (Normally distributed)

			Spearman correlation (Not normally distributed)
	Dependent variable: Stress level	Continuous	
5. To investigate the relationship between socio-demographic characteristics and sleep quality during COVID-19	Independent variable: Socio-demographic characteristics	Categorical: Gender, ethnicity, religion, highest education level, year of working experiences & types of facilities affiliation	Categorical with only two groups: (Gender, Year of working experiences, Types of facilities affiliation) Independent t-test (Normally distributed) Categorical data with more than two groups: (Ethnicity, Religion, Highest education level) One-way Independent ANOVA (Normally distributed)

		Continuous: Age	Pearson correlation (Normally distributed) Spearman correlation (Not normally distributed)
	Dependent variable: Sleep quality	Continuous	
6. To study the association between perceived stress level and sleep quality among nurses	Independent variable: Stress level	Continuous	Pearson correlation (Normally distributed) Spearman correlation (Not normally distributed)
	Dependent variable: Sleep quality	Continuous	

3.11 Ethical Consideration

Participation in the study is strictly voluntary and a complete Participant Information Sheet (PIS) and informed consent will be included in the survey. Thus, ethical approval is important to protect both researcher and participants in the research process. The ethical approval will be applied and obtained from

Medical Research and Ethics Committee (MREC) via online registration through National Medical Research Register (NMRR). After getting the approval permission from MREC, the written ethical approval letter will then send to Jawatankuasa Etika Untuk Penyelidikan Melibatkan Manusia (JKEUPM) and Clinical Research Centre (CRC) to obtain permission to further conduct the study. Written permission will be submitted to the director of Serdang Hospital to obtain permission to access the study site.

This study was registered under NMRR with NMRR-21-62-58079 while ethical approval was obtained from MREC and JKEUPM. Also, Permission for data collection among respondents was obtained from the Director of Serdang Hospital and Head of Matron of Serdang Hospital.

All the information and data regarding the respondents will be kept confidential and only used for research purposes. Also, the participant will be identified by serial number without involving any identifying features. There will not be personal information disclosed when the findings of the study are published. Only the researcher and supervisory committee have total access to the findings. Other than that, the data collected will be store and kept securely by the researcher in Google drive which will only be accessed by the researcher.

3.12 Conclusion

To conclude up, this chapter discussed the study design and methods that will be used in the study.

CHAPTER 4 RESULT

4.0 Introduction

This chapter includes the results of this study that aimed to determine the associations between socio-demographic characteristics, perceived stress level, and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor. All the relevant data had been analyzed using SPSS Statistic 22 with a significance level set at $p < 0.05$.

4.1 Response Rate

A total of 60 respondents answered the online survey and all responses are valid to be used and analyzed in this study. Two hundred ninety-seven respondents were the required sample size, hence the response rate for this study is 20%.

4.2 Socio-demographic Characteristics

The total number of respondents of this study is 60 individuals. The mean age of the respondents is 31.20 ± 6.74 years old. Out of 60 respondents, majority of them were female (80.0%, $n = 48$), Malay (91.7%, $n = 55$) and Islam (91.7%, $n = 55$). The highest educational level among respondents is a diploma (43.3%, $n = 26$). More than half of the respondents are from non-frontline units (65.0%, $n = 39$) and have more than five years of working experience (55.0%, $n = 33$). The details regarding the distribution of respondents' socio-demographic characteristics are reported in Table 4.2.

Table 4.2 Socio-demographic characteristics of nurses working during COVID-19 in Serdang Hospital, Selangor, (N=60).

Demographic	n (%)	Mean $\pm$ SD
Age		31.20 $\pm$ 6.74
Gender		
Female	48 (80.0)	
Male	12 (20.0)	
Ethnicity		
Malay	55 (91.7)	
Non-Malay	5 (8.3)	
Religion		
Muslim	55 (91.7)	
Non-Muslim	5 (8.3)	
Highest Education Level		
Diploma	26 (43.3)	
Bachelor's Degree	23 (38.3)	
Post Basic	11 (18.3)	
Types of Facilities Affiliation		
Non- frontline Units	39 (65.0)	
Frontline & Critical Units	21 (35.0)	
Years of Working Experiences		
< 5 years	27 (45.0)	
>5 years	33 (55.0)	

4.3 Perceived Stress Level among nurses during COVID-19

Perceived stress level among nurses during COVID-19 was measured by using the Perceived Stress Scale instrument (Cohen, Kamarck & Mermelstein, 1983). The total score has been calculated and categorized to determine the perceived stress level among nurses during COVID-19 in Serdang Hospital, Selangor. Based on the result, 78.3% (n=47) of respondents felt moderate stress during COVID-19. Details of the data as described in Table 4.3.1.

Table 4.3.1 Perceived Stress Level among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

PSS-10	n (%)
Perceived Stress Level	
Low Stress	7 (11.7)
Moderate Stress	47 (78.3)
High Stress	6 (10.0)

The mean score for PSS-10 among nurses in this study is $21.45 \pm \text{SD } 5.56$. Based on the result, more than half (55.0%, $n= 33$) respondents were fairly often felt confident in their ability to handle the personal problem. Besides that, there were almost half of the respondents (48.3%, $n=29$) were fairly often felt nervous and stressed. 40.0% ($n=20$) of respondents were fairly often felt anger because of things that happened outside of their control. There were almost half of the respondents were sometimes felt that they were on top of things (48.3%, $n= 29$); sometimes has been upset because of something happened unexpectedly (45.0%, $n=27$), and sometimes found that they could not cope with all the things that they had to do (43.3%, $n=26$). Also, 41.7% ($n=25$) of respondents were sometimes felt difficulty was piling so high until they could not overcome it. The distribution of answers to questions in Perceived Stress Level among nurses during COVID-19 is shown in Table 4.3.2.

Table 4.3.2 Distribution of answers to questions in PSS-10 among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

Questions		n (%)				
		0 Never	1 Almost Never	2 Sometimes	3 Fairly Often	4 Very Often
1.	In the last month, how often have you been upset because of something that happened unexpectedly?	3 (5.0)	12 (20.0)	27 (45.0)	12 (20.0)	6 (10.0)
2.	In the last month, how often have you felt that you were unable to control the important things in your life?	3 (5.0)	21 (35.0)	13 (21.7)	17 (28.3)	6 (10.0)
3.	In the last month, how often have you felt nervous and stressed?	3 (5.0)	13 (21.7)	7 (11.7)	29 (48.3)	8 (13.3)
4.	In the last month, how often have you felt confident about your ability to handle your personal problems?	0 (0.0)	6 (10.0)	20 (33.3)	33 (55.0)	1 (1.7)
5.	In the last month, how often have you felt that things were going your way?	4 (6.7)	18 (30.0)	18 (30.0)	20 (33.3)	0 (0.0)
6.	In the last month, how often have you found that you could not cope with all the things that you had to do?	6 (10.0)	23 (38.3)	26 (43.3)	3 (5.0)	2 (3.3)
7.	In the last month, how often have you been able to control irritations in your life?	3 (5.0)	15 (25.0)	18 (30.0)	17 (28.3)	7 (11.7)
8.	In the last month, how often have you felt that you were on top of things?	1 (1.7)	6 (10.0)	29 (48.3)	21 (35.0)	3 (5.0)
9.	In the last month, how often have you been angered because of things that happened that were outside of your control?	3 (5.0)	4 (6.7)	23 (38.3)	24 (40.0)	6 (10.0)
10.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	3 (5.0)	14 (23.3)	25 (41.7)	13 (21.7)	5 (8.3)

4.4 Sleep Quality among nurses during COVID-19

Sleep Quality among nurses during COVID-19 was measured by using Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman & Kupfer, 1989). The total score has been calculated and categorized to determine the sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor. Based on the result, 81.7% (n=49) of respondents experienced poor sleep during COVID-19. Details of the data as described in Table 4.4.1.

Table 4.4.1 Sleep Quality among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

PSQI	n (%)
Sleep Quality	
Good Sleep	11 (18.3)
Poor Sleep	49 (81.7)

The mean score for PSQI score among nurses during COVID-19 is $7.33 \pm SD 2.43$ which indicates poor sleep quality. Based on the result, nearly half of the respondents (48.3%, n=29) went to bed at 24:00 during the past of the month. Twenty (33.3%) out of 60 respondents usually took 10 minutes and 30 minutes to fall asleep each night. Also, 36.7% (n=22) of respondents usually gotten up at 6:00 am and the hour of actual sleep they got at night was 5.0 hours. Most of the respondents (91.7%, n=55) never took any prescribed and over-the-counter medications during the past month to improve sleep quality. More than half of the respondents never experienced any uncomfortable breathing (66.7%, n=40); cough or loud snoring (63.3%, n= 38); having pain (60.0%, n=36) and trouble staying awake while driving, eating meals, or engaging in social activity (65.0%, n=39) during the past month. Meanwhile, almost half of the respondents (45.0%, n=27) have only a very slight problem in keeping up enough enthusiasm to get things done. Almost three quarter out of 60 respondents (73.3%, n=44) rated that they have fairly good sleep quality during the past month. The details regarding the distribution of answers to questions in Sleep Quality among nurses during COVID-19 are reported in Table 4.4.2.

Table 4.4.2 Distribution of answers to questions of PSQI among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

Questions	n (%)
1 During the past month, what time have you usually gone to bed at night?	
20:00	3 (5.0)
21:00	3 (5.0)
22:00	2 (3.3)
22:30	2 (3.3)
23:00	11 (18.3)
23:30	2 (3.3)
24:00	29 (48.3)
01:00	6 (10.0)
02:00	2 (3.3)
2 During the past month, how long (in minutes) has it usually takes you to fall asleep each night?	
5	4 (6.7)
10	20 (33.3)
15	6 (10.0)
20	2 (3.3)
30	20 (33.3)
45	1 (1.7)
60	7 (11.7)
3 During the past month, what time have you usually get up in the morning?	
5:00	16 (26.7)
5:30	16 (26.7)
6:00	22 (36.7)
6:30	6 (10.0)
4 During the past month, how many hours of actual sleep did you get at night?	
3.0	1 (1.7)
3.5	2 (3.3)
4.0	8 (13.3)
5.0	22 (36.7)
6.0	19 (31.7)
7.0	5 (8.3)
9.0	3 (5.0)

		Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
5	During the past month, how often have you had trouble sleeping because of you...				
	Cannot get to sleep within 30 minutes	10 (16.7)	18 (30.0)	22 (36.7)	10 (16.7)
	Wake up in the middle of the night or early morning	6 (10.0)	25 (41.7)	21 (35.0)	8 (13.3)
	Have to get up to use the bathroom	8 (13.3)	27 (45.0)	19 (31.7)	6 (10.0)
	Cannot breathe comfortably	40 (66.7)	18 (30.0)	2 (3.3)	0 (0.0)
	Cough or snore loudly	38 (63.3)	12 (20.0)	2 (3.3)	8 (13.3)
	Feel too cold	11 (18.3)	29 (48.3)	15 (25.0)	5 (8.3)
	Feel too hot	9 (15.0)	29 (48.3)	9 (15.0)	13 (21.7)
	Have bad dreams	26 (43.3)	16 (26.7)	11 (18.3)	7 (11.7)
	Have pain	36 (60.0)	13 (21.7)	5 (8.3)	6 (10.0)
6	During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?	56 (93.3)	4 (6.7)	0 (0.0)	0 (0.0)
7	During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in the social activity?	39 (65.0)	11 (18.3)	8 (13.3)	2 (8.3)
n (%)					
		No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8	During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	22 (36.7)	27 (45.0)	9 (15.0)	2 (3.3)
n (%)					
		Very good	Fairly good	Fairly bad	Very bad
9	During the past month, how would you rate your sleep quality overall?	3 (5.0)	44 (73.3)	13 (21.7)	0 (0.0)

4.5 Association between Socio-demographic characteristics and Perceived Stress Level among nurses during COVID-19 in Serdang Hospital

The normality test had been conducted for perceived stress level and it found that the total score is normally distributed with Skewness of 0.025 and Kurtosis of 0.112 which is within the normal range of -1 to 1 (George & Mallery, 2010). Hence, parametric tests were conducted to find out the association between socio-demographic characteristics of respondents and perceived stress levels among nurses. Pearson correlation had shown that there is no significant relationship between age and perceived stress level. Next, independent t-test results showed that there is no significant relationship between socio-demographic characteristics (types of facilities affiliation and year of working experiences) with perceived stress. Meanwhile, independent t-test showed significant difference in relationship between gender ($t_{(57.531)} = -2.459$, $p = 0.017$), ethnicity ($t_{(57.959)} = -3.198$, $p = 0.002$) and religion ($t_{(57.959)} = -3.198$, $p = 0.002$). Furthermore, one-way independent ANOVA results showed there is no significant relationship between the highest educational level and perceived stress. The detailed analysis regarding the distribution of association between socio-demographic characteristics and perceived stress level among nurses during COVID-19 is displayed in Table 4.5.

Table 4.5 Distribution of association between socio-demographic characteristics and perceived stress level among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

Variable	PSS-10	
	Mean $\pm$ SD	p-value
Age	$r = -0.014$	0.914 ^a
Gender		
Female	20.98 ± 6.10	0.017^b
Male	23.33 ± 1.30	
Ethnicity		
Malay	21.24 ± 5.76	0.002^b
Non-Malay	23.80 ± 0.45	
Religion		
Islam	21.24 ± 5.76	0.002^b
Non-Islam	23.80 ± 0.45	
Highest Education Level		
Diploma	22.00 ± 5.51	0.380 ^c
Bachelor's Degree	20.22 ± 5.10	
Post Basic	22.73 ± 6.54	
Types of Facilities Affiliation		
Non- frontline Units	21.15 ± 5.81	0.578 ^b
Frontline & Critical Units	22.00 ± 5.15	
Years of Working Experiences		
< 5 years	21.41 ± 4.95	0.958 ^b
> 5 years	21.48 ± 6.08	

*P $\leq$ 0.05 considered as statistically significant

a. Pearson correlation

b. Independent t-test

c. One-way independent ANOVA

4.6 Association between Socio-demographic characteristics and Sleep Quality among nurses during COVID-19 in Serdang Hospital

The normality test had been conducted for sleep quality and it found that the total score is normally distributed with Skewness of 0.686 and Kurtosis of 0.402 which is within the normal range of -1 to 1 (George & Mallery, 2010). Hence, parametric tests were conducted to find out the association between socio-demographic characteristics of respondents and sleep quality among nurses. Pearson correlation had shown that there is no significant relationship between age and sleep quality. Next, independent t-test results showed that there is no significant relationship between socio-demographic characteristics (gender, ethnicity, religion, types of facilities affiliation, and year of working experiences) with sleep experiences. Furthermore, one-way independent ANOVA results showed there is no significant relationship between the highest educational level and sleep satisfaction. The detailed analysis regarding the distribution of association between socio-demographic characteristics and sleep quality among nurses during COVID-19 is displayed in Table 4.6.

Table 4.6 Distribution of association between socio-demographic characteristics and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

Variable	PSQI	
	Mean $\pm$ SD	p-value
Age	$r = 0.166$	0.206 ^a
Gender		
Female	7.08 ± 2.40	0.111 ^b
Male	8.33 ± 2.39	
Ethnicity		
Malay	7.20 ± 2.26	0.407 ^b
Non-malay	8.80 ± 3.83	
Religion		
Islam	7.20 ± 2.26	0.407 ^b
Non-Islam	8.80 ± 3.83	
Highest Education Level		
Diploma	7.27 ± 3.08	0.335 ^c
Bachelor's Degree	6.96 ± 1.55	
Post Basic	8.27 ± 2.10	
Types of Facilities Affiliation		
Non- frontline Units	7.31 ± 2.42	0.912 ^b
Frontline & Critical Units	7.38 ± 2.50	
Years of Working Experiences		
< 5 years	7.37 ± 2.19	0.916 ^b
>5 years	7.30 ± 2.64	

*P $\leq$ 0.05 considered as statistically significant

a. Pearson correlation

b. Independent t-test

c. One-way independent ANOVA

4.7 Association between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital

A positive significant relationship between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital ($p < 0.001$) which showed by Pearson correlation analysis in this study. The detailed analysis of the association between perceived stress level and sleep quality among nurses in Serdang Hospital is shown in Table 4.7.

Table 4.7 Distribution of association between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor, (N=60).

Variable	PSQI	
	Mean $\pm$ SD	p-value
PSS-10	$r = 0.451$	0.000**

* $P \leq 0.05$ considered as statistically significant

**P is significant at the 0.01 level (2-tailed)

a. Pearson correlation

CHAPTER 5 DISCUSSION AND CONCLUSION

5.0 Introduction

The findings of this study are discussed further in this chapter based on the objective. The discussion includes all the results of descriptive findings of respondents' socio-demographic characteristics, perceived stress level, and sleep quality. Furthermore, the association between socio-demographic characteristics with perceived stress level and sleep quality will be discussed in this chapter. Last but not least, the final objective, the association between perceived stress level and sleep quality will be included.

5.1 Socio-demographic characteristics

In this study, the respondents' mean age is 31.20 ± 6.74 years old with a range of age from 25 years old to 51 years old which is similar to the findings conducted in Shenzhen China, a study by Zhang et al. (2021), in which their mean age was 30.42 ± 5.16 years old with an age range from 22 to 54 years old. Also, this is similar to the study from Wan, Lian, Ma, Cai, and Xianyu (2020) which range from 20's to 50's years of age with a mean age of 30.96 ± 6.10 years. Other than that, the majority of the respondents are female (80.0%, n=48) which are similar to studies done in which the majority of them were female (79.5%) by Wanigasooriya et al. (2020), 81.0% from Bachilo, Barylnik, Shuldyakov, Efremov and Novikov (2020) and 83.7% (Hoedl, Bauer & Eglseer, 2020). Besides that, most of the respondents are Malay (91.7%, n=55), followed by Chinese (6.67%, n=4) and India (1.67%, n=1). Thus, most of them are Muslim (91.7%, n=55) and non-Muslim (8.3%, n=5).

The highest educational qualification for most of the participants in this study was Diploma $n=26$ (43.3%) followed by Bachelor's degree (38.3%) and Post basic (18.3%). Furthermore, the majority of the respondents for this study work in the non-frontline unit (65.0%, $n=39$) which is similar to the study from Bachilo, Barylnik, Shuldyakov, Efremov, and Novikov (2020) and Jahrami et al. (2020) where respondents are mostly from non-high-risk areas with 58.9% and 51.6% respectively. Meanwhile, the majority of the respondents have working experiences of more than 5 years (55.0%) which is similar to the study from Wan, Lian, Ma, Cai & Xianyu (2020) which consists of 67.2% of respondents who have more than 5 years working experiences.

5.2 Perceived Stress Level among nurses during COVID-19

In this present study, the mean score for Perceived Stress Level among nurses during COVID-19 is high, with a value of $21.45 \pm SD 5.56$. With the increased cases of COVID-19 cases reported, the stress among nurses is expected to increase. From the result of this study, the assessment of the perceived stress level among nurses during COVID-19 found that more than 70% of the respondents are experiencing moderate stress (78.3%) during the pandemic. This is similar to the findings from Jahrami et al. (2020) where 66.9% of the respondents were having moderate stress and Tselebis et al. (2020) also reported more than 50% of the staff nurses encountered moderate to high stress during the COVID-19 outbreak as nurses have a higher exposure risk to COVID-19 patients because of they are the one who is responsible to deliver nursing care to patients.

To reflect the stress felt by the nurses, the questionnaire is designed with a Likert Scale and each item was emphasize on the experiences and feelings since the outbreak of COVID-19 pandemic. A greater score indicates poorer perceived stress. During the past month, almost half of the respondents (48.3%) fairly often felt nervous and stressed. Besides, 40.0% of them fairly often felt that they have encountered anger and irritate because things were happening outside of their control. About one-third of nurses fairly often felt things were going out of their way. Meanwhile, half of the respondents fairly often think that they have the confidence to handle personal problems during the outbreak. Furthermore, almost half of the nurses sometimes were upset because of things happened unexpectedly and sometimes they felt they could not cope with all the problem. However, about one-third of nurses felt that they were able to control irritation and anger during the past month since the outbreak of COVID-19.

Last but not least, the increasing number of COVID-19 cases also cause extra pressure and worries for the nurses as they were burdening with heavy workloads and responsibilities. Huge responsibilities bring anxiety and stress during the pandemic and this is similar with a study that showed a positive significant association between perceived stress and anxiety in Pearson correlation with ($r = 0.166$, $p = 0.016$). Hence, increased perceived stress directly brings up the anxiety level among nurses. This is similar to the study from Aziznejadroshan, Qalehsari & Zavardehi (2020) which also revealed that 17% of nurses had stress, more than 50% experienced anxiety and almost half of them had depression. Besides, Alnazly, Khraisat, Al-Bashaireh & Bryant (2021) also reported approximately 35% of respondents

encountered severe depression and about half of them had moderate to severe depression during this outbreak.

5.3 Sleep Quality among nurses during COVID-19

In this present study, the mean score for PSQI score among nurses during COVID-19 is $7.33 \pm \text{SD } 2.43$ which indicates poor sleep quality. The assessment of the sleep quality among nurses during COVID-19 found that more than 80% of the respondents are experiencing poor sleep satisfaction (81.7%) during the pandemic. This finding is similar to the studies from Jahrami et al. (2020) where the result showed 75.2% of their respondents were poor sleep quality with a mean global PSQI score of 7.1. Also, a study from China reported a PSQI score among healthcare workers with a mean PSQI of 8.6 ± 4.6 (Xiao, Zhang, Kong, Li & Yang, 2020).

To reflect the sleep quality and satisfaction experienced by nurses, in this present study, nearly half of the respondents went to bed at 24:00 and about one-third of them took 10 minutes and 30 minutes to fall asleep. During the past month, about one-third of nurses cannot fall asleep within 30 minutes and they woke up in the middle of the night once or twice a week. Meanwhile, almost half of the respondents have trouble sleeping because they woke up in the middle of the night, feel too cold or hot less than once a week. On the other hand, almost 75% of the respondents rated their sleep quality fairly good overall.

Besides that, a recent study in China also reported almost half of the medical staff experienced sleep disorders during this outbreak (Zhang et al.,

2020). According to Abbas et al. (2021), the incidence of poor sleep quality increased to 78.8% during COVID-19 has been reported in the study. A study conducted by Al Maqbali (2021) has reported that 58.8% of frontline nurses reported poor sleep satisfaction with a mean PSQI score of 7.04. Sleep disturbance and poor sleep satisfaction often lead to medication error and error in ethical clinical decision-making. Abbas et al. (2021) claimed that participants with bad sleep quality have a greater frequency of encountering medical errors with 82.5% compared to good sleep satisfaction nurses. There is a significant correlation between sleep deprivation and medical error occurrence with $p=0.0001$ (Zaki Ramadan & Saad Al-Saleh, 2014).

5.4 Association between Socio-demographic characteristics and Perceived Stress Level among nurses during COVID-19 in Serdang Hospital

Several inferential analyses had been performed to find out the association between socio-demographic factors with perceived stress level among nurses during COVID-19 in Serdang Hospital as shown in Table 4.5 which manifested no significant relationship between ages, types of working affiliation, years of working experiences and highest educational qualification. However, there is a significant relationship between gender ($p=0.017$), ethnicity ($p=0.002$), and religion ($p=0.002$) with perceived stress among nurses during the pandemic outbreak.

In this present study, females demonstrated significant higher perceived stress compared to the male which is related to previous studies performed by Rodríguez et al. (2020) showed significant dissimilarity in perceived stress

between men and women with ($p < 0.001$) where women reported more anxious feeling compared to men during the pandemic and studies also found that the nervousness levels of females were higher than male (Huang et al., 2020; Huang & Zhao, 2020; Lai et al., 2020; Wang et al., 2020; Zhu et al., 2020). This finding was similar to the other study where females suffer more mental disturbance during the COVID-19 outbreak (Lai et al., 2020). Subsequently, females are more prone to stress reactions because they have a variety of responsibilities on them such as family, children, and workplace. However, the study performed by Alnazly, Khraisat, Al-Bashaireh & Bryant (2021) described that men demonstrated greater scores for anxious and stress compared to women respondents along with the COVID-19 pandemic. However, the literature by Moghanibashi Mansourieh (2020) revealed that men experienced lower stress than women because men have better resilience.

Besides, religion and ethnicity were found significantly associated with perceived stress among Muslim and non-Muslim nurses during COVID-19 in this study. Based the study by Ting, Aw Yong, Tan & Yap (2021) showed significant variance in religion with perceived stress levels among Buddhists, Christian, and Muslims ($p < 0.001$) which indicates the Buddhist population ($p < 0.001$) scored greater perceived stress level compared to Christian ($p < 0.001$) and Muslim ($p = 0.05$). However, according to the literature, there is a significant association between positive religion with less perceived stress which indicates having engagement and a secure relationship with God correlated with less stress level (Arévalo et al., 2008; Peres et al., 2018). Also, Lee (2014) reported a negative correlation between religions with perceived stress. The relationship between religion and ethnicity with perceived stress is

not a simple one as many studies have a varied result. As the sample size of this study did not reach a bigger sample size and the majority of respondents were Muslim and Malay, thus Muslim and Malay nurses had significantly elevated perceived stress levels compared to non-Muslim and non- Malay nurses.

On the other hand, Aziznejadroshan, Qalehsari & Zavardehi (2020) disclosed nurses who were age more than 35 years had triple risks of encountering stress compared to nurses who were younger than 35 years. Meanwhile, Gamonal Limcaoco, Mateos, Fernández & Roncero (2020) proposed that older people which more than 45 years showed the lowest level of anxiety. In another word, the population who is age under 45 will experience a higher level of stress, mostly found between 18 to 25 years old.

Likewise, nurses who are with more clinical experiences which more than 20 years revealed higher levels of fear and stress (Alnazly, Khraisat, Al-Bashaireh & Bryant, 2021). Similarly, Aziznejadroshan, Qalehsari & Zavardehi (2020) showed staff nurses who had exceed 10 years of working experience were at four times greater risks to feel strained and stressed than the nurses who had less than 10 years of working experience. Besides, Rodríguez et al. (2020) found that there are significant differences between education qualifications with perceived stress with $p < 0.01$ which showed higher educational qualifications had a higher mean score of PSS-14.

Another recent study also proved that 84% of frontline healthcare professionals manifested moderate to severe stress during this outbreak (Jahrami et al., 2020). This is also supported by Zhang et al. (2020), majority

of the participants in this study are young with fewer experienced nurses, and they demonstrated high burnout levels due to stress and long working hours as a frontline. However, Marthoenis, Maskur, Fathiarani & Nassimbwa (2021) showed that nurses who are giving services in non-COVID-19 wards experienced significantly higher anxiety with ($p=0.01$) compared to colleagues in the COVID-19 ward.

5.5 Association between Socio-demographic characteristics and Sleep Quality among nurses during COVID-19 in Serdang Hospital

Several inferential analyses had been performed to rule out the association between socio-demographic characteristics with sleep quality among nurses during COVID-19 in Serdang Hospital as shown in Table 4.6 which revealed that there is no significant relationship between socio-demographic characteristics such as ages, gender, ethnicity, religion, types of working affiliation, years of working experiences and highest educational qualification with sleep quality of nurses. This is similar to the study performed in Bahrain among frontlines during COVID-19 which reported that there is no significant relationship between age ($p=0.5$), female sex ($p=0.3$), and types of facilities ($p=0.8$) with sleep quality among frontline healthcare workers during COVID-19 (Jahrami et al., 2020). Also, logistic regression done by Al Maqbali (2021) showed gender and institution type had no significant effects on poor sleep. This is also supported by Pérez-Fuentes, Molero Jurado, Simón Márquez, and Gázquez Linares (2019) which revealed no statically significant differences were found between gender and sleep quality which indicates the sleep quality in men and women were similar.

However, according to works of literature, Al Maqbali (2021) reported that poor sleep quality significantly found mostly among those aged 18-30 years old ($p=0.02$), nurses who have working experiences less than 2 years ($p=0.04$), and nurses who have working experiences between 3 to 5 years ($p=0.04$). The study by Pérez-Fuentes, Molero Jurado, Simón Márquez, and Gázquez Linares (2019) also showed a positive significant correlation between age and sleep quality with ($r = 0.13$, $p < 0.001$) which proven that nurses complained of poor sleep as they grow older. Moreover, a previous study reported women are significantly have a poorer quality of sleep compared to men ($p=0.004$), age ($p<0.001$), years of working experience ($p<0.001$), and working department ($p=0.022$) (Dong, Zhang, Sun, Sang & Xu, 2017).

Also, Study by Qi et al. (2020) demonstrated Chinese frontline medical staff who encountered the pandemic patients have significantly manifested a high incidences of insomnia compared to the non-frontline healthcare worker ($p< 0.001$). This indicates frontlines had poorer sleep disturbance compared to non-front line units. Further subjective inspection of sleep satisfaction for frontline healthcare professionals demonstrated higher sleep disturbances, more common use of sleep medication, and frequent low work competency. According to Jahrami et al. (2020), 75% of frontline healthcare workers in Bahrain experienced poor sleep patterns. Besides that, a study in Fangcang Hospital in China proposed that nurse's sleep quality significantly corresponds with the year of working. Nurses who have worked for more than 15 years claimed worse sleep satisfaction compared to fresh graduate nurses with $p< 0.001$ (Huang et al., 2020).

5.6 Association between Perceived Stress Level and Sleep Quality among nurses during COVID-19 in Serdang Hospital

Last but not least, Pearson correlation had been performed to study the association between perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital as shown in Table 4.7 which manifested that there is a positive significant correlation ($p < 0.001$).

Indeed, increased stress directly affect sleep quality among the healthcare professionals, especially the frontline healthcare worker such as nurses who are taking care and administering treatment for the patients 24 hourly. This is similar to a study from Al Maqbali (2021) that demonstrated a significant association between PSS-10 with PSQI ($p = 0.001$). Another study demonstrated that the sleep quality of nurses had significantly affected by stress with a $p < 0.01$ indicated a high percentage of poor sleep disturbances was observed among nurses during the COVID-19 pandemic (Tselebis et al., 2020). Moreover, Furthermore, a positive significant association was found between SARS (Stanford Acute Stress Reaction) scores and PSQI scores with $r = 0.457$, $P < 0.01$ (Xiao, H et al., 2020). The study explained that one of the factors of sleep disturbances during a pandemic is the stress of getting infected by COVID-19 virus (Salari et al., 2020) and Zhang et al. (2020) manifested more than 50% of the medical workers experienced insomnia together with depressive and anxiety symptoms.

However, Karabulut et al. (2020) reported there is no significant correlation between sleep quality and perceived stress level with $p = 0.61$. Also, the study proposed by Jahrami et al. (2020) indicated no significant association between PSS-10 and PSQI using Pearson correlation coefficient with $p = 0.3$.

5.7 Conclusion

In conclusion, this present study aimed to determine the association between socio-demographic factors and perceived stress level, the association between socio-demographic characteristics and sleep quality, and the association between perceived stress levels and sleep quality among nurses during COVID-19. The research had revealed that the respondents have moderate stress and bad sleep quality during COVID-19 pandemic with a mean PSS-10 score of $21.45 \pm \text{SD } 5.56$ and a mean PSQI score of $7.33 \pm \text{SD } 2.43$. Besides, there is a significant association between gender ($p=0.017$), ethnicity ($p=0.002$), and religion ($p=0.002$) with perceived stress among nurses during the pandemic outbreak. However, there is no significant relationship between socio-demographic factors with sleep quality among nurses during the outbreak. Last but not least, there is a significant correlation between perceived stress and sleep quality among nurses during the pandemic with $p=0.000$.

CHAPTER 6 LIMITATION AND RECOMMENDATION

6.0 Introduction

This study is conducted as a cross-sectional study by using the convenience sampling method to collect data. Hence, there are several limitations found during the research period that will be further discussed in this chapter.

6.1 Limitations

First, the study has a small sample size, with respondents only drawn from one hospital in Selangor state. As a result, the findings may not apply to other states of Malaysia. Thus, the study did not reflect all Malaysian diversity since this only focused on nurses in Serdang Hospital. Secondly, the data collection of the study is short due to the limitation to pass the questionnaire to respondents due to strict movement control order occurred in Selangor. This made the process hard and difficult to reach and achieve the target sample size. Next, this study relied on self-reported data, which might consist of potential sources of bias as respondents relied on memory experiences while answering the questionnaire.

6.2 Implication and Recommendation

The implementation of strategies on improving stress coping methods on enhancing sleep quality is important during the COVID-19 outbreak as this can greatly reduce medical and ethical errors made by nurses. Therefore, at present, encouraging nurses to join active coping stress programs and promote adequate rest time would be useful in manage stress and improve sleep satisfaction.

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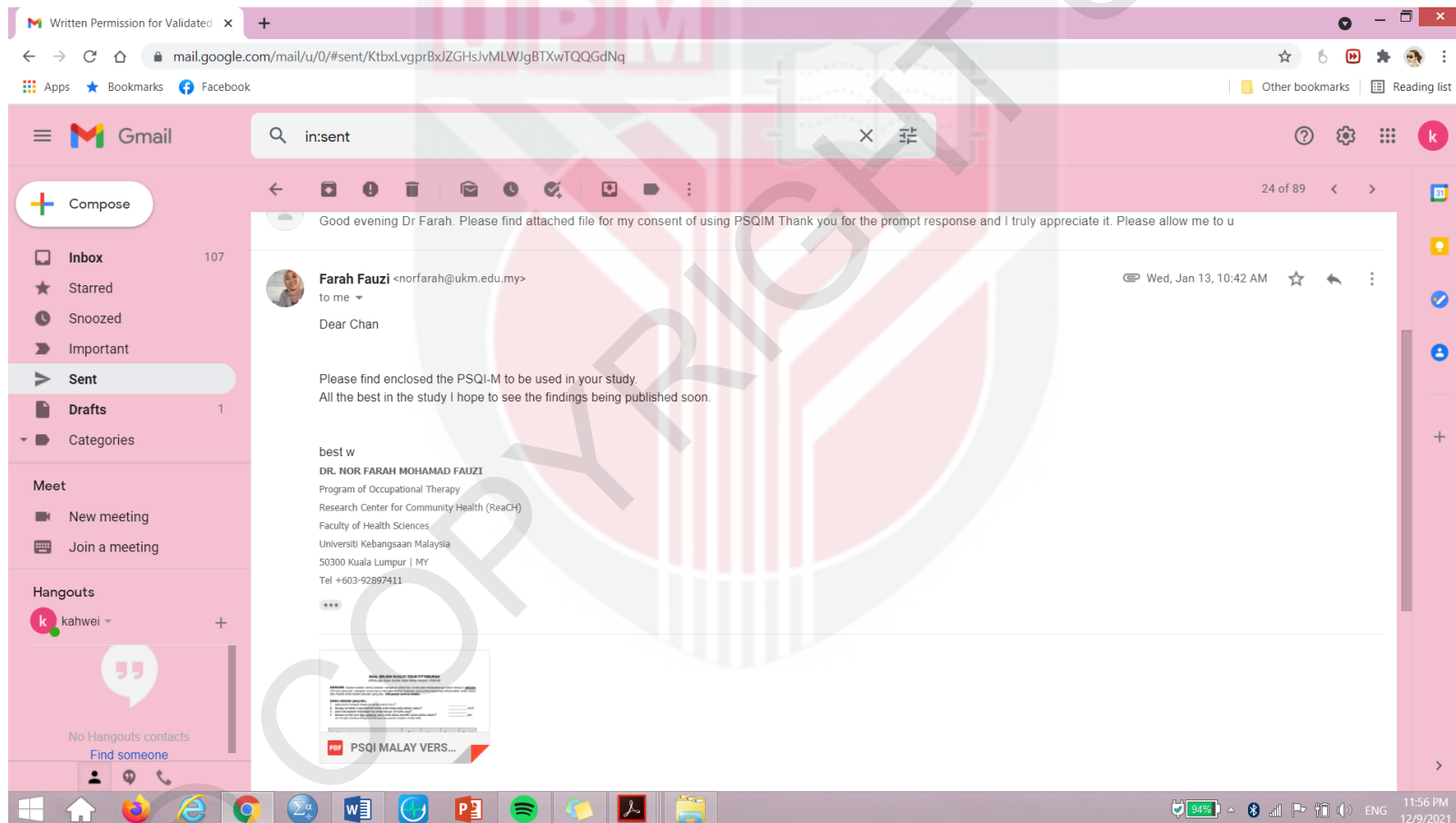
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APPENDICES

Appendix A: Written Permissions for Instrument



Written Permission for Validated x Written Permission for English an x +

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Apps Bookmarks Facebook

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Gmail in:sent

Active ?

1 of 7

Mail

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Chat

No conversations
Start a chat

Rooms

No rooms
Create or find a room

Meet

CHAN KAH WEI / UPM

Good day, Dr. Sukhvinder. I am Chan Kah Wei, an undergraduate student pursuing Bachelor of Nursing in University Putra Malaysia (UPM). Currently, I am in my fin

Fri, Dec 18, 2020, 2:50 PM

sukhvinder sandhu <sukhyaki1@yahoo.com>

to me

Sun, Dec 20, 2020, 3:27 PM

Dear Chan,

Attach is the PSS 10 in Malay version for your kind perusal.
The English version you may get it online for free.

Kindly please cite accordingly in your thesis/study/publications.

All the best.

Regards,

Sukhy

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Appendix B: Participant Information Sheet and Informed Consent Form

PARTICIPATION INFORMATION SHEET

1. Title of study:

Perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor, Malaysia.

2. Name of Investigator and Institution:

Chan Kah Wei, Faculty of Medicine and Health Science, Universiti Putra Malaysia (UPM)

3. Name of sponsor: Self-sponsor

4. Introduction

COVID-19 outbreak has becoming a global health issue which significantly threaten the medical facilities, thus, the perceived stress level and sleep quality among nurses become a hot topic to be discussed. Long term of perceiving stress and poor sleep quality has becoming a big challenge for the nurses. Therefore, this study aims to assess the perceived stress level and sleep quality among nurses.

You are invited to participate in a research study because you have criteria for this study. The details of the research trial are described in this document. It important that you understand why the research is being done and what it will involve. Please take your time to read through and consider this information carefully before you decide if you are willing to participate. Ask the researcher if anything is unclear or if you like more information. After you are properly satisfied that you understand this study and that you wish to participate, you must sign this informed consent form. To participate in this study, you may be required to provide your researcher with

information on your health history; you may harm yourself if you are not truthful with the information provided.

Your participation in this study is voluntary. You do not have to be in this study if you do not want to. You may also refuse to answer any questions you do not want to answer. If you volunteer to be in this study, you may withdraw from it at any time. If you withdraw, any data collected from you up to your withdrawal will still be used for the study. Your refusal to participate or withdrawal will not affect any medical or health benefits to which you are otherwise entitled.

This study has been approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia.

5. What is the purpose of the study?

This study is conducted to study the perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor.

A total of 269 subjects like you will be participating in this study. The whole study will last about 3 months which is from May 2021 until July 2021 and your participation will be about 10-15 minutes only.

6. What are my responsibilities when taking part in this study?

It is important for you to answer all of the questions asked by the researcher honestly and completely. If your condition or circumstances change during the study, you must tell the researcher. As for your safety, you need to follow the instruction given to make sure the process is going well.

7. What are the potential risks and side effects of being in this study?

There is no risk and side effect when you participate in this study.

8. What are the benefits of being in this study?

a. To you as the subject?

The information that you provided regarding your experiences and feeling on stress and sleep quality during COVID-19 are valuable and much appreciated. It has no direct benefit to the respondent, but it will create awareness among respondents and improve the quality of care for the patients. There will be no payment given to the respondent as this participation is voluntary. Besides, this study is also conducted by an undergraduate student and it is a self-sponsor.

b. To the investigator?

The information and data obtained from this study will allow the researcher to assess the perceived stress level and sleep quality among nurses. The researcher able to identify the perception and the relationship between stress level and sleep quality among nurses. Besides, the findings from the study can suggest for any improvement to be done so that the nurses able to increase the awareness on perceived stress level and poor sleep quality will direct affect the patient's care.

9. Who is funding this research?

This study has no funding as it is a self-sponsor.

10. Can the research or my participation be terminated early?

The researcher can terminate this study and your participation anytime if not fulfil the inclusion criteria of participants. If this study to be ended early, you will be informed immediately.

11. Will my information be kept private?

Yes. All information obtained from this study will be kept and handled confidentially per applicable laws and/or regulations. Your identity will not be revealed without your

permission throughout the activities in this study include presentation and publication. However, anyone who is related to this study includes research staff, qualified monitors and auditors, the sponsors and its affiliates and governmental or regulatory authorities has the right to inspect and photocopy your related record when necessary.

12. Who should I call if I have questions?

If you have any problems, please do not hesitate to contact one of the people listed below.

i. Researcher

Chan Kah Wei

Contact no.: +60105520325

Email: charlynchan66@gmail.com

ii. Supervisor

Professor Dr Soh Kim Lam

Contact no.: +60397692429/2430

Email: sklam@upm.edu.my

iii. Co-supervisor

Dr Huzwah Khaza'ai

Contact no.: +60397692436

Email: huzwah@upm.edu.my

If you have any questions about your rights as a participant in this study, please contact the Secretary of Medical Research & Ethics Committee, Ministry of Health Malaysia at +60322874032.

INFORMED CONSENT FORM

Title of Study:

Perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital, Selangor, Malaysia

By signing below I confirm the following:

- I have been given oral and written information for the above study and have read and understood the information given.
- I have had sufficient time to consider participation in the study and have had the opportunity to ask questions and all my questions have been answered satisfactorily.
- I understand that my participation is voluntary and I can at any time free withdraw from the study without giving a reason and this will in no way affect my future treatment. I am not taking part in any other research study at this time. I understand the risks and benefits, and I free to give my informed consent to participate in the conditions stated. I understand that I must follow the study doctor's (investigator's) instructions related to my participation in the study.
- I understand that research staff, qualified monitors and auditors, the sponsor or its affiliates, and governmental or regulatory authorities, have direct access to my medical record to make sure that the study is conducted correctly and the data are recorded correctly. All personal details will be treated as STRICTLY CONFIDENTIAL.
- I will receive a copy of this subject information/informed consent form signed and dated to bring home.
- I agree/disagree* for my participation in this study.

Subject:

Signature:

I/C number:

Name:

Date:

An investigator conducting informed consent:

Signature:

I/C number:

Name:

Date:

Impartial witness: *(Required if contents of the participant information sheet are orally communicated to the subject)*

Signature:

I/C number:

Name:

Date:

Appendix C: Questionnaire



UNIVERSITI PUTRA MALAYSIA
FACULTY OF MEDICINE AND HEALTH SCIENCES
DEPARTMENT OF NURSING
BACHELOR OF NURSING

RESEARCH TITLE:

**PERCEIVED STRESS LEVEL AND SLEEP QUALITY AMONG NURSES DURING
COVID-19 IN SERDANG HOSPITAL, SELANGOR, MALAYSIA:
A CROSS SECTIONAL STUDY**

RESEARCHER: CHAN KAH WEI (194391)

SUPERVISOR: PROFESSOR DR. SOH KIM LAM

CO-SUPERVISOR: DR. HUZWAH BINTI KHAZA'AI

INSTRUCTION:

This study is conducted for academic purposes. All information will be kept private and confidential. Thank you for your cooperation in answering this questionnaire.

Part A: Socio-demographic Information

Instruction:

All the options given are to complete your background information. Please answer each question appropriately by ticking (/) in the box or writing down the answer in the space provided.

1. Age: _____
2. Gender: ☐ Female ☐ Male
3. Ethnicity: ☐ Malay ☐ Chinese ☐ India ☐ Others
4. Religion: ☐ Islam ☐ Buddhism ☐ Hindu ☐ Christian
 ☐ Others
5. Highest Education Qualification:
 ☐ Doctor of Philosophy (PhD)
 ☐ Master Degree
 ☐ Bachelor Degree
 ☐ Post Basic (Please state : _____)
 ☐ Diploma
 ☐ Skills Certificate
6. Types of facilities affiliation:
 ☐ Frontline & Critical Units (A&E, ICU, CCU, CICU)
 ☐ Non- frontline Units (Ward excepted A&E, ICU, CCU, CICU)
7. Year of Working Experiences: ☐ < 5 years ☐ > 5 years

Part B: Stress level during COVID-19

Instruction:

This questionnaire is designed to access the perceived stress level during COVID-19.

Please choose the most appropriate answer by ticking (/) in the column provided.

No	Questions	0 Never	1 Almost Never	2 Sometimes	3 Fairly Often	4 Very Often
1.	In the last month, how often have you been upset because of something that happened unexpectedly?					
2.	In the last month, how often have you felt that you were unable to control the important things in your life?					
3.	In the last month, how often have you felt nervous and stressed?					
4.	In the last month, how often have you felt confident about your ability to handle your personal problems?					
5.	In the last month, how often have you felt that things were going your way?					

6.	In the last month, how often have you found that you could not cope with all the things that you had to do?					
7.	In the last month, how often have you been able to control irritations in your life?					
8.	In the last month, how often have you felt that you were on top of things?					
9.	In the last month, how often have you been angered because of things that happened that were outside of your control?					
10.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?					

Part C: Sleep Quality during COVID-19

Instruction:

The following questions relate to your usual sleep habits during the past month only.

Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night? _____

2. During the past month, how long (in minutes) has it usually takes you to fall asleep each night? _____

3. During the past month, what time have you usually gotten up in the morning? _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

5	During the past month, how often have you had trouble sleeping because you...	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a.	Cannot get to sleep within 30 minutes				
b.	Wake up in the middle of the night or early morning				
c.	Have to get up to use the bathroom				
d.	Cannot breathe comfortably				
e.	Cough or snore loudly				
f.	Feel too cold				
g.	Feel too hot				
h.	Have bad dreams				
i.	Have pain				
6.	During the past month, how often have you taken				

	medicine to help you sleep (prescribed or “over the counter”)?				
7.	During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
		No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8.	During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				
		Very good	Fairly good	Fairly bad	Very bad
9.	During the past month, how would you rate your sleep quality overall?				

THE END. Thank you for your cooperation



UNIVERSITI PUTRA MALAYSIA

FAKULTI PERUBATAN DAN SAINS KESIHATAN

JABATAN KEJURURAWATAN

BACELOR KEJURURAWATAN

TAJUK:

**TAHAP TEKANAN DAN KUALITI TIDUR DALAM KALANGAN JURURAWAT
SEMASA COVID-19 DI HOSPITAL SERDANG, SELANGOR, MALAYSIA**

PENYELIDIK : CHAN KAH WEI (194391)

PENYELIA UTAMA : PROFESSOR DR. SOH KIM LAM

PENYELIA BERSAMA : DR. HUZWAH BINTI KHAZA'AI

ARAHAN:

Kajian ini dijalankan untuk tujuan akademik. Semua maklumat akan disimpan secara peribadi dan sulit. Terima kasih atas kerjasama anda dalam menjawab soal selidik ini.

1. Umur: _____

2. Jantina: [] Perempuan [] Lelaki

3. Etnik: [] Melayu [] Cina [] India [] Lain-lain

4. Agama: [] Islam [] Buddha [] Hindu [] Kristian
[] Lain-lain

5. Tahap Pendidikan Tertinggi:

[] Ijazah Falsafah Kedoktoran

[] Ijazah Sarjana

[] Ijazah Sarjana Muda

[] Post Basik (Sila nyatakan:_____)

[] Diploma

[] Sijil Kemahiran

6. Tempat Pekerjaan Sekarang:

[] Unit Barisan Hadapan atau Krtikal (A&E, ICU, CCU, CICU)

[] Wad Umum (Wad kecuali A&E, ICU, CCU, CICU)

7. Tempoh Masa Pekerjaan Sekarang : [] < 5 tahun [] > 5 tahun

Bahagian B: Tahap Tekanan semasa COVID-19

Arahan: Soalan berikut adalah mengenai perasaan dan pemikiran anda pada BULAN LEPAS. Dalam setiap soalan, sila nyatakan jawapan anda dengan menandakan di atas bulatan yang mewakili BEBERAPA KERAP anda rasa atau fikir secara tertentu.

No	Soalan	0 Tidak	1 Hampir Tidak	2 Kadang Kala	3 Hampir Kerap	4 Sangat Kerap
1.	Dalam bulan lepas, berapa kerap anda berasa kecewa kerana sesuatu berlaku di luar jangkaan?					
2.	Dalam bulan lepas, berapa kerap anda berasa anda tidak boleh mengawal perkara-perkara yang penting dalam kehidupan anda?					
3.	Dalam bulan lepas, berapa kerap anda berasa gementar dan stres?					
4.	Dalam bulan lepas, berapa kerap anda berasa yakin dengan keupayaan anda untuk menangani masalah peribadi?					
5.	Dalam bulan lepas, berapa kerap anda berasa perkara -					

	perkara berlaku mengikut kehendak anda?					
6.	Dalam bulan lepas, berapa kerap anda mendapati bahawa anda tidak mampu menangani perkara yang perlu dilakukan?					
7.	Dalam bulan lepas, berapa kerap anda dapat mengawal perasaan tidak selesa dalam hidup anda?					
8.	Dalam bulan lepas, berapa kerap anda berasa anda boleh mengawal / menguruskan semua cabaran yang diberikan?					
9.	Dalam bulan lepas, berapa kerap anda berasa marah ke atas perkara-perkara yang berada di luar kawalan anda?					
10.	Dalam bulan lepas, berapa kerap anda berasa kesukaran yang bertimbun sehingga anda tidak mampu mengatasinya?					

Bahagian C: Kualiti Tidur semasa COVID-19

Arahan: Soalan-soalan berikut adalah mengenai tabiat tidur anda pada kebiasaannya dalam tempoh sebulan (30 hari) yang lalu. Jawapan anda harus menggambarkan keadaan yang paling tepat bagi kebanyakan waktu siang dan malam anda dalam sebulan yang lalu. Sila jawab semua soalan.

Dalam sebulan yang lalu,

1. Pada pukul berapa biasanya anda masuk tidur?

2. Berapa lamakah masa diambil untuk anda lelap pada setiap malam?

_____ minit

3. Pukul berapakah kebiasaannya anda bangun di waktu pagi?

4. Berapa jumlah jam tidur sebenar yang anda biasa perolehi pada waktu malam? (Ini mungkin berbeza dengan jumlah jam yang anda luangkan di atas katil)

_____ jam

5	Dalam sebulan yang lalu, berapa kerapkah anda mengalami masalah tidur kerana anda...	Tidak pernah dalam sebulan lalu	Kurang daripada sekali seminggu	Satu atau dua kali seminggu	Tiga kali atau lebih seminggu
a.	Tidak boleh lelap dalam tempoh masa 30 minit				
b.	Terjaga di tengah malam atau awal pagi				
c.	Perlu bangun tidur untuk ke tandas				
d.	Tidak boleh bernafas dengan selesa				
e.	Batuk atau berdengkur dengan kuat				
f.	Berasa sangat sejuk				
g.	Berasa sangat panas				
h.	Mengalami mimpi buruk				

i.	Mengalami kesakitan				
6.	Dalam sebulan yang lalu, berapa kerapkah anda mengambil ubat (ubat yang dinasihati oleh doctor atau ubat yang dibeli sendiri tanpa preskripsi) untuk membantu anda tidur?				
7.	Dalam sebulan yang lalu, berapa kerapkah anda mengalami masalah untuk berjaga semasa memandu kenderaan, makan, atau ketika melibatkan diri dengan aktiviti sosial?				
		Tiada masalah langsung	Sedikit bermasalah	Agak bermasalah	Masalah yang besar
8.	Dalam sebulan yang lalu, adakah menjadi suatu masalah untuk anda kekal bersemangat dalam menyelesaikan kerja?				
		Sangat baik	Agak baik	Agak teruk	Sangat teruk
9.	Dalam sebulan yang lalu, bagaimanakah anda nilai kualiti tidur anda secara keseluruhan?				

TERIMA KASIH DI ATAS KERJASAMA ANDA

Appendix D: Gantt Chart

Project	2020			2021							
	OCT	NOV	DEC	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG
Identify the research problem											
Discussion with supervisor regarding the research title											
Review of the article for literature review											
Select an appropriate questionnaire											
Proposal presentation											
Submit proposal											
Obtain permission from the relevant party											
Conduct a pilot study											
Conduct the research and data collection											
Data analysis and discussion											
Thesis presentation											
Submit the research report											

Appendix E: Budget

No.	Tools	Quantity * RM/unit	Total Cost
1.	Stationaries		RM 100.00
2.	Printing - Proposal - Softbound - Hardbound	RM 15 *4 RM 20 *2 RM 35 *4	RM 240.00
3.	Binding	RM 15 *4	RM 60.00
4.	Printer Cartilage	RM 70 *2	RM 140.00
		TOTAL	RM 540.00

Appendix F: Approval Letter from the Medical Research and Ethics Committee (MREC)



JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN
(Medical Research & Ethics Committee)
KEMENTERIAN KESIHATAN MALAYSIA
d/a Kompleks Institut Kesihatan Negara
Blok A, No 1, Jalan Setia Murni U13/52,
Seksyen U13, Bandar Setia Alam,
40170 Shah Alam, Selangor.



Tel: 03-3362 8888/8205

Ref : KKM/NIHSEC/ P21-206 (4)
Date: -Feb-2021

CHAN KAH WEI
UNIVERSITY PUTRA MALAYSIA (UPM)

Dear Sir / Mdm,

ETHICS INITIAL APPROVAL: NMRR-21-62-58079 (IIR)
Perceived stress level and sleep quality among nurses during COVID-19 in Serdang Hospital,
Selangor

This letter is made in reference to the above matter.

2. The Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) has provided ethical approval for this study. Please take note that all records and data are to be kept strictly **CONFIDENTIAL** and can only be used for the purpose of this study. All precautions are to be taken to maintain data confidentiality. Permission from the District Health Officer / Hospital Administrator / Hospital Director and all relevant heads of departments / units where the study will be carried out must be obtained prior to the study. You are required to follow and comply with their decision and all other relevant regulations, including the Access to Biological and Benefit Sharing Act 2017.

3. The investigators and study sites involved in this study are:

HOSPITAL SERDANG
Associate Professor Dr Soh Kim Lam
Chan Kah Wei (Penyelidik Utama)
Dr Huzwah Khaza'ai

4. The following study documents have been received and reviewed with reference to the above study:

Documents received and reviewed with reference to the above study:

1. Study Protocol_Version 4, dated 03-Feb-2021
2. Information Sheet & Implied Consent_English_Version 2, dated 02-Feb-2021
3. Information Sheet & Implied Consent_Malay_Version 2, dated 02-Feb-2021
4. Questionnaire_Version 1, dated 11-Jan-2021
5. Investigator's documents : Declaration of Conflict of Interest (COI), IA-HOD-IA, and CV:
 - a) Associate Professor Dr Soh Kim Lam
 - b) Chan Kah Wei (Penyelidik Utama)
 - c) Dr Huzwah Khaza'ai

5. Please note that ethical approval is valid until 04-Feb-2022. The following are to be reported upon receiving ethical approval. Required forms can be obtained from the National Medical Research Register (NMRR) website.

- i. Continuing Review Form has to be submitted to MREC within 2 month (60 days) prior to the expiry of ethical approval.
- ii. Study Final Report upon study completion to the MREC.
- iii. Ethical approval is required in the case of amendments / changes to the study documents/ study sites/ study team. MREC reserves the right to withdraw ethical approval if changes to study documents are not completely declared.