THE RELATIONSHIP OF QUALITY OF SLEEP AND COGNITIVE PERFORMANCE AMONG INSTITUTIONALISED ELDERLY WITHIN KLANG VALLEY

By

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Faculty of Medicine and Health Sciences

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ABSTRACT

BACKGROUND: The elderly population in Malaysia is increasing rapidly and has raised the issue of optimising elderly's health and wellbeing. The prevalence of poor sleep quality among institutionalised elderly is relatively high and this will lead to increased risk of cognitive decline. Hence, there is a need to raise awareness on the importance of good sleep quality in elderly to improve quality of life.

OBJECTIVES: To determine the relationship of sleep quality and cognitive performance and the relationship between sleep quality and selected socio-demographic variables among institutionalised elderly.

METHODOLOGY: A non-experimental descriptive quantitative, correlational study has been conducted in 14 non-government funded elderly care institutions within Klang Valley, Malaysia. A total of 247 elderly aged 60 years and above were assisted by the researcher in completing the questionnaire. The questionnaire comprised of 3 sections, which were socio-demographic data, Pittsburgh Sleep Quality Index (PSQI) to determine the sleep quality and Montreal Cognitive Assessment (MoCA-B) to assess the cognitive performance. The data were analysed using descriptive statistics and inferential statistics such as Chi-Square test.

RESULTS: Out of 247 subjects, 170 (68.8%) of total study population had poor sleep quality and 185 (74.9%) of the subjects had cognitive impairment. The prevalence of cognitive impairment related to poor sleep quality was 79.4%. No significant difference was found between socio-demographic variables and sleep quality ($p > 0.005$).

CONCLUSION: This study showed there was a significant differences between sleep quality and cognitive performance among institutionalised elderly ($p=0.015$). Interventions are recommended to promote sleep quality and reserve the cognitive function in maintaining elderly's well-being.

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PERMISSION SHEET

It is hereby certified that **OOI MAN THING** (ID No: 14UMB06533) has completed this Research project entitled "THE RELATIONSHIP OF QUALITY OF SLEEP AND COGNITIVE PERFORMANCE AMONG THE INSTITUTIONALISED ELDERLY WITHIN KLANG VALLEY" under the supervision of Ms. Liew Siew Fun (Supervisor) and Ms. Sheela Devi a/p Sukuru (Co-Supervisor) from the Department of Nursing, Faculty of Medicine and Health Sciences.

I hereby give permission to the University to upload softcopy of my final year project/dissertation/thesis* in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

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(OOI MAN THING)

DECLARATION

I hereby declare that the Research project is based on my original work except for quotations and citations which have been duly acknowledge. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

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APPROVAL SHEET

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CHAPTER ONE

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.0. CHAPTER OVERVIEW

In this chapter, the background of the study, statement of the problem, importance of the study, general and specific objectives, research questions, hypothesis and operational definition will be explained in details.

1.1. BACKGROUND

World Health Organization (WHO) (2016) termed elderly or older adults as those who are aged 60 years and above. The world's population is ageing rapidly and United Nations Department of Economic and Social Affairs (2017) stated that the world aged population will be more than double, from 926 million in 2017 to 2.1 billion in 2050. Following the same trend, the number of elderly in Malaysia is expected to increase by 16.4% from 2.8 million in 2015 to 3.26 million in 2020 (Daim, 2016; Ngeow, 2017).

It can be foreseen the health issue in time to come is on maintaining the elderly well-being and sleep will be one of the essential needs to restore, maintain and improve elderly's health and well-being. National Sleep Foundation (2009) reviewed that people tend to have difficulty in falling and staying asleep as they age due to the changes of sleep pattern. Sleep occurs in multiple stages which included dreamless period during light and deep sleep, and occasional periods of active dreaming, or we called as Rapid Eye Movement (REM) sleeps. Elderly spend more time in the lighter stages sleep compared to deep sleep and this causes the elderly to have difficulty in maintaining sleep (Rodriguez,

Dzierzewski and Alessi, 2015). It was estimated by Crowley (2011) that 50% of elderly will complain about difficulty in initiating and maintaining sleep. Sleep disturbances will lead to poor quality of sleep and Rashid, Ong and Wong (2012) did a study in Malaysia, the result showed the prevalence of poor sleep quality among the elderly in old folk home was 76.8%. Vaz Fragoso & Gill (2007 cited in Nebes et al., 2009, p.180) stated that poor sleep quality which contributed by sleep disturbances leading to the escalation of mortality and morbidity rates with the effect caused on daytime drowsiness, functional disability and increased risk of fall.

On the other hand, cognitive impairment arises as a globally concerned issue with its high prevalence and Malaysia could not run away from this phenomenon due to the population aging trend. Wong, et al. (2016) conducted a study among the elderly living in elderly care facilities within Klang Valley and the result showed the prevalence of cognitive impairment was 59.3%. In addition, Miyata, et al. (2013) suggested that poor sleep quality among elderly may affect cognitive performance. The finding was further proven in another study carried out by Sampaio, et al. (2014) that the prevalence of mild cognitive impairment in Japanese elderly was 23.3% with self-reported poor sleep quality. In relation, younger adults with compromised sleep are found to experience consistent effect on cognition, rendering to the increment in cognitive decline risk in older age (Crowley, 2011). The effect of poor sleep quality on cognitive performance was highlighted in the study did by Różyk-Myrta, et al. (2017), emphasising that sleep disturbances in elderly can lead to structural changes in the brain, leading to cognitive impairment such as Alzheimer's disease. It was also indicated by

Centers for Disease Control and Prevention (CDC) (2011) that severe cognitive impairment will lead to the losing of understanding, talking and writing abilities, resulting in diminished ability to live independently. Hence, the elderly will need to give up their household works and social activities.

1.2. PROBLEM STATEMENT

The problems of poor sleep quality have been identified among institutionalised elderly but studies have been done from different aspects such as risk factors and interventions on poor sleep quality (Luo, et al., 2013; Chen, et al., 2015; Altan Sarikaya and OĞUZ, 2016). Based on the information above, there is no study being done on the discovery of relationship of sleep quality and cognitive performance among the elderly in Malaysia. Therefore, there is a need to concentrate in this area due to lacking of information and a gap in knowledge concerning the relationship between sleep quality and cognitive performance among the elderly in Malaysia.

Besides, the importance of optimising elderly's health and wellbeing has long been recognised by the community for higher older-age life satisfaction. However, there is still lack of social awareness among the public and carers regarding the effect of sleep quality on the cognitive performance of the elderly. In addition, the elderly lack of knowledge on sleep disorder and they do not know who to seek help and get support from.

This is an issue to be focused on, as most of the elderly with sleep problems are under-recognised and under-diagnosed by health care provider. Therefore, sleep disturbances and cognitive impairment in elderly must be diagnosed and treated to improve elderly's well-being and quality of life.

1.3. RESEARCH OBJECTIVE

1.3.1. GENERAL OBJECTIVE

To determine the relationship between quality of sleep and cognitive performance among institutionalised elderly within Klang Valley.

1.3.2. SPECIFIC OBJECTIVES

1) To determine the sleep quality status among institutionalised elderly.
2) To determine the cognitive performance status among institutionalised elderly.
3) To determine whether there is any significant difference between sleep quality and cognitive performance among institutionalised elderly.
4) To determine whether there is any significant difference between sleep quality and selected socio-demographic variables among institutionalised elderly.

1.4. RESEARCH QUESTIONS

1) What is the sleep quality status among institutionalised elderly?
2) What is the cognitive performance status among institutionalised elderly?
3) Is there any significant difference between sleep quality and cognitive performance among institutionalised elderly?
4) Is there any significant difference between sleep quality and selected socio-demographic variables among institutionalised elderly?

1.5. HYPOTHESIS

1.5.1. NULL HYPOTHESIS

$H0_1$: There will be no significant difference between sleep quality and cognitive performance among institutionalised elderly.

$H0_2$: There will be no significant difference between sleep quality and selected socio-demographic variables among institutionalised elderly.

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1.5.2. ALTERNATIVE HYPOTHESIS

HA_1: There will be significant difference between sleep quality and cognitive performance among institutionalised elderly.

HA_2: There will be significant difference between sleep quality and selected socio-demographic variables among institutionalised elderly.

1.6. OPERATIONAL DEFINITION

1.6.1. RELATIONSHIP

Relationship is also known as correlation, referring to any relationship between two or more variables.

1.6.2. SLEEP QUALITY

The seven components of sleep quality comprising of subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction, measured with the Pittsburgh Sleep Quality Index (PSQI).

1.6.3. COGNITIVE PERFORMANCE

Cognitive performance is the ability of a person in remembering, learning new things, concentrating and making decisions that affect their daily life. The cognitive performance can be determined by Montreal Cognitive Assessment-Basic tool which comprised of 10 components: executive function, immediate recall, fluency, orientation, calculation, abstraction, delayed recall, visuoperception, naming and attention.

1.6.4. INSTITUTIONALISED ELDERLY

Elderly who are aged 60 years and above and living in an elderly care institution.

1.6.5. KLANG VALLEY

Klang Valley or Greater Kuala Lumpur is the main economic and cultural core of Malaysia with a high density population of 7.2 million

1.7. SIGNIFICANCE OF THE STUDY

This study will indicate the sleep quality among the institutionalised elderly within Klang Valley, Malaysia and will serve as evidence-based information for subsequent and further study on this issue. Poor sleep quality has been proven to decrease elderly's satisfaction and increase fatigue during the day (National Sleep Foundation, 2009). The findings can be disseminated to the residents and the care takers to promote awareness on the importance of good quality of sleep and the impact on elderly‘s well-being. Nurses will initiate appropriate interventions to promote sleep quality which may indirectly or directly have an effect on cognitive performance based on the findings from the study. Appropriate nursing interventions include educating the residents and the care givers on sleep hygiene which include the impact of lifestyle habits and the influence of environment on sleep quality. The quality of life and well-being of the elderly in Malaysia is expected to increase with proper interventions and education. Hence, the healthcare costs, burden and stress on the carers as well as the morbidity and mortality rates associated with poor cognitive function can be reduced.

1.8. SUMMARY

This chapter provided some background information related to the topic study highlighting the needs for the study. Problem statement and significance of this study were also identified. The researcher is keen to study the relationship between the sleep quality and cognitive performance among institutionalised elderly. The literature reviews that support this study will be described in the next chapter.

CHAPTER TWO

LITERATURE REVIEW

CHAPTER 2: LITERATURE REVIEW

2.0. CHAPTER OVERVIEW

In this chapter, the search strategy, literature review and conceptual framework adopted for this study will be explained in details.

2.1. SEARCH STRATEGY

A literature search was conducted in November 2017 for the purpose of locating published research papers by using the keywords: Sleep quality, cognitive performance, and elderly. These keywords were typed into databases such as Science Direct and PubMed. Keywords such as sleep quality, sleep disorder and insomnia, cognitive performance, cognition, and cognitive impairment were used interchangeably using BOOLEAN method. Besides, a Google Scholar search was also conducted to identify other relevant documents or reports.

A total of 113,527 journal articles were retrieved. The articles which were other than English language and before year 2011 were filtered. Irrelevant articles such as sleep quality related to other medical problems, sleep quality among adults, risk factors and interventions on poor sleep quality and other qualitative studies were excluded. Further elimination was done on duplicated articles and qualitative research studies. In the end, 12 relevant articles were selected for review. The flow chart of search strategy is shown in Diagram 2.1.

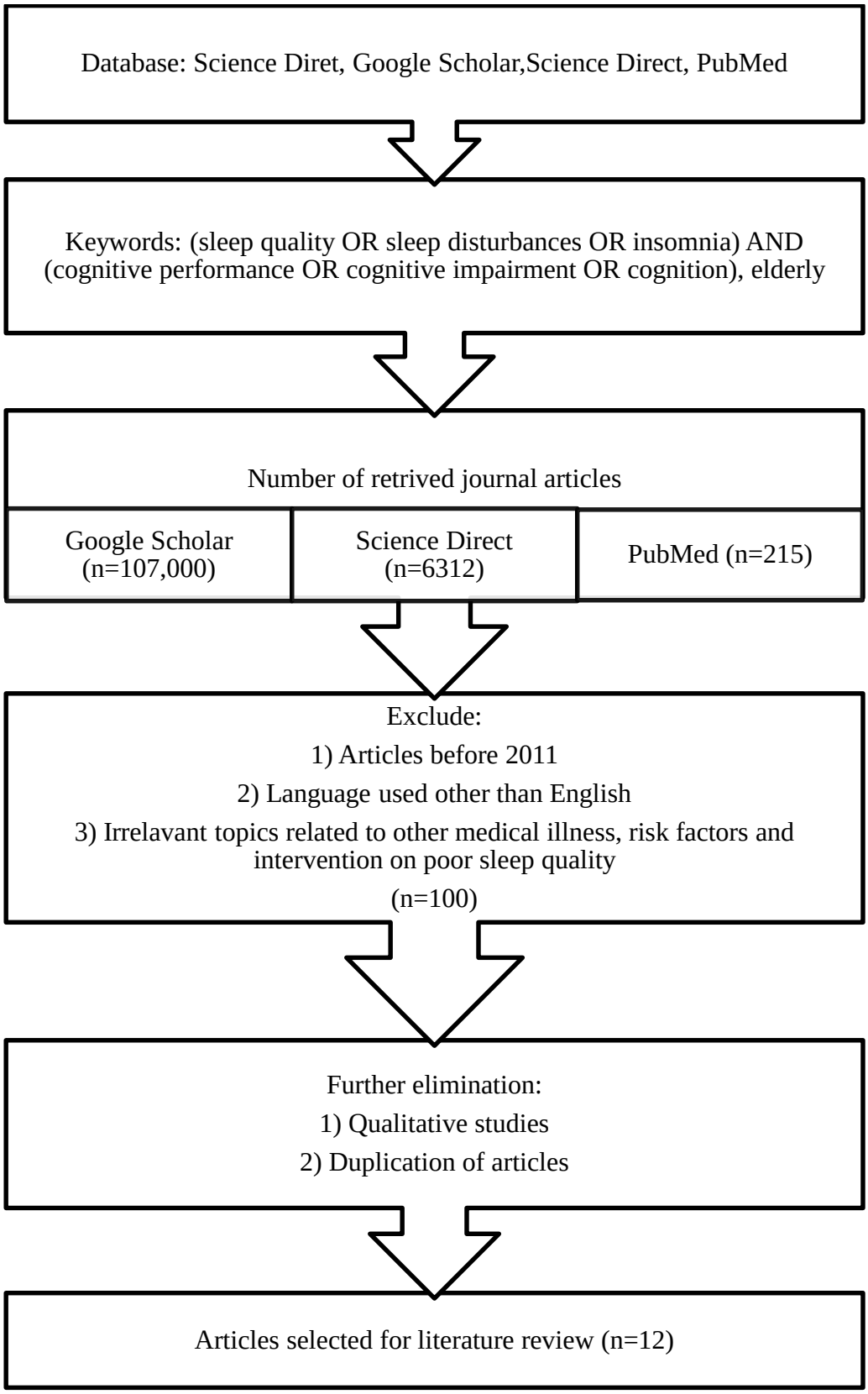

Diagram 2.1.: Flow chart of search strategy

2.2. REVIEW OF LITERATURE

In this literature review, subheading such as sleep quality in elderly; cognitive performance in elderly; sleep quality and cognitive impairment; sleep quality and socio-demographic factors in elderly will be discussed in details.

2.2.1. SLEEP QUALITY AMONG ELDERLY IN OVERSEAS AND MALAYSIA

There are several previous studies have been done about sleep quality among the elderly in overseas and Malaysia. Yaffe, Falvey and Hoang (2014) reviewed that around half of the older people who are 55 years old and above reporting problems in initiating and maintaining the sleep. A cross-national study has been done on the non-institutionalised older adults in 16 European countries and it was reported on average 24.2% of the participants have been bothered by sleep problems in the past six (6) months (van de Straat and Bracke, 2015). On the other hand, the result on a study from China showed a higher prevalence of poor sleep quality with 41.5% among elderly Chinese residents in urban Shanghai (Luo, et al., 2013). Following the same trend, the sleep quality of institutionalised elderly in Malaysia was found to be poor when the result showed the Pittsburgh Sleep Quality Index (PSQI) score with a median score of 6.00 whereby poor sleep quality is indicated with a score of 5.00 and above (Azri, et al., 2016).

2.2.2. COGNITIVE PERFORMANCE AMONG ELDERLY IN OVERSEAS AND MALAYSIA

Previous study has been done on 2943 community dwelling Jamaican elderly to assess their cognitive performance with Mini-Mental Status Examination (MMSE). The result showed 21.2% of the respondents had mild cognitive impairment while 11.0% had severe impairment (Waldron, et al., 2015). Using the same cognitive assessment tool, a study has been done on Chinese community based elderly with age of 80 years and above in Shanghai. Of 480 participants, 30% were diagnosed with cognitive impairment. Higher prevalence seen in Shanghai study as compared to the study in Jamaica might be due to different age group recruited. Vanoh, et al. (2016) has done a cohort study on 1993 community based elderly in Malaysia and the prevalence of mild cognitive impairment was 16%. Besides, Sharifah Zainiyah, et al. (2011) found the prevalence of cognitive impairment among the 101 elderly members in Day Care Centres within the Klang Valley was 4.0%. The variance in the prevalence might be due to different sample size and population recruited.

2.2.3. SLEEP QUALITY AND COGNITIVE IMPAIRMENT

The relationship of sleep quality and cognitive impairment has been studied overseas. Based on a study done by Amer, et al. (2013) on the institutionalised elderly in Egypt, 52% of poor sleepers showed impaired Mini Mental Status Examination (MMSE), while only 24% of good sleepers had impaired MMSE. On the other hand, Różyk-Myrta, et al. (2017) has done a study with another tool, Montreal Cognitive Assessment (MoCA) and the results showed elderly who

described poor sleep quality in United Kingdom, 72% of them scored below 26 points, indicating they have mild cognitive impairment. Besides, the findings from a logistic regression showed that cognitive status were associated with quality of sleep among the community dwelling Japanese elderly (Sampaio, et al., 2014). Lo, et al. (2014) stated that short sleep duration is associated with greater age-related brain atrophy and cognitive decline among healthy elderly in Singapore. In overall, sleep quality has a significant association on the cognitive performance.

2.2.4. SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED TO SLEEP QUALITY IN ELDERLY

2.2.4.1. AGE

It was evident that as the age of an individual increases, their sleep quality decrease. The result from Luo, et al, (2013) showed there is significant differences between age and sleep quality as the rate of poor sleep quality increased from 32.1% in those aged 60–69 years to 52.5% in those aged 80 years and above in Shanghai. The result was further supported by a study conducted in primary care centre in Malaysia that almost half of the patients experienced poor sleep quality (47.2%) which was significantly associated with older mean age (69.5 ±4.55) (Razali, et al., 2016). On the other hand, a study did on non-governmental charity old folks home in Penang showed that the elderly who aged 80 years old and above scored a higher PSQI mean score compared to their younger counterparts but no statistically significant difference was observed

(Rashid, Ong and Wong, 2012). Similar result was found on the community dwelling elderly in China and Taiwan (Niu, et al., 2016 ; Wu, et al., 2012).

2.2.4.2. GENDER

Previous study showed a significant difference between men and women in sleep quality, global PSQI score being poorer in women than in men (Dehghankar, et al., 2018; Zhang, et al., 2017; Wu, et al., 2012). In Turkey, there is a study observed that female elderly had worse sleep compared with male, however, the sleep quality of the elderly groups was not significantly influenced by gender (Daglar, et al., 2014). The result was similar to a study did in Malaysia (Razali, et al., 2016). Conversely, another study in Malaysia by Rashid, Ong and Wong (2012) showed male elderly had slightly higher PSQI mean score compared to female with 7.09 and 7.05 respectively. The inconsistency could be due to different sample population has been adopted.

2.2.4.3. EDUCATION LEVEL

Zhang, et al. (2017) emphasised that education level play a significant amount of the variance in sleep quality among the elderly in China, showing that the elderly with lower education level had poorer sleep. Following the same trends of findings, higher prevalence of poor sleep quality was observed in lower educational level but there was no significant difference between educational level and sleep quality identified (Dehghankar, et al., 2018; Wu, et al., 2012;

Rashid, Ong and Wong, 2012). The difference in result may be due to geographical factors and different sample size recruited.

2.2.4.4. MARITAL STATUS

There were contradicting information regarding the association between marital status and sleep quality. The studies conducted by Zhang, et al. (2017) in China and Wu, et al. (2012) in Taiwan found that the prevalence of poor sleep quality was higher in single, divorced or widowed elderly. Nevertheless, the study by Rashid, Ong and Wong (2012) in Malaysia showed the married elderly were more likely to have poor sleep quality compared to other groups. The contradicting result might be due to the family structure in Malaysia whereby the married elderly live separately due to family commitment, leading to psychological stress that might affect their sleep quality.

2.2.4.5. SOCIAL SUPPORT

The cohort study did by Stafford, et al. (2017) on the British elderly found there is a link between declining social relationship quality and poor sleep quality whereby greater exposure to positive support and lower exposure to negative support were independently associated with better sleep quality. Negative support signifies the social support that might bring detrimental effect to mental health (Chronister, Chou and Liao, 2013). Furthermore, the sleep quality was poorer for those who experienced declining positive support or increasing negative support. In addition, the study did by Rashid, Ong and Wong (2012) in

Malaysia proved there were significant differences between social relationship and the sleep quality among the elderly. The elderly was found to have better sleep quality with higher number of people that could be counted for help and higher feasibility of getting help in the elderly care institution.

2.3. CONCEPTUAL FRAMEWORK

This conceptual framework is based on "Maslow's Motivational theory" by Maslow, A. H., an expanded version of the original five-stage model in 1970 to include cognitive, aesthetic needs and transcendence needs. The theory believed that each stage is necessary for human subsistence and satisfaction (McLeod, 2017).

This framework explain Maslow's theory that the progress to achieve higher level of needs will be disrupted by failure to meet lower level needs and the failure to have needs met at various stages of the hierarchy could lead to illness. Pertaining to the topic of this study, researcher has identified 'sleep' is one of the essential physiological needs to be met among the elderly while socio-demographic variables which determine the fulfilment of psychological needs (safety and security; love and belonging; self-esteem) among elderly will in turn have an effect on sleep quality. The researcher believes that the cognitive performance will be affected when the physiological and psychological needs are unmet due to poor sleep quality. As a result, when the lower level of needs is unmet, the elderly will fail to achieve higher level of needs such as cognitive

need and self-actualisation due to compromised cognitive performance. The illness identified from this study will be cognitive impairment.

The relationship between sleep quality and cognitive performance can be conceptualised at a fairly general level, illustrated in Diagram 2.3.

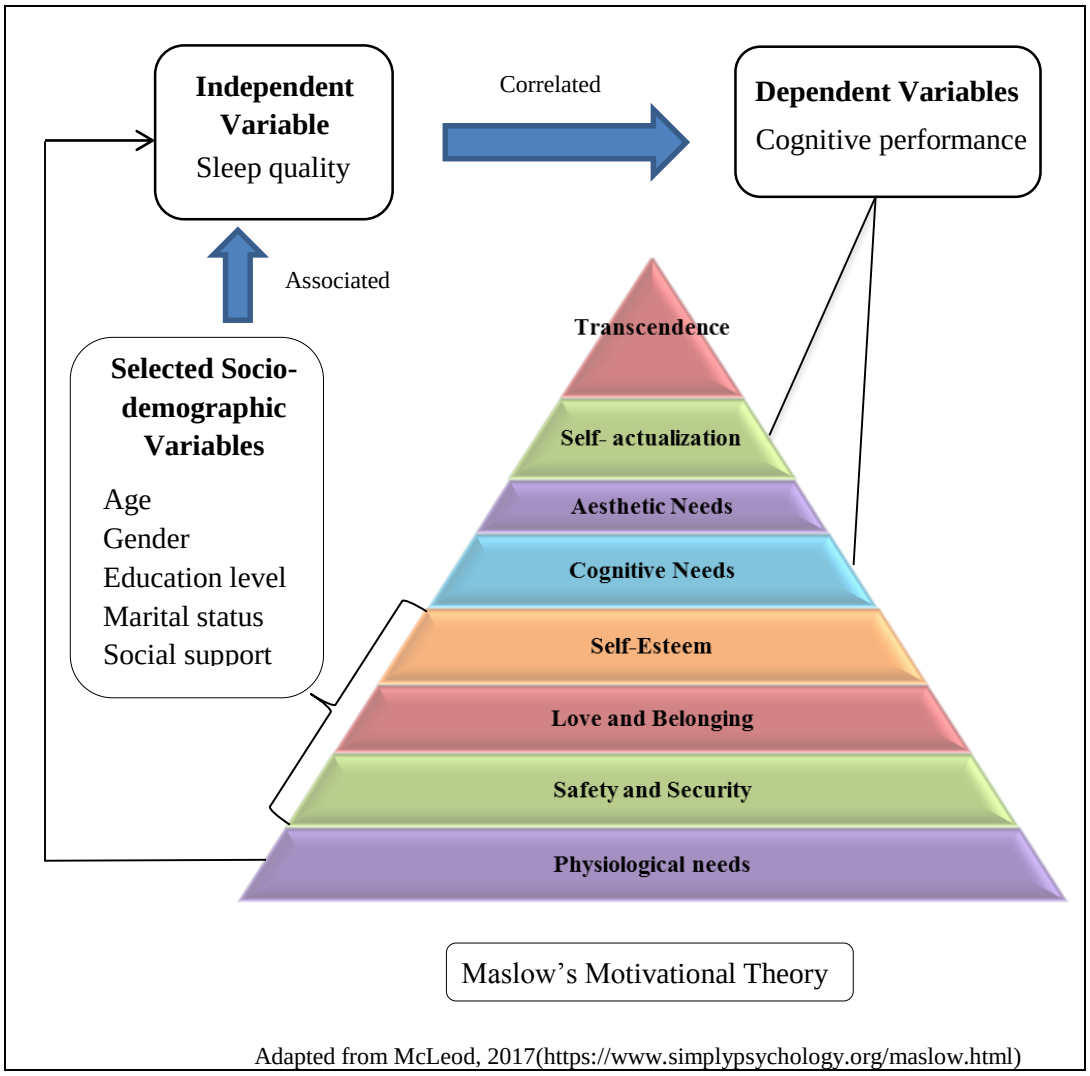

Diagram 2.3.: Conceptual Framework between Sleep Quality, Selected Socio-demographic variables and Cognitive Performance

2.4. SUMMARY

Previous studies from overseas have shown that sleep quality and socio-demographic factors can affect the cognitive performance among the healthy community-dwelling elderly and the elderly living in elderly care institution. The aged population needs greater health and long term care to fulfil the essential physiological need in order to maintain quality of life before achieving higher level of needs, which can create a higher older-age life satisfaction.

CHAPTER THREE

METHODOLOGY

CHAPTER 3 METHODOLOGY

3.0. CHAPTER OVERVIEW

In this chapter, the chosen research design, setting of the study, population, sample, sampling, variables, instruments, validity and reliability, pilot study, data collection procedure, ethical consideration and consent information will be explained in details.

3.1. RESEARCH DESIGN

A non-experimental descriptive correlational study design was selected to investigate the relationships between two or more variables within one group, which is the relationship between sleep quality and cognitive performance among institutionalised elderly. Correlational design does not determine cause and effect but it examines the direction of the relationship (positive or negative) and the strength of the relationship (Richardson-Tench, et al., 2014). In this study, positive relationship was expected that cognitive performance decreased when the sleep quality among institutionalised elderly decreased. Besides, this design is relatively easy to be carried out and it is time and cost effective. The questionnaire were completed by the elderly within the premises of elderly care institutions by assistance from the researchers.

3.1.1. SETTING OF THE STUDY

The research was conducted at fourteen (14) non-government funded elderly care institutions within the Klang Valley, Malaysia as listed in the table 3.1.1. below.

Name of Home	Number of Residents
Siri Jayanti Metta Care Centre, Setapak	15
Yi Xing USJ Old Folks Home, Subang Jaya	13
Kim Loo Ting Temple Home, Setapak	12
Ti-Ratana Welfare Society, Desa Petaling	38
Pusat Jagaan & Pendidikan Warga Emas Darul Insyirah, Bangi	20
Persatuan Jagaan Orang-orang Kurang Upaya dan Terbiar Lovely, PJ	72
St. Mark's Cozy Home, Sg Buloh	58
Pusat Jagaan Rumah Orang Tua Chik Sin Thong, Klang	25
Rumah Victory, Puchong	30
Persatuan Rumah Caring, Kajang	11
Pusat Jagaan Warga Tua Sri Tanjung, Sg Buloh	23
Sungai Way Old Folks Home, PJ	42
Onn Onn Old Folks Home, Setapak	14
My Father's Home, PJ	66
Total	**439**

Table 3.1.1.: List of the home and the number of residents available before applying exclusion criteria

3.1.2. TARGET POPULATION

The targeted population of this study were the elderly who is 60 years and above while the accessible population were the elderly in the fourteen (14) elderly care

institutions within Klang Valley with a total number of 439 residents. Researches managed to recruit 247 elderly as sample of this study after the application of exclusion criteria which will be discussed in section 3.3.3.

3.2. VARIABLES

According to Raiphea (2015), there is no fixed classification and definition of variable in research but it can be defined as a measurable value that varies over the units commonly. The independent variable is a variable that is stable and unaffected by the other variables, in which the researcher can control the variable to determine the effect on dependent variables while the dependent variables rely on other factors that are measured and will be changed with an experimental manipulation of the independent variable (Crammer and Howitt, 2004).

The independent variable in this study is sleep quality of the institutionalised elderly. The dependent variable is cognitive performance of the institutionalised elderly. The selected socio-demographic variables expected to show association with the sleep quality in elderly are age, gender, education level, marital status and social support. The variables were selected according to the findings from literature review.

3.3. SAMPLING

3.3.1. METHOD

Convenience sampling method, a type of non-probability sampling method was applied in the selection of participants. This sampling method does not require a list of the study population that researcher can approach and establish rapport with the potential participants in order to identify if they are in the inclusion criteria before including them in the study. Therefore, all elderly who were available in the selected study settings, in the inclusion criteria and willing to participate were recruited in the study.

3.3.2. SAMPLE SIZE

The researcher entered available participants into the study until desired sample size was met. Kish, L 1960 formula from (1965) was used to calculate the sample size. The formula is shown as bellow:

$$N = \frac{(Z_{1-\alpha})^2 P(1-P)}{D^2}$$

$Z1-\alpha=Confidence\ interval\ of$ 1.96,

P = Prevalence from previous study, Vanoh, et al. (2016)

D = allowable error, 0.05.

Hence,

$$N = \frac{(1.96)^2 0.16(1-0.16)}{0.05^2}$$

$$N = 206 + 0.2\ (206)$$

$$N = 247$$

Researcher has added 20% attrition rate to N in the event that the participants do not response to the researcher. Therefore, the final sample size is 247 participants.

3.3.3. SAMPLING CRITERIA

3.3.3.1. INCLUSION CRITERIA

- Residents who are 60 years old and above
- Residents who are free from cognitive disease (eg. dementia, Alzheimer and cerebral palsy) and mental illness (eg. schizophrenia and anxiety disorder)
- Residents who can understand and response accordingly and with given consent to participate in the study

3.3.3.2.EXCLUSION CRITERIA

- Residents who are younger than 60 years old
- Residents who refused to participate or requested to withdraw during the study
- Residents who failed to response due to cognitive impairment and mental illness
- Resident with visual or hearing impairment which impeded their ability in completing the questionnaire

3.4. RESEARCH INSTRUMENTS

Quantitative assessment tools were used for this study and the questionnaire was divided into three sections, Section A: Socio-demographic questionnaire, Section B: Pittsburgh Sleep Quality Index (PSQI) and Section C: Montreal Cognitive Assessment (MoCA-B) (Appendix A)

3.4.1. SECTION A: SOCIO-DEMOGRAPHIC QUESTIONNAIRE

This section comprised of closed-ended questions, the socio-demographic data which included age, gender, educational level, marital status and social support. The data were collected for data analysis to answer the research question four, that was to determine the significant differences between sleep quality and socio-demographic variables.

3.4.2. SECTION B: PITTSBURGH SLEEP QUALITY INDEX (PSQI)

PSQI was used to determine the sleep quality status of the participants. The questionnaire comprised of questions with seven components which are subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction. The score for each component was calculated according to the scoring format attached in Appendix A and was sum up to determine the sleep quality. A total of 5 or greater indicates poor sleep quality.

3.4.3. SECTION C: MONTREAL COGNITIVE ASSESSMENT (MOCA-B)

MoCA-B, the basic version determined the cognitive performance of the participants. This is a 30-point questionnaire that looks into 10 components of cognitive function such as executive function, immediate recall, fluency, orientation, calculation, abstraction, delayed recall, visuoperception, naming and attention. The score for each component was calculated according to the scoring

system as attached in Appendix A and was added up to determine the cognitive performance. A total score of below 26 indicates mild cognitive impairment.

3.4.4. VALIDITY AND RELIABILITY

Buysse (1989) has validated PSQI with the findings from his study. The findings showed a diagnostic sensitivity of 89.6% and specificity of 86.5% in distinguishing good and poor sleepers. According to Gray, Grove and Sutherland (2017), a tool is found to be reliable when the Cronbach's alpha coefficient value on the internal consistency test is ≥ 0.70. The Cronbach's alpha value from the same study was 0.83, indicating PSQI has a high reliability in distinguishing the sleep quality.

A construct validation on MoCA has been done by Freitas, et al. (2012) and the tool has a Cronbach's alpha coefficient value of 0.905. Therefore, PSQI and MoCA are well validated and the tools are widely used and highly recommended internationally.

3.4.5. PILOT STUDY

The purpose of pilot study is to verify the questionnaire, assess the feasibility and identify the problems that would be encountered during the main study so that changes can be made accordingly. The face and content validity of questionnaire were sent to two external department lecturers for validation. The pilot study was conducted on 25 elderly, 10% of the actual study sample size at

Rumah Kebajikan Love & Care, Kajang and House of Joy, Semenyih on 26 and 29 January 2018 respectively. The elderly could understand the questionnaire and were able to answer the questions accordingly. Cronbach's alpha tests were done for both PSQI and MoCA with a reliability of 0.783 and 0.907 respectively.

3.5. DATA COLLECTION

Data was collected from February 2018 to mid of March 2018 after ethical clearance from UTAR ethical board was obtained. Researchers made sure the permission were granted by the concerned parties of elderly care institutions, followed by obtaining written consent from the participants prior to data collection. The 25 elderly who were involved in pilot study were excluded in the main study. The questionnaires were completed by the elderly in their preferred language with the assistance of the researcher. The flow chart for the process of data collection is shown in next page.

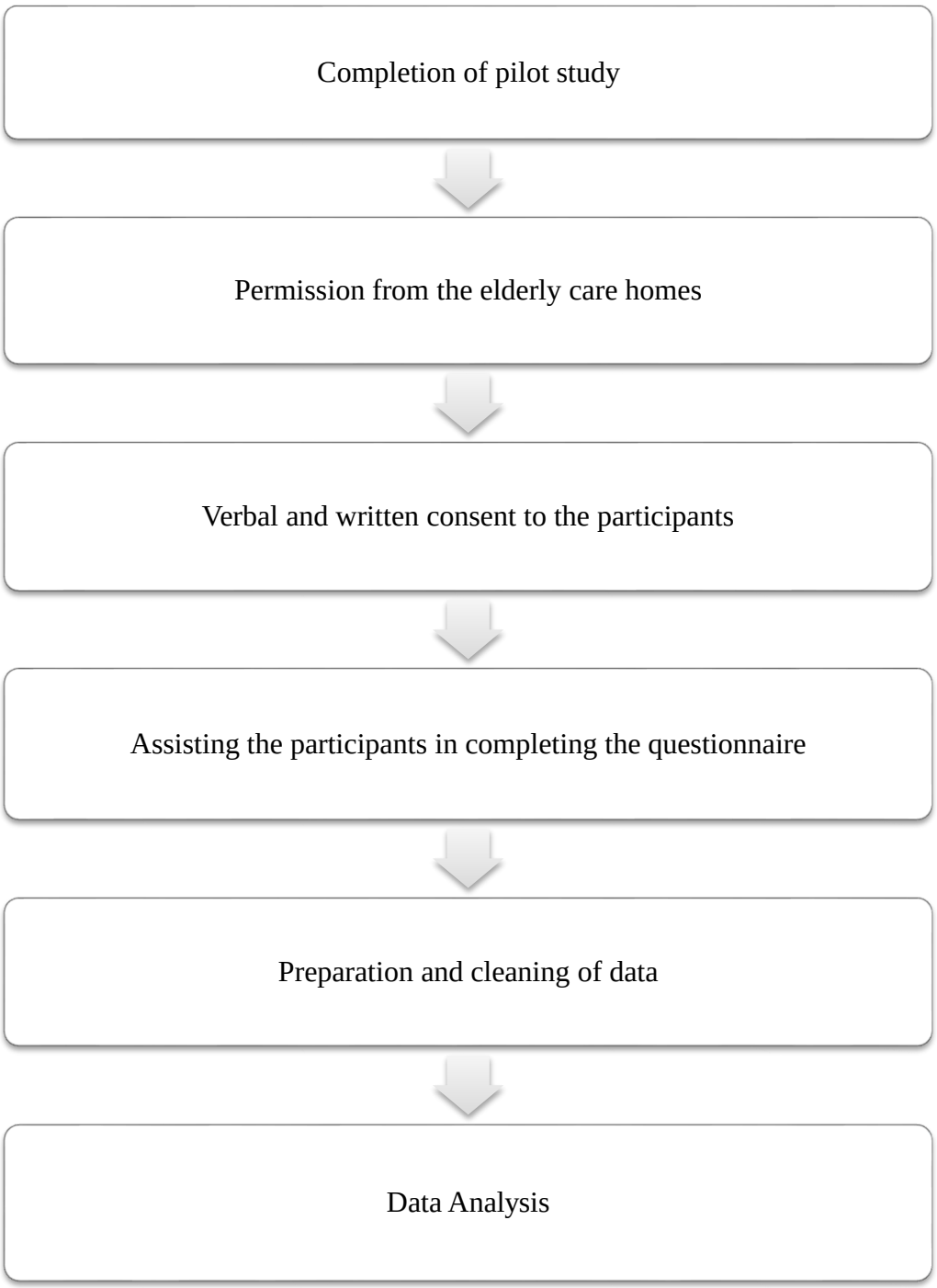

Diagram 3.5.: Data collection flow chart

3.6. ETHICAL CONSIDERATION

The researcher ensured that ethical approval from UTAR ethical board was obtained at least six (6) weeks prior commencing of the research. The sample ethical approval application form is attached in Appendix C and the ethical clearance approval letter is attached in Appendix D.

Permissions from the owners and caretakers of the facilities were obtained before the visitation made. The participants were assured that their information will not be disclosed to any third parties. Anonymity will be ensured by coding each questionnaire with numbers. The data were stored in locked cabinet and the files in computer were encrypted whereby only the researcher will have the access password. Lastly, the data will be kept for seven (7) years before disposal.

3.6.1. CONSENT INFORMATION

The researchers explained about the objective of the research to the participants and they have been assured the information will not be disclosed to anyone. The participants were free from constraints and they have the right to withdraw from the research at anytime. The content of recruitment letter has been included in the information sheet and consent form as shown in Appendix B. Therefore, there were no recruitment letter for this study and only information sheet and consent form were given to and signed by the elderly before the researcher engaged them in the study.

3.7. SUMMARY

Methodology is a system of method applied in a study to answer the research questions from the results obtained after data analysing. Appropriate sampling, method of data collection and data analysis are essential in improving the accuracy and significance of results in order to make a sound and meaningful study which can contribute to the community.

CHAPTER FOUR

DATA ANALYSIS AND RESULT

CHAPTER 4: DATA ANALYSIS AND RESULT

4.0. CHAPTER OVERVIEW

In this chapter, statistical analysis for each specific objectives, data processing and the result obtained from Statistical Package for the Social Sciences version 23 (IBM SPSS Statistic 23) will be discussed in details.

4.1. DESCRIPTIVE AND INFERENTIAL ANALYSIS

4.1.1. DESCRIPTIVE ANALYSIS

- Continuous data were presented in mean and standard deviation while the categorical data were presented in percentage.
- The overview of the participants with socio-demographic data such as age was presented in mean whereas the gender, educational level, marital status and social support were presented in percentage.
- The first and second specific objectives in this study, the sleep quality status and cognitive performance level among the institutionalised elderly were presented in percentage.

4.1.2. INFERENTIAL ANALYSIS

- Chi-square test was done to test the third specific objective, which was to determine the significant differences between the sleep quality and cognitive performance.
- Chi-square test was done to test the fourth specific objective, which was to determine the significant differences between the selected socio-

demographic variables with sleep quality. The age was transformed into categorical data by classifying the participants who were 60-79 years old in young old group whereas 80 years old and above in old-old group. The classification done based on the previous study on elderly in Singapore (Ansah, et al., 2015).

4.2. STATISTICAL DATA PROCESSING AND ANALYSIS

A total of 439 elderly were available for the study before applying exclusion criteria. However, the response rate obtained was 56% after applying exclusion criteria with the number of 133 elderly refused to participate, not responding, or have cognitive and mental disease, 13 of the elderly with hearing or visual impairment and 39 of them are underage. The final count of participants who were eligible for the study is 247. Chi-Square test was used for comparison between two categorical variables and the level of significant was set at p value <0.05. The results are shown as followed.

4.3. RESULTS

4.3.1. DESCRIPTIVE STATISTICS

4.3.1.1. OVERVIEW OF PARTICIPANTS

Table 4.3.1.1. : Overview of participants, N= 247.

Socio-demographic Variables	n (%)	Mean (sd)
Age		74.58 (8.382)
Gender		
Male	111 (44.9)	
Female	136 (55.1)	
Educational level		
None	61 (24.7)	
Primary	89 (36.0)	
Secondary	76 (30.8)	
Tertiary	21 (8.5)	
Social contact		
No	51 (20.6)	
Yes	196 (79.4)	
Marital status		
Single	112 (45.3)	
Married	43 (17.4)	
Widow/Widower	75 (30.4)	
Divorced	17 (6.9)	

N= total sample size, n= number of participants, sd= standard deviation

Categorical data presented by n (%), Continuous data presented by mean (sd)

According to table 4.3.1.1., there are a total number of 247 participants with the mean age of 74.58 years and a standard deviation of 8.382 years. Besides, there were generally more female participants (n=136) which made up 55.1% of the total participants compared to their male counterparts (n=111) which made up 44.9% of the total participants in this research. The participants with primary educational level (n=89) made up 36.0% of the total participants and the number of participants with tertiary educational level (n=21) were only 8.5% of the total participants in the research. As for marital status, it can be found that 112 elderly were single, made up the highest portion in this study (45.3%) compared to the number of divorced elderly (n=17) who made up the least portion in this study with 16.9%. The amount of participants that had support and contact with family or friends was 196 (79.4%), which was approximately 4 times higher than the amount of participants without social support and contact, which was 51 (20.6%).

4.3.1.2.: SLEEP QUALITY STATUS OF PARTICIPANTS

Table 4.3.1.2.: Sleep quality status of participants, N= 247.

Sleep quality	**n (%)**
Poor	170 (68.8)
Good	77 (31.2)

N= total sample size, n= number of participants, categorical data presented by n (%)

Sleep quality status was clearly showed in Table 4.3.1.2. Among 247 total participants, a total of 170 elderly (68.8%) had poor sleep quality whereas 77 elderly (31.2%) had good sleep quality. PSQI has been used to answer the sleep quality among the elderly. The result was generated after adding up each of the

score from seven components including subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction. A total of 5 or greater indicates poor sleep quality while 5 and below indicates good sleep quality.

4.3.1.3. COGNITIVE PERFORMANCE STATUS OF PARTICIPANTS

Table 4.3.1.3.: Cognitive performance status of participants, N= 247

Cognitive performance	**n(%)**
Poor	185(74.9)
Good	62(25.1)

N= total sample size, n= number of participants, categorical data presented by n (%)

Table 4.3.1.3. illustrated the cognitive performance status of the participants. Out of 247 participants, 185 (74.9%) of elderly were reported to have impaired cognitive performance with MoCA scoring lower than 26 marks. On the other hand, there were only 62 (25.1%) of them scored 26 marks and above in MoCA, indicating good cognitive performance. The score was a sum up of 10 components in the questionnaire such as executive function, immediate recall, fluency, orientation, calculation, abstraction, delayed recall, visuoperception, naming and attention.

4.3.2 INFERENTIAL STATISTICS

4.3.2.1.: RELATIONSHIP BETWEEN SLEEP QUALITY AND COGNITIVE PERFORMANCE

Table 4.3.2.1.: Relationship between sleep quality and cognitive performance

	Cognitive Performance		χ^2	**df**	**POR**	**P value**
Sleep Quality	Impaired n (%)	Good n (%)				
Poor	135 (79.4)	35 (20.6)	5.908	1	2.083	0.015*
Good	50 (64.9)	27(35.1)				

Chi-Square test was performed, level of significance at $p < 0.05$, df = degree of freedom, POR = Prevalence Odds Ratio, * significant results

The relationship between sleep quality and cognitive performance is clearly illustrated in Table 4.3.2.1. Prevalence of impaired cognitive performance was higher among institutionalised elderly with poor sleep quality (79.4%) as compared to the prevalence of those with good sleep quality (64.9%). Elderly who did not sleep well were 2.7 times more likely to get cognitive impairment compared to elderly who slept well. In all, there was a significant difference between sleep quality and cognitive performance ($p<0.05$), stressing that institutionalised elderly with poor sleep quality were more inclined to have cognitive impairment.

4.3.2.2.: RELATIONSHIP BETWEEN SLEEP QUALITY AND SOCIO-DEMOGRAPHIC VARIABLES (AGE, GENDER, EDUCATIONAL LEVEL, SOCIAL SUPPORT, MARITAL STATUS)

Table 4.3.2.2. : Relationship between sleep quality and socio-demographic variables (Age, Gender, Educational level, Social support, Marital status)

Socio-demographic Variables	Sleep Quality		χ^2	df	POR	P value
	Poor n (%)	Good n (%)				
Age						
60-79	117(69.6)	51 (30.4)	0.163	1	0.889	0.686
80 and above	53 (67.1)	26 (32.9)				
Gender						
Male	82 (73.9)	29 (26.1)	2.394	1	0.648	0.122
Female	88 (64.7)	48 (35.3)				
Educational level						
None	44 (72.1)	17 (27.9)	1.889	3	NA	0.596
Primary	64 (71.9)	25 (28.1)				
Secondary	48 (63.2)	28 (36.8)				
Tertiary	14 (66.7)	7 (31.2)				
Marital Status						
Single	75 (67.0)	37 (33.0)	7.053	3	NA	0.070
Divorced	13 (76.5)	4 (23.5)				
Widow/ Widower	46 (61.3)	29 (38.7)				
Married	36 (83.7)	7 (16.3)				
Social Contact						
No	40 (78.4)	11 (21.6)	2.764	1	1.846	0.096
Yes	130 (66.3)	66 (33.7)				

Chi-Square test was performed, Level of significance at $p < 0.05$, df = degree of freedom, POR = Prevalence Odds Ratio, * significant result

The relationship between socio-demographic variables and sleep quality are clearly demonstrated in Table 4.3.2.2. The elderly in young-old group, who aged between 60 to 79 showed slightly higher prevalence of poor sleep quality (69.6%) compared to those in old-old group, which aged 80 and above (67.1%). The result showed there was no significant difference between age group and sleep quality ($p>0.05$), indicating age does not affect the sleep quality among the elderly.

The prevalence of elderly with poor sleep quality among male (73.9%) was higher than female (64.7%). However, the result showed the difference between gender and sleep quality was not statistically significant ($p>0.05$). Therefore, the gender did not play a significant role in affecting the sleep quality among institutionalised elderly.

The percentage of elderly with poor sleep quality was highest among the elderly who were illiterate, never attended the school or without a formal education (72.1%). The prevalence of cognitive impairment reduced as the educational level increased when the result showed 63.2% of the elderly with secondary educational level had poor sleep quality. However, there was a slight increase in prevalence in the tertiary educational level group (66.7%). The difference between educational levels and sleep quality was not statistically significant ($p>0.05$) hence, there was no association between educational level and cognitive performance.

The prevalence of poor sleep quality in married (83.7%) and divorced elderly (76.5%) were considerably higher than in single (67.0%) and widow or widower (61.3%) elderly. However, the result was not statistically significant ($p > 0.05$), signifying that marital status was not significantly associated with the sleep quality in institutionalised elderly.

A higher prevalence of poor sleep quality was observed in participants who had no social interaction (78.4%) compared to those who were still in contact with family or friends (66.3%). Despite that, the difference between social support and sleep quality was not statistically significant ($p > 0.05$) thus social support was not an attributable risk for poor sleep quality among the institutionalised elderly.

In conclusion, the sleep quality of the elderly was not significantly influenced by demographic variables such as age, gender, education level, marital status and social support ($p > 0.05$). Although it was not statistically significant, the married male elderly who aged between 60 to 79, were illiterate, never attended the school or without a formal education and claimed without social contact with family and friends were found to have poorer sleep quality compared to other groups living in the elderly care facilities.

4.4. SUMMARY

The data analyses depicted the result that the prevalence of poor sleep quality and cognitive impairment among the elderly were high, with the percentage of 68.8% and 74.9% respectively. The number of elderly with impaired cognitive performance related to poor sleep quality was 2.7 times higher compared to those with good sleep quality. There were no significant differences between socio-demographic variables and sleep quality even there were some differences observed between the two variables. The results will be discussed further along with the previous studies in next chapter.

CHAPTER FIVE

DISCUSSION AND RECOMMENDATION

5.0. CHAPTER OVERVIEW

The chapter includes a discussion related to the research questions and specific objectives addressing sleep quality and cognitive performance status, the relationship of sleep quality and cognitive performance, and the relationship of sleep quality and selected socio-demographic variables. The findings from the previous chapter will be interpreted with previous studies and discussed along with its implication.

5.1. DISCUSSION OF MAJOR FINDINGS

5.1.1. SLEEP QUALITY STATUS

This study showed the prevalence of poor sleep quality among the institutionalised elderly was 68.8% .The result indicated that the sleep quality amongst elderly in living care facilities is poor which is aligned with the previous studies in Malaysia (Rashid, Ong and Wong, 2012; Azri, et al., 2016). World Sleep Society (2018) highlighted one's overall sleep-related wellness is highly related to the environmental conditions, such as temperature, noise, light, bed comfort and electronic distractions. The result from the study of Kohlhuber, et al. (2011) showed that poor sleep quality related to environmental noise lead to long-term consequences such as heart disease and increased medication intake. Besides, National Sleep Foundation (2009) reviewed that changes in the sleep architecture and circadian rhythms that coordinate the timing of bodily functions, including sleep are a part of normal aging process, contributing to the changes in the sleep quality. For example, there are changes in the sleep pattern among

the elderly as they tend to feel sleepy in early evening and wake earlier in the morning compared to the younger adults, leading to poorer sleep quality. Nocturia, which known as frequent micturition at night, is found to be a common factor that affects the sleep quality by fragmenting the natural sleeps cycle in elderly. Nocturia happens when there is a reduction in the bladder capacity to store urine resulted by lower urinary tract dysfunction which is associated to highly prevalent age-related phenomenon such as benign prostate hyperplasia (BPH) and overactive bladder syndrome (OAB) (Osman and Chappler, 2013). Moreover, increased nocturnal urine production happens when the fluid from feet and legs redistributes centrally leading to expansion of the intravascular volume when the elderly sleep in recumbent position (Kass-Iliyya and Hashim, 2018).

5.1.2. COGNITIVE PERFORMACE STATUS

In this study, 74.9% of the elderly were tested to have cognitive impairment. The high prevalence might be due to the fact that institutionalised elderly receive routine care where they are not involved in the planning for their own care and other activities. Therefore, the risk of brain cell degeneration increased when the elderly show poor commitment in their daily life and it was suggested that planning and carrying out various volunteer responsibilities will generate the mental stimulation, which in turn helps to slow or offset the degeneration (Kent, 2011). The prevalence found in this study was significantly higher compared to another study on Malaysian elderly in day care centres, which have found the prevalence of 4.0% (Sharifah Zainiyah, et al., 2011). The vast difference of the

findings might be due to the fact that the respondents in this study are not that socially active as compared to the respondents in day care centres with activities such as computer classes, dancing and singing sessions. Further, the elderly in day care centres have better social relationship as they will go back to interact with their immediate family compared to those staying in old folk homes. In addition, another research done in institutionalised elderly within Klang Valley showed a lower prevalence of cognitive impairment which was 59.3% (Wong, et al., 2016). The difference might be due to larger sample size and the cognitive assessment tool adopted in our study, resulting in difference on classifying cognitive performance.

5.1.3. SLEEP QUALITY AND COGNITIVE PERFORMANCE

We sought to determine the relationship between sleep quality and cognitive performance among elderly as a definitive link between these two variables on elderly has not been documented in Malaysia. In this study, researchers showed that poor sleep quality were related to cognitive performance decline in older adults. Our findings are consistent with previous study done on older adults in United Kingdom that have found the correlation between poor sleep quality due to sleep disorders, based primarily on self-reported sleep quality and cognitive performance decline based on objective measures by MoCA (Różyk-Myrta, et al., 2017). Furthermore, a study by Amer, et al. (2013) in Eygpt found an association between self-reported sleep quality and cognitive performance detected by Mini Mental Status Examination (MMSE) among the elderly living in elderly homes. The link between poor sleep quality and cognitive impairment

can be explained by the mechanism, where sleep disturbance could interfere with the normal activity of neuronal pathways especially the function of Gamma-Aminobutyric Acid (GABA) and Cyclic adenosine monophosphate (cAMP) messenger, which might impair the synaptic plasticity (Havekes, Vecsey and Abel, 2012). Furtheremore, poor sleep can promote neuroinflammation and disrupt neurogenesis in hippocampal area, leading to neurodegeneration. Hippocampal area is known as the neuroanatomical region for learning and memory (Zhu, et al., 2012).

5.1.4. SLEEP QUALITY AND SOCIO-DEMOGRAPHIC VARIABLES

In this study, the sleep quality of the elderly was not significantly influenced by demographic variables such as age, gender, education level, marital status and social support ($p > 0.05$).

5.1.4.1. SLEEP QUALITY AND AGE GROUP

The obtained results indicated that the sleep quality of the young-old is slightly poorer than the old-old, contraindicating the results of Dehghankar, et al. (2018) and Rashid, Ong and Wong (2012). The contradictory results of the studies can be due to unequal percentage of participants in young-old and old-old group in this study. There were a higher percentage of participants in young-old group which took about 68% compared to old-old group with only 32% hence the effect of age group cannot be well identified and distinguished in this study. Besides, the discrepancy might be associated with confounded medical conditions and the

uncontrollable psychological conditions of the elderly while completing the questionnaires. It should be noted that physiologic changes due to aging affect the sleep quality of the elderly negatively.

5.1.4.2. SLEEP QUALITY AND GENDER

The findings also demonstrated a difference between men and women in sleep quality, with sleep quality being poorer in man. The result was consistent with the results of Rashid, Ong and Wong (2012). However, the study from Quan, et al. (2016), Dağlar, et al. (2014) and Wu, et al. (2012) showed poor sleep quality was more prevalent in woman. The result can be explained by the hormonal changes in women due to menopause. National Sleep Foundation (2018) highlighted menopausal women experience sleeping problems with symptoms of hot flashes, mood disorders, insomnia and sleep related breathing disorder due to decreased production of oestrogen and progesterone. In addition, the inconsistency could be due to different sample population has been adopted, as the previous studies have been done on community dwelling elderly.

5.1.4.3. SLEEP QUALITY AND EDUCATIONAL LEVEL

Our results showed the elderly with lower education level had poorer sleep quality but there was no significant difference found, which was in line with the findings from Dehghankar, et al. (2018), Wu, et al. (2012) and Rashid, Ong and Wong (2012). The positive effect of educational level on sleep quality was

confirmed when the results found to be strongly and significantly correlated in a cross sectional study done on community dwelling elderly in China by Zhang, et al. (2016). The difference might be due to larger sample size; with a number of 1653 residents have been recruited in the previous study, making the result to be able to represent the population by limiting the influence of outliers or extreme observations. Another reason might be due to the difference in sleeping environment among the elderly in living care facilities and community. The community dwelling elderly has the ability to modify their sleeping environment with their knowledge as compared to the elderly in living care facilities who lacks of authority in determining their sleeping environment, as the elderly are sleeping under the same environment regardless of their educational level.

5.1.4.4. SLEEP QUALITY AND MARITAL STATUS

Our studies showed no significant differences between marital status and sleep quality but the married elderly were found to be more likely to have poor sleep quality, strengthening by the findings of Rashid, Ong and Wong (2012). However, this result was inconsistent with prior studies did on community dwelling elderly by Zhang, et al. (2017) in China and Wu, et al. (2012) in Taiwan as their results found that the prevalence of poor sleep quality was higher in single, divorced or widowed elderly. The lack of similarity in the results may be due to the Malaysia family structure whereby the married elderly usually will be living separately due to family commitment to take care of their grandchildren and our study was done on the married elderly in living care institutions who live separately with their spouse and this may lead to loneliness, which in turn affect

their sleep quality. This finding is correlated with the study from Costa, et al. (2013) as they found the prevalence of loneliness feelings among the Portugal elderly who frequenting day care centres or living in a retirement home was 68.2%. The result showed loneliness was significantly related poor sleep quality.

5.1.4.5. SLEEP QUALITY AND SOCIAL SUPPORT

The obtained results indicated that elderly who claimed without social support from friends and family had poorer sleep quality but there was no significant difference identified. Conversely, the study done by Rashid, Ong and Wong (2012) proved there were significant differences between social relationship and the sleep quality among the elderly. Besides, another study done by Stafford, et al. (2017) found a link between declining social relationship quality and poor sleep quality. The inconsistence in the result could be attributed by difference in the questionnaire whereby WHO Quality of Life-BREF (WHOQOL-BREF) has been adopted in Rashid, Ong and Wong (2012) study to identify the social relationship among the elderly for a more comprehensive data interpretation compared to our questionnaire which only consisted of closed-ended question. Furthermore, Stafford, et al., (2017) employed longitudinal cohort study design with a larger sample size (n=2446) which took 15 years to observe the sleep quality changes hence they were able to provide stronger evidence to support the association between social support and sleep quality. In overall, social support brings about the sense of belonging, feeling valued and shared interest which may enhance the positive mood, which in turn promote better sleep among elderly (Jackowska, et al., 2016).

5.2. IMPLICATIONS OF STUDY

The findings from this study have brought about numerous results that probably gave us a better picture on the prevalence of poor sleep quality and the impact on cognitive performance among elderly. The findings can be disseminated to the caregivers and the residents to create the awareness on importance of good sleep quality to maintain elderly well-being. Thereby, health promotion shall be focused and adopted as an effective tool in promoting better sleep quality and reserving the cognitive function.

Sleep hygiene education should be emphasised in teaching the individuals about impact of lifestyle habits and the influence of environment on sleep quality (American Sleep Association, 2016). Effective behavioural strategies is one of the elements in sleep hygiene education such as encouraging a bedtime routine with a consistent retiring and arising time and watching television or reading before go to bed. Besides, the elderly should be advised not to take heavy meals or spicy food, caffeine and smoking before bedtime. Regular exercise and exposure to sunlight during daytime is encouraged as the bright light can change the circadian rhythms and increases the production of melatonin which helps induce sleep at night (Karami, et al., 2016). In addition, techniques such as relaxing and tensing the muscles systematically from head to toe, listening to music and using guided imaginary with the help of a tape of ocean sounds, rain, waterfalls or other relaxing auditory sounds can be taught to the elderly in improving their sleep quality. It is advised that the caregivers to implement some strategies in creating a more conducive environment for the elderly to promote sleep such as minimising the noise and dim the lights.

On the other hand, strategies to reserve elderly cognitive function such as engaging in cognitive stimulating, social and leisure activities and performing regular exercise with healthy diet should be included in health promotion. Reading newspapers and engaging in crosswords or card games can stimulate their cognitive function. Furthermore, social and leisure activities such as gardening, swimming and singing competition are recommended. Diet rich in vitamins, antioxidants and methionine-rich amino acids are beneficial. In addition, excess calories should be prevented as it can lead to obesity, diabetes or vascular disorders which contribute to cognitive decline (George, Ummar and Shaji, 2016).

5.3. LIMITATION AND RECOMMENDATION FOR FUTURE RESEARCH

Despite the strength of having bigger sample size and comprehensive cognitive assessment tool, we acknowledge several limitations of the study. This is a correlational study whereby causal inference cannot be seen. Majority of the sample population were Chinese, hence, the findings were lack of generalisation to represent the whole population in Malaysia with multiple ethnicities. The sleep quality was evaluated by subjective measure and there was no validation by more objective measures. Thus, there might be some recall bias in the result. The questionnaire such as MoCA was quite lengthy for the elderly and the closed-ended social support question was too brief for a precise data interpretation. The data analysis on components of sleep quality and cognitive

performance were not done, therefore, the results were superficial and it cannot promote readers' better understanding on these two variables.

Further studies are recommended to prospectively follow up a cohort of institutionalised elders to evaluate elderly sleep quality and their effect on the cognitive performance over time. Besides, multi-ethnic sample population should be recruited and further validation on sleep quality by objective measures such as Actigraphy that is able to provide important information for the early detection and prevention of sleep-related cognitive impairment is preferable. Moreover, it is recommended to select the assessment tool which has greater feasibility, elderly friendly. A more comprehensive tool in determining the social support is needed for a concise result in future research and a more in depth data analysis on components of sleep quality and cognitive performance are necessary for readers' interest.

5.4. CONCLUSION

The prevalence of poor sleep quality and cognitive impairment amongst elderly in living care facilities were high with 68.8% and 74.9% respectively. Poor sleep quality is related to cognitive impairment whereby the elderly with poor sleep quality were more inclined to have cognitive impairment. There was difference observed between socio-demographic variables and sleep quality but the result was not statistically significant. The caregivers of the elderly care institutions should be made aware of the importance of sleep quality to initiate some interventions to promote better sleep quality and reserve the cognitive function in maintaining elderly's well-being.

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APPENDIXES

APPENDIX A: RESEARCH INSTRUMENTS (ENGLISH AND CHINESE)

SLEEP QUALITY AND COGNITIVE PERFORMANCE QUESTIONNAIRE

This questionnaire consists of 3 sections: Section A (Socio-demographic data), Section B: Pittsburgh Sleep Quality Assessment (PSQI) and Section C: Montreal Cognitive Assessment (MOCA). Participants are required to complete ALL sections.

Section A: Personal Information (Socio-demographic data)

Instruction: Please fill in the blank & tick (✔) at appropriate box. ☐

1. Age:_____

2. Gender:
   ☐ Male ☐ Female

3. Race:
   ☐ Chinese
   ☐ Malay
   ☐ Indian
   ☐ Others: _____

4. Education Qualification:
   ☐ None
   ☐ Primary
   ☐ Secondary
   ☐ Tertiary

5. Marital Status:
   - ☐ Single
   - ☐ Married
   - ☐ Widowed
   - ☐ Divorced

6. Social contact
   - ☐ None
   - ☐ Yes

Section B: Pittsburgh Sleep Quality Assessment (PSQI)

Pittsburgh Sleep Quality Assessment (PSQI) Scoring Format by Sleep Components

Instructions:
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

Consists following Components:

1. Component 1: Subjective sleep quality:

a. During the past month, how would you rate your sleep quality overall?

Response	Score
"Very good"	0
"Fairy good"	1
"Fairly bad"	2
"Very bad"	3

Component 1 score: _____

2. Component 2: Sleep latency:

a. How long (in minutes) has it takes you to fall asleep each night?

Response	Score
≤ 15 minutes	0
16-30 minutes	1
31-60 minutes	2
> 60 minutes	3

b. During the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes

Response	Score
Not during the past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Scoring for sleep latency:

Step 1: Add 2a score and 2b score = Sum of 2a & 2b

Step 2: Assign component 2 score as follows:

Sum #2a - 2b	Component 2 score
0	0
1 – 2	1
3 - 4	2
5 - 6	3

Component 2 score: _____

3. Sleep duration:

a. 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 spend in bed.)

Response	Score
> 7 hours	0
6-7 hours	1
5-6 hours	2
< 5 hours	3

Component 3 score: _____

4. Component 4: Habitual sleep efficiency

a. During the past month, when have you usually gotten up in the morning?

Usual Getting Up Time: _____

b. During the past month, when have you usually gone to bed at night?

Usual Bed Time: _____

Step 1: write in the number of hours slept (actual sleep #3a) =

Step 2: calculate the number of time spend in bed= Getting up time (PSQI #4a) – Bedtime (PSQI # 4b) =

Step 3: Calculate habitual sleep efficiency= number of hours for actual sleep / number of hours spent in bed x 100 = habitual sleep efficiency (%)

Habitual sleep efficiency (%)	Score
>85%	0
75-84 %	1
65-74%	2
<65%	3

Component 4 score: _____

5. **Component 5: Sleep disturbances**

	During the past month, how often have you had trouble sleeping because you	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
a	Wake up in the middle of the night or early morning				
b	Have to get up to use the bathroom				
c	Cannot breathe comfortably				
d	Coughing or snore loudly				
e	Feel too cold				
f	Feel too hot				
g	Had bad dreams				
h	Have pain				
i	Other reason(s), please describe, including how often you had trouble sleeping because of this reason(s)				

Scoring on component 5 (sleep disturbance):

Step 1: Add the scores for questions # 5a – 5i:

Step 2: assign sleep disturbance score as follows:

Sum #5a - 5i	Component 5 score
0	0
1 – 9	1
10 - 18	2
19 - 27	3

Component 5 score: _____

6. Component 6: Use of sleeping medication

During the past month, how often have you taken medicine (Prescribed or "over the counter") to help you sleep?

Response	Component 6 score
Not during the past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Component 6 score: _____

7. Component 7: Daytime dysfunction

a. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Response	Score
Never	0
Once or twice	1
Once or twice each week	2
Three or more times each week	3

b. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?

Response	Score
Never	0
Once or twice	1
Once or twice each week	2
Three or more times each week	3

Scoring for Daytime dysfunction:

Step 1: Add 7a score and 7b score = Sum of 7a & 7b

Step 2: Assign component 7 score as follows:

Sum #7a - 7b	Component 7 score
0	0
1 – 2	1
3 - 4	2
5 - 6	3

Component 7 score: _____

Global PSQI Score (Total score of seven components):_____

.

Remark: A total score of "5" or greater is indicative of poor sleep quality

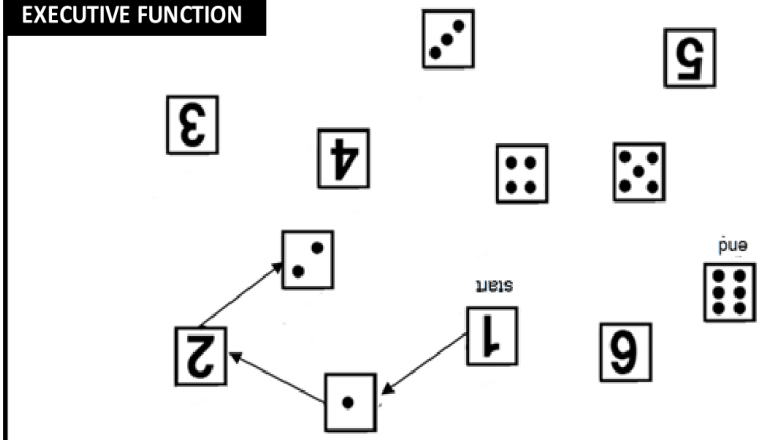
Section C: Montreal Cognitive Assessment (MoCA-B)

MONTREAL COGNITIVE ASSESSMENT (MOCA-B)

BASIC

Name _____
Sex _____ Age ____
Education ____ Date of exam _____
Administered by _____

EXECUTIVE FUNCTION — **SCORE**



START TIME _____

(/1)

IMMEDIATE RECALL — No point

Perform 2 trials even if 1st trial is successful

	ROSE	CHAIR	HAND	BLUE	SPOON
1st trial					
2nd trial					

FLUENCY — Name maximum numbers of **FRUITS** in 1 minute — (/2)

1..... 2..... 3..... 4..... 5..... 6.....
7..... 8..... 9..... 10..... 11..... 12.....
13..... 14..... 15..... 16..... 17..... 18.....

N items
2 points if N = 13 or more
1 point if N = 8-12
0 point if N = 7 or less

ORIENTATION — [ ] time (± 2 hr) [ ] day [ ] month [ ] year [ ] place [ ] city — (/6)

CALCULATION — (/3)

Provide 3 ways to pay using 1 dollar coins, 5 dollar and 10 dollar bills for an object that costs exactly **"13 Dollars"** (3 points if 3 ways, 2 points if 2 ways, 1 point if 1 way, 0 point if no correct way)

[ ] 1..... [ ] 2. ..... [ ] 3. .....

ABSTRACTION — (/3)

To what category these objects belong to ? (e.g. orange - banana = fruit)

[ ] train - boat [ ] north - south [ ] drum - flute

DELAYED RECALL — (/5)

Points are awarded for recall with No cue (1point for each item)

	ROSE	CHAIR	HAND	BLUE	SPOON
Recall with No cue	[ ]	[ ]	[ ]	[ ]	[ ]
Recall with category cue	[ ]	[ ]	[ ]	[ ]	[ ]
Recall with multiple choice cue	[ ]	[ ]	[ ]	[ ]	[ ]

VISUOPERCEPTION — (/3)

Identify drawings. No more than 60 seconds. See complementary sheet.

scissors	T-shirt	banana	lamp	candle
watch	cup	leaf	key	spoon

3 points if N = 9-10
2 points if N = 6-8
1 point if N = 4-5
0 point if N = 0-3
N __

NAMING — Identify animals. See complementary sheet. [ ] zebra [ ] peacock [ ] tiger [ ] butterfly — (/4)

ATTENTION — (/1)

Name the numbers in circles. See complementary sheet. 1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

ERROR ___N
No point if 2 errors or more

Name the numbers in circles & squares: 3 8 5 1 3 0 2 9 2 0 4 9 7 8 6 1 5 7 6 4

See complementary sheet. 1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

ERROR ___ N
2 points if 2 errors or less
1 point if 3 errors
0 point if 4 errors or more

(/2)

END TIME _____

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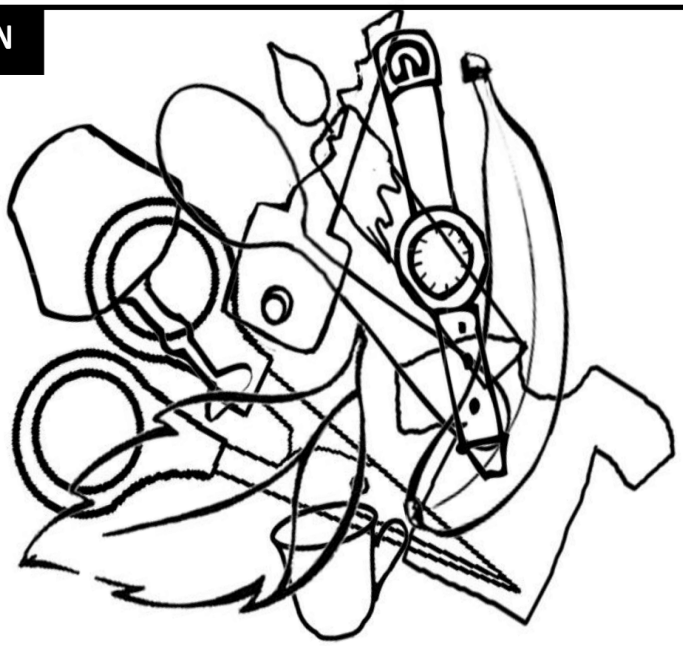
Final Version June 04, 2014

TOTAL SCORE (/30)
Add 1 point if education < 4 year AND add 1 point if illiterate
TOTAL TIME ____ min ____ sec

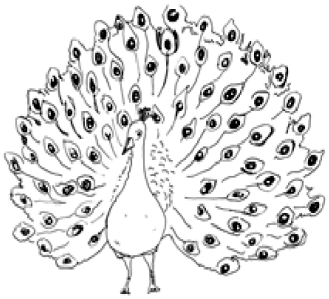
MONTREAL COGNITIVE ASSESSMENT (MOCA-B)

BASIC **COMPLEMENTARY WORKSHEET**

VISUOPERCEPTION



NAMING



ATTENTION

1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

3 8 5 1 3 0 2 9 2 0 4 9 7 8 6 1 5 7 6 4

1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

Adapted by: Parunyou Julayanont MD Copyright: Z. Nasreddine MD Final Version June 04, 2014

睡眠质量和认知表现调查卷

这个调查问卷分为三部分，部分 A (私人资料)，部分 B（匹兹堡睡眠品質量表）和部分 C (蒙特利尔认知评估基础量表) 。参加者必须完成以下的问题。

部分 A：私人资料

指示: 请在线上填上资料和在相关格子☐打个勾(✔) 。

1. 年龄 : _____
2. 性别:
   ☐ 男 ☐ 女
3. 种族:
   ☐ 华人
   ☐ 马来人
   ☐ 印度人
   ☐ 其他 : _____
4. 学历:
   ☐ 没有
   ☐ 小学
   ☐ 中学
   ☐ 大学

5. 婚姻状态:
   - ☐ 单身
   - ☐ 结婚
   - ☐ 寡妇/鳏夫
   - ☐ 离婚

6. 社交联系:
   - ☐ 没有
   - ☐ 有

部分 B: 匹茲堡睡眠品質量表

匹茲堡睡眠品質量表

說明：下列問題是要調查您**過去這一個月來**的睡眠習慣，請您以平均狀況回答。

1. 過去一個月來，您晚上通常幾點上床睡覺？_____點_____分

2. 過去一個月來，您在上床後，通常躺多久才能入睡？_____分

3. 過去一個月來，您早上通常幾點起床？_____點_____分

4. 過去一個月來，您每天晚上真正睡著的時間約多少（這可能和您躺在床上所花的時間不同）？_____小時_____分

下列問題請選擇最適合您的答案，在適合的選項內打勾，並回答所有問題。

5. 過去一個月來，您的睡眠有多少次受到下列干擾？	從未發生	每週少於1次	每週1-2次	每週3次或以上
a. 無法在30分鐘入睡				
b. 半夜或清晨醒來				
c. 需要起床上廁所				
d. 呼吸不順暢				
e. 咳嗽或大聲打鼾				
f. 感覺很冷				
g. 感覺很熱				
h. 作惡夢				
i. 疼痛				
j. 其他情況請說明：_____				
6. 過去一個月來，您有多少次需要藉助藥物(醫師處方或成藥)來幫助睡眠？				
7. 過去一個月來，當您在開車、用餐、從事日常社交活動時，有多少次覺得難以保持清醒狀態？				
	完全沒有困擾	只有很少困擾	有些困擾	有很大的困擾
8. 過去一個月來，要打起精神來完成您應該做的事情對您有多少困擾？				
	非常好	好	不好	非常不好
9. 過去一個月來，您對您自己的睡眠品質整體評價如何？				
總得分				

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. K., & Kupfer, D. J. (1989). The Pittsburgh sleep quality index (PSQI): A new instrument for psychiatric research and practice. *Psychiatry Research, 28*(2), 193-213.

Adapted from Fo Guang Shan Compassion Foundation, 2012

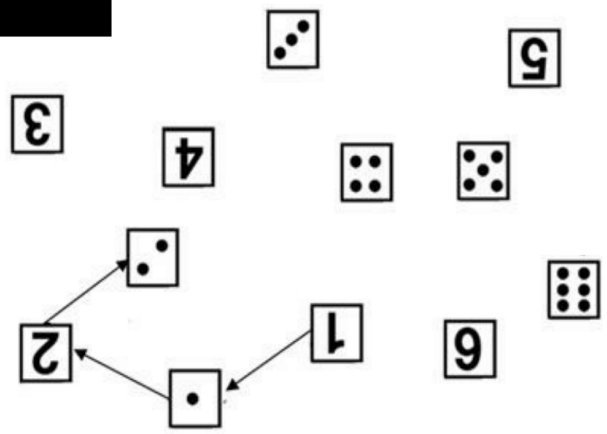
部分 C: 蒙特利尔认知评估基础量表

蒙特利尔认知评估基础量表中文版

Montreal Cognitive Assessment-Basic (MoCA-B) Chinese Version

姓名 . . . . . .
性别 . . . . . 年龄 . . . .
教育年限 . . . 测试日期 . . . .
检查者 . . . . . .

执行功能 — 得分



开始时间 _____

(/1)

即刻回忆 — 不计分

即时第一次测试所有词语均能回忆，也需完成第二次测试。

	梅花	萝卜	沙发	蓝色	筷子
第一次					
第二次					

流畅性 在 1 分钟内尽可能多的说出水果的名字 — (/2)

1-15 秒：	16-30 秒：	31-45 秒：	46-60 秒：

N=_____个
N≥13 计 2 分
N=8-12 计 1 分
N ≤7 计 0 分

定向 [ ] 时间 (± 2 小时) [ ] 星期几 [ ] 月份 [ ] 年份 [ ]地点 [ ] 城市 — (/6)

计算 用 1 元、5 元、10 元钱购买**"13 元"**的物品，说出 3 种付款方式。 — (/3)

（说出 3 种正确付款方式计 3 分，2 种计 2 分，1 种计 1 分，未说出计 0 分）

正确方式：① ② ③ ④ 错误方式：_____

抽象 下面的事物属于什么类别？ （例如：香蕉-桔子=水果） — (/3)

[ ] 火车 - 轮船 [ ] 锣鼓 - 笛子 [ ] 北方 - 南方

延迟回忆 — (/5)

未经提示下自由回忆正确的词计分（每词 1 分）

回忆时	梅花	萝卜	沙发	蓝色	筷子
不提示	[ ]	[ ]	[ ]	[ ]	[ ]
分类提示	[ ]	[ ]	[ ]	[ ]	[ ]
多选提示	[ ]	[ ]	[ ]	[ ]	[ ]

视知觉 图片识别，时间 60 秒。图片见附录。 — (/3)

剪刀	T 恤	香蕉	台灯	蜡烛
手表	杯子	叶子	钥匙	勺子

N = 9-10 计 3 分
N = 6-8 计 2 分
N = 4-5计1分
N = 0-3 计 0 分
(N=__)

命名 动物命名，图片见附录。 [ ] 斑马 [ ] 孔雀 [ ] 老虎 [ ] 蝴蝶 — (/4)

注意 朗读**圆形**中的数字：数列见附录 — (/1)

1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

错误数___N
错误数≤1 个计 1 分

朗读**圆形**和**正方形**中的数字：数列见附录 — (/2)

3 8 5 1 3 0 2 9 2 0 4 9 7 8 6 1 5 7 6 4

1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

错误数 ___N
错误数≤2 计 2 分
错误数=3 计 1 分
错误数≥4 计 0 分

结束时间 _____

Adapted by : Qihao Guo MD
Copyright : Z. Nasreddine MD

Chinese version August 01,2015
www.mocatest.org

总分 (/30)

受教育年限<4 年加 1 分，不识字再加 1 分

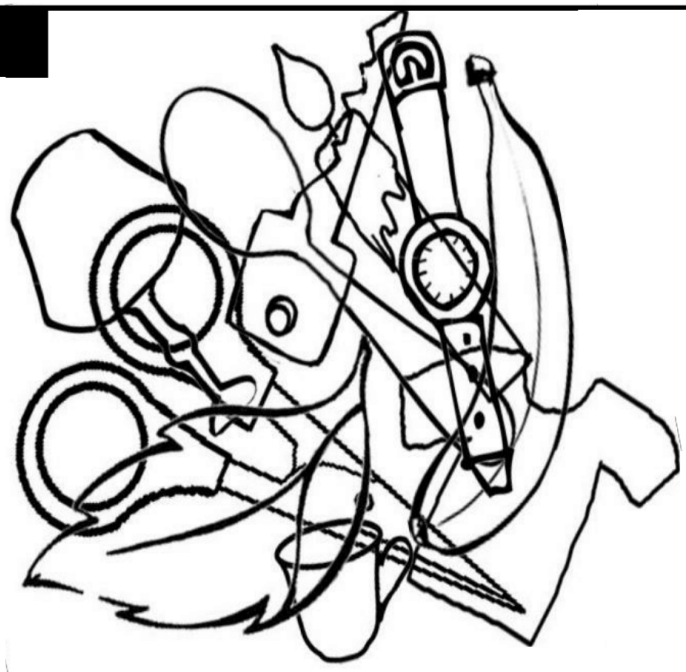
总时间 . . 分 . . 秒

蒙特利尔认知评估基础量表中文版

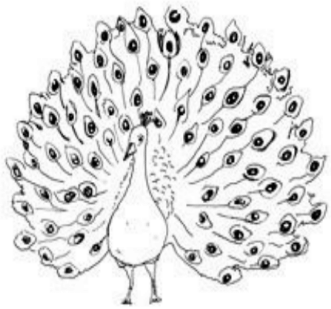
Montreal Cognitive Assessment-Basic (MoCA-B) Chinese Version

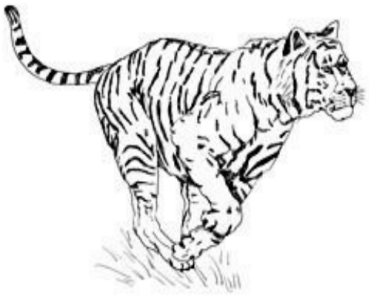
附录

视知觉



命名





注意

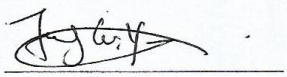
1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

3 8 5 1 3 0 2 9 2 0 4 9 7 8 6 1 5 7 6 4

1 5 8 3 9 2 0 3 9 4 0 2 1 6 8 7 4 6 7 5

Adapted by: Qihao Guo MD Copyright: Z. Nasreddine MD Chinese Version August 01, 2015

Validated by,



(Fong Lai Yen)

Dr Fong Lai Yen

Assistant Professor

Department of Pre-clinical Sciences

Faculty of Medicine and Health Sciences

Universiti Tunku Abdul Rahman

Date: 22/1/2018

Validated by,

24/Jan 2018

(Tarun Amalnerkar)

Mr Tarun Amalnerkar

Lecturer

Department of Physiotherapy

Faculty of Medicine and Health Sciences

UniversitiTunku Abdul Rahman

APPENDIX B: CONSENT FORM

INFORMATION SHEET AND CONSENT FORM

Project Title: **"The Relationship of Quality of Sleep on Cognitive Performance among Institutionalised Elderly within Klang Valley"** by the following researcher;

Ooi Man Thing;
Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Kajang 43000, Cheras, Malaysia.
Contact person: Ooi Man Thing; Phone: +(6016) 4234036; E-mail: manthing94@gmail.com;

Purpose of the study:
This project is an attempt to gather important information about *identifying the sleep quality and cognitive performance among the elderly residing in elderly care institutions.*

The main intention behind this project is **not** to **identify** any **individual's** response, but **group** responses. Your participation in this study is very important as it would help the researcher to better understand the health behaviour process, particularly to determine common risk factors across the identified syndromes of the Malaysian community. There is **no right** or **wrong** answers to the questions asked or the statements made; instead, what is desired of you is your **truthful** and **honest** response.

We are asking you to share with us some very personal and confidential information, and you may feel uncomfortable talking about some of the topics. You do not have to answer any question or take part in the discussion/interview/survey if you don't wish to do so, and that is also fine. You do not have to give us any reason for not responding to any question, or for refusing to take part in the interview or other tests.

Overview of Procedure:
This research will consist of the following:
A questionnaire that records your
(a) general demographic information,
(b) medical problems (if any),
(c) questions to test your sleep quality,
(d) assessment to test your cognitive function.
The time needed to complete the questionnaire is **approximately 15-20 minutes**.
The data collection and assessment will be done by researcher and you are required to answer the questionnaire with the assistance from the researcher.

Duration:
The research will takes place for half of a year. During that time, we might visit you in interval for missing data when neccessary and such subsequent sessions will not last longer than 30 minutes.

Participation:
You have been chosen to be part of this study as you meet the project's pre-set criteria of '*living in an elderly care institution', and because we feel you can contribute much to our understanding and knowledge of problems in the elderly*. Nevertheless, please note that the participation in this research project is entirely **voluntary** and you may choose to withdraw from this study at any point of time without having to state any reason for doing so.

INFORMATION SHEET AND CONSENT FORM

Benefits and Risks:
There will be no direct benefit to you, but your participation is likely to help the researcher find out more about problems faced by elderly individuals in elderly care institutions. You will not be provided any incentive to take part in the research, however the researcher will be able to provide a brief report of the measurements done; which indirectly reflects on your sleep quality and cognitive function.
The researcher will take utmost care to ensure your safety at all times during the interview process and during the conduct tests/measures mentioned earlier. Nevertheless, in the event of an unexpected injury during your participation or in the course of the study or whether or not as a direct result of this study, UTAR will not be liable for any loss or damage or compensation or absorb the costs of medical treatment. However, assistance will be provided to you in obtaining emergency medical treatment.

Confidentiality:
All information gathered as a result of your participating in this study will be treated with utmost confidentiality. All details that can identify you will be removed before storing the data, and before the results of this study can be published.

Thank you for taking the time to read this information sheet and consent form.

Please sign this consent form to express your agreement to participate in this project.
Consent form: (*Please tick (√) the appropriate boxes)*

I have read (or has been read to me) and understood the foregoing project information sheet dated_____. (dd/mm/yyyy). ☐
I have had the opportunity to ask questions about it and any questions I had were answered to my satisfaction. ☐
I consent voluntarily to take part in the project. Taking part in the project will include completing a questionnaire and certain measurements/tests listed above, mentioned in the section "procedure". I understand that I can withdraw from the study at any time and I will not be asked any questions about why I no longer want to take part. ☐
I understand my personal details will not be revealed to people outside the project. ☐
I understand that my words may be quoted in publications, reports, web pages, and other research outputs but my name (identity) will not be revealed unless I consent for it. ☐
I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of that data and if they agree to the terms I have specified in this form. ☐
I understand that other researchers may use my words in publications, reports, web pages, and other research outputs according to the terms I have specified in this form. ☐
I agree to assign the copyright I hold in any materials related to this project to Ms. Ooi Man Thing who are the Principal Investigator of this research study. ☐

_____ ___	_____	_____
Name of Participant	Signature	Date

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

_____	_____	_____
Name of Researcher/person taking consent	Signature	Date

_____	_____	_____
Name of Witness (in case of illiterate participant)	Signature	Date

APPENDIX C: ETHICAL APPROVAL APPLICATION FORM

UNIVERSITI TUNKU ABDUL RAHMAN			
Form Title : **APPLICATION FOR ETHICAL CLEARANCE TO INVOLVE HUMAN SUBJECTS IN RESEARCH**			
Form Number : **FM-IPSR-R&D-056**	Rev No : 1	Effective Date: **09/12/2017**	Page No : **1 of 8**

Application No.
(Official use only)

PRINCIPAL INVESTIGATOR/SUPERVISOR (FOR STUDENT'S PROJECT)					
Full Name	:	Liew Siew Fun			
Chinese character *(if applicable)*	:				
Staff No.	:	10220			
New Identity Card / Passport No.	:	740501-08-5596			
Designation	:	Lecturer cum Head of Department			
Qualification(s)	:	Master in Nursing	Specialization	:	General Nursing
Faculty / Institute	:	FMHS	Department	:	Nursing
Institution Address	:	Universiti Tunku Abdul Rahman Sungai Long			
Telephone	:		Mobile Phone	:	6012-5956788
Fax	:		E-mail	:	liewsf@utar.edu.my

STUDENT		
Full Name	:	Ooi Man Thing
Student No.	:	14UMB06533
New Identity Card / Passport No.	:	941027-07-5032
Programme Name	:	Bachelor of Nursing (Hons)
Faculty / Institute	:	Faculty of Medicine and Health Sciences
Mobile Phone	:	016-4234036
E-mail	:	manthing94@gmail.com

PROPOSED RESEARCH PROJECT

1. **Title of proposed research project**: The relationship of sleep quality on cognitive performance among institutionalised elderly within Klang Valley.

2. **Objectives of the research**:
   1) To determine the sleep quality status among institutionalised elderly.
   2) To determine the significant differences between sleep quality and cognitive performance among institutionalised elderly.
   3) To determine the significant differences between selected socio-demographic variables with cognitive performance among institutionalised elderly.

3. **Location of the research**: Elderly care institutions in Klang Valley.

4. **Specific Outcomes and Expected Contribution of Study**: This study will raise awareness among the community and carers on the importance of good sleep quality in institutionalised elderly. Hence, this will be able to improve the quality of life of institutionalised elderly.

5. **Human Subject Involvement**: *Please tick appropriate box*

A.	Questionnaires/ Interviews	☑
B	Clinical trials of drugs/ formulations	☐
C.	Clinical trials of devices	☐
D.	Use of human tissue samples	☐
E.	Use of body fluids (e.g. blood)	☐
F.	Human genetics research	☐
G.	Others *(please state)* _____	

6. **Prior Review:**
Do you intend to submit or have you submitted this project to any other ethics committee(s)?

☐ YES ☑ NO

Name of ethics committee :

If yes, please provide details :

7. **Possible risks / discomforts to subjects/ patients or volunteers:**

There will be no risk and discomfort for participants.

8. **What are the direct or potential benefits (e.g. medical and financial) to participant?**

This study will raise awareness among the community and carers on the importance of good sleep quality in institutionalised elderly. Hence, this will be able to improve the quality of life of institutionalised elderly.

9. **What are the potential benefits to humanity?**
Create awareness to the community on implementing interventions to promote good sleep quality in enhancing elderly's wellbeing in every aspect, including cognitive wellbeing and performance.

10. **If the research is conducted together with other researchers, please state:**
(Details of co-researcher(s))

	Name	Identity Card No*.	Faculty / Institution	Signature
a.				
b.				
c.				
d.				
e.				

* *Passport No. for Foreign Researcher*

11. **Name of other relevant external parties involved (if any):**

	Name	Identity Card No.	Faculty / Institution	Signature
a.				
b.				
c.				
d.				
e.				

* *Passport No. for Foreign Researcher*

12. **Who will be responsible for research related costs?**

Researcher

For sponsored research, list thoroughly the costs that will be borne by the sponsor.

13. **PROTOCOL CHECKLIST**

13.1 Purpose of the study:

13.1.1 *State concisely what are the specific objectives of the research?*

1) To determine the sleep quality status among institutionalised elderly.
2) To determine the significant differences between sleep quality and cognitive performance among institutionalised elderly.
3) To determine the significant differences between selected socio-demographic variables (age, gender, education level, marital status, social support) with cognitive performance among institutionalised elderly.

13.2 Background:

13.2.1 *Describe the background of the study.*

Sleeping problem is common in people who aged 60 years and above and this problem can lead to cognitive decline. However, this problem is often under-diagnosed and under-treated.

13.2.2 *State concisely the importance of the research described in this application.*

There is no study has been done in Malaysia.
This study will be able to create awareness on the importance of good sleep quality in order to reduce risk of cognitive decline. Therefore, quality of life of elderly can be improved; morbidity and mortality rate associated with poor cognitive function, healthcare costs, burden and stress on the carers can be reduced.

13.3 Preliminary Studies / Progress Reports:

13.3.1 *Provide the report for the preliminary studies (if any) pertinent to the application.*

NA

13.4 Methodology

13.4.1 *Briefly describe the study design (e.g. randomized, double blind, cross over, phase III)*

A non-experimental descriptive correlational study

13.4.2 *Describe sequentially all procedures, interventions and evaluations to be applied to subjects, and identify any that are experimental or performed exclusively for research purposes.*

Informed written consent will be obtained beforehand and the participants will be required to complete the questionnaire by the assistance from researcher.

13.4.3 *Indicate who will carry out the research procedures. Describe where the research will be conducted.*

Researcher will carry out the research procedures in elderly care institutions in Klang Valley.

13.4.4 *Include details on sample size calculation and the statistical methods used to analyse the data.*

Convenience sampling method. Kish, L 1960 formula from Kish (1965) is used to calculate the sample size; the final sample size with 20% attrition rate is 247 participants. SPSS Statistic 23 will be used to analyse the data and the data will be interpreted by descriptive and inferential statistics.

13.4.5 *List all trial related procedures. Please also describe the subject research visits (frequency and procedures involved). For studies with multiple visits, please attach visit schedule.*

Pilot study will be done in January after ethical approval is obtained.

13.4.6 *Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims.*

-Expected limitations: Communication barriers and limited time period for data collection.

13.4.7 *Describe the anticipated benefits and risks to human subjects participating in this research.*

Benefits: Increase awareness to the community and carers on the importance of good sleep quality among elderly.
There is no risk to the participants.

Notes: Drawing of body fluids from volunteer can only be carried out by qualified doctor or nurse

13.5 Additional Information on Methodology: (*Please tick appropriate box*)

☑ 13.5.1 **If research involves databases, please complete the following:**

13.5.1.1 *Storage location of the research data, consent forms and personal data*
The data and forms will be stored and locked in a cabinet and the file in computer will be encrypted.

13.5.1.2 *Who will have access to the data?*
Researcher only

13.5.1.3 *Mode of disposal of data after completion of project.*
Questionnaire will be shredded and computer data will be erased

13.5.1.4 *Mode of disposal of consent forms after completion of project.*
Consent form will be shredded. The personal data protection will be kept for the use of UTAR and submit to SERC

☐ 13.5.2 **If research involves placebo, please complete the following:**

13.5.2.1 *Explain what "standard of care" therapy is available for this condition*

13.5.2.2 *Discuss the ethical implications of using placebo instead of "standard of care" therapy in this situation*

13.5.2.3 *Address the issues of safety and efficacy of other available therapies*

13.5.2.4 *The total duration the subject would be on placebo arm of the research*

13.5.2.5 *Greatest potential harm that the subject might be exposed to as a result of not receiving effective therapy*

13.5.2.6 *Protocol in place to safeguard participants receiving placebo*

☐ 13.5.3 **If research involves tissues / body fluids, please complete the following:**

13.5.3.1 *Describe the samples that will be collected and stored?*

13.5.3.2 *What tests will be performed on these samples?*

13.5.3.3 *What will happen to the tissues after the research is completed?*

13.5.3.4 *Will results from the tests be communicated to the subjects?*

☐ 13.5.4 **If research involves cell cultures / cell lines, please complete the following:**

13.5.4.1 *Describe the cells that will be used for the research.*

13.5.4.2 *Indicate the source of the cell cultures/lines. Please provide proof of purchase or catalog details of the cells.*

14. CHARACTERISTICS OF VOLUNTEERS

14.1 Provide the maximum number of subjects you seek approval to enrol from the entire subject populations you intend to use and justify the sample size.

247 participants , based on sample size calculation method

14.2 Lower Age Limit: 60 Upper Age Limit: 90

14.3 Are there any subject recruitment restrictions based on race of the subject?

No

14.4 Inclusion criteria: (*Please tick appropriate box)*

- ☐ Healthy Volunteers
- ☐ Outpatients
- ☐ Inpatients
- ☐ Children
- ☐ Pregnant Women
- ☐ Incompetent Patients *(Please specify)*
- ☑ Others *(Please specify)* Participants who aged 60 years and above, free from cognitive disease and mental illness and has given consent to participate

14.5 Exclusion criteria

People who are below 60 years old or elderly who is 60 years and above with either one of the following criteria: cognitive disease, mental illness, or refuse to participate.

15. **Attach the following with this application form:**

15.1 Biodata of the applicant and any co-researcher(s).

15.2 List of previous research
Indicate the research in relation to this project with an asterisk (*).

16. INDEMNITY

I shall indemnify, defend and hold harmless UTAR from any or all claims, demands, losses, damages, costs and liabilities made by any third party due to or arising out of any acts, omission or negligence in carrying out this study.

17. DECLARATION

a) I will not initiate this research until I receive written approval from the UTAR Scientific & Ethical Review Committee and the regulatory authority or otherwise relevant authorities (if applicable).

b) I will not initiate any changes in protocol without prior written approval from UTAR Scientific and Ethical Review Committee except when it is necessary to reduce or eliminate risk to the subject.

c) I will promptly report any unexpected or serious adverse events, unanticipated problems or incidents that may occur in the course of this research.

d) I will take all necessary steps to maintain confidentiality of all information, samples and specimens about the volunteers. Data, samples and specimen obtained will be stored securely and will be made available only to the Principal Investigator and the research team, the UTAR Scientific and Ethical Review Committee, the sponsor and the regulatory authorities for the purpose of verifying the research procedures info and/or data

e) I declare that the name and other facts that might identify the volunteer will not appear when this study is presented or its results are published

f) I declare that there is no existing or potential conflict of interest for any of the investigators participating in this research.

g) I have read and understood, and hereby accept and agree to abide by UTAR Research Ethics & Code of Conduct and any applicable UTAR's Guidelines. I undertake that the information I have provided herein is complete and accurate and I agree to carry out the Project in accordance with the terms in the International Conference of Harmonization of Good Clinical Practice Guidelines. My involvement in this Project does not conflict with my University duties and I have no other conflict of interest to declare

h) I further agree that I shall abide by all instructions and directions issued by UTAR pertaining to all aspects of the research herein including but not restricted to suspending and ceasing of the research herein.

Remarks *(if any)* :

_____ _____

Principal Investigator/Supervisor Signature — Date

Name of Principal Investigator/ Supervisor : _____

RECOMMENDATION BY DEAN

Recommended / Not Recommended for Approval

_____ _____

Signature — Date

Name of Dean _____

RECOMMENDATION BY UTAR SCIENTIFIC & ETHICAL REVIEW COMMITTEE

Comments : _____

UTAR Scientific & Ethical Review Committee : Minutes No. _____

.....

Signature of Secretary _____

Name of Secretary: _____

COMPLETED BY THE CHAIRMAN OF THE UTAR SCIENTIFIC & ETHICAL REVIEW COMMITTEE

Approved subject to full review (of protocol, informed consent documents etc.)

_____ _____

Signature of Chairman Date:

Name of Chairman:

BIODATA OF APPLICANT

Name: Ooi Man Thing
Student ID: 14UMB06533
Course: Bachelor of Nursing (Hons)
University Address: Universiti Tunku Abdul Rahman,
Sungai Long Campus, 43000, Kajang, Selangor.
Contact number: 016-4234036
Email address: manthing94@gmail.com

EDUCATION AND ACHIEVEMENTS

Primary School:
SJK © Kong Min Cawangan Kedua, Ayer Itam
2001-2006

- UPSR 7As' achiever

Secondary School:
SMJK Perempuan China, Pulau Pinang
2007-2011

- PMR 8As' achiever
- SPM 10As'achiever

Pre – university:
SMJK Perempuan China, Pulau Pinang
2012-2013

- Form Six achiever

University:
Universiti Tunku Abdul Rahman, Sungai Long Campus (currently)
Oct 2014- Oct 2018

- Dean's list in January 2016 trimester
- Dean's list in January 2017 trimester

WORKING EXPERIENCE

- **Voir, Gurney Plaza**
  December 2011- April 2012
  Worked as part-time retail assistant to gain experience while waiting for SPM results
- **Cat Fest, Seberang Jaya**
  17 Septmeber 2016
  Worked as apps promoter to gain experience in approaching strangers and promote the apps to the public
- **Prince & Princess Kindergarten, Nursery and Childcare Center, Paya Terubong**
  During trimester breaks of Nursing Course
  Working as part-time teacher to learn ways to communicate and interact with the children.

SKILLS

Language: English, Malay, Mandarin and Hokkien.
Computer Skills: Microsoft Office, PowerPoint
Personal Strength: Willing to learn, cheerful, able to withstand stress, receptive to comments

APPENDIX D: ETHICAL CLEARANCE APPROVAL LETTER

UNIVERSITI TUNKU ABDUL RAHMAN
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/15/2018

24 January 2018

Ms Liew Siew Fun
Head, Department of Nursing
Faculty of Medicine and Health Sciences
Universiti Tunku Abdul Rahman
Jalan Sungai Long
Bandar Sungai Long
43000 Kajang
Selangor

Dear Ms Liew,

Ethical Approval For Research Project/Protocol

We refer to your application dated 22 January 2018 for ethical approval for your students' research projects from Bachelor of Nursing (Hons) programme enrolled in course UMNB4024. We are pleased to inform you that the application has been approved under expedited review.

The details of the approval are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Relationship between Sleep Quality and Depression Among Elderly in Assisted Living Facilities within Klang Valley	Shierly Yap Siong Wan	Ms Liew Siew Fun Co-supervisor: Ms Sheela Devi	24 January 2018 – 23 January 2018
2.	The Relationship of Sleep Quality on Cognitive Performance Among Institutionalised Elderly within Klang Valley	Ooi Man Thing		
3.	Prevalence of Urinary Incontinence and Its Impact on Quality of Life Among Elderly Female in Long-term Care Facilities	Eunice Ho Yin Yee	Ms Choo Peak Yean Co-supervisor: Ms Magesvary Maruthiah	
4.	Prevalence of Urinary Incontinence and Its Association with Depression Among Elderly Female in Assisted Living Facilities	Ong Hui Yuan		
5.	Relationship between Oral Health and Nutritional Status Among Elderly in Long-term Care Facilities in Klang Valley	Ong Wei Xin	Ms Woo Li Fong Co-supervisor: Ms Shamala Baskaran	
6.	Relationship between Nutritional Status and Activities Daily Living (ADLs) Among Elderly in Long-term Care Facilities in Klang Valley	Chung Shun Pei		

Address: Jalan Sg. Long, Bandar Sg. Long, Cheras, 43000 Kajang, Selangor D.E. **Postal Address:** P O Box 11384, 50744 Kuala Lumpur, Malaysia
Tel: (603) 9086 0288 **Fax:** (603) 9019 8868 **Homepage:** http://www.utar.edu.my

The conduct of this research is subject to the following:

(1) The participants' informed consent be obtained prior to the commencement of the research;

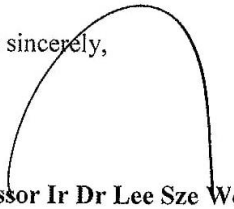
(2) Confidentiality of participants' personal data must be maintained; and

(3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,



Professor Ir Dr Lee Sze Wei
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Medicine and Health Sciences
Director, Institute of Postgraduate Studies and Research

APPENDIX E: PERSONAL DATA PROTECTION STATEMENT

PERSONAL DATA PROTECTION STATEMENT

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

1. The purposes for which your personal data may be used are inclusive but not limited to:-
   - For assessment of any application to UTAR
   - For processing any benefits and services
   - For communication purposes
   - For advertorial and news
   - For general administration and record purposes
   - For enhancing the value of education
   - For educational and related purposes consequential to UTAR
   - For the purpose of our corporate governance
   - For consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/ study loan

2. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

3. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

4. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

1. By submitting this form you hereby authorise and consent to us processing (including disclosing) your personal data and any updates of your information, for the purposes and/or for any other purposes related to the purpose.

2. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

3. You may access and update your personal data by writing to us at _____.

Acknowledgment of Notice

[ ] I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.

[ ] I disagree, my personal data will not be processed.

.....
Name:
Date:

APPENDIX F: GANTT CHART

	2017			2018						
	Oct	Nov	Dec	Jan	Feb	Mar	April	May		
Proposal writing										
Proposal presentation										
Ethics procedures										
Pilot study										
Data collection and preparation										
Data analysis										
Interpret results										
Report writing										
Presentation and thesis submission										

Remark: * Trimester breaks (18 Dec 2017 - 14 Jan 2018)

1) Proposal Preparation & Ethical Procedures: 25% (Nov 2017 - Dec 2017)
2) Pilot Study & Data Collection: 50% (Jan 2018 - April 2018)
3) Analyses & Writing Report: 25% (April 2018 - May 2018)
4) Presentation & Thesis Submission: 10% (May 2018)

APPENDIX G: TURNITIN ORIGINALITY REPORT

ORIGINALITY REPORT

16%	8%	9%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universiti Tunku Abdul Rahman Student Paper	1%
2	"Abstracts", Journal of Sleep Research, 2012. Publication	1%
3	discovery.ucl.ac.uk Internet Source	1%
4	Muhammad Azwan Azri, Akehsan Dahlan, Mohamad Ghazali Masuri, Khairil Anuar Md Isa. "Sleep Quality among Older Persons in Institutions", Procedia - Social and Behavioral Sciences, 2016 Publication	1%
5	Submitted to Universiti Teknologi MARA Student Paper	<1%
6	Submitted to Husson University Student Paper	<1%
7	Hoffman, S.. "Sleep in the older adult", Geriatric Nursing, 200307/08 Publication	<1%