

**FATIGUE AND SLEEP QUALITY AMONG CANCER
PATIENTS RECEIVING CHEMOTHERAPY IN
HOSPITAL UNIVERSITI SAINS MALAYSIA**

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**SCHOOL OF HEALTH SCIENCES
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PATIENTS RECEIVING CHEMOTHERAPY IN
HOSPITAL UNIVERSITI SAINS MALAYSIA**

by

CHEONG PHEY PHEY

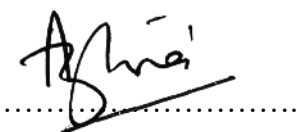
**Dissertation submitted in partial fulfilment of
the requirements for the degree of
Bachelor in Nursing with Honours**

AUGUST 2024

CERTIFICATE

This is to certify that the dissertation entitled “Fatigue and Sleep Quality Among Cancer Patients Receiving Chemotherapy in Hospital Universiti Sains Malaysia” is bona fide record of research work done by Ms Cheong Phey Phey during the period from October 2024 to August 2024 under my supervision. I have read this dissertation and that in my opinion it confirms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor in Nursing with Honours.

Supervisor,

A handwritten signature in black ink, appearing to read 'Azlina', is written over a horizontal dotted line.

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purpose.



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TABLE OF CONTENTS

DECLARATION.....	ii
ACKNOWLEDGEMENT.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS.....	x
ABSTRAK	xi
ABSTRACT.....	xii
CHAPTER 1 INTRODUCTION	1
1.1 Introduction.....	1
1.2 Background of the Study	1
1.3 Problem Statement.....	3
1.4 Research Questions.....	4
1.5 Research Objectives.....	4
1.5.1 General Objective	4
1.5.2 Specific Objective	4
1.6 Research Hypotheses	5
1.7 Definitions of Conceptual and Operational Terms	5
1.8 Significance of the Study	6

CHAPTER 2 LITERATURE REVIEW	8
2.1 Introduction.....	8
2.2 Cancer and its affect to life	8
2.3 Cancer and Fatigue	9
2.4 Cancer and Sleep Quality	9
2.5 Instrumentation	10
2.6 Correlation between Fatigue and Sleep Quality	10
2.7 Conceptual Framework.....	11
CHAPTER 3 METHODOLOGY AND METHOD	13
3.1 Introduction.....	13
3.2 Research Design	13
3.3 Setting and Population	13
3.4 Sampling Plan.....	14
3.4.1 Inclusion Criteria	14
3.4.2 Exclusion Criteria	14
3.4.3 Sampling Method.....	15
3.4.4 Sampling Size Estimation	15
3.5 Research Instrument	16
3.5.1 Questionnaire	16
3.5.2 Translation of Instrument.....	17
3.5.3 Validity and Reliability of Instrument.....	17

3.6	Variable	18
3.6.1	Measurement of Variables and Variable Scoring	18
3.7	Data Collection Method.....	19
3.7.1	Flow Chart of Data Collection.....	21
3.8	Data Analysis Plan	22
3.9	Ethical Considerations	22
CHAPTER 4 RESULTS		25
4.1	Introduction.....	25
4.2	Descriptive Socio-demographic Characteristics	25
4.3	Level of Fatigue among cancer patients receiving chemotherapy.....	26
4.4	Sleep Quality among cancer patients receiving chemotherapy	27
4.5	Correlation between Level of Fatigue and Sleep Quality	28
CHAPTER 5 DISCUSSION.....		29
5.1	Introduction.....	29
5.2	Level of Fatigue among cancer patients receiving chemotherapy.....	29
5.3	Sleep Quality among cancer patients receiving chemotherapy	30
5.4	Correlation between Level of Fatigue and Sleep Quality	30
5.5	Strength and Limitations.....	31
5.5.1	Strength.....	31
5.5.2	Limitation.....	31
CHAPTER 6 CONCLUSION AND RECOMMENDATIONS.....		33

6.1	Introduction.....	33
6.2	Summary of Research Findings.....	33
6.3	Implications and Recommendations.....	33
6.3.1	Nursing Practice.....	33
6.3.2	Nursing Education.....	34
6.3.3	Nursing Research.....	34
6.4	Contribution to Theory Development.....	35
6.5	Conclusion.....	35
	REFERENCES.....	36
	APPENDIX A: RESEARCH INFORMATION FOR PARTICIPANTS.....	40
	APPENDIX B: BORANG MAKLUMAT & PERSETUJUAN PESERTA.....	46
	APPENDIX C: BORANG PERSETUJUAN PENERBITAN BAHAN PESERTA.....	47
	APPENDIX D: SURVEY QUESTIONNAIRE (ENGLISH VERSION).....	48
	APPENDIX E: SURVEY QUESTIONNAIRE (MALAY VERSION).....	53
	APPENDIX F: GANTT CHART/ PROJECT SCHEDULE.....	58
	APPENDIX G: PERMISSIOM TO USE THE INSTRUMENT.....	59
	APPENDIX H: PAMPHLET ABOUT FATIGUE AND SLEEP QUALITY.....	60
	APPENDIX I: INVATATION POSTER.....	61
	APPENDIX J: ETHICAL APPROVAL.....	62

LIST OF TABLES

Table 3.6	Independent and dependent variable	16
Table 4.2	Socio-demographic characteristics of participants	25
Table 4.3	level of fatigue among cancer patients receiving chemotherapy	26
Table 4.4	level of sleep quality among cancer patients receiving chemotherapy	26
Table 4.5	correlations between fatigue and sleep quality	27

LIST OF FIGURES

Figure 1.2	Summary Statistic 2020 in Malaysia	2
Figure 2.7	Conceptual framework adapted from Biopsychosocial Model (BPS)	11
Figure 3.7	Overall Flow of the Data Collection Process	20

LIST OF ABBREVIATIONS

HUSM	-Hospital Universiti Sains Malaysia
WHO	-World Health Organization
EORTC	- European Organisation for Research and Treatment of Cancer
BFI	- Brief Fatigue Inventory
PSQI	- Pittsburgh Sleep Quality Index
SQS	-Sleep Quality Scale
MSQ	- Mini Sleep Questionnaire
BPS	-Biopsychosocial Model

KELETIHAN DAN KUALITI TIDUR DALAM KALANGAN PESAKIT KANSER YANG MENERIMA KIMOTERAPI DI HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRAK

Kanser adalah masalah utama di seluruh dunia dan keletihan adalah gejala yang paling kerap dialami oleh pesakit kanser. Keletihan yang dialami oleh pesakit kanser tidak sama seperti yang dialami oleh orang biasa setiap hari dan ia dipengaruhi oleh kimoterapi dan penyakit tersebut. Kajian ini bertujuan untuk menilai tahap keletihan dan kualiti tidur dalam kalangan pesakit kanser yang menerima kimoterapi. Kajian keratan rentas telah dijalankan di Unit Onkologi Jagaan Harian dan Wad Onkologi di Hospital Universiti Sains Malaysia (Hospital USM) dari Januari hingga Mac 2024. Seramai 99 responden telah dipilih menggunakan persampelan mudah dan data dikumpul menggunakan soal selidik yang diisi sendiri. Data dianalisis dengan statistik deskriptif dan Korelasi Pearson dengan menggunakan perisian Statistical Package Social Sciences (SPSS) versi 27.0. Korelasi Pearson digunakan untuk menentukan korelasi antara tahap keletihan dan kualiti tidur di kalangan peserta. Keputusan menunjukkan pesakit (n=93, 93.9%) mempunyai tahap keletihan yang rendah dan kualiti tidur yang baik (n=66, 66.7%). Korelasi Pearson menunjukkan terdapat korelasi yang signifikan antara tahap keletihan dan kualiti tidur [$r = .467$, $p = .001$] dalam kalangan pesakit kanser yang menerima kimoterapi di Hospital USM. Secara ringkasnya, hasil kajian boleh digunakan sebagai maklumat asas untuk menentukan tahap keletihan dan kualiti tidur dalam kalangan pesakit kanser di persekitaran penjagaan kesihatan Malaysia.

FATIGUE AND SLEEP QUALITY AMONG CANCER PATIENTS RECEIVING CHEMOTHERAPY IN HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRACT

Cancer is a major global issue, and fatigue is one of the most common symptoms experienced by cancer patients. The fatigue experienced by cancer patients differs from that of ordinary people and is influenced by chemotherapy and the disease itself. This study aims to assess the levels of fatigue and sleep quality among cancer patients receiving chemotherapy. A cross-sectional study was conducted at the Day Care Oncology Unit and Oncology Ward at Hospital Universiti Sains Malaysia (Hospital USM) from January to March 2024. A total of 99 respondents were selected using convenience sampling, and data were collected using a self-administered questionnaire. The data were analyzed using descriptive statistics and Pearson's Correlation with the Statistical Package for Social Sciences (SPSS) version 27.0. Pearson's Correlation was used to determine the correlation between fatigue levels and sleep quality among the participants. The results showed that most patients (n=93, 93.9%) had low levels of fatigue and good sleep quality (n=66, 66.7%). Pearson's Correlation indicated a significant correlation between fatigue levels and sleep quality [$r = .467$, $p = .001$] among cancer patients receiving chemotherapy at Hospital USM. In summary, the findings of the study can be used as a basis for determining fatigue levels and sleep quality among cancer patients in the Malaysian healthcare setting.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This research proposal aims to assess fatigue and sleep quality among cancer patients receiving chemotherapy in Hospital Universiti Sains Malaysia (HUSM). This chapter will discuss the background of the study, followed by the problem statement, research questions and objectives, the hypothesis of the study, the significance of the study and the operational definition of key terms used in the study.

1.2 Background of the Study

Cancer is a group of disease characterized by the uncontrolled growth and spread of abnormal; cells or called cancer cells in the body (World Health Organization (WHO), 2022). These abnormal calls can form tumours or invade nearby tissues and organs then cause various health problems and reduce body immunity. Cancer can occur in almost any part of body, and it can be benign which is not cancerous or malignant which is cancerous. Malignant tumours are more concerning because they can invade nearby tissues and spread to other part of body through bloodstream and lymphatic system, it is a process known as metastasis (Putri & Makiyah, 2021).

The risk factor of cancer is alcohol and tobacco use, poor nutrition, lack of physical activity, and air pollution. The risk to get cancer can be reduced by avoid tobacco, maintain healthy body weight, healthy diet, regular exercise, avoid alcohol and more. Surgery, radiation, and systemic therapy such as chemotherapy, hormone treatments, targeted biological therapies are frequently used as treatment of cancer. However, most cancers can treat if detected early and undergo treatment effectively (World Health Organization (WHO), 2022).

Cancer is one of the world's top causes of mortality, particularly in impoverished nations. Nearly 10 million of death in 2020 or one out of six of deaths is cause by cancer. The most common cancer that occur are breast, lung, colon and rectum and prostate cancer. Men are most likely to get lung, prostate, colorectal, stomach, and liver cancers, whereas women are more likely to develop breast, colorectal, lung, cervical, and thyroid cancers (World Health Organization (WHO), 2022).

In 2022, 48,639 new cases of cancer in Malaysia have reported. The five most common cancers in Malaysia are breast cancer, colorectum cancer, lung cancer, nasopharynx cancer and liver cancer. Lung cancer (17%), colorectal cancer (15.4%), prostate cancer (9.3%), Nasopharynx cancer (7.4%) and liver cancer (6.7%) are the top five common cancer in males while breast cancer (32.9%), colorectal cancer (11.9%), ovarian cancer (7.2%), cervical cancer (6.8%) and corpus uteri cancer (5.5%) are more common in female in Malaysia (World Health Organization (WHO), 2022). Figure 1.2 show the summary of the statistic 2020 in Malaysia.

Summary statistic 2020			
	Males	Females	Both sexes
Population	16 630 813	15 735 185	32 365 998
Number of new cancer cases	23 052	25 587	48 639
Age-standardized incidence rate (World)	137.8	151.4	143.9
Risk of developing cancer before the age of 75 years (%)	14.6	15.2	14.8
Number of cancer deaths	15 601	13 929	29 530
Age-standardized mortality rate (World)	92.9	82.2	87.3
Risk of dying from cancer before the age of 75 years (%)	9.7	8.5	9.1
5-year prevalent cases	54 044	73 974	128 018
Top 5 most frequent cancers excluding non-melanoma skin cancer (ranked by cases)	Lung Colorectum Prostate Nasopharynx Liver	Breast Colorectum Ovary Cervix uteri Corpus uteri	Breast Colorectum Lung Nasopharynx Liver

Figure 1.2 Summary Statistic 2020 in Malaysia

1.3 Problem Statement

Multiple studies indicate that advanced cancer patients have complications from their treatment in addition to the symptoms of the disease. Patients with cancer reported 72% fatigue, 67% pain, 45% difficulty sleeping, 30% anxiety, and 35% depression (Locatelli et al., 2023).

Fatigue is a subjective and unpleasant symptom in cancer patients that has a significant impact on daily life. Its causes are secondary to their treatment course, such as chemotherapy, cancer itself, and related conditions. Fatigue in cancer patients is seven times more common than fatigue in the general population, and it differs from fatigue caused by excessive exercise or a lack of sleep (Nugusse et al., 2021) Cancer patients can be treated in a variety of methods, including surgery, chemotherapy, and radiation, yet chemotherapy is the most used. However, chemotherapy have side effects include anorexia, fatigue, sleeplessness, hair loss, or sleep difficulties, as well as the appearance of negative emotions such as depression and anxiety (Putri & Makiyah, 2021)

Sleep disturbances affect almost two times as many cancer patients as the general population (12-25% in the general population and 30-50% in oncology patients). Sleep disorders are characterised by a variety of symptoms, including waking up early in the morning, daytime tiredness, waking up and having difficulties falling back asleep, and problems falling asleep (Momayyezi et al., 2021). Hence, sleep is an important factor in both physical and mental wellness. Sleeping well promotes physical repair by promoting anabolic activities such as protein and tissue production.

However, there is little research available that focus on fatigue and sleep quality among cancer patient in the northern east of Peninsular Malaysia. Thus, the researcher decides to have a research study on fatigue and sleep quality among cancer patient receiving chemotherapy in Hospital USM.

1.4 Research Questions

The research questions for this study are as follows:

1. What is the level of fatigue among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia?
2. What is the level of sleep quality among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia?
3. What is the corelation between fatigue and sleep quality among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia?

1.5 Research Objectives

1.5.1 General Objective

The general objective of this study is to determine the fatigue and sleep quality among cancer patients receiving chemotherapy in Hospital Universiti Sains Malaysia (HUSM).

1.5.2 Specific Objective

The specific objectives for this study are as follows:

- I. To determine level of fatigue among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia.
- II. To determine level of sleep quality among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia.
- III. To determine the corelation between fatigue and sleep quality among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia.

1.6 Research Hypotheses

Hypothesis 1 :(**H₀**) there is no correlation between level of fatigue and sleep quality among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia.

:(**H₁**) there is a correlation between level of fatigue and sleep quality among cancer patient receiving chemotherapy in Hospital Universiti Sains Malaysia.

1.7 Definitions of Conceptual and Operational Terms

There operational terms used in this research proposal are shown below:

Term	Conceptual	Operational
Fatigue	It means overbearing and long-lasting weakness, tiredness, or exhaustion that may be mental, physical, or both (Billones et al., 2021).	a severe, persistent subjective feeling of physical, emotional, and/or cognitive exhaustion or tiredness caused by illness or cancer treatment that is unrelated to recent activities and interferes with normal daily activities (Cheville, 2020).
Sleep quality	Sleep quality is described as an individual's sense of satisfaction with all aspects of their resting experience. Sleep efficiency, sleep latency, sleep length and waking after sleep begin are the four characteristic of sleep quality (Nelson et al., 2022)	Sleep quality has also been considered as a biological and psychological predictor of cancer-related fatigue, as poor sleep quality has been found to lead to greater exhaustion in non-cancer patients (Legg et al., 2022).

Cancer	Cancer is a group of disease characterised by the uncontrolled development and spread of abnormal cells in the body known as cancer cell (World Health Organization (WHO), 2022).	In this study, cancer is a type of illness that patients have been diagnosis before and receiving treatment in Hospital USM.
Chemotherapy	Chemotherapy typically works by preventing cancer cells from growing and dividing further. Its use of toxic chemicals and drugs to kill malignant cells developed in after reports of mustard gas harming lymphatic tissue and bone marrow (Anand et al., 2023)	In this study, chemotherapy is one of the treatments that receive by cancer patient in Hospital USM to treat and avoid cancer become worsen.

1.8 Significance of the Study

The previous study more focus on impact of fatigue on quality of life among cancer patients. It says that fatigue is common in cancer patients, and it has a negative impact on the QOL of cancer patients who receiving chemotherapy (Muthanna et al., 2023).

The study by (Muthanna et al., 2021) is to determine the impact of fatigue on quality of life among breast cancer patients receiving chemotherapy and to identify the risk factor associated with severe fatigue. Besides that, (Vanoh & Hii, 2021) has conduct a study focused on association between nutritional status and sleep quality among patient with cancer and (S Muthanna et al., 2022) has conduct study on prevalence and associated factors of fatigue among breast cancer patients in Malaysia.

Therefore, this study aid to determine the level of fatigue, sleep quality and the correlation between level of fatigue and level of sleep quality among cancer patients receiving

chemotherapy in Hospital USM. This can improve the sleep quality of the cancer patients and improve health outcome.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will review the literature about fatigue, sleep quality, cancer, chemotherapy, the association between sociodemographic characteristics and fatigue, the association between sociodemographic characteristics and sleep quality: and theoretical and conceptual framework which use in this study.

2.2 Cancer and its affect to life

Cancer can have a significant impact on a person's normal life in various ways. The effects of cancer can vary depending on the type and stage of cancer, as well as the individual's overall health, age, and other factors. On physical health, cancer can cause a range of physical symptoms, including pain, fatigue, weight loss, and nausea. The side effects of cancer treatments, such as chemotherapy, radiation therapy, and surgery, can also impact physical health. Cancer can affect emotional and psychological which patient will feeling fear, anxiety, and depression. On social relationships, cancer can affect a person's life and relationship with people surrounding such ad friend and family. Medical bill sand cost of cancer treatment cab also give impact to the patient's life (Garland et al., 2023)

Besides that, cancer and its treatment can affect to daily routine and activity. Other symptom such as pain and fatigue also will limit the patients' exercise and physical ability. Other than that, cancer also change in body image such as weight loss, hair loss and scaring that can affect to a person self-esteem and confidence (Nayak et al., 2017).

2.3 Cancer and Fatigue

Fatigue is a common sign of many medical conditions, and it can be related to emotional problems. The experience and expression of tiredness are also likely to be influenced by social and existential elements such as social support and a sense of purpose or meaning in life. All of these factors may contribute to fatigue in cancer patients, while the corresponding importance of each component in an individual patient may change during the disease (Hinz et al., 2020). Much of the previous research has concentrated on the relationship between the level of fatigue and more easily assessable physical characteristics (Nugusse et al., 2021).

The study show that most of breast cancer patients experienced fatigue and they found that patient who receive a combination of chemotherapy were more likely to develop cancer related fatigue than patient who received only one chemotherapy regime (S Muthanna et al., 2022).

Physically correlated fatigue and cancer can be divided into such cachexia and weight loss, muscle abnormalities, biochemical and haematological abnormalities, endocrine abnormalities, and cytokines. Psychologically correlates of fatigue and cancer in the scope of depression, personality type and stress(Cheville, 2020).

2.4 Cancer and Sleep Quality

Sleep difficulties such as trouble going asleep, staying asleep, and having restorative sleep are common in cancer patients. Night sweats, discomfort, and worry associated with a cancer diagnosis can all interfere with sleep (Momayyezi et al., 2021).Cancer and its treatments can have a significant impact on sleep quality. Sleep disturbances are common among cancer patients and survivors, and they can negatively affect overall well-being and quality of life. Sleep disturbances can influence cancer patients' quality of life and psychological well-being.

In cancer patients, sleeplessness is common and often severe enough to require medical intervention (Vanoh & Hii, 2021).

There are some factors that related to cancer and sleep quality. For example, pain because of disease itself and cause by treatment. Anxiety and depression will cause patient unable fall asleep. Fatigue is a most common symptoms and it strongly effect to insomnia. There are some ways to improve sleep quality such as pain management, stress and anxiety management, medication, sleep hygiene which mean create a comfortable sleep environment, do some exercise, and control nutrition (Legg et al., 2022).

2.5 Instrumentation

There are various instrument types of instruments that can used to determine fatigue and sleep quality. For fatigue, its subscale in several cancer-specific quality of life measures, including the European Organisation for Research and Treatment of Cancer questionnaire (EORTC QLQ c-30) which have focus to fatigue is QLQ FA12, Brief Fatigue Inventory (BFI) and Cancer-Related Fatigue Questionnaire. While for sleep quality, researcher found that Pittsburgh Sleep Quality Index (PSQI), Sleep Quality Scale (SQS) and Mini Sleep Questionnaire (MSQ). However, in this study researcher will use FA 12 to determine level of fatigue and Sleep Quality Scale (SQS) to determine the level of sleep quality because it is open assess and free to use as academic purposes.

2.6 Correlation between Fatigue and Sleep Quality

Fatigue and difficulty sleeping are two of the most common side effects faced by cancer patients. Although trouble sleeping is widespread in these individuals, it has been a problem that has gone undetected. This is due in part to its view as a normal and short-term reaction to

cancer and cancer therapy such as chemotherapy, and in part to patients' underreporting of sleep disruptions. Fatigue and sleep problems can lead to a vicious cycle. There are some examples of cancer-related tiredness that will affect to sleep quality include might cause daytime napping, which can impair nocturnal sleep and contribute to more weariness the next day (Nelson et al., 2022).

According to previous research, sleep problems can cause fatigue and depression both before and during chemotherapy. Furthermore, poor quality sleep has been associated to lower quality of life, decreased function, increased pain, decreased energy, and increased psychological and physical health issues. There is evidence that sleep problems intensify following the start of chemotherapy (Anand et al., 2023).

Furthermore, cancer therapy has been related to pain, fatigue, and changes in the body's biological rhythm. Fatigue in cancer patients can lead to anxiety, depression, and decreased quality of life if it is not treated adequately and immediately. Cancer-induced fatigue can last for up to ten years or more after diagnosis, causing impairment in work, sleep, and social connections, as well as a worse quality of life (Momayyezi et al., 2021).

2.7 Conceptual Framework

The Biopsychosocial Model is a comprehensive framework used in medicine and psychology to understand health and illness by considering the interplay of biological, psychological, and social factors (Lauriola & Tomai, 2019). When applied to cancer patients undergoing chemotherapy and their experiences of fatigue and sleep quality, the model offers valuable insights into the complex nature of these issues. The Biopsychosocial Model relates to fatigue and sleep quality in cancer patients undergoing chemotherapy.

The biological factor that related to fatigue and sleep quality is cancer diagnosis and treatment such as chemotherapy. The diagnosis itself will and the effect of chemotherapy will lead to anemia, inflammation which can cause to fatigue.

Besides that, the psychological factor that related to fatigue and sleep quality is anxiety and depression, and physical health. Cancer itself and chemotherapy will cause anxiety and depression which is closely link to fatigue and sleep disturbances. It's can cause to ruminative thoughts, which interfere with sleep.

By considering the complex interplay of these biological, psychological, and social factors, healthcare professionals can develop a more holistic and effective approach to managing fatigue and improving sleep quality in cancer patients undergoing chemotherapy (Sylvestro et al., 2021).

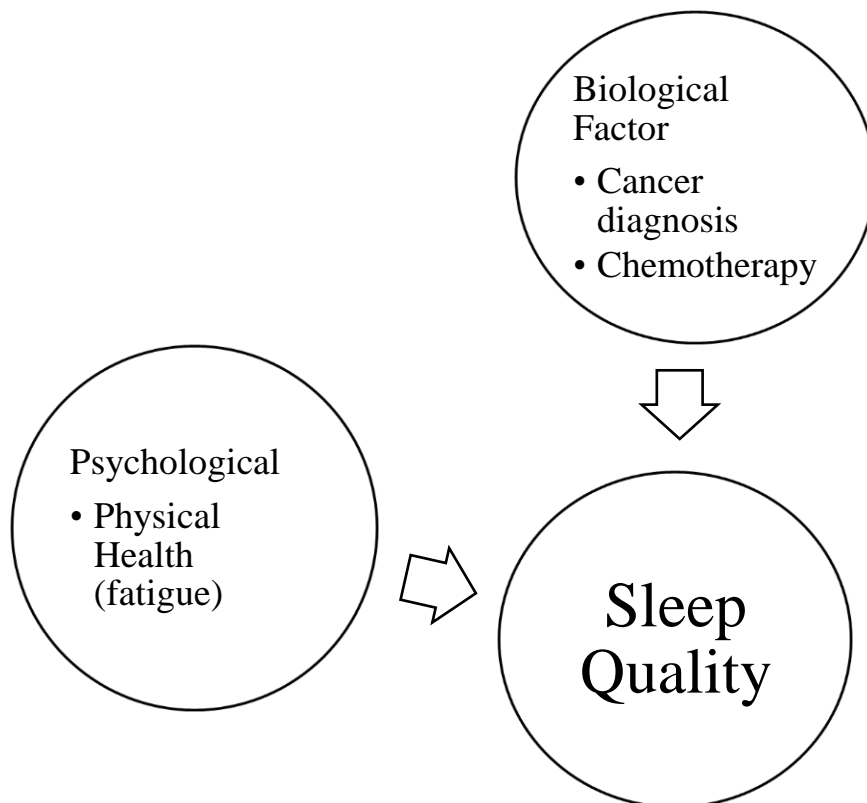


Figure 2.7: Conceptual framework adapted from Biopsychosocial Model (BPS)

CHAPTER 3

METHODOLOGY AND METHOD

3.1 Introduction

In this chapter will explain about the approach and rational used to support the chosen research methodology. This chapter will explain research design that used in this study to achieve the objectives, describe the study setting, location, population, subject criteria, sampling plan include of sampling method and sampling size estimation, research instruments that used in this study. Other than that, this chapter also provide the variable, data collection plan, data analysis plan, the expected outcome.

3.2 Research Design

This study was used cross-sectional study design. Cross-sectional study design is a type of observational study design that collects data from a population at a single moment in time. In a cross-sectional study, researcher determine objective and exposure of the study subject at the same time (Wang & Cheng, 2022).

3.3 Setting and Population

The target population of this study are cancer patients receiving chemotherapy treatment in oncology ward at Hospital USM which are patients in 3 Selatan and oncology clinic located at Nuclear, Radiology, Oncology and Daycare clinic (NROD) in Hospital USM. Hospital Universiti Sains Malaysia is teaching and referral hospital with 950 bed capacity which located at Kubang Kerian, Kelantan.

3.4 Sampling Plan

A sampling plan is the process of choosing entities from a population of interest in such a way that the sample's characteristics can be generalised to the population from which it has been drawn. To ensure that the sample reflects the characteristics of the entire population, specific inclusion criteria must be followed, which is best ensured by using a sampling plan (Stimson, 2018).

3.4.1 Inclusion Criteria

The specific requirements for inclusion in this study required each participant must be:

- Age 18 years and above
- Medically diagnosed with any types of cancer
- Currently receiving chemotherapy treatment
- Able to understand and respond in Malay language

3.4.2 Exclusion Criteria

Subject was excluded from this study if they:

- Medically diagnosed with mental illness
- Karnofsky Performance Score (KPS) below 80

In this study the researchers only choose patients KPS score range 80-100. The KPS is frequently used for assessing cancer patients' performance all over the world. A patient's functional status is range from well-being (100%) to death (0%), with ten points deducted at each level. Patients are categorised into three categories based on the evaluation results: Group

A (100%-80%) can complete daily activities independently, Group B (70%-50%) can perform daily activities with support, and Group C (40%) requires constant care and approaches death progressively (Med Sci et al., 2019). This ensure that the patient condition is suitable to participate this study and improve the data collection progress.

3.4.3 Sampling Method

This study has used convenience sampling method to recruit sample. The researcher only attended to the participant who receive chemotherapy in Hospital USM.

3.4.4 Sampling Size Estimation

Based on objective 2, the sample size was determined using single mean. In a previous study, the standard deviation for sleep quality is 4.85 (Momayyezi et al., 2021). The value representing the desired confidence level, $z=1.96$, thus 90 respondents are needed in this study to be able to reject the null hypothesis when precision, $\Delta=1$.

Calculated sample: 90 sample

The sample size (n) needed for the proposed study is:

$$\begin{aligned}n &= 90 + 10\% \text{ drop out} \\ &= 90 + 9 \\ &= 99 \text{ participants}\end{aligned}$$

3.5 Research Instrument

This study has been used self-administered questionnaire. The instrument used in this study is adopted with permission from two questionnaires which are EORTC QLQ-FA12 from European Organization for Research and Treatment of Cancer group to determine cancer-related fatigue and Sleep Quality Scale (SQS) (Yi, Shin & Shin, 2006). These questionnaires are freely available for academic use.

3.5.1 Questionnaire

The questionnaire used to determine the level of fatigue and sleep quality among cancer patients (Appendix D). The questionnaire is divided into three sections: Section A is socio-demographic data, Section B contain question to determine the level of fatigue among participants, and Section C contains questions to determine the level of sleep quality among participants.

Section A: Socio-demographic Data

This section has 12 questions which will ask some biodata includes age, gender, race, marital status, educational level, employment status, income, type of cancer, stage of cancer, duration of cancer and type of chemotherapy, regime of chemotherapy.

Section B: Level of Fatigue

This section has 12 questions that use to assess the level of fatigue among cancer patients. The question using four-point, Likert-type scale, which will need participants to rate the level of fatigue from 1 to 4. (1 = Not at all, 2 = Mild, 3 = Moderate, and 4 = Very much)

Section C: Sleep Quality

This section has 28 questions that use to assess the level of sleep quality among cancer patients. The question using four-point, Likert-type scale, which will need participants to rate from 0 to 3. (0 = few, 1 = Sometimes, 2 = Often, and 3 = Almost always)

3.5.2 Translation of Instrument

The original version of the Sleep Quality scale (SQS) and FA-12 was established in English (Appendix D). As the study population is from different education level and maybe do not understand English so the questionnaire was translated into Bahasa Malaysia by Pusat Bahasa USM (Appendix E).

3.5.3 Validity and Reliability of Instrument

Validity of a research study refers to how well the findings among study participants correspond to true findings among similar individuals outside of the study (Patino & Ferreira, 2018).

The Cronbach alpha of Sleep Quality Scale (SQS) English Version was shown to have acceptable levels of reliability of $\alpha=0.92$ (Yi H. et al., 2006). While FA-12 English Version has a reliability of $\alpha=0.87$ (Nayak et al., 2017). The acceptable reliability is above 0.7. However, a face validation study has done because the instrument is translated from English to Malay.

Face validation is useful in determining surface level adequacy of an instrument. It is critical for checking the acceptability, appropriateness and relevancy of the study instrument in a sampling who are using Bahasa Malaysia as their main language. The translated questionnaire has tested by 10% of the anticipated sample in this study. To avoid contamination of the

sampling, a total of 9 patients from hematology oncology ward (1TD) Hospital USM was chosen for pilot testing.

As this study was part of an undergraduate research project, a detailed translation and validation process has been omitted due to the time constraints.

3.6 Variable

Variables are those attributes that are used to measured and manipulated in a study. The variables used in this study are independent and dependent variables as shown in Table 3.6.

Table 3.6 *Independent and dependent variable.*

Independent variable	Level of fatigue
Dependent variable	Level of sleep quality

3.6.1 Measurement of Variables and Variable Scoring

The independent variable which is level of fatigue is determine by 12 questions that incorporates three multi-item scales to assess physical fatigue (Q1-Q5), emotional fatigue (Q6-Q8), and cognitive fatigue (Q9-Q10). Besides that, two single items assess interference with daily life (Q11) and social sequelae (Q12) also will be assess. It is using four-point, Likert-type scale, the range from 1 to 4 (1 = not at all, 2 = mild, 3 = moderate, and 4 = very much). The total score ranges from 12 to 48 will transform into range 0-100, with the higher levels indicating high level of fatigue.

Scoring:

1) Raw score

For each multi-item scale, calculate the average of the corresponding items.

$$\text{Raw Score} = RS = \left\{ \frac{(Q1 + Q2 + \dots + Qn)}{n} \right\}$$

For each single-item measure, the score of the concerning item corresponds to the raw score.

2) Linear Transformation

To obtain the Score S, standardize the raw score to a 0 – 100 range using the following transformation:

$$\text{Symptom scales} = S = \left\{ \frac{(RS - 1)}{\text{range}} \right\} \times 100$$

The level of sleep quality, using a four-point, Likert-type scale, respondents indicate how frequently they exhibit certain sleep behaviours from 0 = rarely, 1 = sometimes, 2 = often, and 3 = almost always (rarely: none or 1-3 times a month, sometimes: 1-2 times a week, often: 3-5 times a week, almost always: 6-7 times a week). Total scores can range from 0 to 84, it evaluates six domains of sleep quality which is daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction with higher scores means that the participants have acute sleep problems. For all the scales, though there are no firms benchmarks on classifying the scores, suggested value $\geq 70\%$ represent good discrimination and $<70\%$ represent poor discrimination.

3.7 Data Collection Method

The data was collected in March until April 2024 after obtaining ethical approval from the Human Research Ethical Committee (HREC), USM. The researcher had chosen the Selatan ward and NROD, which was an oncology day care clinic, to undergo the study. For the day

care clinic patients, patients normally came to the clinic in the mornings. After registration and checking vital signs, they had a gap time of about 30 minutes during which the runner went to get the chemo drug. Then they had time to participate in the study before initiating the chemotherapy treatment. The researcher selected eligible participants who fulfilled the inclusion and exclusion criteria before approaching them. The researcher explained the purpose of the study, the protocol, and what the participants needed to do. The researcher brought participants to the counselling room in NROD to answer questionnaires to ensure privacy and confidentiality. However, for the patients in the ward, the researcher distributed the questionnaires to the patients who were in their chemotherapy treatment gap, which normally had an approximately one-week gap between one chemotherapy and another chemotherapy treatment. The researcher screened the patients' conditions and eligibility. It required patients' Karnofsky Performance Score to be in the range of 80-100.

After the selection of eligible respondents who fulfilled the inclusion criteria, the researcher explained the purpose of the study to the participants and obtained their informed consent. The participants were acknowledged that their participation was voluntary, and they had to complete a self-administered questionnaire which took approximately 10 to 15 minutes. For the question on cancer stage, the type of chemotherapy was obtained by the researcher from the patient's folder. Upon completion, the questionnaire was collected by the researcher. All data information was accessed and analysed by the researcher. Figure 3.1 show the overall flow of the data collection process. The Gantt chart was show in Appendix F.

3.7.1 Flow Chart of Data Collection

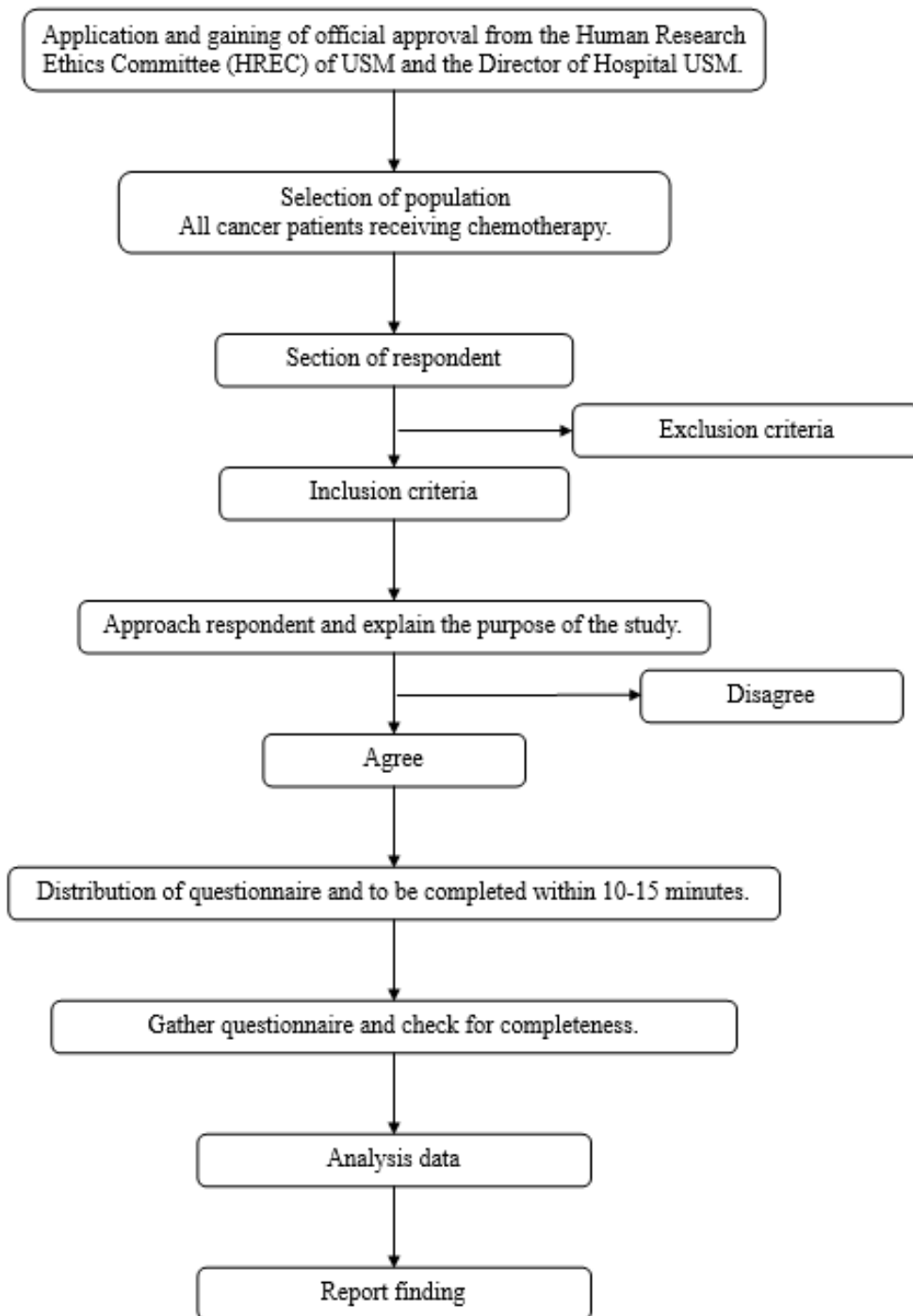


Figure 3.7: Overall Flow of the Data Collection Process

3.8 Data Analysis Plan

The data collected was analysed using Statistical Package for Social Sciences (SPSS) software of version 27.0. The data was screened and checked for accuracy, data errors, outliers, and inconsistencies prior to analysis.

The first objective (level of fatigue) and second objective (level of sleep quality) were analysed using descriptive statistics. Descriptive statistics such as frequency, percentage, and means were used to present the analysis for categorical variables of level of fatigue (low fatigue and high fatigue) and level of sleep quality (good sleep quality, fair sleep quality and poor sleep quality).

Pearson's correlation coefficient (r) was used to demonstrate the association between the variables for the specific third objective (level of fatigue and level of sleep quality). The significance level of all tests was set as $\alpha \leq 0.05$, and all null hypotheses were rejected if the p -value ≤ 0.05 .

3.9 Ethical Considerations

The study should include ethical considerations to preserve the rights of all participants in the study, including respondents, researchers, and institutions. The approval from the human researched ethics committee (HREC), Universiti Sains Malaysia (USM) and the Head of Nursing Department of Hospital USM (Appendix) had been obtained before starting to collect data. Eligible participants had been informed about the studied purpose, procedures, potential risks, and benefits of participation by providing the participant information sheet. Informed consent had been obtained after the clarification process of the researched studied. All personal information including consent form and data collected from questionnaire

obtained from researched participant in this studied had been kept private and confidential, and only been used for academic and researched purpose (Appendix A and B)

The respondents of the study were informed regarding the risks, their rights to participate voluntarily, right to make the decision whether to take part in this research study or reject this study without any influence, constraint or inducement, and the right to discontinue the study at any time, without incurring a penalty. The researcher engaged with treating staff nurses, whom the patients had established rapport and trust over the course of the treatment, to do the initial introduction before answering the questionnaire. As this study was non-interventional and only involved a survey questionnaire, there was no risk involved. However, as the participants answered the survey, they might have experienced emotional disturbance. If this happened, the researcher would calm the respondents first and give them as much time as they wanted to answer the questionnaire. The researcher would refer them to the treating doctor if necessary. In addition, if the participants exhibited a low quality of sleep and high fatigue scores, they were advised to refer to their treating doctor.

There was no conflict of interest as this study was part of a final year research project. Besides that, the privacy and confidentiality of the data obtained throughout the study were maintained at all times. Data presentation was done in groups to protect the privacy and confidentiality of the participants. (Appendix C)

This studied did not involve any sensitive issues among communities. This studied would benefit the healthcare communities in understood the fatigue and slept quality in a cancer patient who received chemotherapy. The findings of this studied could have been an insight to policy makers and healthcare leaders in improved the cared of cancer patients specially the patient that received chemotherapy. By joined this studied, the participants would benefit from

the knowledge obtained from the brochure provided by the researcher upon completion of the surveyed.

There was no honorarium or incentives for participation in this studied. Participants would have thanked verbally for their involvement in this studied after completed the questionnaire. A simple pamphlet that contained ways to improved slept quality would been given to the participants (Appendix H).