NUTRITIONAL STATUS AND ITS RELATIONSHIP WITH THE QUALITY OF LIFE IN CANCER PATIENTS

by

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Dissertation submitted in partial fulfillment
of the requirements for the degree
of Bachelor of Health Sciences (Honours) (DIETETIC)

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CERTIFICATE

This is to certify that the dissertation entitled NUTRITIONAL STATUS AND ITS RELATIONSHIP WITH THE QUALITY OF LIFE IN CANCER PATIENTS is the bona fide record of research work done by Ms NURUL IZZATIE BINTI MOHD ROZUKI during the period from September 2017 to May 2018 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Honours) (DIETETIC).

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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 purposes.

...
Nurul Izzatie Bt Mohd Rozuki

Date: ..27/6/2018.....

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STATUS NUTRISI TUBUH BADAN DAN PERKAITANNYA DENGAN KUALITI HIDUP PESAKIT KANSER

ABSTRAK

Latar belakang: Status nutrisi tubuh badan yang rendah dalam kalangan pesakit kanser akan mengganggu kualiti hidup mereka. Oleh itu, tujuan kajian ini dijalankan adalah untuk mengenalpasti hubungan antara status nutrisi tubuh badan dengan kualiti hidup pesakit kanser di Hospital Universiti Sains Malaysia (HUSM). **Kaedah:** Peserta telah dipilih dengan menggunakan kaedah *purposive sampling* dan kaedah temu bual telah digunakan untuk medapatkan maklumat seperti maklumat demografik, jenis kanser, berat dan tinggi. Untuk kualiti hidup pula, kertas soal selidik *European Organization of Research and Treatment of Cancer Quality of Life (EORTC QLQ-C30)* telah digunakan dan dijawab sendiri oleh peserta. **Keputusan:** Seramai 90 orang pesakit kanser yang telah menyertai kajian ini dan seramai 54.4% pesakit mempunyai berat badan yang normal diikuti oleh obes (16.7%), kekurangan berat badan (15.6%) dan berlebihan berat badan (13.3%). Kualiti kesihatan global untuk populasi ini ialah 58.06 ± 18.84 dan skor purata untuk pesakit di bawah kategori berlebihan berat badan adalah yang tertinggi (69.44 ± 15.21) diikuti oleh berat badan normal (56.80 ± 21.16), kekurangan berat badan (56.55 ± 13.94) dan obes (54.44 ± 15.06) dan berdasarkan jantina ianya ialah 58.89 ± 17.95 bagi perempuan dan 56.39 ± 20.72 bagi lelaki. Didapati bahawa tiada perbezaan yang ketara di antara purata skor kualiti hidup untuk setiap dimensi dengan BMI kecuali untuk dimensi kesakitan, dianalisis menggunakan ANNOVA (p = 0.032). **Kesimpulan:** Kebanyakan pesakit kanser di HUSM mempunyai berat badan normal. Kualiti kesihatan global untuk populasi ini pula adalah di bawah purata yang normal. Hal ini telah membuktikan bahawa terdapat kemerosotan tahap kualiti hidup bagi populasi ini dan kualiti kesihatan global juga adalah tinggi dalam kalangan perempuan berbanding lelaki. Untuk keseluruhannya, kualiti hidup

pesakit yang berlebihan berat badan adalah lebih tinggi dan pesakit dalam kategori obes mempunyai kualiti hidup yang paling rendah.

NUTRITIONAL STATUS AND ITS RELATIONSHIP WITH THE QUALITY OF LIFE IN CANCER PATIENTS

ABSTRACT

Background: In patients with cancer, poor nutritional status is related with poor outcomes and altered quality of life. For that, the aim of this study was to identify relationship between nutritional status with quality of life in cancer patients at Hospital Universiti Sains Malaysia. **Methods:** The respondents had been selected as sample using purposive sampling and interviews method had been used to obtain the information such as socio-demographic data, cancer types, weight and height. For quality of life, European Organization of Research and Treatment of Cancer Quality of Life questionnaire (EORTC QLQ-C30) was used to assess quality of life and it were self-answered questions. **Results:** There were a total 90 of participants and 54.4% of participants had normal weight followed by obese (16.7%), underweight (15.6%) and overweight (13.3%). In this study, population's global quality of health score is 58.06 ± 18.84 and the mean score of patients in BMI categories of overweight were the highest (69.44 ± 15.21) followed by normal weight (56.80 ± 21.16), underweight (56.55 ± 13.94) and obese (54.44 ± 15.06) and for gender it was 58.89 ± 17.95 in the females and 56.39 ± 20.72 in the males. It also had been found that there is no statistically difference of mean score of quality of life in each dimension with BMI except for dimension of pain, tested using ANNOVA with ($p = 0.032$). **Conclusion:** Normal weight patients were common in a representative population of cancer patients at HUSM. HUSM population's quality of health score is slightly less than the EORTC reference value global score. This result had proved that there was worsening of overall quality of life of cancer patients in this population and in comparison with was higher in the females than males. Overall quality of life had demonstrated that overweight had a greater quality of life and obese was in the lowest other than others.

CHAPTER 1: INTRODUCTION

1.1 Background of study

Cancer is a systemic disease that instantly attacks the area of outbreak and can metastasize to other region, causing a variety of complications and loss of progressive organ function (Santarpia, Contaldo, & Pasanisi, 2011). In all types of cancer, some of the body's cells begin to divide without stopping and spread into surrounding tissues. From the histological standpoint there are hundreds of different cancers and had been grouped into six major categories which are Carcinoma, Sarcoma, Myeloma, Leukemia, Lymphoma and mixed types of cancers.

Cancer has a big impact on the society around the world and is one of the leading causes of morbidity and mortality worldwide. It is the major cause of death in economically developed and developing countries (Torre, Siegel, Ward, & Jemal, 2015). To add to the existing burden, the number of cancer cases is increasing in economically developed and developing countries because of population aging and growth (Jemal *et al*, 2011). Increasingly of cancer risk factor associated lifestyle choices, such as smoking, lack of exercise, obesity and overweight, alcohol drinking, 'westernized diet' as well as reproductive patterns, which are already become the common problems in high-income countries, are also becoming increasingly in low- and middle-income countries (Jemal *et al*, 2011).

Based on World Cancer Research Fund International, in 2012, an estimated 14.1 million new cases of cancer had been occurred. From these, 7.4 million cases were in men and another 6.7 million were in women. The four most common cancers

occurring worldwide are lung, female breast, bowel and prostate cancer (Cancer Research UK, 2012). Cancer is the second leading cause of death globally and was responsible for 8.8 million deaths in 2015 with nearly 1 in 6 deaths are due to cancer (World Health Organisation, 2018). More than 60% of the world's new cancer cases occur in Africa, Asia, Central and South America with 70% of the world's cancer deaths were from these regions (National Cancer institute, 2017).

In Malaysia, cancer is the fourth leading cause of death in Malaysia, contributing to 13.02% of all deaths that occurred in the Ministry of Health Hospitals in 2014 succeeding cardiovascular (22.77%) and respiratory diseases (18.54%). According to Malaysian National Cancer Registry Report (MNCR) 2007 – 2011, a total of 103,507 new cases of cancer were diagnosed which 45.2% were males and 54.8% of patients were females. As stated in the report the risk of males getting cancer was 1 in 10 and for females was 1 in 9. The highest three cancer incidences among Malaysian populations are breast cancer followed by colorectal and lung cancer. The five most common cancers among males were cancers of the colorectal (16.3%), lung (15.8%), nasopharynx (8.1%), lymphoma (6.8%) and prostate (6.7%). Among females, the five most common were cancers of the breast (32.1%), colorectal (10.7%), cervix uteri (7.7%), ovary (6.1%) and lung (5.6%) (Ministry of Health, 2015).

In patients with cancer, poor nutritional status is related with poor outcomes and altered quality of life. Poor nutritional status is prevalent among cancer patients with an estimated incidence of approximately 40% (Hebuterne *et al.*, 2014). Many patients with cancer have seriously reduced oral food intake and have not received any nutrition therapy. Malnutrition globally influence all cancer patients by aggravated the risk of

infection, slow down wound healing, increasing treatment toxicity, extending hospital stay and raising health related costs (Gloria *et al.*, 2013)

The role of nutrition as a critical part of a healthy lifestyle for cancer patients is well accepted (Chapman *et al.*, 2011). Cancers will affect the metabolic and physiological aspects of patients' nutritional requirements for macronutrients, vitamins and minerals. In addition cancer patients will be with nutrition related symptoms such as nausea, vomiting, loss of appetite, stomach pain, constipation, diarrhea, loss of taste, sore mouth and difficulty swallowing, have bad effects on energy and dietary intake and wasting, muscle loss, combined with cachexia, induced by tumor metabolism through treatment related complications or both can cause malnutrition in cancer patients and affect quality of life of cancer patients (Omlin *et al.*, 2013). Malnutrition impairs the immune status and reduces the body's defense against infectious diseases (Alexandre, Gross-Goupil & Falssard, 2003).

The term quality of life is used to assess the typical well-being of individuals and societies. It will be evaluated in various areas related to physical, emotional, sexual and functioning (Victorson *et al.*, 2007). According to the World Health Organisation (WHO), quality of life is defined as individual perception of life, values, objectives, standards and interest in the framework of culture. Quality of life is the consequence of patients' physical (movement, physical activities and ability to succeed in work and in family responsibilities), social (social activities, being beneficial, body image, anxiety and depression) and psychological (life satisfaction, social support need and role function) for well-being (Stundag & Zencirci, 2015).

Quality of life is more commonly used as a first outcome measure in studies to analyse the efficacy of treatment (Ali, Daryoush & Saeed, 2009). Many factors that

related to the illness can modify quality of life of patients. The amount of symptoms experienced by an individual has been related to quality of life of people with cancer (Heydarneja, Hassanpour & Solati, 2011).

1.2 Problem statement

Malnutrition and poor nutritional status are known to elevate the risk of infection and hospitalization in patients with cancer. It is prevalent during the cancer diagnosis in up to 40% of patients, and this rate increases to 80% in patients with advanced malignancies (Nelson & Walsh, 2002). Malnutrition also significantly influenced morbidity and responsible for 20% of deaths in cancer patients (Capra, Ferguson, & Ried, 2001). The interaction between cancer and cancer associated cachexia, pro-inflammatory cytokines and host metabolism often can have bad effects on both physical and biochemical nutritional which eventually leads to deprivation of quality of life (Marín, Laviano & Pichard, 2007). It is also can produce many different symptoms depends on the type and stage of cancer and it will influence the quality of life of patients. In patients suffering from chronic illnesses, the effect on quality of life is higher than effect on physical impairment as Wafa Hamdi *et al.* demonstrated in Tunisian patients.

Weight loss is common in cancer patients especially in head and neck cancer patients who develop dysphagia, alteration in taste and loss of appetite that will greatly influence their food intake. Reduced food intake with altered metabolic changes leads to the onset of cancer cachexia with the clinical presentation of muscle wasting, anorexia and systemic inflammation (Santarpia *et al.*, 2011). Reduced food intake is a commonly found problem in patients with cancer and will affect their nutritional status and quality of life. It is related to several factors such as gastrointestinal symptoms

(e.g., nausea, vomiting, diarrhea), tumor position (e.g., esophagus or oral cavity, causing dysphagia), toxicities related to treatments, dysgeusia, as well as poor appetite.

Furthermore, some studies had stated that around 80% in patients with advanced tumors have appetite disorders (David *et al.*, 2017). There are various causes of lack of appetite including the systemic inflammatory response produced by the tumor in central nervous system can reduce and both chemotherapy and radiotherapy can suppress hunger as an adverse event and anatomic changes after surgery can minimize the intake of food (e.g., total gastrectomy) as well as nutrient deficiency can be related to anorexia. Psychological symptoms like anxiety and depression also can be related with appetite suppression (Ezeoke & Morley, 2015). Disturbances of appetite can be demonstrated in different ways such as depletion in the desire to take food, the early feeling of fullness, or combination of both.

The cancer diagnosis brings the powerful changes to quality of life due to the alteration in physical and emotional because of discomfort, pain, distortion, helplessness and less of self-esteem. It is common to relate the word "cancer" to a lethal disease and consider it as morally contagious (Michelone & Santos, 2004). In addition, patient will experience the different types of treatment such as surgeries, radiotherapy and chemotherapy which is has been known to be associated with adverse side effects.

Quality of life currently has become an important endpoint for treatments comparison in many cancer types, particularly in advanced stage (Rizzo PB, Maronato, Marchiori & Gaya, 2008). The cancer-specific quality of life is related to all stages of the cancer and assessing the effect of a specific cancer on quality of life. For all types of cancer, general quality of life instruments can be used to evaluate the overall impact

of patients' health status on their quality of life (Rizzo PB, Maronato, Marchiori & Gaya, 2008).

1.3 Research objective

General objectives

To identify relationship between nutritional status with quality of life in cancer patients

Specific objectives

a) To determine the Body mass Index (BMI) of cancer patients
b) To determine the level of quality of life of cancer patients using EORTC QLQ questionnaire
c) To determine the association of Body Mass Index (BMI) with quality of life in cancer patients

1.4 Research question

a) What is the BMI measurement of cancer patients?
b) What is the level of quality of life of cancer patients?
c) What is the association of BMI with quality of life in cancer patients?

1.5 Hypothesis

H_0 = There is no significant association of the nutritional status with quality of life in cancer patients

H_A = There is significant association of nutritional status with quality of life in cancer patients

1.6 Significance of study

Malnutrition diminishes the immune status and impairs the body's defense towards infectious diseases. In addition to these possible problems, malnutrition appear to be a poor prognostic factor especially in cancer patients who are going to receive anticancer treatments or ongoing treatment and as such issues should be prevented or detected as early as possible.

Details on malnutrition prevalence among cancer patients perhaps can give benefit to the medical staff in developing a multidisciplinary team approach to handle patients with cancer to achieve better clinical outcomes. Hence, it is important to have baseline data in order to recognize the patients being at risk of malnutrition and develop strategy for further intervention programs to maintain patients' health status during treatment. While malnutrition is already very high among cancer patients, nutrition supportive intervention should always be part of the global oncology strategy.

The results from this study not only provide cancer patients' adequate information about the malnutrition status, but also enhance oncologist skills to accomplish better comfort and improve the quality of life of their patients before, during and after the anticancer treatment. Quality of life also as an early measure of disease development and will assist the physician in daily practice to closely monitor the patients.

As lessen the mortality and make sure optimal health-related quality of life are the main objectives of medical care, this study will shows that better quality of life in cancer patient is as important as the survival benefit that a pharmacological treatment may provide. Thus, this study sought to evaluate the quality of life of cancer patients, seeking support for a more comprehensive and human care.

CHAPTER 2: LITERATURE REVIEW

2.1 Impact of cancer diagnosis and treatment on patients

A cancer diagnosis will interrupt the lives of cancer patients and also has a major impact on their families. Diagnosed patients are subjected to multiple physiological and psychological obstacles and may be threatened with many potential losses and lifestyle changes. Majority of the cancer patients had reported the feelings of being burden to others, hopelessness and losing the desire to continue the life (Thwe, 2012). Cancer diagnosis and treatment may be accompanied by massive impact on physical, psychological, social, occupational, and financial stressors (Michelle & Kathryn, 2014).

Several studies have confirmed that cancer patients also have anxiety, depression (Braden, Badger, Mishel & Longman, 2004; Badger, Segrin, Dorros, Meek & Lopez, 2007), nervousness, uncertainty (Sammarco, 2001) and reduced body and social functions (Engel, Kerr, Schlesinger, Sauer H, Holzel, 2004). The physical distress and psychological distress of cancer patients are mutually related. These all influence the confidence of patients to adequately face the disease and all aspects of quality of life (Burgess, Cornelius, Love, Graham, Richards & Ramirez, 2005).

Many of the incidences of distress relate to gender which is based on the study that had been conducted the distress pattern indicates a tendency for higher distress for males in the physical dimension such as limitations in everyday activities and for females in the psychological dimension which highest in the score of anxiety and worries (Herschbach, 2008) and this has been supported by Koyama and colleagues (2016) which they had found that female cancer patients were more likely to suffer

from psychosocial issues such as changes in appearance, family problems and sexuality issues than male patients, and male patients were more likely to have spiritual pain.

Furthermore, in related to age, young and middle-aged adults who are diagnosed with cancer will have additional stressors and challenges in contrast with those who receive cancer diagnoses at older ages because a cancer diagnosis before age 50 years is rare and to be more unexpected for many individuals (Kroenke *et al.*, 2004; Kornblith *et al.*, 2007). One cross-sectional, observational study had identified that among breast cancer patients, depression is higher in the age group 18–40 years and lowest among those above 60 years (Purkayastha, Venkateswaran, Nayar & Unnikrishnan, 2017).

2.2 Impact of cancer on patient's nutritional status

It is widely recognized that diet and nutrition play significant roles throughout the clinical course of cancer (Brown *et al.*, 2003). The profound negative influence of malnutrition on cancer treatment is well recognized, with nutritional deficiencies impacting on all modalities of treatment (Langer, Hoffman & Ottery, 2001). Gastrointestinal tract, head and neck cancer patients being treated with radiotherapy are at an increased risk of malnutrition due to the severe side effects (Ravasco, Monteiro & Camilo, 2003). Then, another study did by Vergara *et al.* (2013) patients with head and neck, pancreatic and gynecologic malignancies were more malnourished. They had found that out the 5 pancreatic cancer patients, 3 were malnourished and of the 7 patients with head and neck cancer, 6 were malnourished.

In the study that involve patients with pelvic radiotherapy also found that 33% of the patients experienced a weight loss of up to 2% over 1 to 6 months prior to treatment with moderate malnutrition (Dzairudzee, Suzana, Zahara, Hazreen & Roslan,

2017) and the incidence of weight loss is likely to increase during the pelvic radiotherapy treatment by up to 83% (McGough, Baldwin, Frost & Andreyev 2004). Furthermore, studies that involve patients with chemotherapy also had stated that nearly half of the patients were malnourished and at a further risk of under-nutrition and among the different cancer types with the treatment of chemotherapy, colorectal, haematological and lung cancer patients were more malnourished (Montoya *et al.*, 2010).

In addition, weight loss is an important prognostic factor in cancer, the higher the extent of weight loss, the shorter the survival time (Dhanapal, Saraswathi & Govind, 2011). Malnutrition in the study participants may have been due to the systemic effects of the cancer, such as altered appetite and sensory functions, anorexia, cancer related discomforts that decrease the food intake leading to weight loss (Van Cutsem & Arends, 2005). Study had had found that weight loss of at least 10% since the start of the illness was reported for 29.7% of the patients with 21.9% of patients had weight loss in 2 weeks, 10% of them had weight loss of more than 5% of their usual weight in one month and 23.7% patients had more than 10% of weight loss from their actual weight (Nourissata A *et al.*, 2008). This study had been supported by the study from Climent *et al.* (2017) in which for the patients with stomach cancer that had been undergoing surgery, more than 10% of weight loss within 2 years had detected in 67% of subjects. One study advised that patient weight loss should be limited as much as possible starting at diagnosis and continuing until six months after treatment (Van den Berg, Rasmussen, van Nispen, van Binsbergen & Merkx, 2008).

2.3 Impact of cancer on patient's quality of life

The cancer treatments include surgery, chemotherapy and radiotherapy. Chemotherapy and radiotherapy are the most common treatment received by patients to inhibit metastasis and enhance long-term survival rates (National Cancer Institute, 2002). It has been known to not only prolong the life expectancy of the patients but also impose significant side effects to them (Harrington & Smith, 2008). Cancer and its treatment affects not only patients' health but also their quality of life (Polanski *et al.*, 2017; Prevost *et al.*, 2014). In fact, cancer and treatment related symptoms are major stressors in patients with cancer undergoing treatment for the disease (Jim, Andrykowski, Munster & Jacobsen, 2007).

Studies have shown that chemotherapy has a very significant negative influence on the quality of life in cancer patients (Turgay, Khorshid, Eser, 2008; Yang, 2012). After chemotherapy, patients have a lower general well-being, more physical discomfort symptoms, reduced motility, increased sleep, sexual dysfunction, and reduced social participation and work abilities compared to before chemotherapy (Turgay, Khorshid, Eser, 2008). Dehkordi *et al.* (2009) had demonstrated in a study among cancer patients undergoing chemotherapy that quality of life is better in patients with more chemotherapy cycles.

Prior to pelvic radiotherapy 50% of patients had limited movement for physical activities but could still carry out simple daily activities (Dzairudzee, Suzana, Zahara, Hazreen & Roslan, 2017). From the start of radiotherapy to 6 weeks after radiotherapy, Budischewski *et al.* (2008) had reported a significant improvement in role functioning, significantly poorer cognitive functioning, and observed no changes in global health status or physical, emotional, or social functioning. In contrast, Bansal *et al.* (2004)

used the EORTC QLQ-C30 to evaluate 45 patients with head and neck cancer at three time points: the start of radiotherapy, fourth week of radiotherapy, and 1 month after radiotherapy. These authors found that global health status and physical, social, and emotional functioning all declined significantly during radiotherapy. One month after radiotherapy, they observed improvement in all the functional scale scores, but none had returned to pre-radiotherapy levels but for the cognitive functioning, it remained high at the fourth week of radiotherapy.

2.4 Relationship between nutritional status and quality of life in cancer patients

Nutrition plays an important role in maintaining better quality of life among cancer patients, and it is an instinct for every human being to value food intake in order to maintain social structure, self-esteem and enjoyment (Aparecida, Denismar & Fabio, 2015). Malnutrition is a disease independent risk factor for reduced muscle strength and functional status in cancer patients. Weight loss can leads to malnutrition in cancer patients. Significant weight loss subsequently leads to decreased quality of life among patients with cancer (Lis *et al.*, 2012; Prevost *et al.*, 2014; Zalina, Lee & Kandiah, 2012). Weight loss and malnutrition are common in patients with advanced malignant diseases that adversely influence patient survival and quality of life (Gudny & Thorsdottir, 2008).

In head and neck cancer, better nutritional status was associated with better quality of life (Capuano, Gentile, Bianciardi, Tosti, Palladino & D Palma, 2010; Jager-Wittenaar, Dijkstra, Vissink, Laan & van Oort *et al.*, 2011; Petruson, Silander & Hammerlid, 2005). One study with the same subjects had reported that weight loss in some patients was related to loss of speech and swallowing capabilities, which may have affected patients' ability to take food by mouth (Morton, Crowder, Mawdsley,

Ong & Izzard, 2009) and it is well known that feeding difficulties and weight loss due to the course of the disease and its therapies have a significant negative impact such as poor quality of life and low energy intake in patients with cancer (Climent *et al.*, 2017). Weight loss also can leads to decreasing trends of Body Mass Index (BMI) and BMI was significantly associated with quality of life which was study had found that lower BMI can leads to decrease quality of life (Gil, Gibbons, Jenison, Hopkins & von Gruenigen, 2007).

Another study had concluded that weight loss of more than 10% at 2 years after surgery had significant impact on quality of life scores at time of diagnosis and that it seemed to significantly worsen global quality of life, fatigue and pain. In the same study, patients with more than 10% of body weight loss after 2 years usually reported more symptoms compared with those patients with less weight loss. It is of noted that severe symptoms with nausea and vomiting, pain and diarrhea were only reported in patients with weight loss over 10% from their usual weight (Van den Berg, Rasmussen, van Nispen, van Binsbergen & Merkx, 2008). The scores for physical, functional, emotional, cognitive and social functions were significantly higher for those patients who had no lost weight (Nourissata A *et al.*, 2008).

In a retrospective study by Gupta *et al.* (2006), malnutrition was associated with a poorer quality of life and its other dimensions, as patients with better nutritional status exhibited better level of functioning in a subset of colorectal patients. Well-nourished patients had a better functioning and global health status with fewer symptoms prior to the pelvic radiotherapy treatment (Dzairudzee, Suzana, Zahara, Hazreen & Roslan, 2017). On the other hand, several studies have demonstrated that the scores of quality of life outcomes in malnourished patients are worse compared to well-nourished

patients (Du *et al.*, 2017; Lis *et al.*, 2012). This finding is consistent with previous study that had also showed that nutritional status can have an impact on physical function and psycho-social parameters (Laky *et al.,* 2010).

Cancer related fatigue is the most prevalent symptom, reported in 50 – 90% of cancer patients (Campos *et al.*, 2005). Malnourished patients showed the highest symptoms score of poor quality of life, particularly fatigue (Zalina, Kathryn, Mirnalini & Lynne Cobiac, 2014) and fatigue, depression, anxiety, and pain can also result in weight loss (Polanski, 2017).

One study had demonstrated that patients classified as well-nourished had significantly better survival compared with patients classified as moderate and severely malnourished, independent of age and stage of cancer (Gupta, Lis, Vashi & Lammersfeld, 2010) and this had been supported by the study to evaluate the role of malnutrition and mortality in patients undergoing surgery for renal cell carcinoma, Morgan *et al.* (2011) had reported that malnutrition is associated with a higher mortality, independent of key clinical and pathological factors and Weight loss as well as malnutrition are common in patients with advanced malignant diseases that adversely influence patient survival and quality of life (Nourissata A *et al.*, 2008).

2.5 Conceptual framework

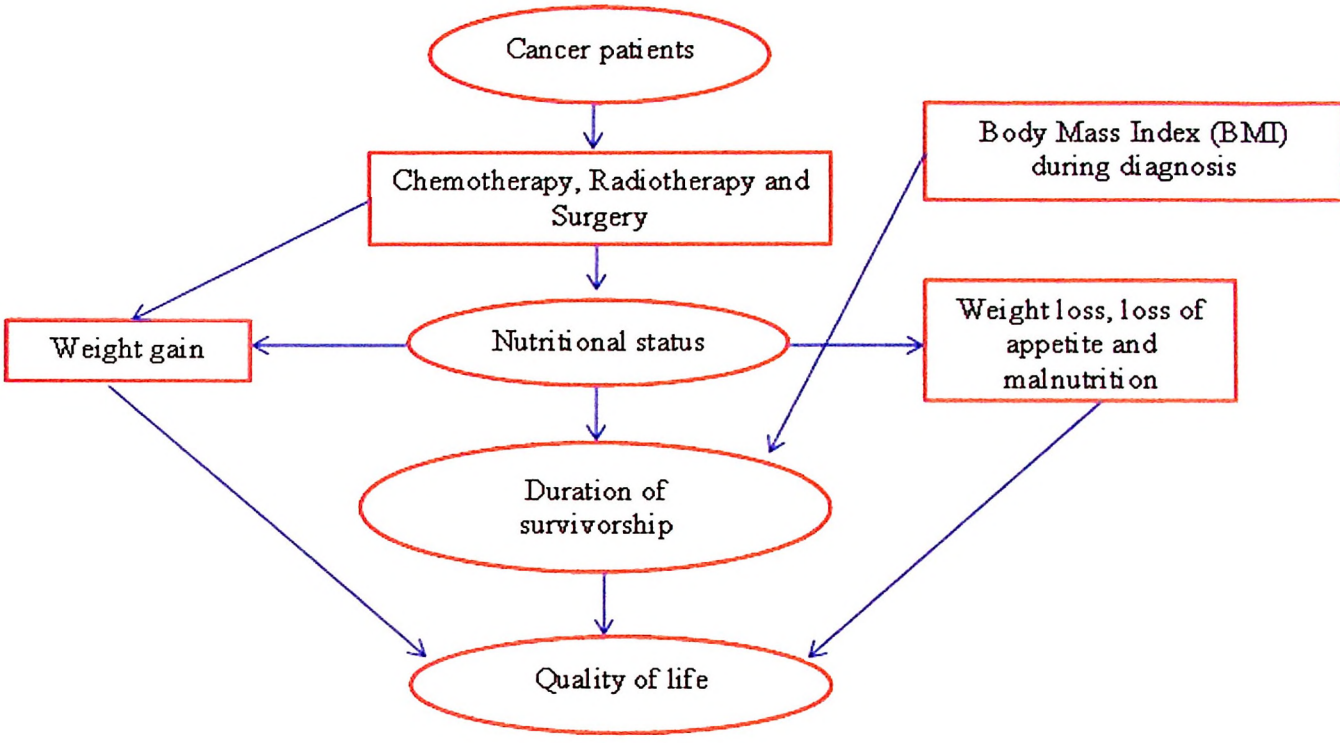

Figure 2.5.1 Conceptual Framework

CHAPTER 3: METHODOLOGY

3.1 Research design

This was a cross-sectional study design and had been conducted to examine the association of nutritional status with quality of life in cancer patients at Hospital Unversiti Sains Malaysia. Therefore, data had been collected directly from sample without initiate any changes or treatment from January 2018 to March 2018. In this study, there was one independent variable which was nutritional status of cancer patients, while dependent variable of this study was quality of life of cancer patients at Hospital Universiti Sains Malaysia.

3.2 Location

The study had been conducted at Ward 4 Timur Depan, 3 Selatan, 1 Timur Depan, 3 Utara and Oncology Clinic in Department Nuclear Medicine, Radiotherapy and Oncology at Hospital Universiti Sains Malaysia (HUSM) in Kubang Kerian, Kelantan.

3.3 Population

The population size includes the cancer patients in Hospital Universiti Sains Malaysia. Subject had been recruited from the clinic and wards in Hospital Universiti Sains Malaysia. The samples of these subjects were among the cancer patients that fulfil all the inclusion and exclusion criteria as stated.

3.4 Sampling method

In this research, the respondents had been selected as sample using purposive sampling. Purposive sampling (also known as judgment, selective or subjective sampling) is a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study. Purposive sampling is a non-probability sampling method and it occurs when elements selected for the sample are chosen by the judgment of the researcher (Black, 2010).

3.5 Sample size calculation

$n = (\frac{z}{d})^2 P (1 - p)$

P = 80% of the population had average and below average of quality of life (Nayak *et al.*, 2017)

d = precision (±10%)

z = Level of confidence 95% (1.96)

Level of significance = 0.1

Therefore, $n = (\frac{1.96}{0.1})^2 0.80 (1 - 0.80)$

n = 61

Include 10% dropout = 67

3.6 Inclusion and exclusion criteria

3.6.1 Inclusion criteria

The inclusion criteria for this study given as below:

- Adult more than 18 years old
- Willing to participate in the research and able to give the consent
- Can understand *Bahasa Malaysia* or English
- Able to communicate orally

- Had been diagnosed with cancer and currently receive the treatment either radiotherapy, chemotherapy or surgery
- Patient that had been able to measure the weight and height

3.6.2 Exclusion criteria

The exclusion criteria for this study given as below:

- Age below than 18 years old
- Disagree and refuse in participation of research
- Cannot understand *Bahasa Malaysia* and English
- Unable to communicate orally
- Not mentally and physically competence
- Patient that on the critically condition
- Pregnant women

3.7 Data collection method

Questionnaires had been distributed to the respondents who fulfilled the inclusion and exclusion criteria. This research is based on voluntarily participation. Consent form had been distributed and attached together with the questionnaires. Questionnaires had been used to obtain information from the subjects such as socio-demographic data, cancer stage, age during the diagnosis, types of treatment received by interview method and for quality of life, it were self-answered questions. Current body weight and height will be measured and BMI had been calculated. Duration that needs for data collection for each subject was approximately 30 minutes.

3.8 Research instrument

The nutritional status of patients had been assessed by anthropometric measurements which were weight was measured by weighing scale, height had been measured using

stadiometer and BMI had been calculated from height and weight. For the quality of life, European Organization of Research and Treatment of Cancer Quality of Life questionnaire (EORTC QLQ-C30) was used to assess quality of life (Aaronson *et al.*, 1993). This instrument is a 30 item multi-dimensional cancer–specific questionnaire developed to assess the quality of life of cancer patients in the following domains: functional scales, symptom scales, global health scale and single items. It contains five functional scales (physical, role, cognitive, emotional and social), symptom scales (appetite loss, nausea, vomiting, pain, dyspnea, constipation, diarrhea, fatigue, insomnia, financial difficulties) with one global health scale (GHS) and six single items assessing symptoms and financial impact of disease.

3.9 Measurement of variables

There were two types of variables covered in this research. These include independent variables and dependent variables. Independent variable was nutritional status that will be measured based on Body Mass Index (BMI) from the calculation of weight and height. The measurement of height and weight had been taken twice and the mean of the measurements with one decimal place had been used

For the quality of life EORTC QLQ-C30 questionnaire has total 30 item multi-dimensional cancer–specific questionnaire developed to assess the QoL of cancer patients. Item 1 to 28 had been rated as (1 = Not at all, 2 = A little, 3 = Quite a bit, 4 = Very much) and for item 29 and 30 had been rated from 1 (very poor) to 6 (excellent). The EORTC QLQ-C30 core module was completed by the patients. A translated questionnaire with *Bahasa Malaysia* and English version were given to the patients. EORTC QLQ-C30 questionnaire was administered anytime during the patient's admission. Scoring was applied according to the EORTC Manual, with a range from 0-

100. For the global and the functional scales, a higher score indicated better global and physical functioning and for the symptom scale, a higher score would indicate worse symptoms.

3.10 Data analysis

All data had been analysed using the Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics including means, range, and standard deviation were used to present subject's demographic information as well as nutritional status by Body Mass Index (BMI) and cancer types. Independent T-Test was used to compare the BMI categories between gender and comparison of patient's Quality of Life Score and dimensions by EORTC QLQ version 3 between Male and Female. For the Pearson Chi Square, it was used to find the association of gender with types of cancer. Meanwhile, ANNOVA test was used to test Patient's Quality of Life Score and dimensions by EORTC QoL ver 3 by Body Mass Index (BMI). $p<0.05$ was deemed as the significant level.

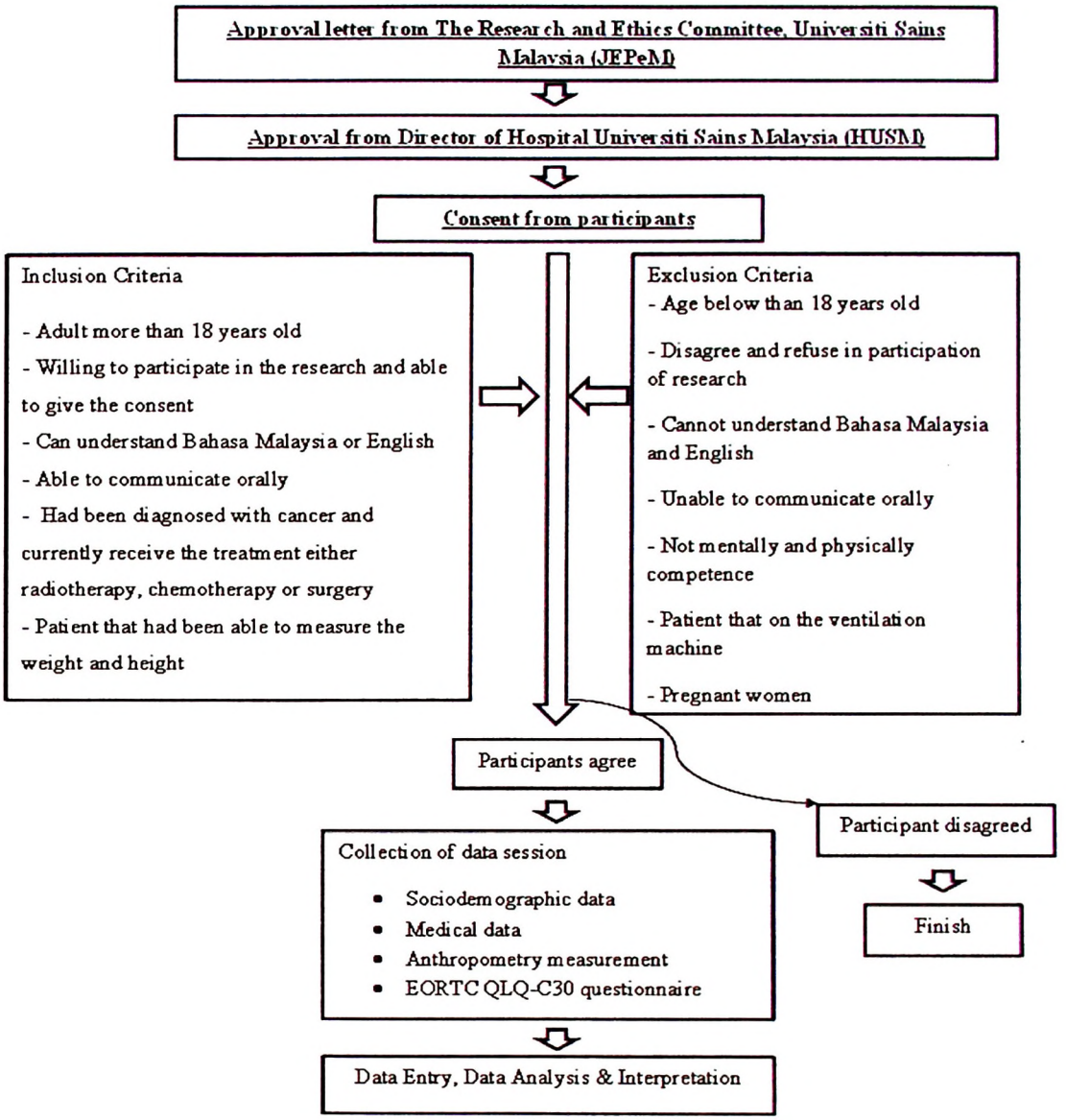

Figure 3.1: Flowchart of study

CHAPTER 4: RESULT

4.1 Socio-demographic background

As shown in Table 4.1 there were a total of 90 of cancer patients that had been took part in this study conducted at Hospital Universiti Sains Malaysia (HUSM) in which 33.3% of them were males and 66.7% were females. The mean of age of the respondents was 48.41 ± 15.04 years with respondents age below than 30 years old for males were 42.9% and 57.1% for females followed by 46.2% males participants and 53.8% females from age range from 31 to 40 years old, 41 to 50 years old (27.8% males and 72.2% females), 51 to 60 years old (5.3% males and 94.7% females), 61 to 70 years old (43.5% males and 56.5 females) as well as 66.7% of males participants and 33.3% females participants were 71 years old and older. Majority of the respondents were Malay which was 89 participants with 1 participant was Chinese. Its percentages were 33.7% of males and 66.3% of females for Malay and the only 1 Chinese was female.

Then, for the marital status, majority of the participants were married contributed to the 75.6% of total respondents which 35.3% were males and 64.7% were females followed by single (37.5% males and 62.5% females) and both divorced and single parents had given rise to the same percentage value which were 3.3% form total participants and 100.0% females. Furthermore, Body Mass Index (BMI) were calculated in this study and had been categorize into some categories based on World Health Organization (WHO) guidelines which was BMI for underweight was less than 18.4kg/m^2, normal weight was between 18.5-24.9 kg/m^2 while overweight was between 25.0-29.9kg/m^2 and more than 30.0kg/m^2 for obese categories. The mean BMI of the

respondents were 23.98 ± 5.99 kg/m^2 with 28.6% males and 71.4% females participants were underweight followed by normal weight (34.7% males and 65.3% females), overweight (33.3% males and 66.7% females) and obese (33.3% males and 66.7% females).

In addition, for the types of cancer, participants from the Hematologic group of cancer had the highest percentage which were 38.9% followed by 26.7% from Breast Cancer, Colorectal Cancer (12.2%), Bone Cancer (6.7%), Head and Neck (5.6%) and 3.3% for Gynecologic, Prostate and Lung Cancer. For the Hematologic, there were 51.4% from males and 48.6% from females followed by Breast Cancer participants (100.0% females), Lung Cancer (33.3% males and 66.7% females), Prostate Cancer (100.0% males), Head and Neck Cancer (20.0% males and 80.0% females), Bone Cancer (16.7% males and 83.3% females) and for Gynecologic Cancer were 100.0% females. Cancer patients had undergoing treatments which were majority of them having chemotherapy (80.0%) with 34.7% from males and 65.3% females followed by 10.0% of them having both chemotherapy and radiotherapy with 22.2% males and 77.8% females, 7.8% of them having radiotherapy with 42.9% males and 57.1% females as well as minority of them having surgery (2.2%) with 100.0% of them were females.

Table 4.1: Socio-demographic characteristics of respondent

Characteristic	Male n (%)	Female n (%)	Total n (%)
Gender	30 (33.3)	60 (66.7)	90
Race (n = 90)			
Malay	30 (33.7)	59 (66.3)	89 (98.9)
Chinese	0 (0.0)	1 (100.0)	1 (1.1)
Indian	0 (0.0)	0 (0.0)	0 (0.0)
Others	0 (0.0)	0 (0.0)	0 (0.0)
Age in groups (n = 90) 48.41 ± 15.04			
Age under 30	6 (42.9)	8 (57.1)	14 (15.6)
31 – 40	6 (46.2)	7 (53.8)	13 (14.4)
41 – 50	5 (27.8)	13 (72.2)	18 (20.0)
51 – 60	1 (5.3)	18 (94.7)	19 (21.2)
61 – 70	10 (43.5)	13 (56.5)	23 (25.6)
71 and older	2 (66.7)	1 (33.3)	3 (3.3)
Marital status (n = 90)			
Married	24 (35.3)	44 (64.7)	68 (75.6)
Single	6 (37.5)	10 (62.5)	16 (17.8)
Divorced	0 (0.0)	3 (100.0)	3 (3.3)
Single parent	0 (0.0)	3 (100.0)	3 (3.3)
Body Mass Index (n = 90) 23.98 ± 5.99			
Underweight (Below 18.4 kg/m^2)	4 (28.6)	10 (71.4)	14 (15.6)
Normal weight (18.5 kg/m^2 – 24.9 kg/m^2)	17 (34.7)	32 (65.3)	49 (54.4)
Overweight (25.0 kg/m^2 – 29.9 kg/m^2)	4 (33.3)	8 (66.7)	12 (13.3)
Obese (More than 30.0 kg/m^2)	5 (33.3)	10 (66.7)	15 (16.7)
Types of Cancer (n = 90)			
Hematologic	18 (51.4)	17 (48.6)	35 (38.9)
Colorectal	6 (54.5)	5 (45.5)	11 (12.2)
Breast	0 (0.0)	24 (100.0)	24 (26.7)
Lung	1 (33.3)	2 (66.7)	3 (3.3)
Prostate	3 (100.0)	0 (0.0)	3 (3.3)
Head and Neck	1 (20.0)	4 (80.0)	5 (5.6)
Bone	1 (16.7)	5 (83.3)	6 (6.7)
Gynecologic	0 (0.0)	3 (100.0)	3 (3.3)
Types of treatment (n = 90)			
Chemotherapy	25 (34.7)	47 (65.3)	72 (80.0)
Radiotherapy	3 (42.9)	4 (57.1)	7 (7.8)
Chemotheraphy and Radiotherapy	2 (22.2)	7 (77.8)	9 (10.0)
Surgery	0 (0.0)	2 (100.0)	2 (2.2)