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QUALITY OF LIFE AMONG CANCER PATIENTS ON CHEMOTHERAPY IN ONCOLOGY UNIT HUSM

Dissertation submitted in partial fulfillment for the Degree of
Bachelor of Health Science in Nursing

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CERTIFICATE

This is to certify that the dissertation entitled '**Quality of Life among Cancer Patients on Chemotherapy in Oncology Unit HUSM'** is the bonafide record of research work done by Yong Siew Yee matric number: 70994 during the period of July 2005 to March 2006 under my supervision. This dissertation submitted in partial fulfillment for the degree of Bachelor of Science (Health) in Nursing. Research work and collection of data belong to University Science Malaysia.

Signature of Supervisor

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ABBREVIATIONS

CIA	Chemotherapy-Induced Alopecia
CIAA	Chemotherapy-Induced Appetite Alteration
CIC	Chemotherapy-Induced Constipation
CID	Chemotherapy-Induced Diarrhea
CIF	Chemotherapy-Induced Fatigue
CINV	Chemotherapy-Induced Nausea and Vomiting
EORTC QLQ-C30	European Organization for Research and Treatment of Cancer Quality Of Life Questionnaire-C30
FACT	Functional Assessment of Cancer Therapy
FLIC	Functional Living Index-Cancer
KPS	Karnofsky Performance Status
LASA	Linear Analogue Self-Assessment
MOS	Medical Outcomes Study
NHL	Non-Hodgkin's Lymphoma
NPH	Nottingham Health Profile
NSCLC	Non Small Cell Lung Cancer
SF-36	36-Item Short-Form Health Survey
SIP	Sickness Impact Profile
SPSS	Statistical Package for Social Science
UKM	Universiti Kebangsaan Malaysia
UM	University Malaya
WHO	World Health Organization
5-HT_3	5-Hydroxytryptamine type-3

QUALITY OF LIFE AMONG CANCER PATIENTS ON CHEMOTHERAPY IN ONCOLOGY UNIT HUSM

ABSTRACT

Background of the study: Cancer is becoming a major health problem throughout the world and chemotherapy is one of the most important tools for its treatment. However, side effects of chemotherapy can influence patient's QOL (quality of life). In addition, physicians frequently underestimate patient's QOL. Accurate QOL information can make a major contribution to improve the management of cancer patients. It gives guidelines and awareness for clinicians and nurses to concentrate more on QOL and plan specific interventions to meet the needs in order to improve patients' QOL.

Objective: To identify the frequency of side effects during chemotherapy treatment, compare the QOL pre- and on-chemotherapy treatment and determine the domains of QOL (physical, mental and social) in relation to the three most common side effects of chemotherapy in HUSM.

Methodology: This study was a cross-sectional design and descriptive study. Fifty heterogeneous cancer patients with chemotherapy treatment enrolled into this study. A modified version 3.0 of the EORTC QLQ-C30 was used with reliability alpha 0.829.

Result: Results from this study revealed that the three most common side effects of chemotherapy were fatigue, alopecia and appetite alteration. There was a significant difference of QOL before and during chemotherapy. The three most common side effects were significantly correlated with domains of QOL except for alopecia which was related to physical domain. Overall, the global QOL of cancer patients were improved.

Conclusion: Assessment and evaluation of QOL for cancer patients with chemotherapy is very important. Concentrating on QOL allows nurses to plan, implement, evaluate and revise QOL care during various treatment periods. Nurses can provide information for cancer patients regarding prevention and management strategies for side effects of chemotherapy.

KUALITI KEHIDUPAN PESAKIT KANSER YANG MENJALANI RAWATAN KEMOTERAPI DI UNIT ONKOLOGI HUSM

ABSTRAK

Latar belakang kajian: Kanser merupakan masalah kesihatan yang utama di seluruh dunia. Kemoterapi adalah salah satu rawatan penyakit kanser yang paling penting. Walau bagaimanapun, kesan sampingan kemoterapi akan mempengaruhi kualiti kehidupan pesakit. Tambahan pula, doktor sering menberi taksiran yang tidak tepat terhadap kualiti kehidupan pesakit. Maklumat tentang kualiti kehidupan yang tepat akan meningkatkan pengurusan rawatan pesakit kanser. Ia memberi panduan dan kesedaran kepada doktor dan jururawat untuk menumpu lebih banyak perhatian dan merancang tindakan yang spesifik untuk meningkatkan kualiti kehidupan pesakit.

Objektif: Mengenalpasti frekuensi kesan sampingan kemoterapi, membandingkan kualiti kehidupan sebelum dan semasa rawatan kemoterapi dan menentukan perkaitan antara kualiti kehidupan domain (fizikal, mental dan sosial) dengan tiga jenis kesan sampingan kemoterapi yang paling utama di HUSM.

Metodologi: Kajian ini menggunakan pendekatan kuantitatif dan kaedah pengumpulan data adalah keratan lintang. Seramai 50 orang pesakit kanser yang menerima rawatan kemoterapi terlibat dalam kajian ini. EORTC QLQ-C30 versi 3.0 yang telah diubahsuai dengan reliabiliti alfa 0.829 telah digunakan dalam kajian ini.

Keputusan: Tiga jenis kesan sampingan yang paling utama adalah keletihan, keguguran rambut dan perubahan selera makan. Terdapat perbezaan kualiti kehidupan sebelum dan semasa kemoterapi. Terdapat perkaitan antara tiga jenis kesan sampingan kemoterapi yang paling utama dengan kualiti kehidupan domain kecuali keguguran rambut yang hanya berhubungkait dengan domain fizikal. Secara keseluruhan, global kualiti kehidupan pesakit kanser telah ditingkatkan.

Kesimpulan: Penaksiran dan penilaian kualiti kehidupan pesakit kanser adalah sangat penting. Jururawat boleh merancang, melakukan, menilai dan menyemak jagaan kualiti kehidupan pesakit semasa tempoh rawatan. Jururawat boleh memberi maklumat tentang pencegahan dan strategi pengurusan kesan sampingan kemoterapi kepada pesakit kanser.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Cancer is a family of complex disease with manifestations that vary according to the body system affected and the type of tumor cells involved (Dewit 1998; LeMone & Burke 1996). Cancer is becoming a major health problem throughout the world. According to American Cancer Society in Atlanta (Smeltzer & Bare 2000), more than 1.2 million Americans are diagnosed each year with a cancer affecting various body sites. The leading cause of cancer deaths in the United States are lung, prostate, breast and colorectal cancer.

In the First Report of the National Cancer Registry in Malaysia, 26,089 cases were registered among the population in Peninsular Malaysia and 3,750 cases registered in Sabah and Sarawak (Lim 2005). Lim noted that cancer constitutes 10.3% of medically certified deaths, which is the fourth leading cause of death after diseases of the circulatory system, accidents, poisonings and violence, and diseases of the respiratory system. According to Zaini Mohd. Noor (2005), the most common cancer in HUSM Oncology Ward (3S) is Non-Hodgkin's lymphoma (NHL) that is 20.5%, following by osteosarcoma (11.4%) and lung cancer (7.0%) in 2004.

Treatment options offered to cancer patients is based on the type of cancer. One of the treatments for cancer is chemotherapy. Chemotherapy is one of the most important tools currently available for the treatment of neoplastic diseases (Cawley 1990; Dewit 1998; McKnight 2003; Walter 1982). The goal of chemotherapy is to prolong survival while maintaining an excellent quality of life (QOL) for patients during and after the treatment period (McKnight 2003; Walter 1982). However, chemotherapy has side effects (Dewit 1998; LeMone & Burke 1996; Walter 1982). The type and severity of the side effects depend upon the drugs used. Overall, the common severe side effects are fatigue, alopecia, nausea and vomiting (Payne 1992). The National Comprehensive Cancer Network (NCCN) stated that fatigue is the third most severe side effect, following the effects of treatment on family or a partner and alopecia (Edwards 2003). These side effects may lead to a reduction in patient's QOL. For example, alopecia may profoundly affect a patient's self-image and self-confidence. Apart from that, nausea and vomiting may reduce patient's appetite, leading to malnutrition and thus weight loss (Wilkes & Ades 2004).

1.2 Problem statement

Historically, clinicians have relied on biomedical markers such as the result of laboratory tests to determine whether a health intervention is necessary or has been successful (http://www.qualitymetric.com/intents/ClinicalPractice.shtml). However, clinical measures can miss the outcomes that matter most to patients – namely, how people function and their experiences with care – referred to as their QOL. QOL is very subjective. Most of the components such as social functioning and spirituality cannot be directly observed. Consequently, physicians frequently underestimate patient's QOL.

Newell et al. (1998) proposed a study about how well do medical oncologists' perceptions reflect their patients' reported physical and psychosocial problem. The researchers conducted a cross-sectional survey of physical symptoms, anxiety, depression and perceived needs among 204 consenting patients visiting an outpatient medical oncology department. Immediately following consultations with consenting patients, medical oncologists and registrars also completed a survey in which they indicated their perception of each patient's level of each problem. These two data sets were then compared. They found that five oncologists' perceptions of patients' levels of the major physical symptoms (fatigue, nausea, vomiting and alopecia) demonstrated the highest level of awareness, with sensitivity rates up to 80%. But the sensitivity was less than 50% for other physical symptoms. It proved that medical oncologists' perceptions may not accurately reflect their patients' reported physical and psychosocial experiences.

Assessment and evaluation of QOL for cancer patient is very important. This emphasis was confirmed by Zittoun, Achard and Ruszniewski, who undertook a study about assessment of QOL during intensive chemotherapy or bone marrow transplantation in 1999. Patients with cancer enter therapy with the recognition that therapy aimed at cure is often accompanied by side effects that have a negative impact on their QOL. Palliative care is concerned primarily with managing side effects, controlling symptoms and supporting overall QOL when cure or control of the cancer is no longer believed to be possible. During this stage of disease, QOL issues are particularly important. Therefore, oncologists need to recognize the problems experienced by their patients and, when possible, help resolve these problems.

According to Zaini Mohd. Noor (2005), patients who receive chemotherapy treatment had increased since 2001 in HUSM as shown in Figure 1. There were 188 cases reported in 2003 and 658 cases were reported in 2004. Meanwhile, 487 cases were reported from January until July of 2005 and are expected to increase again. Since it is reported particularly in HUSM that number of cancer patients receiving chemotherapy are increasing each year, it is worthwhile to determine the QOL of the cancer patients in order to improve their lives.

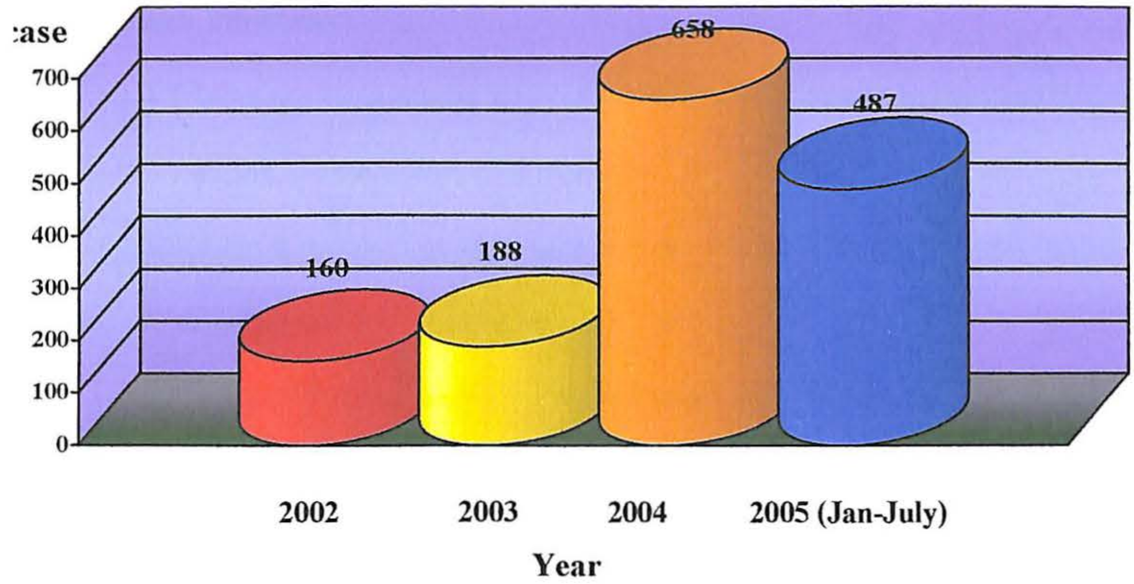

Figure 1.1: Number of cancer patients on chemotherapy treatment in HUSM from 2002 to 2005 (Jan-July).

1.3 Objectives of the study

Therefore, the general objective of this study is to evaluate the QOL of cancer patients on chemotherapy.

The specific objectives of this study are:

1.3.1 To identify the frequency of side effects for cancer patients in HUSM during the chemotherapy treatment.

1.3.2 To compare the QOL of cancer patients in pre- and on-chemotherapy treatment in HUSM.

1.3.3 To determine the domains of QOL (physical, mental and social) in relation to the three most common side effects of chemotherapy in HUSM.

1.4 Research questions

1.4.1 What are the common side effects suffered by cancer patients in HUSM during chemotherapy treatment?

1.4.2 What is the level of difference between QOL for cancer patients in pre- and on-chemotherapy treatment in HUSM?

1.4.3 What is the relationship between domains of QOL and the three most common side effects of chemotherapy in HUSM?

1.5 Research hypothesis

1.5.1 Null Hypothesis: There is no significant difference between QOL for cancer patients in pre- and on-chemotherapy treatment in HUSM.

1.5.2 Null Hypothesis: There is no relationship between domains of QOL and the three most common side effects of chemotherapy in HUSM.

1.6 Operational definition

1.6.1 Cancer

A disease process whereby cells proliferate and growth abnormally (Smeltzer & Bare 2000). It is a neoplastic disease process that begins when an abnormal cell is transformed by the genetic mutation of the cellular DNA and forms a clone then begins to proliferate abnormally (www.medterms.com/script/main/art.asp?articlekey=20677).

1.6.2 Quality Of Life (QOL)

QOL is well-being in three areas: physical functioning, mental or cognitive health and social functioning (Camilleri-Brennan & Steele 1999). It is a subjective, multidimensional and health-related (King, Dobson & Harnett 1996). It is patient perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (Bottomley 2002).

1.6.3 Chemotherapy

It is a treatment of cancer with drugs that can destroy cancer cells (Wilkes & Ades 2004). Chemotherapy is antineoplastic agents that are used to kill tumor cells by interfering with cellular functions and reproduction (Yarbro, Frogge & Goodman 2004).

1.6.4 Pre-chemotherapy treatment

Pre-chemotherapy refers to the cancer patients who have not undergone the 1st cycle of chemotherapy treatment in the context of this study.

1.6.5 On-chemotherapy treatment

In this study, on-chemotherapy refers to the cancer patients who undergo chemotherapy treatment in 3rd cycle and above.

1.7 Benefits of the study

QOL measurement has become the key to develop better way to monitor and improve care delivery (http://www.qualitymetric.com/intents/ClinicalPractice.shtml). Coates, Porzsolt and Osoba (1997) described that QOL measurements are used as outcome measures by which to compare different treatments. QOL information is improving oncologists' knowledge about the side effects of chemotherapy. Accurate QOL information could therefore make a major contribution to improve the management of cancer patients. It provides valuable insights that will help cancer patients and their clinicians make decisions about the therapeutic options in the clinical setting.

More clinicians are considering the importance of QOL as critical to cancer patients' care. Kurihara et al. (1999) believed that QOL should be considered just as important as the cancer end-points response rate, disease-free survival and overall survival. Hopefully through this study, QOL care can be planned and implemented, evaluated and revised during chemotherapy period. It gives guidelines and awareness for clinicians and nurses to be more concentrate on QOL for chemotherapy patients and plan specific interventions to meet the needs in order to improve QOL in patients.

1.8 Limitations of the study

This study had a number of limitations. The duration of the study was short that was within 1 year. It was quite impossible for the researcher to get large sample size which was approximately 197 samples. Therefore, the result from this study cannot be generalized to population. Apart from that, QOL contains a relative judgment. It is difficult to get accurate results. Meanwhile, the study was done on heterogeneous cancer patients and various types of anticancer drug regimes. The occurrence of each side effect was different in time too.

Furthermore, patients with co-morbid diseases which gave negative impacts on QOL were enrolled in this study as well. Therefore, some recommendations will be discussed in Chapter 6 in order to improve the study in future.

1.9 Theoretical framework of QOL and side effects of chemotherapy

In 2003, Ventegodt, Merrick and Andersen presented the theoretical and philosophical framework of the Danish Quality of Life Survey as shown in Figure 1.2. According to them, QOL is divided into three groups: subjective, existential and objective. The objective QOL contains four theories of QOL, namely objective factors, fulfillment of needs and realization of the life potential and biological order. Four theories of QOL also existed in subjective QOL as well which are well-being, satisfaction with life, happiness and meaning in life.

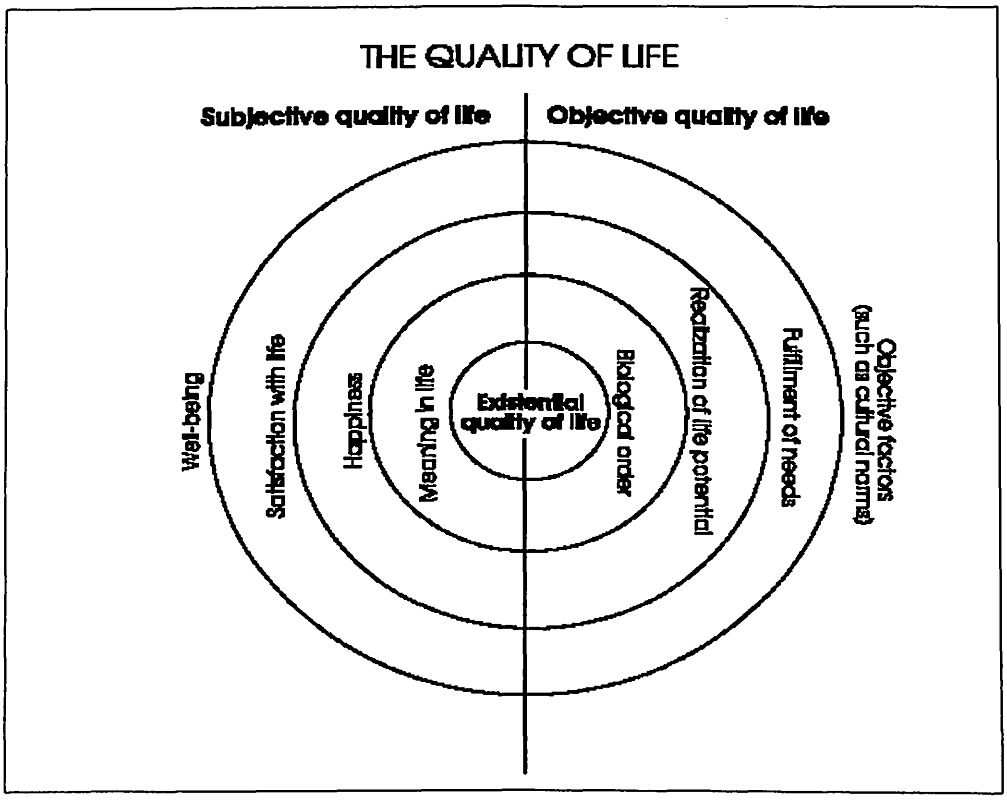

Figure 1.2: The Integrative Theory of QOL (Ventegodt, Merrick & Andersen 2003).

In this study, researcher only used well-being theory in Theoretical Yong. Theoretical Yong is depicted in Figure 1.3. Well-being theory is the most natural aspect of the subjective QOL. It is less complex and more straightforward than satisfaction with life and happiness. Besides that, it is closely linked to how things function in an objective world and with the external factors of life.

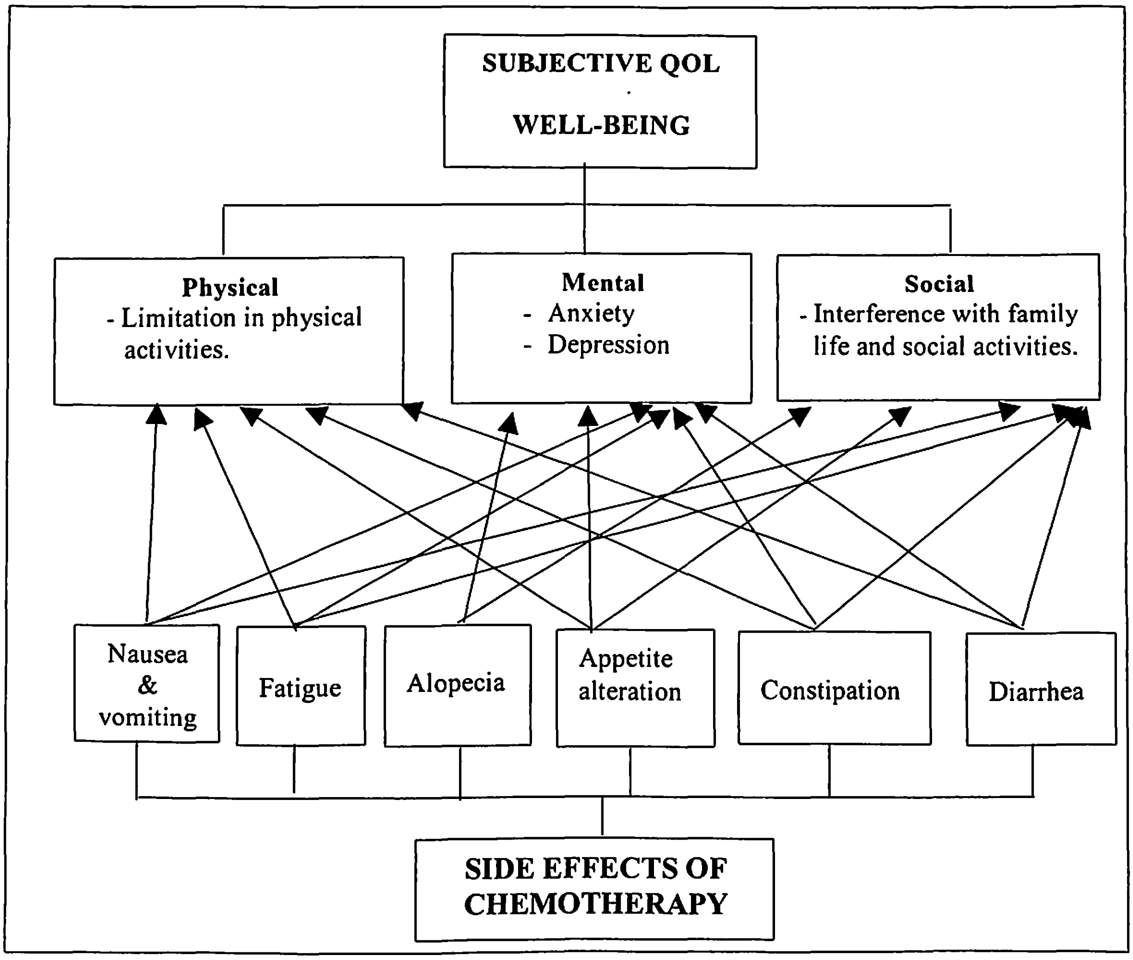

Figure 1.3: Theoretical Yong cited from Integrative QOL theory (IQOL).

Within well-being theory, it is divided into physical, mental and social domains. The World Health Organization (WHO) has defined healthy broadly as a state not merely the absence of disease or infirmity but also include physical, mental and social domains (http://www.phoenix5.org/glossary/Quality_of_Life.html). This statement has promoted the development of the QOL concept towards a multidimensional definition.

According to the European Organization for Research and Treatment of Cancer Quality Of Life Questionnaire-C30 (EORTC QLQ-C30) version 3.0 (http://clinicalresearch.nl/portec2/Qualityof_LifequestionnairePORTEC-2), the domain of physical well-being in cancer patients on chemotherapy is based on limitations in physical activities. Interference with family life and social activities are determined under social domain. Meanwhile, the mental domain is evaluated based on anxiety and depression.

Anxiety and depression are highly correlated with QOL (Payne 1992). The study reported by Hipkins et al. (2004) demonstrated significant prevalence of anxiety (38%) and depression (33%) in cancer patients at the end of chemotherapy. The prevalence of anxiety in patients with cancer varies greatly, ranging from 0% to 49% (Yarbro, Frogge & Goodman 2004). According to them again, most patient's psychological distress decreases over time, although 20% to 30% of patients continue to experience increased levels of anxiety during post-treatment follow-up. Almost 90% of the psychiatric disorders were reactions to disease or treatment. Among individuals hospitalized for cancer, 25% were found to have depression.

In 2003, a study was carried out by Morita et al. to determine the relative influence of side effects on QOL during chemotherapy in 377 patients with advanced non-small lung cancer. The common side effects are nausea and vomiting, alopecia, fatigue, appetite alteration, constipation and diarrhea. They found that fatigue, appetite, constipation, nausea and vomiting had a significant influence on all three domains (physical, mental and social), especially physical domain. Diarrhea had a significant influence not only on physical but also on the mental and psychosocial. Meanwhile, alopecia only gives impacts on mental and social domains.

Byar et al. (2006) also carried out a study to identify differences in fatigue, other physical symptoms and psychological symptoms and their relationship to QOL of breast cancer patients during chemotherapy. From their findings, anxiety was highest at baseline whereas depression was highest during the fourth chemotherapy treatment. Fatigue was correlated with other physical and psychological symptoms at some times during treatments and consistently following treatment. Higher fatigue was associated with lower QOL in several domains.

CHAPTER 2

LITERATURE REVIEW

2.1 Cancer

Cancer is a disease that results when normal cells mutate into abnormal, deviant cells that then perpetuate within the body (Dewit 1998; LeMone & Burke 1996). The problem of cancer in Malaysia is growing, as Lim from Department of Radiotherapy and Oncology, Hospital Kuala Lumpur noted in Japanese Journal of Clinical Oncology (2002). According to him, the estimated annual incidence of cancer is 30,000 in 2005.

Apart from that, data from the 2003 National Cancer Registry report (Latham 2003) indicated that the most common cancers among men are lung cancer (13.8%), nasopharynx (8.8%) and colon cancer (7.6%). Meanwhile, breast cancer (31.0%) is the most common cancer among female, following by cervix cancer (12.9%) and colon cancer (3.0%).

Research is currently focusing on many different areas including studies about QOL issues, primary conducted by doctor or nurse for individuals with cancer (Bottomley 2002; Coates, Porzsolt & Osoba 1997; Hanna et al. 2004; Holzner et al. 2001; Martha, Bhaduri & Jain 2004). Other research areas include new combinations of chemotherapy drug, chemoprevention trials and the use of biologic response modifies (Cawley 1990; Edwards 2003; Ikebe et al. 2003).

2.2 Chemotherapy

Multiple modalities are commonly used in cancer treatment. Cancer treatment includes variety of therapies, namely surgery, radiotherapy, chemotherapy, immunotherapy, photodynamic therapy and bone marrow transplantation (LeMone & Burke 1996; Rosenberg 1991). According to Wilkes and Ades (2004), chemotherapy is the first choice for treating many cancers and it differs from surgery or radiation for it is always used as a systemic treatment in that the medicines travel throughout the whole body or system. Depending on the type of cancer and how advanced it is, chemotherapy can be used for different goals such as cure, control and palliation (McKnight 2003; Robinson 1993; Walter 1982; Wilkes & Ades 2004).

Meanwhile, Cawley (1990) explained that chemotherapy may be given as neoadjuvant therapy (before surgery or radiation) or as adjuvant therapy (after surgery or radiation). Within the last decade, knowledge of the pathogenesis and treatment of cancer has increased dramatically. Wilkes and Ades (2004) stated that more than 100 drugs are currently used for chemotherapy, either alone or in combination. Basically, chemotherapy drugs are divided into several categories based on how they affect specific chemical substances within cancer cells such as alkylating agents, nitroureas, antimetabolites, antitumor antibiotics, mitotic inhibitors, hormones and miscellaneous agents (LeMone & Burke 1996; McKnight 2003; Robinson 1993; Rosenberg 1991; Walter 1982; Wilkes & Ades 2004).

Advances in cancer treatment have brought significant improvements in the overall survival expectation for many malignant diseases (Brown et al. 2005; Kim et al 1999; Schipper et al. 2005). But on the other hand, it gives negative impacts on QOL. A study which was performed by Hipkins et al. (2004) in women with ovarian cancer after completing chemotherapy treatment found that there was a significant prevalence of cases of anxiety (38%) and depression (33%) suffered by these patients.

2.3 Quality of life (QOL)

QOL is a term which has been applied to various disciplines, such as politics, economics and religion. However, this term has been used mainly in medical studies. It measures the effect of illness, disease and its treatment on the patient's welfare by going beyond the physician-dominated indicators of the patient's progress (Camilleri-Brennan & Steele 1999). Only 20 years ago, scant literature reported QOL benefits. However, there has been a large increase in studies reporting the assessment of QOL in recent years.

Kahn (2003) examined the growing use of QOL instruments in clinical trials from 1990-2001. From his finding, it appears that use of QOL measurements reached current levels in only five years and is now increasing slowly. The highest frequency of use of QOL measures is in oncology area (80%), following by immunodulation (40%) and hematology (40%).

In oncology area, a study was carried out by Fallowfield, Cella and Cuzick (2004) to examine impact of different adjuvant endocrine treatments (Anastrozole and Tamoxifen) on QOL of breast cancer patients. From the result, they found that there were vasomotor advantages for women treated with Anastrozole. However reports of gynecological and sexual difficulties were more common on Anastrozole. This information will assist women with breast cancer and their clinicians to weigh the risks and benefits when making decisions about endocrine therapies for early stage breast cancer.

Since 1985, the U.S. Food and Drug Administration requires that an effect on improvement of QOL needs to be shown before a new chemotherapy drug is approved for use and many international research groups include QOL in their studies, introducing QOL into oncology (Bottomley 2002; Bottomley et al 2003).

In the late 1980s and early 1990s, active discussion took place about the definition of QOL and the methodology for assessing QOL in cancer patients (Morita et al. 2003). There is no universal agreement on the definition of QOL. QOL is multidimensional, subjective and dynamic concepts which are intimately related together. It depends upon an individual's perceptions, beliefs, feeling and expectations.

In the literature, some authors emphasize normality, stating that QOL can be viewed as fulfillment and the ability to lead a normal life (http://encyclopedia.laborlawtalk.com/quality_of_life). Some focus on satisfaction by claiming that QOL is the degree of need satisfaction (Zlatanovic 1997) or the extent to which pleasure and satisfaction characterize human existence (Bottomley 2002). Other authors emphasize individuality when defining QOL as the perception of personal meaning (King, Dobson & Harnett 1996). Only the individual himself can state whether his present QOL is high or low.

2.4 Chemotherapy and QOL

Although chemotherapy is given to kill cancer cells, it can also damage normal cells. Normal cells that divide rapidly such as bone marrow, hair follicles and cells in the reproductive and digestive tracts are most likely to be damaged (Wilkes & Ades 2004). Damage to these cells accounts for many of the side effects such as dyspnea, appetite alteration, constipation and diarrhea.

According to Robinson (1993), the toxicities found to occur with anticancer drugs have been reported to affect almost every organ system and tissue. The major potentially life-threatening organ toxicities are gastrointestinal (92%), bone marrow (88%) and hepatic (52%). However, side effects are different for each chemotherapy drug. The most common side effects are nausea and vomiting, fatigue and alopecia (McKnight 2003). These side effects will gradually reduce the cancer patients' QOL. Haes et al. (2000) reported that symptom control, reduction of treatment toxicity and of patients' distress have become more relevant objectives in the evaluation of cancer treatment.

2.4.1. Chemotherapy-Induced Nausea and Vomiting (CINV)

According to Yarbro, Frogge and Goodman (2004), more than 75% of patients experience nausea and about 40% vomiting after chemotherapy. This finding was confirmed by Edwards, oncology research nurse who studied about prevention and treatment of adverse effects related to chemotherapy for recurrent ovarian cancer in 2003. She stated that nausea and vomiting are among the most distressing side effects of cancer treatment. Despite the development of effective antiemetics and chemotherapy regimes with low emetogenic potential, patients may erroneously regard nausea and vomiting as an unavoidable consequence of chemotherapy (McKnight 2003; Walter 1982; Wilkes & Ades 2004).

Patients undergoing chemotherapy will experience nausea and vomiting in varying degrees. As noted by Perdue (2005), factors that contribute to the severity of the symptoms include the chemotherapy agents used and their dosage, age (it is more pronounced in younger people), gender (females are more prone to CINV), alcohol intake (a chronic, high alcohol intake reduces incidence of these side effects), individuals who suffer from motion sickness may experience more severe episodes of nausea and vomiting, and increased levels of anxiety.

Aapro and Blower (2005) stated that these side effects may last for more than 5 days after administration. They suggested that 5-Hydroxytryptamine type-3 (5-HT$_3$) receptor antagonists are considered the antiemetic 'gold standard'. Likewise, The National Comprehensive Cancer Network (NCCN) recommends that any patient scheduled to receive highly or moderately emetogenic chemotherapy be premedicated with a serotonin (5-HT$_3$) receptor antagonist combined with Dexamethasone and possibly Lorazepam before initiating chemotherapy treatment (Edwards 2003; Walter 1982). Reduced emesis also has resulted from the availability of Ondansetron (Zofran), Dolasetron (Anzemet), Granisetron (Kytril) and Tropisetron (Decker, DeMeyer & Kisko 2006; Fernandez-Ortega et al. 2003; Sharma, Tobin & Clarke 2005).

Before the use of modern antiemetics, patients ranked nausea and vomiting as the most distressing toxic effects of systemic chemotherapy. To date, CINV continues to negatively affect QOL and can deter patients from continuing treatment (Fernandez-Ortega et al. 2003; Sharma, Tobin & Clarke 2005). The impact of nausea and vomiting on QOL in cancer patients during chemotherapy was studied by Ballatori and Roila in 2003. They evaluated evaluate QOL of 122 patients with various cancers by using EORTC method. From that study, they claimed that the nausea and vomiting accompanying cytotoxic chemotherapy have a negative impact on QOL.

In the study carried out by Fernandez-Ortega et al. (2003) to assess incidence and impact of CINV, 75% of patients with nausea and 51% with emesis reported a significant impact on their daily life, hampering their ability to carry out activities of daily living comfortably.

2.4.2. Chemotherapy-Induced Fatigue (CIF)

The most common unrelieved and distressing symptom related to cancer and chemotherapy treatment is fatigue (Ahlberg et al. 2003; Byar et al. 2006; Neridjon & Sowers 2000). CIF is a problem both because it is an unpleasant sensation and because it diminishes QOL. Although literature focusing on fatigue has increased, researchers still have not agreed on a universal definition of fatigue. For the current study, fatigue was defined as a persistent and subjective sense of tiredness related to cancer or cancer treatment that interferes with usual functioning and can vary in unpleasantness, duration, and intensity (Ahlberg et al. 2003; Byar et al. 2006). The research on fatigue in cancer patients focuses on fatigue as a side effect of treatment.

Neridjon and Sowers (2000) stated that patients report peak fatigue immediately on the day chemotherapy is administered and gradually decreases until the next treatment. They also found that the level of cancer-related fatigue immediately before the next treatment gradually increases over the cycles of chemotherapy in some patients. However, the study about QOL of breast cancer patients on chemotherapy which proposed by Byar et al. (2006) found that patients reported moderate-intensity fatigue on day 3 after each treatment, and the level of fatigue remained relatively stable during treatment. Levels of fatigue reduced after treatments ended, with the lowest level reported one year after the first chemotherapy treatment.

In the study of assessment and management of CIF in adults, Ahlberg et al. (2003) revealed that 70-100% of patients being treated for cancer are affected by CIF. The results of their study indicate that fatigue affects the whole person (their body and mind) and is a complex symptom with physical, emotional and mental effects. CIF is associated with psychological factors such as anxiety and depression. It is inversely associated with activity level and with functional capacity. In addition, they found that a significant correlation between disease burden and fatigue.

In Zittoun et al. (1999) study, 75% of patients with various solid tumors (in which 48 of 95 had metastasis disease) had a significantly increased fatigue score and experienced moderate change during chemotherapy. In addition, the strongest correlations were found between physical domain and fatigue (r=0.41), and also between fatigue and emotional (r=0.62). Thus, they concluded that fatigue, like pain, is not explained by physiologic mechanisms alone, it also must be understood as a multidimensional concept that includes physical, psychological, social and spiritual aspects.

One of the reasons that cause fatigue is due to anemia. It is because most chemotherapeutic agents cause some degree of toxicity on bone marrow. Neutropenia and thrombocytopenia are the most common acute toxicities because these cells have the shortest half-life. Chemotherapy-induced anemia tends to be a more chronic toxicity. According to Ahlberg et al. (2003) and Zittoun et al. (1999), fatigue is the most frequent manifestation of anemia in patients with cancer. The drugs suppress bone marrow and prevent formation of new blood cells. In an assessment of 2719 patients, receiving chemotherapy in the United of Kingdom, 33% needed at least one blood transfusion for anemia (Barrett-Lee et al. 2000).

2.4.3. Chemotherapy-Induced Alopecia (CIA)

Hair loss as a result of anticancer therapy has been described in the medical literature for more than 40 years (Yarbro, Frogge & Goodman 2004). It is one of the most distressing side effects of chemotherapy (McKnight 2003; Rosman 2003; Wilkes & Ades 2004). Neridjon and Sowers (2000) stated that over 75% of hair follicles on the scalp are dividing at any one time. Dividing cells are the most vulnerable to chemotherapy and radiotherapy. According to Wilkes and Ades (2004), alopecia can be individual and depends on which drugs are given, doses and the length of treatment. Alopecia is usually delayed 2 to 3 weeks after the start of chemotherapy. Re-growth begins 4 to 6 weeks after the completion of therapy and takes a year to return to normal thickness and texture.

Alopecia has a negative impact on the QOL of most cancer patients. It is as assault to physical appearance, body image, sexuality and self-esteem. This finding was confirmed by a number of research articles. In 2004, Rosman carried out an exploratory qualitative study among 35 patients with lung or breast cancer. He examined how patients react to alopecia due to chemotherapy within such frameworks as self-esteem, body-image and self-perception. 80 of the interviewees had undergone chemotherapy and almost all of them had lost all of their hair. It was found that 73% of the patients did not feel as self-confident as they had prior to treatment. People with CIA frequently suffer from depression and anxiety. He also stated that alopecia was a more traumatic experience for women than for men. For women in particular, hair is an important indicator of personality, attractiveness and femininity.

Many chemotherapeutic drugs can produce alopecia as such agents make no distinction between cancer and normal cells; all sites of energetic mitotic activity are prone to their chemical insult (Neridjon & Sowers 2000). According to Yarbro, Frogge and Goodman (2004), chemotherapy agents that high potential to produce alopecia are Cyclophosphamide, Doxorubicin, Etoposide, Ifosfamide and Taxotere. Meanwhile, 5-Fluorouracil, Cisplatin, Methotrexate and Vincristine are drugs that moderate potential to induce alopecia.

2.4.4. Chemotherapy-Induced Appetite Alteration (CIAA)

Anorexia is a decrease in or complete loss of appetite. It is a side effect of some chemotherapeutic agents and may occur along with nausea and vomiting (Wilkes & Ades 2004; Yarbro, Frogge & Goodman 2004).

According to Wilkes and Ades (2004), anorexia may be mild or it may lead to cachexia, a form of malnutrition. Cancer treatments and the cancer itself can change the way some foods taste. These changes occur because chemotherapy drugs Cisplatin, Levamisole and Mechlorethamine can change the taste-receptor cells in mouth. Changes in taste and smell may continue as long as chemotherapy treatments continue or longer. Taste changes can contribute to anorexia and malnutrition.

Furthermore, the oral pain and discomfort that accompany mucositis and infections of the oral mucosa may make the patient reluctant to eat. Mucositis also known as stomatitis, is an acute inflammation of the oral cavity characterized by redness, swelling and ulceration (Edwards 2003). Mucositis can lead to compromised nutrition, reduced QOL and increased risk of infection in neutropenic patients (Yarbro, Frogge & Goodman 2004). It has been estimated that up to 25% of all cancer patients have difficult in swallowing (Neridjon & Sowers 2000). Cancer patients may loss of appetite. As a consequence, physical deterioration and weight loss occur, leading to diminished performance and QOL.

2.4.5 Chemotherapy-Induced Constipation (CIC)

Chemotherapeutic agents may alter bowel function either constipation or diarrhea (Tenenbaum 1994). In order to accurately identify and manage constipation, it is necessary to define it. Constipation, as with many symptoms and concepts nurses use on a regular basic, lacks a definitive definition. It is and abnormal pattern of bowel elimination and the irregular uneasy passage of a formed stool at least three times per week and no more than three times per day (Yarbro, Frogge & Goodman 2004). Constipation is the passage (usually with discomfort), hard and dry stool.

QOL on cancer patients with constipation problem is likely to diminish due to increased physical, social and psychological distress. Signs and symptoms of constipation that could affect QOL include abdominal fullness or distention, painful cramping, flatus, anorexia and excessive straining to relieve hard stool. For patients with cancer, the prevalence of constipation is less clear, but its frequent occurrence has been reported to be as high as 40% to 50% of those individuals who were referred to a chemotherapy treatment (Wujcik 1992). A quality-assurance program conducted by staff nurses on a 28-bed oncology unit found that 95% of that patient population experienced significant constipation while on opioid therapy during chemotherapy (Robinson et al. 2000 cited in Yarbro, Frogge & Goodman 2004).

Constipation may occur in direct response to a tumor located in the large intestine or pelvic legion. It may also be a side effect of cytotoxic agents (Vinca alkaloids or Ondansetron), $5HT_3$ antagonists and antiemetics. Other factors such as decreased physical activity, poor diet, decreased fluid intake and dehydration, bed rest and depression also can cause constipation.

2.4.6. Chemotherapy-Induced Diarrhea (CID)

Diarrhea is the passage of loose or watery stools three or more times a day with or without discomfort (Wilkes & Ades 2004). CID is a primarily a secretory diarrhea that typically occurs within 24 to 96 hours after infusion of the chemotherapy drug (Viele 2003). It is a common dose-limiting toxic effect associated with chemotherapy, especially in the treatment of colorectal cancer by use of Irinotecan, Fluouracil, Capecitabine, Oxaliplatin or Raltitrexed (National Cancer Institute 2005; Sharma, Tobin & Clarke 2005; Viele 2003).

Chemotherapeutic agent especially antimetabolites will destroy gastrointestinal epithelium (Tenenbaum 1994). Yarbro, Frogge and Goodman (2004) stated that in population treated with Fluoropyrimidines and Irinotecan, diarrhea occurrence rates rise to 50% to 80%. According to them again, diarrhea is a more common side effect than constipation.

QOL can be significantly affected by diarrhea especially in physical and psychological domains. It reduces comfort levels and performance potential, altering the role and interpersonal relationships. Severe diarrhea causes dehydration, renal failure and thromboembolic events. Furthermore, diarrhea combined with severe neutropenia commonly leads to gram-negative sepsis and such complications have contributed to the high incidence of mortality within 60 days for patients who received Irinotecan-based regimens (Sharma, Tobin & Clarke 2005). Viele (2003) noted that CID not only causing impairment in QOL, but also a negative impact on the outcome of cancer therapy.

2.5 QOL measurement

QOL is a subjective experience. The most accurate way to measure QOL is by letting the patients themselves rate their own QOL. Clinicians frequently under-assess the level of functioning of the patient and under-report symptoms that the patient actually reported.

Bottomley carried out a study to compare 163 cancer patients' QOL with clinical assessment in 2002. He found that only 54% of physician assessments correlated with patient assessments. Therefore, the use of patient-reported questionnaires has become a standard practice in the assessment of cancer patient QOL.

Axelsson (2001) reported a poor correlation between patient and doctor rating. Apart from that, there is also a wide variability between doctor and other health professional rating concerning the same patient.

In conclusion, patient's own view and assessment of his or her QOL, as well as his or her rating the important of its elements may provide a more valid picture of one's own life quality.

2.6 QOL instruments

Several hundred of well-validated cancer-specific instruments have been developed and used to measure QOL across diseases and its treatment (Kaasa et al. 1995). Most of the instruments included physical, functional and symptom control, as well as psychosocial aspects. However, it is crucial to select an instrument appropriate to measure QOL in a specific group of patients. The choice of QOL instrument will affect the outcomes reported and the conclusions drawn (Axelsson 2001; King, Dobson & Harnett 1996).

Axelsson (2001) stated that two oncologists created the first QOL instrument, Karnofsky Performance Status (KPS) to determine nursing requirements on an oncological ward in 1949. Whereas LASA (Linear Analogue Self-Assessment) was the first QOL questionnaire developed in 1976 to measure the impact of breast cancer and its treatment on QOL.

According to Hanna et al. (2004), QOL instruments can be divided into general and disease-specific instruments. General measures assess the overall impact of patients' health status on their QOL and cover a broad spectrum of functional, physical, psychological and