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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS
AND THE QUALITY OF LIFE FOR GASTRIC
CANCER PATIENTS

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science

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College of Natural and Health Sciences
School of Nursing
Advanced Nurse Generalist

December 2019

This Thesis by: Nguyen Thi Hong Van

Entitled: *The Relationship Between Nutritional Status and the Quality of Life for Gastric Cancer Patients*

has been approved as meeting the requirement for the Degree of Master of Science in College of Natural and Health Sciences, School of Nursing, Advanced Nurse Generalist program

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ABSTRACT

Van, Nguyen Thi Hong *The Relationship Between Nutritional Status and the Quality of Life for Gastric Cancer Patients*. Unpublished Master of Science thesis, University of Northern Colorado, 2019.

Cancer patients often suffer from malnutrition and low quality of life, especially gastric cancer patients. This is an important factor in the decision to treat cancer.

Researchers are interested in the relationship of nutritional status between quality of life through body mass index to the main aspects of quality of life: core healthy days, physical, mental, or emotional problems; physical, functional, cognitive, and social limitations; and side effects such as fatigue; nausea, pain, anorexia, constipation, and diarrhea. The relationship between quality of life and weight loss indicates the importance of nutrition management in cancer patients.

Cancer patients have special physical and mental health needs because they face risks associated with late side effects as well as recurrence of the disease. Studies have shown a scientific diet helps prevent some complications of stomach cancer patients. Researchers are also exploring some diets and exercise habits of patients after cancer treatment that could help prevent the disease from recurring and reduce complications to improve the quality of life of the patient.

Education programs could help cancer patients learn how to change their lifestyle to stay healthy. Programs that include diet, exercise, and stress management would be more likely to help cancer patients adapt to these changes. Maintaining life for cancer patients should rely on the nutrients in food. The most important problem of cancer

patients is the lack of nutrients; improving nutrition for patients would be an important method in treating and fighting cancer. Combining the right foods for cancer patients could improve the body's resistance and have an effect on the treatment and quality of life for patients with stomach cancer.

Using a cross-sectional correlation study, the researcher investigated 38 gastric cancer patients with chemotherapy at an oncology hospital. Baseline anthropometrics included changes over time, body mass index (BMI), and Health Related Quality of Life. The instrument was a researcher administered questionnaire and a medical history form was also completed.

The results indicated a correlation between nutritional status parameters and quality of life. The results shown in the analysis of nutritional status showed health-related quality of life was significantly correlated with perception of healthy days: activity limitation and healthy days symptom scale with r^2 value of 0.239 and Durbin-Watson value of 2.

ACKNOWLEDGMENT

In order to carry out and complete this research project, I have received the support as well as the care and encouragement of my teachers, friends, and colleagues. Scientific research projects are also completed based on the references, learning experiences from related research results, books, and specialized newspapers of many authors of universities.

First, I would like to thank profoundly Dr. Katrina Einhellig—my research project direct supervisor—who has always spent a lot of time and her tireless efforts to guide me during the process of conducting and completing research projects. Dr. Faye Hummel also provided support for me during this project.

I would also like to thank my teachers at Hong Bang International University who provided me the opportunity to complete this study.

I highly appreciate the great support of Ms. Gwen from the UNC English Center in helping with the revisions of my thesis.

I would like to express my sincere thanks to the Board of Directors and the nurses at Medical Ward 4 at Oncology Hospital in HCM City for supporting and creating a favorable condition for me to study and implement this research.

Finally, I would like to thank my husband, my son, friends, and colleagues for supporting and encouraging me in completing this thesis.

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CHAPTER I

INTRODUCTION

Gastric cancer is one of the most common cancers in the world; in Vietnam, it is the third most common type of cancer after lung cancer and breast cancer (Asombang, Rahman, & Ibdah, 2014). Because tumor location directly affects digestion and absorption of nutrients and the addition of side effects due to chemical treatment of the gastrointestinal tract, gastric cancer can be particularly devastating. The course of treatment could cause stomach ulcers and lead to limited gastric digestive function, severely affecting the patient's nutritional status demonstrated by symptoms of weight loss and malnutrition. Moreover, cancer is a chronic disease that directly affects the onset area and can spread to other sites, causing a series of complications that have a variety of negative effects on the patient's condition and nutritional status.

Malnutrition is the first sign of the presence of this disease. Cancer chemotherapy has a significant impact on the patient's nutritional and health status due to its side effects. Malnutrition is detrimental to cancer patients (Lis, Gupta, Lammersfeld, Markman, & Vashi, 2012), especially patients treated with chemotherapy. Malnutrition reduces the quality of life, decreases the patient's functional activities, increases the rate of complications, prolongs hospital stays, and increases the risk of death. Therefore, early assessment of nutritional status and appropriate nutritional interventions in gastric cancer patients could improve their nutritional status, help patients maintain their weight and respond better to treatment, and improve their quality of life. Diet is one of the

factors that seriously affects the development of cancer. The development of cancer can increase the risk of malnutrition due to the cancer itself or the treatment side effects. Consequently, weight loss could then increase the morbidity and mortality associated with cancer treatment. Thus, proper nutrition counseling must be part of the cancer treatment plan.

Furthermore, understanding the factors related to the nutritional status of gastric cancer patients would provide evidence that guides the clinician and nutritionists to provide advice and timely nutritional interventions beneficial to the patient. Cancer and its treatments could cause side effects that impact diet, which is an important part of cancer treatment. Eating appropriate foods before, during, and after treatment would help patients feel better and improve the quality of life for cancer patients, especially those with gastric cancer. For these reasons, this study was conducted to determine the impact of nutritional status on the quality of life of gastric cancer patients.

Research Purpose

This study allowed the researcher to understand the impact of nutritional status on the quality of life of gastric cancer patients and, potentially, to provide solutions to improve their quality of life as well.

Research Question

The following research question guided this study:

Q1 What is the relationship between nutritional status and the quality of life of gastric cancer patients?

Research Tasks

This study aimed to systematize theoretical issues and legal documents on the nutritional status of gastric cancer patients in medical ward 4 at the Oncology Hospital in

Ho Chi Minh City, Vietnam. Additionally, a main goal was a proposal of measures to aid the nutritional status of gastric cancer patients to improve their quality of life.

Scope of the Research

This thesis focused on analyzing how the nutritional status affected the quality of life for gastric cancer patients at the Oncology Hospital in Ho Chi Minh City.

Overview of the Problem

Gastric Cancer

Definition of gastric cancer. Gastric cancer refers to a cancerous malignancy arising in any part of the stomach. In the literature and clinical practice, the term GC does not refer to a single disease but rather different cancerous diseases affecting a single organ. Although GC is a heterogeneous disease covering lymphoma, leiomyosarcoma, carcinoid, adenocarcinoma and squamous cell carcinoma, the most frequently encountered histological type is mucosal adenocarcinoma, which comprises more than 90% of all GC cases worldwide (Forman & Burley, 2006). Therefore, a majority of the time in this thesis GC refers to adenocarcinoma.

Diagnosis of disease stage. Gastric cancer refers to cancerous malignant types arising from various parts of the stomach. Diagnosis can occur at any stage of the disease process and is based on the location and extent of disease progression. Although GC is a heterogeneous disease, the location and metastasis of the disease largely affects the disease severity and treatment.

Symptoms of gastric cancer. Gastric cancer usually has no symptoms or only causes non-distinct symptoms in the early stages. When symptoms appear, the cancer has usually spread to other parts of the body, which is one of the main reasons for the diagnosis of the disease. Gastric cancer has the following early symptoms: Indigestion or

heartburn and lack of appetite, especially for meat. Late symptoms could include abdominal pain or discomfort in the epigastric area, nausea and vomiting, diarrhea or constipation, bloating after eating, weight loss, weakness and fatigue, difficulty swallowing—may be a sign of a tumor in the medial area or spread of gastric tumors to the esophagus, and hemorrhaging (vomiting blood) that is black, which might lead to chronic anemia. These symptoms might be caused by other diseases such as gastroenteritis, peptic ulcer disease, or oral sores. Diagnosis should be made by a gastroenterologist or oncologist.

Stages of gastric cancer. According to the American Cancer Society (ACS, 2019), gastric cancer is divided into five stages, ranging from 0 to 4, corresponding to the size of the tumor and the extent of metastasis of the cancer cells.

Stage 0. The tumor is only found in the lining of the gastric wall. This stage is also called epithelial carcinoma.

Stage 1. The tumor only invades the second layer of the gastric wall below the mucosa. Cancer cells spread to different lymph nodes. The number of lymph nodes that have been spread to is less than six.

Stage 2. The tumor only invades the subcutaneous tissue and cancer cells have spread to 7 to 15 lymph nodes; or the tumor has invaded under the mucosa and muscle and cancer cells have spread to one to six lymph nodes; or the tumor has penetrated the outer layer of the stomach and cancer cells have not spread to lymph nodes and other organs.

Stage 3. The tumor has invaded the underlying mucosa and muscle. Cancer cells have spread to 7 to 15 lymph nodes; or the tumor has invaded the outer layer and cancer

cells have spread from 1 to 15 lymph nodes; or tumors have invaded neighboring organs like the liver, colon, or spleen and cancer cells have not spread to lymph nodes and distant organs.

Stage 4. Cancer cells have spread to more than 15 lymph nodes; or tumors have invaded the surrounding organ and at least one lymph node; or cancer cells have spread to distant organs.

Helicobacter pylori infection is responsible for most gastric cancers.

Autoimmune gastric ulcer (intestinal metaplasia) and hereditary links are known to cause increased risk of gastric cancer. Diet is not considered the cause of disease. More specifically, *H. pylorus* is the main risk in 65-80% of gastric cancers but only 2% of those are infected with the bacteria. About 10% of cases are related to genetic factors.

According to World Cancer Research Fund International (cited in Torre et al., 2015), it was demonstrated the prevalence of gastric cancer was predominant in men; the incidence of the cancer in men and women was two to one, respectively. A small percentage of scleroderma could be genetic. Hereditary diffuse gastric cancer (HDGC), which is being studied, was also identified. However, there are methods of gene screening and treatment for high-risk families.

Some researchers have indicated a correlation between deficiency or iodine deficiency and stomach cancer; there have also been reports of a reduction in the incidence of gastric cancer deaths when iodine supplements were successfully administered. Tabaeizadeh et al. (2013) found only a correlation between gastric carcinoma and iodine deficiency. Iodine deficiency and excess iodine were investigated by the authors of an historical iodine study (Venturi et al., 1993) who determined iodine

deficiency or, in some cases, excess iodine were associated with the development of and might be a new risk factor for gastric cancer.

Cancer Epidemiology

Gastric cancer is the second most common cancer in the world with 930,000 cases diagnosed in 2002 (Plummer, Franceschi, & Muñoz, 2004). It is also a disease with a high mortality rate (about 800,000 deaths per year). In fact, gastric cancer causes the second highest amount of cancer deaths in the world after lung cancer (Plummer et al., 2004). It accounts for 951,600 patients with new stomach cancers every year (Torre et al., 2015) but it is more common in other countries; incidence rates are highest in Eastern Asia (particularly in Korea, Mongolia, Japan, and China). For instance, this is the leading cause of cancer in Korea with a 20.8% rate of melanoma (Lee, Yang, & Ahn, 2002).

Roder (2002), a researcher of Gynecology, Epidemiology and Oncology at University of South Australia, showed the incidence of gastric cancer mortality has significantly decreased all over the world; the rate of the reduction was about 40% over the last 20 years in South Australia. The reasons included reduced salt in diet, smoked and canned foods, and an increase in fruit and vegetables in their diet. *Helicobacter pylori* infection was reduced primarily because of revised treatment alternatives. Gastric cancer occurs more frequently in lower socioeconomic groups; the number of countries that had high stomach cancer proportion included parts of the Middle East, Central and South America, Eastern Europe, Japan, and China. Roder estimated gastric cancer could be reduced by up to 50% by adding more fruit and vegetables to patients' diets.

Nutritional Status of Gastric Cancer Patients in the World and in Vietnam

Worldwide research. Throughout the world, numerous research studies have assessed the nutritional status of stomach cancer patients. Menon, Razak and Ismail (2014) reported that in Malaysia, more than one-third of patients with gastric cancer were underweight and malnourished at the time of the diagnosis. Of these, 39% had a body mass index (BMI) of less than 18.5; the percentage of subjects with low hemoglobin (<120 g / l) was 62% and 26% had serum albumin under 38 g / dL. Results of the study also showed the median arm circumference and BMI of the subjects were 24.1 ± 5.5 cm; 17.6 ± 7.9 mm and 21.1 ± 3.9 kg /m² (Menon et al., 2014).

Similarly, according to a study by Bauer, Capra, and Ferguson (2002), the Patient-Generated Subjective Global Assessment (PG-SGA) methodology was used in assessing the nutritional status of 71 gastric cancer patients between the age of 18 and 92; 24% of patients were well-nourished; and 59% were malnourished. Another study by Geirsdottir and Thorsdottir (2008) on nutritional status, dietary intake, and nitrogen balance in 93 chemotherapy patients showed a 40% risk of malnutrition and an average diet of 2032 ± 500 kcal/day, protein was 76 ± 22 g/day, lipid was 73 ± 23 g/day, and glucose was 223 ± 66 g/day.

Vietnam research. The study by Young et al. (2016) on gastric cancer patients at Bach Mai Hospital showed the rate of malnutrition was approximately 50% and if they were not treated, these patients would continue to decline. In another study published by Garth, Newsome, Simmance, and Crowe (2010), malnutrition is common in surgical patients with gastrointestinal cancer. Poor nutritional status with delayed and inadequate post-operative nutrition increased the average hospital stay for patients to 14 ($SD = 12.2$) days with a complication rate of 35%. A study by Pham, Cox-Reijven, Greve, and Soeters (2006) showed a very high malnutrition rate and concerned parameters such as weight loss, muscle wasting, subcutaneous fat loss, and gastrointestinal symptoms among the 438 patients studied: 194 (44.3%) were classified as A, 126 patients (28.8%) were classified as B and 118 patients (26.9%) were classified as C. The rate of patients classified as subjective global assessment (SGA) class C (33.6%) with postoperative infectious complications was higher compared to A (6%) and B (11%) and malnutrition was associated with an increase in infectious complications for-surgical patients in Vietnam (Pham et al., 2006).

Summary

Gastric cancer is a matter of current concern because stomach cancer is detected with mounting rates in society and affects the lives of families, especially the patient. Most organ systems can be affected by the infiltration of cancer. In particular, gastric cancer is the third most common cancer worldwide. Thus, patients with gastrointestinal cancers in general and gastric cancer patients in particular are those who are at high risk for weight loss and impairment. Nutrition for patients with gastric cancer in particular plays a very important role; it supports the treatment process before, during, and after the

treatment of the patient. For patients with gastric cancer, nutrition issues were also a problem frequently mentioned. The stomach is where food is broken down and absorbed, which plays a very important role in metabolism, absorption, and hematopoiesis. For patients who have had gastric cancer and subsequent surgery to remove the stomach, this is actually a relatively difficult problem. After gastric surgery, considerable complications might occur, especially those related to syndromes of reflux and indigestion.

The concept of health-related quality of life (HR-QoL) is defined with regard to the way in which illness (as a source of pain, physical dysfunction and discomfort) imposes limitations or alterations on everyday behavior, social activities, psychological wellbeing, as well as in other aspects of personal daily life (U.S. Department of Disease Prevention and Health Promotion, 2018). The measurement of quality of life brings a holistic dimension to the burden of a clinical state or to the response to an operation. However, the relationship between quality of life and nutritional status has not been well studied. Furthermore, measuring HR-QoL is a complex process because it is a subjective, multifactorial construct response to individual expectations in different facets of life. The way in which HR-QoL is affected by the nutritional status of patients with gastric cancer has been a subject of consistent interest and long-term debate. It is well established that an impoverishment of nutritional status leads to a decrease in physiological function, increasing the risk of complications and septic death. A significant correlation also exists between nutrition and alterations in muscular, immune, and cognitive functions. Therefore, an improvement in nutritional status is an influencing factor in the improvement of physiological function. The necessity and importance of the

measurement of HR-QoL, both general and specific, tied to a definite concept could be justified on the basis of studies that showed perceived health is independently associated with medium-term mortality. Specific instruments designed to relate a patient's HR-QoL to a specific pathology have grown in importance in recent years. They also provide a subset of relevant evidence that points to a positive causality (U.S. Department of Disease Prevention and Health Promotion, 2018).

To better understand how these concepts of nutrition and health-related quality of life affect and relate to stomach cancer patients, this thesis presents them in more detail in the next chapter. In addition, this study allowed the researcher to determine the relationship between nutrition and quality of life of patients with gastric cancer and then propose solutions to improve the quality of life for gastric cancer patients.

CHAPTER II

LITERATURE REVIEW

Theoretical Framework

In 1954, Maslow wrote his initial book detailing the hierarchy of needs theory, a theory focused on the existence of universal needs that explain how humans are motivated to make decisions in their life. The hierarchy originally introduced by Maslow has been depicted as a pyramid shape starting with physiological needs at the bottom of the pyramid. Once an individual has his/her needs met, he/she can move up to the next level of the pyramid, focusing on his/her safety needs. Maslow proposed five levels of need for human beings: physiological, safety, love and belonging, esteem, and self-actualization (see Figure 1).

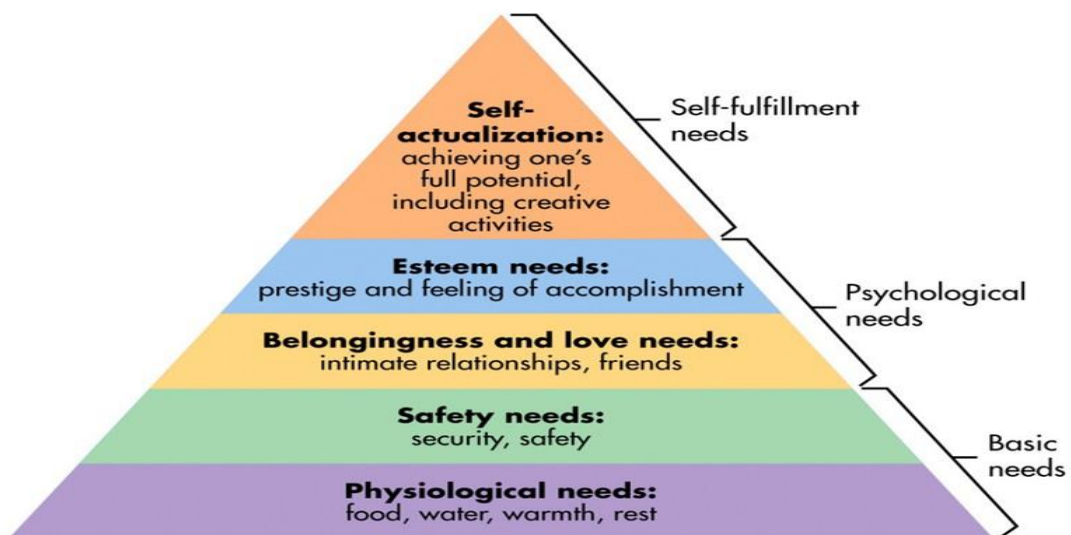


Figure 1. Maslow's hierarchy of needs.

Believing these needs are fluid, an individual might be focused on multiple levels of needs at any given time but only once a level is met can the individual move on to the next level. The hierarchy of needs (Maslow, 1954) was basically a model of psychological health based on the idea of fulfilling innate human needs. The more needs a person fulfilled, the higher his/her level of life satisfaction.

Years later, Maslow (1962) wrote his second piece of historical work focusing on the psychology of being that built upon his prior theory and introduced new ideas from which was derived a theory of quality of life, which is still considered a conceptual theory of quality of life by modern psychology experts today. From his human developmental perspective, quality of life is described by the level of need satisfaction that is met for an individual. The higher level of need satisfaction achieved by a person, the higher the perceived quality of life for that person. Quality of life has been described in many different ways throughout history; it is the perception of satisfaction that individuals have with their overall physical health, psychological well-being, employment, wealth, safety and their environment. Many other elements are included in a person's definition of quality of life and those are defined by the individual.

More recently, the U.S. Department of Disease Prevention and Health Promotion (2018) used the concept health-related quality of life (HRQOL), which is defined as an individual's perception of physical and mental health over time. Using this theoretical basis and more specifically looking at the concept of HRQOL, this study attempted to understand how the nutritional status of gastric cancer patients affected their perception of quality of life.

Nutritional Status

There are ways to provide nutritional support for cancer patients: eating, supplying medication for appetite, or providing parenteral feeding by infusion for patients. It is important to provide nutritional counseling, especially to malnourished patients as well as to those who are cachectic or have a loss of appetite (Wu, Lin, & Chen, 2008). Stimulating drugs could also be implemented with improvement in appetite (Tazi & Errihani, 2010). According to Silva, de Oliveira, Souza, Figueroa, and Santos (2015), 20% of gastric cancer patients die from the effects of malnutrition rather than the malignancy itself.

In a former study, nutritional interventions significantly affected quality of life as well as food intake. Gavazzi, Colatruglio, Sironi, Mazzaferro and Miceli (2011) discussed the benefits of nutritional support and the assessment of nutritional status in gastric cancer patients. They stated the endpoints for clinical treatments traditionally had been the impact on the malignancy and survival time but having a better quality of life, feeling and functioning better, and living a worthwhile life were outcome variables of ultimate interest to the patient. Nutritional assessment is a comprehensive process of identifying individuals and populations at nutritional risk and of planning, implementing, and evaluating a course of action. As Gavazzi et al. (2011) emphasized, a need existed for early and recurrent assessments of nutritional status in gastric cancer patients. Early identification of patients who were malnourished or who were suspected of developing malnutrition made it easier to prevent further nutritional deterioration and to maintain or improve QOL.

It is important to measure self-reported weight and height; information about body weight (BW) and height is necessary for calculation of resting energy expenditure and for BMI (kg/m²). It is well-known there are both under- and overreporters of weight but little is known about cancer patients in this regard. In a study by Dahl, Hassing, Fransson and Pedersen (2010) using the National Health and Nutrition Examination, the replies from 11,284 participants to questions about "What is your weight without clothes or shoes?" and "How tall are you without shoes?" were compared with measured weight and height. An overall tendency for men was to overreport their weight whereas women underreported it. Underweight men and women overreported their weight whereas overweight men and women underreported it. Severely overweight young men and women (20-34 years) underreported more than did the elderly (55-74 years). Both men and women overreported their height and older (45-74 years) more than younger (20-44 years). The association between self-reported and measured weight as calculated by Dahl et al. (2010) was collected from applicants for medical insurance at seven sites in the United States (four were obesity treatment sites) and one site in Denmark. There were strong correlations both in the American ($r = 0.974$) and Danish data ($r = 0.856$). The conclusion was it is possible to carry out valid studies of weight status by questionnaires and even by telephone interviews. Both methods are used in the present study. Detsky et al. (1987) developed a standardized instrument called the Subjective Global Assessment (SGA). This instrument classified patients into SGA-A (well-nourished), SGA-B (moderately/suspected malnourished), and SGA-C (severely malnourished). The SGA has been used for assessment of nutritional status of patients with various diseases. It has been translated into Swedish and tested for validity and reliability in studies of patients

undergoing gastrointestinal surgery and in patients at geriatric clinics. A modified version of the SGA has been developed, the PG-SGA, and intended for use with gastric cancer patients (Li, Ge, & Ba, 2017). This version differed from the original SGA in that the patient completes the first four questions and the clinician, dietician, or nurse completes the remaining questions.

Weight Loss and Quality of Life

Malnutrition and weight loss might influence QoL (Vergara, Montoya, Luna, Amparo, & Cristal-Luna, 2013). Previous studies have shown patients who experienced no weight loss had better QoL than patients with weight loss (Lis et al., 2012) and weight loss and reduction of appetite were related to a reduced QoL (O'Gorman, McMillan, & McArdle, 1998). The common conditions of fatigue, nausea, vomiting, and loss of appetite often happen to patients with weight loss and there is ultimately a relationship between weight loss and QoL (Takayoshi, Uchino, Nakano, Ikejiri, & Baba, 2017). Overall, survival was significantly improved in gastric cancer patients when weight was stabilized.

Nutrition Decline

During recent decades, weight loss in cancer patients has been considered a challenge. It is most frequently observed in patients with carcinoma of the head and neck, esophagus, stomach, and pancreas. The frequency of weight loss in cancer patients is shown to range from 31% in patients with favorable non-Hodgkin's lymphoma up to 87% in patients with gastric cancer.

According to O'Gorman et al. (1998), 32% of gastric patients had lost more than 5% of their body weight with the highest rates of weight loss in patients with lung,

pancreatic, and gastric cancer. Weight loss was also shown to be more pronounced as the disease progressed in advanced stages and impacted their quality of life (Lis et al., 2012). The prevalence of weight loss was reported in 46% of cancer patients from 17 studies (totaling 13,167 patients) and increased to 86% during the last two weeks of life. Consequences of weight loss in gastric cancer patients have been investigated in several studies. The results indicated increased complications after surgical procedures, increased length of hospital stay, increased treatment toxicity, and reduced survival. In malnourished cancer patients, it was also shown their immune-competent cells were reduced (Mariette, De Botton, & Piessen, 2012).

Gastric Cancer

Weight loss and nutrition risk or malnutrition have been assessed in different settings in patients with colorectal cancer (CRC). In one study of 101 patients, 5 of 14 with stage I/II CRC had lost >10% of their usual body weight before the start of neoadjuvant radiotherapy, whereas 61 of 86 patients with stage III/IV CRC had lost >10% of their body weight (Ravasco, Monteiro-Grillo, & Camilo, 2007). At the end of radiotherapy, 46 of the 86 patients with stage III/IV had lost >10% of their baseline body weight. In another study investigating CRC patients prior to surgery, 35 of 85 patients were malnourished as assessed by SGA, 18 patients had unintended weight loss of >10% of their body weight, and 40 patients had lost up to 10% of their body weight (Burden, Hill, Shaffer, & Todd, 2010). An additional study investigating the nutrition risk in 186 patients prior to surgery found weight loss in 102 patients (55%; Schwegler et al., 2010). Two different tools for nutrition risk were used. Using the Nutrition Risk Screening tool in this study, 39% of the patients were at nutritional risk and subsequent increased

mortality; whereas 32% were at risk when using Reilly's nutrition risk score (Schwegler et al., 2010). All patients had stage III/IV CRC. A retrospective study evaluated the prognostic significance of malnutrition defined by SGA in 217 patients with stage III/IV CRC. All patients were treated at one medical center and as many as 113 (52%) patients were found to be malnourished.

In an additional study of 781 patients with locally advanced or metastatic CRC, weight loss was reported to occur in 246 patients (34%) before referral to an oncology unit and the start of chemotherapy (Imamura et al., 2016). The magnitude of weight loss was not described.

A review of 464 patients with metastatic colorectal cancer (mCRC) receiving palliative chemotherapy showed 13% of the patients had lost >10% of body weight and 28% had lost between 5 and 10% (Sorbye et al., 2009). The SGA questionnaire was evaluated in 87 patients with various malignant neoplastic diseases in an Out-patients Unit. A subgroup of 31 patients had CRC. According to SGA, 5 of 13 patients with CRC Dukes' B+C, and 6 out of 18 patients with CRC Dukes' D were malnourished. Of 51 patients with advanced CRC attending a clinic for palliative treatment, 28% of patients were malnourished according to SGA (Ferguson et al., 1999). Eighteen patients had lost >10% of their body weight during the last six months. Overall these studies showed that despite different settings and stages of the disease, a prevalence of weight loss in CRC patients remained between 41 and 71%. Studies investigating nutrition risk or nutritional status showed 30% to 55% were at nutrition risk or malnourished.

Survival

According to a study by Scott et al. (2002), 80% of patients were male and had elevated circulating C-reactive protein ($p = .047$), weight loss ($p = .056$), Karnofsky performance status ($p = .002$), and fatigue ($p = .046$), which were independent predictors of survival.

The results of weight loss were also a prognostic factor in inoperable non-small cell lung cancer patients; the more the systemic inflammatory response increased, the poorer the physical activity status, the greater the weight loss and fatigue, the poorer the survival rate. In a study by Campbell et al. (2011), they investigated 1,096 women with colon cancer; BMI within normal range was related to survival of patients with cancer at advanced stages.

The reason for the reduced survival for cancer patients who have lost weight is thought to be the increased toxicity of chemotherapy, resulting in a lower total dose intensity of chemotherapy given. In three randomized studies, the effect of improving nutritional status of gastric cancer patients by parenteral nutrition was investigated (Wu et al., 2008) and the positive benefits were demonstrated with this enhancement to their nutritional intake.

Quality of Life

The World Health Organization (2018) defined QoL as a state of complete physical, mental, and social well-being, and not merely the absence of disease. The concept of QoL describes health in terms that capture aspects of coping, flexibility, pleasure, independence, among others. It refers commonly to a broad range of physical and psychological characteristics that express a person's capability and pleasure to

function. Quality of life is an imprecise term that means different things to different people and the term is under continuing debate. One aspect is the referral to those things that give a person worth, meaning, purpose and satisfaction in life. To distinguish QoL in its more general sense from the requirements of clinical medicine and trials, the term *health-related quality of life* (HR-QoL) is frequently used. Assessment of QoL becomes crucial in situations in which a patient's treatment is likely to cause distressing symptoms or disturbances in physical functioning, work, family and social roles, cognition, or emotional adaption. The European Organization for Research and Treatment of Cancer (2018) developed and provided access to a questionnaire module to assess quality of life and developed a cancer-specific, health-related QoL (HR-QoL) questionnaire measuring functional, global health status, and single- and multi- item symptoms. Health-related quality of life is a multidimensional concept that quantifies the physical and psychosocial effects of an illness and its therapy. In cancer patients, health status is well reflected on the measured QoL, which is largely influenced by nutritional aspects. Nutrition care should be integrated into overall oncology care because of its significant contribution to QoL.

In gastric cancer patients, maintenance of HR-QoL is an important aim of treatment in addition to delaying disease progression. Fatigue, pain, lack of energy, weakness, and appetite loss occurred in more than 50% of patients with incurable malignant disease from whom 37 symptoms were identified.

Nutrition Care

Proper nutrition in the hospital is regarded as a human right. It is emphasized as an essential component of high-quality health care with a team working to achieve this.

The Council of Europe's (2003) resolution on food and nutrition care in hospitals stated that hospital management, physicians, pharmacists, nurses, dietitians and food service staff should work together toward providing nutrition care. Gastric cancer patients often have a significant number of symptoms that reduce food intake. To relieve the symptoms, pharmacological options should be chosen on an individual basis. Symptom assessment followed by dietary advice and pharmacological prescription have been proven to reduce the overall symptoms in patients with advanced cancer. Nutrition care is defined as interventions and counseling of individuals on appropriate nutrition intake through the integration of information from the nutrition assessment. In all, 44 tools for assessing nutritional status or identifying a person at risk of malnutrition were identified in the literature (Jones, 2002). A validation of the tools for nutrition assessment is essential. The screening tools developed for adults have been evaluated for validity, reliability, sensitivity and specificity, ease of use, and cost effectiveness. Concerning outcome measurement, the American Society of Parenteral and Enteral Nutrition (Malone, 2014) stated in their guidelines that only the SGA tool had been validated with respect to clinical outcomes. When different assessment tools were compared in the same group of patients, wide discrepancies were found in the prevalence of malnutrition. Due to the lack of a gold-standard for nutrition assessment, a number of different tools were used.

Clinical Outcomes

Diverse clinical outcomes such as patients' mortality, survival, physiological measures, QoL, or other clinical end-points should be analyzed when evaluating the assessment tools. The nutrition care process (NCP) was introduced by the American

Dietetic Association (ADA, 2008) in 2003 and updated in 2008. The NCP aimed to provide high-quality nutrition care with emphasis on doing the right thing at the right time in the right way for the right person to provide the best possible results. The NCP consisted of four distinct steps: (a) nutrition assessment, (b) nutrition diagnosis, (c) nutrition intervention, and (d) nutrition monitoring and evaluation (see Figure 2).

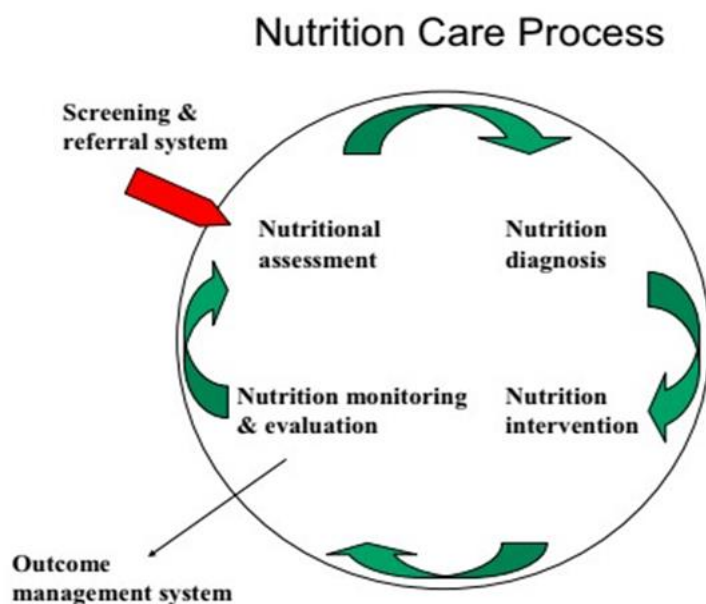


Figure 2: Nutrition care process.

Nutrition Diagnoses

Setting nutrition diagnoses challenges the clinical dietitian to critically consider the likely cause(s) of the nutrition problem and how it could be solved. Initially, 62 nutrition diagnostic terms were identified for the dietetics' profession (ADA, 2008). Later, two diagnoses were deleted—hyper metabolism and hypo metabolism. The reason for this was dietetic practitioners were unable to treat these patients within their scope of practice. Of the 60 nutrition diagnostic terms, 22 commonly occurring diagnoses in

oncological patients were content validated by members of the Oncology Nutrition Dietetic Practice group. The diagnoses were divided into three domains: (a) Intake domain: 11 diagnoses, (b) Clinical domain: six diagnoses, and (c) Behavioral-Environmental domain: five diagnoses (ADA, 2008). Malnutrition belongs to the intake domain while unintended weight loss is one of the diagnoses in the clinical domain.

Nutrition Interventions

Nutrition interventions are typically directed toward resolving nutrition diagnoses but might also be targeted at reducing the signs or symptoms of nutrition diagnoses. Ideally, nutrition support should involve a team approach including clinical dietitians, nurses, and physicians.

Nutrition: Monitoring and Evaluation

The purpose of monitoring and evaluation is to determine if progress has been made and the goal(s) or desired outcome of nutrition care has been met. Monitoring and evaluation require active commitment to measure and record outcome indicators relevant for the nutrition diagnosis and intervention. The major goal of outcome management is to utilize collected data to further improve the quality of nutrition care rendered. Recently, the International Confederation of Dietetic Associations (2019) and the European Federation of the Associations of Dietitians (2019) decided to recommend that their members implement the NCP and International Dietetics and Nutrition Terminology within the clinical dietitian professions.

In conclusion, the NCP is a systematic problem-solving method developed to reflect current practice. The model is intended to be used by food and nutrition professionals delivering nutrition care. The NCP is regularly reviewed and updated.

Summary

Cancer patients have considerable signs and symptoms. If clinicians do not create plans for early nutrition enhancement in the clinical course of cancer patients, it could lead to a reduction in the response to chemotherapy, increased risk of chemotherapy, toxicity to the body, a higher risk of postoperative complications, and impaired immune function so nutrition is a very important factor in the treatment of cancer. Nutrition is also a therapeutic treatment in a general treatment plan. The condition affects the patient's nutritional status and poor nutritional status then affects the method, compliance, treatment response, and quality of treatment. Cancer patients are at a very high risk of losing weight because of the physical and mental effects of both the disease and the treatment process.

Although there is no common diet for all cancer patients, depending on the characteristics of the disease, the treatment method, and the patient's condition, fitness, and weight index, health care practitioners can decide upon the nutritional needs of individual patients. However, there are some general principles to maintain a balanced, reasonable diet that ensure the body has enough energy to resist diseases and side effects due to treatment. Usually doctors recommend a diet high in fruits, vegetables, and fats with a sugar restriction but in some specific cases, it might be necessary to increase the protein content or sugar in a meal. If oral intake is still not enough or for patients with severe exhaustion, one should consider supplementing with other forms such as through a gastric tube or intravenous nutrition. Weight loss due to cancer or poor nutrition not only affects the quality of life but also affects treatment. Therefore, current treatment in cancer care focuses on nutrition that aims to recognize all forms of depletion, thus

delaying the symptoms of depletion and improving quality of life, which is an extremely important factor for cancer patients.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Quantitative research is considered a reasonable design used to measure research subjects and is often applied to quantifiable phenomena. Theoretical foundations based on inference methods (Gravetter & Forzano, 2011) often accompany quantitative research. This is a research method that quantifies, measures, and reflects relationships between variables. The deductive method is a method of reasoning that starts from the general theory or concept of a problem from which it can give logical reasoning about a problem. The deductive method is a form of argument whose purpose is to arrive at a conclusion, which is the consequence or conclusion based on a general theoretical basis. When general theoretical foundations have been specifically chosen, then proper and valid theories can be inferred using a deductive method to determine which is correct and valid.

Research Design

The selection of an applied research methodology is fundamental to the success of a research project. Saunders, Lewis, and Thornhill (2009) explained the research design describes the summary of investigation questions answered. In addition, the study design aims to deliver the response to the research issues and data collection. According to Zikmund, Babin, Carr and Griffin (2003), if the research design is based on a quantitative method, it should be established and based on the theoretical background from the literature and the data analysis. This study collected information concerning the

nutritional status of gastric cancer patients and how that status affected the quality of life for that individual; a cross-sectional correlational design was used to assess the nutritional status and quality of life of gastric cancer patients who were undergoing chemotherapy in Ho Chi Minh City, Vietnam.

Data Collection Procedure and Instruments

Both primary and secondary data methods were used for this research. The purpose was to collect data for statistical analysis. Primary data were examined as the collection of accurate information (Sekaran & Bougie, 2010). The primary data collection focused on how nutritional status impacted the quality of life for a gastric cancer patient. The hospital selected for data collection was the Oncology Hospital in Ho Chi Minh City, Vietnam. Dependent variables were nutritional status and quality of life while independent variables were stage of cancer and symptoms associated with nutrition.

Preparation Phase

First, questionnaires were developed for data collection, translated into English, and then translated to Vietnamese for equivalence and clarity. Next, permission to conduct the research and collect data was obtained by the Board of Director of the Oncology Hospital (see Appendix A). Finally, approval to collect data was obtained from the University of Northern Colorado's Institutional Review Board (see Appendix B).

Implementation Phase

Surveys were given to gastric cancer patients who agreed to participate in the study (2.5% were excluded for invalid and incomplete responses; see Appendix C for consent form). The face-to-face interviews as well as completion of the survey took

approximately 25 minutes per patient. The researcher collected the information via questionnaire surveys and then entered them into SPSS for data analysis.

Sampling Design

Sampling is the data selection procedure from an entire population in which a segment roughly possesses a common set of characteristics (Saunders et al., 2009). The researcher handed out and collected the completed questionnaires and answers from targeted participants. Eligibility criteria for recruitment for the study included gastric cancer patients who had a diagnosis of gastric cancer at stage two, stage three, or stage four in the past 12 months. The patients were over the age of 18 and agreed to participate and sign their consent to the study. The study excluded individuals with gastric cancer on combined treatment therapy (chemotherapy with radiotherapy), those with other chronic diseases such as diabetes or, hypertension, and those who were human immunodeficiency virus positive. Patients under the age of 18 and persons who met the inclusion criteria but for additional reasons were not able to participate in the study were excluded.

Sampling Techniques

Purposive sampling was used to attain the sample for the study. The cancer clinic was conducted weekly and an average of three gastric cancer patients who needed follow-up were seen on each clinic day. Given the small population (approximately 65 patients per month) on chemotherapy, the study used all eligible participants until the required sample size of 49 was obtained. This calculation was based on the following parameters: the average population of 65 gastric cancer patients receiving chemotherapy, a reliability of 95% and a confidence interval of 10 (Creative Research Systems, 2012) to enable a sample size of 38.

Research Instruments Used

The researcher-administered questionnaire (see Appendix D) was used to collect data on socio-demographics, food consumption, nutrition management practices, and the nutritional status of the patient. Simple questions were organized into a meaningful order and formatted with structured and unstructured questions including both closed and open-ended questions. A medical history form (see Appendix E) was used to collect data on the date of diagnosis, type of cancer, and any other health complications experienced by the respondent.

Health-related quality of life was used to measure health status on quality of life. Health-related quality of life is often measured by the Behavioral Risk Factor Surveillance System that asks four core questions about general health status and number of unhealthy days. Health-related quality of life might also be used for health evaluation, subgroup comparison, trend monitoring, and risk factor identification (U.S. Department of Disease Prevention and Health Promotion, 2018).

Pre-Testing of Instruments

The questionnaires were pre-tested to assess the length, content, wording of questions, and language. The questionnaire was administered to five respondents who participated together to answer the questions and equally comprehend them; this procedure was meant to ensure participants could understand and provide valid answers before the researcher collected data from actual patients. This allowed modifications to the questionnaires, to correct and/or eliminate ambiguous questions, to ensure clarity, and to elicit the required information, thereby enhancing reliability. The order of questions was changed to start with the more general ones so as to put the respondent at ease.

Standardization and Reliability of the Instruments

The scale used to weigh patients was calibrated at the beginning and end of each day of data collection. After zeroing the scale properly, the researcher applied a random set of standard weights daily to roughly check the accuracy of the weighing scale. The stadiometer was checked every day by the researcher to ensure the upright bar was intact. These checks were noted in the equipment calibration log. The horizontal bar had to be firmly attached to the upright sliding section and the section had to operate smoothly. The length board was checked at the beginning of each data collection period.

Validity

Content validity for the instruments was established by seeking the expertise of the research supervisors and experts in the field of clinical nutrition. A copy of the questionnaire was given to each supervisor and the research experts. Each of them chose questionnaire items that were relevant to the study objectives and also added some relevant variables they deemed were missing. This ensured correct variables relevant to the study were included in the questionnaire. The questionnaire was constructed and revised according to the feedback of the experts.

Data Analysis and Presentation

Completed questionnaires were checked on a daily basis for accuracy and completion status in recoding of responses. Editing and coding was done before data entry. Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics such as frequencies and percentages for discrete data (non-continuous) and mean values for continuous data were computed. Bi-variate correlations for QoL, BMI, age, and nutrition risk were done and a Pearson correlation

was done to test for a relationship between these variables. A p value of $< .05$ was used as the criterion for statistical significance.

Summary

Cancer patients often have considerable clinical symptoms and if health care practitioners do not seek early nutrition enhancement in the clinical course of cancer patients, this could lead to a reduction in the response to chemotherapy, increased risk of chemotherapy, toxicity to the body, higher risk of postoperative complications, and impaired immune function.

Nutrition is an important factor in the treatment of cancer. Nutrition is also a therapeutic treatment in a general treatment plan. The condition affects nutritional status and poor nutritional status affects the method, compliance, treatment response, and quality of treatment. Cancer patients are at a high risk of losing weight, which is often depleted because of the physical and mental effects of both the disease and the treatment process. As patients experience weight loss and possible malnutrition, it is imperative to understand how this issue affects their perceived quality of life. An understanding of this relationship could provide health care providers with further direction as they work to treat this complex group of patients.

A cross-sectional correlational design was used to assess the nutritional status and quality of life of gastric cancer patients undergoing chemotherapy at the Oncology Hospital in Ho Chi Minh City, Vietnam.

CHAPTER IV

DATA ANALYSIS AND RESULTS

Presented in this chapter are the study findings regarding the following objectives:

(a) To assess the nutritional status of persons with cancer ages (18-70) undergoing chemotherapy, (b) to determine the prevalence of nutrition-impact symptoms at different disease stages, and (c) to determine the relationship between nutritional status and quality of life.

Demographic and Economic Profile of Respondents

The majority of respondents who answered were mainly in the 51-70-year-old age group (53%, $n = 20$), followed by the 30-50-year-old age group (40%, $n = 15$), and the age group under 30 (7%, $n = 3$). Figure 3 provides the age and gender distribution of the study population.

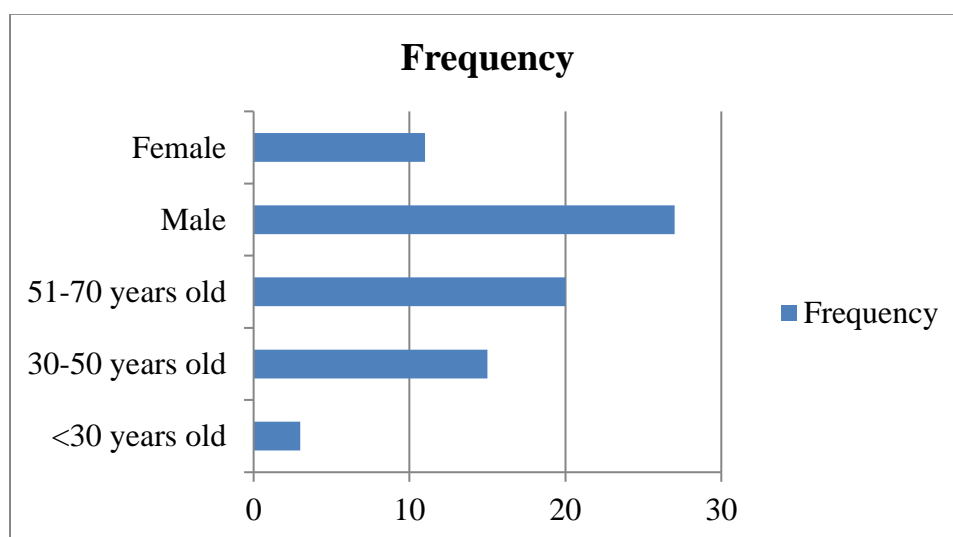


Figure 3. Age and gender distribution.

As demonstrated in Figure 4, most of respondents' income was in the range 10,000,000-30,000,000 VND/month (53%), followed by those earning more than 30,000,000VND/month (8%). About 39% earned less than 10,000,000VND/month.

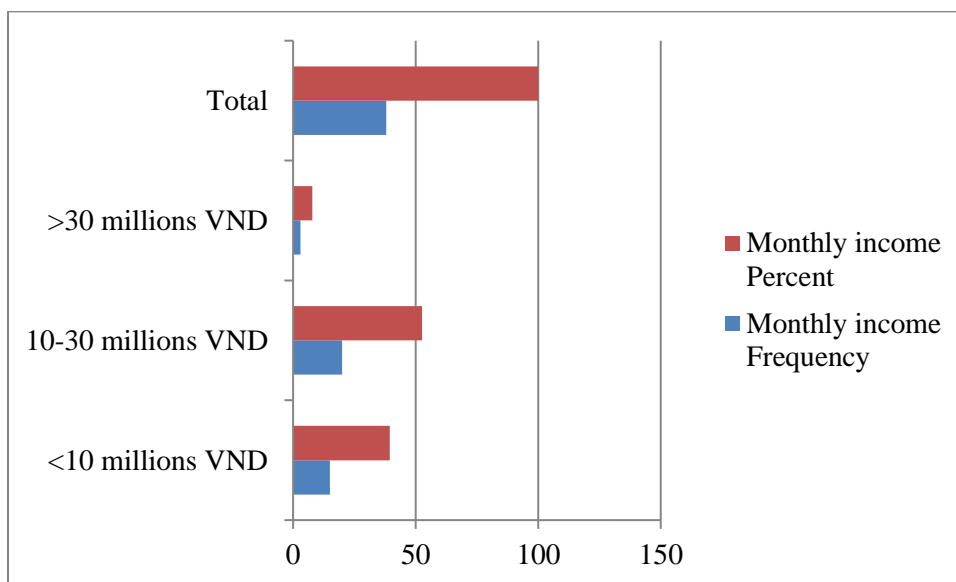


Figure 4. Monthly income.

According to statistics, gastric cancer most often affects those in middle age and later; it is concentrated in low-to-average income people and men are twice as likely as women to be affected. Most patients in this study reported having no history of cancer in their family (23 responses, 60.5%). Within the size of surveyed respondents, 13 patients (34.2%) confirmed a history of cancer in their family. Finally, the rest of those surveyed (two responses, 5.3%) had no prior information as to whether or not they had a history of cancer in the family.

Nutrition Practices

Food Cravings

The majority of respondents answered they had more than three meals with added snacks per day (57.9%), while 42.1% reported not eating snacks. Looking at the appetite of respondents ($n = 10$, 26.3%) in the second stage, more than two-thirds felt they had a moderate appetite. The respondents experienced food craving frequencies for some foods ($n = 22$, 57.9%) and the rest had no appetite ($n = 16$, 42.1%). The dietary intake was dichotomized as “frequent meals,” which was defined as three meals or less.

For most of the patients, the disease affected their food intake but there was a slight increase in their BMI compared to their initial BMI at the diagnostic time (see Figure 5). However, the proportion of respondents with malnutrition increased slightly by 5.2% but remained high at 36.8% ($n = 14$).

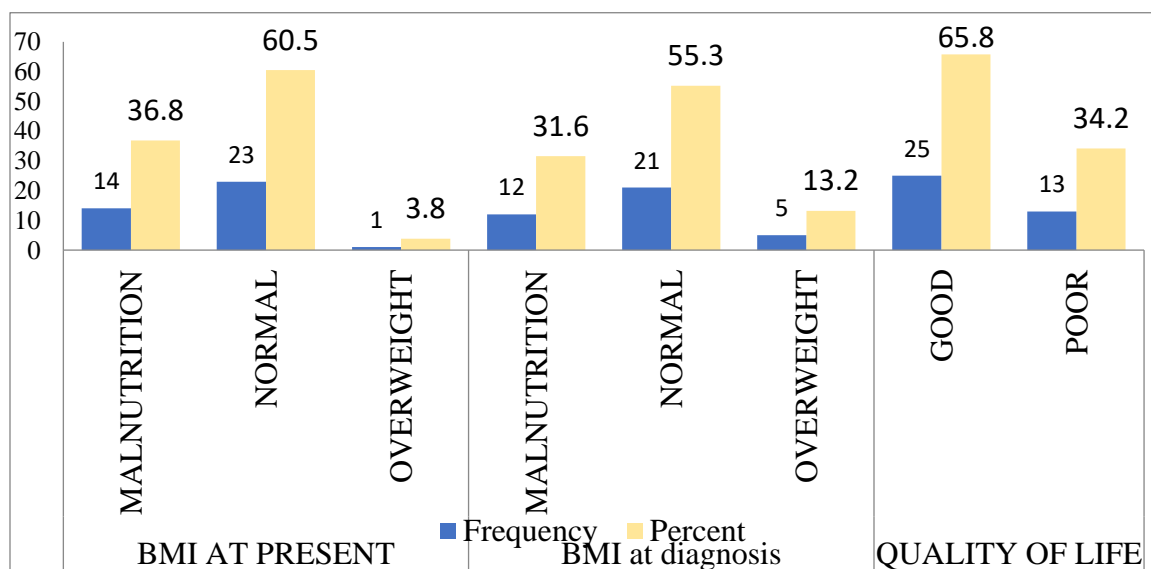


Figure 5. Body mass index and quality of life.

Approximately 57.9% of patients who ingested three meals with snacks added had been provided nutrition education counseling early in their cancer diagnosis, accounting for a majority of participants. Most patients were counseled by nutritionists and followed the recommended diets and the doctor's advice strictly.

Other Nutrition Practices

Other nutritional practices impacted the health status of the respondents. Of the 38 respondents, 31 reported having received nutrition counseling and as a result, 29 had complied with a change of diet. The other respondents ($n = 5$) either had no nutritional education or had parenteral nutrition ($n = 2$).

Nutritional Status of the Respondents

Fourteen respondents (36.8%) were underweight, over half of the respondents ($n = 23$, 60.5%) had a moderate BMI, and one respondent (3.8%) had a BMI above 25 with good nourishment. Based on the guideline of the World Health Organization (2018), BMI (formerly called the Quetelet index) is the nutritional index used by adults; it is defined as a person's weight in kilograms divided by the squared root of the person's height in meters (kg/m^2). Underweight is classified as $\text{BMI} < 18.5$, normal weight is a BMI at 18.5 to 24.9, and pre-obesity is in the BMI range of 25 to 29.9. In this study, the respondents were within the three ranges of BMI mentioned above.

Nutritional Risk Score of the Respondents

Cross tabulations were conducted to check on the proportion of respondents who were at any nutritional risk. Fourteen of the respondents (36.8 %) were under nutritional risk and a majority of them were those between 51 and 70 years of age.

Cancer Stage of Respondents and Nutritional Impact Symptoms

Cancer Stages

Cancer stages of the 38 respondents were as follows: more than half ($n = 22$, 57.9%) were in cancer stage two, over a third ($n = 14$, 36.8%) were in cancer stage three, and two respondents were in stage four (5.2%).

Nutritional Impact Symptoms

Among the 38 respondents participating in this study, more than one quarter experienced good appetite ($n = 21$, 55.2%), three experienced vomiting (7.9%), two (5.3%) experienced diarrhea, and four experienced nausea (10.5%). Nutrition impact symptoms were more pronounced in the second and third stages of cancer. Most of the respondents experienced appetite problems ($n = 21$, 55.2%), malnourishment ($n = 8$, 21.1%), vomiting ($n = 3$, 7.9%), and diarrhea ($n = 2$, 5.3%). The prevalence of the nutrition impact symptoms generally increased from stage two to stage four and over half of respondents indicated their treatment affected cravings ($n = 22$, 57.9%). The majority of participants had more than three meals plus snacks per day ($n = 22$, 57.9%). A large number of participants were also given nutritional education ($n = 31$, 81.6%), strictly followed nutritional guidance from their doctor ($n = 22$, 57.9%), and changed their diet according to the doctor's advice ($n = 29$, 76.3%) because they agreed the recommended foods were best for the state of their disease. However, respondents had constraints to face in maintaining a proper diet such as lack of time, lack of patience, and other factors (see Table 1)

Table 1

Nutritional Status

		<i>N</i>	<i>n</i>	%
Cravings for any particular foods	Yes	38	22	57.9
	No		16	42.1
Disease state/treatment given interfered with food intake	Yes		20	52.6
	No		18	47.4
If yes or sometimes how does it interfere with intake of food	Eat very little food		8	21.1
	Appetite		21	55.2
	Has nausea		4	10.5
	Vomiting		3	7.9
	Diarrhoea		2	5.3
Meal taken in a day	One		1	2.6
	Two		1	2.6
	Three		11	28.9
	More than 3 snacks + Snacks only		22	57.9
			3	7.9
Appetite problems	Good		10	26.3
	Moderate		26	68.4
	Poor		1	2.6
	Very poor		1	2.6
The hospital interventions to improve your food intake	Nutrition education		31	81.6
	Enteral /parenteral nutrition		2	5.3
	Nothing		5	13.2
Changed diet	Yes		29	76.3
	No		9	23.7
Followed the prescribed diet	Strict adherence		22	57.9
	Rarely		2	5.3
	Sometimes		14	36.8
Agreed that these foods are best for disease stage	Yes		32	84.2
	No		6	15.8
Constraints you face in proper dietary	Lack of time		11	28.9
	Lack of patience		16	42.1
	Given up		6	15.8
	Others		5	13.2

Nutritional Status and Quality of Life for Gastric Cancer Patients

Nutritional Status

According to the classification of BMI by the WHO (2018), 13.2% of gastric cancer patients at the point of diagnosis in this study were overweight, the rate of malnutrition was 31.6%, and 55.3% were normal. About 2% of patients experienced a BMI classification of being overweight and lost weight. The BMI of those who were underweight also slightly decreased while the BMI of those classified as normal increased 5.2% after gastric cancer treatment in comparison with before their cancer diagnosis with a small improvement in nutrition. However, the rates of malnutrition still remained high at 36.8%.

Better focus on nutrition among health care professionals was assumed to be an important premise to start this process and to implement good nutritional care. It was determined healthcare workers with access to clinical dietitians in hospital units had better focus on clinical nutrition compared to those without access. This correlated with the number of respondents in this study who had no significant BMI loss.

Clinical dietitians have gained scientific knowledge in nutrition during their gastric patient education and have the skills to translate this knowledge into useful dietary advice. The majority of clinical dietitians in oncology hospitals work with patients with malignant neoplastic diagnoses. Therefore, enabling clinical dietitians to specialize within nutritional oncology might increase the awareness of nutrition care among cancer patients.

Quality of Life

In this study, more than a half ($n = 24$, 63.2%) of participants perceived control over stress, depression, and problems with emotions. These numbers were raised ($n = 26$, 68.4%) when respondents could attend to their usual activities such as self-care, having a regular appetite, self-dressing, personal hygiene, work, or recreation. A large number of respondents felt healthy and full of energy.

When discussing healthy days, more than half ($n = 26$, 68%) of the participants in this study described their physical health as fair to good. Two-third of the respondents had no physical illness or injury as well as no problems with stress, depression, or emotions; nothing was keeping them from doing their usual activities such as self-care, work, or recreation. Some respondents were limited in some ways and within some activities because of health impairment. However, they did not require the help of others with personal care needs such as eating, bathing, dressing, or getting around the house; and a great of number respondents had no pain in answering. Approximately one-third of patients felt worried, tense, anxious, sad, or depressed about their disease (see Table 2 for HR-QoL scores).

Table 2

Health Related Quality of Life Scores

		n	%
General health	Very good	1	2.6
	Good	15	39.5
	Fair	10	26.3
	Poor	12	31.6
During the past 30 days – was your physical health adequate?	Yes	16	42.1
	No	20	52.6
	Don't know/Not sure	2	5.3
	Walking problem	4	10.5
Does pain make it hard for you to do your usual activities, such as self-care, work, or recreation?	Cancer	13	34.2
	Depression/anxiety/emotional problems	7	18.4
	Other impairment/problems	4	10.5
	Yes	12	31.6
During the past 30 days, have you felt sad, blue, or depressed?	No	24	63.2
	Yes	13	34.2
During the past 30 days, have you felt worried, tense, or anxious?	No	23	60.5
	Yes	13	34.2

N = 38

According to the table, the data showed participants' health in general was quite good. Most participants reported good mental health. Lower than one-third of participants agreed they were limited in taking part in activities due to their physical health problems, which was one of the factors that kept participants from their usual activities. It was clear from the question "How long have your activities been limited because of your major impairment or health problem?" that major impairment causing their limited activities was not mostly from pain and other impairments such as chronic conditions that usually lasted from months to many years. Although they were limited, most of them took care of themselves without much difficulty because of pain. Furthermore, most of participants felt very healthy and full of energy. Overall, most of participants' physical health was described as normal despite light chronic conditions while their mental health was good at all times ($n = 24, 63.2\%$).

Relationship Between Nutrition and Quality of Life

A significant association between Nutrition and QoL ($p < .05$) was found to positively correlate with daily activities. When a Pearson correlation was conducted for respondents, significant positive correlations were found between QoL and nutritional status based on respondents ($r = 0.3, p = .017$) and between BMI at present and cancer stage of the respondents ($r = 0.4, p = .04$; see Table 3). This finding demonstrated that nutritional status and quality of life were correlated with the stage of cancer and nutritional status correlated the quality of life of stomach cancer patients, which was shown to be consistent with previous studies (Nourissat et al., 2008).

Table 3

Correlations of Body Mass Index, Quality of Life, and Cancer Stage

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
General health	0.452	0.717
Physical health, illness and injury,	0.543	0.663
Mental health	0.508	0.687
Doing your usual activities, such as self-care, work, or recreation?	0.621	0.613
Limited in any activities	0.691	0.764
The major impairment or health problem that limits your activities	0.907	0.604
Activities been limited	0.866	0.67
Need the help of other persons with your personal care needs	0.678	0.766
You need the help needs business, shopping, or getting around for other purposes?	0.315	0.315
Quality of life	0.519	0.493
BMI at present	0.413	0.623
Cancer stage	0.463	0.544

The correlation between nutritional status parameters and quality of life is shown in Table 4. The analysis of nutritional status according to HRQoL classification and its relationship with QoL dimensions showed HR-QoL was significantly correlated with some healthy days. Activity limitation and healthy days symptom scale with $r^2 = 0.239$ and Durbin Watson = 2.08.

Table 4

Quality of Life Variables

Variables		Quality of Life	BMI at Present	Cancer Stage
Quality of Life	Pearson Correlation	1	.385*	.462**
	Sig. (2-tailed)		.017	.004
BMI at Present	Pearson Correlation	.385*	1	.328^
	Sig. (2-tailed)	.017		.045
Cancer Stage	Pearson Correlation	.462**	.328*	1
	Sig. (2-tailed)			

*. Correlation is significant at the 0.05 level (2-tailed).

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

CHAPTER V

DISCUSSION AND CONCLUSIONS

In the present research, the researcher studied the focus of healthcare professionals on clinical nutrition and examined the association between nutritional status and quality of life in cancer patients. Most of the prior research conducted in this area suggested nutritional status of cancer patients has an impact on their quality of life (Ravasco et al., 2004). This research study found associations among increased focus on clinical nutritional counseling, a higher priority on nutrition education, less weight loss, as well as more nutrition education. Nutritional counseling for nutritional status, clinical status, and cancer stage could improve nutrition and QoL. Nutritional status of cancer patients should be evaluated from the date of diagnosis. Nutritional counseling from a cancer dietitian and the importance of nutritional status related to quality of life should be emphasized.

Recommendations for Practice

Most gastric cancer patients have lower daily nutrient levels than reference values. At the significant level $\alpha = 0.05$, age, cancer stage, meals per day, and attractive food preparation with high-protein and high-calorie foods could improve the nutritional status of stomach cancer patients (Tian & Chen, 2005). Moreover, rehabilitation exercise could increase the appetite of patients and help them recover their body functions, which in turn might improve the quality of life of stomach cancer patients (Loprinzi & Lee, 2014). Loprinzi and Lee (2014) also found physical activity could help improve physical

and mental health, reduce the risk of cancer recurrence and death, and decrease side effects associated with cancer treatment.

The high prevalence of nutritional decline found in CRC patients entering chemotherapy calls for more focus on nutrition at an earlier point in a patient's course of the disease. There is an urgent need to agree on how to define cachexia and make clear distinctions of under-nutrition. Weight loss does not discriminate cachexia from under-nutrition or vice versa. Mechanisms behind muscle loss seen in cancer patients needs to be explored. A longitudinal study investigating changes in body weight and body composition during the course of disease, from initial diagnosis, and through surgery, radiation, and chemotherapy might bring more insight into the natural course of fluctuations in body composition. In such a study, it would be crucial to measure muscle mass and muscle strength and include measures of physical activity and dietary intake.

In planning a nutritional intervention, it is essential to have an adequate diagnosis of the nutritional problem (Ravasco, Monteiro-Grillo, Vidal, & Camilo, 2004). Clinical dietitians need to sub-specialize in nutritional oncology to provide good quality advice and guide patients in nutrition during the course and varying stages of the disease. Nutrition is a very important factor in the treatment of cancer and is also a therapeutic treatment in a general treatment plan. Cancer stage and a patient's condition affect nutritional status and poor nutritional status affects method compliance, treatment, and substance response. Cancer patients are at high risk of losing weight and depletion because of the physical and mental effects of both the disease and the treatment process if medical professionals do not plan properly (Uster et al., 2013).

In the Uster et al. study (2013), the association between QoL of the patients and the education of dieticians was demonstrated. Nutritional education during the treatment process resulted in lower rates of adverse effects associated with treatment. Another study of efficacy of nutrition intervention showed similar results with minimizing weight loss, a better global score for gastric cancer patients receiving education, and dietary counseling during chemotherapy (Mohammadi, Sulaiman, Koon, Amani, & Hosseini, 2013).

Nutritional support should be included as a strong therapeutic weapon during active oncology treatments. The main objectives would be to prevent early death, decrease complications, and improve quality of life. Additionally, some evidence indicated improving nutritional status reduced complications for patients undergoing chemotherapy. Disadvantages of parenteral nutrition feeding include major complications and increased cost of treatment. However, there is no common diet for all cancer patients—it depends on the characteristics of the disease, the treatment method, the patient's condition, fitness, and weight index; it is up to the medical professional to decide the nutritional regimen for a given individual. Some general principles include maintaining a balanced, rational, and delicious diet divided into many meals to ensure the body has enough energy to resist disease and its effects. Generally, doctors recommend a diet high in fruits, vegetables, with fat and sugar restrictions but in some specific cases, it might be necessary to increase energy and thus supplement with protein and sugar in a meal. If oral intake is still not enough or patients have severe exhaustion, doctors could consider supplementing using other forms such as through gastric tube or intravenous

nutrition. Oral nutritional supplements are cheaper and easier to administer than parenteral or enteral nutrition due to their few disadvantages.

According to the nutritional status classification of BMI, malnutrition rates did not increase significantly, only fluctuating 5.2% compared to the time of diagnosis. The general malnutrition rate is 36.8% and those overweight equaled 3.8%. This study's malnutrition rate was slightly higher (36.8% compared to 20%) compared to another study conducted at Hanoi Medical University Hospital (Phuong, Huong, Linh, & Yen, 2016); symptoms such as fatigue, anorexia, and nausea also fluctuated with nutritional status. Ravasco et al. (2004) showed timely nutrition interventions improved nutritional status for cancer patients as well as quality of life. Gupta et al. (2006) also showed patients with malnutrition had a poor quality of life compared with patients who were not malnourished.

When diagnosed, most patients fall into emotional states such as disbelief that they have cancer as well as shock, fear, anger, fatigue, depression, loneliness, and despair. This is a difficult time for the patients; patients want emotional support from doctors (Slevin et al., 1996) so emotional support for cancer patients is valuable. At this time, physicians and medical staff are responsible for encouraging, advising, clarifying the diagnosis to patients, treatment, monitoring, and prognosis methods to help patients understand; all would help the patient have a positive and optimistic attitude during the treatment process. Some surveys showed that in patients who had been thoroughly consulted and the disease and treatment had been explained, the adherence rate was higher and the results of treatment were better (Caro, Laviano, & Pichard, 2007). In one particular study focusing on the survival of head and neck cancer patients (Peltz, 2002),

the patients with head and neck cancer had the highest incidence of malnutrition when compared with all other types of cancer but the patients who received nutritional support not only had higher perceptions of quality of life but also tended to live longer.

Other research demonstrated cancer stage was the major determinant of a patient's perception of quality of life. However, poor nutrition combined with deficiencies in nutritional intake might be more important factors for the quality of life, specifically for gastric cancer patients (Tian & Chen, 2005). As such, this does not conflict with the results of the current research. Nourissat et al. (2008) also advised that nutritional interventions need to be implemented as soon as cancer is diagnosed and nutritional support therapy is necessary in cancer treatment.

In summary, nutritional status impacts the quality of life for gastric cancer survivors. Additionally, body weight status (has been shown to be important in health-related quality of life so it is very important to do a nutrition consultation at the time of diagnosis to have an appropriate intervention.

The results of this research could be useful for doctors and nurses at community healthcare centers to help improve the quality of life of stomach cancer patients and also useful for patients to have more knowledge to be able to fight cancer more effectively.

Recommendations for Research

It is recommended that nutritionists specifically trained in oncology needs could consult with gastric cancer patients through periods of illness. Clinical professionals must have proper nutrition strategies for patients undergoing chemotherapy as well as supportive nutrition.

This study should be repeated with a larger sample size to assess more closely the processes that impact nutrition status in relation to the quality of life for gastric cancer patient. From additional studies, further data could be obtained to provide the foundation for future changes and nutritional consultation processes that enhance patient outcomes.

Although this study provided information about weight loss in cancer patients, it is recommended that future research be conducted regarding the types of food that are suitable for gastric cancer with the purpose of decreasing the rate of loss weight in gastric cancer patients.

Doctors and nutritional specialists need to examine a given patient's nutrition at the time of diagnosis to have an appropriate intervention for every disease stage in order to avoid weight loss. Medical staff need to recognize their roles and responsibilities in nutritional counseling for gastric cancer patients. Additionally, medical professionals should provide the patient with knowledge about their disease and treatment so he/she understands, accepts, and prepares to fight it. Physical activity as well as exercise counseling could also help improve QoL.

Limitations

In this study, limitations to the research were the small sample size as it was not representative of all patients and the low reliability of the research questionnaire. In the future, researcher will conduct further research with larger samples to have higher reliability.

In addition, a possible limitation for this study could be the results were based on cross sectional self-reports, resulting in possible contamination from a common method variance. The common method variance problem was the data collection on multiple

variables using a single approach. The self-report questionnaires could have led the participants to apply the same biases to each term as well as an over-estimation of the strength of relationships among variables.

Conclusion

This study sought to investigate the influence of nutritional factors on the quality of life of gastric cancer patients in an oncology hospital and to determine which potential nutritional strategies might increase perceptions of quality of life. Nutritional status affected the quality of life for gastric cancer survivors. Additionally, body weight status was shown to be important in health-related quality of life and patients should receive nutritional counseling at the time of diagnosis to generate appropriate interventions.

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APPENDIX A
PERMISSION TO CONDUCT RESEARCH
AT ONCOLOGY HOSPITAL



SỞ Y TẾ TP. HỒ CHÍ MINH
BỆNH VIỆN UNG BƯỚU
HỘI ĐỒNG ĐẠO ĐỨC TRONG NCYSH

Số: 218 /BVUB-HĐĐĐ
 V/v: Chấp thuận vấn đề Đạo đức
 trong nghiên cứu y sinh học.

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

Thành phố Hồ Chí Minh, ngày 21 tháng 5 năm 2019

GIẤY CHỨNG NHẬN CHẤP THUẬN CỦA HỘI ĐỒNG ĐẠO ĐỨC TRONG NGHIÊN CỨU Y SINH HỌC

Căn cứ quyết định số 3532/QĐ-BVUB ngày 27/11/2018 của Ban Giám đốc bệnh viện Ung Bướu Thành phố Hồ Chí Minh về việc thành lập Hội đồng Đạo đức trong nghiên cứu y sinh học cấp cơ sở;

Xét đề nghị của Thư ký Hội đồng Đạo đức trong nghiên cứu y sinh học cấp cơ sở - Bệnh viện Ung Bướu Thành phố Hồ Chí Minh trong tờ trình số 216/HĐĐĐ-CĐT ngày 21/05/2019 đã được Chủ tịch Hội đồng thông qua,

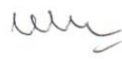
Nay Hội đồng Đạo đức trong nghiên cứu y sinh học cấp cơ sở - Bệnh viện Ung Bướu Thành phố Hồ Chí Minh chấp thuận về các khía cạnh đạo đức trong nghiên cứu đối với đề tài:

1. Tên đề tài: ***“Ảnh hưởng của tình trạng dinh dưỡng đến chất lượng sống của người bệnh ung thư dạ dày”***
2. Chủ nhiệm đề tài: **SV. Nguyễn Thị Hồng Vân**
3. Địa điểm nghiên cứu: Bệnh viện Ung Bướu TP. HCM
4. Thời gian nghiên cứu dự kiến: Từ ngày 03/06/2019 đến ngày 28/06/2019
5. Phương thức xét duyệt: Theo qui trình rút gọn

Lưu ý: Hội đồng Đạo đức có thể kiểm tra ngẫu nhiên trong thời gian tiến hành nghiên cứu.

Ngày chấp thuận: 21/05/2019

CHỦ TỊCH HỘI ĐỒNG ĐẠO ĐỨC ✓


 BS. Trâm Đặng Ngọc Linh

Ghi chú: Hội đồng đạo đức BV Ung bướu TP. HCM hoạt động tuân thủ theo các nguyên tắc của GCP và các hướng dẫn của Bộ Y tế. Nghiên cứu nêu trên chỉ bắt đầu triển khai sau khi chính thức được phê duyệt bởi Hội đồng đạo đức – Bộ Y tế

APPENDIX B
INSTITUTIONAL REVIEW BOARD APPROVAL



Institutional Review Board

DATE: September 25, 2019

TO: Hong Van Nguyen Thi
FROM: University of Northern Colorado (UNCO) IRB

PROJECT TITLE: [1445410-2] THE RELATIONSHIP NUTRITIONAL STATUS AND THE QUALITY OF LIFE FOR GASTRIC CANCER PATIENTS

SUBMISSION TYPE: Revision

ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS

DECISION DATE: September 25, 2019

EXPIRATION DATE: September 25, 2023

Thank you for your submission of Revision materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Nicole Morse at 970-351-1910 or nicole.morse@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX C

**CONSENT FORM TO PARTICIPATE IN HUMAN
RESEARCH IN ENGLISH AND VIETNAMESE**



CONSENT FOR PARTICIPATION IN THE RESEARCH

Project Title: The Impact of Nutritional status on the quality of life for gastric cancer patient in Oncology Hospital In Ho Chi Minh City

Researcher: Van Nguyen (Nguyen Thi Hong Van) - student in the Advanced Nurse Generalist-Master Program, Hongbang International University, Vietnam (HIU) & University of Northern Colorado, USA (UNCO)

Phone: 0906336798 Email: nguy9474@bears.unco.edu;phucboxy30@yahoo.com

Research advisor: Dr Katrina, Katrina Einhellig PhD, RN, CNE

katrina.einhellig@unco.edu

Dear Sir/Madam,

The purpose of this research study is to identify the relationship nutrition effect to quality of life for patient cancer with your cancer treatment provided by your medical doctor or nurse and other health professionals. There are no risks associated with your participation in this study.

I would be grateful if you can kindly spare 15 minutes to fill in the questionnaire.

Your participation in this study is voluntary and confidential. The following statement will be placed on each patient questionnaire "You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions please complete the attached survey/questionnaire if you would like to participate in this research".

Please also note that your answers are the basis for me to assess the status of the research problem, so I hope to receive your detailed and honest answers. All relevant information will only be used for research purposes and will be treated with utmost confidentiality.

If you agree to participate in this study, your completion of the research procedures indicates your consent. You may request a copy of this survey and attached consent form. If you have any concerns about your selection or treatment as a research participant, please contact Nicole Morse, Office of Research, Kepner Hall, University of Northern Colorado, Greeley, CO, 80639; 970-351-1910.

If you have any question or require further information, please contact the researcher:

Nguyen Thi Hong Van Phone: 0989044459

Email: nguy9474@bears.unco.edu;phucboxy30@yahoo.com

Thank you for your cooperation and support.



PHIẾU ĐỒNG Ý THAM GIA NGHIÊN CỨU

Tên dự án: Ảnh hưởng của tình trạng dinh dưỡng đến chất lượng cuộc sống của bệnh nhân ung thư dạ dày tại Bệnh viện Ung bướu tại Thành phố Hồ Chí Minh

Người nghiên cứu: Van Nguyen (Nguyen Thi Hong Van) – sinh viên chương trình Thạc sĩ Y khoa, Đại học Quốc tế Hong Bang, Việt Nam (HIU) & Đại học Colorado, Hoa Kỳ (UNCO)

Số điện thoại: 0989044459, Email: nguy9474@bears.unco.edu; phucboxy30@yahoo.com

Cố vấn nghiên cứu: Dr Katrina, Katrina Einhellig PhD, RN, CNE

Kính gửi anh/chị,

Mục đích của nghiên cứu này là xác định hiệu quả dinh dưỡng mối quan hệ với chất lượng cuộc sống đối với bệnh nhân ung thư với phương pháp điều trị ung thư của bạn được cung cấp bởi bác sĩ y tế hoặc y tá và các chuyên gia y tế khác. Không có rủi ro liên quan đến việc bạn tham gia vào nghiên cứu này.

Kính mong anh/chị dành chút thời gian để trả lời cho tôi một số câu hỏi dưới đây. Cũng xin lưu ý rằng những câu trả lời của anh/chị là cơ sở để tôi đánh giá thực trạng của vấn đề nghiên cứu nên rất mong nhận được câu trả lời chi tiết và trung thực của anh/chị. Mọi thông tin liên quan sẽ chỉ phục vụ duy nhất cho mục đích nghiên cứu đề tài và sẽ được bảo mật hoàn toàn.

Việc thu thập thông tin sẽ bằng một bảng câu hỏi đơn giản, anh chị có thể rút lại và không tham gia vào nghiên cứu bất cứ lúc nào. Tham gia vào nghiên cứu này là tự nguyện và ẩn danh. Quyết định của anh/chị sẽ được tôn trọng và sẽ không dẫn đến mất lợi ích mà bạn được hưởng. Sau khi đọc và có cơ hội hỏi bất kỳ câu hỏi nào, vui lòng hoàn thành bản khảo sát / bảng câu hỏi đính kèm nếu bạn muốn tham gia vào nghiên cứu này. Bằng cách hoàn thành bảng câu hỏi, bạn đồng ý tham gia. Bạn có thể yêu cầu một bản sao của khảo sát này và mẫu đồng ý đính kèm. Nếu bạn có bất kỳ lo ngại nào về việc lựa chọn hoặc điều trị như một người tham gia nghiên cứu, vui lòng liên hệ với Văn phòng các Chương trình được Tài trợ, Kepner Hall, Đại học Bắc Colorado Greeley, CO 80639; 970-351-1910.

Nếu bạn có bất kỳ câu hỏi hoặc yêu cầu thêm thông tin, xin vui lòng liên hệ với nhà nghiên cứu:

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 Trân trọng cảm ơn sự hợp tác và giúp đỡ của các anh/chị.

APPENDIX D
RESEARCHER ADMINISTERED QUESTIONNAIRE

Note: Interviews will be conducted with a patient and interviewer present. The interviewer will ask each of the questions and transcribe the information given to them by the patient.

Administrative details

Questionnaire Code NO.

Name of the interviewerCode No.

Date of interview Time started Time finished

Socio-economic status

Please answer the questions by circling the choice and filling information

1. Age..... a) below 30 years b) 30-50 years c)50-70 years
 2. Gender: male Female
 3. Place of birth of patient: Home.....Hospital.....
 4. Date of birth of patient.....
 5. Total number of siblings
 6. Fathers Occupation: Mothers Occupation
 7. Age Age
 8. Education level Education level
1. What is your family's total monthly income (in VND)?
 - a. Below 10 millions b. 10-30 millions c. Above 30 millions
 2. Do you have any other source of income/livelihood?
 - a. yes
 - b. no

If yes which source

- a. Crop income
- b. Livestock income
- c. Both the above

Patient anthropometry/nutritional status

1. Anthropometric measurements

	1st reading	2nd reading	average
Weight (Kg)
Height/length (cm)

Then compute the following:

BMI/Age:

- 2. How has been the weight gain since diagnosis?
 - a. Poor
 - b. Fluctuating
 - c. Slow
 - d. Satisfactory
 - e. Constant

Nutritional management practices

- 1. Is there history of cancer in your family?
 - a) Yes (specify who)
 - b) No
 - c) Don't know

- 2. Does the disease state/treatment given interfere with your food intake?
 - a. Yes
 - b. No
 - c. Sometimes

3. If yes or sometimes how does it interfere with your intake of food
 - a. Eat very little food
 - b. Appetite problems
 - c. Has nausea
 - d. Vomiting
 - e. Diarrhea
 - f. Any other specify.....

4. If b above how do you describe your appetite now or most of the time?
 - a. Good
 - b. Moderate
 - c. Poor
 - d. Very poor

5. How many meals do you take in a day?
 - a. One
 - b. Two
 - c. Three
 - d. More than 3 snacks + snacks
 - e. Snacks only

6. In case of poor appetite are you assisted to eat in hospital or at home
 - a. Yes
 - b. No
 - c. Sometimes

7. (A) Are you encouraged to eat when your appetite is poor?
 - a. Yes
 - b. No

(B) If yes how do you do it?

 - a. Use a stick
 - b. Prepare attractive food
 - c. Serve small amount of food
 - d. Others
 - e. (specify).....

(C) If no, why?

- a. Lack of time
- b. Lack of patience
- c. Given up
- d. Specify others.....

8. (A). What attempts are being made by the hospital to improve your food intake?

- a. Give multivitamin to boost appetite
- b. Nutrition education
- c. Enteral /parenteral nutrition
- d. Nothing

(B) Have they been successful?

- a. Yes
- b. No

Food consumption

1. List the foods you like and those you dislikee

Food likedFood disliked

.....

2. (a) Do you crave for any particular foods?

- a. Yes
- b. No

(b). If yes list some of them

.....

.....

3. (a). Are there foods that you do not eat completely?

- a. Yes
- b. No
- c.

(b) If yes which are some of these foods?

.....

4. (a) Have you been told to change your diet since the doctor learnt you had cancer?
- a. Yes
 - b. No
 - c.
- If yes what was the reason given?
.....
- (b) Have you yourself changed the diet?
- a. Yes
 - b. No
- (c) If no, Why?
.....
- (d) If yes how do you follow the prescribed diet?
- a. Strict adherence
 - b. Rarely
 - c. Sometimes
 - d. Never
- (e) Do you agree that these foods are best for your disease state?
- a. Yes
 - b. No
5. What are some of the constraints you face in proper dietary planning for yourself?
- a. Lack of time
 - b. Lack of patience
 - c. Given up
 - d. Specify others.....

.....END.....

APPENDIX E
MEDICAL HISTORY FORM

MEDICAL HISTORY FORM

Code No:

This was filled from hospital records

1. Date of diagnosis.....

On diagnosis of disease

Weight.....

Height/length.....

BMI..... Date

started on chemotherapy.....

2. Date of last visit.....

3. Anthropometric measurements in the last visit

Weight

Height/Length

BMI

4. Major complications?

.....,,

5. Any nutritional problem(s) from records

.....,,