FACTORS RELATED TO SYMPTOM EXPERIENCES AMONG PATIENTS WITH GASTROINTESTINAL CANCER HAVING CHEMOTHERAPY AFTER SURGERY

XIN XIN CHEN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR MASTER DEGREE OF NURSING SCIENCE
(INTERNATIONAL PROGRAM)
IN ADULT NURSING PATHWAY
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ประสบการณ์อาการและปัจจัยที่เกี่ยวข้องในผู้ป่วยหลังการผ่าตัดที่เป็นมะเร็งระบบทางเดินอาหารในระหว่างการรักษาด้วยเคมีบำบัด

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The Thesis of Xin Xin Chen has been approved by the examining committee to be partial fulfillment of the requirements for the Master Degree of Nursing Science (International Program) in Adult Nursing Pathway of Burapha University

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XIN XIN CHEN : FACTORS RELATED TO SYMPTOM EXPERIENCES AMONG PATIENTS WITH GASTROINTESTINAL CANCER HAVING CHEMOTHERAPY AFTER SURGERY. ADVISORY COMMITTEE: NIPHAWAN SAMARTKIT, Ph.D. CHUTIMA CHANTAMIT-O-PAS, Ph.D. 2024.

Gastrointestinal cancer (GI cancer) patients were generally affected by cancer and treatment-induced symptom experience. This study aimed to examine the relationships between age, gender, cumulative dose, social support, and self-care behavior with symptom experiences among patients with GI cancer having chemotherapy after surgery. The theory of unpleasant symptoms (TOUS) guided this study. A simple random sampling technique was used to recruit 120 participants with GI cancer having chemotherapy after surgery. Research instruments consisted of a demographic questionnaire, the Memorial Symptom Assessment Scale (MSAS), the Multidimensional Scale of Perceived Social Support (MSPSS), the Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale, each bearing a reliability coefficient of .78~.87, .94 and .88 respectively. Data were analyzed using descriptive statistics, Pearson's product-moment correlation, and Point-biserial correlation.

The results showed that for symptom experiences, the top five occurrence of symptoms were (1) numbness/tingling in hands/feet (81.7%), followed by (2) lack of energy (78.3%), (3) nausea (73.3%), (4) lack of appetite (71.7%), (5) change in the way food tastes (56.7%), they also cause much more frequency, severity, and distress than other symptoms. Point biserial correlation results indicated that gender had a moderate relationship with symptom frequency, severity, and distress (r = .41, .40, .42, p < .01, respectively) as well as the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI (r = .31, .44, .47, p < .01, respectively). Pearson's product-moment correlation results showed that cumulative dose had a positive correlation with symptom frequency, severity, and distress (r = .44, .47, .48, p < .01, respectively) as well as the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI (r = .37, .43, .47, p < .01, respectively). Self-care behavior had a negative correlation with symptom frequency,

severity, and distress (r = -.55, -.49, -.43, p < .01, respectively) as well as the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI (r = -.49, -.30, -.40, p < .01, respectively). Social support had a negative correlation with symptom frequency, severity, and distress (r = -.37, -.37, -.30, p < .01, respectively) as well as the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI (r = -.32, -.26, -.29, p < .01, respectively). However, age had no statistically correlations with symptom frequency, severity, and distress (r = .064, -.018, .012, p > .05, respectively) as well as those subscales (r = .076, -.059, .005, p > .05, respectively).

The findings in this study can be useful in developing appropriate nursing intervention to reduce the symptom experience by concerning on gender and cumulative dose of chemotherapy, moreover, improving self-care behavior and social support.

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CHAPTER 1
INTRODUCTION

Background and significance of the problems

According to estimates from the World Health Organization (WHO) in 2020, gastrointestinal (GI) cancers account for 41.4% of new cancer cases and 49% of cancer deaths in China (Sung et al., 2021). GI cancer account for three of the five major cancers with high incidence in China (Xie et al., 2020). By the year 2020, the most commonly diagnosed GI cancers in Chinese male was dominated by stomach (13.4%), colorectum (12.9%), liver (12.2%), and esophagus (9.0%) of GI cancer cases, and for Chinese female, they were colorectum (11.3%), stomach (7.1%) cancer (Sung et al., 2021). According to the data reported by the Center for Disease Control and Prevention in Wenzhou, China, the top five cancers incidence in Wenzhou are lung cancer, colorectal cancer, thyroid cancer, liver cancer, and stomach cancer. The leading cause of death in Wenzhou people is cancer, among which lung cancer, liver cancer, gastric cancer, colorectal and anal cancer, and esophageal cancer are the top five cancer mortality rates.

Gastrointestinal cancers account for nearly 50 percent of both morbidity and mortality. These data indicated that the GI cancer cases in Wenzhou China are still high, especially for stomach cancer and colorectal cancer (Ling et al., 2021). The high incidence of gastric cancer and colorectal cancer may be related to Wenzhou people's lifestyle and dietary habits. Wenzhou is a coastal city where many people like to marinate seafood before eating it. Pickles are also a traditional food in Wenzhou, and they are preserved food (Ling et al., 2021). Furthermore, Chinese people prefer to eat together in the family, which will increase the risk of transmission of helicobacter pylori. Studies had shown that chronic helicobacter pylori infection is the main cause of gastric cancer (Murakami & Matsubara, 2018).

According to statistics, in China, more than 80% of GI cancer patients were already in stage II, stage III, and stage IV at the time of their first diagnosis with advanced gastric cancer and colorectal cancer. The treatment of gastric and colorectal cancer in stage II, stage III, and stage IV is mainly surgery, supplemented by chemotherapy, immunotherapy, traditional Chinese medicine, and other supportive treatment, to the survival rate and reduce the recurrence rate (Young et al., 2016). Studies have shown that 30% to 40% of colorectal cancer patients have recurrence or metastasis after the operation, and the 7-year overall survival rate of patients with oxaliplatin combined with capecitabine chemotherapy can be increased to 73% (Schmoll et al., 2015). In China, 50% to 70% of patients with gastric cancer will relapse after the radical operation, and the 5-year survival rate is only 40%, however, through oxaliplatin combined with capecitabine chemotherapy, 74% of gastric cancer patients can achieve three-year disease-free survival (Ji et al., 2018). Therefore, whether receiving full-dose chemotherapy can affect the efficacy, recurrence rate, and survival rate of patients (Bland et al., 2019).

Multiple factors contribute to full-dose chemotherapy, including white blood cell count, red blood cell count, platelet count, liver function, and so on, but another important one is the symptom burden during chemotherapy (Feng et al., 2019). A previous study showed that chemotherapy-related symptoms (CRS) will adversely affect treatment compliance (Oh et al., 2020). In addition, a longitudinal study conducted by Hua (2010) on symptom distress of patients receiving adjuvant chemotherapy after colon cancer surgery showed that nearly 70% of patients could not complete chemotherapy on schedule due to various reasons, and there was a significant difference in symptom distress scores between the two groups of patients with different completion of chemotherapy, suggesting that symptom distress was one of the factors affecting patients' completion of chemotherapy. Therefore, nurses need

to teach patients symptom management methods, which can not only improve the survival rate of patients but also improve the quality of life.

As a result, although gastrointestinal cancer surgery and chemotherapy can improve the survival rate of the patient, it also has varying degrees of adverse effects on the patient's physical function, psychological status, family relationships, social interaction, and economic status (Rohrl et al., 2016). Through literature review, the symptom experience of postoperative chemotherapy in patients with GI cancer comes from two aspects, one is operation, and another one is chemotherapy.

The operation will damage the normal anatomical structure of the patient's digestive system, affect its digestion and absorption function, and lead to malnutrition, diarrhea, etc. (Tantoy et al., 2018). Patients with gastrointestinal cancer may experience pain, nausea, diarrhea, constipation, anxiety, fatigue, and other symptoms after surgery (Wennström et al., 2020). Therefore, patients are already experiencing some of the symptoms before they receive chemotherapy.

Moreover, during chemotherapy, due to the toxic side effects of drugs, GI cancer patients will experience clustered symptoms, such as fatigue, nausea, vomiting, pain, insomnia, constipation, diarrhea, loss of appetite, etc. (Röhrl, Guren, Astrup, Småstuen, & Rustøen, 2020). Even in the early stages of treatment, cycle two or three, patients with GI cancer who receive oxaliplatin chemotherapy can experience a variety of symptoms in terms of occurrence, severity, and distress (Pettersson, Bertero, Unosson, & Borjeson, 2014). With the change of time, common symptoms such as pain, lack of energy, nausea, feeling drowsy, difficulty sleeping, and changes in food taste changed in the occurrence, severity, and distress (Tantoy et al., 2018). Therefore, the symptom experience of the patients receiving chemotherapy runs through the whole treatment process, affects the quality of life of the patients, causes trouble to the patients, and even interrupts or reduces the dose of chemotherapy.

Because of its cyclical reasons, the average hospitalization time of chemotherapy in Wenzhou China is 1-3days, followed by a period without treatment (at home) before the next cycle, and clinical staff is more likely to ignore clustered symptoms and reactions that patients may have at home (Han et al., 2019). Previous research has shown that patients report the lowest levels of symptoms on the day of chemotherapy (Giesinger et al., 2014). Whereas chemotherapy exposition triggers the need for unplanned visits over the second and third week after treatment (Foltran et al., 2014). Insight into the self-reported symptom experience is of importance to give the best supportive care during treatment.

Based on the theory of unpleasant symptoms (TOUS), experienced symptoms are the central focus of the model, conceived as indicators of change in the health status of the individual, which often occurs multiple times and concomitantly, and although they are different from each other, present four common dimensions: intensity, time, suffering and quality (Lenz et al., 1997). When choosing chemotherapy regimens, most cancer patients take the severity of the side effects of chemotherapy as the main reference (Hirose et al., 2005). According to the TOUS (Lenz et al., 1997), symptom experience of the postoperative chemotherapy gastrointestinal cancer patient can occur in isolation or lead to another symptom, and each symptom is conceptualized as a multidimensional experience considering the timing, frequency of occurrence, intensity (severity of the symptom), distress (level of perceived distress, and quality (the patient's description of what the symptom feels like). It is acknowledged that physiological (e.g., pathologic problems), psychological (e.g., mood state) and situational factors (e.g., social support) are interrelated and may interact to influence symptom experience. Symptoms are at the heart of nursing care. Much of what nurses do for and with patients is focused on symptoms: measuring them, assessing factors that may influence changes, developing prevention and

management strategies, and helping patients with ongoing monitoring and self-management.

In addition, the theory of unpleasant symptoms (TOUS) can be used to develop preventive interventions to adjust influencing factors for multiple symptoms (Lee et al., 2017). Multiple factors contribute to symptom experience (Röhrl et al., 2019). According to the TOUS, the factors that influence symptom experience are categorized into physiologic, psychological, and situational components (Lenz et al., 1997). Symptom experiences of GI cancer persons were very complex, there were many factors related to symptom experiences, including age, gender, cancer stage, chemotherapy regimens, chemotherapy cycles, education level, financial status, family income, and health literacy (Cheng et al., 2009; Chu, 2020). However, it is worth noting that enhancing the power of self-care can promote symptom management (Guo et al., 2017). Moreover, cancer patients with higher social support will make them more confident in overcoming the experience of uncomfortable symptoms (Oh et al., 2020). Based on TOUS (Lenz et al., 1997), this study will examine the relationship between physiological factors (age, gender, cumulative dose), and situational factors (social support, self-care behavior) with symptom experiences.

The relationship between age and symptom experience among postoperative GI cancer patients undergoing chemotherapy remains unclear. Some study findings suggest that there was a positive association between age and symptom distress (Van Cleave et al., 2013). Moreover, younger patients with cancer undergoing chemotherapy experience greater symptomatic distress than older adults (Wong et al., 2017). Other study findings show either no association (Agasi-Idenburg et al., 2017). These adverse effects appear more severe in older patients than in younger adults, which are known to be attributed to the presence of underlying diseases and changes in pharmacokinetics and pharmacodynamics based on aging (Lee et al., 2018). Young

people are originally the main source of income for their families. After illness, both work and financial pressure will increase, and young people's pursuit of quality of life is different from that of the elderly (Maeda, Onuoha, & Munakata, 2006). However, these findings are inconsistent and may be related to different times or different regions (Kim et al., 2015). Thus, this study needs to examine whether age is associated with symptom experience.

Gender is another factor associated with symptom experience of postoperative GI cancer patients undergoing chemotherapy (Röhrl et al., 2019). One study investigated the symptoms during chemotherapy in postoperative colorectal cancer patients and found that female was associated with more severe worrying, lack of energy, and nausea (Röhrl et al., 2019). Another study also showed that female patients with colorectal cancer undergoing postsurgical adjuvant chemotherapy had significantly higher symptom severity and symptom interference scores than did male patients, which a mean severity score: 3.17 vs. 2.39, respectively; ($p < .001$), mean distress score: 3.17 vs. 2.04; ($p < .001$) (Zhang et al., 2015). Similar findings were reported by Hua (2010), a survey of patients with adjuvant chemotherapy after colon cancer surgery in China found that the total score of symptoms, total score of frequency, and severity in female patients was significantly higher than that in male patients, suggesting that female patients are more likely to have adverse reactions to chemotherapy, or female patients are more inclined to report the uncomfortable symptoms of chemotherapy to medical staff. Therefore, this study is interested to examine whether gender is associated with symptom experience.

Each chemotherapy regimen has a distinct toxicity profile. A well-known side effect of oxaliplatin is peripheral neuropathy, which increases with cumulative dose (Brewer et al., 2016). The chronic form of oxaliplatin-induced peripheral neuropathy is cumulative dose-dependent, the cumulative dose of oxaliplatin reported in the literature was between 600 and 850mg/m^2 (Zribi et al., 2020). In this

longitudinal study (Tantoy et al., 2018), participants have followed up a total of 6 times during chemotherapy, they found that with the change of time, common symptoms such as pain, lack of energy, nausea, feeling drowsy, difficulty sleeping, and changes in food taste changed in the incidence, severity, and distress. As the cumulative dose of chemotherapy increases, the cumulative toxic effects of chemotherapy drugs in the body increase, then, the patients' tolerance to the drugs decreases as well as the resistance of the body, therefore, the level of symptoms experienced by the patients increased (Wu, 2010). As chemotherapy progresses, each dimension of symptom experience changes so this study will examine whether different cumulative doses are related factors of symptom experience.

Self-care behavior reflects patients' adoption of a healthy lifestyle, daily functional recovery exercise, and other behaviors (White et al., 2019), maintaining and improving patients' health through patients' monitoring of and managing the symptoms of their illness, reducing the influence of illness on their social functioning, emotion, and interpersonal relationships (Lorig & Holman, 2003). Previous research on patients with colorectal cancer undergoing chemotherapy reported that self-care behavior is an influencing factor in the quality of life (Lee et al., 2018). However, few previous studies have addressed the relationships between self-care behavior and symptom experience among patients with gastrointestinal cancer having chemotherapy after surgery. So, it is necessary to examine whether different self-care behavior is related factors of symptom experience.

Social support includes practical help in assessment, affection, tasks, communication in relationship formation and guidance, and social companionship of the family, friends, or medical experts (Queenan et al., 2010). Less social support tends to have more difficulty in controlling symptoms in post gastrectomy patients (Maeda & Munakata, 2008). As perceived social support decreased, symptom severity increased in cancer patients receiving adjuvant treatment (Ochayon et al., 2015).

Lower social support is linked to a variety of negative mental and physical health outcomes among survivors. In addition, cancer survivors with lower levels of social support experienced a higher level of pain and depressive symptoms (Hughes et al., 2014). Thus, it is necessary to identify the relationship between social support and symptom experience in GI cancer patients undergoing chemotherapy.

Despite the evidence of research that supports the relationships between age, gender, cumulative dose, self-care behavior, and social support with symptom experience in cancer patients undergoing chemotherapy, less is conducted on GI cancer patients in China. To address this gap, the present study will examine symptom experience in postoperative GI cancer received chemotherapy patients and its association with selected factors (i.e., age, gender, cumulative dose, social support, and self-care behavior).

This study will help Chinese health care workers to understand the incidence and severity of various symptoms of postoperative gastrointestinal cancer patients during chemotherapy. It can also help nurses to understand and well respond to symptom experiences and the related factors, moreover, can further design the intervention to deal and manage with a series of symptoms during chemotherapy based on a systematic evaluation of the patient's symptom experience.

Research objectives

1. To describe symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

2. To examine the relationships between age, gender, cumulative dose, social support, and self-care behavior with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

Research hypotheses

1. Age has a relationship with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

2. Gender has a relationship with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

3. Cumulative dose has a positive relationship with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

4. Self-care behavior has a negative relationship with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

5. Social support has a negative relationship with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

Scope of the study

The purpose of the study was to examine the symptom experience and its relationships with age, gender, cumulative dose, social support, and self-care behavior in postoperative gastrointestinal cancer patients during chemotherapy. Data was collected in the Gastrointestinal Oncology department and the Department of Radiotherapy and Chemotherapy at the Second Affiliated Hospital of Wenzhou Medical University, Wenzhou, China. Data collection was conducted in November and December, 2021.

Conceptual framework

This study was based on the theory of unpleasant symptoms (TOUS) (Lenz et al., 1997). According to the TOUS, there are three major concepts, which are influencing factors, unpleasant symptoms, and performance (Lenz et al., 1997). The factors that influence symptom experience are categorized into physiologic, psychological, and situational components. Physiologic factors include structural,

physiologic, and genetic variables that have a reciprocal relationship with the occurrence of a symptom. Psychological factors represent affective and cognitive components that can worsen the symptom. Situational factors are those that encompass the individual's physical and social environment such as lifestyle behaviors and social support (Blakeman, 2019). These can influence an individual's way of interpreting symptoms or the availability of help in dealing with symptoms. Unpleasant symptoms are indicators of changes in normal functioning, which are perceived through the individual's personal experience rather than objective observation (Lenz et al., 1997). Each symptom consists of multidimensional characteristics including intensity, distress, quality, and timing, and these symptoms can be shared (Lenz et al., 1997).

The TOUS indicated that physiological factors include age, gender, and variables related to the illness (es) and treatments. Psychological factors include mood and cognition (for example, knowledge about and understanding of the illness). they exert a strong influence on symptoms. Situational factors are external to the individual. they emphasize the potential impact of the physical and social environments on the patient (Lenz et al., 1997).

Therefore, guiding by the TOUS, in this study, physiological factors (age, gender, cumulative dose), and situational factors (social support, self-care behavior) were presented as the independent variables and may be related to symptom experiences. The relationship among the all of variables in this study was described in figure 1.

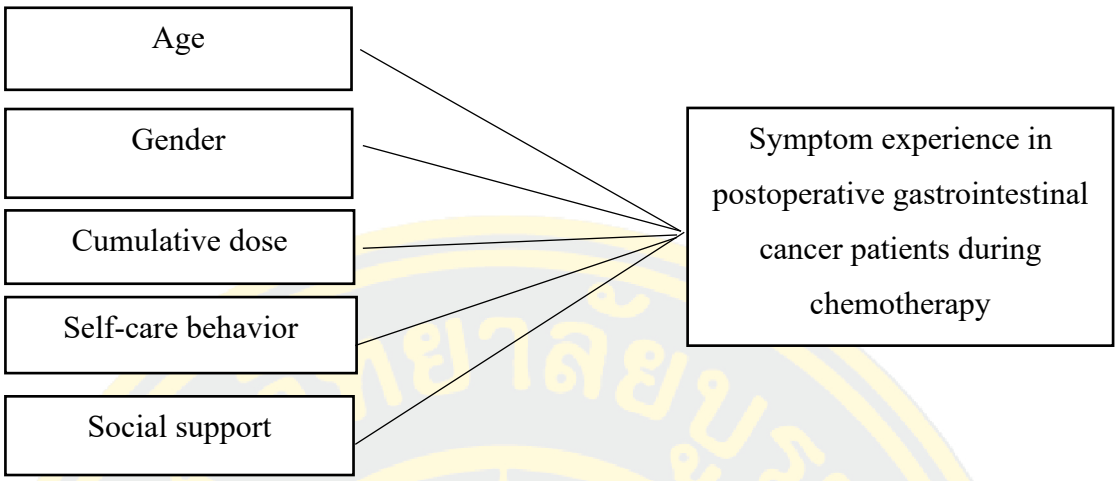

Figure 1 Conceptual framework

Definition of terms

Patients with gastrointestinal cancer having chemotherapy after surgery

Patients with gastrointestinal cancer having chemotherapy after surgery refer to patients who were diagnosed with gastrointestinal cancer after radical resection of stomach cancer or colorectal cancer and received at least two cycles of oxaliplatin combined with capecitabine chemotherapy.

Symptom experience

Symptom experience is the perception and reaction of the persons with gastrointestinal cancer having chemotherapy after surgery about the occurrence, frequency, severity, and distress of each symptom. It was measured by the Chinese version of the memorial symptom assessment scale（MSAS) scale translated by Cheng et al. (2009).

Self-care behavior

Self-care behavior refers to the range of voluntary activities that persons with gastrointestinal cancer having chemotherapy after surgery uses to maintain life, health, and well-being. It is learned behavior and is performed by individuals on their

behalf (Zhang et al., 2015). It was measured by the Chinese version of the appraisal of self-care agency scale-revised (ASAS-R) translated by Guo et al. (2017)

Social support

Social support refers to the perception of persons with gastrointestinal cancer having chemotherapy after surgery related to instrumental, informational, and emotional support received from family, friends, and significant others. Social support in this study was measured by the Chinese version of the multidimensional scale of perceived social support (MSPSS) translated by Chou (2000).

CHAPTER 2
LITERATURE REVIEWS

This chapter presented an overview of gastrointestinal (GI) cancer, symptom experiences of postoperative chemotherapy for the gastrointestinal cancer patients, the theory of unpleasant symptoms (TOUS), and factors related to symptom experience of postoperative chemotherapy for gastrointestinal cancer patients as follows below.

Overview of gastrointestinal cancer

Definition of GI cancer

Gastrointestinal cancer is a type of tumor that originate in the accessory organs of the digestive tract, including esophageal cancer, gastric cancer, liver cancer, colorectal cancer, and bile duct cancer (Gao et al., 2014). Among the ten cancers with the highest mortality in the world, five are digestive tract cancers, and more than 3 million patients die of GI cancer every year (Tözün & Vardareli, 2016). In this study, we focus on gastric cancer and colorectal cancer. The early symptoms of GI cancer are not obvious, sometimes they are only manifested as wasting, nausea, and abdominal distension (Spiller, 2001).

Incidence of GI cancer

The most commonly diagnosed GI cancers in Chinese males, in 2018, were dominated by stomach (13.5% of total cases), colorectum (12.8%), liver (12.4%), and esophageal (9.0%) cancer, and for Chinese females, they were colorectum (11.3%), stomach (7.1%) cancer (Feng et al., 2019). According to the data released by the center for disease control and prevention in Wenzhou, China, the top five cancers of reported incidence in Wenzhou are lung cancer, colorectal cancer, thyroid cancer, liver cancer, and stomach cancer. The leading cause of death in Wenzhou people is cancer, among which lung cancer, liver cancer, gastric cancer, colorectal, anal cancer, and esophageal cancer are the top five cancer mortality rates.

Carcinogenic factors

Carcinogenic factors refer to substances or factors that can significantly increase the incidence of malignant tumors in human or experimental animals. It can be divided into three broad categories: physical, chemical, and biological (Vernia et al., 2021). The major physical carcinogen is radioactivity, which accounts for about 5-10% of the etiology of human tumors. The major biological carcinogens are oncogenic viruses, such as helicobacter pylori, associated with gastric cancer (Murakami & Matsubara, 2018). Biological carcinogenesis accounts for about 5% of the etiology of tumors, and genetic factors cause less than 5% of tumors. The remaining 80% of tumors are caused by chemical carcinogens (Kleihues et al., 2010)

The incidence of GI cancer in Wenzhou, China

In Wenzhou, China, the high incidence of GI cancer may be related to Wenzhou people's lifestyle and dietary habits. Studies have shown that chronic helicobacter pylori infection is the main cause of gastric cancer (Murakami & Matsubara, 2018), and Chinese people are not used to eating separately will increase the risk of transmission of helicobacter pylori. Because helicobacter pylori can be found in the dental plaque and saliva of infected people. Europeans and Americans are accustomed to eating separately, so the infection rate of this bacterium is lower than that of the Chinese. Wenzhou is a coastal city; many people like to marinate seafood before eating it. Pickles are also a traditional food in Wenzhou, and they are also preserved food. As a result, Wenzhou, China is a city with rapid economic development and traditional eating habits. The diet and living habits of the people here may be one of the reasons for the high incidence of gastrointestinal cancer.

Stages of gastrointestinal cancer

GI cancer staging is important for a few reasons. Often, doctors will decide if one patient needs more tests based on the cancer stage. The cancer stage is also one of the factors that doctors use to assess prognosis. Prognosis is a medical term for the expected pattern and outcome of a disease. Very importantly, the cancer stage is one factor used by doctors to plan which treatments that are best for each patient. As for research, the cancer stage is used to assess treatment results among patient groups, compare results between treatment centers, and plan research studies (Benson et al., 2021).

From the National Comprehensive Cancer Network (NCCN) guidelines, cancer is often staged twice. The first rating is done before treatment and is called the clinical stage. The second rating is done after treatment, such as surgery, and is called the pathologic stage. The pathologic stage is more precise the extent of the cancer

The Tumor-Node-Metastasis (TNM) staging system is most often used to stage cancer. It is maintained by the American Joint Committee on Cancer (AJCC) and Union for International Cancer Control (UICC). In this system, the letters T, N, and M describe different areas of cancer growth. Based on test results, the investigator will assign a score to each letter (Network, 2021).

T scores are based on the presence, size, and extension of the primary tumor. A TX score means that the primary tumor can't be assessed. A T0 score means there is no primary tumor. It is possible to have cancer but not have a primary tumor. A T score means there are abnormal or cancer cells, but there is no chance for the cells to spread to distant sites. Scores of T1, T2, and so on are based on the primary tumor's size, extension, or both. Higher values mean a greater extent of cancer (Wang et al., 2018).

The N category reflects the extent of cancer within nearby lymph nodes. N scores are based on whether there's cancer in nearby lymph nodes and the number or region of nodes with cancer. An NX score means that the lymph nodes can't be assessed. An N0 score means that no cancer was found in the lymph nodes. N1, N2, and N3 scores are based on the number of nodes with cancer or which nodal groups have cancer. Higher values mean a greater extent of cancer (Sambasivan et al., 2021).

The M category tells if cancer has spread to distant sites. Such sites include distant lymph nodes beyond nearby lymph nodes. Cancer cells can break off the primary tumor and spread to distant sites. This process is called metastasis. Cancer cells can spread to distant sites through lymph or blood. M0 means there is no cancer in distant sites. M1 means there is cancer in distant sites (Sambasivan et al., 2021).

GI cancers that do not spread to distant sites are rated as stage 0. Stage I includes small primary tumors that haven't spread to lymph nodes. Stage II and III are more extensive primary tumors with or without cancer in nearby lymph nodes. Stage IV is cancer that has spread to distant sites at diagnosis. Early-stage GI cancer is defined as GI cancer confined to mucosa and submucosa, regardless of whether there

is evidence of regional lymph nodes metastasis, irrespective of tumor size (Wang et al., 2018). Advanced GI cancer is defined as a tumor that invades the lamina propria or deeper GI wall (Wang et al., 2018).

Treatment of GI cancer

The treatment of advanced gastric cancer and colorectal cancer is mainly surgery, supplemented by chemotherapy, immunotherapy, traditional Chinese medicine, and other supportive treatment, to improve the survival rate and reduce the recurrence rate (Yang et al., 2017). Studies have shown that 30% to 40% of stage II, stage III, and stage IV colorectal cancer patients have recurrence or metastasis after the operation, and the 7-year overall survival rate of patients with oxaliplatin combined with capecitabine chemotherapy can be increased to 73% (Schmoll et al., 2015). In China, 50% to 70% of patients with stage II, stage III, and stage IV gastric cancer will relapse after the radical operation, and the 5-year survival rate is only 40%, through oxaliplatin combined with capecitabine chemotherapy, 74% of gastric cancer patients can achieve three-year disease-free survival (Ji et al., 2018).

Treatments of different stages of gastrointestinal cancer are as follows: Because stage 0 cancers are limited to the inner lining layer of the GI and have not grown into deeper layers, they can be treated by surgery alone. No chemotherapy or radiation therapy is needed. People with stage IA GI cancer typically have their cancer removed. The nearby lymph nodes are also removed. Endoscopic resection may rarely be an option for some small T1a cancers. No further treatment is usually needed after surgery. Stage IB: The main treatment for this stage of GI cancer is surgery. Chemotherapy or chemoradiation (chemotherapy plus radiation therapy) may be given before surgery (Team, 2021).

The main treatment for stage II GI cancer is surgery, and to remove nearby lymph nodes. Many patients are treated with chemo or chemoradiation before surgery to try to shrink cancer and make it easier to remove. Treatment after surgery may include chemo alone or chemoradiation. If a person is too sick (from other illnesses) to have surgery, they may be treated with chemoradiation if they can tolerate it (Wang et al., 2018).

Surgery is the main treatment for patients with stage III cancer unless they have other medical conditions that make them too ill for it. Some patients may be

cured by surgery along with other treatments, while for others the surgery may be able to help control cancer or help relieve symptoms. Some patients may receive chemotherapy or chemoradiation before surgery to try to shrink cancer and make it easier to remove. Patients who received chemotherapy before surgery will probably give chemotherapy again after surgery (Wang et al., 2018).

Different types of surgery can be used to try to remove stomach cancer. The type of operation used depends on what part of the stomach the cancer is in and how far it has grown into nearby areas (Duda et al., 2018). There are two types of surgery for stomach cancer, including:

1. Subtotal (partial) gastrectomy, in this operation, only part of the stomach is removed. This is often recommended if the cancer is only in the lower part of the stomach, in which case it is known as a distal gastrectomy. It might also be used for cancers that are only in the upper part of the stomach, in which case it is known as a proximal gastrectomy. Eating is much easier after surgery if only part of the stomach is removed instead of the entire stomach.

2. Total gastrectomy, this operation is done if cancer has spread widely in the stomach. It is also often advised if the cancer is in the upper part of the stomach, near the esophagus. But people who have had their stomachs removed can only eat a small amount of food at a time. Because of this, they will need to eat more often.

Thus, postoperative patients with gastric cancer are prone to fatigue, nausea, vomiting, loss of appetite, weight loss, etc. Patients with total gastrectomy, in particular, have more severe Figure 2 Table 1 symptoms (Terashima et al., 2014).

A colectomy is a surgery to remove all or part of the colon. Nearby lymph nodes are also removed. If only part of the colon is removed, it's called a hemicolectomy, partial colectomy, or segmental resection. The surgeon takes out the part of the colon with cancer and a small segment of the normal colon on either side. Usually, about one-fourth to one-third of the colon is removed, depending on the size and location of cancer (Tong et al., 2017). The remaining sections of the colon are then reattached. At least 12 nearby lymph nodes are also removed so they can be checked for cancer. Sometimes after colorectal surgery, the bowel takes longer than normal to “wake up” and start working again after the surgery. This is called an ileus (Tong et al., 2017). Previous studies have shown that postoperative patients with

colorectal cancer are prone to fatigue, abdominal distention, constipation, diarrhea, and other symptoms (Pettersson et al., 2014).

Mostly, GI cancer stage IV has spread to distant organs, a cure is usually not possible. But treatment can often help keep cancer under control and help relieve symptoms. This might include surgery, such as a gastric bypass or even a subtotal gastrectomy in some cases, to keep the stomach and/or intestines from becoming blocked (obstructed) or to control bleeding (Hsu et al., 2021). Some patients have colon cancer that has spread to other parts of the body and also have tumors blocking the colon. In this case, surgery may be done to relieve the blockage without removing the part of the colon containing cancer. Instead, the colon is cut above the tumor and attached to a stoma (an opening in the skin of the abdomen) to allow stool to come out. This is called a diverting colostomy. It can often help the patient recover enough to start other treatments (such as chemotherapy).

In this study, chemotherapy regimen: oxaliplatin combined with capecitabine, repeated for 21 days, a total of 6-8 cycles, including oxaliplatin is given intravenously, capecitabine twice a day for 14 days, oral administration for two weeks, stop for one week, three weeks as a course of treatment (Nabors et al., 2020). One of the most important limits of oxaliplatin treatment is its peripheral neurotoxicity. Acute and chronic neuropathy differ in their timing, duration, and symptomatology. Acute oxaliplatin neurotoxicity is induced by cold and is characterized by distal sensory symptoms such as paresthesia and dysesthesia occurring in days following oxaliplatin infusion (Miyamoto et al., 2022). It occurs rapidly in nearly all patients treated and is typically transient (Beijers et al., 2014; Pachman et al., 2015). The chronic form occurs because of the repetition of chemotherapy cycles. Neuropathy is cumulative dose-dependent and can persist for months leading to quality of life deterioration (Mols et al., 2013). Currently, there is no effective strategy for preventing oxaliplatin-induced peripheral neuropathy (OIPN) and pharmacologic management is limited (Zribi et al., 2020).

Symptom experiences among persons with gastrointestinal cancer having chemotherapy after surgery

Symptom experience

Symptom experience is the understanding and response to symptom events and distress, and reaction to emotion, belief, and behavior-related symptoms caused by existing or potential health problems perceived by the persons with gastrointestinal cancer having chemotherapy after surgery. Symptom events refer to the frequency, duration, and severity of symptoms. Symptom distress refers to people's reaction to symptom events, including the perception of distress and the recognition of anxiety, tension, and mental distress (Lee, Vincent, & Finnegan, 2017).

Symptom experiences among persons with GI cancer before surgery

Persistent symptoms like blood in stools, unexplained weight loss, unexplained anemia, recurrent vomiting, difficulty swallowing, painless jaundice, pain, and a lump in the abdomen can be due to GI Cancers (Fodeh et al., 2013). Patients with GI cancers often present in advanced stages because these nonspecific symptoms are often ignored and not investigated early (Fodeh et al., 2013). Recently there has been tremendous advancement in all fields of cancer-related treatment. The minimally invasive surgery done either by 3D Laparoscopy or Robotic systems has led to decreased discomfort, decreased blood loss, early recovery, less pain, and early return to work with no compromise in cancer-related results. Similarly, improved cancer drugs (chemotherapy), availability of targeted therapy, and immunotherapy have improved patients' longevity and decreased side effects (Chu, 2020; Hajj & Goodman, 2015; Kouchaki et al., 2018).

Symptom experiences among persons with gastrointestinal cancer after surgery

It is well known that surgical intervention for GI cancer may result in gastrointestinal (GI) symptoms such as heartburn, abdominal pain, nausea, and dumping syndrome (Maeda & Munakata, 2008). These complications often affect a patient’s food intake, nutritional state, and physical reconditioning and may even be an obstacle to preadaptation to normal social life. However, different individuals may have different perceptions of these postoperative symptoms, which may be difficult to

control with medication (Maeda & Munakata, 2008). Although medication and improving eating habits are appropriate, there may be individual differences in the appearance of postoperative symptoms.

Symptom experiences among persons with gastrointestinal cancer having chemotherapy after surgery

Chemotherapy is an important adjuvant method for the treatment of stage II to stage IV gastrointestinal cancer, which is widely used in cancer treatment. Postoperative adjuvant chemotherapy for gastrointestinal cancer can limit the cancer focus, eliminate the remaining cancer focus, prevent a recurrence, relieve symptoms, and prolong life (Imam et al., 2021). However, chemotherapy drugs circulate through the blood to all tissues and organs throughout the body, their toxic effects often cause a series of side effects, such as nausea, fatigue, numbness in the hands and feet, and these symptoms often continue to affect cancer patients for some time after the treatment (López et al., 2017). As a result, persons will be troubled by physical and psychological symptoms during and after chemotherapy. Zarei et al. (2021) revealed that cancer patients have memorial symptoms in both physical and psychological domains:

1. Physical symptoms

1.1 Gastrointestinal symptoms

GI symptoms include loss of appetite, nausea, vomiting, dry mouth, mouth sores, altered eating taste, difficulty swallowing, constipation, and diarrhea. Many studies have confirmed that nausea and vomiting are one of the most common adverse reactions in cancer patients during chemotherapy (Haryani et al., 2018; Rha et al., 2020). However, postoperative chemotherapy may be directly induced GI symptoms that may be difficult to distinguish from those induced by surgery. Frequent nausea, vomiting, and loss of appetite not only bring severe discomfort and confusion to patients but also easily lead to water and electrolyte imbalance and nutritional deficiency (Han et al., 2019). Patients with severe reactions may reduce treatment compliance and refuse further chemotherapy.

1.2 fatigue

Relevant research shows that the incidence rate of cancer-related fatigue is generally higher (van Amelsfoort et al., 2022). Barnes and Bruera (2003) showed

that the incidence of fatigue in cancer patients undergoing chemotherapy was 70% to 100%. A recent study of 558 patients with varied cancer diagnoses also reported lack of energy as one of the top symptoms of all types of cancer, and more than 75% of patients with CRC experienced lack of energy (Deshields et al., 2011).

1.3 Chemotherapy-induced peripheral neuropathy (CIPN)

Numbness/tingling is related to chemotherapy-induced peripheral neuropathy (CIPN), Wu (2010) showed that 54.7% of gastric cancer patients had numbness or tingling in hands and feet during chemotherapy, which interferes with several activities of patients. Acute and chronic neuropathy differ in their timing, duration, and symptomatology. Acute oxaliplatin neurotoxicity is induced by cold and is characterized by distal sensory symptoms such as paresthesia and dysesthesia occurring in days following oxaliplatin infusion (Griffith et al., 2017). It occurs rapidly in nearly all patients treated and is typically transient. The chronic form occurs because of the repetition of chemotherapy cycles. Neuropathy is cumulative dose-dependent and can persist for months leading to quality-of-life deterioration (Zribi et al., 2020).

2. Psychological symptoms

A Previous study showed that 61.1% of the patients felt sad; 54.7% of patients had poor sleep; 40.0% of the patients were irritable; 34.7% of patients had mental stress; 31.6% of patients had anxiety; 31.6% of patients had difficulty concentrating (Wu, 2010). Psychological symptoms of GI cancer patients after surgery during chemotherapy include poor sleep, feeling sad, nervous, irritable, anxious, and difficulty concentrating (Van Cleave et al., 2013).

Once the patients have psychological problems, on the one hand, the treatment compliance will be reduced or even the treatment will be refused, affecting the treatment effect (Yan & Sellick, 2004). On the other hand, the disorder of neuroendocrine regulation will be caused by psychological problems, and the immune system will be suppressed, affecting the prognosis. At the same time, a variety of adverse psychological symptoms also cause distress to patients and families, finally reducing the quality of life (Bland et al., 2019).

In one study, 104 colorectal cancer patients who received the second and third cycle of chemotherapy, used the MSAS questionnaire to describe the prevalence,

frequency, severity, and distress of symptoms (Pettersson et al.,2014). The results showed that the highly prevalent symptoms were numbness/tingling in the hands and feet (64%), lack of energy (62%), drowsiness (49%), and nausea (45%). The symptoms with the highest scores in terms of frequency, severity, and distress were lack of energy, followed by sleep difficulties and numbness of hands and feet.

With the accumulation of oxaliplatin toxicity, the symptom experiences will change in different chemotherapy cycles (Wang & Yao, 2017). The researcher designed a follow-up survey of 404 patients with GI cancer in the early stage of postoperative chemotherapy, the results suggested the occurrence, severity, and distress of seven common symptoms (pain, lack of energy, nausea, drowsiness, numbness/tingling of hands and feet, difficulty in sleep, changes in food taste) changed over time.

The theory of unpleasant symptoms (TOUS)

According to the TOUS, there are three major concepts, which are influencing factors, unpleasant symptoms, and performance (Lenz et al., 1997). The factors related to symptom experience are categorized into physiologic, psychological, and situational components. Physiologic factors include structural, physiologic, and genetic variables that have a reciprocal relationship with the occurrence of a symptom. Psychological factors represent affective and cognitive components that can worsen the symptom. Situational factors are those that encompass the individual's physical and social environment such as lifestyle behaviors and social support (Blakeman, 2019). These can influence an individual's way of interpreting symptoms or availability for dealing with symptoms.

Unpleasant symptoms are indicators of changes in normal functioning, which are perceived through the individual's personal experience rather than objective observation (Lenz et al., 1997). Symptoms are at the heart of nursing care, each symptom consists of multidimensional characteristics including intensity, distress, quality, and timing, and these symptoms can be shared (Lenz et al., 1997). Two or more symptoms can occur together, a phenomenon currently identified as a symptom cluster. Multiple symptoms occurring together may have the same or different causes and can have cumulative or multiplicative effects.

Experienced symptoms are the central focus of the model, conceived as indicators of change in the health status of the individual, which often occurs multiple times and concomitantly, and although they are different from each other, they present four common dimensions: intensity, time, suffering and quality. Symptom experience includes two aspects: symptom events and symptom distress (Lenz et al., 1997).

According to the theory, the three related categories of influencing factors affect the occurrence of one or more symptoms and how patients with gastrointestinal cancer having chemotherapy after surgery are experienced. By classifying influencing factors as physical, psychological, and situational, TOUS encourages thinking beyond physical care. Physiological factors include age, sex, and variables related to disease and treatment. Psychological factors include emotion and cognition (such as knowledge and understanding of disease). Situational factors are external to the individual. Lenz et al. (1997) emphasize the potential impact of the physical and social environment on patients. The result of symptomatic experience is performance, which is widely defined as including physical, cognitive, and social role expression.

The theory of unpleasant symptoms is consistent because it emphasizes the complexity and interaction of the symptoms, the interrelationship between symptoms, the factors that influence symptoms, and the results and consequences of symptoms, thus supporting the planning of nursing interventions in cancer patients who are receiving chemotherapy (Kim & Jung, 2021). Altogether, the TOUS provides a comprehensive framework through which to consider the symptom experience. It offers a holistic way for investigators to conduct symptom research.

This study was based on the theory of unpleasant symptoms (TOUS) (Lenz et al., 1997), to examine the relationships between physiologic factors (age, gender, cumulative dose), situational factors (social support and self-care behavior), and symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

Factors related to symptom experiences among persons with gastrointestinal cancer having chemotherapy after surgery

There were many studies about symptom experience that have used the theory of unpleasant symptoms by Lenz et al. (1997) to examine the relationship between related factors and symptom experience. In this study, the independent variables of interest were guided by this model. By classifying influencing factors as physical, psychological, and situational factors. Physiological factors include age, gender, and variables related to disease and treatment. Psychological factors include emotion and cognition, such as knowledge and understanding of the disease. Situational factors are external to the individual. Because the patients with gastrointestinal cancer having chemotherapy after surgery were suffering more from physical symptoms after surgery and during chemotherapy. So, the researcher decided to study the physical and situational factors in this population.

Based on the literature review, the symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery can be affected by many factors such as age, gender, cumulative dose, self-care behavior, and social support. The study shows that the symptom experience level of patients of different ages is different (Lin et al., 2021), the distress experience level of female patients is higher than that of male patients (Lin et al., 2021), and the self-care behavior is related to the symptom experience level of patients (Zhang et al., 2015). The symptom experience level of patients with good social support is lower than that of patients with poor social support.

Age

In this study, age refers to the patient, 18 years or over, who were diagnosed with gastrointestinal cancer after radical resection of stomach cancer or colorectal cancer, received at least two cycles of oxaliplatin combined with capecitabine chemotherapy. Wong et al. (2017) suggest that younger patients with cancer undergoing chemotherapy experience greater symptomatic distress than older adults. A systematic review and meta-analysis study by Han et al. (2020) searched 7 databases from 2009 to 2019. Results showed that younger age patients with colorectal cancer after chemotherapy reported more adverse symptoms. Miaskowski

et al. (2014) examined factors across multiple tumor types associated with increased symptom distress during cancer chemotherapy and found younger age to be characteristic of the symptom grouping for greater symptom severity. The psychological burden of the young may be heavier than that of the elderly. Lo et al. (2010) conducted a longitudinal study in Canada and found younger age was a predictor of depressive symptoms in patients with metastatic GI Cancer.

However, some studies showed a positive association between age and symptom distress (Tantoy et al., 2018). These adverse effects appear more severely in older persons than in younger adults, which are known to be attributed to the presence of underlying diseases and changes in pharmacokinetics and pharmacodynamics based on aging (Lee et al., 2018). Young people are originally the main source of income for their families. After illness, both work and financial pressure will increase, and young people's pursuit of quality of life is different from that of the elderly (Tantoy et al., 2018). However, these findings are inconsistent and may be related to different times or different regions (Tantoy et al.,2018). In addition, other study findings show either no association (Agasi-Idenburg et al., 2017). Thus, this study needs to examine whether age is associated with symptom experience

Gender

Gender is a term that refers to social or cultural distinctions associated with being male, female, or intersex. Röhrl et al. (2019) investigated the symptoms during chemotherapy in postoperative colorectal cancer patients and found that female was associated with more severe worrying, lack of energy, and nausea. Another study also showed that female patients with colorectal cancer undergoing postsurgical adjuvant chemotherapy had significantly higher symptom severity and symptom interference scores than did male patients, with median severity scores:3.17 vs. 2.39, respectively; $p < .001$, median interference scores: 3.17 vs. 2.04; $p < .001$ (Zhang et al., 2015). Besides that, the results of another study by Wu (2010) showed that the levels of various symptoms (physiological symptom score, total distress index, and Total MSAS score) in female gastric cancer patients during chemotherapy were higher than those in male patients, indicating that gender is one of the influencing factors for the symptom experience of gastric cancer patients. A systematic review and meta-analysis study by Han et al. (2020) searched 7 databases from 2009 to 2019. Results

showed that females with colorectal cancer after cancer treatments reported more adverse symptoms. Female colorectal patients have also reported greater levels of anxiety and depression (Kim et al., 2015) and higher numbers of emotional and physical problems (Bergerot et al., 2017) during chemotherapy. Therefore, this study is interesting to examine whether gender is associated with symptom experience.

Cumulative dose

For first- and second-line treatment of advanced colorectal cancer in oxaliplatin combination with capecitabine (XELOX or Cape OX) (Sakamoto et al., 2021). Intravenous dosage is 130 mg/m^2 intravenous injection over 2 hours on day 1 in combination with capecitabine (1,000 mg/m^2 PO twice daily, beginning on the evening of day 1 through the morning of day 15), repeated every 3 weeks (Adjei et al., 2021). Chemotherapy drugs can be extremely toxic due to their potency, so minor errors in dosing can lead to severe adverse drug events. In addition, some effects are cumulative, that is, they only occur after a few cycles of given chemotherapy (Komori et al., 2021).

As the application of the drug is cumulative, at the end of treatment, fatigue, which is the most common side effect of all patients, becomes more evident (Bergerot et al.,2017). A well-known side effect of oxaliplatin is peripheral neuropathy, which increases with cumulative dose (Ewertz et al., 2015). The chronic form of oxaliplatin-induced peripheral neuropathy is cumulative dose-dependent (Verstappen et al., 2003), the cumulative dose of oxaliplatin reported in the literature was between 600 mg/m^2 and 850 mg/m^2 (Zribi et al., 2020), thus, patients are at increased risk of developing chronic peripheral neuropathy after their fourth or fifth cycle of chemotherapy. Gui et al. (2021) found that both the cycles and cumulative dose were positively correlated with the occurrence of peripheral neurotoxicity. In this longitudinal study (Tantoy et al., 2018), participants have followed up a total of 6 times during chemotherapy, they found that with the change of time, common symptoms such as pain, lack of energy, nausea, feeling drowsy, difficulty sleeping, and changes in food taste have a higher incidence, more severity, and distress. As chemotherapy progresses, each dimension of symptom experience changes, so this study examines whether different cumulative doses are related factors of symptom experience.

Self-care behavior

Self-care behavior reflects patients' adoption of a healthy lifestyle, daily functional recovery exercise, and other behaviors (Lee et al., 2018), maintaining and improving patients' health through patients' monitoring of and managing the symptoms of their illness, reducing the influence of illness on their social functioning, emotion, and interpersonal relationships (Lorig & Holman, 2003). Self-care behaviors are preparation before receiving chemotherapy, self-conduct during and after chemotherapy, and self-care at home (Prutipinyo et al., 2012). This way, patients can return to normal life in their environment and society.

Previous research on patients with colorectal cancer undergoing chemotherapy reported that self-care behavior is an influencing factor in the quality of life (Lee et al., 2018), based on the TOUS (Lee et al., 2017), influencing factors, symptoms, and performance are interdependent, the quality of life will feedback to unpleasant symptoms. Yeager et al. (2016) studied a sample of Americans living in poverty with advanced cancer in Africa who learned how to relieve pain and deal with daily symptoms, and they found that participants used two main symptom management strategies, constantly adjusting medications and lifestyle behaviors, and finding stability through "spirituality" with faith and prayer, to ease the burden of the symptom experiences. Chou, Dodd, Abrams, & Padilla, Chou et al. (2007) explored the experience of cancer symptoms, self-care strategies, and quality of life of Chinese-Americans during outpatient chemotherapy, participants reported about 14 symptoms a week, with an average of two self-care strategies for each symptom, a good self-care behavior leads to less severity of symptom experiences. According to a previous study in cancer patients undergoing chemotherapy, increases in physical activity or self-care behavior skills may stimulate physical functioning, such as the volume of stool, reduce the occurrence of severe depressive symptoms, and promote emotional well-being (Hanai et al., 2016). A previous study also demonstrated that self-care behavior was positively correlated with self-efficacy, which indicates that individuals need to believe that they can put self-care activities into practice to exert sufficient effort and be able to perform self-care behavior (Zhang et al., 2015). Through literature review, we know that self-efficacy is negatively correlated with symptom experience of

cancer patients undergoing chemotherapy (Akin & Kas Guner, 2019; Kırca & Kutlutürkan, 2021; Murley et al., 2019; Wu et al., 2021).

However, few previous studies have addressed the relationships between self-care behavior and symptom experience among patients with gastrointestinal cancer having chemotherapy after surgery. So, it is necessary to examine whether different self-care behavior is related factors of symptom experience.

Social support

Social support is defined as any combination of informational, tangible, emotional, and appraisal support from the family, friends, or medical experts (Queenan et al., 2010). It includes both structured and unstructured, formal and informal, social and professional support (Gottlieb & Bergen, 2010). Social support enables patients with cancer to attend appointments, undergo diagnostic tests and procedures, and feel emotionally sustained during cancer therapy (Shahrokni et al., 2020). Older patients with cancer may rely even more on their social support to overcome challenges during chemotherapy (Shahrokni et al., 2020).

As perceived social support decreased, symptom severity increased in cancer patients receiving adjuvant treatment (Ochayon et al., 2015). Lower social support is linked to a variety of negative mental and physical health outcomes among survivors. In addition, cancer survivors with lower levels of social support experienced higher levels of pain and depressive symptoms (Hughes et al., 2014). A systematic review and meta-analysis study by Han et al. (2020) searched 7 databases from 2009 to 2019. Results showed that patients having good social support with colorectal cancer after cancer treatments reported fewer adverse symptoms. Mardanian-Dehkordi and Kahangi (2018) did the research, results showed a negative relationship between fatigue and perceived social support in cancer patients undergoing chemotherapy. Therefore, social support interventions can help reduce fatigue.

Thus, it is necessary to identify the relationship between social support and symptom experience among patients with gastrointestinal cancer having chemotherapy after surgery.

Summary

Gastrointestinal cancer patients were generally affected by cancer and treatment-induced symptom experience. Chemotherapy is a drug treatment that uses powerful chemicals to kill fast-growing cells in the body. Though chemotherapy is an effective way to treat many types of cancer, chemotherapy treatment also carries a risk of side effects. Some chemotherapy side effects are mild and treatable, while others can cause serious complications. The most common ones are poor appetite, nausea and vomiting, hair loss, tired muscles, lethargy, infections, bruising, dry eyes, and mouth ulcers. Most side effects are only temporary. However, sometimes chemotherapy can cause long-term problems. The patients' daily life and work have been seriously disturbed, and their quality of life has declined to vary degrees. So, managing the side effects of chemotherapy is important. Through literature review, we know that patients' experience of symptoms is related to age, gender, cumulative dose, self-care behavior, and social support. Despite the evidence of research that supports the relationships between age, gender, cumulative dose, self-care behavior, and social support with symptom experience in cancer patients undergoing chemotherapy, less is conducted on GI cancer patients in China. To address this gap, the present study examined postoperative GI cancer-received chemotherapy patients and its association with selected factors (i.e., age, gender, cumulative dose, social support, and self-care behavior). The research result can help clinical staff to design personalized interventions, by identifying with age, sex, cumulative dose, self-care behavior, and social support. Moreover, health care workers can develop advanced nursing interventions for caring for patients who have just started chemotherapy which can help them to carry out early intervention and prevention of symptoms, improve the completion rate of full dose chemotherapy, and their quality of life during receiving chemotherapy.

CHAPTER 3
RESEARCH METHODOLOGY

In this chapter, the research methodology has described the details including, research design, research setting, population and sample, research instruments, quality of instruments, ethical considerations, data collection procedures, and data analysis.

Research design

A descriptive correlational research design was used to explore symptom experience and its relationships with age, gender, cumulative dose, self-care behavior, and social support among patients with gastrointestinal cancer having chemotherapy after surgery.

Population and sample

Population

The populations in this study were patients with GI cancer having chemotherapy after surgery, who were hospitalized in the Gastrointestinal Oncology department and the Department of Radiotherapy and Chemotherapy, in the Second Affiliated Hospital of Wenzhou Medical University. It is estimated that about 80-100 patients with postoperative GI cancer during chemotherapy are admitted to the hospital every month.

Sample

The samples for this study were recruited from the postoperative GI cancer patients during chemotherapy, who were hospitalized in the gastrointestinal surgery ward, radiotherapy, and chemotherapy ward of the Second Affiliated Hospital of Wenzhou Medical University according to the following inclusion criteria:

1. Aged 18 years or over
2. Received at least two cycles of oxaliplatin combined with capecitabine
3. Could read, write, and speak Chinese
4. No recurrent or metastatic cancer

5. No history of psychiatric disorders from medical record

6. No cognitive disorders that may affect the ability to respond to the survey. Cognitive disorders by screening with the Modified Mini-mental State Examination test in the Chinese version (Zhang et al., 2005)

Sample size

The sample size in this study was calculated by using the G*Power 3.1.9.7 program (Faul et al., 2007). The researcher tested the relationship between the symptom experience and each independent variable. Therefore, the correlation bivariate normal model was chosen as a type of statistical test in the G*Power program with a significance level of .05, the statistical power of .80, and according to the literature review, the effect size fluctuates between .22 and .28 (Hua, 2010; Röhrl et al., 2019; Wu, 2010), so the researcher chose the average effect size of .25. Based on this formula, 120 subjects were needed.

Sampling technique

In this study, a simple random sampling method was used to recruit samples, and each sample had an equal chance to be selected. The researcher asked the nurse to explain the basic information to postoperative GI cancer patients who were hospitalized for chemotherapy, and recorded the patients who met the inclusion criteria. Then using Excel software to number them and randomly select 50% of these patients as samples through the generated random numbers. Before collecting data, the researcher asked the patients for their consent to participate in this study and had them sign an informed consent form. It was estimated that approximately 4~6 patients can be recruited every day. Data collection was continued till the required number of samples of 120 was obtained.

Research setting

This study was carried out in the two departments of the Second Affiliated Hospital of Wenzhou Medical University. There are two wards for patients with gastrointestinal cancer having chemotherapy after surgery. First is the Gastrointestinal Oncology Department, there are about 40 patients with gastrointestinal cancer having chemotherapy after surgery per month, 40 patients with gastrointestinal cancer having chemotherapy after surgery per month in the department of Radiotherapy and

Chemotherapy. In general, in the whole hospital, there were about 80 patients with gastrointestinal cancer having chemotherapy after surgery every month. The average hospitalization time of patients undergoing chemotherapy was 1-3 days, and the average cycle of chemotherapy was 21 days. On the first day of admission, the nurse collected the patient's medical history and physical examination. The doctor evaluated the patient's blood test results and prescribed chemotherapy drugs, then the patient was injected intravenous with oxaliplatin.

Research instruments

Data was collected by using four questionnaires which include the Demographic Questionnaire, the Memorial Symptom Assessment Scale (MSAS), the Multidimensional Scale of Perceived Social Support (MSPSS), the Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale, the details of the questionnaires as follows:

Demographic questionnaire

This part was developed by the researcher. It consisted of questionnaires to assess the demographic characteristics of the participants including their age, gender, marital status, educational level, employment status, Body Mass Index (BMI), primary tumor site, stage of cancer, cumulative dose, and comorbidity.

The Memorial Symptom Assessment Scale

In this study, the researcher used the Memorial Symptom Assessment Scale (MSAS) to measure symptom experience. Portenoy et al. (1994) developed the Memorial Symptom Assessment Scale (MSAS) to measure the prevalence, frequency, severity, and distress of common physical and psychological symptoms. Cheng et al. (2009) introduced this scale to China and did a back-translation process.

The prevalence, severity, and distress of symptoms were evaluated with 32 specific symptoms, while symptom frequency was evaluated in only 24 of these symptoms because frequency for 8 of the symptoms was not relevant (e.g., hair loss). The patients were asked to recall the symptoms as present or absent during the past 7 days. The incidence rate is determined by “yes” or “no”. If they experienced the symptoms, they were asked to rate their frequency, severity, and distress. Frequency and severity were rated using a four-point Likert scale (i.e., 1 = slight, 2 = moderate, 3

= severe, 4 = very severe). Distress was rated using a five-point Likert scale (i.e., 0 = not at all, 1 = a little bit, 2 = a somewhat, 3 = quite a bit, 4 = very much). For ease of calculation, Portenoy et al. (1994) recommends converting the values on the distress scale are set to a range that is roughly similar to the other dimensions: 0 = .8, 1 = 1.6, 2 = 2.4, 3 = 3.2, and 4 = 4. The initial step calculates a score for each symptom.

For 32 items, if a symptom is not experienced, each dimension is scored as 0, and the score for that symptom is 0. If a symptom is experienced, the score for that symptom is determined as the average of the scores on the severity, frequency, and distress scales for 24 items, moreover, for others 8 items, if the symptom is experienced the score for that symptom is determined as the average of the scores on the severity and distress scales only.

Moreover, the scoring of the MSAS yields several subscale scores, including a Physical Symptom subscale score (PHYS), a Psychological Symptom subscale score (PSYCH), and a Global Distress Index (GDI). Both the total score of MSAS and the 10-item MSAS-GDI validly measure overall symptom distress.

The PSYCH subscale score is the average of the symptom scores for six symptoms: feeling sad, worrying, feeling irritable, feeling nervous, difficulty sleeping and difficulty concentrating. The PHYS subscale score is the average of the symptom scores for the 12 symptoms identified as high prevalence physical symptoms: lack of appetite, lack of energy, pain, feeling drowsy, constipation, dry mouth, nausea, vomiting, change in taste, weight loss, feeling bloated and dizziness. The Global Distress Index (GDI) is the average of the single dimension scores for 10 symptoms: the frequency scores for feeling sad, worrying, feeling irritable, and feeling nervous, and the distress scores for lack of appetite, lack of energy, pain, feeling drowsy, constipation and dry mouth.

MSAS total score is the average score of all 32 symptoms in the MSAS symptom assessment form, and the average score of each symptom is the frequency, severity, and distress of the symptoms (Portenoy et al., 1994). Moreover, the total MSAS score can provide valid information about symptom distress but is less meaningful from the clinical perspective than the Global Distress Index (GDI) (Portenoy et al., 1994). Researchers suggested that although the MSAS subscale scores were useful we recommend considering the raw scores for symptom frequency,

severity, and distress when healthcare professionals need to communicate with patients about their symptoms to understand the patient's level of symptom experience (Portenoy et al., 1994).

The validity and reliability of The MSAS are well established. Portenoy et al. (1994) analyzed the reliability and validity of the scale in the cancer population. The analysis showed that the high incidence of physical symptoms Cronbach's alpha coefficient of .88, and psychological symptoms Cronbach's alpha coefficient of .83, confirmed that the scale is a reliable and effective evaluation tool (Portenoy et al., 1994). The Chinese version has good reliability and validity and can be used in the clinics, the Cronbach's alpha coefficient of The PHYS and PSYCH subscales were .79 and .81, respectively. The total scale Cronbach's alpha coefficient for all 32 items (TMSAS-CH) was .87. The test-retest Cronbach's alpha coefficient for the PHYS subscale was .68, which was at the borderline value for the criterion of test-retest reliability. The test-retest Cronbach's alpha coefficient for the PSYCH subscale and TMSAS-Ch were .79 and .74, separately, all of which were in excess of .70 (Cheng et al., 2009).

The Multidimensional Scale of Perceived Social Support (MSPSS)

The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1990) was used to measure the level of social support. Chou (2000) introduced this scale to China and did a back-translation process. The scale consists of 12 items which can be divided into 3 subscales: Support from family (items 3, 4, 8, and 11), support from friends (items 6, 7, 9, and 12), and support from significant others (items 1, 2, 5, and 10) such as neighbors, professional medical staff. Patients were requested to rate each item on a 7-point Likert scale (1 = very strongly disagree to 7 = very strongly agree). The total score of the perceived social support ranges from 12 to 84 points, with a higher average score indicating higher social support (Dahlem et al., 1991).

The scoring of the multidimensional scale of perceived social support is based on the guideline of Zimet et al. (1990). The level of social support among GI cancer patients was described as following

For total mean scores of social supports

Scores from 12 to 36 were considered low-level social support

Scores from 36.1 to 60 were considered moderate level social support

Scores from 60.1 to 84 were considered a high-level social support

For family, friends, and significant others subscale mean scores

Scores from 4 to 12 were considered low-level social support

Scores from 12.1 to 20 were considered moderate level social support

Scores from 20.1 to 28 were considered high-level social support

The internal consistency coefficient (Cronbach's alpha) for the Chinses version of the MSPSS scale was .89, which showed good reliability in China (Chou, 2000).

The Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale

The Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale was used to measure self-care behavior (Sousa et al., 2010). Guo et al. (2017) introduced this scale to China and did a back-translation process. It is a 15-items scale that measures one's general and specific capabilities to engage in self-care (e.g., I am able to get the information I need) as well as self-care behaviors (e.g., I have changed some of my old habits in order to improve my health). It has three subscales, 1) having power for self-care, six items, 2) developing power for self-care, five items and 3) lacking power for self-care, four items (Guo et al., 2017; Sousa et al., 2010). Subscale 3 was negative and need a reverse score. Each item uses a 5-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree), with summated scores ranging from 15 to 75 and higher average scores indicating greater self-care (Sousa et al., 2010).

The overall ASAS-R had a Cronbach's alpha of .89 in previous research (Sousa et al., 2010). The Chinese version of the ASAS-R had a Cronbach's alpha of .89 (Guo et al., 2017).

Quality of instruments

For validity, since all the scales used in this study have already been validated and used in previous studies on cancer patients undergoing chemotherapy. The researcher used all of these scales without modification.

For reliabilities, the Memorial Symptom Assessment Scale (MSAS), the Multidimensional Scale of Perceived Social Support (MSPSS), and the Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale were tested for the internal

consistency reliability. For this study, the reliability of the instruments was tested with 30 participants, for the MSAS, in this study, the internal consistency reliability of the three dimensions of the scale was Cronbach's alpha of .79 to .86. The reliability of the PHYS subscale was .79, the reliability of the PSYCH subscale was .78, and the reliability of the GDI subscale was .75. Cronbach alpha coefficient was .96 for the MSPSS and .88 for the ASAS-R. Overall, all the scales used for the research were reliable. For this study with 120 participants, the internal consistency reliability of the frequency, severity, and distress dimensions of the MSAS scale was Cronbach's alpha of .79, .86, .88, respectively. The reliability of the PHYS subscale was .79, the reliability of the PSYCH subscale was .78, the reliability of the GDI subscale was .75. Cronbach alpha coefficient was .94 for MSPSS and .89 for the ASAS-R scale.

Protection of human subjects

This study was conducted with respect to human rights. The Human subject's approval was obtained from the Ethical Approval Committee, Burapha University, Thailand (G-HS0044/2564) as well as The Second Affiliated Hospital of Wenzhou Medical University (2021-K-55-02). In the data collection process, all patients were informed carefully about the aims of the study and involvement procedure. The researcher described the nature of the study as well as the respondents' rights to participate or to refuse to participate in the study. All the forms for collecting data were anonymous and involvements in this study were not harmful to participants. Confidentiality was maintained because no names are disclosed in the research. Patients volunteered to participate in the study. They have the right not to answer any questions that they feel discomfort and could withdraw at any time if they want. The consent form was completed before collecting data. All data obtained from the study were kept strictly confidential. Once the data were punched on the statistical software, a hard copy of the data was securely treasured under lock and key. Similarly, the soft file was saved on password protected computer. No unauthorized personnel were accessible to the data except the researcher and the major advisor. Findings of the study was reported as a group data without disclosing individual characteristics. The data would be destroyed after a publication of the result.

Data collection procedures

Data collection was conducted after the research proposal was approved by the Ethical Approval Committee, Burapha University, Thailand, and the Second Affiliated Hospital of Wenzhou Medical University. The researcher explained to the authorities, the purposes of the study, procedure, and method of this study to each director. After granting permission from them, the researcher began to recruit the samples. The data collection was carried out by the researcher as follows:

1. After getting permission from the head of the clinical agency, the researcher met the clinicians and nurses working in the department of Gastrointestinal Oncology department and Radiotherapy and Chemotherapy department to apprise them of data collection.

2. The researcher followed the registration record to find the participants appropriate with the inclusion criteria. Besides, the researcher introduced herself to the potential research participants fulfilling the inclusion criteria.

3. The researcher recruited those subjects who were willing and volunteered to take part in the study.

4. The researcher screened cognitive disorders with the Modified Mini-Mental State Examination test in the Chinese version (Zhang et al., 2005). Moreover, the researcher used a simple random sampling technique to recruit participants.

5. Data collection was carried out based on the convenience of the subjects.

6. The four scales were bound into books and sent to the subjects. Before the survey, explain to each subject the purpose, significance, and voluntary participation of the survey, the harmlessness, and confidentiality of the results, obtain the consent of the patients, and then issue a questionnaire.

7. The researcher used unified instructions to explain in detail the requirements for filling out the questionnaire so that the respondents can fill it out independently after full understanding. The respondents completed the questionnaire as required. Some of the items in the general questionnaire were filled out by the investigators according to the medical records and self-selected subjects. All questionnaires were collected on the spot.

8. The patients were invited to a separate interview room. The researcher interviewed each participant by using the Demographic Questionnaires, Appraisal of

Self-care Agency Scale-Revised (ASAS-R) scale, the Multidimensional Scale of Perceived Social Support (MSPSS), the Memorial Symptom Assessment Scale (MSAS).

9. The average time for administrating the full questionnaire was 30-40 mins. Finally, the researcher checked each filled in a questionnaire for completeness of information before allowing subjects to leave.

10. Because of the COVID-19 pandemic, the guidelines for preventing COVID-19 (including the data collection pattern consistent with)

10.1 The researcher and the participants had to wear masks correctly throughout the data collection process.

10.2 A safe distance of at least 1 meter were maintained between the researcher and the participants.

10.3 Participants and the researcher needed to wash their hands with alcohol before and after data collection.

10.4 Items touched by participants were cleaned and disinfected before being given to the next participant.

10.5 Completed questionnaires were kept in a separate archive bag.

11. This process was repeated until meet the sample size.

Data analyses

The data were entered into a statistical program and analyzed. The alpha level of statistical significance was set at .05. Data analyses were divided into three major parts as follows:

Part I Descriptive statistics including frequency, percentage, range, mean, and standard deviation (*SD*) were used to describe demographic information, symptom experience, social support, and self-care behavior.

Part II Pearson's product-moment correlation coefficient and partial correlation coefficient were used to explore the association between symptom experience and selected factors including age, cumulative dose, self-care behavior, and social support.

Part III Point biserial correlation was used to examine the relationship between gender and symptom experience.

The strength of the size of correlation coefficients was based on (Grove et al., 2012), as shown in Table 1.

Table 1 Interpretation of the size of correlation coefficients

Strength of relationship	**Positive relationship**	**Negative relationship**
Weak relationship	0.00 to < 0.30	0.00 to < - 0.30
Moderate relationship	0.30 to 0.50	- 0.30 to - 0.50
Strong relationship	> 0.50	> - 0.50

CHAPTER 4
RESULTS

This chapter presents the results of the study about symptom experience and related factors (i.e., age, gender, cumulative dose, self-care behavior, and social support) among gastrointestinal cancer receiving chemotherapy after surgery. The results were divided into three parts.

1. The patients' demographic characteristics include age, gender, marital status, educational level, employment status, BMI, primary tumor site, stage of cancer, chemotherapy cycles, cumulative dose, and comorbidity.

2. Description of symptom experience, social support, and self-care behavior.

3. The relationships between age, gender, cumulative dose, social support, self-care behavior, and symptom experience.

Part 1 Characteristics of sample groups

The demographic characteristics and health information of the participants are illustrated in table 2, table 3.

Table 2 Frequency, percentage, mean, and standard deviation of demographic characteristics and health information of the participants (*n* =120)

Variables	**Number (n)**	**Percentage (%)**
Age (years)		
37-44	11	9.2
45-59	37	30.8
60-74	70	58.3
75-78	2	1.7
(*M* = 59.60; *SD* =9.78; *Min* =37; *Max* =78)		

Table 2 (Continued)

Variables	**Number (n)**	**Percentage (%)**
Gender		
Male	70	58.3
Female	50	41.7
Marital status		
Single	2	1.7
Married	118	98.3
Educational level		
Primary school	43	35.8
Junior high school	45	37.5
High school	27	22.5
College	5	4.2
Employment status		
Employed	50	41.7
Unemployed	15	12.5
Retired	55	45.8
BMI		
Underweight (<18.5 kg/㎡)	11	9.2
Normal weight (18.5–24.9 kg/㎡)	101	84.2
Overweight (≥25kg/㎡)	8	6.6
（*M* = 21.5; *SD* =2.394; *Min* =14.8; *Max* =28.4）		
Comorbidity		
None	98	81.7
Hypertension	21	17.5
Diabetes	1	.83
Primary tumor site		
Gastric cancer	56	46.7
Colorectal cancer	64	53.3

Table 2 (Continued)

Variables	Number (n)	Percentage (%)
Stage of cancer		
Stage II	16	13.3
Stage III	104	86.7
Chemotherapy cycles		
（*M* = 5.58; *SD* = 1.34; *Min* = 3; *Max* = 8）		
Cumulative dose of oxaliplatin (mg/m^2）		
(*M* = 678.72; *SD* = 170.64; *Min* = 342; *Max* = 1,073)		

According to table 2, the participants' age ranged from 37 to 78 years with an average age of 59.6 years (SD = 9.78). Among all age brackets, the population of younger elderly aged 60-74 was the highest, accounting for 58.3%, followed by middle-age adults aged 45-59 (30.8%). There were more males (58.3 %) than females (41.7 %), majority of the participants were married (98.3%). Among these participants, 37.5% had junior high school education, followed by primary school education (35.8%). While most of them were retired (45.8%), 41.7% of participants were still working.

In terms of health-related information, 84.2% of the participant had a normal weight range. 81.7% of them have no comorbidities. 53 % of them were diagnosed with colorectal cancer, followed by gastric cancer (46.7 %). Moreover, 86.7% of patients were classified as having stage III GI cancer. The participants received chemotherapy in cycles 3-8, with the average cycle of 5.58 (*SD* = 1.34), while the cumulative dose of oxaliplatin was ranged from 342-1073 mg/m^2 (*M* = 678.72, *SD* = 170.64).

Table 3 Frequency, percentage, range, mean, and standard deviation of cumulative dose of oxaliplatin of the participants (n =120)

Cycles	Number (n)	Percentage (%)	Cumulative dose of oxaliplatin (mg/m^2)		
			Range	*M*	*SD*
Cycle 3	8	6.7	342-575	388.25	76.74
Cycle 4	24	20	412-549	481.33	40.43
Cycle 5	12	10	548-647	613.33	30.65
Cycle 6	54	45	618-843	726.78	59.45
Cycle 7	11	9.2	728-968	867.45	79.89
Cycle 8	11	9.2	901-1073	967.27	55.48

Table 3 showed that most of the participants have received chemotherapy at the 6th cycle (45%). The cumulative dose of oxaliplatin were ranged from 342-1073 mg/m^2 (*M* = 678.72, *SD* = 170.64).

Part 2 The description of the study variables

Description about the symptom experience

In this study, the occurrence, frequency, severity, and distress of symptoms were used to describe the symptom experiences of patients. The results illustrated in table 4, figure 2, figure 3, figure 4, figure 5, table 5, table 6, and table 7.

Table 4 Frequency, percentage, mean, and standard division of symptom occurrence, frequency, severity, and distress among patients (*n*=120)

Symptoms	Occurrence		Frequency		Severity		Distress	
	n	(%)	Mean	SD	Mean	SD	Mean	SD
Numbness/tingling in hands/feet	98①	81.7	1.63②	1.05	1.36②	.81	1.37③	.92
Lack of energy	94②	78.3	1.67①	1.13	1.41①	.96	1.53①	.98
Nausea	88③	73.3	1.53③	1.16	1.33④	1.03	1.47②	1.05
Lack of appetite	86④	71.7	1.49④	1.22	1.35③	1.11	1.47②	1.01
Change in the way food tastes	68⑤	56.7	-	-	.98⑤	1.02	1.06④	1.04
Vomiting	56	46.7	.78⑤	1.00	.69	.90	.89	1.05
Weight loss	54	45	-	-	.72	.94	.75	.91
Dizziness	45	37.5	.58	.87	.48	.69	.61	.85
Feeling irritable	45	37.5	.55	.84	.55	.82	.67	.96
Feeling drowsy	43	35.8	.62	.94	.57	.88	.65	.94
Worrying	43	35.8	.59	.91	.66	1.00	.73	1.08
Feeling sad	40	33.3	.54	.84	.64	1.00	.69	1.01
Dry mouth	39	32.5	.43	.73	.38	.58	.44	.69
Feeling bloated	39	32.5	.48	.79	.43	.71	.55	.84
Diarrhea	38	31.7	.57	.95	.45	.76	.54	.89

Table 4 (Continued)

Symptoms	Occurrence		Frequency		Severity		Distress	
	n	(%)	Mean	SD	Mean	SD	Mean	SD
Difficulty sleeping	36	30	.57	1.02	.53	.93	.65	1.08
Changes in skin	36	30	-	-	.46	.79	.43	.72
Feeling nervous	33	27.5	.48	.86	.49	.90	.57	1.01
Pain	32	26.7	.48	.92	.39	.74	.46	.81
Sweats	20	16.7	.32	.78	.26	.63	.29	.68
Constipation	20	16.7	-	-	.27	.68	.32	.75
Mouth sores	19	18.3	-	-	.23	.60	.29	.72
Difficulty concentrating	15	12.5	.17	.47	.17	.49	.17	.50
Problems with urination	14	11.7	.15	.48	.15	.44	.18	.51
Shortness of breath	13	10.8	.21	.67	.17	.52	.21	.64
Itching	13	10.8	.15	.46	.14	.45	.15	.45
Hair loss	13	10.8	-	-	.23	.77	.24	.74
Cough	10	8.3	.10	.35	.10	.35	.11	.39
Swelling of arms or legs	9	7.5	-	-	.09	.37	.13	.47
I don't look like myself	9	7.5	-	-	.10	.40	.14	.50
Problems with sexual interest or activity	5	4.2	.06	.29	.06	.30	.08	.45
Difficulty swallowing	3	2.5	.04	.27	.03	.22	.04	.25

The results in table 4 showed that numbness of hands and feet was the highest occurrence of symptoms, and lack of energy ranked first in frequency, severity, and distress. Details of other symptoms were shown in figure 2, figure 3, figure 4, and figure 5.

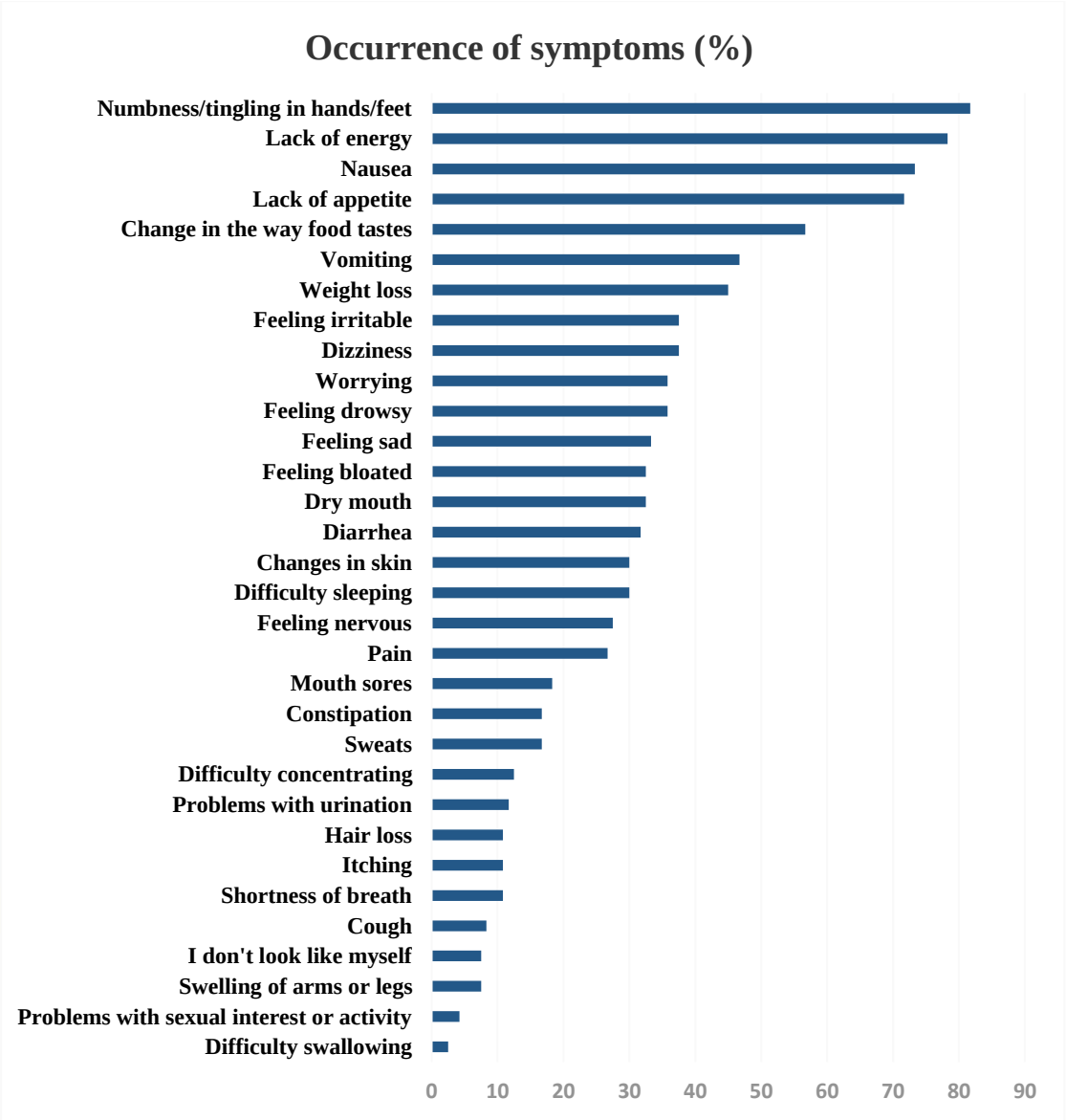

Figure 2 Percentages of occurrence of 32 symptoms with using MSAS (n = 120).

The results in table 4 and figure 2 showed that the participants had the highest occurrence of (1) numbness/tingling in hands/feet (81.7%), followed by (2) lack of energy (78.3%), (3) nausea (73.3%), (4) lack of appetite (71.7%), (5) change in the way food tastes (56.7%).

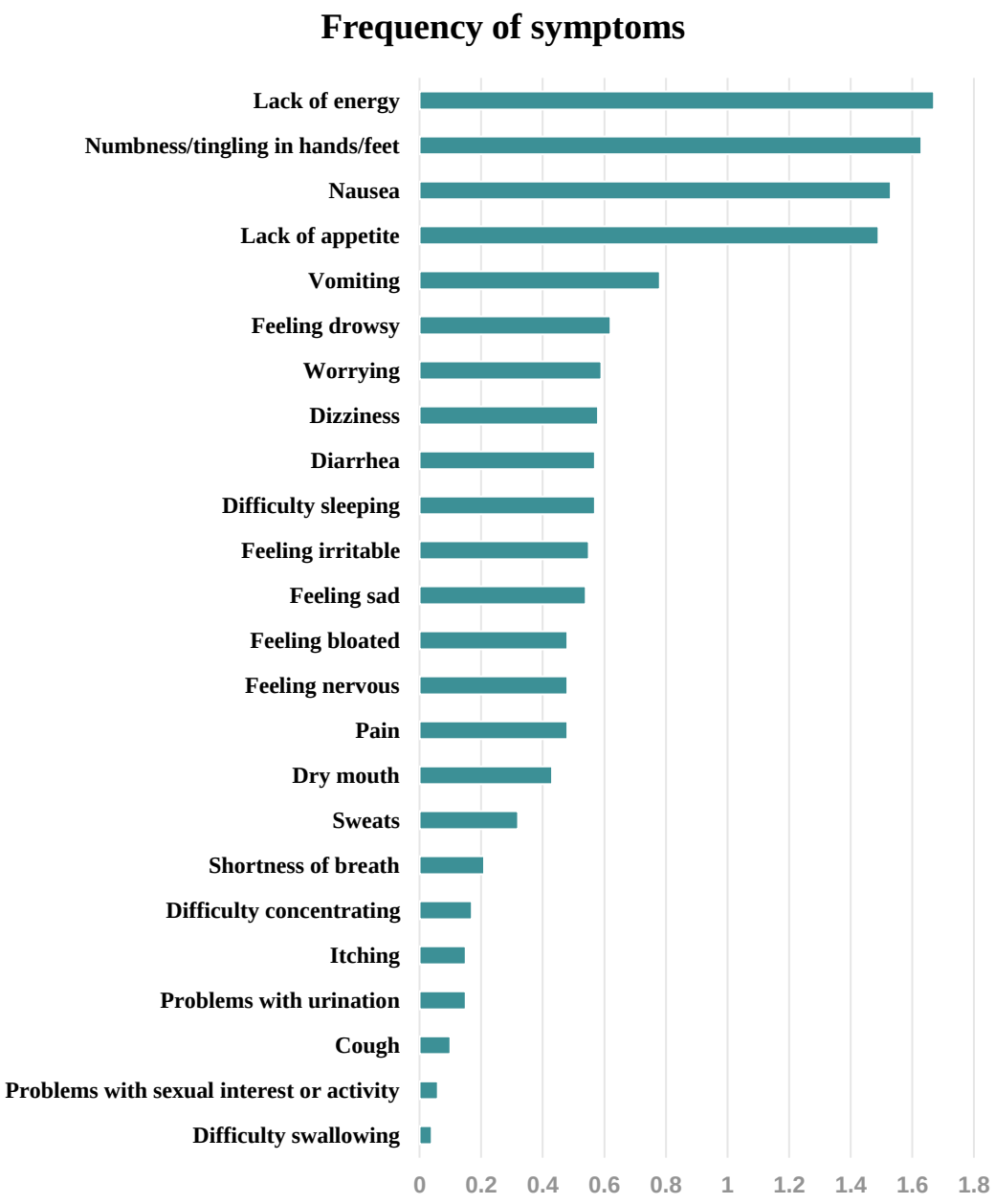

Figure 3 Average score of frequency of 24 symptoms with using MSAS (n =120)

The results in table 4 and figure 3, the frequency of symptoms showed that (1) lack of energy had the highest frequency with average score of 1.67 (*SD* = 1.13), followed by (2) numbness/tingling in hands/ feet (*M* = 1.63, *SD* = 1.05), (3) nausea (*M* = 1.53, *SD* = 1.16), (4) lack of appetite (*M* = 1.49, *SD* = 1.22), (5) vomiting (*M* = .78, *SD* = 1).

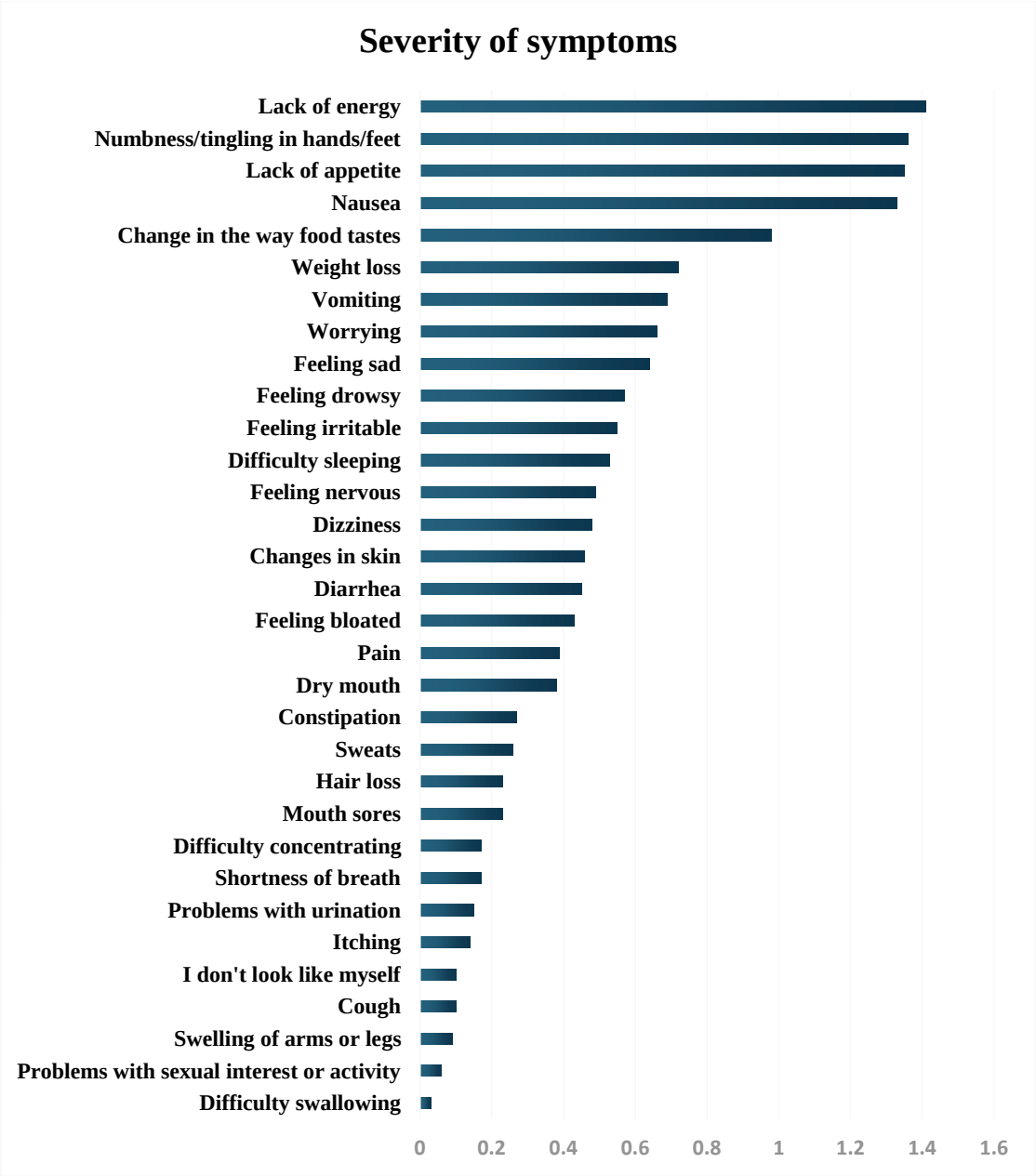

Figure 4 Average score of severity of 32 symptoms with using MSAS (n = 120)

As showing in table 4 and figure 4, the results showed that (1) lack of energy had the highest severity with average score of 1.41 (*SD* = .96), followed by (2) numbness/tingling in hands/ feet (*M* = 1.36, *SD* = .81), (3) lack of appetite (*M* = 1.35, *SD* = 1.11), (4) nausea (*M* = 1.33, *SD* = 1.03), (5) change in the way food tastes (*M* = .98, *SD* = 1.02).

Figure 5 Average score of distress of 32 symptoms with using MSAS (n = 120)

The results in table 4 and figure 5 showed that the order of distress of symptoms (1) lack of energy had the highest distress with average score of 1.53 (*SD* = .98), followed by (2) lack of appetite (*M* = 1.47, *SD* = 1.05) and nausea (*M* = 1.47, *SD* = 1.01), (3) numbness/tingling in hands/feet ((*M* = 1.37, *SD* = .92), (4) change in the way food tastes (*M* = 1.06, *SD* = 1.04).

Table 5 Range, mean, and standard deviation of symptom numbers of MSAS per participant (n = 120)

	Range		*M*	*SD*
	Possible number	**Actual number**		
Number of symptoms	0-32	2-25	9.8	5.22

As presented in table 5, each participant reported occurrence symptoms from 2 to 25 with a mean of 9.8 (*SD* = 5.22).

Table 6 Range, mean, and standard deviation of three dimensions of MSAS among the participants (n = 120)

MSAS dimensions	Range		*M*	*SD*
	Possible score	**Actual score**		
Frequency	0-96	2-43	14.17	8.24
Severity	0-128	2-59	15.85	10.24
Distress	0-128	.80-48.4	17.90	11.91

Table 6 showed that the total score of frequency was ranged from 2-43, the mean score was 14.17 (*SD* = 8.24), while the total score of severity was ranged from 2-59, the mean score was 15.85 (*SD* = 10.24). The total score of distress was ranged from .8-48.4, the mean score was 17.90 (*SD* = 11.91).

Table 7 Range, mean, and standard deviation of three MSAS subscales and Total MSAS among the participants (n = 120)

MSAS subscales	Range		*M*	*SD*
	Possible score	Actual score		
MSAS-PHYS	0-4	0-2.31	.84	.51
MSAS-PSYCH	0-4	0-2.20	.53	.61
MSAS-GDI	0-4	0-1.76	.73	.47
TMSAS score	0-4	0-1.85	.31	.46

Abbreviation: MSAS-PHYS= Physical Symptom Subscale, MSAS-PSYCH= Psychological Symptom Subscale, MSAS-GDI= Global Distress Index, TMASA= Total MSAS score.

According to Table 7, results showed that the total score of the MSAS-PHYS was ranged from 0–2.31, the mean score was 0.84 (*SD* = .51), while the total score of the MSAS-PSYCH score was ranged from 0–2.20, the mean score was 0.53 (*SD* = .61). In terms of the MSAS-GDI, the total score was ranged from 0-1.76, the mean score was .73 (*SD* = .47). The total MSAS score ranged from 0-1.85, the mean score was .31 (*SD* = .46).

Description about the social support

The multidimensional scale of perceived social support consisted of 12 items, which can be divided into 3 subscales: support from family, support from friends, and support from significant others. Table 8 showed the results of the total score and 3 subscales of the multidimensional scale of perceived social support in this study.

Table 8 Range, mean, standard deviation, and level of social support among the participants (n = 120)

Variables	**Range**		***M***	***SD***	**Level**
	Possible score	**Actual score**			
Social support	12-84	32-80	59.9	11.1	Moderate
Family	4-28	8-28	21.3	4.05	High
Friends	4-28	4-28	17.4	4.87	Moderate
Significant other	4-28	9-28	21.1	4.10	High

Table 8 showed that the total score of social support was ranged from 32 to 80, with a mean score of 59.9 (*SD* = 11.1), which indicated that the social support of participants was a slightly high level. The mean score of the family subscale was 21.3 (*SD* = 4.05) showing a high level of social support as well as a significant other subscale (*M* = 21.1, *SD* =4.01), while the friends subscale score showed a moderate level (*M* = 17.4, *SD* = 4.87).

Description about the self-care behavior

The appraisal of self-care agency scale-revised (ASAS-R) scale was used to measure self-care behavior. It has three subscales: 1) having power for self-care, 2) developing power for self-care, and 3) lacking power for self-care. The results illustrated in table 9.

Table 9 Range, mean, and standard deviation of self-care behavior among the participants (*n* =120)

Variables	Range		*M*	*SD*
	Possible score	Actual score		
ASAS-R	15-75	23-63	43.97	7.99
Having power for self-care	6-30	8-24	17.89	3.78
Developing power for self-care	5-25	6-22	15.45	3.21
Lack power for self-care	4-20	5-19	10.63	3.16

Table 9 showed that total scores of the ASAS-R ranged from 23 to 63 (*M* = 43.97, *SD* = 7.99). Having ability for self-care had the mean score of 17.89 (*SD* = 3.78), developing power for self-care (*M* = 15.45, *SD* = 3.21), and lack power for self-care (*M* = 10.63, *SD* = 3.16).

Part 3 Relationships between age, gender, cumulative dose, self-care behavior, social support, and symptom experience

The normal distribution of the variables was tested through skewness/ standard error and Kolmogorov-Smirnov test as well as QQ-plot. All variables conform to a normal distribution. The Pearson's product-moment correlation was used to examine the relationship between age, cumulative dose, self-care behavior, social support, and symptom experience. Point biserial correlation was used to examine the relationship between gender and symptom experience. The results were presented in the table 10.

Table 10 Correlation coefficients between age, gender, cumulative dose, self-care behavior, social support, and subscales of symptom experience (n = 120)

	Symptom experience		
	MSAS-PHYS	**MSAS-PSYCH**	**MSAS-GDI**
Age	.076	-.059	.005
Gender	.31rpbi**	.44rpbi**	.34rpbi**
Cumulative dose	.37**	.43**	.47**
Self-care behavior	-.49**	-.30**	-.40**
Social support	-.32**	-.26**	-.29**

Note: **p< .01 rpbi = Point Biserial correlation (male =1, female=2)

Table 10 indicated that gender had a moderate positive relationship with the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI (r = .31, r = .44, r = .47, p < .01, respectively), which suggested that female participants reported significantly higher scores of symptom experience than male. Cumulative dose had a moderate positive relationship with those subscales (r = .37, r = .43, r = .47, p < .01, respectively). Self-care behavior had a moderate negative relationship with those subscales (r = -.49, r = -.30, r = -.40, p < .01, respectively). Social support had a moderate negative correlation with those subscales (r = -.32, -.26, -.29, p < .01, respectively). Age had no statistically significant correlations with those subscales (r = .076, r = -.059, r = .005, p > .05, respectively).

Table 11 Relationships between age, gender, cumulative dose, self-care behavior, social support, and three dimensions of symptom experience (n =120)

	Symptom experience		
	Frequency score	**Severity score**	**Distress score**
Age	.064	-.018	.012
Gender	.41rpbi**	.40rpbi**	.42rpbi**
Cumulative dose	.44**	.47**	.48**
Self-care behavior	-.55**	-.49**	-.43**
Social support	-.37**	-.37**	-.30**

Note: **p< .01 rpbi = Point Biserial correlation (male =1, female=2)

Table 11 indicated that gender had a moderate positive relationship with symptom frequency, severity, and distress (r = .41, r = .40, r = .42, p < .01, respectively), which suggested that female participants reported significantly higher scores of symptom experience than male. Cumulative dose had a moderate positive relationship with symptom frequency, severity, and distress (r = .44, r = .47, r = .48, p < .01, respectively). Self-care behavior had a negative significant correlation with symptom frequency, severity, and distress (r = -.55, r = -.49, r = -.43, p < .01, respectively). In addition, self-care behavior had a strong relationship with symptom frequency while other had a moderate relationship. Social support had a moderate negative correlation with symptom frequency, severity, and distress (r = -.37, r = -.37, r = -.30, p < .01, respectively). Age had no statistically significant correlations with symptom frequency, severity, and distress (r = .064, r = -.018, r = .012, p > .05, respectively).

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter presents summary of the findings and discussion of the study results according to the research objectives and hypotheses. Implications of the study findings, limitations, and recommendations for future research were presented.

Summary of the study

This study aimed to describe symptom experience and to examine its relationships with age, gender, cumulative dose, self-care behavior, social support among patients with cancer having chemotherapy after surgery. The theory of unpleasant symptoms (TOUS) was used as a conceptual framework to guide the study. A simple random sampling technique was applied to recruit 120 participants from the Second Affiliated Hospital of Wenzhou Medical University. Data was collected using self-reported questionnaires, which include Chinese version of the Memorial Symptom Assessment Scale (MSAS) (Cheng et al., 2009), Chinese version of the Multidimensional Scale of Perceived Social Support (MSPSS) (Chou, 2000), Chinese version of the Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale (Guo et al., 2017). For this study with 120 participants, the internal consistency reliability of the frequency, severity, and distress dimensions of the MSAS scale was Cronbach's alpha of .79, .86, .88, respectively. The reliability of the PHYS subscale was .79, the reliability of the PSYCH subscale was .78, the reliability of GDI subscale was .75. Cronbach alpha coefficient was .94 for MSPSS and .89 for the ASAS-R scale. Overall, all the scales used for the research were reliable.

The results in this study show that participants' age ranged from 37 to 78 years with an average age of 59.6 years (*SD* = 9.78). Among all age brackets, the population of younger elderly aged 60-74 was the highest, accounting for 58.3%, followed by middle-age adults aged 45-59 (30.8%). There were more males (58.3%) than females (41.7%). Majority of the participants were married (98.3%). Nearly three-quarters of the patients had no more than middle school education (73%). Most of them were retired (45.8%), while 41.7% of participants were still working.

In terms of health-related information, 84.2% of participants had the normal weight range. 81.7% of the participants have no comorbidities. 53% of them were diagnosed with colorectal cancer, followed by gastric cancer (46.7%). Moreover, 86.7% of patients were classified as having stage III GI cancer. The participants received 3-8 cycles of chemotherapy, and most of them received 6 cycles (45%). The cumulative dose of oxaliplatin that the participants received were ranged from 342-1073mg/m^2 (*M* = 678.72, *SD* = 170.64).

Participants reported a mean of 9.8 (*SD* = 5.22) symptoms, the highest occurrence of symptoms was (1) numbness/tingling in hands/feet (81.7%), followed by (2) lack of energy (78.3%), (3) nausea (73.3%), (4) lack of appetite (71.7%), (5) change in the way food tastes (56.7%). However, (1) lack of energy had the highest frequency with average score of 1.67 (*SD* = 1.13), followed by (2) numbness/tingling in hands/ feet (*M* = 1.63, *SD* = 1.05), (3) nausea (*M* = 1.53, *SD* = 1.16), (4) lack of appetite (*M* = 1.49, *SD* = 1.22), (5) vomiting (*M* = .78, *SD* = 1). Moreover, the most severity symptom were (1) lack of energy with average score of 1.41 (*SD* = .96), followed by (2) numbness/tingling in hands/ feet (*M* = 1.36, *SD* = .81), (3) lack of appetite (*M* = 1.35, *SD* = 1.11), (4) nausea (*M* = 1.33, *SD* = 1.03), (5) change in the way food tastes (*M* = .98, *SD* = 1.02). Furthermore, (1) lack of energy had the highest distress with average score of 1.53 (*SD* = .98), followed by (2) lack of appetite (*M* = 1.47, *SD* = 1.05) and nausea (*M* = 1.47, *SD* = 1.01), (3) numbness/tingling in hands/feet ((*M* = 1.37, *SD* = .92), (4) change in the way food tastes (*M* = 1.06, *SD* = 1.04). Of those, lack of energy had the highest frequency, severity and the most distressing to patients.

Moreover, about the three dimension of symptom experience, the mean total score of distress was (*M* = 17.90, *SD* = 11.91), followed by severity (*M* =15.85, *SD* = 10.24), frequency (*M* =14.17, *SD* = 8.24). For the MSAS subscale scores, the results showed that the total score of the MSAS-PHYS was ranged from 0–2.31, the mean score was 0.84 (*SD* = .51), while the total score of the MSAS-PSYCH score was range from 0–2.20, the mean score was 0.53 (*SD* = .61). In terms of the MSAS-GDI, the total score was range from 0-1.76, the mean score was .73 (*SD* = .47).

The results of social support indicated that the participants had slightly high social support. In addition, they also have high social support from family and

significant others, while they have a moderate support from friends. The self-care behavior ranged from 32 to 80 (M = 43.97, SD = 7.97).

Point biserial correlation results indicated that gender had a moderate positive significant correlation with symptom frequency, severity, and distress (r = .41, r = .40, r = .42, p < .01 , respectively) as well as the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI (r = .31, r = .44, r = .47, p < .01, respectively). Pearson's product-moment correlation results showed that cumulative dose had a positive significant correlation with symptom frequency, severity, and distress (r = .44, .47, .48, p < .01, respectively) as well as those subscales (r = .37, .43, .47, p < .01, respectively). Self-care behavior and social support had a negative significant correlation with symptom frequency, severity, and distress (r = -.55, -.49, -.43, p < .01, respectively) as well as those subscales (r = -.49, -.30, -.40, p < .01, respectively). Social support had a negative significant correlation with symptom frequency, severity, and distress (r = -.37, -.37, -.30, p < .01, respectively) as well as those subscales (r = -.32, -.26, -.29, p < .01, respectively). However, age had no statistically significant correlations with symptom frequency, severity, and distress (r = .064, -.018, .012, p > .05, respectively) as well as those subscales (r = .076, -.059, .005, p > .05, respectively).

Discussion

The findings of this study were discussed based on the research objectives and research hypothesis.

Symptom experience

The results from this study suggest that gastrointestinal cancer patients after surgery who treated with chemotherapy can experience multiple symptoms. The mean of symptoms per individual was 9.8 (SD = 5.22). The result in this study is consistent with others findings on patients with GI cancer. Pettersson et al. (2014) found that patients treated with chemotherapy for colorectal cancer (CRC) can experience multiple symptoms, and reported a mean of 10.3 symptoms per individual, while other studies found that the GI cancer patients reported a mean of 10.5 and 11 symptoms per individual respectively (Cao & Li, 2015; Han et al., 2019). Based on the theory of unpleasant symptoms (Lenz et al., 1997), symptom in cancer patients

who received chemotherapy often do not occur in isolation. There is some synergy between different symptoms (Cheng et al., 2009). A cancer patient may be suffering physical, psychological, social as well as soulful in four dimensions, and each discomfort symptom needs to be seen and valued (Han et al., 2020).

In this study, participants reported both physical and psychological symptoms, however, the top 5 of the occurrence, frequency, severity, and distress were physical symptoms. The numbness/tingling in hands/feet, lack of energy, nausea, lack of appetite, and change in the way food tastes were higher and caused more serious distress to patients. These findings have consisted of the results of subscales of MSAS. For all participants, the highest score in the domain of MSAS-PHYS was .84 (*SD* = .51). In addition, the subscale of MSAS-GDI means score was .73 (*SD* = .47), while the lowest score in the MSAS-PSYCH was .53 (*SD* = .61). The results have consisted with the previous study, Wu (2010) studied the symptom experience in GI patients undergoing chemotherapy in China and found that the MSAS-PHYS score was the highest (*M* = .94, *SD* = .39). The mean MSAS-GDI score was .74 (*SD* = .35), MSAS-PSYCH score was .57 (*SD* = .38). However, the overall scores of the three subscales were higher than in this study. The reasons for these findings can be enumerated in terms of different cancer stages of the participants as well as different BMI.

Based on the unpleasant symptom theory (Lenz et al., 1997), symptoms can be influenced by physiological factors , which are those related to “ normally functioning bodily systems ” factors like an alteration in nutrition, including cancer stage and BMI (Blakeman, 2019). Our study showed that the participants were at the cancer stage II and III which was lower than Wu’s study (stage II ~ stage IV). The literature showed that symptom experience was higher in patients having a more advanced cancer diagnose (Akin et al., 2010; Haryani et al., 2018).

Moreover, 84% of the participants in this study had a normal range BMI and relatively higher overall nutritional status than in the Wu’ study, which 60% of the participants had a below normal BMI (Wu, 2010), at a time when cancer and chemotherapy are very taxing on the body, those with a normal BMI have a relatively better nutritional status, patients are more capable of self-care and activity (Caccialanza et al., 2021). Therefore, more attention was paid to nutritional support

therapy for cancer patients in clinical practice. This will led to the improvement of symptom management in cancer patients (Wang et al., 2021).

For the highest occurrence, numbness/tingling in the hands and feet was the most prevalent symptom (81.7%) reported in this study, which was much higher than the previous study (64%, 52%) (Pettersson et al., 2014; Wu, 2010). Numbness/tingling is related to chemotherapy-induced peripheral neuropathy (CIPN), which interferes with several activities of patients. Acute and chronic neuropathy differ in their timing, duration, and symptomatology. Acute oxaliplatin neurotoxicity is induced by cold and is characterized by distal sensory symptoms such as paresthesia and dysesthesia occurring in days following oxaliplatin infusion (Griffith et al., 2017). It occurs rapidly in nearly all patients treated and is typically transient. The chronic form occurs because of the repetition of chemotherapy cycles. Neuropathy is cumulative dose-dependent and can persist for months leading to quality-of-life deterioration (Zribi et al., 2020).

High occurrence of numbness/tingling in the hands and feet among the participants in the current study can be explained that the time of data collection in this study was November and December, which was winter in China. Moreover, most of them have received 6 cycles (45%), a longitudinal study has shown that patients' experience of all three dimensions of symptoms increased with the duration of chemotherapy, especially after six cycles of chemotherapy (Wang et al., 2019). Likewise, the mean cumulative of oxaliplatin that the participants received were 678.72 mg/m^2 (*SD* = 174.06). Literature review showed that the median cumulative dose of oxaliplatin that induced neuropathy was 432.4 mg/m^2 (Zribi et al., 2020), therefore, the occurrence of hand and foot numbness in this sample is relatively high.

Moreover, 42% of the participants in this study were employed, and the impact of hand numbness on work and the impact on fine work will cause distress to patients (Zribi et al., 2020). These findings thus support the view that patients should be informed and educated about neurotoxicity so they can assess early changes, and it is also important that they know how to report these changes to the healthcare personnel responsible for their care.

We know from the TOUS that symptoms interact with each other, and when patients have severe numbness in their hands and feet, they tend to lack of energy

(Tantoy et al.,2018). In addition, in our study, the participants in this study were GI cancer patients after surgery. Therefore, postoperative reconstruction of the digestive tract itself can affect the patient's digestive function and lead to some GI reactions (i.e., nausea, lack of appetite, and change in the way food tastes). Moreover, a variety of gastrointestinal reactions lead to reduce intake of patients, which is also easy to cause a lack of energy.

This study also found that the ranking of the overall incidence, frequency, severity, and distress scores of symptoms was consistent with previous studies (Pettersson et al., 2014; Yan & Sellick, 2004). The symptoms with the highest distress scores did not have the highest occurrences rates or severity scores. The second most frequent symptom in our study was lack of energy (78.3%), though when looking at the proportion of patients scoring the symptom as present frequently or almost constantly, lack of energy was ranked top. The same applies to the dimensions of severity and distress of lack of energy (i.e., fatigue). This is in accordance with the previous study (Pettersson et al., 2014).

Cancer-related fatigue (CRF) is a subjective experience that constitutes one of the most common and frustrating symptoms through all stages of the cancer trajectory and into survivorship (Soones et al., 2022). It is defined as a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer and/or cancer treatment that is not proportional to recent activity, interferes with usual functioning, and is not relieved by rest or sleep (Deb et al., 2021). A study supported the high occurrence of lack of energy among patients with CRC undergoing chemotherapy in cycle 2 or cycle 3 (Pettersson et al., 2014). T The occurrence in their study (60%) was a little lower than our findings (78.3%), which may indicate that as the course of chemotherapy increased, the patient's symptoms increased. Our results indicate the importance of informing patients about fatigue at the start of the treatment and of increasing efforts to find strategies to reduce fatigue.

In the TOUS, symptoms are acknowledged to be multidimensional in nature, including four dimensions: intensity, distress, timing, and quality (Lenz et al., 1997). These four symptom dimensions may interact with one another (Lenz et al., 1997). An evaluation of symptom distress is important because unrelieved distress can interfere

with patients' willingness to obtain or continue treatment (Pettersson et al., 2014), which can impact overall survival, so the evaluation of a particular symptom should integrate all three dimensions of the symptom. Our findings suggest that nurses need to assess multiple dimensions of the symptom experience in patients with GI cancers and attempt to manage the most common, severe, and distressing symptoms.

Relationships between symptom experience and selected factors

In this study, the results showed that gender and cumulative dose had a positive significant correlation with symptom frequency, severity, and distress as well as symptom experience subscales. Self-care behavior and social support had a negative significant correlation with symptom frequency, severity, and distress as well as symptom experience subscales. However, age had no statistically significant correlations with symptom frequency, severity, and distress as well as symptom experience subscales. The above results are in line with the objective of this study. However, age is in contrast to the research hypothesis These results can be discussed as follows below.

Gender

In consistent with the hypothesis of the study, gender had a positive significant correlation with symptom frequency, severity, and distress as well as symptom experience subscales. According to the theory of unpleasant symptoms (TOUS), gender which was a physiologic factor has a reciprocal relationship with the occurrence of symptoms (Lenz et al., 1997).

In this study, female participants reported significantly higher scores of symptom frequency, severity, and distress than male. Similar findings were reported by Hua (2010), who conducted a survey of patients with adjuvant chemotherapy after colon cancer surgery in China. The total score of symptom frequency, severity in female patients were significantly higher than that in male patients, but there was no difference in the distress dimension. This suggests that female patients are more likely to have adverse reactions to chemotherapy, and female patients were more inclined to report the uncomfortable symptoms of chemotherapy to medical staffs (Hua, 2010).

Besides that, in this study, female participants reported significantly higher scores on the MSAS-PHYS, MSAS-PSYCH, and MSAS-GDI subscales than males. The results of a study by Wu (2010) showed that the scores of those three MSAS

subscales in female gastric cancer patients during chemotherapy were significantly higher than male patients, which indicated that gender is one of the influencing factors for the symptom experience of gastric cancer patients. Another prospective study of changes in anxiety, depression, and problems in living during chemotherapy treatments also showed that female patients reported greater emotional, family, and physical problems than male patients (Bergerot et al., 2017), which also revealed that gender had a relationship with the MSAS-PHYS, MSAS-PSYCH.

Moreover, previous study showed that among patients with higher postoperative chemotherapy symptom distress in colon cancer, female patients were more inclined to fail to complete chemotherapy as planned (Hua, 2010).As a result, nurses should pay more attention to female patients with postoperative adjuvant chemotherapy for GI cancer, have foresight on the occurrence of physical and psychological symptoms, as well as multidimensional evaluation of symptoms, intervene early, and improve the completion rate of chemotherapy (Kim et al., 2015).

Cumulative dose

In consistent with the hypothesis of the study, cumulative dose had a positive significant correlation with each dimension of the symptom experience (Frequency, severity & distress) and all symptom experience subscale. The population in this study were received 3-8 cycles of oxaliplatin combined with capecitabine. Most of them have received 6 cycles (45%), the mean cumulative of oxaliplatin that the participants received were 678.72 mg/m^2 (*SD* = 170.64). One of the most important limits of oxaliplatin treatment is its peripheral neurotoxicity. Neuropathy is cumulative dose-dependent and can persist for months leading to quality of life deterioration (Mols et al., 2013). As the cumulative dose of chemotherapy increases, the cumulative toxic effects of chemotherapy drugs in the body increase (Zribi et al., 2020). Therefore, when the side effects increases, therefore, the level of symptoms experienced by the patients increases (Wu, 2010).

In the present study shown that cumulative dose had a positive significant correlation with all of symptom experience subscales. This can be explained that the participants in this study, the average hospitalization time of patients undergoing chemotherapy was 1-3 days, and the average cycle of chemotherapy was 21 days. Because of its cyclical reasons, chemotherapy patients need to spend not only the

cost, but also time as well as the companionship of caregivers. This situation may cause psychological impact to the cancer patients. Based on the theory of unpleasant symptoms (TOUS), it is acknowledged that physiological (e.g., cumulative dose), psychological (e.g., mood state) and situational factors (e.g., frequent medical visits) are interrelated and may interact to influence symptom experience (Lee et al., 2017).

In addition, 41.7% of the participants in this study were still in working status and needed to take time off to go to the hospital during chemotherapy, as the chemotherapy course increased, the number of visits to the hospital increased, so the physical and psychological burden of the patients increased, which made them more distress (Hua, 2010). Furthermore, 58.3% of the participants were younger elderly. When they went to the hospital to receive chemotherapy, they might need the guidance of their family members, so with the increase of chemotherapy courses, they will feel more guilty to their family members, and their psychological burden will increase (Cao & Li, 2015).

Self-care behavior

The level of self-care behavior reported in the current sample (M = 43.97, SD = 7.99) was lower than previous study reporting a mean self-care behavior score of 53.96 (SD = 6.79) among cancer patients receiving chemotherapy in China (Zhang et al., 2015). The reason may be that in Zhang' s study, the mean age (M= 51.76, SD = 6.74) was younger than this study (M = 59.6, SD = 9.78).

According to the theory of unpleasant symptoms (TOUS), physiologic factors (age) and situational factors (self-care behavior) relate to one another (Lenz et al., 1997). Previous study found that with the increase of age, there was a decline in both ability for self-care and functional independence (Oller et al., 2012). Some self-care behaviors may be intuitive, for example, resting when feeling fatigued. However, more complex and systematic self-care behaviors may be taught by nurses to help patients cope with the anticipated effects of chemotherapy treatment (Sousa et al., 2010). Therefore, young people are more capable of receiving knowledge than older people and have higher levels of self-care behavior.

In this study, self-care behavior had a negative significant correlation with each dimension of the symptom experience (Frequency, severity & distress) and all 3 subscales of symptom experience. The theory of unpleasant symptoms (TOUS) also

indicated that situational factors (self-care behavior) may interact to influence the symptoms (Lenz et al., 1997). Previous research supports the result of this study, Akin and Kas Guner (2019) reported that self-care behaviors may have a positive impact on performing cognitive and behavioral fatigue management strategies in GI cancer patients to reduce the fatigue.

In the present study shown that self-care behavior had a negative significant correlation with physical, psychological symptom subscale and global distress index. Previous study demonstrated that self-care behavior was positively correlated with self-efficacy, which indicates that individuals need to believe that they can put self-care activities into practice to exert sufficient effort and be able to perform self-care behavior (Zhang et al.,2015). Through literature review, we know that self-efficacy is negatively correlated with symptom distress of cancer patients undergoing chemotherapy (Akin & Kas Guner, 2019; Kırca & Kutlutürkan, 2021; Murley et al., 2019; Wu et al., 2021), which can explain the results of this study.

On the other hand, based on the theory, the experience of unpleasant symptoms can change one' s situational status (self-care behavior) (Lenz et al., 1997). In this study, participants had the highest incidence of numbness/tingling in hands/feet (81.7%), followed by lack of energy (78.3%), nausea (73.3%), lack of appetite (71.7%), because patients suffering so much unpleasant experiences that they did not have the energy to practice health self-care behaviors (Chou et al., 2007).

Social support

Perceived social support include instrumental, informational and emotional support received from family, friends and significant others (Zimet et al., 1990). The mean total scores of social supports of participants in this study were slight high. For the subscales, the mean score of family subscale and significant other subscale were high, and friend's subscale was in moderate level. The possible explanation for high perceived social support among participants in this study can be attributed to periodicity of chemotherapy and clinicians' emphasis on continuity of care as well as the COVID-19.

Chemotherapy is followed by a course of treatment, the GI cancer patients need 6-8 cycles of chemotherapy (Brewer et al., 2016). Information on health promotion from the health care provider is available at each hospital visit. Majority of

the participants were married (98.3%), the hospitalization time of chemotherapy is relatively short, and patients live with their families for most of the time, besides, because of the COVID19, low immunity of participants and the time of data collection was in winter, Patients spend more time at home with families.

Furthermore, Clinical staffs are now very concerned about the continuity of care(Morey et al., 2021), after the patients are discharged from the hospital, and most GI cancer patients having chemotherapy and family members are invited to join the WeChat groups when they are discharged from the hospital. The participants could receive support from both the health care providers and other patients. They can consult the group about anything related to diet, activity, medication, etc. Besides, they can get to know patients who are also undergoing chemotherapy or have successfully completed chemotherapy, because they are also patients, they can easily empathize with each other and share some ways to relieve their discomfort symptoms. Moreover, in this study, 41.7% of participants were still working, they can get encouragement from their colleagues.

In this study, social support had a negative significant correlation with each dimension of the symptom experience (Frequency, severity & distress), and the MSAS-PHYS, the MSAS-PSYCH, MSAS-GDI subscales. Previous study showed that patients who have less social support tend to have more difficulty in controlling postoperative physical symptoms in each dimensions (Maeda & Munakata, 2008). Moreover, many studied suggested that perceived social support affects a cancer patient's psychological condition, and it has been widely recognized that there is a relationship between a low level of perceived emotional support and a high level of depression (Parker et al., 2003; Stark & D., 2002).

In the theory of unpleasant symptoms (TOUS), situational factors that influence the symptom experience are those that encompass the individual's physical and social environment such as social support (Lenz et al., 1997).These can influence an individual's way of interpreting symptoms or dealing with symptoms. This was consistent with previous studies (Kim et al., 2015; Wu, 2010). This result can be understood that social supports play an important role in alleviating the symptom experience of GI cancer patients undergoing chemotherapy.

On the other hand, the theory of unpleasant symptoms also indicate that

unpleasant symptoms can feedback situational status (social support) (Lenz et al., 1997).The patients suffering a variety of physiological and psychological unpleasant symptom experiences that they may just want to stay quiet and not engage in social activities.

Age

Findings indicated that age had no statistically significant correlation with symptom experience. As we known from literature review, the relationship between age and symptom experience among postoperative GI cancer patients undergoing chemotherapy remain unclear. Some study findings suggest that younger patients with cancer undergoing chemotherapy experienced greater symptomatic distress than older adults (Cao & Li, 2015; Wong et al., 2017). Other study findings show either no association (Agasi-Idenburg et al., 2017; Wu, 2010) or a positive association between age and symptom distress (Van Cleave et al., 2013).

In this study, the participants' age ranges from 37 to 78 years with the average of 59.6 years (*SD* = 9.78). Among all age brackets, the population of younger elderly aged 60-74 was the highest, accounting for 58.3%, so, more than half of the participants were elderly. In addition, age has a two-sided effect on symptoms. First, the memory, adaptability and physical fitness of the elderly are not as good as those of young people (Wu, 2010). Second, they have less access to disease-related health knowledge than young people (Hua, 2010). Elderly participants' ability to learn and accept ways to relieve symptoms is not as good as younger people, however, they might forget some light symptoms that they experienced 1 week ago because of poor memory.

On the other hand, young people are in their golden years of work and study, and sudden diagnosis of cancer and treatment cause psychological and financial distress to young patients (Wu, 2010). Moreover, young people have higher demands on quality of life than older people and are more likely to express their discomfort to medical personnel (Wang et al., 2019). Therefore, chemotherapy causes many levels of symptom burden in patients of different ages.

Conclusion

In conclusion, our study confirmed the high symptom burden experienced by GI cancer patients receiving chemotherapy and identified differences in symptoms by occurrence, frequency, severity, and distress. Self-care behavior and social support are important related factors for decreased symptom experience, while female, and cumulative dose of oxaliplatin are important risk factors for increased symptom experience. These factors can help clinicians identify GI cancer patients at increased need for early, aggressive symptom management.

Implication for nursing practice

Findings of the current study might be useful in the following areas:

1. Nursing practice

The findings of the study provided deeper insight regarding symptom experience and its related factors among patients with GI cancer having chemotherapy after surgery. This information can be useful in developing appropriate nursing intervention to reduce the symptom experience. Personalized nursing assessment can be provided for patients based on gender and cumulative dose of chemotherapy, and symptom experience can be reduced by improving self-care behavior and social support.

2. Nursing education

It can also be useful for nurse educator to enhance nursing student's knowledge to reduce symptom experience by provide nursing assessment concerning gender and cumulative dose of chemotherapy, and symptom experience can be reduced by improving self-care behavior and social support.

Recommendations for future research

This study is a cross-sectional study, which only investigated the characteristics of symptom experience of gastrointestinal cancer patients during a certain chemotherapy course. Future studies can conduct longitudinal studies of symptom experience of gastrointestinal cancer patients during chemotherapy to track the characteristics and changes of symptom experience of the same patient during

different chemotherapy courses. Based on the factors related the symptom experience of gastrointestinal cancer patients during chemotherapy as revealed by the results of this study, an interventional study should be conducted on this group of gastrointestinal cancer patients to explore effective symptom control measures in order to reduce patients' symptom levels and improve their quality of life. Moreover, symptoms clusters of can be studied based on this in the future.

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APPENDICES

APPENDIX A

Questionnaires in English version

1.The Demographic Questionnaire

Direction: Please read the questions in part 1 and part 2 carefully and give an honest answer. Please choose the answer as follow by write down your answers in the space provided.

Part 1: General information (To be completed by the participant)

1. Age: _____
2. Gender:

   □ Male □ Female
3. Marital status

   □ Single □ Married □ Divorced □ Widowed
4. Employment status

   □ Employment □ Unemployment □ Retired
5. Educational level

   □ Primary school □ Secondary school □ High school

   □ □ college and higher

Part 2: Health information (To be collected by the researcher from the patient record)

1. Primary tumor site:_Stage of cancer_____
2. Height:____m Weight:____kg BMI:____kg/m^2
3. Cumulative dose:_____
4. Chemotherapy cycles:__
5. Comorbidity

   □ None

   □ Hypertension

   □ Diabetic

   □ Heart disease

   □ Others:

2. The Memorial Symptom Assessment Scale

MEMORIAL SYMPTOM ASSESSMENT SCALE

Name **Date**

Section 1

Instructions: We have listed 24 symptoms below. Read each one carefully. If you have had the symptom during this past week, let us know how <u>OFTEN</u> you had it, how <u>SEVERE</u> it was usually and how much it <u>DISTRESSED or BOTHERED</u> you by circling the appropriate number. If you <u>DID NOT HAVE</u> the symptom, make an "X" in the box marked "<u>DID NOT HAVE</u>."

<u>DURING THE PAST WEEK</u> Did you have any of the following symptoms?	DID NOT HAVE	<u>IF YES</u> How OFTEN did you have it?				<u>IF YES</u> How SEVERE was it usually				<u>IF YES</u> How much did it DISTRESS or BOTHER you?				
		Rarely	Occasionally	Frequently	Almost Constantly	Slight	Moderate	Severe	Very Severe	Not at all	A Little Bit	Somewhat	Quite a Bit	Very Much
Difficulty concentrating		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4

....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
....		1	2	3	4	1	2	3	4	0	1	2	3	4
Feeling irritable		1	2	3	4	1	2	3	4	0	1	2	3	4

Section 2

INSTRUCTIONS: We have listed 8 symptoms below. Read each one carefully. If you have had the symptom during this past week, let us know how SEVERE it was usually and how much it DISTRESSED or BOTHERED you by circling the appropriate number. If you DID NOT HAVE the symptom, make an "X" in the box marked "DID NOT HAVE."

DURING THE PAST WEEK, Did you have any of the following symptoms?	IF YES How SEVERE was it usually?				IF YES How much did it DISTRESS or BOTHER you?				
	Slight	Moderate	Severe	Very Severe	Not at all	A little bit	Somewhat	Quite a bit	Very much
....	1	2	3	4	0	1	2	3	4
Change in the way food tastes	1	2	3	4	0	1	2	3	4
....	1	2	3	4	0	1	2	3	4
....	1	2	3	4	0	1	2	3	4
Constipation	1	2	3	4	0	1	2	3	4
....	1	2	3	4	0	1	2	3	4
"I don't look like myself"	1	2	3	4	0	1	2	3	4
....	1	2	3	4	0	1	2	3	4

IF YOU HAD ANY OTHER SYMPTOMS DURING THE PAST WEEK, PLEASE LIST BELOW AND INDICATE HOW MUCH THE SYMPTOM HAS DISTRESSED OR BOTHERED YOU.					
Other:	0	1	2	3	4
Other:	0	1	2	3	4
Other:	0	1	2	3	4

3. The Multidimensional Scale of Perceived Social Support

Instructions: There are 12 sentences below, and there are 7 answers at the end of each sentence. please choose one answer at the end of each sentence according to your own situation. For example, “1” means “very strongly disagree”, “2” means “strongly disagree”, “3” means “mildly disagree”, “4” means “neutral”, “5” means “mildly agree”, “6” means “strongly agree”, “7” means “very strongly agree”.

	Items	Score						
1	There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2	There is a special person with whom I can share joys and sorrows	1	2	3	4	5	6	7
3	…….....	1	2	3	4	5	6	7
4	…….....	1	2	3	4	5	6	7
5	…….....	1	2	3	4	5	6	7
6	…….....	1	2	3	4	5	6	7
7	…….....	1	2	3	4	5	6	7
8	…….....	1	2	3	4	5	6	7
9	…….....	1	2	3	4	5	6	7
10	…….....	1	2	3	4	5	6	7
11	…….....	1	2	3	4	5	6	7
12	I can talk about my problems with my friends.	1	2	3	4	5	6	7

4. Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale

Instructions: There are 15 sentences below, and there are 5 answers at the end of each sentence. please choose one answer at the end of each sentence according to your own situation. For example, “1” means “total disagree”, “2” means “disagree”, “3” means “neither disagree nor agree”, “4” means “agree”, “5” means “total agree”.

	Items	Score				
1	Item 1 (A1) As circumstances change, I make the needed adjustments to stay healthy	1	2	3	4	5
2	Item 2 (A2) If my mobility is decreased, I make the needed adjustments	1	2	3	4	5
3	…….....	1	2	3	4	5
4	…….....	5	4	3	2	1
5	…….....	1	2	3	4	5
6	…….....	1	2	3	4	5
7	…….....	1	2	3	4	5
8	…….....	1	2	3	4	5
9	…….....	1	2	3	4	5
10	…….....	1	2	3	4	5
11	…….....	5	4	3	2	1
12	…….....	1	2	3	4	5
13	…….....	1	2	3	4	5
14	…….....	5	4	3	2	1
15	…….....	5	4	3	2	1

APPENDIX B

Permission letters to use instruments

1. Multidimensional Scale of Perceived Social Support.

RE: [External] Ask for the permission of using the multidimensional scale of perceived social support (MSPSS)

From： Zimet, Gregory D<gzimet@iu.edu>

To： sicily89757<sicily89757@163.com>

Time： 2021 03月01日 08:43

Dear Xin Xin Chen,

You have my permission to use the Multidimensional Scale of Perceived Social Support (MSPSS) in your research. I have attached the original English language version of the scale (with scoring information on the 2nd page), a document listing several of the articles that have reported on the reliability and validity of the MSPSS, and a chapter that I wrote about the scale.

Also attached is a simplified Chinese translation of the MSPSS, which may be helpful to you.

I hope your research goes well.

Best regards,

Greg Zimet

Gregory D. Zimet, PhD, FSAHM
Professor of Pediatrics & Clinical Psychology
Co-Director, IUPUI Center for HPV Research
Division of Adolescent Medicine | Department of Pediatrics
410 W. 10th Street | HS 1001
Indianapolis, IN 46202
+1.317.274.8812 tel
+1.317.274.0133 fax
gzimet@iu.edu

From: sicily89757 <sicily89757@163.com>

Sent: Saturday, February 27, 2021 6:45 AM

To: Zimet, Gregory D <gzimet@iu.edu>

Subject: [External] Ask for the permission of using the multidimensional scale of perceived social support (MSPSS)

Dear professor

How are you? I am Xinxin Chen, a master degree student of Burapha University，Thailand. I am doing my thesis "Symptom Experience and the Related Factors in Postoperative patients with gastrointestinal cancer during Chemotherapy ", and need to use the scale you developed, and I need both the English one and Chinese version.

2. The Memorial Symptom Assessment Scale.

RE: {External} - Ask for the permission of using the memorial symptom assessment scale

From：Russell Portenoy<RPORTENO@mjhs.org>
To：sicily89757<sicily89757@163.com>
Time：2021 年 03 月 01 日 20:22

The MSAS has been used in many studies. From my perspective, you are free to use it without limitations or cost. I have various copies in my files and I attach relevant one's for you. I have no additional material related to the measure.

Best of luck in your research.

R. Portenoy MD

From: sicily89757 <sicily89757@163.com>
Sent: Saturday, February 27, 2021 6:37 AM
To: Russell Portenoy <RPORTENO@mjhs.org>
Subject: {External} - Ask for the permission of using the memorial symptom assessment scale

Dear Dr R.K. Portenoy

How are you? I am Xinxin Chen，a master degree student of Burapha University，Thailand. I am doing my thesis "Symptom Experience and the Related Factors in Postoperative patients with gastrointestinal cancer during Chemotherapy in China", and I need to use the scale you developed, and I need both the English one and Chinese version.

3. Appraisal of Self-Care Agency Scale-Revised (ASAS-R) scale

From: **guolina09** <guolina09@126.com>

2022年2月24日 8 : 05AM

To: **Sicily <805663453@qq.com>**

好的 欢迎使用。这些文献你可以参考。

1.郭丽娜,高涵,郭启云等.修正版自我护理能力评估量表汉化后的信效度评价[J].中国实用护理杂志,2014,30(30):64-66.

2.Guo LN, Zauszniewski, JA, Ding XF, et al. The Appraisal of Self-Care Agency Scale–Revised (ASAS-R): Reliability and Validity: Among Older Chinese People. Western Journal of Nursing Research. 2017 Nov;39(11):1459-1476.

3.Guo L, Soderhamn U, Mccallum J, **Liu Y***, et al. Testing and comparing two self-care-related instruments among older Chinese adults[J]. PLoS One, 2017, 12(8): e182792. 有临界点可供参考

4.郭丽娜. 老年人自我护理能力量表的本土化修订与验证[D].锦州医科大学,2016.

量表中英文完整版以及量表的详细分析

郭丽娜

郑州大学第一附属医院

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Good Regards,

Dr. Lina Guo

Department of Neurology, the first Affiliated Hospital of Zhengzhou University, Zhengzhou, China

APPENDIX C

Participant’s information sheet and consent forms

เอกสารชี้แจงผู้เข้าร่วมโครงการวิจัย

(Participant Information Sheet)

รหัสโครงการวิจัย : .....

(สำนักงานคณะกรรมการพิจารณาจริยธรรมในมนุษย์ มหาวิทยาลัยบูรพา เป็นผู้ออกรหัสโครงการวิจัย)

โครงการวิจัยเรื่อง : ...Factors related to symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery

Dear participants

I am Mrs. Xinxin Chen, a student in Master of Nursing Science (International Program) Faculty of Nursing, Burapha University Thailand. My study is “Factors related to symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery”. The objectives are to describe symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery and to examine the relationships between age, gender, cumulative dose, social support and self-care behavior with symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery.

This study will be a survey study. Participating in this study is voluntary. If you agree to participate in this study, you will answer the following questionnaires, which will take approximately 30-40 minutes. During the data collection period, the researcher will clarify any questions posed by the participants for clarity regarding the language or content. You will not get any direct benefits by participating in this study. However, the information you provide will be valuable in helping nurses to understand and well respond to symptom experience and the related factors, moreover can further design the intervention to deal and manage with a series of symptoms during chemotherapy on the basis of systematic evaluation of patients' symptom experience. There will be no identified physical and psychological risk to the person participating in the study and no risk to the society.

You have the right to end your participation in this study at any time, and no necessary to inform the researcher, and it will not hamper treatment and disease

prognosis. Any information collected from this study, including your identity, will be kept confidential. A coding number will be assigned to you and your name will not be used. Findings from the study will be presented as a group of participants and no specific information from any individual participant will be disclosed. All data will be accessible only to the researcher which will be destroyed one year after publishing the findings. You will receive a further explanation of the nature of the study upon its completion, if you wish.

The research will be conducted by Mrs. Xinxin Chen under the supervision of my major-advisor, Associate Professor Dr. Niphawan Samartkit. If you have any questions, please contact me at mobile number: + 8613738730552 or by email 805663453@qq.com and/or my advisor's e-mail address nsamartkit@gmail.com. Or you may contact Burapha University Institutional Review Board (BUU-IRB) telephone number 038 102 620. BUU IRB's email address "buuethics@buu.ac.th" BUU IRB's phone number (+66-38-10-2620) Your cooperation is greatly appreciated. You will be given a copy of this consent form to keep.

Xinxin Chen

เอกสารแสดงความยินยอม

ของผู้เข้าร่วมโครงการวิจัย (Consent Form)

รหัสโครงการวิจัย : ……..

(สำนักงานคณะกรรมการพิจารณาจริยธรรมในมนุษย์ มหาวิทยาลัยบูรพา เป็นผู้ออกรหัสโครงการวิจัย)

โครงการวิจัยเรื่อง ……Factors related to symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery……

Date of data collection ……Month…..……Year …….

Before giving my signature below, I have been informed by researcher, Mrs. Xinxin Chen, about the purposes, method, procedures, benefits and possible risks associated with participation in this study thoroughly, and I understood all of the explanations. I consent voluntarily to participate in this study. I understand that I have the right to leave the study any time I want, without fearing that it might hamper my treatment and disease prognosis.

The researcher Mrs. Xinxin Chen has explained to me that all data and information of the participants will be kept confidential and only be used for this study. I have read and understood the information related to participation in this study clearly and I am signing this consent form.

Signature ……..…….. Participant

(…….)

APPENDIX D

Ethical clearance letter and data collection letters

สำเนา

ที่ IRB3-085/2564

เอกสารรับรองผลการพิจารณาจริยธรรมการวิจัยในมนุษย์
มหาวิทยาลัยบูรพา

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาโครงการวิจัย

รหัสโครงการวิจัย : G-HS044/2564
โครงการวิจัยเรื่อง : Factors related to symptom experiences among patients with gastrointestinal cancer having chemotherapy after surgery
หัวหน้าโครงการวิจัย : MRS.XIN XIN CHEN
หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์

BUU Ethics Committee for Human Research has considered the following research protocol according to the ethical principles of human research in which the researchers respect human's right and honor, do not violate right and safety, and do no harms to the research participants.

Therefore, the research protocol is approved (See attached)

1. Form of Human Research Protocol Submission Version 2 : 5 July 2021
2. Research Protocol Version 1 : 22 June 2021
3. Participant Information Sheet Version 2 : 5 July 2021
4. Informed Consent Form Version 2 : 5 July 2021
5. Research Instruments Version 1 : 22 June 2021
6. Others (if any) Version - : -

วันที่รับรอง : วันที่ 21 เดือน กรกฎาคม พ.ศ. 2564
วันที่หมดอายุ : วันที่ 21 เดือน กรกฎาคม พ.ศ. 2565

ลงนาม *นางสาวรมร แย้มประทุม*
(นางสาวรมร แย้มประทุม)
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา
ชุดที่ 3 (กลุ่มคลินิก/ วิทยาศาสตร์สุขภาพ/ วิทยาศาสตร์และเทคโนโลยี)

温州医科大学附属第二医院 温州医科大学附属育英儿童医院

伦理委员会审查批件

批件号：伦审（2021-K-55-02）

科室：胃肠肿瘤外科	主要研究者：陈新新	职称：护师	
项目名称	消化道肿瘤术后患者化疗期间的症状体验及影响因素		
申办单位	温州医科大学附属第二医院、育英儿童医院		
审查类别	初始审查	审查方式	简易审查
审查日期	2021 年 7 月 5 日	审查地点	/
审查委员	王爱霞		
审查材料	1. 复审申请表 2. 临床课题研究初始审查申请 3. 研究者简历及 GCP 证书 4. 试验方案（版本号：V2.0，版本日期：2021.6.23） 5. 知情同意书（版本号：V2.0，版本日期：2021.6.23） 6. 病例报告表（版本号：V2.0，版本日期：2021.6.23）		
审查意见	经过我院医学伦理委员会审查，审查结果为：同意		
年度/定期跟踪审查	审查频率为该研究批准之日起每 12 月一次，首次请于 2022 年 7 月 5 日前 1 个月递交“定期/年度研究进展报告”。 本伦理委员会有根据实际进展情况改变跟踪审查频率的权利。		
批件有效期	2021 年 7 月 6 日——2022 年 7 月 5 日（逾期未实施，自行废止）		
主任或副主任委员签字： 日 期：2021 年 7 月 6 日 温州医科大学附属第二医院 温州医科大学附属育英儿童医院 医学伦理委员会（盖章）			

声明：

本伦理委员会的职责、人员组成和工作程序均遵循 ICH-GCP、NMPA-GCP、中国相关法律和法规。

地址：浙江省温州市龙湾区温州大道东段 1111 号　　电话：0577-85676879　　邮编：325000

照 NMPA/GCP 最新要求及时递交我院伦理委员会，国内外其他中心发生的严重不良事件或药物可疑且非预期严重不良反应需定期汇总后递交伦理委员会，伦理委员会有权对其评估做出新的决定。

3）研究纳入了不符合纳入标准或符合排除标准的受试者，符合中止试验规定而未让受试者退出研究，给予错误治疗剂量，给予方案禁止的合并用药等没有遵从方案的情况；或可能对受试者的权益\健康以及研究的科学造成不良影响等偏离 GCP 原则的情况，请发现者及时提交“不依从或违背方案报告”。

4）自批件签发之日起，请研究者在规定的跟踪审查截止日期前 1 个月提交“定期/年度研究进展报告”，本伦理委员会有根据实际进展情况改变跟踪审查频率的权利。

5）暂停或提前终止临床研究，请及时提交书面申请。

6）完成试验请及时提交“结题报告”。

7）凡涉及中国人类遗传资源采集标本、收集数据等研究项目，必须获得中国人类遗传资源管理办公室批准后方可在本中心开展研究。

8）凡经我院伦理委员会批准的研究项目在实施前，申请人应按相关规定在国家卫健委、药审中心等的临床试验登记备案信息系统平台登记研究项目相关信息。

医学伦理委员会

MHESI 8137/1559

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

August 5th, 2021

Dear President of The First Affiliated Hospital of Wenzhou Medical University

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments (Try Out)

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. XIN XIN CHEN to collect data for testing the reliability of the instruments.

Mrs. XIN XIN CHEN ID 62910079, a graduate student of the Master of Nursing Science Program (International Program), Major in Adults Nursing Pathway, Faculty of Nursing, Thailand, was approved her thesis proposal entitled: "Factors Related to Symptom Experiences Among Patients with Gastrointestinal Cancer Having Chemotherapy After Surgery" under supervision of Assoc. Prof. Dr. Niphawan Samartkit as the principle advisor. She proposes to collect data from 30 patients with gastrointestinal cancer having chemotherapy after surgery in Gastrointestinal Surgery and Tumor Radiotherapy and Chemotherapy Department, The First Affiliated Hospital of Wenzhou Medical University.

The data collection will be carried out from August 10th, 2021 - August 20th, 2021. In this regard, you can contact Mrs. XIN XIN CHEN via mobile phone +86-1373-8730-552 or
E-mail: 805663453@qq.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

(Assoc. Prof. Dr. Nujjaree Chaimongkol)
Dean of Graduate School, Burapha University

Graduate School Office
Tel: +66 3810 2700 ext. 701, 705, 707
E-mail: grd.buu@go.buu.ac.th
http://grd.buu.ac.th

BIOGRAPHY

NAME	Xinxin Chen
DATE OF BIRTH	06 August 1988
PLACE OF BIRTH	Wenzhou city, Zhenjiang province, China
PRESENT ADDRESS	Jinxiu road, Wenzhou city, Zhenjiang province, China
POSITION HELD	2010-present Registered Nurse Department of Gastrointestinal Oncology The Second Affiliated Hospital of Wenzhou Medical University
EDUCATION	2006-2010 Bachelor of Nursing Wenzhou Medical University, Wenzhou city, China 2019-2022 Master of Nursing Science Faculty of Nursing, Burapha University, Chonburi, Thailand