2015

Improving Nutritional Status in the Hematologic Oncology Population

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The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Mary A. Malone, Student

Dr. Martha Biddle, Advisor

Final DNP Practice Inquiry Project Report

Improving Nutritional Status in the Hematologic Oncology Population

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Fall 2015

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Dedication

This manuscript is dedicated to my family, especially my husband, because without their continued support and encouragement, I would not have been able to complete my DNP journey.

Acknowledgements

I would like to acknowledge and thank my DNP committee, Dr. Martha Biddle, Dr. Karen Stefaniak and Stacy Stanifer for their continued support, guidance and encouragement throughout my DNP studies. I have learned so much from each of you and appreciate everything you have done. I would also like to thank Dr. Leslee Bertram and Dr. Mary Skinner, two of the best classmates ever, for their friendship during this DNP journey.

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Practice Inquiry Project Report Overview/Introduction

Malnutrition is the most common secondary diagnosis in patients with cancer and is a major prognostic indicator for poor response to treatment and shortened survival (Wilson, 2000). Nutrition is one aspect of care of the oncology patient that is frequently overlooked before, during and after cancer treatment. Due to the many problems that can occur from the risks of malnutrition, it is important to implement the best evidence based practices at the appropriate intervals for these patients. Patients undergoing treatment for cancer experience numerous side effects that can impact their nutrition. If severe, an individual may not be able to continue with their treatments or develop infections or other comorbidities. Education that should be initiated at diagnosis is many times lacking and there is no consistent follow up with patients, especially once they are discharged from the hospital. Patients with a hematologic cancer diagnosis are many times healthy and nutritionally stable at the beginning of their treatment. However, due to the high dose chemotherapy treatments, they can become malnourished very rapidly. Interventions are many times not initiated in this population until after bone marrow or stem cell transplant has been completed. In many cases, these patients have not had any oral intake for 2-3 days. Nursing as a whole does not categorize nutritional status as a top priority. Assessment is usually very limited and there is little to no education provided by the nurse to a patient at risk for malnutrition while hospitalized.

A literature review was completed to determine what the best nutritional interventions existed in oncology to battle the ongoing issue of malnutrition in this population. It was found that there were few articles that discussed a specific nutrition intervention to prevent malnutrition. Also, there was very little evidence in the literature

regarding the hematologic population. Most of the articles referred to the use of parenteral or enteral nutrition only after nutrition had been negatively impacted. The interventions that were listed were not specific as to what type of information was provided.

From the evidence, a nutritional intervention was developed and implemented. A nutrition education intervention along with a pre and posttest of nutritional knowledge was also created. The nutrition intervention consisted of 3 educational visits that provided information, resources and education around the importance of nutrition, use of oral supplements and symptom management. The focus of the study was to compare the nutrition knowledge of the patients on an inpatient oncology unit before and after nutrition education was provided. The patients were also given the opportunity to review material and ask questions.

In addition to providing care for the patient, it was evident that interventions and protocols needed to be put in place to guide the nurse. A nurse driven nutrition standing order set was developed to initiate oral supplements upon admission for those who met the criteria of being at risk for malnutrition. A policy was created to establish the guidelines for use of the standing order set. The order set was created by an interdisciplinary team that consisted of an oncology clinical nurse specialist, bone health nurse navigator and licensed dietician. In addition, specific discharge instructions were created to provide additional education and resources for patients who had been using oral supplements while in the hospital. The standing order set is currently under review and awaiting approval from the System Order Set committee as well as the policy and discharge instructions. Education is being created to address the nurses and provide them

with the knowledge and tools to not only understand the importance of nutrition and its impact in oncology, but to provide early and consistent interventions to prevent the incidence of malnutrition. The impact of this order set will hopefully decrease length of stay, readmissions and comorbidities which will in turn decrease costs to the facility. The implementation of the practice inquiry project allowed for improvements for the patient, nurse and system in regards to nutrition in the oncology population.

Effective Interventions to Manage Nutritional Issues in Oncology: Review of Literature

Patients receiving treatment for cancer experience numerous symptoms that greatly affect their nutritional status. These symptoms can be so severe that the patient will become malnourished and unable to complete their oncology treatment. Impaired nutritional status in cancer has been shown to be a negative prognostic indicator of outcome (Trifilio, Helenowski, Giel, Gobel, Pi, Greenberg, et al., 2012). Malnutrition ranges from 20-80% in patients with cancer and has been associated with reduced response to treatment, survival and quality of life (Kubrak & Jensen, 2007). There are many factors such as fear of the disease, fear of treatment or taste changes that can diminish a patient's desire to eat or the ability to maintain adequate food intake (Wilson, 2000). Due to these numerous factors, early intervention is key to maintaining adequate nutrition during cancer diagnosis and treatment. The evidence indicates that interventions given early and consistently have a positive impact on the nutritional status of oncology patients (Brown, Capra & Williams, 2008).

Malnutrition occurs frequently in patients with head/neck cancer, or gastrointestinal cancers (Isenring, Bauer, & Capra, 2007). These diagnoses typically require either radiation or chemotherapy and in some instances both treatment options are used. The side effects from these treatments can include mucositis, taste changes, dysphagia and nausea/vomiting (Isenring, et al, 2007). Any one of these side effects can be potentially detrimental to a patient's appetite and place them at risk for malnutrition. However, malnutrition is also very prevalent in the hematologic population but interventions to prevent malnutrition are usually started later on in the treatment plan after symptoms have occurred. Nutritional support in the hematologic population is

frequently delivered after bone marrow transplant to prevent malnutrition (Muscaritoli, Grieco, Capria, Iori, & Fanelli, 2002).

Typical treatment for hematologic cancers requires high dose aggressive chemotherapy followed by bone/stem cell transplant. These chemotherapy treatments can last for several days to weeks and severely compromise the nutritional status of patients. The high dose chemotherapy intensifies the side effects they experience and individuals become extremely fatigued, immunocompromised and are at a high risk for mucositis. All of these combined with the alteration in their taste makes it virtually impossible for the patients to maintain an adequate nutrition level. Cederholm, Eriksson, & Palmblad, (2002) indicated in their study that total parenteral nutrition was typically started when oral intake was impeded for 2-3 three days in patients who were receiving chemotherapy for remission of leukemia. Hung, Bauer, Horsley & Isenring (2013) conducted a study to determine patient satisfaction with nutrition services in the stem cell transplant population by comparing usual care with a nutrition intervention. The nutrition interventions were provided at 100 days' post-transplant and not prior to transplant. The interventions used to improve nutrition for the hematologic population indicates using parenteral and enteral nutrition but only after, they have received chemotherapy and have received their bone/stem cell transplant (Ziegler, 2001). The objective of this review is to evaluate the current literature regarding the best interventions for management of nutritional issues in both the medical and hematologic oncology population and to provide guidance and evidence to promote practice changes and further research.

Literature Review

A review of the literature was conducted using CINAHL and Cochrane databases as well as a hand search to find pertinent articles. The intent of the review was to find articles that related to specific nutritional interventions for both solid tumor and hematologic oncology populations. Articles were chosen for review that were research based, preferably randomized controlled trials, qualitative and quantitative research, used specific interventions for nutrition or assessed nutritional status. The majority of literature was either Level II or III B, which is considered strong evidence to support recommendations for practice changes regarding management of nutritional issues in oncology. There were a total of 10 articles included in the review. The search was refined several times to pinpoint only those articles that dealt specifically with malnutrition and nutrition interventions in oncology. One study was a meta-analysis of thirteen studies and the remaining studies were randomized controlled trial (n=3), cross sectional (n=3), and prospective studies (n=2). The meta-analysis consisted of thirteen studies regarding nutritional interventions that included dietary consultation, oral nutrition supplements or a combination of both. One article did not pertain to a nutrition intervention, however, the results of the study highlighted the importance of patient satisfaction with nutritional intervention because if patients are not satisfied with the care provided in regards to nutrition, they are less likely to be compliant (Isenring, Cross, Kellett, Koczwara, & Daniels, 2010). The studies were categorized into subcategories of malnutrition prevalence, nutrition interventions, patient satisfaction, quality of life and the impact of parenteral versus enteral nutrition. There was not a specific theme in regards to diagnosis, which included both medical and hematologic malignancies. All

participants in the studies were undergoing some type of cancer treatment that included radiation, chemotherapy and/or bone marrow or stem cell transplant. One article reviewed the prevalence of malnutrition and patient utilization of available nutrition resources. Two studies detailed very specific nutritional interventions that included dietary consultation and follow up and the use of oral nutrition supplements. Three of the studies were specific to the hematologic oncology population and nutrition. The interventions examined included: the effects of food caregivers, enteral nutrition and the use of glutamine supplements on nutritional outcomes.

Malnutrition Prevalence: Isenring, Cross, Kellett, Koczwara and Daniels (2010) wanted to identify the prevalence of malnutrition, patient utilization of available nutrition resources, patient nutrition information needs and what types of external sources were used for nutrition information by patients. Although this study did not deal directly with a specific nutrition intervention and was the only one of its kind in the review, the information gained was extremely valuable. The data showed that 49% of the patients in the study were malnourished and required symptom management and nutritional interventions (Isenring, et al., 2010). This provides valuable information as to the prevalence of malnutrition in the oncology population. The Patient Generated-Subjective Global Assessment (PG-SGA) was used to measure the incidence of malnutrition in the patients. It is useful because it requires input from both the patient and the healthcare provider and provides a better picture of the nutritional status. Some of the common symptoms reported by the patients included peculiar taste, no appetite and nausea and it was noted that patients who had a greater number of symptoms were more likely to be malnourished. In regards to the resources available, half of the sample was aware of

what was available but less than half actually utilized the information they received (Isenring, et al., 2010). However, all patients agreed the information was helpful and sufficient to meet their nutritional education needs (Isenring, et al., 2010). Underutilization of nutritional resources can greatly affect the nutritional status of an oncology patient and is a common problem.

Patient Satisfaction: Isenring, Cross, Kellett and Koczwara (2008) conducted a study to review patient satisfaction with nutritional interventions. Almost half of the patients in the study were at nutritional risk and a small sample were even considered moderate to high risk. The high-risk patients received dietetic review and moderate risk patients received nutrition handouts. Even though there was no statistical significance found between the dietetic review and the nutrition handouts, a majority of patients felt the information was helpful and met their expectations and needs (Isenring, et al., 2008). There was an overall high patient satisfaction with the services. It can be concluded that a higher patient satisfaction with services and resources will lead to better compliance.

Quality of Life: Nourissat, Vasson, Merrouche, Bouteloup, Goutte and Mille (2008) wanted to assess the association between quality of life and malnutrition. The intent, was to specifically review weight loss at several intervals (start of illness, over last week, last month and at 6 months) to determine if an association existed. There is a significant association between quality of life and malnutrition and this association can greatly affect the patient's actions in regards to utilizing nutritional materials and resources. Patients with less than 10% weight loss at the start of their illness had a higher quality of life score (62.8) compared to those who had lost more than 10% weight (48.8, $p<0.001$) (Nourissat, et al. 2008). In addition, 43% of the patients were diagnosed with

moderate to severe malnutrition. The implications of the study suggest that malnutrition does have a significant impact on quality of life and that nutritional counseling/interventions should begin at the time cancer diagnosis is made (Nourissat, et. al. 2008).

Nutritional Intervention: Two of the studies reviewed pertained to specific nutritional interventions that addressed nutritional status among oncology patients. These interventions included dietary consultation and follow up and the use of oral supplements. The first study, by Isenring, Capra and Bauer, (2004) was a randomized, controlled trial in an ambulatory oncology setting to determine the impact of nutrition intervention versus usual care on certain factors such as; body weight, nutritional status, quality of life and bowel health. The intervention consisted of early and intensive nutrition support by a dietician during the 12-week study along with high energy and protein oral nutrition supplements. The usual care consisted of education by nurses, nutrition pamphlet and oral nutrition supplements. The findings suggested that patients in the intervention group had a higher satisfaction and felt that the intervention was beneficial and of higher importance to their health (Isenring, et al, 2004). This may influence a higher compliance rate with nutritional prescriptions and treatment plans.

The second study by Isenring, Bauer, and Capra (2007) was to determine the impact of a nutrition intervention versus standard practice on the dietary intake of patients in an outpatient radiation setting (Isenring, et al, 2007). The intervention consisted of nutrition counseling using the ADA medical nutrition therapy protocol for radiation oncology. The standard practice was a general nutrition talk and booklet. Specific parameters of dietary intake were reviewed that included total energy, protein

intake and fiber. The intervention group had a higher intake of protein and total energy compared with the standard practice group. The intervention group had a protein intake of 1.1-1.3 g/kg/day, while the standard group had protein intake of 1.0-1.1g/kg/day (Isenring, et al, 2007). The intensive nutrition intervention using the ADA protocol resulted in an improved dietary intake and improved nutritional outcomes and quality of life.

Van den berg, et al (2010) conducted a study to compare the use of dietary counseling versus standard nutritional care. Dietary counseling (IDC) included individual counseling with the patients on optimal energy and protein requirements. Standard care (SC) included usual nutrition education provided by an oncology nurse. The results showed that over time malnutrition decreased in the patients receiving the individual dietary counseling from a dietician and malnutrition increased in the standard care group. (Van den berg, et. al, 2010). Both groups maintained a 3% unintended weight loss 2 weeks after receiving treatment (Van den berg, et. al., 2010). However, two months after treatment, the IDC group started to gain weight, about a 1% gain and the SC group continued to lose weight (Van den berg, et. al., 2010). The results of this study indicate that individual dietary counseling contributes to a decrease in weight loss and thus malnutrition in the oncology population. All three studies in this group indicate dietary counseling is a key component to improving nutrition outcomes in oncology.

A systematic review and meta-analysis by Baldwin, Spiro, Ahern and Emery (2012) reviewed thirteen studies regarding nutritional interventions consisting of dietary consultation, oral supplements or combination of both. There were 1414 participants in the study and all had some form of cancer in various stages, types and treatments

(Baldwin, et al, 2012). The purpose was to determine the impact these interventions had on quality of life, weight and energy intake as well as nutritional status using oral nutritional interventions. Six of the studies compared dietary consultation with routine care, three studies compared the use of oral supplements with routine care and seven studies compared dietary consultation plus oral supplements with routine care (Baldwin, et al, 2012). The results indicated that the nutritional intervention did have a beneficial impact on quality of life in the form of emotional functioning, dyspnea, loss of appetite and overall quality of life (Baldwin, Spiro, Ahern, & Emery, 2011). However, it was not determined that the use of oral nutritional supplements had an impact on the energy intake and body weight of patients but there was a statistically significant correlation between the impact on quality of life and the use of oral supplements. The evidence presented was low to moderate quality and is a good indication that further studies need to be done in regards to nutritional interventions in the oncology population.

Parenteral versus Enteral Nutrition: Seguy, Duhamel, Rejeb, Gomez, Buhl, Bruno, et.al, (2012) conducted a prospective cohort study between 2001 and 2005 with patients undergoing stem cell transplant to determine if enteral nutrition improved early outcomes after transplant. The patients in the study either received enteral nutrition thru a nasogastric tube or parenteral/oral nutrition. While Zigler (2001) compared the use of standard glutamine free parenteral nutrition and glutamine supplemented parenteral nutrition in patients undergoing bone marrow transplant. Seguy, et al. (2012) found that the overall outcomes in the enteral group were better than the parenteral/oral nutrition group. The enteral group was found to have less infection (36%) compared to the other group at 59% and the overall survival in the first 100 days improved in the enteral group

(p=0.019) compared to the parenteral/oral nutrition group (p=0.047) (Seguy, et al., 2012). Ziegler (2001), however, found that the glutamine supplemented parenteral groups developed fewer infections (3 vs 4) and decreased length of hospital stay (29 vs 36) than the glutamine free parenteral groups. Seguy, et al. (2012) indicated that enteral nutrition was proven more effective than parenteral nutrition. However, because of the constant availability of central venous access, and the fact that enteral nutrition is typically given thru a nasogastric tube, parenteral nutrition has been the nutritional option of choice. This raises the question as to whether or not the parenteral groups in the Seguy study were glutamine supplemented or not. Both studies provide supporting evidence and benefits for the use of enteral and parenteral nutrition in the hematologic population.

There are benefits to using glutamine supplemented parenteral nutrition can reduce length of stay, decrease infection and also help to decrease other common side effects of bone marrow transplant such as mucositis, which can in turn affect nutritional status. However, it is difficult to determine which nutritional intervention is deemed better.

Food Caregivers: Lindman, Rasmussen and Andersen (2013) compared two cross sectional studies of patients with hematologic malignancies before and after the implementation of food caregivers. The clinical outcomes addressed included increased nutritional intake and knowledge. The participants were divided into two groups, before food caregivers and after food caregivers. Each group was given a questionnaire with two main topics: were the patients offered in between meals and did the inpatients receive dietary advice. The food caregivers went through a sixteen-hour course to help encourage and educate patients to increase their food intake. The role of the food

caregiver was to take a more proactive approach and role to encouraging patients to increase their nutritional intake as well as provide the patients with nutritional information. The role of the food caregiver prior to the training was the usual duties of a kitchen assistant (preparing meals and snacks, review and follow up on food plans and stock management). The results indicated that the before group had 41% informed about their nutritional needs and 61% in the after group were informed (Lindman, et al, 2013). The results also indicated that the use of food caregivers increased nutritional intake, the before group increased an average of 76% and the after group increased significantly with 93% (Lindman, et al, 2013).

Conclusion

Malnutrition is a problem in the oncology population, is frequently overlooked and affects many aspects of a patient's care and livelihood. Nurses are the front line caregivers for patients with cancer and must be knowledgeable regarding evidence based practices and new information regarding appropriate nutritional management and care. The implications for practice for both nursing and patient education include; early and consistent nutritional interventions, patient satisfaction with type and delivery method of nutritional interventions and the use of dietary consultation and oral supplements. The earlier and more consistent interventions are implemented will have a significant impact on nutritional status and help prevent further complications. Patient satisfaction with interventions is extremely important because if they are not happy with the intervention or view it as beneficial then compliance to the prescribed treatment will be low. Dietician consultation provides additional support and follow up for patients with nutritional issues. Patients may feel more satisfied with their care if dietician support is

provided and in turn may be more compliant. Individual dietary counseling can provide patients with the needed information, resources and support to maintain an adequate nutritional status. Oral nutritional supplements are an easy and effective method to improve or supplement nutrition. These supplements provide patients with needed nutrients when they are not able to eat a normal diet due to side effects of treatment or other complications.

Another implication to consider is specific to the hematologic oncology population. The articles that pertained to this population addressed the use of parenteral versus enteral nutrition, but only after transplant and many times after oral intake had been impeded for 2-3 days. While both interventions were proven effective, what effects, if any, would there be on the nutritional status of these patients if oral nutritional supplements were started earlier especially at diagnosis? Could potential nutritional issues and co morbidities be decreased or even avoided with earlier intervention? This is an area for further research that could potentially improve the nutritional outcomes of these patients after their transplant.

The Effectiveness of Early Nutrition Intervention on Nutritional Status in the Hematologic Oncology Population

Background

Patients receiving treatment for both solid tumors and hematologic malignancies experience numerous symptoms that greatly affect their nutritional status. Approximately, 66% of hospitalized patients with cancer develop protein-calorie malnutrition (Wilson, 2000). These symptoms can be so severe that the patient will become malnourished and unable to complete their oncology treatment. Impaired nutritional status in cancer patients has been shown to be a negative prognostic indicator of outcome (Trifilio, Helenowski, Giel, Gobel, Pi, Greenberg, et al., 2012). Malnutrition ranges from 20-80% in patients with cancer and has been associated with reduced response to treatment, survival and quality of life (Kubrak & Jensen, 2007). The evidence indicates that interventions given early and consistently have a positive impact on the nutritional status of oncology patients (Brown, Capra & Williams, 2008). The interventions listed in the evidence were nutrition counseling with a dietician, handouts/education about the importance of nutrition and oral supplements, availability of resources and patient satisfaction with resources. Although, these interventions were used mainly in the solid tumor population and have shown success, they could be beneficial with hematologic malignancies as well. Patients with a hematologic can and do experience many of the same symptoms as those with a solid tumor diagnosis. One difference is that the side effects in hematologic malignancies are sometimes more severe due to the high dose chemotherapy treatments. These interventions could be extremely beneficial with this population especially when implemented early such as at diagnosis.

A majority of the research in the area of nutrition has been in the medical oncology or solid tumor population. Malnutrition occurs frequently in patients with head/neck cancer, or gastrointestinal cancers (Isenring, Bauer, & Capra, 2007). These cancer diagnoses typically can require either radiation or chemotherapy or in some instances both. The side effects from these treatments can include; mucositis, taste changes, dysphagia and nausea/vomiting (Isenring, et al, 2007). Any one of these side effects can be potentially detrimental to a patient's appetite and place them at risk for malnutrition. There has been some research into the relationship between nutrition and the hematologic cancers, but the majority of research revolves around the post-transplant phase for patients requiring a bone marrow or stem cell transplant with little discussion regarding the implementation of interventions at diagnosis. Nutritional support in the hematologic population is frequently implemented after bone marrow transplant to prevent malnutrition (Muscaritoli, Grieco, Capria, Iori, & Fanelli, 2002). Patients with a hematologic diagnosis can and do experience many of the same symptoms as those with a solid tumor diagnosis.

Patients with hematologic cancer are generally in good nutritional health at diagnosis (Lindman, Rasmussen & Andersen, 2013). The treatments for this population include high dose chemotherapy, radiation and in many cases bone marrow or stem cell transplant. A patient may receive one or a combination of the treatment options for their cancer. Nutrition is frequently overlooked and not addressed until after chemotherapy has started or even until after a bone marrow or stem cell transplant. The high dose chemotherapy intensifies the side effects they experience compared to their counterparts with a solid tumor diagnosis. During the course of treatment, these patients are prone to

problems with eating, anorexia, weight loss and a deteriorating nutritional status (Lindman, et, al., 2013). Chemotherapy attacks cancer cells as well as normal cells especially those in the GI tract and mucosa. This in turn can inhibit a patient's ability to eat due to the mucositis and inability to absorb nutrients. They become extremely fatigued, immuno-compromised and are at a high risk for mucositis as well as pain. All of these combined with the alteration in their taste makes it virtually impossible for the patients to maintain an adequate nutrition level. Therefore, symptom management is just as important in this population as in the solid tumor population. Without proper symptom management, these patients can be at a higher risk for other complications such as infection. They are also less likely to be able to tolerate a transplant if indicated.

When nutrition is addressed, the typical intervention(s) chosen include total parenteral nutrition or enteral nutrition because the patient is unable to tolerate oral intake. Cederholm, Eriksson, & Palmblad, (2002) indicated in their study that total parenteral nutrition was typically started when oral intake was impeded for two to threedays in patients who were receiving chemotherapy for remission of leukemia. Hung, Bauer, Horsley & Isenring (2013) conducted a study in the stem cell transplant population and found that nutrition interventions were provided at 100 days' post-transplant and not prior to transplant. Nutrition is a key component during the early phases of treatment and beyond for hematologic cancers. There is an obvious gap in the literature regarding the effects of early interventions and their impact on nutritional status in this population. Another gap in the literature is that most of the evidence discussed the hematologic malignancies that required a bone marrow or stem cell transplant. There were few articles related to the hematologic malignancies that only require high dose

chemotherapy for treatment. It is equally important to look at patients receiving all different treatments for hematologic malignancies as they can experience the same detrimental effects to their nutrition. The interventions recommended to improve nutrition for the hematologic population are parenteral and enteral nutrition but only after they have received high dose chemotherapy and those that have received their bone or stem cell transplant (Ziegler, 2001).

This project will focus on providing early nutritional interventions in the form of education regarding the importance of nutrition as well as proper symptom management. Cancer treatments can cause many severe symptoms and if not managed appropriately can in turn affect nutrition. Patients may not understand the importance of nutrition and symptom management without the proper resources.

Objectives

There is very little research for the hematologic oncology population and nutrition at diagnosis and at the beginning of treatment. The objective of the project is to determine the effectiveness of a nutritional intervention on the nutritional status and knowledge of oncology patients with a hematologic diagnosis. Nutritional status will be assessed using the Malnutrition Screening Tool (MST) and a score will be assigned to determine nutrition risk. Nutritional status will be defined as not at risk (MST score of 0 or 1) or at risk (MST score ≥2) (Wu, Courtney, Shortridge-Baggett, Finlayson & Isenring, 2012). The MST has been validated in the literature for use in the oncology population to assess nutritional status. The question that will guide the evaluation of the intervention in terms of process, outcome and impact is:

a. Does an increase in patient knowledge and an early nutrition education intervention within 24 hours of admission have an impact on the nutritional knowledge and status of patients with a hematologic oncology diagnosis?

Methods

The quasi-experimental feasibility study used a pre and posttest design to assess the impact of a nutritional intervention on the level of nutritional knowledge and the nutritional status of hematology patients. The nutrition pre and posttest was used to evaluate the nutrition knowledge of the patients before and after the nutrition intervention. The nutrition intervention consisted of three educational visits by the clinical nurse specialist. The aim of the study was to determine if the focused nutritional intervention had an effect on the level of nutrition knowledge and nutritional status of patients with a hematologic cancer.

The study sample was a defined population of patients, aged 18-85 admitted to the inpatient oncology unit at a community hospital in Louisville, KY. The hospital is one of four hospitals in a system in Louisville, KY. The facility offers a wide range of services and has a designated hematology/oncology unit as well as an outpatient oncology infusion center. The oncology unit is a 33-bed unit in which patients have an extended length of stay and receive high dose chemotherapy either to prepare them for a bone marrow or stem cell transplant or to cure the cancer diagnosis. Historically, there have not been any patients over the age of 85 or under the age of 18 that have received treatment for their cancer diagnosis on the oncology unit. All patients who met the inclusion criteria were recruited and enrolled in the study from September 2015 thru November 2015. The original sample size was to be 50 consecutive patients, however,

due to time constraints and low census on the unit, only a sample size of 16 patients was obtained. After enrollment, one patient declined to participate in the intervention and was withdrawn from the study. Inclusion criteria for the study included a hematologic cancer diagnosis, able to speak and write in English and either currently undergoing cancer treatment or will begin cancer treatment during their hospitalization. Patients without a hematologic cancer diagnosis, under the age of 18, or unable to provide informed consent were excluded from the study.

The APRN provider referred patients, within 24 hours of hospital admission, to the study based on diagnosis and their assessment. A research assistant then provided information on the study to the referred patients and obtained informed consent for those willing to participate. The informed consent discussion took place in the participant's hospital room and the study was explained in full detail including risk/benefits and participant's rights as well as ensuring all questions had been answered. The research assistant then determined eligibility and any patients that did not meet eligibility requirements were informed they were not eligible to enroll. After informed consent the research assistant then administered the pre nutritional knowledge evaluation and stayed with the study participant while they filled out nutrition evaluation to answer questions and then collected forms when completed. A study number was assigned to each patient but no identifying information was placed on the nutrition evaluation. The primary investigator collected all informed consents and nutrition evaluation forms and kept in a locked filing cabinet in a locked office.

Once participants were determined eligible, informed consent obtained and the pre-nutritional knowledge evaluation had been administered, the designed intervention

was provided by the primary investigator, who is a trained Oncology Clinical Nurse Specialist. The intervention consisted of an initial nutrition assessment by the PI, and then three 15-minute educational visits by the PI to discuss nutrition and symptom management. The symptoms discussed include nausea/vomiting, mucositis, taste alterations and pain. Any one of these side effects can be potentially detrimental to a patient's appetite and place them at risk for malnutrition (Isenring, et al., 2007). At the end of each visit, the patient received educational materials and was asked to teach back at least 2 pieces of information they retained from the visit. Patients were enrolled in the study for approximately 7 days to 6 weeks based on hospital length of stay. Participants continued to receive the standard medical therapy of a dietician consult and recommendations during their hospitalization as directed by the healthcare provider.

During the first visit, the PI, conducted a nutrition assessment. The PI provided education and materials on nutrition, good food choices, and oral supplements. The participants received the Eating Hints packet printed from the National Cancer Institute.

During the second visit, the PI discussed methods to manage symptoms, the importance of taking prescribed medications and oral care. The participants received handouts on the following symptom management topics: nausea/vomiting, mucositis, taste alterations and pain.

The third visit was an opportunity for the reinforcement and review of the previously discussed topics and allow the patients to ask any new questions they might have. On the day of hospital discharge, or closest time to discharge, the participants were

given a posttest of their knowledge regarding nutrition and the benefits of the resources provided.

Data Analysis

Descriptive analysis was used to describe the demographics of the patient population (age, gender, race/ethnicity and type of cancer). Means with standard deviation and paired sample t tests were used to assess changes in patient knowledge between pre and post intervention time periods. Means with standard deviation and paired sample t tests were used to compare changes in the admission and discharge protein and albumin levels as well as BMI.

Data was collected from the electronic medical record as well the pre and post-test nutrition assessments. The pre and post nutritional knowledge evaluation for patient knowledge regarding nutrition had been developed by the research team, as there were no suitable evaluation tools found in the literature. The assessment tool has 11 questions regarding nutrition, oral supplements, good food choices and the importance of nutrition during cancer. The responses are based on a 4-point Likert scale that ranges from "not at all important" to "very important". A summary score ranging from 0-33 was computed with higher scores indicating higher patient knowledge. Expert oncology practitioners reviewed the assessment tool to ensure that it captures the essence of what patients with cancer should know about nutrition. The practitioners consisted of two oncology certified dieticians and two oncology certified advanced practice registered nurses.

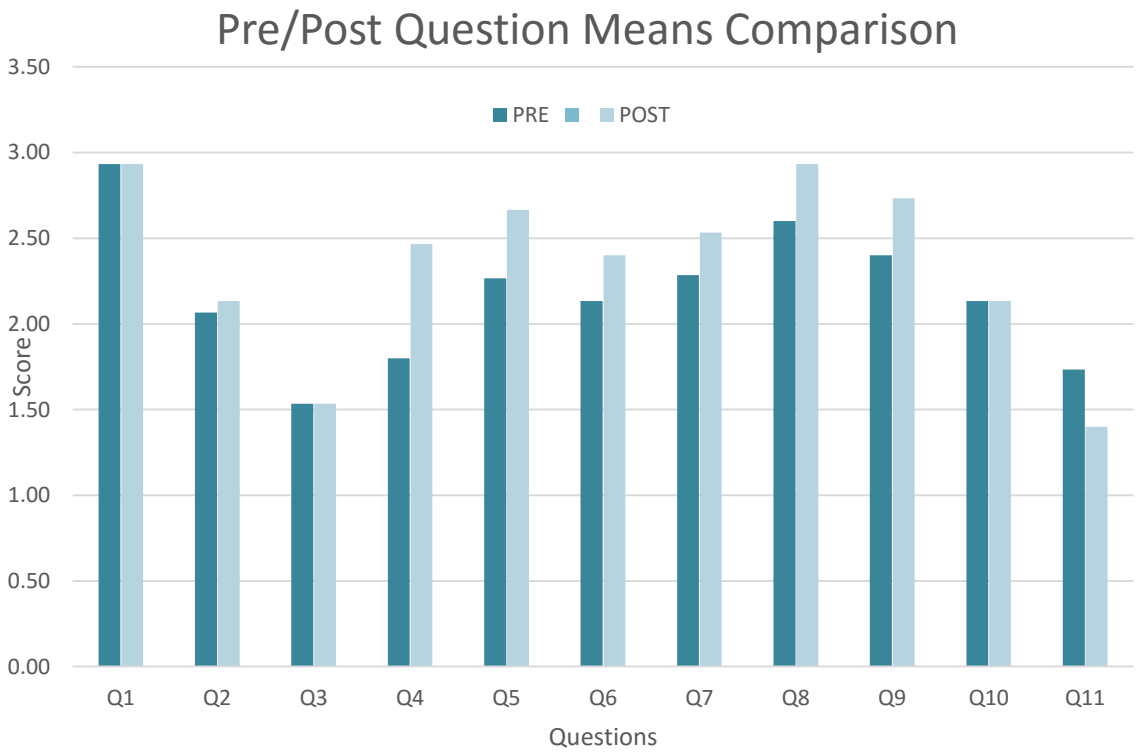
Results

The gender of patients was fairly even between females (53.3%) and males (46.7%) and the majority were white (86.7%) with an average age of 54.6 years (STD ±9.6). The type of cancer diagnosis was also evenly distributed between leukemia (46.7%) and lymphoma (53.3%) with no cases of myeloma. The admission MST score showed that only 2 of the 15 participants were considered at risk for malnutrition with a MST score >/=2. Of the 15 participants, only 2 had a MST screening completed at discharge. Therefore, it was not possible to compare the admission/discharge malnutrition levels of the patients. The average length of stay for the patients was 6.87 days.

The mean of the pre knowledge evaluation was 23.73 (STD ±3.73) and post knowledge evaluation was 25.86 (STD ±3.06) with a p value = 0.026 which is considered statistically significant for increase in patient nutritional knowledge. Knowledge evaluation questions 4 and 5 referred to how familiar patients were with ways to improve nutritional status and how willing would the patient be to make changes in their diet during cancer diagnosis and treatment respectively. Both questions had a significant increase post intervention which indicates that patients are not only more familiar with ways to improve their nutrition but that they are also willing to make the necessary changes. Interestingly, question 11 refers to the frequency of caffeinated beverages consumed by the patients. There was a decrease in the frequency amount at post intervention. Though patients did have access to caffeinated beverages while in the hospital, the results could indicate a willingness to change behavior in order to improve

nutritional status. Figure 1 compares the pre and post mean scores for each question on the knowledge evaluation.

Figure 1 – Pre/Post Question Means Comparison



Protein and albumin levels are useful in the identification of patients at risk for malnutrition. In cancer, especially with chemotherapy treatments, the inflammatory process in the body is increased which leads to high protein catabolism. Lower albumin levels are also typically seen with a malnourished state. The normal range for protein and albumin levels are 6.3-8.2 gm/dl and 3.5-5.0 g/dl respectively. The mean protein level at admission and discharge was 6.66 (STD ±0.69) and 6.06 (STD ±0.60), while the mean albumin level was 3.68 (STD ±0.39) and 3.24 (STD ±0.32). There was a significant decrease in both protein and albumin levels which would indicate that patients were at risk for malnutrition and would most likely require some type of nutritional intervention

as well as evaluation and follow up after discharge. It is difficult to definitively conclude that the nutrition educational intervention had a positive impact on nutritional status. The short time frame that patient were followed is another factor that makes it difficult to determine if the intervention truly impacted the levels. Due to the fact that there could have been other factors impeding nutrition during the hospital stay and more long term follow up is needed to determine the effect of the education on nutritional status.

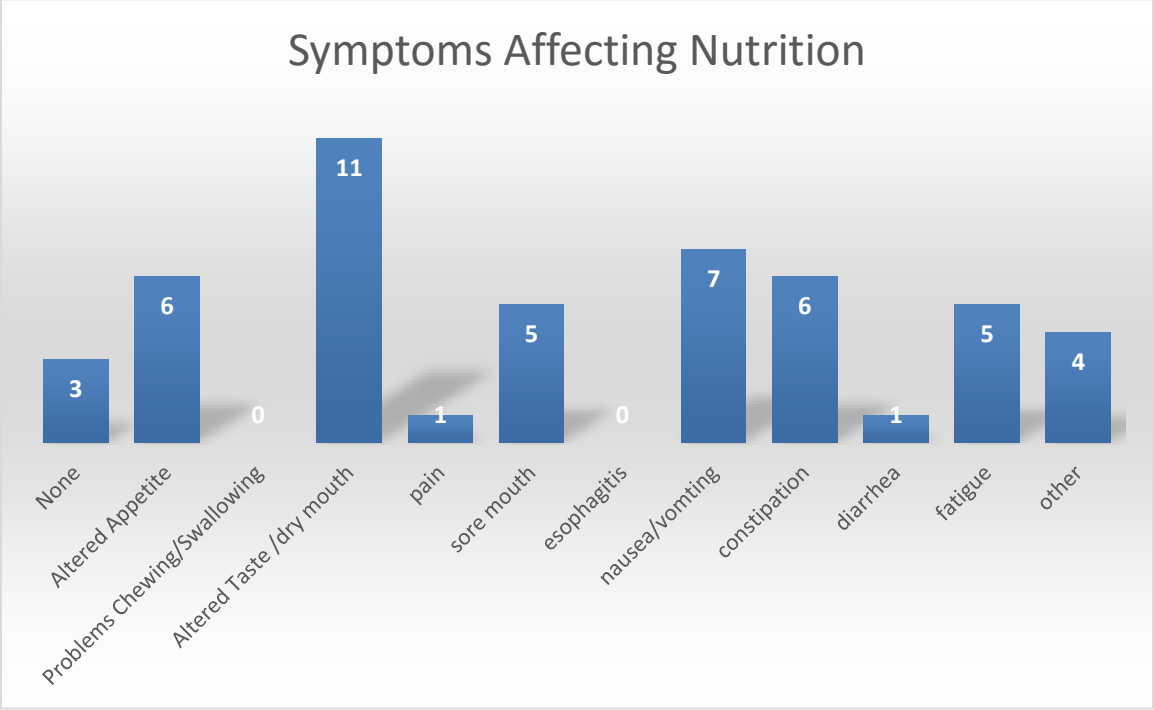
BMI was also to evaluate nutritional status because individuals with a normal BMI or even high BMI can still be at risk for malnutrition. The American Cancer Society defines the BMI range as the following; underweight <18.5, normal 18.5-24.9, overweight 25-29.9 and obese >30 (www.cancer.org). Individuals with a known cancer diagnosis have a significantly reduced survival compared to those with adequate or normal BMI (Chaves, Boleo-Tome, Monteiro-Grillo, Camilo & Ravasco, 2010). Individuals with cancer are more likely to have depleted muscle mass even with a normal BMI and especially with an overweight or obese BMI which can lead to poor performance status and decreased survival (Chaves et., al. 2010). The mean BMI at admission and discharge was 30.25 (STD ±7.59) and 30.80 (STD ±7.37). A BMI of 30 or more is considered obese, which indicates these patients are at risk for malnutrition. However, due to the short timeframe that patients were followed, you would not see a drastic change in the BMI. Therefore, it is difficult to interpret the exact impact, if any, that intervention had on BMI.

The data for percentage of meals eaten, proper food choices and oral nutritional supplement use were unable to be collected due to various contributing factors that included incomplete documentation and breakdown in dietary menu process. The initial

agreed process with dietary for collecting the proper food choice menus was unsuccessful due to conflicting times for data collection with the PI/research assistant and there was not a consistent dietary individual for each meal to collect the meal information. The percentage of meals eaten and oral nutritional supplement use could not be collected due to incomplete and inconsistent documentation by the nursing staff.

Additional results worthy of mentioning were one of the components of the nutrition assessment conducted by the PI that addressed the symptoms experienced by the patient that would affect nutrition. There were 12 evidence based symptom options that can have an impact on an individual's nutritional status. Of the 12 options, altered taste, nausea/vomiting and altered appetite were the most common symptoms described by the patient's that affected their nutrition. This is reflective of what the evidence states as the most common symptoms affecting a patient's nutritional status. Pain and sore mouth or mucositis were other highly common symptoms listed in the literature as well. Figure 2 describes the symptoms and the frequency of each reported by the patients.

Figure 2 – Symptoms Affecting Nutrition



Discussion

The current study indicates that this type of nutritional educational intervention is feasible in an inpatient oncology population to help improve nutritional knowledge and potentially nutritional status. The author found partial support for the effectiveness of the intervention in regards to an increase in nutritional knowledge pre and post intervention. There was a statistically significant increase in patient knowledge, but it is difficult to determine if the intervention was clinically significant. The lack of data collection due to incomplete documentation makes it difficult to ascertain the clinical significance of this intervention. It is important to note, however, that not only are patients familiar with ways to improve their nutrition but that they are willing to make the necessary changes to improve and maintain good nutritional status during cancer diagnosis and treatment. The protein and albumin levels had a significant decrease at discharge which would indicate

that the intervention was not impactful on the nutritional status. However, because other data components such as proper food choices and percentage of meals eaten could not be collected, it is difficult to make a definitive conclusion about the outcome. Also, it is highly probable that in order to determine the effect, long term follow up after discharge would be necessary. The average BMI for patients in the study was 30 which indicates obesity. A higher BMI places cancer patients at a higher risk for other comorbidities and decreased survival compared to their adequate weight counter parts. These patients are also at risk for depleted muscle mass and other nutritional deficiencies. Again, in order to determine the effect on the BMI, long term follow up after discharge would be necessary. In future studies, the BMI should be used more as a descriptive statistic to describe the sample.

Despite the positive results, there were several limitations to this study. There was a small sample size and time constraints and low census on the unit made it difficult to achieve the original sample of 50. Some of the original data to be collected to assess nutritional status was the percentage of meals eaten, proper food choices and the use of oral nutritional supplements. However, this data could not be collected due to inadequate or incomplete documentation in the electronic medical record. The intake for liquids was documented but there were no indicators as to whether it was an oral supplement or other beverage. Plus, many patients who were aware of oral supplements and actually used them at home, did not have any ordered during their hospital stay. Proper food choices were a key piece of data to determine whether the education was successful. However, due to a break down in the initial process for collecting the information, this data was not able to be collected. In future studies, a more defined study protocol with defined data

measurements is necessary to ensure successful data collection. Another limitation was that there was no follow up after discharge to determine whether the intervention had a long term affect. Also, there was no nutrition assessments completed by the nurses using the MST at discharge or if the patient had a length of stay greater than 7 days. This information would have proved useful to determine if patients were at risk for malnutrition and to provide the appropriate referrals/resources. In future studies, there should be some follow up after discharge to determine if further education or assistance is needed to assist patients in maintaining adequate nutritional status.

Implications for Practice

This intervention is feasible in this population and the intervention could and should be provided by an APRN with reinforcement provided by the nursing staff. It is difficult to make recommendations for practice change due to inadequate data collection from incomplete documentation. It is not possible to determine the effectiveness of the intervention in this project. However, several observations can be made regarding practice. Early and consistent assessment and interventions should be provided for oncology patients regarding nutrition by all providers including the APRN, Dietician and RN. Assessment and intervention are necessary after discharge to ensure that patients have retained but are also still utilizing the information they gained while in the hospital. There needs to be more emphasis placed by the nurse on nutrition in the oncology population. This is evidenced by the lack of documentation in the electronic medical record. Education is needed to increase the RN's knowledge of nutrition and its importance during cancer treatment. If patients are using oral supplements, it needs to be accurately identified in the documentation. Also, patients should be provided with the

resources such as oral supplements to improve their nutrition. Nursing and/or dieticians should have the capabilities through standing order sets to appropriately order oral nutritional supplements for those patients at risk for malnutrition. These are all areas that the advanced practice nurse can impact by implementing practice/policy changes.

This study should be repeated but with a more defined protocol and defined measurement points. There need to be further studies in the hematologic population to determine the exact effect that early nutrition educational interventions can have on nutritional status after transplant and/or cure. Other studies of interest would include looking at the patient satisfaction of the education materials provided and if they found them useful. Some field notes that were collected during the educational sessions with the patients revealed some interesting themes regarding why patients don't eat. Some of the themes included; everyone tells me to eat but does not offer suggestions of what or how, environmental factors such as the smell of the hospital or the smell of the food decreases appetite and including family members in the educational sessions. Another theme that came out during the education was that this type of information was not covered at diagnosis or during treatment. No one really discussed nutrition and that many had not seen or even knew about the outpatient dietician that was available to them. All felt that this information would have been very helpful at the very beginning and would definitely be useful as they moved into the transplant phase of their treatment. Many of these types of qualitative studies have been conducted in the solid tumor population but the research is sparse in the hematologic population.

In conclusion, nutrition is an important component of oncology patient care. Malnutrition can greatly impact the outcomes of patients with cancer. The educational

intervention is feasible in this population and patients were very receptive to the education. The author plans to continue the current study until the original sample size of 50 is achieved. Then there are plans in the works to conduct some qualitative studies regarding the themes mentioned above to determine what effectiveness can be achieved in regards to nutrition management in the hematologic population. There is already a quality initiative being developed to provide early nutrition intervention for patients and to continue the care after discharge. The current initiative is in the approval process and will hopefully be fully implemented in early 2016.

Improving Oncology Nutrition Outcomes: Clinical Nurse Specialist led Quality Initiative

Background

Malnutrition can cause adverse effects on body function as well as clinical outcomes and can occur in patients with any BMI (www.malnutrition.com). Patients receiving treatment for both solid tumors and hematologic malignancies experience numerous symptoms that greatly affect their nutritional status. These symptoms can be so severe that the patient will become malnourished and unable to complete their oncology treatment. Impaired nutritional status in cancer patients has been shown to be a negative prognostic indicator of outcome (Trifilio, Helenowski, Giel, Gobel, Pi, Greenberg, et al., 2012). Malnutrition ranges from 20-80% in patients with cancer and has been associated with reduced response to treatment, survival and quality of life (Kubrak & Jensen, 2007). Other negative outcomes associated with malnutrition include pressure ulcers, infections, falls and readmissions (www.malnutrition.com). Nutritional interventions can improve quality of care and reduce costs by reducing avoidable readmissions, reducing average length of stay, decreasing incidence of pressure ulcers and overall complication such as infections (www.malnutrition.com). Malnutrition can occur in normal, overweight as well as obese cancer patients. A normal weight does not indicate that an individual is not at risk for malnutrition.

Approximately 50% of cancer patients have some form of nutritional deficit even before diagnosis (Halpern-Silveria, Susin, Borges, Paiva, Assuncao, & Gonzalez, 2010). Research has shown that a majority of cancer patients suffer from various nutritional deficits and up to 85% will experience some type of weight loss and malnutrition during treatment (Sauer & Voss, 2012). Weight loss, even as little as 5%, can have a significant

influence on the survival of cancer patients (DeWys, et al., 1980). Some of the causes of malnutrition can include decreased dietary intake, impaired nutrition digestion/absorption, increased dietary needs and an increased loss of nutrients. Early and consistent interventions can improve nutritional status, increase performance status and quality of life while decreasing the rate of complications and morbidity. Oral nutritional supplements are an easy and effective method to address the nutritional challenges faced by oncology patients. Oral nutritional supplements provided during hospitalization have demonstrated a 21% decrease in length of stay and 6.7% decrease in 30 day readmissions (Philipson, 2013). There have been many societies that have supported proactive nutritional interventions in cancer including the American College of Surgeons Commission on Cancer, Academy of Nutrition and Dietetics and the Association of Community Cancer Centers Cancer Program Guidelines.

Nutrition Quality Initiative

A multidisciplinary team led by the Oncology Clinical Nurse Specialist developed a nutrition protocol using oral nutritional supplements to address the nutritional deficiencies discovered on the oncology unit. The purpose of the protocol was to provide nurse driven nutritional interventions to improve nutrition assessment and management. The goals of our quality initiative were to close the gap between nutrition screening and intervention, embed the intervention into the existing workflow, ongoing audit of the process and to evaluate outcomes. The clinical nurse specialist discovered gaps in care regarding nutrition thru patient assessment and chart audits as well as discussions with nursing. Patients on the unit were experiencing significant weight loss while in the hospital, as well as decreased oral intake. Chart audits revealed that the nutrition

documentation by the staff was poor and did not portray a complete picture of the nutritional status of the patients. Oral nutritional supplements were options for interventions but were rarely used by both nurse and patient. A dietician would visit with patients at least once a week while in the hospital, but the recommendations were rarely carried out by the nursing staff or physicians. The other issue was the dietician could not place any orders for nutritional recommendations; a physician order was necessary. Upon interviewing and talking with the nursing staff, the clinical nurse specialist also discovered that nurses did not view nutrition as a top priority. The nursing staff would perform the nutrition assessment in the computer as indicated by the admission criteria. Other than that, nutrition was not readily addressed for the remainder of the hospital stay except by the dietician.

Oral nutritional supplements are an easy way to enhance nutrition especially while in the hospital. Evidence has shown that the use of oral nutritional supplements can reduce readmissions, pressure ulcers as well as the incidence of infection. After conducting a literature search regarding best practices with oral nutritional supplements, the team developed a nutrition protocol which includes a nurse driven nutrition standing order set, discharge instructions and policy. In addition, discharge instructions specific to the use of oral nutritional supplements were developed to encourage supplement use after discharge. The discharge instructions also included access to coupons and various resources to provide assistance with purchasing oral nutritional supplements. A policy was created to address the use of the order set to allow the dieticians the ability to order supplements as well.

The current tool used for nutrition screening is the Malnutrition Screening Tool (MST) and is completed upon admission to the hospital. This is a validated tool and provides a quick, straightforward evaluation of nutrition (Tappenden, Quatrara, Parkhurst, Malone, Fanjiang, & Ziegler, 2013). This is a convenient tool for providers to use in both the oncology and non-oncology settings. It takes less than 5 minutes to complete and is comprised of two simple questions pertaining to weight loss and appetite (Tappenden, et al, 2013). The nutrition order set would then be initiated if the patient met the criteria established for being at risk for malnutrition. If the patient has galactesemia or casein allergy, then no oral supplements are ordered and the dietician will address nutrition needs. The criteria include MST score 2 or greater, BMI <19, Braden score less than/equal to 18 and or skin breakdown/wounds present. If any of the criteria are present, the order set would be initiated by the nurse by choosing the appropriate nutritional supplement based on the patient's medical history. The oral supplement used by the facility is Ensure, so only those products are listed on the order set. The nurse would choose the appropriate supplement based on whether the patient is at risk for malnutrition and has a history of diabetes, renal disease or dialysis or none of the above mentioned conditions. The supplements are ordered one can twice a day along with the available flavors and the Ensure clear as an option for those patients that cannot tolerate the regular Ensure.

Discharge instructions were developed to address the needs of the patient at discharge. The instructions provided the patient with the information as to what oral nutritional supplement they had received while in the hospital and whether the physician recommended they continue on an outpatient basis. There was a hard stop created in the

discharge education process that would not allow the nurse to continue on until the oral nutritional supplement prescription was completed. The patient is also provided with a Nutrition Starter Kit at discharge that contains one sample of the appropriate Ensure product along with coupons for Ensure if they choose to continue using the product. The discharge instructions also include information with contact information for resources to obtain coupons for other oral nutritional supplements. The team did not want to endorse one particular brand of supplement and understood that some may prefer another brand.

The policy was developed to guide the nutrition program and allow the supplements to be initiated by any provider, physician, nurse or dietician. The policy states guidance for initiating the supplements appropriately as well as discontinuing the supplements as the patient's condition warrants or if the patient does not consistently consume the supplement. The policy also gives the provider, physician, nurse, and/or dietician, the ability to change the frequency of supplements based on patient condition and request. This was a vitally important component to the program, as the nurse and dietician could not readily make any changes and required a physician order.

Physician champions played a key role in this initiative as they were asked to review the order set and provide feedback. All were very eager to participate and felt that the initiative was extremely important. They all agreed that nutrition was not something they felt comfortable addressing and relied heavily upon the expertise of the dietician. They also admitted that the dietician's notes were not always reviewed due to the difficulty of navigating the electronic medical record. These factors attributed to overwhelming support from the physicians. Other collaborative efforts by the team included working with the outpatient oncology clinic as well as the inpatient oncology

unit to provide education to the patients. A Summer Smoothie Beach Party was held with samples of healthy smoothies made from Ensure. The purpose was to expose the patients and staff to the benefits of using oral nutritional supplements as well as tips on creative recipes. The team used a decorated cart to transport samples of smoothies made from Ensure around to all the patients on the inpatient and outpatient oncology settings. Patients and staff were given the option to try one of two different smoothies. In addition, they were provided with a sample of the appropriate Ensure product, coupons and a recipe booklet. The team provided on the spot education about the benefits of oral nutritional supplements and the various recipes that were available.

Outcome

Currently, the nutrition protocol has received approval from the facility Medical Executive Committee and is under review by the System Quality Matrix and System Medical Executive Committee. The education component will also be sent for review by the System Education Matrix. Due to the importance of the project and the overwhelming response from both staff, patients, physicians and administration, the decision was made to implement the project system wide. The team is currently revising the education that will be rolled out to the entire system for nursing and dieticians. It will be vitally important that the nutrition knowledge of nurses is increased and that their awareness of the negative outcomes of malnutrition is increased as well. Patient education is also a key component of improving nutrition and nurses are in an excellent position to provide that education. Nutrition education packets have been created and will be provided to the patient upon admission and continued discussion will occur throughout the hospital stay. The team is continuing the work with the outpatient

settings by collaborating with the oncology dieticians to develop an easy process to guarantee appropriate follow up after discharge. During the process of developing the protocol, the team engaged the nursing staff and dieticians. The feedback has been extremely positive and both groups feel that the order set will not only improve nutrition outcomes for the patients, but make it easier for nursing and dieticians to provide this very simple nutrition intervention. In addition to the protocol and education, the team is working with dietary services to provide a space on the unit for the oral nutritional supplements to be stocked. The current process is that these items are kept in the dietary department and only delivered to the unit when ordered. The supplements are not kept in the refrigerator and are usually warm when delivered to the patient. This inhibits the use because warm supplements are not very pleasing to an oncology patient already experiencing numerous symptoms. The benefits of having supplements stocked on the unit include easy access by the nurse, allow the supplements to be chilled and to achieve better patient compliance. There are many steps to the approval process but the project should be in full implementation by January 2016 with education provided in December 2015. There will be ongoing audits of the process and changes will be made as deemed necessary. An evaluation of patient outcomes regarding nutrition will also be completed to determine if the initiative was successful and reports will be provided to the Quality department.

Conclusion

Malnutrition is an overwhelming problem in oncology due to various factors and frequently overlooked and not addressed appropriately. This can be due to many factors such as lack of knowledge/understanding or lack of available resources. Despite the fact

the process has not been fully implemented, there is already a heightened awareness by the staff, dieticians and physicians. From the work that has been done, the nursing staff on the oncology unit are making a more concentrated effort to address nutrition issues with their patients and consult the oncology clinical nurse specialist. There is a more open line of communication between the outpatient oncology dieticians and the oncology clinical nurse specialist and there has been improvement in the continuity of care. Oral nutritional supplements are an easy but effective way to enhance or supplement nutrition for those patients who are at risk. It is a simple method to help decrease readmissions, infections and other health concerns for patients.

Implications for Practice

There are many implications for practice regarding malnutrition in the oncology population and there is continual work that needs to be done to ensure the adequate nutritional status of these patients. Three main implications include increased knowledge/education for both patient and nurse, improve continuity of care and improve nutritional outcomes for oncology patients. Nurses need to be aware of the importance that nutrition plays in the care of the oncology patient. Nutrition can impact many aspects of the patient's health and determine whether or not they can receive or even continue their oncology treatment. Nutrition assessment and management should be an ongoing process the same as symptom management or providing chemotherapy infusions. Nurses need to provide education to their patients regarding the importance of nutrition and the various options available to enhance nutrition, particularly oral nutritional supplements. They need to be aware of the importance of nutrition and the role that oral nutritional supplements can play in improving their health. Patients need to

be provided with education and interventions that they can be satisfied with to ensure compliance to the prescribed treatment plan. Continuity of care is vitally important and should continue even after discharge. Many times, patients receive an enormous amount of information at discharge but never use it once they get home. Nurses need to ensure that patients understand the discharge information given to them and are aware of the resources available.

Continuing nutrition counseling after discharge is equally important for oncology, patients should be followed by an oncology dietician in the outpatient setting. Consults to the outpatient dietician are equally as important as the follow up appointments with the oncology provider. There should be ongoing efforts between the inpatient and outpatient settings to improve communication and collaboration when dealing with nutrition initiatives. Improving nutritional outcomes for oncology patients are necessary to prevent readmissions, development of pressure ulcers, infections, inability to continue with treatment or developing other health problems. Nurses, dieticians and physicians should constantly be evaluating their practice regarding the nutritional health of their patients. As healthcare providers, continual assessment and review need to occur to guarantee that if patients are readmitted, develop infections or other comorbidities, that it was not due to malnutrition.

Practice Inquiry Project Report Conclusion

In conclusion, key interventions were identified in regards to the care of nutrition in the oncology patient from the literature. These interventions included providing early and consistent interventions, individual dietary counseling, nutrition handouts/pamphlets but at the same time ensuring that the patient was satisfied with the material and delivery method. This satisfaction would ensure compliance to any prescribed nutritional therapy. Nutritional status should be monitored continually to assess for changes. It was also evident in the literature that most of the recommendations were geared toward the solid tumor population, but very few discussed the hematologic population.

The practice inquiry project focused the nutritional intervention in the hematologic population. The nutrition intervention provided patients with a nutrition packet and individual dietary counseling on many different areas of nutrition. The study provided an opportunity to determine what the knowledge level of nutrition was prior to and after the intervention, something that has not been discussed in the literature. It is important to know what a patient knows about nutrition so that the interventions can be geared toward their needs. The results showed an increase in patient knowledge statistically but clinical significance is difficult to determine due to inadequate data collection. Many of the participants were pleased with the nutritional packets and expressed the desire to have had the information from the very beginning. Due to the small sample size and limitations of the study, it important to continue the study until the goal sample size is reached. The study should be repeated but with a more defined study protocol and defined measurement points. Then data analysis will determine any statistical significance of the nutritional intervention provided and can guide further

practice changes. The quality nutrition initiative focused on the nurse caring for the patients and the gaps in care regarding nutrition assessment and intervention. The outcome of the initiative will allow nurses to drive the care nutritionally for their oncology patients. Nutritional interventions will be provided earlier and more consistently and there will be continual assessment of the patient's nutritional status. Nurses will have an increased knowledge of the importance of nutrition and the role it plays in the oncology patient outcomes.

The impact of the practice inquiry project and quality initiative will be the driving force for practice change. The implementation of the initiative will improve quality patient outcomes while reducing hospital readmissions as well as healthcare costs.

Appendix A

Nutrition Knowledge Evaluation Tool

1. How important is proper nutrition during cancer diagnosis and treatment?
    - Not at All Important
    - Somewhat Important
    - Important
    - Very Important

2. Do you know what healthy food choices reflect a well-balanced diet?
    - Not at All
    - Somewhat
    - Well
    - Very Well

3. To what extent have side effects from your cancer diagnosis and treatment affected your nutrition?
    - Not at All
    - Somewhat
    - Affected
    - Very Affected

4. Are you familiar with ways to improve your nutritional status if you are not eating a well-balanced diet during cancer diagnosis and treatment?
    - Not at All
    - Somewhat
    - Familiar
    - Very Familiar

5. Would you be willing to make changes in your diet to improve your nutritional status and overall health during cancer diagnosis and treatment?
    - Not at All
    - Somewhat Willing
    - Willing
    - Very Willing

6. Are you familiar with medical nutritional supplements such as Boost and Ensure?
    - Not at All
    - Somewhat Familiar
    - Familiar
    - Very Familiar

7. How effective do you think medical nutritional supplements such as Boost and Ensure can be in regards to improving your nutrition during cancer diagnosis and treatment?
    - Not at All Effective
    - Somewhat Effective
    - Effective
    - Very Effective

8. How important do you think nutrition education can be in regards to improving your nutritional status and overall health during cancer diagnosis and treatment?
    - Not at All Important
    - Somewhat Important
    - Important
    - Very Important

9. How effective do you think education on side effects can help you to improve your nutrition?
    - Not at All Effective
    - Somewhat Effective
    - Effective
    - Very Effective

10. How frequently do you drink water?
    - Not at All
    - Somewhat Frequently
    - Frequently
    - Very Frequently

11. How frequently do you drink caffeine beverages such as coke, Pepsi, tea or coffee?
    - Not at All
    - Somewhat Frequently
    - Frequently
    - Very Frequently

Appendix B

Data Collection Tool

Study ID #: _____

Age	Gender	Ethnicity	Cancer Diagnosis

Nutrition Knowledge Evaluation Score

Baseline: _____

Discharge: _____

Nutritional Status

Measure	Baseline	Discharge
Protein		
Albumin		
BMI		
Nursing Assessment Score		
MST score		

Nutritional Status

Day	Proper Food Choices (yes/no)	% Meals Eaten	Oral Supplements (yes/no)

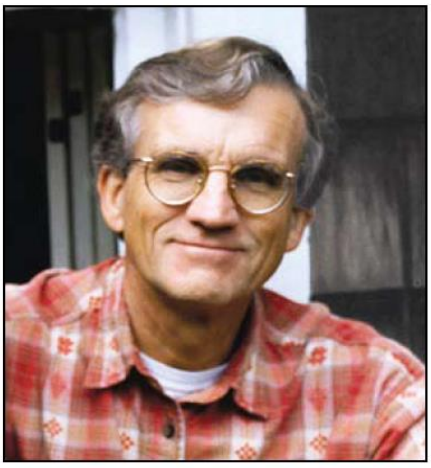
Appendix C

Nutrition Packet: National Cancer Institute Eating Hints Booklet and Symptom Management Handouts

National Cancer Institute

Managing Chemotherapy Side Effects

Pain



"I was worried about getting addicted to pain medicine. Then I talked with my doctor. She told me that **treating pain is an important part of good cancer treatment.** So now I take my pain medicine on time and am able to enjoy life more!"

Call the doctor or nurse if:

- **The pain isn't getting better or going away**
- **The pain comes on quickly**
- **The pain makes it hard to eat, sleep, work, or play**
- **You feel new pain**
- **The pain medicine is not working as fast or for as long as it used to**

It's important to treat pain.

If you find that you are in pain, don't put up with it. There are many medicines to help lower or get rid of pain. Talk with your doctor to learn about medicine that can help you. Ask what other things, like massage or acupuncture, could also help. Remember, being in less pain will help you feel stronger and better.

Give your doctor or nurse a list of all of the medicines you are taking.

Tips to get the most out of your pain medicine:

- Ask **how much** pain medicine to take. Take the right amount of medicine each time you are supposed to.
- Ask **when** to take the pain medicine. Take the pain medicine on time. If you take the pain medicine too late, it may not work as well.
- Tell your doctor or nurse if the pain does not go away after you take the medicine.
- Tell your doctor or nurse if you are in pain, but it's not yet time to take the pain medicine.
- Don't stop taking the pain medicine unless your doctor tells you to.
- Talk with your doctor, nurse, or social worker if you need help to pay for pain medicine.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

Appendix C

National Cancer Institute

Managing Chemotherapy Side Effects

Nausea and Vomiting

"I take medicine so I won't feel sick to my stomach or vomit. My doctor and I had to try a few different kinds of medicine before we found one that worked for me."

Call your doctor or nurse if the medicine is not working and you have nausea or vomiting.

What are nausea and vomiting?

Nausea is when you feel sick to your stomach, like you are going to throw up. Vomiting is when you throw up. You will most likely feel better on days you don't get chemotherapy.

Take these steps to feel better:

Take your anti-nausea medicine.

- Talk with your doctor or nurse to make sure you are taking your medicine the right way.
- It's very important to take your medicine—even on days you are feeling well.

Stay away from some foods.

- Eat less greasy, fried, salty, sweet, or spicy foods.
- If the smell of food bothers you, ask others to cook for you. Then let the food cool down before you eat it.

Have enough to eat and drink.

- Take small sips of water during the day, if you find it hard to drink a full glass at one time.
- Eat 5 or 6 small meals during the day, instead of 3 big meals.

Choose foods from the list on the other side of this sheet.

On days you get treatment:

- Deep breathing and meditation help some people to relax before treatment.
- Learn the best time for you to eat and drink. Some people feel better when they eat a little just before treatment. Others feel better when they have nothing to eat or drink before treatment.
- After treatment, wait at least 1 hour before you eat or drink.
- Acupuncture lowers nausea and/or vomiting in some people. Talk with your nurse to learn more about acupuncture and other ways to feel better during treatment.

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National Institutes of Health

Appendix C

National Cancer Institute

Managing Chemotherapy Side Effects

Mouth and Throat Changes

"My mouth felt sore. I let my nurse know right away. He told me about medicine that can help. He also showed me how to make a mouth rinse to use each day."

Call your doctor or nurse if you have:

- **Trouble eating or swallowing**
- **Painful spots or sores in your mouth**
- **Sores on your lips or in your mouth**

Tell your doctor or nurse if you have:

- Changes in taste or smell
- Dry mouth (little or no saliva)
- Pain when you eat hot or cold foods

Take these steps:

Clean your mouth with care.

- Brush your teeth and tongue after each meal and before you go to bed. Use a very soft toothbrush or cotton swabs.
- Use toothpaste or gel that has fluoride in it.
- Rinse your mouth with the baking soda, salt, and water mix in the box below.

Every 3 hours during the day, mix together:

- **1 cup warm water,**
- **1/4 teaspoon baking soda, and**
- **1/8 teaspoon salt.**

Take small sips and swish them around in your mouth. Then rinse with plain water.

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Appendix C

National Cancer Institute

Managing Chemotherapy Side Effects

Appetite Changes

"Many days I'm just not hungry. I find it easier to eat 5 small meals, instead of 3 big meals each day. My nurse told me about foods that can help me keep up my strength."

What are appetite changes?

Two common changes you may notice are feeling less hungry and finding that some foods may taste different.

- **Eat well to help your body stay strong.**
- **Let your doctor or nurse know if you lose weight.**

Try these tips to make eating easier:

Set meal times and routines.

Eat a little, even if you're not hungry.

- It may help to eat 5 or 6 small meals each day, instead of 3 large meals.
- Try new foods to keep up your interest in food.
- Eat with family or friends, or watch television while you eat.
- Choose foods that are high in calories or protein like those listed on the back of this sheet.
- Ask your doctor or nurse about seasonings that may help some foods taste better.
- If food tastes like metal, eat with plastic forks or spoons.

Be active.

Being active may help you feel more hungry.

- Take a short walk each day.
- Talk with your doctor or nurse about exercises that can help you.

Drink liquids.

Getting enough to drink is important, but don't fill up on liquids during meals.

- Drink milkshakes or soups that are easy to swallow.
- Keep track of how much you eat and drink each day. Then talk with your doctor or nurse to make sure you are eating and drinking enough.

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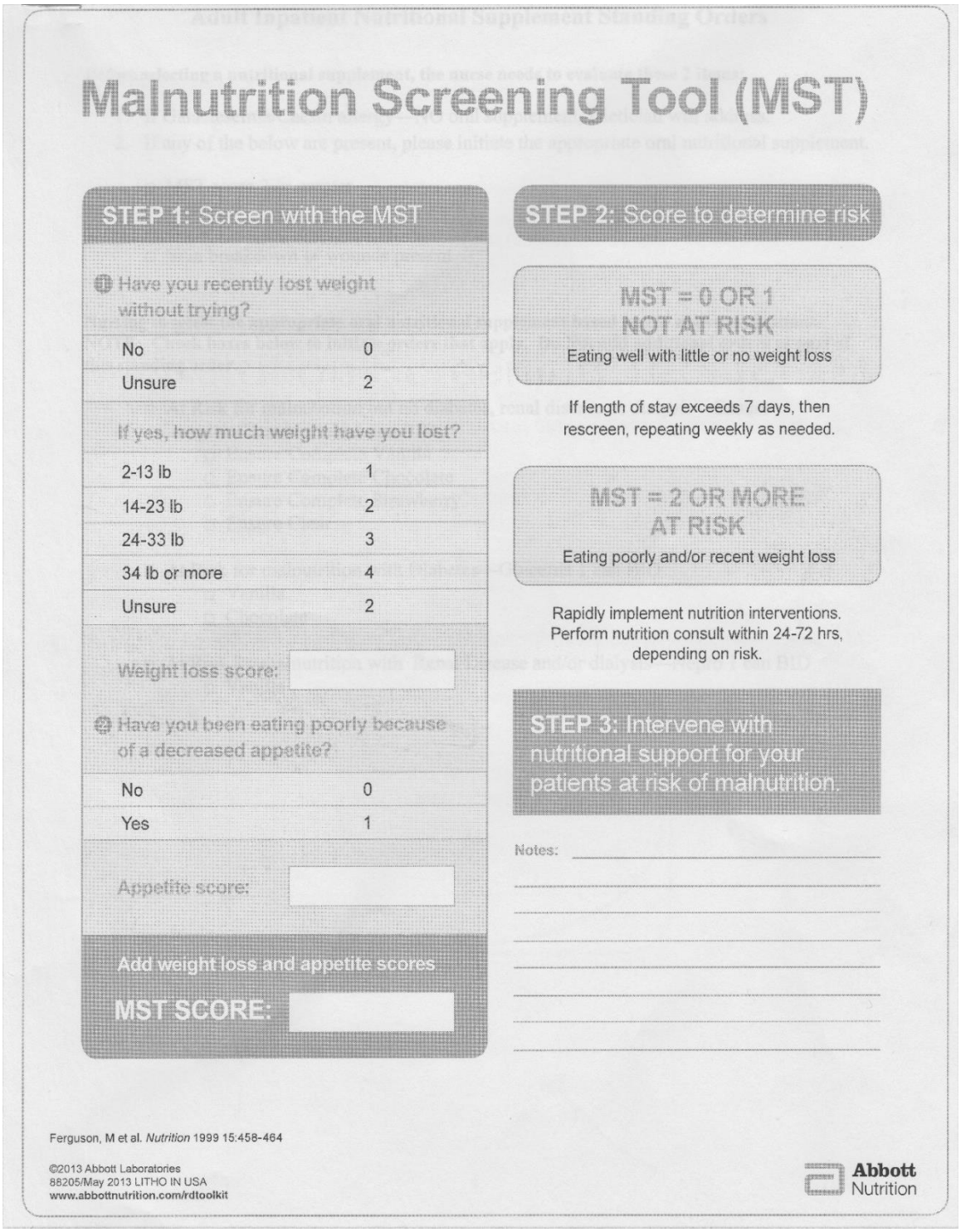
Appendix D

Malnutrition Screening Tool



Malnutrition Screening Tool (MST)

STEP 1: Screen with the MST

① Have you recently lost weight without trying?

No	0
Unsure	2

If yes, how much weight have you lost?

2-13 lb	1
14-23 lb	2
24-33 lb	3
34 lb or more	4
Unsure	2

Weight loss score: ____

② Have you been eating poorly because of a decreased appetite?

No	0
Yes	1

Appetite score: ____

Add weight loss and appetite scores

MST SCORE: ____

STEP 2: Score to determine risk

MST = 0 OR 1
NOT AT RISK
Eating well with little or no weight loss

If length of stay exceeds 7 days, then rescreen, repeating weekly as needed.

MST = 2 OR MORE
AT RISK
Eating poorly and/or recent weight loss

Rapidly implement nutrition interventions. Perform nutrition consult within 24-72 hrs, depending on risk.

STEP 3: Intervene with nutritional support for your patients at risk of malnutrition.

Notes: _____

Ferguson, M et al. *Nutrition* 1999 15:458-464

Abbott Nutrition

Appendix E

Nutrition Standing Order Set

Before selecting a nutritional supplement, the nurse needs to evaluate these 2 items:

1. If Galactesemia/Caesin allergy—NO oral supplement, Dietician will address.
2. If any of the below are present, consider the patient at risk for malnutrition and initiate the appropriate oral nutritional supplement.

    □ MST score 2 or greater
    □ BMI <19
    □ Braden less than/equal to 18
    □ Skin breakdown or wounds present

Nursing to select the appropriate oral nutritional supplement based on the above evaluations.
NOTE: Check boxes below to initiate orders that apply. Do Not add additional orders as part of this standing order.

□ At Risk for malnutrition but no diabetes, renal disease or dialysis—Ensure Complete/Ensure Clear 1 can BID.
    □ Ensure Complete Vanilla
    □ Ensure Complete Chocolate
    □ Ensure Complete Strawberry
    □ Ensure Clear

□ At Risk for malnutrition with Diabetes—Glucerna 1 can BID
    □ Vanilla
    □ Chocolate

□ At Risk for malnutrition with Renal Disease and/or dialysis—Nepro 1 can BID
    □ Vanilla

Appendix F

Nutrition Discharge Instructions

AVS Smart Text

.nutritiondc

1. **Nutrition to Heal and Recover!**

Nutrition plays a large role in recovery from recent illness and/or surgery.

Your illness may make it difficult for you to get the proper nutrition you need.

It is recommended that you try to eat 5-6 small meals throughout the day to help improve your nutrition unless you have been advised not to.

While you were in our care at the hospital, your doctor prescribed _____ .It is recommended that you continue this oral nutritional supplement, or a similar/generic product, at home.

You can drink your oral nutritional supplement ***with meals***, ***in-between meals***, ***and/or before bedtime***.

These supplements can be purchased at most local grocery stores, pharmacies, and chain super-stores.

If you have questions regarding your oral nutritional supplements, please call Kim Cooley, MSRD@502-629-3138.

PLACE ORAL NUTRITIONAL SUPPLEMENT COUPON HERE

Practice Inquiry Project Report References

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention. (n.d.). Retrieved November 15, 2015, from www.cancer.org.

Baldwin, C., Spiro, A., Ahern, R., & Emery, P. (2012). Oral nutritional interventions in malnourished patients with cancer: a systematic review and meta-analysis. *Journal of National Cancer Institute, 104*, 371-385.

Brown, L., Capra, S. & Williams, L. (2008). A best practice dietetic service for rural patients with cancer undergoing chemotherapy: a pilot of a pseudo-randomized controlled trial. *Nutrition & Dietetics*, 65, 175-180.

Cederholm, T., Eriksson, K., & Palmblad, J. (2002). Nutrition and acute leukemia in adults: Relation to remission rate and survival. *Haematologia, 32(4)*, 405-41

Chaves, M., Boleo-Tome, C. Monteiro-Grillo, I. Camilo, M., & Ravasco, P. (2010). The diversity of nutritional status in cancer: new insights. *The Oncologist*, 15, 523-530.

DeWys, W., Begg, C., Lavin, P., et al., (1980). Prognostic effect of weight loss prior to chemotherapy in cancer patients. *American Journal of Medicine*, 69, 491-497.

Ferguson, M., Capra, S., Bauer, J., & Banks, M. (1999). Development of a valid and reliable malnutrition screening tool for adult acute hospital patients. *Nutrition*, 15, 458-464.

Helpern-Silveira, D., Susin, L., Borges, L., Paiva, S., Assuncao, M., & Gonzalelz, M. (2010). Body weight and fat free mass changes in a cohort of patients receiving chemotherapy. *Supportive Care in Cancer*, 18, 617-625.

Hung, Y., Bauer, J., Horsley, P., & Isenring, E. (2013). Patient satisfaction with nutrition services amongst cancer patients treated with autologous stem cell transplantation: A comparison of usual and extended care. *Journal of Human Nutrition and Dietetics, 27(Suppl. 2),* 333-338.

Isenring, E., Capra, S., & Bauer, J. (2004). Patient satisfaction is rated higher by radiation oncology outpatients receiving nutrition intervention compare with usual care. *Journal of Human Nutrition and Dietetics*, *17*, 145-152.

Isenring, E., Cross, G., Kellett, E., & Koczwara, B. (2008). Preliminary results of patient satisfaction with nutrition handouts versus dietetic consultation in oncology outpatients receiving chemotherapy. *Nutrition & Dietetics, 65*, 10-15.

Isenring, E., Bauer, J., & Capra, S. (2007). Nutrition support using the American Dietetic Association medical nutrition therapy protocol for radiation oncology patients improves dietary intake compared with standard practice. *Journal of American Dietetic Association, 107*(3), 404-412.

Isenring, E., Cross, G., Kellett, E., Koczwara, B., & Daniels, L. (2010). Nutritional status and information needs of medical oncology patients receiving treatment at an Australian public hospital. *Nutrition and Cancer, 62*(2), 220-228.

Kubrak, C., & Jensen, L. (2007). Critical evaluation of nutrition screening tools recommended for oncology patients. *Cancer Nursing*, 30(5), E1-E6.

Lindman, A., Rasmussen, H., & Andersen, N., (2013). Food caregivers influence on nutritional intake among admitted hematological cancer patients—a prospective study. *European Journal of Oncology Nursing, 17,* 827-834.

Muscaritoli, M., Grieco, G., Capria, S., Iori, A. & Fanelli, F. (2002). Nutritional and metabolic support in patients undergoing bone marrow transplantation. *American Journal of Clinical Nutrition*, 75, 183-190.

Nourissat, A., Vasson, M., Merrouche, Y., Bouteloup, C., Goutte, M., Mille, D., et al. (2008). Relationship between nutritional status and quality of life in patients with cancer. *European Journal of Cancer, 44*, 1238-1242.

Philipson, T., Thornton Snider, J., Lakdawalla, D., Stryckman, B., & Goldman, D. (2013). Impact of oral nutritional supplementation in hospital outcomes. *American Journal of Managed Care,* 19, 121-128.

Seguy, D., Duhamel, Al, Rejeb, M., Gomez, E., Buhl, N., Bruno, B., et., al. (2012). Better outcome of patients undergoing enteral tube feeding after myeloablative conditioning for allogeneic stem cell transplantation. *Transplantation, 94(3),* 287-294.

The Prevalence of Malnutrition. (2014, February 1). Retrieved October 25, 2015, from www.malnutrition.com

Tappenden, K., Quatrara, B., Parkhurst, M., Malone, A., Fanjiang, G., & Ziegler, T. (2013). Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. *Journal of Parenteral and Enteral Nutrition,* 20(10), 1-16.

Trifilio, S., Helenowski, I., Giel, M., Gobel, B., Pi, J., Greenberg, D., & Mehta, J. (2012). Questioning the role of a neutropenic diet following hematopoietic stem cell transplantation. *Biology of Blood and Marrow Transplantation,* 18, 1385-1390.

Van den Berg, M., Rasmussen-Conrad, E., Wei, K., Lintz-Luidens, H., Kaanders, J., and Merkx, M. (2010). Comparison of the effect of individual dietary counselling and of standard nutritional care on weight loss in patients with head and neck cancer undergoing radiotherapy. *British Journal of Nutrition, 104*, 872-877

Wilson, R. (2000). Optimizing nutrition for patients with cancer. *Clinical Journal of Oncology Nursing*, *4*(1), 23-28.

Wu, M.L., Courtney, M., Shortridge-Baggett, L.M., Finlayson, K., & Isenrign, E. (2012). Validity of the malnutrition screening tool for older adults at high risk of hospital readmission. *Journal of Gerontological Nursin, 3(6),* 38-45.

Ziegler, T. R. (2001). Glutamine supplementation in cancer patients receiving bone marrow transplantation and high dose chemotherapy. *The Journal of Nutrition, 131,* 2578-2584.