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Cancer-Related Fatigue

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RUNNING HEAD: CANCER-RELATED FATIGUE

Cancer-Related Fatigue

Rebecca E. Bowman

Submitted as Partial Fulfillment for the Doctorate of Nursing Practice degree

Regis University

July 5, 2013

Copyright Page

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Abstract

Variables related to cancer-related fatigue were studied. Adults over the age of 18 who were actively undergoing cancer treatment in a rural, outpatient clinic were included in the study. The purpose of this project was to assess fatigue levels of patients who are undergoing cancer treatment. The Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F) questionnaire was administered to participants and their scores were used to compare variables significance to cancer-related fatigue. The significant variables included cancer-related pain, dementia, congestive heart failure, and anxiety. This study increased provider and patient awareness of variables that influence how cancer-related fatigue is experienced and the need for evaluation during treatment.

Executive Summary

Cancer-Related Fatigue

Problem

The National Cancer Institute (2011) estimated that 1,529,560 men and women (789,620 men and 739,940 women) would be diagnosed with cancer in 2010. According to Cheville (2009), of the one-half to one-third of Americans who develop cancer, over 90% will develop cancer-related fatigue (CRF) during or after their disease course. The PICO model was used to guide the research question. The problem was identified through the clinical experience of following cancer patients during and after treatment at an outpatient cancer clinic in Western Nebraska with no survivorship program.

Purpose

The purpose of this capstone project was to assess fatigue levels of patients who are undergoing cancer treatment by administering the Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F) questionnaire to evaluate and describe variables related to fatigue.

Goal

The overall goal of the capstone project was to provide information to the stakeholders and the outpatient cancer clinic regarding the impact of cancer-related fatigue and the necessity of a survivorship clinic to provide cancer patients with resources to have the best quality of life possible.

Objectives

The short-term objectives of the study were to assess fatigue levels in cancer patients and report variables associated with cancer-related fatigue.

Plan

The study was a quantitative-descriptive study. The FACIT-F questionnaire was used which is a subjective, 13 item questionnaire. The capstone project received Institutional Review Board approval from Regis University and from the outpatient cancer clinic and met exempt status.

Outcomes and Results

A goal of 15-25 participants was set and a sample size of 25 was obtained. Cancer-related fatigue affected respondents regardless of age, as the age range of the respondents was 34-81. There was a wide variety of cancers and chemotherapy regimens represented in the data with the most common cancers being colon, breast, and prostate cancer and the most common chemotherapies received were Carboplatin/Paclitaxel every three weeks, Cisplatin/VP-16, 5 Fluorouracil/Leucovorin/Avastin, Paclitaxel/Herceptin weekly, Docetaxel every three weeks, and Rituxan. The most common variables associated with cancer-related fatigue were anemia, hypertension, and diabetes. The average FACIT-F score was 20.12.

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Finally, I would like to thank God for things only he knows.

Table of Contents

I.	Preliminary Pages	
	a. Copyright Page.....	i
	b. Abstract.....	ii
	c. Executive Summary.....	iii
	d. Acknowledgements.....	iv
	e. Table of Contents.....	v-vi
	f. List of Tables.....	vii
	g. List of Appendices.....	viii
II.	Problem Recognition and Definition	
	a. Problem Statement and Purpose.....	1-2
	b. PICO.....	2
	c. Project Significance.....	3
	d. Theoretical Foundation.....	3-5
	e. Literature Selection.....	5-6
III.	Review of Evidence	
	a. Background	1-2
	b. Systematic Review of the Literature.....	30-65
IV.	Project Plan and Evaluation	
	a. Market Analysis.....	7
	b. Project Strengths, Weaknesses, Opportunities, Threats.....	7-8
	c. Need.....	8
	d. Stakeholders and Project Team.....	8-9

e.	Cost-Benefit Analysis.....	9-10
f.	Mission/Vision/Goals.....	10-13
g.	Logic Model.....	14
h.	Population.....	14
i.	Setting.....	15
j.	Protection of Human Rights.....	15-16
k.	Methodology/Instrumentation/Data Collection.....	16-17
l.	Timeframe/Budget.....	17-18
V.	Project Findings and Results.....	18-23
VI.	Limitations, Recommendations, and Implications for Change.....	23-25
VII.	References.....	27-29
VIII.	Appendices.....	30-75

List of Appendices

A. Review of Literature.....30-65

B. Logic Model.....66

C. Letter of Consent.....67

D. CITI Training Certificate.....68

E. Regional West Medical Center IRB Letter and Letter of Support.....69-70

F. Regis IRB Letter.....71

G. Functional Assessment of Chronic Illness-Therapy.....72

H. Capstone Spreadsheet.....73

I. Demographic Collection.....74

J. Tables/Figures.....75

List of Tables/Figures

1. SWOT Analysis for Capstone Project.....	75-76
2. Study Goals for Capstone Project.....	76
3. Timeline for Capstone Project.....	77
4. Budget for Capstone Project.....	77
5. Age of Respondents.....	78
6. Respondent's Cancer Diagnosis.....	78
7. Respondent's Stage of Diagnosis.....	79
8. Respondent's Chemotherapy Regimen.....	80
9. Functional Assessment of Chronic Illness-Therapy (FACIT-F) Scores.....	81
10. Variables Associated with Cancer-Related Fatigue.....	82

Cancer-Related Fatigue Background

The National Cancer Institute (2011) estimated that 1,529,560 men and women (789,620 men and 739,940 women) would be diagnosed with cancer in 2010. Oncology nurse practitioners have the opportunity to see cancer patients before, during, and after treatment. One of the common concerns heard from patients, regardless of diagnosis, is that they are fatigued.

According to Cheville (2009), of the one-half to one-third of Americans who develop cancer, over 90% will develop cancer-related fatigue (CRF) during or after their disease course. The fatigue can be severe enough that it can delay or stop treatment. A delay in chemotherapy or in reduced dosage results in a lower dosage per unit time or relative dose intensity (RDI). The continued decrease in dosage of chemotherapy leads to decreased opportunities to kill tumor cells and the smaller doses at inappropriate intervals can have an impact on long-term, disease-free, and overall survival (Lenhart, 2005). Oncology nurse practitioners help patients manage their symptoms and ensure that they can complete the treatment that will give them the best possible outcome(s). Cancer-related fatigue is a problem that plagues cancer patients and is the focus of this capstone project.

Problem Recognition and Definition

The National Comprehensive Cancer Network (NCCN) describes cancer-related fatigue as a subjective, persistent, and distressing sense of either a combination of physical, emotional, or cognitive tiredness not related to recent physical activity and interferes with a patient's normal function (Hilarius, Kloeg, van der Wall, Komen, Gundy, & Aaronson, 2011). Fatigue among patients undergoing cancer treatment is prevalent, disabling, and treatable (Cheville, Shen, Chang, & Basford, 2013). Although most cancer patients suffer with fatigue, it may not be included in a full assessment or treatment plan by cancer care providers. Patients are often

reluctant to talk to their provider about their fatigue as they feel the fatigue is part of the treatment and do not want to be perceived as complaining for fear of a change in the treatment plan (Cheville, 2009). Cancer-related fatigue is often underreported and undertreated. Realizing the effect that cancer-related fatigue has upon patients undergoing active cancer treatment is imperative to ensuring adequate treatment. Additionally, fatigue has a great impact long after the cancer is treated.

The Office of Cancer Survivorship (OCS) has identified areas that are priorities for cancer-survivorship research. The research includes the development of instruments and/or theories that encompass the needs and outcomes of cancer patients. The goal of cancer-related research supported by the OCS was to address the health and life of a cancer survivor at the acute diagnosis, during the treatment phase, and thereafter (NCI, 2012).

Purpose

The purpose was to assess fatigue levels of patients who were undergoing cancer treatment by administering the FACIT-F questionnaire to evaluate and describe variables related to fatigue.

PICO

The Population, Intervention, Comparison, Outcome (PICO) acronym was used by practitioners to form the practice question and facilitate the literature search. The PICO model guided the research question as stated.

Purpose- assess fatigue levels of patients undergoing cancer treatment.

Intervention- administration of the FACIT-F questionnaire

Comparison- there is no comparison group.

Outcome- to identify variables associated with cancer-related fatigue.

Problem Identification

The problem has been identified through the clinical experience of following cancer patients during and after treatment. The problem for cancer patients and for clinicians was the cancer-related fatigue that patients suffer during and/or after chemotherapy.

Project Significance

The Capstone project was imperative to the outpatient cancer clinic since there was an inevitable increase in cancer patients and subsequent treatment sequelae that needed to be addressed to enhance the patient's quality of life. The framework used was the concept of liminality. Liminality views cancer survivorship as a process cancer patients undergo to develop a new sense of self (Blows, Bird, Seymour, & Cox, 2012). Patients often think of cancer and treatment as a 'bump in the road' and expect that their lives will return to normal after they are done. The truth of the matter is that cancer patients' lives are never normal and they need help in emerging into their new roles as survivors and benefit from guidance in dealing with the limitations that have developed because of their cancer treatment (IOM, 2005). The previous way of treating fatigue was to encourage the patient to rest and reassuring the individual the fatigue would get better.

Theoretical Foundation

Imogene King's Theory of Goal Attainment assumes that the focus of nursing is to help individuals obtain, maintain, or regain health (Parker & Smith, 2010). The conceptual system is based upon three systems: personal, interpersonal, and social. From the conceptual system, King selected four concepts to develop her theory, which includes perception, communication, interaction, and transaction (Messmer, 2006). From the concepts, King developed her transaction process. The transaction process was designed to assist nurses in assessing, planning,

implementing, and evaluating nursing care (Messmer, 2006). The crucial element in the transaction process is mutual goal setting between the nurse and the patient. King theorized that when the nurse and patient are both engaged in setting goals, the goals will be achieved (Messmer, 2006). The transaction process begins with the nurse and the patient developing a perception that leads to judgment and an action producing a reaction followed by an interaction, resulting in a transaction (Parker & Smith, 2010). The communication continues to go through a feedback loop.

King's theory of goal attainment is applicable to cancer-related fatigue and treatment. The overall goal of King's theory was that patients would obtain, maintain, or regain their health through the process of mutual goal setting between the patient and the nurse with interventions aimed at the goals and reassessment to ensure the goals are met (Messmer, 2006). When a patient is being evaluated for CRF, the practitioner and the patient must decide upon mutual goals during evaluation and treatment. The process of treating CRF begins with the evaluation of the fatigue. The practitioner and patient begin by evaluating secondary causes such as anemia, medication side effects, pain, depression, anxiety, sleep disturbances, nutritional deficits, weight/calorie intake changes, decreased activity, deconditioning, cardiac dysfunction, endocrine dysfunction, infection, and renal or pulmonary dysfunction (NCCN, 2011). If a secondary cause is identified, then the patient/practitioner team needs to develop a plan of action, timing of re-evaluation, and next step. The patient/practitioner team continues to go through the transaction process until the goals are obtained and the CRF is adequately treated.

King's theory was implemented during the Capstone project. Patients were administered the FACIT-F questionnaire and secondary causes related to the fatigue were identified. The data will be used when the survivorship program is implemented and the FACIT-F will be used in

practice at the outpatient cancer clinic. The continued goal will be to help patients obtain, regain, or maintain their health after cancer treatment.

The change theory chosen was Lewin's theory of change. The theory is simple yet applicable to cancer-related fatigue. The theory has three stages. The first stage is unfreezing which occurs when change is needed. The second stage is moving when the change is instigated. The third and final stage is refreezing when equipoise is achieved (Mitchell, 2013). The theory was pertinent to cancer-related fatigue and the Capstone Project because there was no program in place to assess fatigue and other symptoms that affect patients undergoing cancer treatment in place. The use of a tool to assess fatigue required adjustment and a change process. The Capstone project initiated the unfreezing when change was needed. The second and third stages of the theory are still progressing because implementation of a survivorship program is in progress.

Literature Selection

A comprehensive review of the literature was completed and 102 articles were reviewed. Of the 102 articles, 55 were deemed as appropriate for the Capstone project based upon the tool used and the goals of the Capstone project. The initial keywords used for the literature search were cancer-related fatigue, treatment, and survivors. The literature search was narrowed based upon the use of the FACIT-F in the study and cancer-related fatigue. After refining the literature review search, 45 articles were identified as applicable to the project. The search engines used for the project included EBSCO host that encompasses Academic Search Premier & CINAHL. The literature was used throughout the project as appropriate to enrich the project. The literature review not only provided selection of the questionnaire but also identified treatment options for patients with cancer-related fatigue. For the purpose of this project, the literature review focused

on the applicability of the FACIT-F in assessing cancer-related fatigue. The literature review identified several different instruments used to assess cancer-related fatigue; however, the NCCN did not have a recommendation for use of a specific tool (NCCN, 2012). Examples of the applicability of the articles include the study by Alexander, Minton, and Stone (2009) a review of fatigue-assessment instruments was undertaken. The study identified patients at high risk of clinically significant fatigue with the use of the FACIT-F. The use of the FACIT-F scores was to identify cancer survivors at high risk of clinically significant ongoing post-treatment fatigue (Alexander, Minton, Stone, 2009). In a study by Lai, Cella, Chang, Bode, and Heinemann (2003), the FACIT-F score was used to compare 1,022 cancer patients and a random sample of 1,010 people to identify if the FACIT-F is reliable in distinguishing cancer-related fatigue from fatigue experienced in or by the general population. The results of the study indicate that the FACIT-F was trustworthy in distinguishing fatigue and the FACIT-F determines that fatigue was worse in cancer patients than the general population (Lai, et al., 2003).

In a study of 64 patients who began chemotherapy in the last two weeks the FACIT-F was used to ascertain whether increased fatigue scores reflect decreased physical function and it found that there was a relationship with increased fatigue scores and decreased physical function (Mallinson, Cella, Cashy, & Holzner, 2006). The study by Mallinson, Cella, Cashy, and Holzner (2006) began to link patients FACIT-F fatigue scores to a person's ability to perform everyday activities. The literature review displayed the utility of the FACIT-F and therefore will be used in this capstone project (See Appendix A).

Project Plan and Evaluation

Market Analysis

Assessing a community's need for an outcome project was important. At the outpatient cancer clinic, there was a need for a survivorship program that focused on cancer survivors' needs and concerns during and after treatment. In Western Nebraska, the largest cohort of cancer patients seen and treated was between the ages of 40 and 65. In Western Nebraska 32.1% of the population was between the ages of 40 and 65 (United States Census Bureau, 2010). Patients identify themselves as cancer survivors at the time of diagnosis, throughout cancer treatment, and after cancer treatment (Chambers, 2012). Survivorship gives patients who are undergoing treatment the hope of being cancer-free (Chambers, 2012). Unfortunately, at the outpatient cancer clinic where the Capstone project was completed there was no program that helped meet the needs of the patients undergoing treatment. The project investigator then defined the desired outcome. The final step was the conclusion or the outcome of the project to identify variables related to fatigue and demonstrate the need for the outpatient cancer to build a survivorship program to enhance cancer survivors needs and provide holistic cancer treatment.

Strengths/Weaknesses

A Strengths/Weaknesses/Opportunities/Threats (SWOT) assessment was conducted for analysis prior to the project to assess the strengths, weaknesses, opportunities, and threats the project investigator might encounter and the applicability of the project before it was undertaken. The strengths of the study were identified and include the benefit to the patient through the increased knowledge of cancer-related fatigue. The questionnaire was short and easy to answer and designed not to consume a lot of energy to complete; that was a benefit to the patient and the researcher. Since this was the first evidence-based practice to be performed at the outpatient

cancer clinic, it introduced the role of the Doctor of Nursing Practice (DNP) and benefit of the advanced education.

The weaknesses of the study were the small sample size and limited resources. The study findings provided cancer-related fatigue data about the patient population currently undergoing treatment and evidence of the need for a survivorship program. Threats to validity for this project were identified through practice and planning of the project. The small sample size was felt to be a threat because it could affect the power of the statistical analysis, the potential for limited physician participation was a concern as without it, data collection would be hindered, and the financial obligation was a potential threat as finances are limited and there was no capital available for the budget. The SWOT analysis provided guidance to the researcher as the project was undertaken. The SWOT analysis is displayed in Table J1, See Appendix J.

Needs/Resources/Sustainability

The needs for the project included access to the Capstone Project patient population, access to patient's medical record, cooperation from staff, and positive reinforcement for patient participation. The resources included access to the copy machine, time for staff and patient education regarding the study, and time for patients to complete the study. The sustainability of the project is possible as development of a survivorship clinic is taking place and the oncology nurse practitioners plan on using the FACIT-F as the tool for assessing fatigue levels.

Stakeholders

When it comes to impacting people's lives and health, there are several stakeholders. Cancer patients are the biggest stakeholders as it is their health and well-being affected. Providers' stake in cancer-related fatigue is about helping patients feel better, improving patient outcomes, and building a reputation of a holistic cancer program that is attractive to patients.

Insurance companies' interest in cancer-related fatigue is tied to disability and subsequent co-morbidities. If insurance companies see a cost savings by treating cancer-related fatigue and a decline in claims because of a patient's ability to regain health, they will support survivorship. If there is no cost savings to treating cancer-related fatigue, then insurance companies stand to lose money on survivorship programs and suffer a potentially bigger loss in the form of disability claims.

Employers of cancer patients have a stake in cancer-related fatigue. When workers are fatigued, they are less productive. Employers cannot discriminate against cancer patients, therefore it is to the employers' benefit that patients regain their health and have decreased fatigue. A patient's support system has an impact on the patient's well-being because the patient is an intricate part of the social and family system; the patient needs to be able to function at full capacity to feel like a productive member. The project team includes the project investigator, oncologists, nurses, and the front-office staff. The success of the project is beneficial to the team as it reflects on the capabilities to perform research and collaborate successfully.

Cost-Benefit Analysis

In 2009, the total cost of cancer care in the United States was \$228.1 billion. The total cost of health expenditures was \$93.2 billion which were direct medical costs including chemotherapy, hospitalizations, office visits, and other modalities of treatment. The indirect cost of cancer care, \$18.8 billion, included the loss of productivity due to illness. The cost of lost productivity due to premature death, the indirect mortality costs, equaled \$116.1 billion (NCI, 2012). In cancer care and treatment, value is defined by the "benefits in expected life extension and improved quality of life are obtained at a reasonable cost comparable with other typically funded treatments and at a reasonable cost per quality-adjusted life year (QALY)" (Brock, 2010,

p. 36). No studies were found that compare the costs versus the benefits of having a survivorship program treating cancer-related fatigue. The costs versus benefits of having a program to address survivorship and cancer-related fatigue are an area for further research.

Mission/Vision/Core Values of the Capstone Project

The mission statement was to assess cancer-related fatigue in patients undergoing treatment and correlate variables related to fatigue. The vision of the capstone project was to provide evidence to the outpatient cancer clinic of the needs our patients possess regarding cancer-related sequelae and subsequent survivorship care. The core values of the Capstone Project include respect, autonomy, dignity, evidence-based practice, collaboration, and quality cancer care.

Goals

The Institute of Medicine (2005) has developed ten recommendations to assist in transitioning cancer patients to cancer survivors. The first recommendation is that providers, patient advocates, and stakeholders work to raise awareness of the needs of cancer survivors, help establish cancer survivorship as a phase of cancer care, and ensure the delivery of survivorship care. The second recommendation is patients completing the initial treatment be provided with a comprehensive care summary and follow-up care plan; and services recommended in the care plan be covered by insurance. The third recommendation is providers use evidence-based practice including guidelines, and assessment and screening tools to manage effects of cancer treatment. The fourth recommendation is quality of survivorship care be benchmarked and organizations strive to reach those benchmarks.

The fifth recommendation for survivorship is the Centers for Medicare and Medicaid Services (CMS), National Cancer Institute (NCI), Agency for Healthcare Research and Quality,

the Department of Veterans Affairs, and other cancer-related organizations support programs to test models of coordination and interdisciplinary survivorship care across the systems of healthcare. The sixth recommendation is Congress support institutions such as the Centers for Disease Control and Prevention (CDC) and similar institutions to develop comprehensive cancer control plans including survivorship care with the intent of implementing, evaluating, and refining existing state cancer control plans. The seventh recommendation is the NCI, professional medical associations, and voluntary organizations coordinate their efforts to provide educational opportunities to providers enabling them to address the quality of life issues facing cancer survivors (IOM, 2005).

The eighth recommendation for survivorship is employers, legal advocates, healthcare providers, sponsors of support services, and government agencies eliminate discrimination and decrease the adverse effects of cancer on employment, while supporting cancer survivors who suffer from short-term and long-term limitations in ability to work due to their cancer care. The ninth recommendation is federal and state policy makers ensure that cancer survivors have access to adequate and affordable health insurance. The tenth and final recommendation is organizations increase their support of survivorship research (IOM, 2005). Cancer-related fatigue affects most cancer patients therefore should be at the forefront of cancer survivorship treatment as evidenced by the Institute of Medicine Recommendations.

Benchmarking is beneficial for comparing clinical outcomes and as quality indicators (Zaccagnini & White, 2011). The benchmark target for assessing and intervention in cancer-related fatigue is to assess patients before they begin treatment and at subsequent visits (NCCN, 2012). At each visit, the provider has the opportunity to assess fatigue, implement an intervention, and evaluate and re-evaluate interventions. The hindrance that comes with studying

cancer-related fatigue is associated with the lack of benchmarks for levels of fatigue and inability to benchmark improvement because of multiple extraneous variables including age, type of cancer, stage of cancer, co-morbidities, intervention, and inability to predict response to intervention.

The study goals were displayed in Table J2, See Appendix J:

1. Cancer-related fatigue is assessed in patients who are undergoing treatment at the outpatient cancer clinic.
2. Variables related to fatigue are reported.
3. Establishment of survivorship as a phase of cancer care.
4. Patients are provided with a comprehensive care summary and follow-up care plan.

Using an equal access to care/socialized medicine approach, survivorship care can be benchmarked because of the access to large database (IOM, 2005).

5. System such as the Centers for Medicare and Medicaid Services (CMS), National Cancer Institute (NCI), Agency for Healthcare Research and Quality, the Department of Veterans Affairs, and other cancer-related organizations will be cohesive and be able to support programs to test models of coordination.
6. Coordination of organizations to provide educational opportunities to providers enabling them to address the quality of life issues facing cancer survivors.
7. Organizations to increase their support of survivorship research and all organizations will be cohesive (IOM, 2005).

The long-term goals identified are the ideal care for cancer patients, however are not obtainable during this Capstone project. It is still important to state the long-term goals as cancer

care is dynamic and optimal care is envisioned. The overall goal of the project was to enhance cancer care for patients currently undergoing cancer treatment specifically related to fatigue.

Participation in the Study

There were no associated risks of the study to the participants. The project investigator may have been the primary care provider of the subject; therefore, other individuals were trained to attain participation consent from subjects so there was no obligation or perceived coercion to participate in this study. There was the possibility that subjects still felt obligated to participate because of the project investigator's role in the clinic and the community. There were no associated threats to safety as this was not a vulnerable population. This study did not have an impact on the subjects care or their illness. There was no financial incentive for subjects. There were no associated risks to subjects by answering a questionnaire, and this questionnaire did not ask potentially sensitive questions. There were no known future risks to subjects. Although there are no known risks to participation, protection of personal information was addressed.

Benefits of the Study

The consequences of not having a cancer-related fatigue policy were identified. The first problem was the financial loss associated with productivity of working cancer patients. The second problem of not having a policy was the 11.7 million cancer survivors in the United States who will suffer unnecessarily due to of a lack of care (NCI, 2012). An unintended consequence of not having an implemented policy was the cancer-related fatigue could delay or stop treatment (Cheville, 2009). There were no potential benefits to participants. The benefit of the project to society and to the participating outpatient cancer clinic specifically was an increased knowledge of evaluation of cancer-related fatigue for care providers.

Logic Model

The conceptual model of research selected for this capstone project was the logic model. According to Zaccagnini and White (2011), the logic model identified how the project will flow from beginning to end. The logic model began with the problem concerning this Capstone project; patients who experience cancer-related fatigue during chemotherapy. The next step was to assess community needs, the need for a survivorship program that focused on cancer survivors' needs and concerns during and after treatment. The project investigator then defined the desired outcome, decreased fatigue and a subsequent improvement in quality of life.

Influential factors identified were variables such as the patient's prior fatigue level, environmental factors, socio-economic status, family support, treatment regimen, and the patient's treatment team (oncologist, nurse practitioner, nurses); all could influence the patient's fatigue experience. Strategies for handling fatigue included assessing fatigue at a chemotherapy visit with the FACIT-F (NCCN, 2012). The final step was the assumption or the outcome of the project, despite cancer stage, diagnosis, treatment modality, age, prognosis, previous co-morbidities that variables associated with cancer-related fatigue would be identified (See Appendix B).

Population/Sampling Parameters

All patients who were currently undergoing cancer treatment at the participating outpatient cancer clinic were offered participation in this study when they came for treatment at their clinic visit. Patients who were undergoing cancer treatment and were over the age of 18 were included in the study. The sample size projected was 15-25 participants and 25 participants were obtained. The recruitment plan for this study strived to include the optimal number of subjects. Patients under the age of 18 were excluded.

Setting

Since the study took place in rural Nebraska, there were limited numbers of potential participants who fit the inclusion criteria. The study took place at an outpatient cancer clinic in Western Nebraska. At the outpatient cancer clinic, three oncologists and two oncology nurse practitioners see an average of five patients a day, 50 patients a month, and an average of 250 patients a year who are undergoing active cancer treatment. There are patients whose treatment regimens call for multiple days of chemotherapy in a row, as well as, patients who are chronically on treatment due to advanced cancer.

Protection of Human Rights

All patients invited to participate in the survey were informed that their care would not be affected by participation or declining to participate. Subjects were given the opportunity to discuss this study with the project investigator, an oncologist, or a nurse practitioner. When a participant answered a survey, it was considered consent. A letter of information or statement was provided to each potential participant explaining the reason for the study, the benefit to society, and voluntary aspects of informed consent (See Appendix C).

The fidelity or veracity of the subject information is confidential. All subject information was anonymous. The files were protected by the following: only numbers were used on surveys to prevent duplication of data and no personal identifiers were used. The data collected was stored in a locked filing cabinet. Demographic and survey data was analyzed in aggregate. An identification sheet was used to correlate questionnaires and demographics. Information was kept on a computer that is password restricted. The demographic information was filed separately from the questionnaires and will be destroyed five years after the close of the study.

The project investigators, as well as the Capstone chair, have successfully completed the CITI training developed to ensure that the project investigator is adequately prepared for ensuring protection of human subjects (See Appendix D). The Capstone project has been approved by Regis University Institutional Review Board (IRB) as well as the Medical Center that owns the outpatient cancer clinic IRB. Letters of approval were obtained and are kept on file (See Appendix E & F).

Methodology/Instrumentation/Measurement

This study was a quantitative-descriptive study. The study included three oncologists and two board certified advanced oncology nurse practitioners. The FACIT-F is a subjective, 13 item questionnaire, and the patients were asked to rate the following items: feeling of fatigue, feeling of weakness, feeling of listlessness, feeling tired, trouble starting things, trouble finishing things, having energy, doing usual activities, need for sleep during the day, too tired to eat, needing help doing usual activities, too tired to do the things the patient wants, and limiting social activity (FACIT-F, 2012).

The level of measurement was ordinal as identified by using a Likert scale questionnaire. Each item was rated on a five-point scale from a patient having no symptoms to a lot of symptoms (Cella, Lai, & Stone, 2010). Patients gave a rating of 0= not at all, 1= a little bit, 2= somewhat, 3=quite a bit, and 4= very much (FACIT-F, 2012) (See Appendix G).The sensitivity of the FACIT-F is 80% while the specificity is 71% (Campos, Riechelmann, Martins, Hassan, Casa, & Giglio, 2011).

The patient was administered the FACIT-F questionnaire to obtain a fatigue score when enrolled in the study. The variables studied were the factors and descriptions of fatigue as measured by the FACIT-F questionnaire and were reported in the analysis. The extraneous

variables recognized were race, gender, and type of chemotherapy received, length of chemotherapy, age, and fatigue level before treatment, performance status, previous health conditions social support, family support, and work status. The extraneous variables that were included in the study were race, gender, type of chemotherapy received, and previous health conditions. The extraneous variables to include in the study were chosen by the researcher as they were of interest and believed to be pertinent to report. Influential factors that affect a patient's fatigue level are important to identify such as variables that correlate with the fatigue. The variables include the patient's prior fatigue level, environmental factors, socio-economic status, family support, treatment regimen, and the patient's treatment team (oncologist, nurse practitioner, nurses); all can influence the patient's fatigue experience. The study variables and outcomes were determined by a review of professional literature and review of clinical practice guidelines as reviewed in the problem definition and literature review sections.

Timeframe

The Capstone project was initially slated to begin in January however due to a delay in the IRB process the project date was moved to March 1, 2013. Data collection began March 5, 2013 and was completed on April 1, 2013. The timeline is displayed for the capstone project in Table J3, See Appendix J.

Budget/Resources

The budget and resources needed to complete the Capstone project are outlined in Table J4, See Appendix J. The items included in the budget included paper, The Statistical Package for Social Sciences (SPSS) software, and project investigator time. The cost of paper was calculated based upon the price of paper, toner, and printer maintenance. The average cost per piece of paper was \$0.015 (Blutinger, 2013). The SPSS software was previously purchased and the price

paid is as shown. The project investigator time was based upon an average hourly wage and was included as if the study took 20 hours per week for 16 weeks or four months and as if, indeed, the project investigator were being paid to conduct the study. The budget was completed in order to project cost for future similar studies however since this was a Capstone project, no payment was received.

Project Findings and Results

The Capstone project findings are reported and are organized by objective. The first objective of the assessment of cancer-related fatigue in patients who were undergoing treatment at the outpatient cancer clinic was met. The goal was to have 25 patients undergoing treatment complete a FACIT-F questionnaire and that was completed. The demographic characteristics chosen to be reported were age, race, and gender.

The data was entered into Statistical Package for the Social Sciences version 21 (See Appendix H). Data collection for the population included age, diagnosis, stage of diagnosis, chemotherapy regimen, FACIT-F score, race, and diagnosis each patient posed that could be related to the fatigue (See Appendix I). Descriptive statistics were used to describe the study population characteristics. The FACIT-F scores were operationally defined cancer-related fatigue. The mean was calculated when appropriate and the descriptive statistics were represented appropriately by graphs and tables, See Appendix J.

Key Findings

The racial profile of respondents was 96% White and 4% Hispanic. The gender profile was 56% of respondents were male and 44% of respondents female.

The age range of the respondents was from 34-81 with a mean of 62.64 years old. The most prevalent age group was 40% of respondents were in their 70's, followed by 24% of

respondents in their 60's, 20% in their 50's, 8% in their 80's, 4% in their 30's, and 4% in their 40's. The data was tabulated through frequency and percentages. The age of respondents is represented in Table J5, See Appendix J.

The most common type of cancer in the United States is prostate cancer, with more than 238,000 new cases expected in 2013 (National Institute of Health, 2013). The next most common cancers in the U.S. are breast cancer and lung cancer respectively (NIH, 2013). The most prevalent form of cancer in respondents was colon cancer at 16%, followed by prostate and breast cancer at 12%, non-hodgkin's lymphoma, small-cell lung cancer, multiple myeloma, chronic lymphocytic leukemia at eight percent each, followed by esophageal cancer, chronic myleogenous leukemia, myleodysplastic syndrome, adenocarcinoma, astrocytoma, non-small cell lung cancer, and gastrointestinal stromal tumor at four percent each. In Table J6 depicts frequencies of cancer diagnosis reported by percentages, See Appendix J.

The cancer was reported as either stage one through four, extensive, or not a stageable cancer. The most common stage of cancer respondents suffered from was stage four or stage IV at 44%. The second most common stage of cancer reported was not a stageable cancer at 24% of respondents. The next most common stage of cancer reported was stage two and three at 12% each followed by extensive stage cancer affecting 8% of respondents. Graph J7 depicts the cancer stage of the respondents, See Appendix J.

The most common chemotherapy regimen respondents received were weekly carboplatin/paclitaxel every three weeks, cisplatin/VP-16, 5 flurouricil/leucovorin/avastin, paclitaxel/herceptin weekly, docetaxel every three weeks, and rituxan at eight percent each. The next most common chemotherapies respondents received were rituxan/cvp, carboplatin and paclitaxel every three weeks, weekly carboplatin, oxaliplatin/xeloda, vidaza, iclusig,

revlamid/velcade, 5 fluorouracil/leucovorin, pentassa/vincristine, revlamid/zometa, eligard/casodex, rituxan/gemzaar, and gleevec each at four percent. The graph J8 depicts the chemotherapies and percentage of patients that received them, See Appendix J.

The scores were reported as the total score for the FACIT-F questionnaire. The 13 questions were each scored from zero to four and then totaled with the maximum achievable score of 52 and the lowest achievable score of zero. The scores were obtained from 25 respondents and analyzed through frequency. The most common FACIT-F scores reported were 12, 16, and 25 each at 12%. The second most common scores reported were 11, 22, 23, and 32 each comprising eight percent of the respondents. The next set of scores reported each comprised four percent of the respondents and include 13, 15, 17, 19, 20, 31, 33, and 36. The range of FACIT-F scores was 11-36. The average score was 20.12. Table J9 depicts the frequencies of the FACIT-F scores reported, See Appendix J.

The second objective was to identify variables associated with cancer-related fatigue was completed. The variables were obtained through a frequency analysis and cross-tabulation. The most common variables associated with cancer-related fatigue were anemia (56%), hypertension (48%), and diabetes (40%). The other variables reported with cancer-related fatigue included: iron deficiency, hypothyroidism, depression, hyperlipidemia, oxygen dependence, malnutrition, diarrhea, cancer-related pain, pulmonary embolism, anxiety, insomnia, gastrointestinal reflux disease, hypercalcemia, hyponatremia, hypokalemia, deep vein thrombosis, factor V Leiden deficiency, chronic kidney disease-any stage, lupus, coronary artery disease, chronic obstructive pulmonary disease, cancer-related fatigue, restless leg syndrome, status post bone marrow transplant, dementia, atrial fibrillation, congestive heart failure, and peripheral vascular disease. The least common variables related to fatigue include dementia, atrial fibrillation, congestive

heart failure, peripheral vascular disease, restless leg syndrome, factor V Leiden deficiency, deep vein thrombosis, and pulmonary embolus each at four percent of respondents affected. Table J10 depicts the percentage of each variable analyzed, See Appendix J.

A Pearson's R correlation analysis was performed with the variables to determine relationship with the FACIT-F scores. The variables showed a positive relationship or an inverse relationship represented by a negative sign (-). The strength of the correlation was reported as no correlation with a value less than 0, a weak correlation with a value of 0.1-0.4, a moderate correlation with a value of 0.4-0.7, a strong correlation of greater than 0.8, or a perfect correlation with a value of 1.0. The p-value of each calculation was reported for significance analysis in addition to the correlation.

The variables that revealed a positive correlation or relationship with FACIT-F scores were reported based upon the strength. The variables that revealed no correlation included bone marrow transplant at 0.010 (p-value 0.961), hyponatremia 0.010 (p-value 0.961), coronary artery disease 0.059 (p-value 0.780), chronic obstructive pulmonary disease 0.089 (p-value 0.673), and hypokalemia 0.073 (p-value 0.728). The variables that revealed a weak correlation included hypothyroidism 0.102 (p-value 0.626), oxygen dependence 0.109 (p-value 0.606), restless leg syndrome 0.211 (p-value 0.311), anemia 0.265 (p-value 0.201), pulmonary embolus 0.266 (p-value 0.199), and iron deficiency 0.350 (p-value 0.087). There were no moderate, strong, or perfectly correlated variables.

The variables that revealed an inverse correlation or relationship with FACIT-F scores were reported based upon strength of the inverse relationship. The variables that revealed no inverse relationship were a diagnosis of cancer-related fatigue -0.034 (p-value 0.873), atrial fibrillation -0.061 (p-value 0.772), and peripheral vascular disease -0.061 (p-value 0.772). The

variables that revealed a weak inverse relationship were hyperlipidemia -0.109 (p-value 0.603), diarrhea -0.123 (p-value 0.559), gastroesophageal reflux disease -0.155 (p-value 0.458), depression -0.159 (p-value 0.447), malnutrition -0.162 (p-value 0.438), insomnia -0.189 (p-value 0.367), chronic kidney disease -0.167 (p-value 0.426), hypertension -0.223 (p-value 0.284), hypercalcemia -0.304 (p-value 0.139), diabetes -0.320 (p-value 0.104), deep vein thrombosis -0.333 (p-value 0.104), and factor V leiden deficiency -0.333 (p-value 0.104). The variables that displayed a moderate inverse relationship with the FACIT-F scores included cancer-related pain -0.407 (p-value 0.044), dementia -0.415 (p-value 0.039), congestive heart failure -0.415 (p-value 0.039), and anxiety -0.442 (p-value 0.027).

The variables that have a p-value of <0.05 were considered significant. The variables that were noted to be significant also had an inverse relationship with the FACIT-F scores. The significant variables included cancer-related pain, dementia, congestive heart failure, and anxiety. Recognition of variables associated with cancer-related fatigue provides practitioners with pertinent information that enhances the ability to identify patients who are at high risk for CRF before, during, and after treatment.

The third objective to establish survivorship as a phase of cancer care has been met through the development of a survivorship program. The oncology nurse practitioners at the outpatient cancer clinic have established a survivorship program and it is in the infancy stage. With the establishment of a survivorship program, objective four will be met, as patients will be provided with a comprehensive care plan that will be developed at survivorship visits. Completion of the outcomes studies such as this Capstone project provides important data, however multiple studies will be needed for future completion of long-term objectives numbers

five, six, and seven that pertain to cohesion of medical organizations to support survivorship care, increased awareness of quality of life issues that cancer survivor's face, and increased survivorship research.

The foremost points of the Capstone project are summarized. Cancer-related fatigue affected respondents regardless of age, as the age range of the respondents was 34-81. The average FACIT-F score was 20.12. There was a wide variety of cancers and chemotherapy regimens represented in the data with the most common cancers being colon, breast, and prostate cancer plus the most common chemotherapies received were carboplatin/paclitaxel every three weeks, cisplatin/VP-16, 5 fluorouracil/leucovorin/avastin, paclitaxel/herceptin weekly, docetaxel every three weeks, and rituxan. The most common variables associated with cancer-related fatigue were anemia, hypertension, and diabetes.

Limitations/Recommendations/Implications for Change

Limitations

There were limitations to the study. The first limitation was the small sample size. Living in a rural area such as Western Nebraska, recruiting more patients would have required a longer data collection period and a longer timetable. The small sample size was a limitation because of the lower statistical power the information provided and if the data were going to be validated it would be beneficial for the study to be reproduced at a larger institution.

The second limitation was that only one of the Oncologists was invested with the project and while the other two were re-educated several times they did not demonstrate interest in the results or the subsequent changes in practice. The re-education provided was verbal reminders of the research project and providing them with a copy of the materials. Limited participation is a

hindrance because the study was designed to advance practice that affects the oncologists and their patients.

The third limitation was this Capstone project was the first evidence-based practice study done in the clinic. This is a limitation because the staff did not have first-hand experience in gathering data and consenting patients. of The staff required repeated verbal and written education of why and how the study was being conducted.

Finally, the fourth limitation was that there was one patient who was Spanish speaking only and the researcher only had the questionnaire available in English. Her daughter was able to translate for her and the questionnaire was completed but it was a lesson for any further studies, that both English and Spanish materials be procured.

Recommendations/Implications for change

Based upon the Capstone project, recommendations and implications for change are addressed at this time based upon the population studied and the variables associated with their FACIT-F scores and association between variables. The first recommendation is that all cancer centers implement a survivorship program as this study touched the tip of the problems cancer patients deal with. Nurses need to be aware of quality of life issues that patients face during and after treatment and need to be trained to refer patients to a survivorship program that can address the issues.

An area that requires further research is advancement in pharmacologic and non-pharmacological methods to help patients cope with fatigue. It is hard to tell someone who is exhausted that they need to exercise, change their diet, and do certain things when they are simply trying to survive. Those patients need encouragement, support, empathy, and resources available from the healthcare team to embrace success against the fatigue. From a theoretical

perspective, a cancer survivorship theory could be developed to encompass all the things survivors are faced with before, during, and after cancer treatment.

Conclusion

Cancer-related fatigue affects the one-half to one-third of Americans who develop cancer. (Cheville, 2009). The purpose of the Capstone project was to evaluate fatigue levels of patients who were undergoing cancer treatment by administering the FACIT-F questionnaire to evaluate and describe variables related to fatigue. The conceptual model of research selected for this capstone project is the logic model and the theoretical models utilized were King's Theory of Caring and Lewin's Theory of change.

This study was a quantitative, descriptive study. The study included three oncologists and two board certified advanced oncology nurse practitioners. The FACIT-F a subjective, 13 item questionnaire that contains pertinent items to fatigue evaluation was used as the instrument (FACIT-F, 2012). Descriptive statistics were to describe the study population characteristics, FACIT-F scores, and variables will be operationally defined related to cancer-related fatigue. The budget and resources were identified and defined. The study exhibited that regardless of diagnosis, stage of disease, age, sex cancer-related fatigue was associated with multiple comorbidities and affects patients' lives in an adverse way.

The Capstone project completion signified the achievement of identifying variables associated with cancer-related fatigue in patients undergoing treatment-providing information to the stakeholders and the outpatient cancer clinic regarding the impact of cancer-related fatigue and the necessity of a survivorship clinic to provide cancer patients with resources to have the best quality of life possible. The knowledge gained from this study will be provided to the clinic for review to increase provider and patient awareness of how cancer-related fatigue is

experienced and its importance to the provision of care as well as survivorship of this most devastating disease.

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Appendix A

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
1	Abernethy, A.P., Zafar, S.Y., Uronis, H., Wheeler, J. L., Coan, A., Rowe, K., Shelby, R.A., Fowler, R., and Herndon, J.E. (2010). Validation of the patient care monitor: a review of system assessment instrument for cancer patients. <i>Journal of Pain and Symptom Management, 40(4)</i> , 545-558.	EBSCO/FACIT-F/The breast and gastrointestinal (GI) cancer studies were funded through an Outcomes Research service agreement with Pfizer, Inc. The lung cancer study was funded through a research grant from Kanglaite-USA, Inc. Neither Pfizer nor Kanglaite-USA has access to individual data.	The purpose of the study was to validate and test the Patient Care Monitor (PCM) in three cancer populations.	<p>Cancer patients who were participating in clinical trials.</p> <p>Two hundred seventy-five individuals participated in three clinical trials enrolling breast (65), gastrointestinal (113), and lung (97) cancer patients.</p> <p>The mean age of the participants was 58 years (standard deviation: 11), 52% were females, 79% were whites, 17% were blacks, 62% had no college degree, and 78% had metastatic or recurrent disease.</p> <p>Patients eligible for the study were English speaking, consenting adults with a pathologic diagnosis of any stage of disease.</p> <p>Power= Moderate</p>	The study established the validity of the PCM in three academic oncology populations.	<p>The study was economically and socially diverse.</p> <p>Electronic versions of the document used.</p> <p>The system “learns” by routinely analyzing captured information.</p> <p>Data collection at the individual level can be used to inform care, contribute to evidence development, evidence implementation and support evidence synthesis.</p>	<p>The electronic versions of the assessments were unable to separately validate each instrument.</p> <p>The period did not allow the analysis of whether the PCM subscales were sensitive to changes in disease state or functional status.</p> <p>PCM is comprised of 80 items however only 54 are used in calculating the subscales.</p>	Level III	I do not plan to use this article for my capstone because I have chosen to use the FACIT-F tool.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
2	Alexander, A., Minton, O., Andrews, P., and Stone, P. (2009). A comparison of the characteristics of disease-free breast cancer survivors with or without cancer-	EBSCO/Cancer-Related Fatigue/ No funding info available.	The first purpose of the study was to determine the prevalence of cancer-related fatigue syndrome in a	<p>Participants were women with stage I–IIb breast cancer.</p> <p>There were 200 women</p>	The tool used was the FACT-F, BFS, fatigue catastrophising scale, work and social adjustment	The study provided evidence to support the usefulness of Cella and colleagues’ diagnostic	There were a large number of variables and caution is required in not allocating too much significance.	Level IV	I am going to use this article because it does use the FACT-F and I do see many breast cancer

	related fatigue syndrome. <i>European Journal of Cancer</i> , 45, 384-392.		population of disease-free breast cancer survivors. The second purpose of the study was to investigate the relationship between cancer-related fatigue syndrome and clinical variables.	recruited who were between 3 months and 2 years after completion of primary therapy for breast cancer and were disease free. Sixty women were found to fit the criteria. Inclusion criteria were age at least 18 years; histologically proven breast cancer; completed all treatment modalities at least 3 months and not more than 2 years previously; and concurrent hormone use was allowed. Exclusion criteria included pregnancy; co-existing cancer diagnosis; evidence of recurrent disease and confusion or dementia. Power= Weak	scale, hospital anxiety and depression scale, European organization of research and treatment of cancer quality of life questionnaire, EORTC breast module. Cancer-related fatigue affects 30% of women after breast cancer treatment and has significant effects on quality of life and mood.	criteria for cancer-related fatigue in breast cancer survivors. The prevalence of women with cancer-related fatigue was 30% that was consistent with two previous studies done. There was only one interviewer therefore inter-rater reliability of the diagnostic criteria.	There were no adjustments for multiple comparisons in the statistical analysis and our results interpreted with this caveat. The groups were not age-matched.		survivors.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
3	Alexander, S., Minton, O., and Stone, P.C. (2009). Evaluation of screening instruments for cancer-related fatigue syndrome in breast cancer survivors. <i>Journal of Clinical Oncology</i> , 27(8), 1197-1201.	EBSCO/FACT-F and Cancer-Related Fatigue/ No information given.	The purpose of the study is to identify if a screening questionnaire could identify patients at high risk of clinically significant fatigue who should be considered for a suitable intervention.	Disease-free breast cancer patients were recruited from a nurse led follow-up clinic. These women had undergone successful primary therapy and were seen between 3 months and 2 years after treatment was completed. They had histologically proven breast cancer (stage of I/IIb) at	The FACT-F and BFS cut off scores can be used to identify breast cancer survivors at higher risk of clinically significant post-treatment fatigue.	The FACT-F yields a sensitivity of 80% and a specificity of 71%. The Bidimensional Fatigue Scale (BFS) yields a sensitivity of 92%, a specificity of 53%, and a negative predictive value of 94%.	There is no inter-rater reliability. The ideal screening tool should have a high sensitivity and a high negative predictive value, the FACT-F has a low negative predictive value and is not as good as the BFS. The population size was only 60.	Level IV	I am going to use this study for the data on the reliability and validity of the FACT-F.

				<p>the time of diagnosis and were disease free at the time of entry to the study.</p> <p>Over a 2-year period, 292 women were eligible for the study and 208 consented to participate. Eight women did not proceed to interview leaving 200 women who completed the full interview process. Subjects had a mean age of 58 years and the majority were white. Overall 60 (30%) of 200 participants met the criteria for CRFS.</p> <p>One hundred and forty women who were noncases of CRFS, 36 had a psychiatric disorder and 104 had neither fatigue nor a psychiatric disorder. The 36 women who were not included had a comorbid psychiatric diagnosis that may have resulted in fatigue and were excluded from further analysis.</p> <p>Power= Moderate</p>					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
4	Alexander, S., Stone, P., White, S., Andrews, Pl, Nussey, S., and Bano, G.	EBSCO/Cancer-Related Fatigue/ This study was	The purpose of the study was to compare the responses of	Patients recruited from a larger study of	The study consisted of 44 women. The cancer-	The study demonstrated the utility and acceptability	The population was small. The estimated	Level II	I do not plan to use this article for my capstone

	(2010). Evaluation of central serotonin sensitivity in breast cancer survivors with cancer-related fatigue syndrome. <i>Journal of Pain and Symptom Management</i> , 40(6), 892-898.	funded by Cancer Research UK Grant no. C11075/A7143.	breast cancer survivors with or without cancer-related fatigue syndrome to the buspirone challenge test.	<p>fatigue in breast cancer survivors who were cancer free at the time of study and had completed cancer therapy between three months and two years previously.</p> <p>Forty- four of 164 (27%) of the potentially eligible women from the larger study agreed to participate in the buspirone challenge test.</p> <p>Exclusion criteria for the buspirone test were as follows: pregnancy, breast-feeding, epilepsy, psychotropic medication, difficult veins to cannulate, lymphedema or pain in the arm, moderate or severely impaired renal or liver function (two times the upper limit), and patients unable to fast.</p> <p>Power= Weak</p>	<p>related fatigue syndrome women accounted for 16 and 28 women were controls.</p> <p>The Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders was used for assessment.</p> <p>There were no significant differences in baseline or stimulated cortisol release after buspirone challenge.</p>	<p>of buspirone as a probe of central serotonin sensitivity in this population.</p> <p>There was a control group.</p>	<p>sample was 20 cases and 20 control cases.</p> <p>There was poor recruitment of patients into the study after three years.</p> <p>The comparison group was underpowered .</p> <p>The use of buspirone as a selective probe for 5-HT function.</p> <p>The control group was not age matched.</p>		however; it is interesting and may be an area of further research.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
5	Baro, E., Carulla, J., Cassinello, J., Colomer, R., Garcia, J., Gascon, P., Gasquet, J.A., Herdman, M., Rodriguez, C.A., Sanchez, J., and Valentin, V. (2009). Development of a new questionnaire to assess patient perceptions of	EBSCO/Cancer-Related Fatigue/ No information given.	The purpose of the study was to develop an instrument to measure the impact of cancer-related fatigue on the health-related quality of life of cancer patients.	<p>Oncology patients with cancer-related fatigue.</p> <p>The mean age of the patient sample was 57 years and 56% were female.</p>	<p>There were 238 cancer patients who suffered from cancer-related fatigue who were included in the study.</p> <p>The newly developed questionnaire measures the</p>	<p>The Cronbach's alpha coefficients obtained were satisfactory and exceeded 0.90.</p> <p>The questionnaire assesses the</p>	<p>The focus groups had a limited number of patients who were used for the item generation phase.</p> <p>The sample group left 1, more of the</p>	Level IV	I do not plan to use this study in my capstone project because I am going to use a tool that is reliable and valid and has been reproduced in several

	cancer-related fatigue: item generation and item reduction. <i>Value in Health, 12(1)</i> , 130-138.			Breast cancer was the most common cancer (30%), followed by lung cancer (18.1%). Sixty-three percent of the patients presented a moderate fatigue level and the rest a severe one. Most (62.6%) of the sample were receiving palliative care, 18.5% were receiving adjuvant treatment and 10.1% curative treatment. Patients were more than 18 years of age, with a diagnosis of cancer (any site and period of disease). Power= Strong	impact of cancer-related fatigue on oncology patients has shown feasibility, reliability, and validity.	attitudes and beliefs about cancer-related fatigue and treatment in clinical practice. A validated study of the questionnaire is underway.	12 patients left 1, or more questions unanswered 22% of the time. There should be further studies to evaluate psychometric properties such as test-retest reliability or sensitivity to change, which could not be evaluated because of cross-sectional design.		different studies.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
6	Barsevick, A., Zwiderman, A., and Halyard, M. (2010). I'm so tired: biological and genetic mechanisms of cancer-related fatigue. <i>Quality of Life Research, 19</i> , 1419-1427.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study is to discuss cancer-related fatigue and address issues related to the investigation into potential biological and genetic causal mechanism.	N/A	The study is a meta-analysis to review, synthesis and interpretation of the literature. Until recently, cancer-related fatigue and quality of life have been understood primarily as subjective patient-reported experiences. There are physiologic reasons for cancer-related fatigue including: cytokine dysregulation, hypothalamic-pituitary-	The paper addressed issues that increase our understanding of cancer-related fatigue and supplied the current evidence for biologic pathways and mechanisms that regulate the development of cancer-related fatigue.	The studies analyzed have shown a lack of statistical precision. The data sets are small and measures to correct for multiple testing have not been performed. Gene expression in blood cells is not optimal.	Level I	I am going to use this article for my capstone project because it is essential to understand biological factors that influence cancer-related fatigue. Discussing with patients about research that is ongoing in developing laboratory tests to substantiate the diagnosis is reassuring because patients often wonder if the fatigue is in

					adrenal axis dysfunction, dysregulation of serotonin, circadian rhythm disruption, alterations in adenosine triphosphate, and vagal afferent nerve activation that we are beginning to understand.				their head or real.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
7	Blaney, J., Lowe-Strong, A., Rankin, J., Campbell, A., Allen, J., and Gracey, J. (2010). The cancer rehabilitation journey: Barriers to and facilitators of exercise among patients with cancer-related fatigue. <i>Physical Therapy, 90(8)</i> , 1135-1147.	EBSCO/ Cancer-Related Fatigue/ This study was supported by the Department for Employment and Learning, Northern Ireland.	The purpose of the study was to explore barriers and facilitators of exercise of patients with cancer-related fatigue.	<p>Patients in palliative care were recruited through a local hospice that provided multidisciplinary palliative care services.</p> <p>A total of 26 participants with CRF (16 female, 10 male) took part in the study. There were 12 survivors of cancer, 10 were patients in palliative care, and 4 were patients who were recently diagnosed and undergoing treatment. All participants were White and had a mean age of 55 years (range=39-83).</p> <p>Eligible participants were over 18 years of age, with a previous or current diagnosis of cancer, and who were identified as having CRF as defined by the</p>	<p>The study consisted of 26 participants evaluated with the Oncology Nursing Society (ONS) fatigue scale.</p> <p>The conclusion of the study was that there are numerous barriers to exercise during and after treatment.</p>	<p>The findings can aide physical therapists in helping design exercise programs for patients with cancer-related fatigue.</p> <p>The study addressed some of the methodological issues of previous qualitative studies.</p>	<p>The patients had advanced cancer, the sample size was small, and the sample size consisted of mainly women who had breast cancer staged III to stage IV.</p> <p>The participants were all white and do represent the population.</p>	Level III	I will use this article in my capstone because exercise is important in effectively helping cancer-related fatigue.

				National Comprehensive Cancer Network (NCCN). Individuals diagnosed with a fatigue-related comorbidity (e.g., multiple sclerosis, fibromyalgia, chronic-fatigue syndrome) was excluded. Power= Weak					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
8	Breitbart, W. and Alici, Y. (2008). Pharmacologic treatment options for cancer-related fatigue: current state of clinical research. <i>Clinical Journal of Oncology Nursing</i> , 12(5), 27-36.	EBSCO/Cancer-Related Fatigue/ Information not given.	The purpose of the study was to evaluate psychostimulant, wakefulness-promoting agents, antidepressants, and cholinesterase inhibitors studied for CRF treatment.	N/A	The meta-analysis was a review of antidepressants and psychostimulants. Methylphenidate was studied and is most effective and well tolerated despite common side effects. Antidepressants studies have shown mixed results.	Understanding mood disorders and treating them is an essential step in cancer-related fatigue.	Randomized, placebo-controlled trials are needed to further assess the efficacy and tolerability of various medications in cancer-related fatigue treatment.	Level I	This meta-analysis is helpful during my capstone because the NCCN guidelines use antidepressants to treat depression that is identified during fatigue assessment and psychostimulants are used for fatigue in the NCCN guidelines.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
9	Butt, A., Lai, J.S., Abernethy, A.P., Rosenbloom, S.K., and Cella, D. (2010). Age-associated differences in fatigue among patients with cancer. <i>Journal of Pain and Symptom Management</i> , 40(2), 217-223.	EBSCO/Cancer-Related Fatigue/ A subset of the data analyzed for this study was collected as part of National Institutes of Health.	The purpose of the study is to determine the differential impact of age and cancer diagnosis on ratings of fatigue using a validated self-report instrument.	Patients were recruited from Chicago-area oncology clinics and all patients received some treatment for their cancer. The general population sample was 51% female and primarily	Fatigue data was available from the U.S. general population and a sample of cancer patients Cancer patients experienced more fatigue than the general population.	Anemia was identified as a possible explanatory variable for fatigue by secondary data analysis. Data was obtained from not only the U.S. general population but also a sample of	Similar analyses in other studies have failed to find a substantial effect of age on fatigue and/or anemia-related QOL in cancer patients/additional data is needed to explore fatigue in	Level IV	I am going to use this study for my capstone because anemia evaluation is identified as a possible underlying cause of fatigue in the NCCN guidelines.

				<p>84% Caucasian. Cancer patients were 64% female, 88% Caucasian, and 79% self-reported ECOG performance status ratings of 0 or 1 (no symptoms to symptomatic, but ambulatory). Fifteen Breast cancer patients (33%) and colorectal (12%) were the most common tumor types. There were 1813 patients total.</p> <p>There was no exclusion criteria listed.</p> <p>Power= Strong</p>		<p>cancer patients.</p>	<p>older patients.</p> <p>The study was limited in potential covariates.</p> <p>The study had a small oldest age group.</p>		
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
10	<p>Campos, M.P., Riechelmann, R., Martin, L., Hassan, B.J., Casa, F.B., and Giglio, A. (2011). Guarana (paullinia cupana) improves fatigue in breast cancer patients undergoing chemotherapy. <i>The Journal of Alternative and Complementary Medicine</i>, 17(6), 505-512.</p>	<p>EBSCO/FACIT-F/ The investigators received no external funding.</p>	<p>The purpose of the study was to examine the use of Guarana in cancer patients who suffer from fatigue and are undergoing chemotherapy.</p>	<p>The study was of adult women aged 22-70 with a histological diagnosis of breast cancer at any stage who were about to start the first cycle of systemic chemotherapy.</p> <p>One hundred twenty-one patients were offered participation and 45 were excluded because of severe fatigue at baseline.</p> <p>Patients with a history of hypothyroidism, depression or other major psychiatric disorder, anemia, prior</p>	<p>Adult women age 22-70 with a diagnosis of breast cancer and undergoing chemotherapy were evaluated using the FACIT-F and Chalder fatigue scale. The Results were favorable with using Guarana in patients with cancer related fatigue.</p>	<p>Use of two different instruments to evaluated the cancer-related fatigue.</p> <p>There was an observed effect on fatigue of the guarana on sleep or mood disturbance.</p> <p>The FACIT-F showed significant improvement in mood for the two groups during the guarana implementation.</p>	<p>The study population was small.</p> <p>There were no significant differences between control group and the study groups' HADS scores.</p> <p>This was a single institutional trial.</p> <p>The presence of selection basis was possible as only patients with breast cancer were included.</p>	<p>Level III</p>	<p>This study is appropriate for my study because it is an alternative for patients who wish to use a complementary route for cancer-related fatigue versus prescription medication.</p>

				<p>antineoplastic treatment, or inability to sign an informed consent were excluded. Patients who could be harmed by the stimulating properties of guarana such as those with a history of insomnia, angina or other cardiovascular disease, uncontrolled hypertension, or neurologic disorders. Patients receiving antidepressants, anxiolytics, or sleeping pills were not included in this trial.</p> <p>Power= Moderate</p>					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
11	<p>Cella, D., Lai, J.S., and Stone, A. (2011). Self-reported fatigue: one dimension or more? Lessons from the functional assessment of chronic illness therapy-fatigue (FACIT-F) questionnaire. <i>Support Cancer Care, 19</i>, 1441-1450.</p>	EBSCO/FACIT -F/Not available.	The purpose of the study was to evaluate the use of the FACIT-F in evaluating cancer patient's fatigue.	<p>General population and patients with cancer-related fatigue who have undergone therapy. A random sample of 1,075 people, aged 18 and older.</p> <p>Across two general population (total n=1,878) in addition, two cancer (total n=3,140) samples. Mean age 63.3. Female 59.37%. Male 40.63%. The participants 23.3% had lung cancer, followed by breast (16.0%),</p>	<p>All comparisons were statistically significant at p=0.01, indicating that experience alone, affect alone, and overall fatigue could statistically discriminate participants with different performance levels and/or anemic status.</p>	<p>The scores can be reported as a single score or two separate scores (impact and experience).</p> <p>The sample size for general cancer patients consisted of a large sample size of 738 patients.</p> <p>The patients included varied in type of cancer, stage of cancer, different chemotherapies, and different demographic information.</p>	<p>Patients with mild fatigue rarely report significant impact on quality of life.</p> <p>Further research is needed to determine if experience and impact scores vary in different ways across different groups or if impact and experience change over time with treatment.</p> <p>The fatigue impact measure would be slightly more vulnerable to ceiling effects.</p> <p>The fatigue experience measure is more</p>	Level IV	I will use this study for my capstone, as the FACIT-F is the tool I plan to use for my study.

				gynecologic (12.6%), non-Hodgkin lymphoma (10.0%), and gastrointestinal cancer (8.7%). Participants were excluded when (1) average response time was less than one second per item; (2) response time was less than half a second for at least ten consecutive items; or (3) more than 50% missing data were identified. Power=Strong			vulnerable to floor effects.		
#	Article Citation	Database/Keywords/Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
1 2	Chan, R. (2011). Cochrane Review Summary for cancer nursing: Drug therapy for the management of cancer-related fatigue. <i>Cancer Nursing, 34</i> (3), 205-251.	EBSCO/Cancer-Related Fatigue/Information not available.	The purpose of the study was to assess the effectiveness and adverse events associated with drugs used for CRF in patients with cancer, compared with standard care or nonpharmacological intervention and to determine optimal dose and duration of drug therapies by reviewing 31 randomized controlled trials.	N/A	The meta-analysis included 31 randomized controlled trials. Psychostimulant had shown statistically significant effects in reducing CRF compared with placebo.	Psychostimulants have shown efficacy in reducing cancer-related fatigue. The Cochrane Review summarized 31 articles about the findings of the use of medications used for cancer-related fatigue.	RBC stimulants can no longer be recommended for treatment of fatigue due to increased risk of metastatic disease. The use of steroids did not show any improvement in cancer-related fatigue.	Level I	I do plan to use this article because it addresses the dangers of using RBC stimulants in treating fatigue.
#	Article Citation	Database/Keywords/Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
1 3	Ching Shun, S., Hur Lai, Y., and Hsiao, F.H. (2009). Patient-related barriers to fatigue communication in cancer patients receiving active treatment. <i>The Oncologist, 14</i> , 936-	EBSCO/Cancer-Related Fatigue/The National Taiwan University and National Science Council in Taiwan.	The purpose of the study was to explore barriers to reporting fatigue in cancer patients receiving active treatment and the significant	Patients with various types of cancers being treated in outpatient chemotherapy centers. The study assessed 288	Fear of distracting the doctor was rated as the highest barrier of reporting fatigue. The degree of fatigue interference	The sample size was large and contained 288 patients with various cancer types. A cross-sectional	Limitations exist first findings from this study can only be generalized to cancer patients receiving only chemotherapy	Level III	This is a study that I will use for my capstone project because it explores barriers to patients discussing

	943.		factors associated with those barriers from fatigue characteristics.	patients fatigue level from an outpatient chemotherapy center using the fatigue management barriers questionnaire . Patients receiving their first chemotherapy were excluded. Power= Strong	with daily life by patients was associated with the willingness to report fatigue. Patients with gastrointestinal cancer experienced more barriers to reporting fatigue than those with hematological cancer. Patients without religion perceived the highest level of barriers to fatigue communication. Outpatients had higher levels of concern regarding fatigue than inpatients.	survey was used. There were two different instruments used to assess fatigue levels the Fatigue Symptom Inventory (FSI) and the Fatigue Management Barriers Questionnaire (FMBQ).	or to those receiving concurrent chemo and radiation. Barriers to fatigue communication might change over time because of the symptom distress caused by active treatment. This study revealed that patients with different cancer diagnoses can have different levels of barriers.		their fatigue levels.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
14	Dahele, M., Skipworth, R.J.E., Wall, L., Voss, A., Preston, T., and Fearson, K.C.H. (2007). Objective physical activity and self-reported quality of life in patients receiving palliative chemotherapy. <i>Journal of Pain and Symptom Management</i> , 33(6), 676-685.	EBSCO/FACT-F/ This study was supported in part by an unrestricted grant from Ross Products Division, Abbott Laboratories, and Columbus, Ohio, USA.	The purpose of the study was to compare those patients receiving palliative chemotherapy to controls in the areas of patient's activity, quality of life and clinical performance status.	Patients with upper GI cancers and healthy volunteers were recruited. Twenty ambulant outpatients with biopsy-proven advanced upper GI cancer (esophagus = 8, gastric = 6, esophagogastric junction = 2, pancreatic = 2, and other = 2) were studied. Thirteen age-matched healthy volunteers were recruited from a local lawn bowling club. Eligibility criteria included proven cancer (patients only), being	The 20 patients with gastrointestinal cancer and 13 health patients that were assessed with the FACT-F and FACT questionnaires. The Energy expenditure was 8% lower and the medial steps taken/day was 43% lower in the palliative chemo group versus the general health patients. Patients receiving palliative chemotherapy are less active than healthy controls.	The study provides a little objective data about how cancer therapy affects physical activity.	The sample size is small and larger patient numbers needed to get an accurate assessment of the impact of palliative chemotherapy upon patient's quality of life and clinical performance status.	Level IV	I might use this article because of the data on energy expenditure of patients receiving treatment versus the general population. I will see if there is a relevant place in my capstone project for this information.

				<p>able to give informed consent and comply with study requirements, being able to wear the activity meter, and age 18 years or over. Exclusion criteria included dementia or other conditions causing confusion, the use of walking aids, and severe medical comorbidity that grossly impaired mobility (e.g., severe cardiac failure).</p> <p>Power= Weak</p>					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
15	<p>Escalante, C.P., Kallen, M.A., Valdres, R.U., Morrow, P.K., and Manzullo, E.F. (2010). Outcomes of a cancer-related fatigue clinic in a comprehensive cancer center. <i>Journal of Pain and Symptom Management</i>, 39(4), 691-701.</p>	<p>EBSCO/Cancer-Related Fatigue/ No information is available.</p>	<p>The purpose of this study is a retrospective review of patients treated in the cancer-related fatigue clinic.</p>	<p>Patients who attended the cancer-related fatigue clinic.</p> <p>Two-hundred sixty CRF patients in the sample, most were female (66%, n = 172). The most common cancer diagnosis was breast cancer (34%, n = 87). The sample was mainly White (82%, n = 212). CRF patients averaged .56 years of age (range: 24–86 years); 65% (n = 168) were married. Nearly two-thirds of patients (63%, n = 146) no longer had any evidence</p>	<p>There were 262 patients referred for evaluation of cancer-related fatigue.</p> <p>The study tools included the Brief Fatigue Inventory (BFI), Brief Pain Inventory (BPI), Brief sleep disturbance scale (BSD), Patient-Generated Subjective Global Assessment of Nutrition (PGSGAN), M.D. Anderson cancer-related symptom inventory, Functional Status Index (FSI), Beck Anxiety Inventory, Short Form-1, and Beck Anxiety Inventory (BAI).</p>	<p>Examine outcomes and describe challenges encountered in treating these patients.</p> <p>Large patient population. Retrospective review of patients treated in the cancer-related fatigue clinic between 1998-2005.</p>	<p>Patients are astonished at the suggestion of exercise.</p> <p>There is an increased risk of a type I error because the approach to conduct multiple comparisons across patient demographic and clinical characteristics and patient follow-up, fatigue severity, and treatment success status used unadjusted P-values.</p> <p>Ability to identify potentially important associations between cancer-related fatigue and predictors of cancer-related fatigue is difficult.</p>	<p>Level III</p>	<p>I am going to use this article as it has good evidence supporting treatment of patients with fatigue in cancer-related fatigue or survivorship clinics.</p>

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
16	Fagundes, C.P., Murray, D.M., Hwang, B.S., Gouin, J., Thayer, J.F., Sollers, J.J., Shapiro, C.L., Malarkey, W.B., and Kiecolt-Glaser, J.K. (2011). Sympathetic and parasympathetic activity in cancer-related fatigue: more evidence for a physiological substrate in cancer survivors. <i>Psychoneuroendocrinology</i> , 36, 1137-1147.	EBSCO/ Cancer-Related Fatigue/ NIH grants, NCCR Grant, and an American Cancer Society Postdoctoral Fellowship Grant.	The purpose of the study was to evaluate relationships between fatigue and both sympathetic and parasympathetic nervous system activity in breast cancer survivors.	Eligible women had completed treatment for stage 0-IIIa breast cancer within the past two years and were at least two months post-surgery, radiation, or chemotherapy (whichever occurred last). The sample size was 109 women. Exclusions included a prior history of breast or any other cancer except basal or squamous cell, more than 5 h a week of vigorous physical exercise, a body mass index (BMI) of 40 or greater, diabetes, chronic obstructive pulmonary disease, uncontrolled hypertension, evidence of liver or kidney failure, and symptomatic ischemic heart disease. Power=Mode rate	There were 109 women who had completed treatment for stage 0-IIIa breast cancer within the past two years, were at least two months post-surgery, radiation or chemotherapy. Multi-dimensional fatigue symptom inventory short form and RAND vigor/vitality scale. Women with more fatigue had significantly higher norepinephrine and lower heart rate variability before and after the stressor than their less fatigued counterparts.	The data suggests that heart rate variability and norepinephrine could prove to be important biomarkers for identifying an etiology for cancer-related fatigue.	Breast cancer survivors were more fatigued in this sample compared to other studies. The cross-sectional design can cause an uncertainty that heart rate variability or higher norepinephrine leads to greater fatigue for vice versa. Objective physiological measures of fatigue are needed	Level IV	The NCCN does not recommend checking biomarkers at this point for patients with cancer-related fatigue however the recommendations change frequently and I could end up using this article by the time my research starts.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria /	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/ Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
17	Fernandez-Lao, C., Cantarero-Villanueva, I., and Diaz-Rodriguez, L., Cuesta-Vargas, A.I., Fernandez Delas-Penas, C., and Arroyo-Morales, M. (2011). Attitudes towards massage modify effects of manual therapy in breast cancer survivors: a randomized clinical trial with crossover design. <i>European Journal of Cancer Care</i> , 21, 233-241.	EBSCO/Cancer-Related Fatigue/ The study was funded by a research project grant from the Health Institute Carlos III and a grant of Andalusian Health Service, Junta de Andalucía and a grant of the Research Office of the University of Granada.	The purpose of the study was to investigate the immediate effect of myofascial release on heart rate variability and mood state, and the influence of attitude towards massage in breast cancer survivors with cancer-related fatigue.	Breast cancer survivors. There were 20 participants included. They were eligible if: (1) had a diagnosis of breast cancer (stage I- IIIA); (2) between 25 and 65 years; (3) finished co-adjuvant treatment except hormone therapy; (4) not having active cancer; (5) had interest to improve their lifestyle; and (6) present moderate–high fatigue (>6 points over a 10 maximum score in the Piper Fatigue Scale during the preceding week). Power= Weak	The 20 breast cancer survivors studied had holter electrocardiograms and profile of mood states questionnaires. Patients who had manual therapy had a significant decrease in fatigue and disturbance of mood with no changes after placebo. The manual therapy had a positive influence on the attitude scale.	The study was conducted from December 2008 to June 2010. Both interventions were administered by a physical therapist with more than 5 years of clinical experience in manual therapy and more than 2 years treating breast cancer survivors. The intervention was designed by an experienced manual therapist.	The study was a single-blind placebo-controlled crossover design. There was a single operator procedure as the same therapist performed all manual therapy interventions that could not validate massage method. There is the possibility of placebo effects. The positive changes from massage are related to the patients' attitudes about massage.	Level III	Massage is an intervention for pain and fatigue through the NCCN guidelines and I will use this article in my capstone.
18	Gelinas, C. and Fillion, L. (2004). Factors related to persistent fatigue following completion of breast cancer treatment. <i>Oncology Nursing Forum</i> , 31(2), 269-278.	EBSCO/Cancer-Related Fatigue/ No information available.	The purpose of the study was to verify the predictive capacity of the stress-process theory to explain persistent fatigue following completion of breast cancer treatments; to verify the relationship between interleukin-16 and fatigue.	Breast cancer patients who had completed treatment. One hundred and three women in remission from breast cancer after the end of treatment. The inclusion criteria: included: (a) had received an initial breast cancer diagnosis, (b) had completed their cancer treatments (3–24	Fatigue was related theoretically and coherently too many stress-process variables. By controlling pain, the final regression model included cancer stressors and passive and active coping as predictors, which accounted for 41% of the variance in fatigue. This conclusion was reached by using the multi-dimensional	The stress-process theory represents a relevant theoretical framework to developed educational programs for patients with breast cancer. By focusing on reducing cancer-related stressors, nursing interventions based on this theoretical framework could be developed. The	The cross-sectional design. A single time measurement does not allow the dynamic changes in the stress variables to be investigated over time according to different cancer and treatment phases. Size was limited and samples were recruited from the radiation center and did	Level III	This article is appropriate because it addresses the relationship between pain and other cancer stressors such as fatigue. I will plan to use it in my capstone project.

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
				<p>months after the end of radiotherapy or chemotherapy). (c) were from 30–75 years of age (homogenous sample), and (d) understood and spoke French.</p> <p>Power= Moderate</p>	<p>fatigue inventory, inventory of recent life experiences for cancer patients. Subjective appraisal rating scale, profile of mood states, coping with health injuries and problems scale, and Brief Pain Inventory (BPI) on 103 women in remission from breast cancer who were recruited.</p>	<p>intervention is co-led by nurses.</p>	<p>not include women treated only with surgery and chemotherapy for breast cancer.</p> <p>The regression use as the confirmatory statistical analysis limits the results because it does not allow the exploration of mediation relationships between variables.</p>		
19	<p>Godino, C., Jodar, L., Duran, A., Martinez, I., and Schiaffino, A. (2006). Nursing education as an intervention to decrease fatigue perception in oncology patients. <i>European Journal of Oncology Nursing</i>, 10, 150-155.</p>	<p>EBSCO/FACT-F/ No information was available.</p>	<p>The purpose of the study is to determine whether nursing education decreased the perception of fatigue in patients with colon or gastric cancer.</p>	<p>Patients included were at the colorectal and digestive tumors unit on their first appointment to the oncologist.</p> <p>The sample consisted of 40 patients: 23 in the experimental group (12 men and 11 women) and 17 in the control group (nine men and eight women).</p> <p>The inclusion criteria were colorectal or gastric cancer patients; between 30 and 75 years old; Karnofsky Index \geq70%; chemotherapy-naïve, and willing to sign the consent form. Exclusion criteria were previous cancer treatment, presence of respiratory, cardiac or</p>	<p>Patients that received education had less fatigue than those that did not. Comparing fatigue levels between two groups of patients who received the same treatment and had the same type of cancer using the FACT-F.</p>	<p>Good evidence that education decreases fatigue.</p> <p>Supports Nurse Practitioner and DNP's role in education.</p> <p>Patient's satisfaction was high in regards to the intervention.</p>	<p>Performed in colon and gastric cancer patients.</p> <p>The sample size was small and was 40 patients total and was an experimental design.</p> <p>Some patients had fast disease progression and were unable to finish the study.</p> <p>Each group had to be reduced by 10 patients at some point in time in the study.</p> <p>The nursing intervention was different each time based upon the participant.</p>	<p>Level IV</p>	<p>Education is part of the NCCN guidelines for dealing with fatigue and I will use this article.</p>

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
20	Goedendorp, M.M., Gielissen, M.F.M., Peters, M.E.J.W., and Bleijenberg, G. (2008). Severe fatigue and related factors in cancer patients before the initiation of treatment. <i>British Journal of Cancer</i> , 99, 1408-1414.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of this study was to investigate the prevalence of severe fatigue and related factors in cancer patients before the initiation of treatment.	<p>hepatic dysfunctions; learning disability; central nervous system metastasis, and previous radiotherapy.</p> <p>Power= Moderate</p> <p>Patients were included in this study after being diagnosed with a primary cancer and before initiation of treatment with curative intention.</p> <p>There were 179 cancer patients who were eligible and included in the study.</p> <p>Patients with lung cancer, and head and neck cancer were not included. Patients were included if they were between 18 and 75 years old, and able to speak, read and write Dutch. Patients were excluded if they had a co-morbidity that could cause fatigue, indicated to be severely fatigued for several years or have been seeking treatment for their fatigue. Patients who were receiving psychiatric or psychological treatment in the last 3</p>	<p>Large numbers of cancer patients already experience severe fatigue before initiation of treatment. The tools used include the Checklist Individual Strength (CIS), Sickness Impact Profile (SIP), Beck Depression Inventory Primary Care (BDIP), Symptom Checklist-90 (SC-90), and six numeric rating scales to measure fatigue, pain, and physical activity.</p>	<p>This was the first study to look at the relationship between fatigue and pain.</p> <p>A large number of cancer patients already experience severe fatigue before cancer treatment initiation.</p> <p>A topic for future research is if patients with severe fatigue should have a kind of early intervention before initiation of cancer treatment.</p>	<p>Reliance on cross-sectional data.</p> <p>The patient's estimation of physical activity.</p> <p>The patient's perception of physical activity does not always match the real level.</p> <p>The prevalence of fatigue is significantly higher than in other studies.</p> <p>Potentially biased sample.</p>	Level III	This article raises a good question of the relationship between pain and fatigue and introduces an area for further research and I will use it in my capstone project.

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
21	Goldstein, D., Bennett, B.K., Webber, K., Boyle, F., de Souza, P. L., Wilcken, N.R.C., Scott, E. M., Toppler, R., Murie, P., O'Malley, L., McCourt, J., Friedlander, M., Hickie, I.B., and Lloyd, A.R. (2012). Cancer-related fatigue in women with breast cancer: Outcomes of a 5-year prospective cohort study. <i>Journal of Clinical Oncology</i> , 30, 1805-1812.	EBSCO/Cancer-Related Fatigue/ Susan G. Komen Foundation, University of New South Wales, Prince of Wales Hospital, Ramaciotti Foundation, and Friends of the Mater.	The purpose of the study was to study a prospective cohort of women receiving adjuvant treatment for early-stage breast cancer.	Women diagnosed with stage I or II breast cancer. Two-hundred fifty two women. Women were excluded if they were not literate in English or had serious medical or psychiatric comorbidities. Power= Strong	Persistent cancer-related fatigue was predicted by tumor sized but not demographic, psychologic, surgical, or hematologic parameters. Cancer-related fatigue was associated with significant disability and health care utilization. The tools used for analysis include the SPHERE, Sleep Assessment Questionnaire (SAQ), Brief Disability Questionnaire (BDQ), and the Perceived Need for Care Questionnaire (PNCQ), which was administered to 218 women and studied at 1, 3, 6, 9, 12 months and 5 years.	The predictors of persistent fatigue, mood disturbance, and health care utilization were analyzed by the logistic regression mode. Large sample size. Alternative explanations were pursued for ongoing symptoms to allow a reliable association between cancer, treatment, and chronic fatigue. Research suggests that the natural history of cancer-related fatigue is favorable.	Not all patients who participated in the study were included in the main cohort. There were no treatment related factors that predicted cancer-related fatigue. Large tumor size was the only predictor of persistent cancer-related fatigue and the effect size was minimal. Rates of cancer-related fatigue were consistent across the board despite which tool was administered. No clinical evaluation was performed at 5 years.	Level III	I will use this article for my capstone because it provides information about consistency of tools measuring fatigue and it follows patients 5 years out which is what our survivorship clinic would like to do in practice.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
22	Hauser, K., Rybicki, L., and Walsh, D. (2010). What's in a name? Word descriptors of cancer-related fatigue. <i>Palliative Medicine</i> , 24(7), 724-730.	EBSCO/Cancer-Related Fatigue/ There was no specific funding received for this study.	The purpose of the study was to identify clinical associations of three-fatigue word descriptors 'easy fatigue', 'weakness', and 'lack of energy'.	Advanced cancer patients referred to the Cleveland Clinic Palliative Medicine program. 1000 patients consecutively referred to the palliative medicine program. No exclusion criteria was noted.	The prevalence of 'easy fatigue' was 69%, 'weakness' 66%, and 'lack of energy' 61%. Evaluation of fatigue should use multiple descriptors as they are not synonymous. The 38-item symptom checklist was administered to 1000 palliative medicine patients.	The study found that using multiple descriptors allows for a complete description of the subjective experience. The population was large in size. The timing of the referral to palliative care is positive because	Lack of validation of the symptom instrument. The fatigue word descriptors are not synonymous.	Level III	I will use this article for my capstone as it is important how we word our questions to patients.

				Power= Strong	Patients who had more than two or three fatigue word descriptors had an increase in mortality.	palliative care providers are trained to deal with patients with a high symptom burden. The rating scale minimized missing data.			
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
2 3	Hoffman, A.J., von Eye, A., Gift, A.G., Given, B.A., Given, C.W., and Rotherth, M. (2009). Testing a theoretical model of perceived self-efficacy for cancer-related fatigue self-management and optimal physical functional status. <i>Nursing Research</i> , 58(1), 32-41.	EBSCO/Cancer-Related Fatigue/ National Institutes of Health, National Institute of Nursing Research, Individual Ruth L. Kirschstein National Research Service Award, Grant 1F31 NR009621-01A1, Mary Margaret Walther Cancer Research Fellowship, Behavioral Cooperative Oncology Group, Walther Cancer Institute, Indianapolis, Indiana, Blue Cross Blue Shield of Michigan Foundation, Sigma Theta Tau International Honor Society of Nursing, Kappa Epsilon Chapter-At-Large, and John F. Dunkel Scholarship Award.	The purpose of the study was to test the hypothesis that physical functional status can be predicted through patient characteristics, cancer-related fatigue, other symptoms, and perceived self-efficacy for fatigue self-management in persons with cancer.	The sample included patients with cancer who had undergone at least 2 cycles of chemotherapy. The sample included 105 breast patients, 63 lung patients, 44 colon patients, 86 patients with other sites of cancer. Study participants were at least 21 years old and undergoing a course of chemotherapy with at least two cycles remaining at time of enrollment for a new or recurrent diagnosis of breast, colorectal, or lung cancer; other solid tumors; and non-Hodgkin's lymphoma and may have been receiving concurrent radiation therapy. Persons had to be intact cognitively, English	The results support the hypotheses testing in this study support the credibility of the theoretical framework derived through a synthesis of the TOUS and Banduras Self-Efficacy theory. Brief Fatigue Inventory (BFI) and Lorig Arthritis Self-efficacy scale (ASE).	The model was improved by removing nonsignificant paths and including paths that were not taken into account the first time. Removing and including new paths was based on parameter estimates, modification indices, goodness-of-fit tests, and theoretical considerations. Greater cancer-related fatigue increases the average symptoms that patients have during chemotherapy.	Study data was obtained through secondary analysis of people undergoing chemotherapy. The final findings can only be generalized to patients who are undergoing chemotherapy and are fatigued. The analysis was partly exploratory and needs to be reproduced to support the findings.	Level V	This is an important subject regarding cancer-related fatigue. The level of evidence is insufficient however if I find that it is relevant at the time then I might use it in my capstone project.

				speaking, able to conduct telephone interviews, and not receiving hospice care. Power= Strong					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
24	Honea, N., Brant, J., and Beck, S.L. (2007). Treatment-Related symptom clusters. <i>Seminars in Oncology Nursing</i> , 23(2), 142-151.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study was to identify cancer treatment-related symptom clusters that arise or worsen during treatment.	N/A	Clinical overview of treatment-related symptom clusters as well as a practical basis for examining and managing them. The review of symptoms is helpful because 1.4 million people were diagnosed with cancer in 2007.	Managing one cancer-related symptom may intern improve another symptom. Comprehensive assessment tools can be helpful in assessing symptoms. Relieving symptoms can improve how patients manage treatment.	There are several different modalities of treatment and each modality affects patients differently.	Level I	I will use this article, as it is important to identify symptoms that go along with the treatment modalities that patients have undergone.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
25	Hwang, S.S., Chang, V.T., Rue, M., and Kasimis, B. (2003). Multidimensional independent predictors of cancer-related fatigue. <i>Journal of Pain and symptom management</i> , 26(1), 604-614.	EBSCO/FACT-F/ Information not available.	The purpose of the study was to identify independent predictors of clinically significant fatigue based upon a multidimensional model.	Male veteran cancer patients. Seventy-four outpatients and 106 inpatients diagnosed with cancer. No exclusion criterion was noted. Power= Moderate	Fatigue was present in 113 patients and 80 patients had unusual fatigue. The levels of fatigue were assess by using the FACT-F, Brief Fatigue Inventory (BFI), memorial symptom assessment scale short form, Zung self-rating depression, and Karonfsky performance status in 180 cancers patients who completed questionnaires.	Multiple logistic regression analyses support a symptom-oriented approach of assessment of cancer-related fatigue. Several of the independent predictors have been previously reported. The finding that physical and psychological symptoms can predict fatigue in the multidimensional model adds a new perspective	There is limited information on the effectiveness of symptom interventions in advanced cancer patients. Patients with cancer have multiple symptoms and fatigue is common. The interventions used for symptoms are moderately effective. Study was conducted at a VA medical center, therefore, results cannot	Level III	This is appropriate for my capstone project and I will plan to use this article.

						on fatigue assessment and shows the importance of systematic symptom assessment.	be generalized. This was a secondary analysis and further studies are needed to confirm the findings.		
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
26	Johnson, R.L., Amin, A.R., and Matzo, M. (2012). Cancer-related fatigue. <i>American Journal of Nursing, 112(4)</i> , 57-60.	EBSCO/Cancer-Related Fatigue/ No information was given.	The purpose of the study was to obtain recommendations for management of cancer-related fatigue.	N/A	Fatigue was best tackled multi-dimensional. The Meta-analysis reveals that no single tool was better than another was.	Clinicians need to understand the causes and evidence-based practice recommendations to adequately treat patients.	Information may not be generalized to all cancer patients.	Level I	This article is appropriate for my capstone project as it summarizes the NCCN guidelines.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
27	Kamath, J., Feinn, R., and Winokur, A. (2012). Thyrotropin-releasing hormone as a treatment for cancer-related fatigue: a randomized controlled study. <i>Supportive Cancer Care, 20</i> , 1745-1753.	EBSCO/Cancer-Related Fatigue/ Susan G. Komen Foundation, the Hollfelder foundation, the General Clinical Research Center at the University of Connecticut Health Center (National Institute of Health grant no. M01 RR06192), and the Manfred J Sakel Distinguished Chair in Psychiatry Fund.	The purpose of this study was to evaluate the efficacy of the thyrotropin-releasing hormone in improvement in fatigue levels.	Patients with cancer experiencing significant fatigue without medically reversible causes. Eight Patients were in the sample. Patients in the study were at least 18 years of age and were at least 1 month beyond chemotherapy. Patients with comorbid conditions contributing to the severity of the fatigue were allowed to participate if these comorbidities were not clinically significant from the perspective of fatigue symptoms and did not dominate the clinical	Thyrotropin-releasing hormone resulted in significant improvement in fatigue levels for 8 patients who were assessed with the FACIT-F and completed the study.	TRH was safe and tolerable in the treatment of cancer-related fatigue and had a positive impact on quality of life. These results provide an area for further research in a larger population who suffer from cancer-related fatigue.	The sample size was small and homogenous patient population. The fatigue in the group was widely variable. There are potential errors in a cross-over design.	Level III	I will use this article as it is another option for those who do not respond to the treatments recommended by the NCCN.

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
28	Kirshbaum, M. (2010). Cancer-related fatigue: a review of nursing interventions. <i>British Journal of Community Nursing</i> , 15(5), 214-219.	EBSCO/Cancer-Related Fatigue/ No information given.	The purpose of this study was to review the current knowledge surrounding cancer-related fatigue and the nursing interventions that can be implemented in community practice.	N/A	Physical exercise and the treatment of underlying problems are effective interventions. Complementary therapies are likely helpful. The Meta-analysis used the FACT-F and EORTC for analysis.	An individually tailored holistic approach is recommended that includes review of symptoms and discussion of how to control the symptoms.	There were 436 titles were initially identified and only 61 articles were used because of overt lack of relevance. Research is still recommended to provide stronger support for a wide range of interventions.	Level I	This is appropriate for my capstone project and I will use it.
29	Kisiel-Sajewicz, K., Davis, M.P., Siemionow, V., Seyidova-Khoshknabi, D., Wyant, A., Walsh, D., Hou, J., and Yue, G.H. (2012). Lack of muscle contractile property changes at the time of perceived physical exhaustion suggests central mechanisms contributing to early motor task failure in patients with cancer-related fatigue. <i>Journal of Pain and Symptom Management</i> , 44(3), 351-361.	EBSCO/Cancer-Related Fatigue/ This study was supported by a Cleveland Clinic grant and a Ministry of Science and Higher Education grant from the Republic of Poland.	The purpose of the study was to determine if muscle contractility alterations occurred at the end of a low-intensity muscle contraction to exhaustion and if these properties differed between those with cancer-related fatigue and healthy individuals.	Cancer survivors with cancer-related fatigue. Ten middle-aged patients including seven women with advanced solid cancer (lung, breast, and gastrointestinal cancer) and CRF and 12 middle-aged healthy controls participated in the study. Eligible patients had a hemoglobin concentration >10 g/dL, and no clinical evidence of polyneuropathy, amyotrophy, or a myasthenic syndrome, by history and physical examination. COPD and oxygen	Cancer-related fatigue patients failed motor tasks earlier than the healthy controls. Analysis was done with Brief Fatigue Inventory (BFI) and the sample size was 10 patients with advanced cancer 12 healthy controls.	Muscle tissue is directly related to cancer-related fatigue and can impair neuromuscular abnormalities. The use of central stimulant drugs to patients with cancer-related fatigue may be important during treatment.	Limitation is small sample size. The ages between the cancer-related fatigue patients (average 59.9 years) and the control patients (average 46.6 years) was different. Upper limb muscles slow with age. A discrepancy exists between perceived physical exhaustion and true physical exhaustion.	Level IV	Stimulants are part of the NCCN guidelines and this gives further evidence of use for medications when all other options have been exhausted. I will use this in my capstone project.

				dependence was an exclusion criterion for both groups. Patients and controls that suffered from depression or were currently on psychostimulants or antidepressants were excluded. Patients with weight loss greater than 10% of pre-illness body weight were excluded. Power= Weak					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
30	Kluthcovsky, A.C.G.C., Urbanetz, A. A., de Carvalho, D. S., Maluf, E. M. C. P., Sylvestre, G.C.S., and Hatschbach, S.B.B. (2012). Fatigue after treatment in breast cancer survivors: Prevalence, determinants and impact on health-related quality of life. <i>Supportive Cancer Care</i> , 20, 1901-1909.	EBSCO/Cancer-Related Fatigue/ No financial support was received for this study.	The purpose of the study was to evaluate if disease free cancer survivors experience fatigue that affects their quality of life.	Breast cancer survivors who were at least a year out from diagnosis. Two-hundred two women participated in this study. Eligible criteria included: female patients with primary breast cancer, whose diagnosis has been made more than 1 year before data collection, 18 years of age or older, and those without cognitive function and communication problems. Women with evidence of metastatic cancer or those with a history of other types of cancer were excluded.	The Piper fatigue scale and the European Organization for Research and Treatment of Cancer QLQ-C30 were used for analysis in the 202 women diagnosed with breast cancer who were evaluated.	Associations were found with patients that higher rates of pain with an increased risk for fatigue. The study may contribute to management of fatigue in cancer survivors. The focus on the fatigue in Brazilian disease-free breast cancer survivors. Use of two standardized and internationally validated cancer-related questionnaires.	Study was cross-sectional and conducted at two different centers. No causal relations among the variables can be established. Further evaluation is required to identify the relationship between fatigue and pain. An instrument needs to be designed to assess depression, psychosocial or biological factors.	Level IV	I will use this study in my capstone project as it is relevant to the issue at hand.

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
31	Kurz, K., Fiegl, M., Holzner, B., Giesinger, J., Pircher, M., Weiss, G., Denz, H.A., and Fuchs, D. (2012). Fatigue in patients with lung cancer is related with accelerated tryptophan breakdown. <i>PLoS one</i> , 7(5), 1-9.	EBSCO/Cancer-Related Fatigue/ Information was not available.	The purpose of the study is to examine the relationship between fatigue and breakdown of essential amino acids and tryptophan.	Lung cancer patients with fatigue. Sample size was 50 patients. No exclusion criterion was identified. Power= Weak	Scores of psychological tests correlated significantly with tryptophan breakdown and with circulatory markers of inflammation. The patients were analyzed using the FACT-An and FACT-F and FACT-general and Mental Adjustment to Cancer questionnaire. The population analyzed included 50 patients with lung cancer suffering from fatigue.	The self-assessment of patients' fatigue correlated with their results of the FACT-F and FACT-An.	The population was small. The population was heterogeneous with different kinds of lung cancer, stages, and treatment regimens. The analysis of the subgroups is underpowered. The relationship between the metabolic changes could not be analyzed. Cross-sectional study can only provide correlational evidence.	Level III	I am not going to use this study in my capstone.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
32	Kwak, S.M., Choi, Y.S., Yoon, H. M., Kim, D.G., Song, S.H., Lee, Y.J., Yeom, C.H., Koh, S.J., Park, J., Lee, M.A., and Suh, S.Y. (2011). The relationship between interleukin-6, tumor necrosis factor, and fatigue in terminally ill cancer patients. <i>Palliative Medicine</i> , 26(3), 275-282.	EBSCO/Cancer-Related Fatigue/ Korean Academy of Family Physicians Grant.	The purpose of the study was to measure fatigue while assessing a variety of possible correlates.	Patients with cancer-related fatigue. There were 90 participants. The inclusion criteria were incurable cancer, age greater than 18 years, ability to complete questionnaire and participate in an interview, and no evidence of cognitive impairment. Exclusion criteria included the following specific medical	BMI, dyspnea, Western Cooperative Oncology group performance status, and the levels of albumin, BUN, total bilirubin, and c-reactive protein were significantly associated with fatigue. Levels of the two proinflammatory cytokines were not significantly associated with fatigue. The analysis was done by structured interview and questionnaire related to their medical conditions.	Study method is sound, precise, and the Cronbach's alpha coefficient for the Brief Fatigue Inventory-K (BFI-K) in the study was calculated at 0.95. Correlations between fatigue scores and levels IL-6 and TNF-a were examined using Spearman's correlation analysis. Multiple linear regression analysis was used to assess associations	Unidimensional assessment tool to evaluate fatigue but fatigue could include multifactorial symptoms such as physical, mental of affective problems. There was no way to clarify the detailed contribution of these predictive factors to fatigue, No additional information about mood status such as anxiety and stress levels, or psychosocial factors such	Level III	I will use this for my capstone project as it provides valuable information on correlates with fatigue.

				<p>problems chemotherapy, radiotherapy, planned to actively treat the cancer, hematologic malignancies, use of psycho-stimulant medication, known history of a psychiatric disorder, fever, prescribed antibiotics due to infection at enrollment, prophylactic antiepileptic medication use against seizure and elevated TSH levels within the month prior to enrollment.</p> <p>Power= Strong</p>	<p>The study population was 90 patients with incurable cancer (median survival 27 days)</p>	<p>between BFI scores and covariates.</p> <p>Statistical tests were two-sided at the 0.05 significance level.</p>	<p>as marital status, relationships, employment status and financial problems were studied.</p>		
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
33	<p>Lai, J.S., Cella, D., Chang, C.H., Bode, R.K., and Heinemann, A.W. (2003). Item banking to improve, shorten and computerize self-reported fatigue: An illustration of steps to create a core item bank from the FACIT-T Fatigue scale. <i>Quality of Life Research</i>, 12, 485-501.</p>	<p>EBSCO/FACIT-F/ Information was not given.</p>	<p>The purpose of the study was to identify how to an item bank, using 13 items from the Functional Assessment of Chronic Illness Therapy Fatigue Subscale as the basis.</p>	<p>Anemic cancer patients and patients from the general population that were not screened for health problems.</p> <p>The general population number was 1010 and the cancer population studied was 1022.</p> <p>There was no exclusion criteria noted.</p> <p>Power=Strong</p>	<p>Fatigue is worse in cancer patients than the general population. The FACIT-F was used to analyze the 1022 cancer patients and 1010 random sample.</p>	<p>The ability to expand the test item bank.</p> <p>Structure for well-defined fatigue assessment driven by a testable measurement model.</p>	<p>Inability to calculate errors for polytomous scale.</p> <p>Bias due to the high non-response rate of 47% in the general population sample.</p>	<p>Level IV</p>	<p>I will use this in my capstone project because the data is sound and I am going to use the FACIT-F for my assessment tool.</p>
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
34	<p>Lower, E.E., Fleishman, S., Cooper, A., Zeldis, J., Faleck, H., Yu, Z., and Manning, D.</p>	<p>EBSCO/Cancer-Related Fatigue/ Celgene Corporation.</p>	<p>The purpose of the study was to evaluate the uses of dexamethylphen</p>	<p>Patients who have undergone cytotoxic chemotherapy</p>	<p>Improvement in fatigue symptoms, no cognitive function</p>	<p>Improvement in fatigue symptoms.</p> <p>Double-blind,</p>	<p>High rate of adverse events and higher rate of discontinuatio</p>	<p>Level IV</p>	<p>This study is appropriate for my project because</p>

	(2009). Efficacy of dexmethylphenidate for the treatment of fatigue after cancer chemotherapy: a randomized clinical trial. <i>Journal of Pain and Symptom Management</i> , 38(5), 650-662.		idate for treatment of chemotherapy-related fatigue and cognitive impairment.	y and are experiencing fatigue. One hundred sixty-eight patients were enrolled in the study. Patients were males or females who were not pregnant or lactating aged 18–70 years with diagnoses of cancer, excluding primary or metastatic brain tumors, previously treated with ≥4 cycles of cytotoxic chemotherapy completed ≥2 months before study entry. Patients were required to have a life expectancy of >6 months. Power= Strong	improvement. High rate of adverse events and higher rate of discontinuation. The analysis was done with FACIT-F and Clinical Global Impression-severity scores. The population was 154 patients with breast and ovarian cancer.	placebo-controlled study.	n. No cognitive function improvement. Low baseline fatigue, low dose, and a short observation period. Data was exploratory.		dexmethylphenidate is indicated for use of cancer-related fatigue treatment in the NCCN guidelines.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
35	Luthy, C., Cedraschi, C., Pugliesi, A., Di Silvestro, K., Mugnier-Konrad, B., Rapiti, E., and Allaz, A. (2011). Patients' views about causes and preferences for the management of cancer-related fatigue-a case for non-congruence with the physicians? <i>Supportive Cancer Care</i> , 19, 363-370.	EBSCO/Cancer-Related Fatigue/ No funding given.	The purpose of the study was to explore patients' views about CRF and determining whether they are congruent with best practice treatments.	Hospitalized patients with cancer-related fatigue. One hundred and sixty patients hospitalized in a supportive care setting. Inclusion criteria were patients 18 years old, undergoing an active cancer treatment and a sufficient knowledge of French. Power= Moderate	Anxiety, depression and dimensions of quality of life were significantly related with CRF. Two thirds of the patients associated CRF with cancer-related morbidities. The Brief Fatigue Inventory and questionnaire was used for the analysis of 160 patients hospitalized in a supportive care setting.	Clinical and psychological characteristics of the patients in sample were similar to those of other supportive care settings. Results put an emphasis on the perceived costs and benefits of the interventions and discussing fatigue.	Conducted in a teaching hospital and questionable whether it is applicable to other settings. Cross-sectional and cannot establish causal relationships.	Level III	This study is appropriate for my capstone project and I plan to use it.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?

				Size/Criteria / Power				ce	
3 6	Mallinson, T., Cella, D., Cashy, J.L., and Holzner, B. (2006). Giving meaning to measure: linking self-reported fatigue and function to performance of everyday activities. <i>Journal of Pain and Symptom Management, 31(3)</i> , 229-241.	EBSCO/FACIT-F/ Ortho Biotech, Advanced Rehabilitation Research Training Project in Health Services Research to Northwestern University from the National Institute of Disability and Rehabilitation.	The purpose of the study is to examine the relationships between self-reported and performance-based measures of function in patients receiving chemotherapy to link self-reported fatigue measures to self-report and performance-based measures of function.	Cancer patients in urban hospitals who had begun chemo in the last 2 weeks. The population evaluated was 64 patients who had begun chemotherapy in the last 2 weeks. Patients who were receiving their first cycle of CT, read English fluently, and had no overt evidence of motor or neurological problems were eligible to participate. Power= Moderate	Increase in reported fatigue correlated with less ability to function physically. The analysis tool used was the FACIT-F physical function 10 subscale.	Begin to link fatigue scores to a person's ability to perform everyday activities. Strongest correlations between assessments that tapped the same level of disablement under the ICF model.	Measures of cognitive performance did not correlate strongly with fatigue or physical function. Future studies should examine the relationships found in this study and if they are maintained at the end of treatment.	Level III	I will use this in my capstone as it establishes the use of the FACIT-F.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
3 7	Minton, O., Richardson, A., Sharpe, M., Hotopf, M., and Stone, P.C. (2011). Psychostimulant for the management of cancer-related fatigue: a systematic review and meta-analysis. <i>Journal of Pain and Symptom Management, 41(4)</i> , 761-767.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study was to assess and summarize the increasing evidence for the use of psychostimulant particularly methylphenidate in the treatment of CRF.	N/A	Several trials failed to find any benefit over placebo.	Meta-analysis of 5 psychostimulant trials. Significant effect of psychostimulants over placebos. All but one study used the FACT-F.	Studies independently were difficult to interpret.	Level I	I will use this in my project as part of the NCCN guidelines is stimulants and I plan to use the FACIT-F in my project.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
3 8	Minton, O., and Stone, P.C. (2010). The use of proteomics as a research methodology for studying cancer-related fatigue: a review. <i>Palliative Medicine, 24(3)</i> , 310-316.	EBSCO/Cancer-Related Fatigue/FACT-F/Information not available.	The purpose of the study was to examine specifically the potential role of the science of protein structure and function (proteomics) as a technique to improve our knowledge in this area.	N/A	It is hoped that proteomic investigations linked to a well-defined clinical phenotype will eventually generate a panel of several biomarkers that reliably associated	Meta-analysis	Studies typically only involve 50-100 subjects. Any protein signatures identified need to be validated in larger external datasets.	Level I	I plan to use this in my capstone project as it is important to identify other potential causes of fatigue and the FACT-F was used.

					with CRF. The tools used for analysis were the FACT-F, Chalder fatigue scale, European Organization for research and treatment of cancer, 30-item quality of life questionnaire.				
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
39	Murphy, H., Alexander, S., and Stone, P. (2006). Investigation of diagnostic criteria for cancer-related fatigue syndrome in patients with advanced cancer: a feasibility study. <i>Palliative Medicine</i> , 20, 413-418.	EBSCO/Cancer-Related Fatigue/ Information not given.	The purpose of the study was to explore the feasibility of applying diagnostic criteria for cancer-related fatigue syndrome in patients with advanced cancer and to assess the use of screening instruments for fatigue and expression in this population.	Patients with advanced cancer who are currently experiencing fatigue. The sample size was 16 patients. The exclusion criterion was those under 18. Power= Weak	BFS has a sensitivity of 70% and specificity of 64% and Edinburgh had 67% sensitivity and specificity of 100%. Bi-dimensional fatigue scale and Edinburgh Postnatal depression scale. The population of interest is 16 patients with advanced cancer were interviewed using the diagnostic interview.	The diagnostic criterion developed is feasible even in patients with advanced disease.	Excluding patients with co-morbid psychiatric disorders from the diagnosis of CRFS significantly lowers the prevalence of fatigue and may give a low prevalence of the disorder. The SCID took 45 minutes complete and two patients withdrew because they were too tired to complete.	Level III	This study is not applicable to my capstone project.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
40	Oh, H.S. and Seo, W.S. (2011). Systematic review and meta-analysis of the correlates of cancer-related fatigue. <i>Worldviews on Evidence-Based Nursing</i> , fourth quarter, 191-201.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study was to examine overall association of symptom and psychological distress with cancer-related fatigue using literature review.	N/A	All symptoms and psychological distress had a significant association with cancer-related fatigue with medium to large effect sizes. Piper's Conceptual Model of Fatigue was used as the tool for analysis.	Meta-analysis of 30 primary studies.	Further meta-analysis with other correlates of fatigue with the Piper's model is required. Findings of the quantitative review could be used as a knowledge basis for the development or examination of new hypotheses of the etiology of cancer-related fatigue. Hard to combine	Level I	This study is appropriate for my capstone project even though a different model of fatigue was used than I will be using.

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
41	Piper, B.F., Borneman, T., Chih-YiSun, V., Koczywas, M., Uman, G., Ferrell, B., and James, R.L. (2008). Cancer-related fatigue: role of oncology nurses in translating national comprehensive cancer network assessment guidelines into practice. <i>Clinical Journal of Oncology Nursing</i> , 12(5), 37-47.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study was to review the NCCN guidelines for cancer-related fatigue assessment and discusses many of the common barriers that hinder the translation of the cancer-related fatigue guidelines into practice settings.	N/A	Oncology nurses must remember to assess the gang of 7 (anemia, pain, sleep difficulties, nutrition issues, deconditioning, emotional distress, comorbidities).	By using resources, nurses can play significant roles in helping patients with fatigue.	The lack of clearly defined criteria for identifying a cancer-related fatigue diagnosis for research, disability, and reimbursement purposes may limit the field.	Level I	I will use this study in my capstone project as it is important in using the NCCN guidelines.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
42	Reidy, A. (2011). Cancer-related fatigue: physical assessment is not enough. <i>British Journal of Nursing</i> , 20(17), s32-s39.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study is to examine literature regarding the prevalence of cancer-related fatigue, its manifestation and assessment.	N/A	Encourages health care professionals to reflect on their own practice when assessing and managing fatigue and identifies the need to address the psychosocial dimensions of the experience as well as the physical.	Literature review. Knowledge with participants stating that they found it helpful that they understood what was happening.	Literature review found that larger sample sizes are needed, greater diversity of sample populations, exploration of interventions in recurrent disease, query into the correlation between fatigue interventions and quality of life, and pharmacological and non-pharmacological interventions.	Level I	I will plan to use this study in my capstone project.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
43	Saligan, L.N. and Kim, H.S. (2012). A systematic review of the association between immunogenomic markers and cancer-related fatigue. <i>Brain, Behavior, and Immunity</i> , 26, 830-848.	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study is to systematically review of 34 studies to determine patterns of associations between immunogenomic markers and levels of cancer-related fatigue.	N/A	Correlation between elevated inflammatory markers and cancer-related fatigue.	Ten longitudinal and twenty-four cross sectional studies. Patterns of associations between specific immunogenomic markers and fatigue in	Lack of longitudinal studies exploring the associations of immunogenomic markers and fatigue. Lack of case-definition of cancer-related fatigue.	Level I	This study is appropriate for my capstone project because of the correlation of immunogenomic markers and cancer-related fatigue.

						survivors with early stages of cancer.	Lack of standard cancer-related fatigue measures that can predict clinical significance.		
#	Article Citation	Database/Keywords/Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
44	Seo, Y., Oh, H., and Seo, W. (2010). Causal relationships among factors associated with cancer-related fatigue. <i>European Journal of Oncology Nursing</i> , 14, 380-386.	EBSCO/Cancer-Related Fatigue/ INHA UNIVERSITY Research Grant.	The purpose of the study is to develop and verify a comprehensive model that illustrates the dynamic causal relationships between fatigue and its associated factors in cancer patients.	<p>Cancer patients with fatigue and its associated factors.</p> <p>One hundred and ten patients in/outpatients with various types of cancer.</p> <p>Inclusion criteria were those with a diagnosis of cancer who were undergoing chemotherapy, radiation therapy, or conservative therapy; those who understood the study purpose and consented to participate in the study; and those who were able to read and comprehend the questionnaire.</p> <p>Power= Moderate</p>	Psychological distress should be relieved in combination with a strategy to reduce physical distress in order to obtain better outcomes with respect to CRF. The fatigue scale used was the Piper Fatigue scale. The population of interest was 110 in or outpatients with various types of cancer being treated at a University hospital.	The most prominent finding is that fatigue is affected directly by exercise alone.	<p>The patients had various cancers at various stages.</p> <p>Only exercise had a direct effect on fatigue.</p> <p>The results of this study are in conflict with previous studies where physiological, physical performance and sleep-related factors were found to be related significantly to fatigue.</p>	Level III	The study is appropriate for my capstone project because exercise is indicated in the NCCN guidelines for cancer-related fatigue treatment.
#	Article Citation	Database/Keywords/Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
45	Skerman, H.M., Yates, P.M., and Battistutta, D. (2012). Cancer-related symptom clusters for symptom management in outpatients after commencing adjuvant chemotherapy at 6 months, and 12 months. <i>Support Care Cancer</i> , 20, 95-105.	EBSCO/Cancer-Related Fatigue/ QUT Postgraduate Research Award.	The purpose of the study was to analyze secondary data analysis to investigate symptom clusters over time for symptom management of a patient group after commencing adjuvant	<p>Cancer outpatients within 1 month of commencing treatment.</p> <p>There were 219 patients who participated in the study.</p> <p>The inclusion criteria were</p>	Fatigue and daytime sleepiness were the most prevalent distressing symptoms over time. The fatigue tool used was the Rotterdam Symptom Checklist. The population of interest was	<p>The pattern coefficients guide the decision on the number of clusters and structure coefficients.</p> <p>Using structure coefficients better reflects the clinical reality that</p>	<p>No control over the sample and symptom assessment, no assessment prior to treatment.</p> <p>Only physical symptoms were assessed.</p> <p>Patients in</p>	Level III	The study is appropriate for my capstone project and I plan to use it in my paper.

			chemotherapy.	age 18 and ability to read the information. Power= Moderate	219 cancer outpatient's prospective longitudinal study within one month of commencing chemotherapy, 6 months, and 12 months.	symptoms could arise from different causal mechanisms.	poor health were lost to attrition.		
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
4 6	Taskila, T., Dijk, F.J. and Verbeek, A.M. (2011). Fatigue and its correlates in cancer patients who had returned to work—a cohort study. <i>Psycho-Oncology</i> , 20, 1236-1241.	EBSCO/Cancer-Related Fatigue/ Dutch Cancer Society.	The purpose of the study was to Understand patients' perspectives and experiences is an undoubted asset for efficient health exploring how beliefs and interventions and improved clinical concordance. Health interventions should be ecological and attuned to the specific sociocultural context of the patients.	Patients between 18 and 58 years of age, who had been treated for primary diagnosis of cancer in one of the three participating hospitals in The Netherlands, were asked to participate in the study. There were 195 participants total. Patients had to be in paid employment at the time of the diagnosis, to be within 4–6 months following their first day of sick leave, and to have had treatment with curative intent. Power= Strong	Lack of workplace accommodations was related to fatigue at the end of the follow-up. Accommodations for illness can help to reduce fatigue and depression.	Study showed work place accommodations helped patients cope with cancer-related fatigue.	Patients in this study were out on sick leave at the end of follow-up. Depression was an initial determinant of fatigue, but not a year later.	Level III	I will use this study in my capstone as it discusses the impact of work on cancer-related fatigue that is important to discuss with patients.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
4 7	Vallance, J.K., Lavalley, C.M., Culos-Reed, N.S, and Trudeau, M.G. (2011). Physical activity is associated with clinically important differences	EBSCO/Cancer-Related Fatigue/ Project Interface Grant from Alberta Health Services—	The purpose of the study was to examine differences in health-related quality of life and fatigue between rural	Breast cancer patients who live in a rural community. There 524 patients who participated	The conclusion was that 44.1%, 13.7%, and 34.7% breast cancer survivors met public health	Retrospective survey design. Large population of 524 patients.	Selection bias may exist because of the transparent purpose of the study and time lapse since	Level III	I will use this in my capstone project because I live in a rural town and the data will be

	in health-related quality of life among rural and small-town breast cancer survivors. <i>Supportive Cancer Care</i> , 20, 1079-1087.	Cancer Corridor.	and small-town breast cancer survivors meeting and not meeting public health physical activity recommendation.	in the study. Patients included were survivors who were at least 18 years of age, living in rural and small town sectors of Southern Alberta, Canada, diagnosed with (and histologically confirmed) stage I-IIIa breast cancer, and completed adjuvant therapy except hormone therapy. Power=Strong	physical activity recommendations.	Study provides evidence that rural and small-town survivors have similar behaviors estimates across the cancer trajectory to urban survivors.	diagnosis may cause difficulty in recall.		useful.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
48	Van der Lee, M. L. and Garssen, B. (2010). Mindfulness-based cognitive therapy reduces chronic cancer-related fatigue: a treatment study. <i>Psycho-Oncology</i> , 21, 264-272.	EBSCO/Cancer-Related Fatigue/ Zorg Innovatie Fonds.	The purpose of the study was to evaluate the efficacy of mindfulness-based cognitive group therapy in reducing fatigue.	Curatively treated adult cancer patients. There were 59 participants. The inclusion criteria included completing the last treatment (all cancer types were accepted) at least 1 year previously, were curatively treated, older than 18 years, scored greater than on the severity of fatigue subscale of the self-report Checklist Individual Strength (CIS) and had no other	The findings indicated a 30% improvement in fatigue.	The study showed that Mindfulness-based cognitive therapy is acceptable and effective treatment for cancer-related fatigue.	Selection bias, difficulty recalling information, limited data to examine potential difference between study responders. Small sample size. A qualitative method was used which can be hard to measure.	Level III	I plan to use this for my capstone project because the NCCN guidelines recommend cognitive therapy.

				somatic disease or medicine use that could explain the fatigue. Power= Weak					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
49	Van Weert, E., May, A.M., Korstjens, I., Post, W.J., van der Schans, C.P., van den Borne, B., Mesters, I., Ros, W., and Hoekstra-Weebers, J. (2010). Cancer related fatigue and rehabilitation: a randomized controlled multicenter trial comparing physical training combined with cognitive-behavioral therapy with physical training only and with no intervention. <i>Physical Therapy, 90(10)</i> , 1413-1425.	EBSCO/Cancer-Related Fatigue and Rehabilitation/ Dutch Cancer Society, Comprehensive Cancer Center North-East, and Maastricht University.	The purpose of the study was to compare the effect on cancer-related fatigue of physical training combined with cognitive behavioral therapy with physical training alone and with no intervention.	Survivors with cancer-related fatigue versus general population. There were 209 patients/control included the study. Inclusion criteria includes age 18 years of age, last cancer-related treatment at least 3 months before study entry, estimated life expectancy of at least 1 year, knowledge of the Dutch language, and a minimum of 3 positive findings, as judged by the physician. Power= Moderate	Patients that received physical intervention had a significant decrease in fatigue compared with the control.	Randomized study, supervised, standardized, and theory based-interventions. Conducted at four different rehabilitation centers.	Over representation of breast cancer patients.	Level IV	I plan to use this in my capstone project because it compares physical training combined with cognitive behavioral therapy versus physical training alone. Exercise is in the NCCN guidelines.
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
50	Wanchai, A., Armer, J. M., and Stewart, B. R. (2010). Nonpharmacologic supportive strategies to promote quality of life in patients	EBSCO/Cancer-Related Fatigue/ Information not available.	The purpose of the study was a literature review of nonpharmacologic options for cancer-related	N/A	Exercises, education, counseling, sleep therapy, and complementary therapy are	28 studies reviewed.	Different inventories were used in the 28 studies.	Level I	The study is appropriate as the NCCN guidelines call for non-pharmacological

	experiencing cancer-related fatigue: A systematic review. <i>Clinical Journal of Oncology Nursing</i> , 15(2), 203-214.		fatigue.		feasible therapies.				interventions.
#	Article Citation	Database/Keywords/Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
51	Wang, X.S. (2008). Pathophysiology of cancer-related fatigue. <i>Clinical Journal of Oncology Nursing</i> , 12(5), 11-20.	EBSCO/Cancer-Related Fatigue/Information not available.	The purpose of the study was to identify factors that mediate cancer related fatigue.	N/A	There are a number of factors that influence cancer-related fatigue such as, pro-inflammatory hypothesis, serotonin hypothesis, vagal afferent activation hypothesis, anemia hypothesis, adenosine triphosphate hypothesis.	Meta-analysis	If peripheral fatigue is, a part of cancer-related fatigue is unknown.	Level I	I plan on using this study in my capstone project because understanding the pathophysiology of cancer-related fatigue.
#	Article Citation	Database/Keywords/Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
52	Wu, H.S., Davis, J.E., Padiyar, J.P., and Yarandi, H. (2011). A comparison of disrupted sleep patterns of women with cancer-related fatigue and postmenopausal women without cancer. <i>European Journal of Oncology Nursing</i> , 15, 318-324.	EBSCO/Cancer-Related Fatigue/ONS Foundation/Novartis Nursing Research Grant and NIH.	The purpose of the study was to examine fatigue and disrupted sleep often coexists and both are prominent clinical problems in cancer affecting quality of life. This study aimed to characterize and compare disrupted sleep patterns in fatigued breast cancer patients receiving chemotherapy with postmenopausal women without a history of cancer.	The population studied included fatigued breast cancer patients receiving chemotherapy with disrupted sleep patterns. The sample size was 30 females undergoing chemo with breast cancer and sleep problems. Participants had to meet criteria: female, one to five years since cessation of menses, FSH levels >40 miU, not on estrogen replacement therapy, sedentary, and one or more symptoms of difficulty maintaining	Fatigued breast cancer patients showed significant sleep difficulties characterized by prolonged sleep onset latency. Sleep deprivation may increase CRF. The Pittsburgh Sleep Quality Index and State-Trait Anxiety Inventory were used for analysis. The population was 30 fatigued females breast cancer chemotherapy outpatients and 32 non-cancer postmenopausal women.	The samples were diverse.	The women were recruited with different criteria. Small sample size. Significant differences in levels of depression between the two groups. Present study does not allow for the Characterization of disrupted sleep across time.	Level IV	I plan to use this study in my capstone as it examines the sleep aspect of fatigue.

				<p>sleep. Exclusion criteria included a history of surgical menopause, evidence of cardiovascular disease or stroke; history or evidence of sleep apnea; evidence of clinical depression, musculoskeletal problems; or taking prescribed medication for pain, hypertension, hyperlipidemia, psychotropic, sedative or antihistamine medication.</p> <p>Power= Moderate</p>					
#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
53	<p>Yavuzsen, T., Ranganathan, V.K., Walsh, D., Siemionow, V., Kirkova, J., Dhoshknabi, D., Lagman, R., LeGrand, S., and Yue, G.H. (2009). Cancer-related fatigue: central or peripheral? <i>Journal of Pain and Symptom Management</i>, 38(4), 587-596.</p>	<p>EBSCO/ Cancer-Related Fatigue/ Cleveland Clinic internal grant and a Department of Defense grant.</p>	<p>The purpose of the study was to evaluate cancer related fatigue by objective measurements to determine if CRF is a more centrally or peripherally mediated disorder. The study group included 29 cancer patients and 16 healthy controls.</p>	<p>Cancer patients who have fatigue and have muscle wasting.</p> <p>There were 16 controls and 16 participants in the sample size.</p> <p>Patient eligibility includes a hemoglobin concentration of more than 10 g/dL, no evidence of polyneuropathy, amyotrophy, or a myasthenic syndrome by history or physical examination. Patients with more than 10% of pre-illness body weight loss or with significant pulmonary compromise defined by</p>	<p>There was a greater twitch forces, a measure of muscle fatigue and compound action potential. CRF group had a higher BFI score and a shorter ET and greater twitch force.</p>	<p>Cancer-related fatigue is associated with a malfunction of the CNS related to cancer or its treatment.</p>	<p>It is difficult to distinguish CRF from depression using validated screening tools because of overlapping psychological symptoms.</p> <p>Small sample size and inability to control for medications that may influence neuromuscular conduction.</p> <p>There was no screening for acetylcholine receptors or voltage-gated calcium channel antibodies, which could impair NMJ conduction.</p>	<p>Level IV</p>	<p>I will not use this in my capstone project.</p>

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sam ple Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Eviden ce	Appropriate for Capstone Project?
5 4	Yeh, E.T., Lau, S.C., Su, W.J., Tsai, D.J., Tu, Y.Y., and Lai, Y.L. (2011). An examination of cancer-related fatigue through proposed diagnostic criteria in a sample of cancer patients in Taiwan. <i>Biomed Central Cancer, 11</i> , 387-396.	EBSCO/Cancer-Related Fatigue/No information was given.	The purpose of the study was to evaluate the proposed International Statistical Classification of Diseases and related health problems.	<p>oxygen dependence were excluded.</p> <p>Power= Weak</p> <p>Cancer patients with fatigue.</p> <p>There were 265 participants in the sample size. The participants were diagnosed with various types of cancer, including head and neck (7.9%), lung and mediastinum (10.5%), breast (36.6%), liver (3.7%), GI tract (16.6%), GU tract (3.3%), GYN (6.4%), prostate (3.3%), hematologica l malignancy (0.3%), and others (8.6%).</p> <p>Inclusion criteria includes a pathological diagnosis of cancer, be at least 18 years old, and be able to communicate in Mandarin or Taiwanese. Patients were excluded if they were cognitively impaired, if they refused to participate, or if they could not understand the intent of this study.</p> <p>Power= Strong</p>	The findings were that 228/265 cancer patients had suffered from fatigue.	ICD 10 criteria were used.	<p>The sample population was not representative of the general cancer patient population in Taiwan since more were recruited from Taiwan.</p> <p>Patients with cognitive impairment and poor communication skills were excluded.</p>	Level III	The study will be used in the capstone project as the ICD 10 is in use.

#	Article Citation	Database/ Keywords/ Funding	Purpose of the Study	Population Studied/Sample Size/Criteria / Power	Conclusion and Key Findings	Strengths	Weaknesses	Level of Evidence	Appropriate for Capstone Project?
55	Yeo, T.P., Burrell, S.A., Sauter, P.K., Kennedy, E.P., Lavu, H., Leiby, B.E., and Yeo, C.J. (2012). A progressive post resection walking program significantly improved fatigue and health-related quality of life in pancreas and periampullary cancer patients. <i>Journal of American College of Surgeons</i> , 214, 463-477.	EBSCO/Cancer-Related Fatigue/ Jefferson School of Nursing Faculty Seed Money Research Award.	The purpose of the study was to examine patients with pancreas and periampullary cancer experience improved survival rates and longevity, the focus shifts toward living life while surviving cancer. Fatigue is the most commonly reported symptom in all cancer patients. Exercise has been found to effectively decrease fatigue levels and improve physical functioning in cancer patients.	The population studied was patients with pancreas and periampullary cancer who live with the disease and are fatigued. Sample was 102 patients with resected pancreas and periampullary cancer. The eligibility criteria included patients being 18 years or older with resected PPC, adenocarcinoma only. Patients were not eligible if Stage IV metastatic disease was found at the time of operation, if the final pathology revealed something other than adenocarcinoma, or if comorbidities such as severe arthritis, dizziness, or inability to walk prevented the patient from actively participating in a walking program. Power= Moderate	Patients had significant improvement in their fatigue scores after implementing an exercise program.	This is the first study to evaluate the effects of structured home walking program in patients after resection of pancreatic and periampullary adenocarcinoma.	Sample was primarily Caucasian, unknown patient pre-diagnosis activity level; a monthly phone call received by the IG may have been responsible for the observed improvement in symptomatology as opposed to the walking program, symptom cluster analysis.	Level III	I will use this study in my capstone project as exercise is important in treating fatigue.

Appendix B

Logic Model Development

<p>Strategies</p> <ol style="list-style-type: none"> 1. Assess fatigue with the Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F). 2. Identify variables related to the fatigue. 	<p>Assumptions</p> <ol style="list-style-type: none"> 1. Despite cancer stage, diagnosis, treatment modality, age, prognosis, previous comorbidities patients will suffer from in cancer related fatigue and inversely an increase in quality of life. 	
<p>Influential Factors</p> <ol style="list-style-type: none"> 1. Patients' prior fatigue level. 2. Patients' environmental factors. 3. Patients' socio-economic status. 4. Patients' family support. 5. Patients' treatment regimen. 6. Patients' treatment team (oncologist, nurse practitioner, nurses). 	<p>Problem or Issue</p> <ol style="list-style-type: none"> 1. Cancer related fatigue is a persistent, subjective problem that is physical, emotional, and cognitive tiredness or exhaustion related to cancer or cancer treatment that is not relieved by rest and is not proportional to activity and interferes with functioning. 2. The population of interest is cancer patients who are undergoing treatment. <p>Community Needs/Assets</p> <ol style="list-style-type: none"> 1. Increased awareness of the survivorship problems such as fatigue. 2. Implementation of a survivorship program. 	<p>Desired Results (outputs, outcomes, and impact)</p> <ol style="list-style-type: none"> 1. Identify variables related to cancer-related fatigue. 2. Show impact of Cancer-related fatigue on patients at Regional West Medical Center-Oncology.

References

National Comprehensive Cancer Network. (2012). NCCN clinical practice guidelines in oncology (NCCN Guidelines): Cancer related fatigue. Retrieved from http://www.nccn.org/professionals/physician_gls/pdf/fatigue.pdf

Appendix C

Letter of Consent

My name is Rebecca Bowman. I am a student of the Doctorate of Nursing Practice program at Regis University. My contact information is Rebecca Bowman 3911 Avenue B Suite 1110 Scottsbluff, Nebraska 308-630-2100. I am conducting a research study entitled “Cancer-Related Fatigue” which seeks to study fatigue due to cancer treatment.

I am asking you to participate in this study because you are undergoing cancer treatment. Your participation is voluntary. Choosing not to participate will not affect your access to any goods or services. There are no direct benefits to participating in the study.

I will be conducting the study by asking you to rate your fatigue and how it affects your daily activities. The Functional Assessment of Chronic Illness- Fatigue (FACIT-F) questionnaire will be used. Participation in this study will take about 10 minutes one time.

I will not be collecting any data that can link you to the answers you provide. Your anonymity and the confidentiality of your responses will be protected as much as possible. If you are uncomfortable answering any question, you may choose to not answer that question or to stop your participation and have any notes or hard copy answers destroyed. To further protect the confidentiality of your responses, I will not be collecting a signed consent form but will instead consider your participation in the study as consent permitting me to collect the data you provide.

Should you have any questions or concerns about participation in this study, you may contact me using the information in the first paragraph. My faculty Advisor is Dr. Mary Jo Coast; email: mcoast@regis.edu; phone: 303-458-4235. You may also contact the Chair of the Regis University Institutional Review Board for human subjects participation by telephone at 303-346-4206; by mail at Regis University, Office of Academic Grants, 447 Main, Mail Code H-4, 3333 Regis Blvd., Denver, CO, 80221; or by e-mail at irb@regis.edu with questions or concerns, or if you feel that participation in this study has resulted in some harm.

Sincerely,

Rebecca Bowman, APRN, AOCNP, ACHPN

Appendix D

Completion Report

Page 1 of 1

CITI Collaborative Institutional Training Initiative**Human Research Curriculum Completion Report
Printed on 7/29/2012****Learner:** Rebecca Bowman (username: rebowman)**Institution:** Regis University**Contact Information** 2701 18th Avenue
Scottsbluff, NE 69361 USA
Department: Nursing
Phone: 308-635-7986
Email: onsnurse1@yahoo.com**Social Behavioral Research Investigators and Key Personnel:****Stage 1. Basic Course Passed on 07/29/12 (Ref # 8366020)**

Required Modules	Date Completed	
Introduction	07/29/12	no quiz
History and Ethical Principles - SBR	07/29/12	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	07/29/12	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBR	07/29/12	5/5 (100%)
Informed Consent - SBR	07/29/12	5/5 (100%)
Privacy and Confidentiality - SBR	07/29/12	5/5 (100%)
Regis University	07/29/12	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

[Return](#)

Appendix E



4021 Avenue B
Scottsbluff, NE 69361
308.635.3711 | www.rwhs.org

February 26, 2013

Rebecca Bowman, APRN, AOCNP
Regional West Physicians Clinic
3911 Avenue B, Suite 1110
Scottsbluff, NE 69361

RE: Cancer Related Fatigue Study

Dear Mrs. Bowman,

The Institutional Review Board for Regional West Health Services reviewed the above referenced research study. Having met all applicable requirements, the research study is approved. The approval period for this study begins on March 1, 2013 and ends on August 31, 2013. The research study cannot continue beyond the approval period without a continuing review and approval by the IRB.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey Holloway".

Jeffrey Holloway, M.D.
Chairman

JH:jlb



Regional West Medical Plaza South
3911 Avenue B | Suite 1110
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PhysiciansClinic.net

December 10, 2012

Regis University
Nurse Practitioner Clinical Study

RE: Rebecca Bowman, APRN, AOCNP

To Whom It May Concern:

I am the supervising physician for Rebecca Bowman, Nurse Practitioner. She is beginning a clinical study regarding fatigue in cancer patients. We are hoping to enroll 30 patients on the trial and determine if there are opportunities for improved outcomes in this patient group.

I am in support of Rebecca Bowman with respect to this trial and will be assisting her in her efforts to complete it.

If I can provide any further information or answer any questions, please feel free to notify me.

Sincerely,

A handwritten signature in black ink, appearing to read "Vincent Bjorling", is written over a faint, illegible printed name.

Vincent Bjorling, MD
VGB/all

Appendix F



Academic Affairs
Academic Grants

3333 Regis Boulevard, H-4
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IRB – REGIS UNIVERSITY

February 11, 2013

Rebecca Bowman
2701 18th Avenue
Scottsbluff, NE 69361

RE: IRB #: 13-037

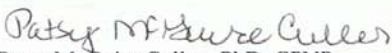
Dear Ms. Bowman:

Your application to the Regis IRB for your project “Cancer Related Fatigue” was approved as an exempt study on February 11, 2013. This study was approved under exempt category 45CFR46.101.b(2).

The designation of “exempt,” means no further IRB review of this project, as it is currently designed, is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval.

Sincerely,


Patsy McGuire Cullen, PhD, CPNP
Chair, Institutional Review Board
Associate Professor and Director
Department of Accelerated Nursing
Loretto Heights School of Nursing
Rueckert-Hartman College for Health Professions
Regis University

cc: Dr. Mary Jo Coast

Appendix G

FACIT Fatigue Scale (Version 4)

Below is a list of statements that other people with your illness have said are important. Please circle or mark one number per line to indicate your response as it applies to the past 7 days.

		Not at all	A little bit	Some- what	Quite a bit	Very much
Hi7	I feel fatigued	0	1	2	3	4
Hi12	I feel weak all over.....	0	1	2	3	4
An1	I feel listless ("washed out").....	0	1	2	3	4
An2	I feel tired	0	1	2	3	4
An3	I have trouble <u>starting</u> things because I am tired	0	1	2	3	4
An4	I have trouble <u>finishing</u> things because I am tired	0	1	2	3	4
An5	I have energy	0	1	2	3	4
An7	I am able to do my usual activities.....	0	1	2	3	4
An8	I need to sleep during the day	0	1	2	3	4
An12	I am too tired to eat	0	1	2	3	4
An14	I need help doing my usual activities.....	0	1	2	3	4
An15	I am frustrated by being too tired to do the things I want to do.....	0	1	2	3	4
An16	I have to limit my social activity because I am tired	0	1	2	3	4

Appendix H

Demographic Collection

Patient Name: _____

Survey number: _____

Patient Date of Birth: _____

Patient Race: _____

Patient's Diagnosis: _____

Patient's Treatment: _____

Patient's Initial FACIT-F score and date: _____

Diagnosis related to fatigue:

1. _____

2. _____

3. _____

4. _____

Appendix J

Table J1

SWOT Analysis for Capstone Project

<p><u>Strengths</u></p> <p>Benefits the patient</p> <p>Evidence-based practice</p> <p>Physician support</p> <p>Questionnaire short and easy to answer</p> <p>Additional funding not required</p> <p>Leads to development of survivorship program</p> <p>Stimulates thinking of other survivorship issues</p> <p>Demonstrates value of DNP role</p>

<p><u>Weaknesses</u></p> <p>Small sample size</p> <p>Limited resources</p> <p>Conservative population</p>	<p><u>Strategies to Overcome Weaknesses</u></p> <p>Recruit the maximum number of patients</p> <p>Demonstrate value to patients</p> <p>Obtain IRB approval</p>
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<p><u>Opportunities</u></p> <p>Provide data regarding impact fatigue has on patient population</p> <p>Demonstrate value of DNP role</p> <p>Develop survivorship program</p> <p>Validate value of outcomes studies in Western Nebraska</p>
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<u>Threats</u>	<u>Strategies to Overcome threats</u>
Limited patient participation	Educate patients regarding study
Limited physician participation	Educate physicians of importance of study
Financial obligation	Prove benefit to patients

Table J2

Study Goals for Capstone Project

Goal	Type of Goal
Cancer-related fatigue be assessed in patients undergoing treatment	Short-Term
The most common variables related to fatigue be reported	Short-Term
Establishment of survivorship program	Long-Term
Patients are provided with a comprehensive care summary	Long-Term
Cohesiveness of government regulated centers	Long-Term
Coordination of organizations addressing quality of life issues affecting cancer survivors	Long-Term
Increased survivorship support	Long-Term

Table J3

Timeline for Capstone Project

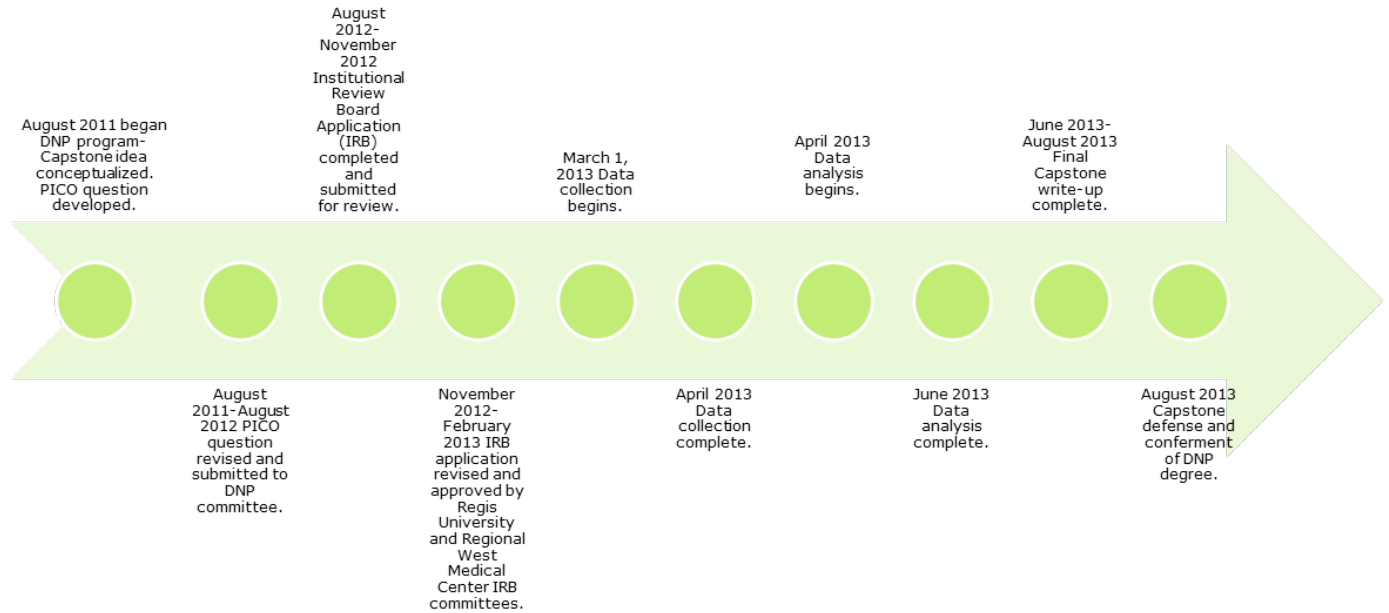


Table J4

Budget for Capstone Project

Expense Item	Price per Unit	Units Used	Total
Paper	\$0.015	25 for FACIT-F 25 for Demographic Sheet 25 for letter of statement 500 for articles/proposal/misc. Total projected= 575	\$ 8.63
SPSS 21 Software	\$208.50	1	\$ 208.50
Project investigator	\$32.66	20 hours per week x 16 weeks	\$ 10, 451.20
		Total	\$10, 668.33

Table J5

Age of Respondents

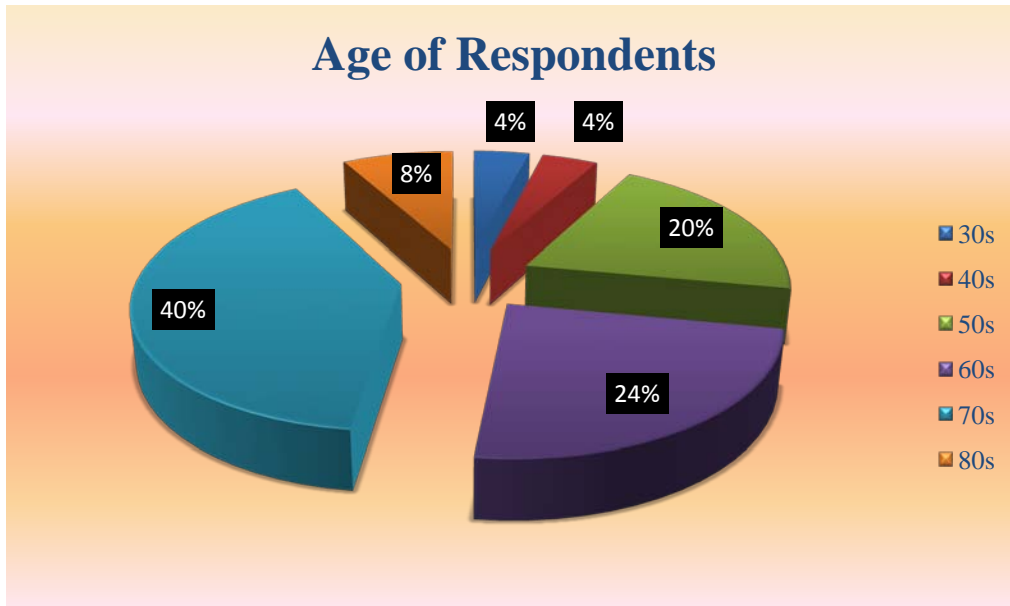
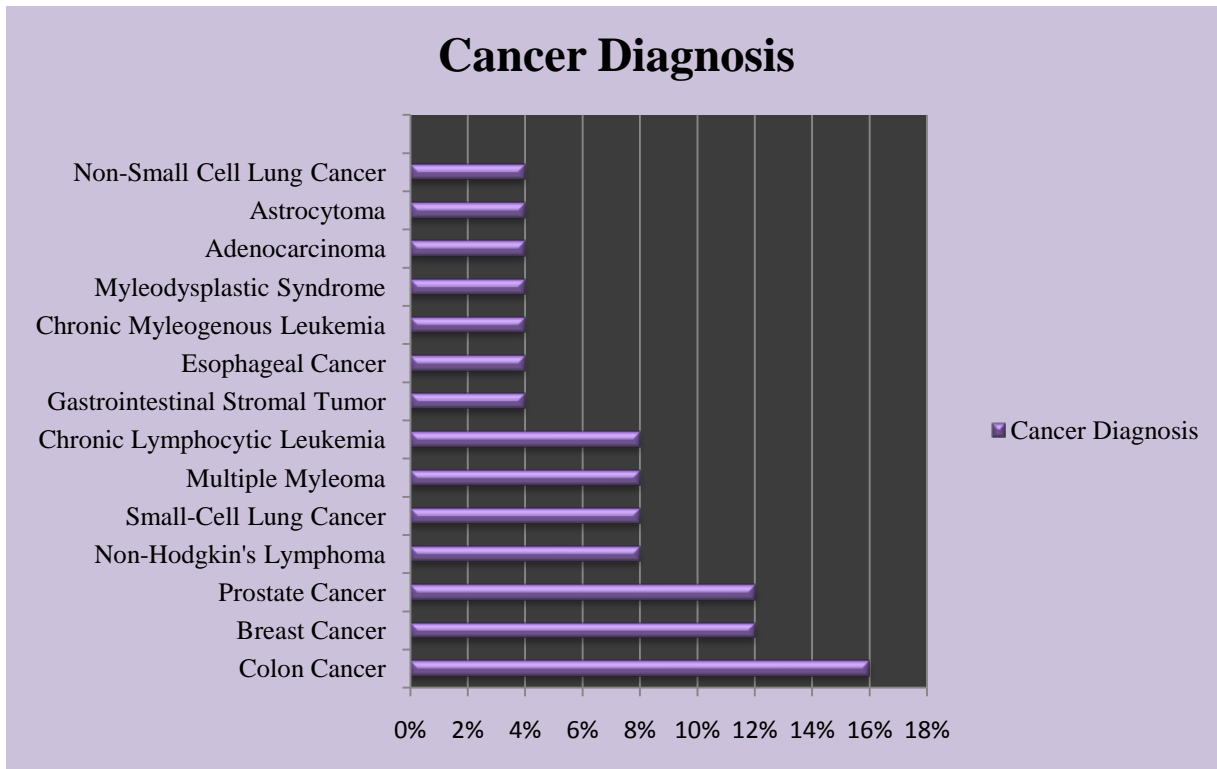


Table J6

Respondent's Cancer Diagnosis



Graph J7

Respondent's Stage of Diagnosis

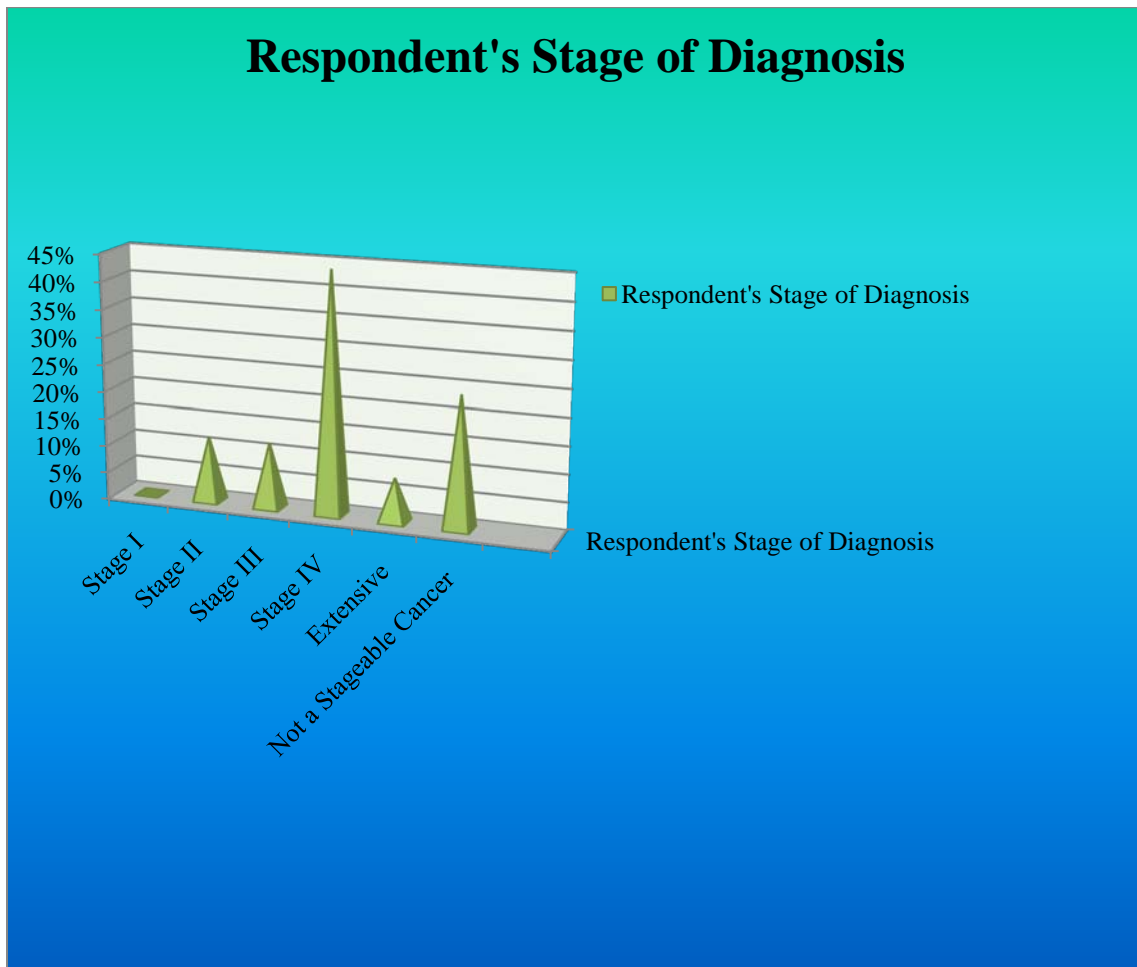


Table J8

Respondent's Chemotherapy Regimen

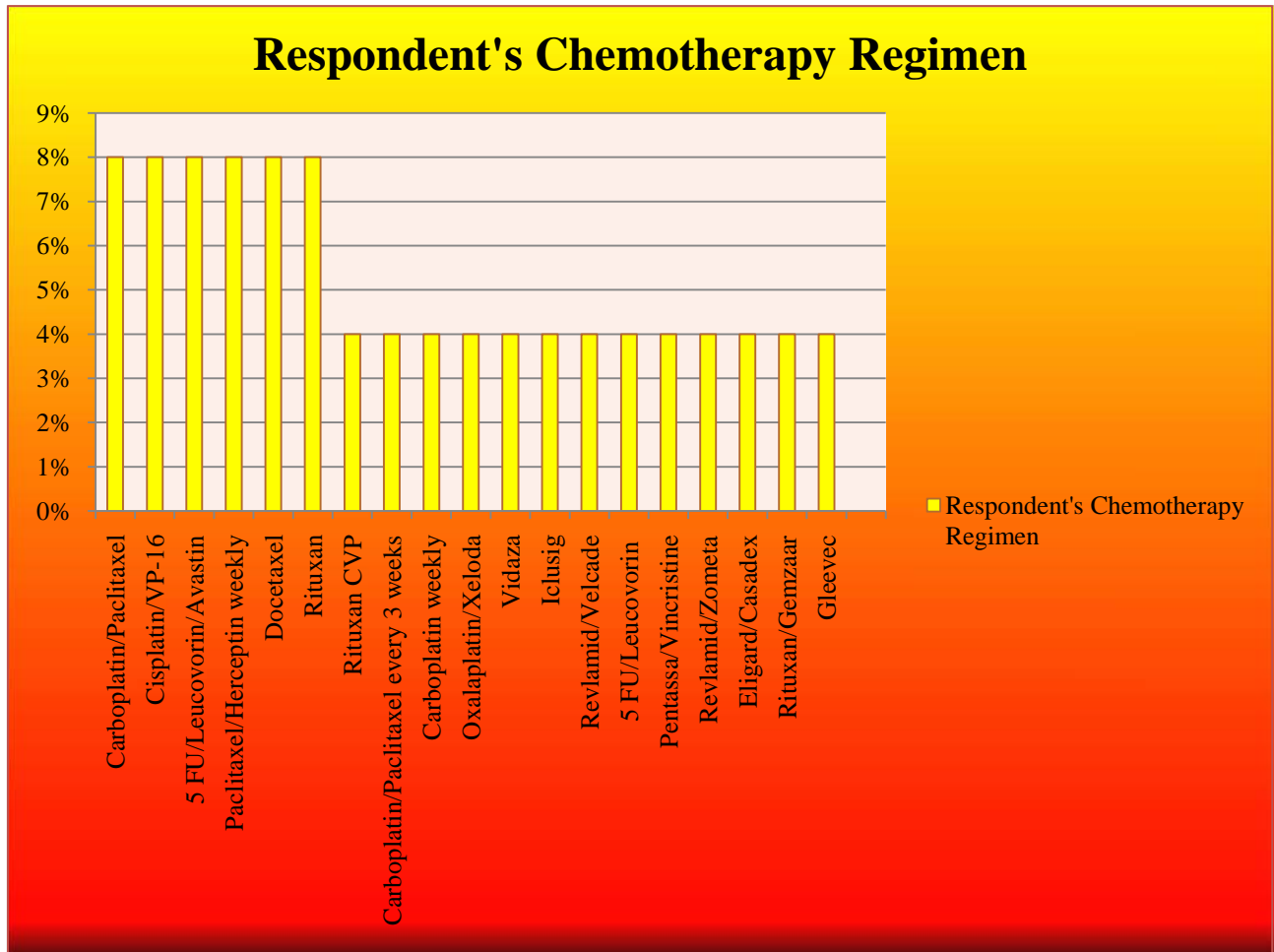


Table J9

FACIT-F Scores

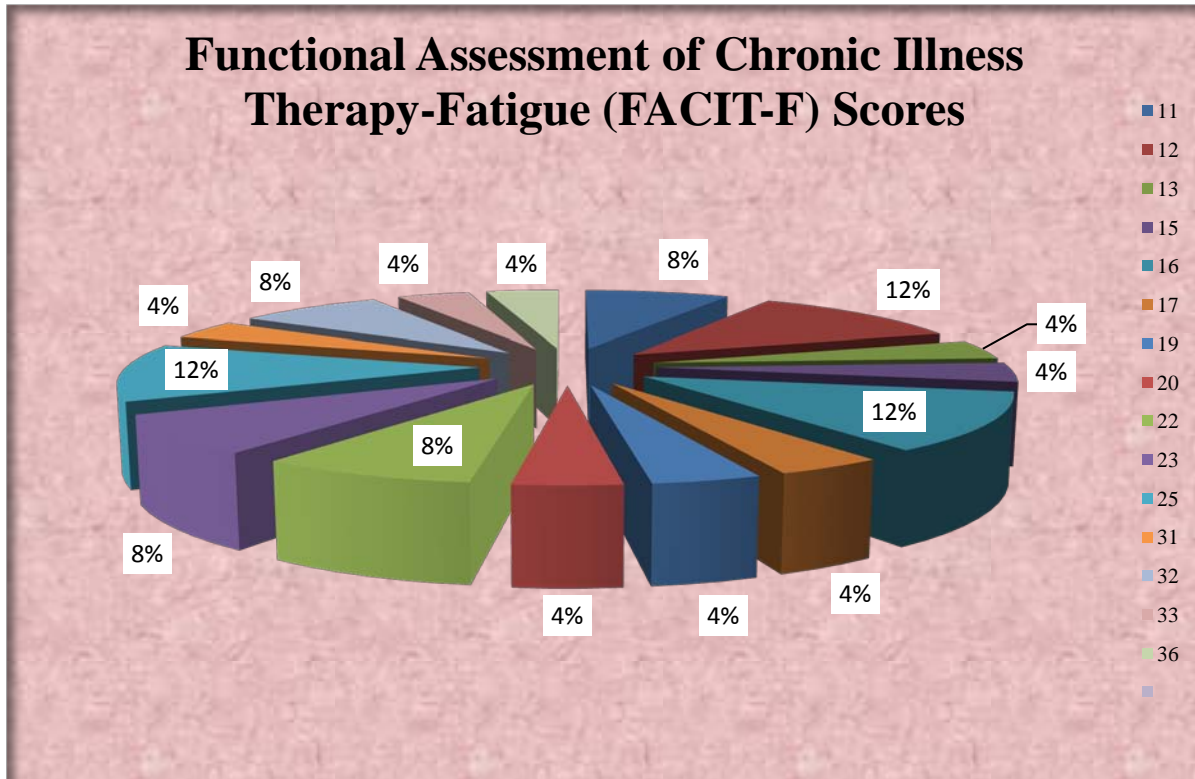


Table J10

Variables Associated with Cancer-Related Fatigue

