Provider Education to Increase Knowledge of Effective Obesity Management in the Prevention of Cancer

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Provider Education to Increase Knowledge of Effective Obesity Management in the Prevention of Cancer

A DNP Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences
Florida International University

In partial fulfillment of the requirements for the Degree of Doctor of Nursing Practice

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Abstract

Background: Obesity is a chronic disease that can result in the development of myriad related health problems including cancer. Providers lack knowledge of the link between obesity and cancer and often miss critical care encounters to educate patients about evidence-based surgical options for reducing obesity and preventing cancer.

Objectives: The objective of this quality improvement project was to increase provider knowledge of surgical options for the treatment of obesity to prevent cancer.

Methodology: The project utilized a pre-/post-intervention quality improvement framework to evaluate provider knowledge of the topic at baseline (T0), immediately following an educational program (T1). Knowledge scores were measured using a 20-item test in which all questions were worth one point.

Results: A total of $n = 15$ primary care providers agreed to participate in the project including 16(52%) females. Average knowledge scores from pre-intervention, and post-intervention were 7.85 and 18.99, respectively. Results from a Wilcoxon sum rank test indicated that statistically significant changes in scores occurred from baseline to post-intervention ($p < .000$).

Conclusions: The results support the use of an educational intervention to increase provider knowledge of the topic. Increased knowledge should result in changes to practice to improve patient care.

Implications: Education should be considered as an opportunity to increase provider knowledge of the use of surgical options to reduce cancer incidence in patients with obesity.

*Keywords*: obesity, cancer, bariatric surgery, education, primary care provider
Provider Education to Increase Knowledge of Effective Obesity Management in the Prevention of Cancer

Despite its devastating implications, the incidence of obesity in America continues to steadily grow. Obesity has been linked with various diseases and emerging research clearly demonstrates that there is a link between obesity and several different types of cancers (Rosenthal et al., 2017). The patient population most commonly impacted and burdened by this health issue include White American women and minorities such as Hispanics and African American females (Rosenthal et al., 2017). Of major concern to our health, are the medical conditions that are linked to obesity such as hypertension, cardiovascular disease, type 2 diabetes (T2DM), and obstructive sleep apnea (Jehan et al., 2018). All of these conditions can result in significant morbidity, mortality, and premature death (Jehan et al., 2018). In recent years, an increased body of literature has been published demonstrating a strong link and increased incidence of obesity related cancers including breast cancer (Argolo et al., 2018). Because breast cancer is considered to be the leading cause of cancer in the world and the U.S. suggesting that in patients with obesity, the risk could carry with it significant individual and public health implications (Steele et al., 2017).

Being obese predisposes individuals to an increased incidence of type 2 diabetes mellitus. The prevalence of diabetes mellitus is growing worldwide, and in the United States, it affects 1 in 10 adults (Jiang et al., 2022). If the growth continues, it is estimated that 1 in 3 patients in the US will have type 2 diabetes mellitus by 2050 (Jiang et al., 2022). As mentioned above, obesity predisposes individuals to develop T2DM and obesity and diabetes have both been linked to an increase incidence of cancer (Dai & Jiang, 2019). While obesity alone can increase the risk of
developing cancer by 50%, when associated with comorbid illnesses such as type 2 diabetes mellitus, the risk can dramatically increase up to 200% (Moore et al., 2017).

In an attempt to prevent and manage severe obesity and its serious medical consequences different medical approaches including dietary interventions, lifestyle changes, and medications have been developed and implemented (Kushner & Kahan, 2017). Unfortunately, while these conservative treatment modalities are effective in helping patients lose some of their excess body weight, the weight loss achieved is neither significant nor durable (Schauer et al., 2017). In the last two decades, surgery to treat obesity has become minimally invasive, drastically reducing patient morbidity and mortality associated with these interventions such as bariatric surgery (Aminian & Nissen, 2020). Reduced morbidity and mortality have improved patient health outcomes and increased patients’ acceptance, helping obese patients lose their excess body weight in a rapid and durable fashion which can also result in the remission of obesity-related comorbidities (Aminian & Nissen, 2020). Randomized controlled trials have demonstrated that bariatric procedures such as sleeve gastrectomy and gastric bypass when combined with medical interventions, have a significantly higher success as far as weight reduction and remission of comorbid illnesses when compared with medical interventions alone. (Schauer et al., 2017).

What is most concerning about this health issue, is that there is a significant lack of awareness amongst the lay public and healthcare providers about the seriousness of obesity and the implications of its associated comorbid illnesses (Rosenthal et al., 2017). In addition, there is a significant knowledge gap amongst the public and the primary care healthcare providers regarding the use and effectiveness of surgical interventions that can be used to treat obesity rapidly and effectively (Rosenthal et al., 2017). Without information to provide to patients regarding the seriousness and implications of obesity, including an increased risk of several
different cancers, patients will lack proper guidance on the topic to make an informed decision regarding their health. This can make it difficult for patients to force obesity-associated comorbidities into remission and decrease the incidence of cancer. (Rosenthal et al., 2017).

**Purpose and PICO Question**

The purpose of this Doctor of Nursing Practice (DNP) quality improvement project was to educate primary healthcare providers about the link between cancer and obesity as well as the efficacy of surgical interventions to help foster weight loss and prevent cancer. The current evidence does indicate that there is a significant link between obesity and cancer (Moore et al., 2017). This risk can be mitigated through the use of surgically induced rapid and durable weight loss (Aminian et al., 2022). The assumption made in this project was that by educating primary care providers about the relationship between obesity and cancer and the options available to help prevent cancer, clinician knowledge will increase. This increase in knowledge should translate into a change in practice for providers to treat obesity more aggressively in the primary care setting as a means to reduce the incidence of cancer among patients and in the population.

With these issues in mind, the PICO (population, intervention, comparison, and outcome) clinical question developed for this quality improvement project was as follows: Among primary care providers (P) does the use of an educational intervention regarding surgically induced rapid and durable weight loss to prevent cancer in obese patients (I) increase provider knowledge of the topic (O) when compared with baseline (pre-education) knowledge (C)? The population included primary care providers and the intervention involved an educational module on the topic of surgically induced rapid and durable weight loss to prevent cancer in obese patients. The comparison involved provider knowledge at baseline and the outcome measured was a change or increase in provider knowledge of the topic.
Problem Statement

To investigate the problem of interest, a fully developed problem statement was needed. Moran et al. (2020) provide a comprehensive description of the elements that are needed to provide an effective problem statement. In particular, these authors assert that a problem statement should include an identification of the problem, background information on the topic, an examination of the scope of the problem, the consequences of not addressing the problem, knowledge gaps, and the proposed solution. Each component of the problem must be evidence-based (Moran et al., 2020). Utilizing the problem statement framework proposed by Moran and coauthors, the topic investigated in this quality improvement project was reviewed.

Problem Identification

In recent years, evidence has emerged from the Centers for Disease Control and Prevention (CDC) demonstrating that while the frequency of the overweight and obesity amongst American citizens continue to grow, the cancer risk in the obese population is significantly increased when compared to the non-obese population (Steele et al., 2017). In this 10-year retrospective review, Steele and coauthors (2017) found that the patient groups who are obese and most likely to develop cancer include women, especially minority women including Hispanic and African American women. In this study, Steele et al. found that the overall link between obesity and cancer was identified in 42% of newly diagnosed cases. Of major concern was the staggering number of obese patients with obesity being diagnosed with cancer. Steele et al. foundation that obesity was linked with a 55% of newly diagnosed cancers in women and 24% of newly diagnosed cancers in men (Steele et al., 2017).

Randomized control trials have demonstrated that weight loss induced by intensive medical or surgical interventions result in a decreased incidence of obesity related cancers
Strategies to prevent or treat obesity range from simple lifestyle changes to medications and surgical interventions. However, when compared to medical treatment and lifestyle changes alone, surgically induced rapid and durable weight loss has proven to be safe and is considered the most effective treatment modality to induce associated comorbidities into remission as well as decreasing the prevalence and mortality of cancer (Aminian et al., 2022). The latter has been clearly demonstrated in the most recent publication by Aminian and coauthors (2022) who showed in a 14-year, single site, retrospective study, that bariatric surgery, such as sleeve gastrectomy and gastric bypass decreased the incidence of cancer and cancer related mortality when compared to a matched group of obese subjects who did not undergo bariatric surgery.

**Background**

Obesity is a condition that has affected humankind since its inception. Depicted in paintings and sculptures, it was considered for thousands of years a cosmetic problem and not a disease (Allison et al., 2008). Approximately 2,500 years ago the physician Hippocrates, otherwise referred as the father of medicine, predicted that overweight individuals were at increased risk for sudden death (Allison et al., 2008). Later on, Malcolm Flemyng, a physician from the 18th century wrote in the English language one of the two earliest books on overweight/obesity (Allison et al., 2008). Flemyng classified that “corpulency” can be a disease in some cases lists historical quotations on obesity as a disease, between 1600s to 1934. A review of this evidence indicates that society and medical providers often failed to see obesity as a disease (Allison et al., 2008). Written information about obesity has proliferated throughout the past several hundred years. Scholars reviewing the topic believe that obesity is considered a disease only when it gets to a certain degree of severity, thus implying that obesity should be
classified as a disease in some, but not all cases (Allison et al., 2008). To further depict the time needed for humanity to recognize obesity as a disease, the American Medical Association (AMA) founded in 1847, needed 166 years since its establishment to recognize obesity as a disease. (Allison et al., 2008).

In the past three decades, studies were reported from over 1,700 different centers identifying the health dangers and significant increase in the prevalence of obesity globally (Xu & Mishra, 2018). This growing trend has become a worldwide concern due to numerous conceivable linked and associated comorbidities. In North America the premise holds sound in that obesity has been projected to contribute to 3.5% of all cancers in men and 9.4% of all cancers in women (Xu & Mishra, 2018). Similarly, obesity is correlated with 15 to 20% of all cancer mortality (Xu & Mishra, 2018). Nonetheless, a main challenge impedes this obesity-cancer association. Both biologically and epidemiologically, the source for this connection remains unclear. Three systems, namely insulin and insulin-like growth factors, sex hormones, and adipokines, have been reviewed as common hypotheses associated to cancer development (Zhao et al, 2018). Additionally, a popular inference on carcinogenesis and fat excess is the obesity-related hypoxia, shared genetic susceptibility, and migrating adipose stromal cells (Avgerinos et al., 2019).

The relationship between telomeres and cancer has also been explored by multiple groups (Welendorf et al., 2019). As cancers seems to occur with aging, obesity seems to shorten the length of telomere, creating a chromosomal instability that might result in cancer, especially in older adults (Welendorf et al., 2019). However, only recently has the relationship between obesity and telomeres length begun to be viewed as one of great importance. Several authors showed how weight loss is associated with telomere length (Himbert et al., 2017; Welendorf et
The greater weight loss the greater the increase in telomere length. Others have demonstrated that telomere lengthening is observed 3 to 5 years post-bariatric surgery (Dershem et al., 2017). Taking this into account, it is hypothesized that telomere length could be an explanation of the cancer risk reduction after bariatric interventions.

The concerning rise of worldwide obesity has contributed to an exponential increase of bariatric operation. In fact, according to the latest report on bariatric surgery and endoluminal procedures from the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) in 2014, the total number of bariatric and metabolic procedures has dramatically increased, and sleeve gastrectomy is presently the most common surgical procedure in the world (Angrisani et al., 2017). This surge of popularity of bariatric surgery might be due to the additional benefits seen following bariatric surgery. The resolution/remission of obesity-related comorbidities has resulted in long-term positive outcomes (Nguyen & Varela, 2017). Therefore, bariatric surgery has become or considered the standard of care for overweight/obesity and its metabolic implications (Nguyen & Varela, 2017).

**Scope of the Problem**

It is estimated that there are over 640 million individuals worldwide that are affected by obesity (Moore et al., 2018). Despite warnings by the CDC, about Americans having to modify their diet and sedentary lifestyle, the incidence of obesity in the United States population continues to grow at an exponential rate (Rosenthal et al., 2017). The linear time trend forecasts suggest that by 2030, 51% of the United States population will be obese (Rosenthal et al., 2017). The U.S. obesity prevalence, the highest in the world, was 30.5 % in 2017 and has increased to 41.9 % in 2020 (CDC, 2021). Throughout the same period, the occurrence of morbid obesity increased from 4.7% to 9.2% respectively (CDC, 2021). The latter is typically considered to be a
life-threatening condition due to obesity-related illnesses that include stroke, type 2 diabetes, heart disease, and certain types of cancer, all of which remain among the main causes of avoidable, premature death (CDC, 2021).

According to the CDC (2021), the occurrence of obesity is recorded as the highest among African American adults (48.1%), followed by Hispanics (42.5%), and Whites (34.5%). Overweight- and obesity-related cancer prevalence are greater among adults (ages ≥ 50 years) than younger individuals; greater among females than males; and higher amongst non-Hispanic black and non-Hispanic white adults compared with other groups (CDC, 2021). The projected yearly healthcare cost of obesity in the US stood at approximately $173 billion in 2019 CDC, 2021). Medical expenditures for adults with obesity was $1,861 greater than medical costs for persons with healthy weight (CDC, 2021).

Consequences of the Problem

Americans affected by severe obesity are not aware of the serious health implications of this medical condition, nor are they well educated about the safety and effectiveness of potential treatment modalities that will result in remission of comorbidities and the prevention of cancer. Screening strategies for those affected and at risk are lacking. A survey conducted by the American Society of Metabolic and Bariatric Surgery suggests that Americans fear that being affected by obesity can have serious and life-threatening implications, including cancer (Imbus et al., 2018). The seriousness of obesity becoming a threat to individual livelihood was perceived as more serious than heart disease, strokes or other medical conditions such as diabetes (Rosenthal et al., 2017). In addition, the survey further demonstrated that despite the above-mentioned concerns, there is a significant knowledge deficit among primary healthcare providers on counseling patients about the disease implications and current treatment modalities (Rosenthal et
al., 2017). When obese subjects see their primary healthcare doctors for medical conditions that are associated to obesity, a minority of them would recommend for patients to lose weight by either means of intensive medical therapy or surgery (Rosenthal et al., 2017). Bariatric surgery as such was rarely seen as a safe and valid treatment modality by most of the physicians that cared for the patients that were interviewed in this survey (Rosenthal et al., 2017).

By enhancing the knowledge of healthcare providers about obesity as a disease, patients’ awareness of the health risks of obesity should be enhanced accordingly. Consequently, early preventive measures can be taken into consideration to avoid the obesity disease and associated comorbidities to ensue. Furthermore, primary healthcare providers can make recommendations to those affected by severe obesity on how to treat this disease either by intensive medical interventions or bariatric surgery as well as through the development of new screening strategies that are lacking in current literature. If Americans continue to disregard the serious implications of obesity and its associated comorbid illnesses, the prevalence of obesity in the USA will continue to increase and so will the prevalence of metabolic syndrome (diabetes, hypertension, hyperlipidemia, and sleep apnea) as well as the incidence of obesity-associated cancer.

**Knowledge Gaps**

The World Health Organization (WHO) defines obesity as one of today’s most blatantly visible yet most overlooked public health problems (Min et al., 2021). The 2017 survey report “Obesity in America” by Rosenthal et al. showed that the American community lacks confidence that the country’s problem with obesity will improve in the near future. Most believe that the obesity pandemic will rise (57%) or remain unchanged (29%). Further, according to the report by Rosenthal et al. only 13% think there will be fewer obese Americans in the future. African Americans are more positive in their expectations than whites; almost twice as many of African
Americans (23%) as Caucasians (10%) are under the impression that there will be fewer
overweight Americans in the next 5 years (Rosenthal et al., 2017). The gap is related to a
knowledge deficit of both the public and affected population as well as the healthcare providers
including primary care providers (PCPs). In the American Society for Metabolic and Bariatric
Surgery (ASMBS) report on “Obesity in America,” subjects interviewed for the study provided
information regarding their own assessment of their weight status (Eisenberg et al., 2022). A
small percentage of those interviewed that suffered from obesity were able to recognize that they
were obese rather than being overweight. A total of 47% of those who have a BMI greater than
35 think of themselves to be heavy but not obese, and another 9% do not even perceive
themselves to be overweight at all (Eisenberg et al., 2022).

This evidence clearly demonstrates that there are knowledge gaps for patients when it
comes to obesity and its implications for health. While this is clearly an issue of concern, it is
also important to note that healthcare providers, including those working in primary care also
report the need for knowledge to increase patient understanding of obesity and its evidence-
based treatments (Hyer, 2019; Nanda et al., 2021). A lack of provider knowledge regarding this
topic is well illustrated by Turner et al. (2018) who evaluated the knowledge of 1,506 healthcare
providers in different areas of specialization including primary care. In this study, Turner and
coauthors asked providers to complete a knowledge assessment of evidence-based guidelines for
the treatment of obesity. The authors found that between 15% and 17% of providers could
answer knowledge questions about the treatment of obesity from the guidelines. This suggests
that as many as 83% to 85% of providers may not have adequate knowledge to treat patients who
are obese.

Proposed Solution
To promote optimal health in the general population, a key goal should be training primary healthcare providers to encourage prevention, recognition, screening, and treatment modalities in patients affected by the obesity disease and at risk of developing cancer. The lack of knowledge on this subject has contributed to a significant increase in the frequency of hospital admissions of patients with cancer and comorbid with obesity (Ortiz et al., 2020). It has also resulted in increased morbidity and mortality of the affected population (Ortiz et al., 2020). What this suggests is that provider education is needed to ensure that patients have access to the highest quality, evidence-based care when it comes to the treatment of obesity.

Not surprisingly, provider education has been used across the healthcare system as a means to increase knowledge and promote practice change (Sherman & Nishigori, 2020). Provider education enables clinicians to review critical evidence and to integrate this information into practice to enhance care quality and patient safety. Although the use of provider education to increase knowledge of obesity-related treatments is scant, a recent study completed by Iwamoto et al. (2018) did demonstrate that following the use of a provider training program for primary care providers, knowledge of obesity treatment did increase. The study conducted by Iwamoto et al. was a randomized controlled trial (RCT) indicating that this is a strong piece of evidence for use in the development of evidence-based practice change (Dang & Dearholt, 2017).

Summary

Obesity rates in the U.S. continue to increase prompting some public health officials to argue that the problem has become an epidemic in the U.S. Classified as a disease by the American Medical Association in 2013, obesity and its associated comorbid conditions such as diabetes, arterial hypertension, hyperlipidemia and obstructive sleep apnea, are responsible for significant morbidity, disability, and premature death. Women including minority women such
as African Americans and Hispanics are most impacted by this health issue. Despite all of the knowledge regarding obesity and its impact on health there is a knowledge gap amongst the public and healthcare providers about the detrimental effects of obesity, its link to cancer, and the potential preventive and treatment modalities including lifestyle changes, medications, and surgical interventions that could be used for treatment. The aim of this quality improvement project was to determine if provider education increases knowledge of the relationship between obesity and cancer and the surgical interventions that can and should be used to treat obesity more aggressively in clinical practice.
Section Two: Literature Review

Obesity is a growing threat to individual and public health (CDC, 2021). As rates of obesity increase, data demonstrate a concomitant increase in cancer rates as well (Rosenthal et al., 2017). Further, evidence definitively indicates that when surgically induced weight loss is used as a means to help prevent cancer, incidence of cancer does decline (Hyer, 2019; Nanda et al., 2021). Overweight and obesity are typically treated in the primary care setting (Aminian et al., 2022). However, research regarding the treatment of obesity in this care setting clearly indicates that provider willingness or ability to address weight issues with patients is often suboptimal (Nanda et al., 2021). Consequently, many patients do not receive adequate education regarding their risks of living with obesity and potential options that could not only improve health but also reduce their risk of cancer. Based on this framework, provider education to improve knowledge of these topics was implemented. Provider education should foster practice change as increased knowledge of the topic should be applied to improve patient care.

Because this quality improvement project was an evidence-based initiative, the problem and solution were rooted in the literature. Given this requirement, a literature review on efficacy of surgical interventions to help prevent cancer and the use of provider education to enhance knowledge of clinical topics related to obesity was needed. With this in mind, a review of the literature is provided in this section. More specifically, this section reviews the PICO question, the literature search process, the inclusion and exclusion criteria used for selecting articles for inclusion, a literature appraisal matrix, a review of the characteristics of the included literature, and a synthesis of the literature.
PICO Question

The purpose of this DNP quality improvement project was to increase provider knowledge of the relationship between obesity and cancer as well as the use of surgical interventions to help promote weight loss and to reduce cancer risk among obese patients. To begin the literature search, the PICO question was reviewed to identify potential search terms for the project. The PICO question for this DNP quality improvement project was as follows: Among primary care providers (P) does the use of an educational intervention regarding surgically induced rapid and durable weight loss to prevent cancer in obese patients (I) increase provider knowledge of the topic (O) when compared with baseline (pre-education) knowledge (C)?

Literature Search Process

As noted, the literature search process began with an identification of search terms based on the PICO question. Initial searches combined the following PICO terms with the Boolean operator AND: “primary care,” “obesity,” “education,” “surgery.” These terms were combined with synonyms including “community care,” “obese,” “training,” “bariatric” along with the Boolean operator OR. Additional searches were undertaken to identify what has been noted regarding the use of surgical treatment of obesity and cancer incidence. Once search terms were identified for the project, databases for identifying relevant and timely articles were selected. Three databases were searched including PubMed (including Medline Complete), Embase, and Cochrane Central. To ensure the selection of the strongest evidence to support the project, limiters were placed on the database searches including articles published between 2017-2022, articles published in peer-reviewed journals, articles available in full text, and articles written in English.
Searches from each of the databases were combined, resulting in a total of 1,429 articles. With duplicates removed, this left 743 articles. The articles were ordered in terms of relevance to the search terms and the article abstracts were reviewed to determine their feasibility for inclusion. Articles that included a primary study that provided data supporting the problem or intervention were placed in a separate folder for full text review. After abstract review, this left a total of 219 articles for full-text review. The same criteria were applied for evaluating articles in full text. Based on a review of the articles, eight with the highest level of evidence to support the project were selected for inclusion in this literature review.

**Inclusion and Exclusion Criteria**

Articles were included in this literature review if they met the following criteria: used a primary study that provided quantitative data, demonstrated positive results supporting the problem or solution, and could be designated with an A or B quality rating as per the Johns Hopkins Nursing Evidence-Based Practice Model (Dang & Dearholt, 2017). Limiters placed on the searches also ensured that all included articles were timely (published in the last five years) and scholarly. Exclusion criteria for articles were based on the following: the use of a qualitative methodology, the article did not include a primary research study, and/or the article was of low quality: C Quality per the Johns Hopkins Model (Dang & Dearholt, 2017).

**Literature Appraisal and Literature Matrix**

A literature matrix for this project can be found in Appendix A. The literature matrix includes a brief summary of the pertinent elements of each study and also includes a review of the level of evidence and quality rating for the article based on the Johns Hopkins Model (Dang & Dearholt, 2017). The Johns Hopkins Model provides a taxonomy for critiquing the evidence. Articles that include a systematic review with or without meta-analyses are identified as Level I
studies along with meta-analyses that use only randomized controlled trials (RCTs) and individual RCTs. Level II studies include meta-analyses that use studies other than RCTs and interventional studies such as quasi-experimental studies. Retrospective and cross-sectional studies, while quantitative in nature, do not include an intervention and are classified as Level III under the Johns Hopkins taxonomy. As per the literature matrix found in Appendix A, all studies included in this literature review were Level I – III.

Characteristics of the Included Studies

A cursory overview of the literature collected for this DNP quality improvement project demonstrates that there were four studies located which definitively demonstrated the link between bariatric surgery and cancer incidence (Aminian et al., 2022; Schauer et al., 2017; Schauer et al., 2019; Stroud, 2020). In addition, there were four studies located illustrating the role of education for providers in managing obesity in various care settings including primary care (Hyer, 2019; Iwamoto et al., 2018; Nanda et al., 2021; Turner et al., 2018). A targeted review of each study is provided in this section based on these two general themes.

The Link Between Bariatric Surgery and Cancer

As noted, four studies on the link between obesity and cancer were included in this literature review (Aminian et al., 2022; Schauer et al., 2017; Schauer et al., 2019; Stroud, 2020). The first study reviewed was undertaken by Aminian et al. (2022) and included a matched retrospective cohort study. The objective of this investigation was to determine if bariatric surgery was associated with lower cancer risk and mortality in patients with severe obesity. Using data from 30,318 patients, the authors divided the sample based on patients that did have bariatric surgery (n = 5,053) and patients that did not have bariatric surgery (n = 25,265). Estimated time to incident obesity-related cancer was assessed for 13 different types of cancer.
The results of the study demonstrated that during the 10-year follow-up 96 (2.9%) patients in the surgical group compared with 780 (4.9%) in the non-surgical group developed cancer. Rates of cancer were higher in severely obese patients who did not have bariatric surgery.

This study by Aminian et al. (2022) provides empirical proof that bariatric surgery can help reduce cancer incidence. The study also included a large cohort of patients, enhancing the ability to generalize the findings. Even though these study strengths are present, there are some weaknesses. In particular, the project utilized a retrospective design, indicating that initial data collected was not intended to be used for research. Further, the study was only conducted at a single site and the results may not be similar at other sites. Despite these weaknesses, the study does support the project problem and does indicate that surgical intervention may be useful for reducing cancer incidence. As per the Johns Hopkins Model, this study was found to be a Level III study with an A Quality rating (Dang & Dearholt, 2017).

The second study demonstrating the link between cancer and bariatric surgery critiqued for inclusion in this literature review was conducted by Schauer et al. (2019) and included a retrospective cohort study to determine if the use of bariatric surgery was associated with a lower risk of developing cancer. In this study 22,198 obese patients who had bariatric surgery were compared with 66,427 matched controls to evaluate cancer rate at 10 years following bariatric surgery. At a mean follow-up of 3.5 years, 2,543 patients in the entire study group were found to have cancer. When cancer rates were compared between surgical and non-surgical patients, those that had undergone bariatric surgery were noted to have a 33% lower hazard risk of developing cancer compared with patients that did not have the surgery. The results demonstrate a strong link between surgical intervention and a reduction in obesity rates.
The strengths of this study by Schauer et al. (2019) can be found in the use of a large sample from a multisite cohort as well as the use of a well-matched control group to thoroughly compare the data. The limitations of the study include the use of a retrospective methodology as well as the fact that the sample was not randomized. Even though the study does have some pertinent weaknesses it does support the problem being investigated and further illustrates the importance of ensuring that patients are aware of their options to manage their weight. The study was identified as a Level III investigation with an A Quality rating as per the Johns Hopkins Model (Dang & Dearholt, 2017).

An additional investigation conducted by Schauer et al. (2017) also sought to determine if the reduction in cancer risk following bariatric surgery was the result of weight loss. In this retrospective matched cohort study, the authors included 18,355 obese patients that had undergone bariatric surgery and 40,524 obese patients that had not undergone surgery. The authors analyzed the data using a multivariable Cox proportional hazard model to evaluate the relationship between weight lost at one year and incident cancer rates 10 years following surgery. The results indicated that there were 1,196 cases of incident cancer across the entire sample. At the end of one year, the bariatric group had an average weight loss of 27% compared with 1% in the non-surgical group. This suggests that the risk of cancer is much lower in patients that lose weight from surgery compared with patients that do not undergo this type of intervention. The authors emphasize the importance of surgical intervention to promote weight loss and prevent cancer.

The study by Schauer et al. (2017) has pertinent strengths including the use of a large sample from multiple sites. Because the sample was not randomly selected, this helps to improve the generalizability of the findings. Weaknesses for the study primarily stem from the use of a
retrospective methodology. This methodology does not allow for tight control of study variables, having implications for internal validity. Overall, however, the study does support the current project and demonstrates that by reducing weight through surgical intervention, it should be possible to reduce the incidence of cancer. As per the Johns Hopkins Model, this study was identified as a Level III investigation with an A Quality rating (Dang & Dearholt, 2017).

The final article included on this topic was written by Stroud (2020) and utilized an observational cohort study to evaluate the relationship between surgical weight loss and serum biomarker changes with incident cancer in patients that had undergone bariatric surgery. A total of 8,759 obese patients were included in this study and were drawn from multiple sites. Weight and serum biomarkers were measured one year post-operatively. Cox proportional hazard models were used to adjust sample data based on weight loss age, gender, education, and smoking history. Of those included in the study, 82 reported a new cancer diagnosis. Further, the authors found that in patients who lost 20-34.9% of their body weight one year following surgery, compared with patients that lost less than 20% of their body weight, had a significant decrease in serum biomarkers, suggesting that cancer risk for these patients was lower. Based on this data, it becomes evident that the amount of weight loss associated with bariatric surgery will play a role in shaping future cancer risk for the patient.

The study by Stroud (2020) demonstrated the role of weight loss and specific targets that will reduce the patient’s risk of developing cancer. The study is bolstered by the use of a large, multisite sample. However, the study does not use a randomized sample or a control group. Further, the study does not compare an intervention, which demonstrates the weaknesses of the use of observational cohort methodologies. Although the study does have some pertinent methodological weaknesses, the results do clearly illustrate the problem by demonstrating that
obesity does increase patient cancer risk and further that bariatric surgery can be effective for reducing this risk. This study was identified as a Level III investigation with an A Quality rating as per the Johns Hopkins Model (Dang & Dearholt, 2017).

**Provider Education in Managing Obesity**

As noted in the introduction to this section, there were four studies located regarding the issue of provider education in managing obesity (Hyer, 2019; Iwamoto et al., 2018; Nanda et al., 2021; Turner et al., 2018). The first study critiqued on this topic was undertaken by Hyer (2019) and included a systematic review of the literature to identify barriers for nurse practitioners working in primary care to provide weight loss counseling and support for patients. The author selected articles from six different scholarly academic databases. All articles were published between 2019 and April 2018. The author used a PRISMA flow diagram to organize articles and a standardized extraction table to review all articles. A total of 169 articles were evaluated and 15 were retained for inclusion in the study. The results indicated that among the most pressing challenges facing nurse practitioners in counseling and treating obese patients was a lack of knowledge and access to education to provide patients with care. Many nurses did not view patients being overweight or obese as problematic. This suggest that nurse practitioners lack vital knowledge to properly care for obese patients.

This systematic review by Hyer (2019) uses the highest level of evidence (Level I) and has an A quality rating as per the Johns Hopkins Model (Dang & Dearholt, 2017). Systematic reviews combine results over multiple studies making this an important piece of evidence to support practice change. Although this article has notable strengths, the author did not include a meta-analysis due to the lack of methodologically rigorous studies on this topic. This indicates that more primary research is needed on the topic. However, the article clearly demonstrates the
dearth of knowledge that exists for nurse practitioners working in primary care to provide effective care for patients struggling with their weight. Knowledge gaps for providers could be ameliorated through education.

Iwamoto et al. (2018) also consider education and its implications for improving primary care provider knowledge obesity management. More specifically, these authors employed a randomized controlled trial framework that evaluated PCP knowledge before and following an educational intervention to improve provider knowledge of obesity treatment and management. PCPs working at four primary care clinics were provided with the education and PCPs working five primary care clinics were not provided with education. Pre- and post-implementation assessments of provider knowledge and attitudes were used to measure outcomes. The results indicated that in terms of knowledge and comfort with counseling obese patients, PCPs from control and intervention sites had similar scores before the training ($P = 0.8$). Comfort and knowledge with regard to weight loss treatments increased for providers in the intervention as compared with the control arm: mean and standard deviation $= 4.00 [2.57]$ vs. $6.17 [2.27]$, $P < 0.001$.

The strengths of the study undertaken by Iwamoto et al. (2018) stem from its methodologically rigorous design which provides robust findings demonstrating that education does improve provider knowledge of this topic. The weaknesses of the study stem from the use of a small sample from a similar region, limiting the generalizability of the findings. In addition, no longitudinal data or impact on outcomes for provider care are measured in this study. The results do support the intervention used for this quality improvement project and do demonstrate that the intervention is evidence-based. This study is methodologically sound and would be
classified as a Level I study with an A Quality rating as per the Johns Hopkins Model (Dang & Dearholt, 2017).

The third study located on this topic was undertaken by Nanda et al. (2021) and utilized a cross-sectional survey to evaluate the knowledge, attitudes, and needs of primary care providers and nurses with regard to obesity management education. The sample included 80 providers (n = 43 nurses and n = 38 providers) working in primary care. An email survey sent between June 20, 2019 and September 12, 2019 to 194 healthcare workers across the U.S. was used for data collection. Among the 80 providers who responded to the survey, 79% reported a need for more education to provide care for obese patients. This study clearly demonstrates that a large majority of providers self-report needing education and training to help improve their management of obesity in the primary care setting. Given the scope and impact of obesity on the population, this is clearly a need to educate providers.

The study’s strengths stem from the magnitude of the results which demonstrate the need for education and the sample diversity with providers responding from across the country. This suggests that the gap in provider knowledge on the topic is widespread. Although the sample is diverse, it is small which limits the generalizability of the findings. Further, the method used does not trial an intervention and the results of cross-sectional studies can change over time. Using the Johns Hopkins Model, this article was identified as a Level III study with an A Quality rating.

The final study located on this topic and included in this literature review was undertaken by Turner et al. (2018). Specifically, Turner and coauthors used a cross-sectional study of a nationally representative sample of healthcare workers to assess the knowledge of healthcare professionals’ regarding evidence-based practice guidelines for the treatment of obesity. The
sample included 1,506 internists, family practitioners, obstetricians/ gynecologists, and nurse practitioners with data collected from a web-based survey conducted between June 9 and July 1, 2016. On various elements assessed regarding evidence-based practice guidelines, providers showed a low and inconsistent level of knowledge indicating that a majority of providers in the sample do not have knowledge of practice guidelines for the treatment of obesity. This clearly indicates that a knowledge gap is present for a substantial number of healthcare providers.

The strengths of this study stem from the positive results demonstrating provider gaps in knowledge, suggesting that education is needed on this topic. Further, the sample is nationally representative, suggesting that the results can be generalized to other provider groups in other areas of the county. Methodological weaknesses are present as well and include the use of a cross-sectional survey as results may not remain consistent over time. Additionally, this study did not use a specific intervention and does not evaluate what outcomes will result over time. The study does support the intervention used in this quality improvement project, as provider knowledge is clearly lagging. The application of the Johns Hopkins Model indicates that this is a Level III study with an A Quality rating.

**Synthesis of the Literature**

A review of each individual study included in this literature review does provide important insight into the type and strength of evidence that is available to support this quality improvement project. While a review of each study is helpful for understanding the evidence and how it supports the project, a synthesis of the literature is needed to help identify gaps in the current research that may impact the implementation of this quality improvement project. With this in mind, a literature synthesis of the articles reviewed above is provided here. The articles
are integrated based on the identified topics including the link between bariatric surgery and cancer and provider education in managing obesity.

**The Link Between Bariatric Surgery and Cancer**

Synthesis of the four articles regarding the link between bariatric surgery and cancer does indicate that each demonstrates that there is a higher risk of developing cancer if an obese patient does not have bariatric surgery (Aminian et al., 2022; Schauer et al., 2017; Schauer et al., 2019; Stroud, 2020). This evidence provides a strong rationale for justifying this DNP quality improvement project. Integration of these four articles also demonstrates that each was identified as a Level III study as per the Johns Hopkins Model (Dang & Dearholt, 2017). This indicates that while quantitative data was collected, an interventional study to test a new treatment to prevent cancer in patients struggling with obesity was implemented. Although this level of evidence does indicate that the studies do have some methodological rigor, there are inherent challenges for evaluating the risk between obesity and cancer. Most notably, a randomized controlled trial in which obesity is manipulated for the patient would not be ethical, reducing the number of experimental (Level I) and quasi-experimental (Level II) studies that can be implemented to investigate the topic.

With the use of experimental studies to investigate the topic limited, scholars have relied on past research to evaluate cancer outcomes in obese patients. For instance, Aminian et al. (2022) used a matched retrospective cohort study as did Schauer et al. (2017) and Schauer et al. (2019). Stroud (2020) utilized an observational cohort study which limited randomization of the sample. Although retrospective studies can be structured as a controlled investigation of two groups, these types of studies use data that was not initially intended for use in research (Nimehchisalem, 2018). Consequently, this suggests that variables may not have been tightly
controlled, such as what may have happened in a randomized controlled trial (Nimehchisalem, 2018). Further, retrospective studies rely on data that has been previously collected without any control over the process. Data may be incomplete or inaccurate. Errors in the data or a lack of uniformity in data collection may be difficult to confirm given that the data is typically extracted from patient charts or organizational metrics recorded several months or years earlier (Nimehchisalem, 2018).

Differences in the articles can also be seen with regard to the specific metrics used to determine cancer risk for patients following surgical intervention for obesity. Aminian et al. (2022) for instance used retrospective patient data from obese patients undergoing bariatric surgery and compared the data to obese controls that did not undergo surgical intervention. Schauer et al. (2017) used a similar approach and in both studies, it was possible to see that the cohort that did not undergo surgery had a higher risk for developing cancer over the long-term (i.e., 10 years). Schauer et al. (2019), on the other hand, used patient weight loss following surgery to evaluate cancer rates in an effort to link weight loss with reduce cancer risk. Stroud (2020) used a one-group pre-/post-observational cohort framework to evaluate the amount of weight lost following bariatric surgery and cancer risk. These authors confirmed what was noted by Schauer et al. (2017) while also showing that patients who lost > 20% of the body weight in the first year following surgery had a significantly improved biomarkers for developing cancer, suggesting that their risk for the disease was lower.

The ethical challenges of conducting experimental research to examine this topic are significant and does provide justification for using studies with Level III frameworks and quantitative but non-experimental frameworks. Because the available evidence on the topic is rigorous and does demonstrate that obesity is a significant risk factor for cancer, there is ample
support to demonstrate that there is an impetus to reduce and prevent obesity as a means to reduce cancer incidence. By highlighting the scope of the problem through this evidence, this should motivate change agents within the organization to seek solutions that will improve the quality of patient care while also improving patient health outcomes.

**Provider Education in Managing Obesity**

The four articles regarding provider education in managing obesity were also integrated to acquire deeper insight into the topic. These four articles each addressed the issue of provider knowledge and education in different ways. While the topic was addressed through different approaches, collectively, the data indicate that providers lack essential knowledge regarding the treatment of obesity (Hyer, 2019) and further, providers consistently identify a lack of knowledge and access to education on the topic as a critical issue impacting their ability to provide this type of care for patients (Nanda et al., 2021). Provider education was shown in one RCT to have a positive and statistically significant impact on provider knowledge of the topic (Iwamoto et al., 2018). When these articles are synthesized, this provides a pragmatic foundation for implementing the solution for this problem: i.e., provider education.

A closer look at the evidence provided in these four studies does provide a comprehensive overview of the topic. Being able to show that providers do not have direct knowledge of evidence-based practice guidelines clearly indicates that there is a tangible and important gap in provider knowledge (Turner et al., 2018). Evidence-based practice guidelines are often viewed as the cornerstone of improving health and nursing care (Turner et al., 2018). While providers lack the empirical knowledge to effectively treat obesity in practice, providers also self-report this knowledge deficit (Hyer, 2019; Nanda et al., 2021). This suggests that providers are aware of the issue of obesity and its impact on individual and public health and
may not fully understand how to address it in practice. Providers clearly need education and support to change the way in which care is provided to patients with obesity. Although empirical evidence demonstrating the efficacy of provider education regarding obesity treatment is scant, the evidence available does support the use of practice change to educate providers regarding this topic.

Also, of importance to note is that primary care providers and the primary care setting was included in each of the studies in some way. Hyer used a systematic review that included only nurse practitioners working in primary care. Iwamoto et al. (2018) used an RCT framework that utilized only primary care providers and primary care practice sites. The sample used by Nanda et al. (2021) involved primary care providers and nurses working with obese patients. Turner et al. (2018) included primary care providers a long with internists, obstetricians/gynecologists, and nurse practitioners. This finding from the research not only highlights the deficits of provider knowledge regarding this topic that exist in primary care but also, the use of primary care in these studies demonstrates that this practice setting is feasible for implementing change. This quality improvement project utilizes a primary care setting and providers as the targets of education.

Combined the literature reviewed for this project supports the use of bariatric surgery to reduce cancer risk. The literature also demonstrates that most providers may not have this knowledge and often lack the information needed to appropriately treat obesity using evidence-based practice guidelines. By having empirical support that demonstrates both the scope and impact of the problem and the feasibility and need for the solution, there is a strong evidence base upon which to advocate for change to improve provider knowledge. The evidence also supports educational interventions to fill the knowledge gaps of primary care providers.
Definition of Terms

For the purposes of this quality improvement project, the following terms were defined:

- **Bariatric Surgery** – Surgical procedure that is performed on the intestine or stomach to induce weight loss in the overweight or obese (Schauer et al., 2017).

- **Cancer** – A malignant tumor or growth cause by uncontrolled division of irregular cells in part of the body (Steele et al., 2017).

- **Cancer Prevention** – This is the practice of taking active measures to lower the chance of developing cancer. This may involve lifestyles changes; screenings to prevent exposure to cancer causing agents; and vaccines to prevent cancer from developing. (Aminian et al., 2022).

- **Diabetes** – Also known as diabetes mellitus (DM), this is a disease that affects the body’s ability to produce or respond to impaired insulin production resulting in too much glucose in the blood stream. (Schauer et al., 2017).

- **Obesity** – Described as a condition of having excessive body fat or being overweight that increases and individuals’ risk of health issues such as cancers and heart disease. (Rosenthal et al., 2017).

Summary

This literature review provides a solid justification for increasing provider knowledge of preventing cancer in obese patients through the use of an educational program. In addition to the fact that surgical weight loss for obese patients can result in a lower risk of cancer, the literature reviewed here also demonstrates that provider knowledge of the topic is suboptimal and that education can work to increase provider knowledge of the topic. Although certain gaps in the literature exist including how increases in provider knowledge will impact provider behavior, the
evidence does support the need for a practice change to increase provider knowledge of managing obesity in primary care. With such extensive support for the practice change, it is necessary to consider how this quality improvement project will be operationalized in practice.
Section Three: Methodology

The basic tenet of a quality improvement project, as defined by the US Agency for Healthcare Research and Quality ([AHRQ], 2020), is "doing the right thing, at the right time, for the right person achieving the best possible outcomes” (para 10). Measuring or identifying mistakes is a key aspect of the quality improvement process. This quality improvement project sought to ameliorate a knowledge deficit or gap amongst primary healthcare providers with the belief that an educational intervention will lead to change in provider knowledge. This change in provider knowledge should result in alterations in clinical practice with providers advocating for surgical intervention in patients with obesity to prevent cancer. This should serve to improve patient and population health including a reduction in cancer rates as well as increases in patient morbidity and mortality due to both obesity and cancer.

Primary DNP Project Goal

The aim of this project was to enhance the knowledge of primary care providers about the link between obesity and cancer and the role that surgical weight loss will serve in improving outcomes for patients. Clinicians agreeing to participate in this project were provided with data that reflects the impact of the medical conditions that are associated with obesity and its link to an increased incidence of cancer. The indications and outcomes of treatment modalities such as intensive medical therapy with lifestyle interventions was compared to surgical treatment modalities. By increasing knowledge and awareness of primary healthcare providers it was believed that this will result in a change in practice. More specifically, providers will work more aggressively to educate patients and treat obesity as a medical condition to help improve patient health outcomes while also reducing the incidence of cancer related to obesity that develops over the long-term.
The practice site where the project will be implemented was a not-for-profit multispecialty academic medical center located in South Florida that integrates clinical and hospital care with research and education. The aim of the organization is to provide excellent patient care based on the principles of cooperation, compassion, and innovation while fostering research and education. A total of 30 participants from the practice site were sought including nurses and healthcare providers working in primary care within the facility.

**SMART Objectives**

Four SMART (specific, measurable, achievable, realistic and timebound) goals were identified for this project. These goals are as follows:

1. By the April of 2023, develop an evidence-based educational module for providers working at The Cleveland Clinic.
2. By June of 2023, assess provider knowledge of the link between obesity and cancer as well as treatment of obesity and the use of surgical intervention to reduce patient cancer risk before an educational intervention.
3. By late June 2023, deliver provider education to 30 providers currently working at the practice site.
4. By early July 2023, assess provider knowledge of the link between obesity and cancer as well as treatment of obesity and the use of surgical intervention to reduce patient cancer risk.

**Theoretical Framework/Conceptual Underpinning**

Theoretical frameworks are commonly used in nursing care to help nurses structure the care provided to patients (Moullin et al., 2020). In the context of nursing research or evidence-based practice, theory can serve as the basis for structuring practice change and for interpreting
the results of a research study or practice project (Moullin et al., 2020). Given the importance of theoretical frameworks to guiding evidence-based practice projects, the framework used in this quality improvement project must be discussed. Specifically, the health belief model (HBM), initially described by Rosenstock and others in the 1950s and expanded upon throughout the twentieth century (Moullin et al., 2020) was applied in this quality improvement project. A review of the theory is provided in this section along with an overview of the theory’s clinical fit to the project and an evaluation of the theory using Peterson and Bredow’s (2013) framework including of six questions to evaluate the theory.

**Theory Overview**

The health belief model was initially developed as a means for public health officials to understand patterns of patient health behavior when studying the prevention or detection of disease (Sulat et al., 2018). The model was extrapolated to better understand individual health behavior and to identify the factors that would motivate a person to engage in behavior change to achieve health goals (Houlden et al., 2021). The theory postulates that factors such as age, gender, race, personality and knowledge would all combine to shape individual perceptions of and attitudes toward health behavior and health behavior change (Sulat et al., 2018). Individual perceptions of health behavior are shaped by four factors including the following:

- Perceived susceptibility/perceived severity: This refers to the threat a person feels with regard to developing a potential health problem.
- Perceived benefits: This refers to the benefits that the individual may perceive as a result of engaging in health behaviors.
- Perceived barriers: This includes the barriers that the individual sees when it comes to making health behavior change.
• Self-efficacy: This refers to the belief of the individual regarding their ability to make change (Sulat et al., 2018).

The HBM also includes environmental cues which can shape the action or behavior of the patient (Houlden et al., 2021). Environmental cues could include providers taking a more assertive role in providing patients with education about this topic to help them make informed choices about bariatric surgery to prevent cancer.

Understanding the individual elements of the HBM is critical as provider assessment of the patient’s perceptions can provide insight into what may be hindering engagement in health promotion (Sulat et al., 2018). If, for instance, the patient does not view their risk of developing the disease as high, this may impact the willingness of the patient to make change.

Environmental cues such as education may make patients aware of their risk for developing a disease. However, if providers do not have the knowledge and information to provide to patients and further do not make an effort to educate patients, this could potentially lead to the inability of providers to effectively target the root causes of poor patient motivation to engage in health promotion behaviors.

**Theory/Clinical Fit**

In recent years nursing scholars have demonstrated an increased interest in health behavior change interventions such as the one implemented in this project. A review of the literature on the HBM suggests that the approach has been used to structure prevention and treatment of obesity in children and adolescents (Keshani et al., 2019), college students (McAuthur et al., 2018), young adults (Luquis & Kensinger, 2019), women who are pregnant (Shafieian & Kazemi, 2017), patients with obesity-related comorbidities (Tehrani et al., 2022),
and various ethnic groups (Lee et al., 2021; Villar et al., 2017). The model has also been used to study patient behaviors and actions when considering bariatric surgery (McVay et al., 2018).

Although this quality improvement project focused on the education of providers to improve individual health, the project did employ a public health focus. The idea was that education would improve provider awareness and knowledge of the topic which should, in turn, have an impact on the care provided to patients. Once providers understand the importance of treating obesity and have the knowledge to make evidence-based recommendations for patients regarding bariatric surgery, this should result in more patients seeking this treatment. Over time, this should result in improved outcomes for public health as the overall incidence of cancer cases decline within the community. Numerous studies have employed the health belief model to examine changes in health behavior of the public and to examine how changes in behavior impact public health (Guidry et al., 2019; Houlden et al., 2021; Maseko et al., 2021).

**Theory Evaluation**

The final component of evaluating the HBM involves the application of Peterson and Bredow’s (2013) theory evaluation framework. The framework involves six questions that must be evaluated in terms of the theory and its application. The first question focuses on how the theory is operationalized to the clinical issue being investigated. As noted, when reviewing the clinical fit of the theory, it has been used to promote health behavior change in various clinical groups (Keshani et al., 2019; Luquis & Kensinger, 2019; Shafieian & Kazemi, 2017) as well as fostering behavior change in patients seeking bariatric surgery (McVay et al., 2018). This evidence suggested that the theory could be operationalized to fit the project. The second question in Peterson and Bredow’s (2013) framework focuses on where the theory has been applied in the past. As noted, the theory has its origins in public health (Sulat et al., 2018).
However, the theory has been widely applied in direct patient care as a means to motivate behavior change for patients (Houlden et al., 2021). The evolution of the theory demonstrates its broad applicability in public health, healthcare, nursing care, and direct patient care.

The third and fourth questions of Peterson and Bredow’s (2013) theory evaluation framework focus on how well the theory performs in comparison to the phenomenon to which it relates and the relationship of the theory to the clinical problem, respectively. The HBM has been noted to have significant empirical accuracy and as noted, has been extensively applied to the topic of obesity in different clinical groups (Luquis & Kensinger, 2019). Obesity continues to be viewed as a lifestyle choice and, therefore, patient behavior in controlling obesity is viewed as an essential component of addressing this health issue (Puhl et al. 2020). Consequently, the HBM is closely related to the topic of health behavior change for patients to reduce weight. In terms of the clinical problem being investigated, it is clear that the HBM may not have direct implications for providers. However, the ability of providers to use their knowledge while providing care for obese patients will have a direct relationship to the theoretical framework as patient motivation to adopt bariatric surgery for treatment should increase.

The final two questions from the theory evaluation framework focus on the congruency of the clinical problem with the theory, and whether there are tools to measure the theory, respectively (Peterson & Bredow, 2013). The clinical problem focuses on raising provider awareness of obesity and methods for cancer prevention. Health education was employed as the primary intervention to address the problem. Health education is often noted in the literature as a means for increasing knowledge and changing perceptions/self-efficacy of those who complete educational interventions (Luquis & Kensinger, 2019; Shabibi et al., 2017). This suggests that the theory would be congruent with the topic being investigated. Finally, a review of the
literature regarding empirical referents for the HBM does suggest that the health belief scale or the health belief model scale has been utilized to evaluate the specific components of the health belief model that should be considered when focusing care on health behavior change (Avci & Altinel, 2018; Wu et al., 2020).

Setting and Participants

The setting for this project was a not-for-profit multispecialty academic medical center located in South Florida that integrates clinical and hospital care with research and education. The facility is a multispecialty academic center that provides care to community, regional, national, and international patients seeking healthcare for a large variety of disease processes. IRB approval from the practice site was required to complete this project. An IRB approval letter from the facility can be found in Appendix B. IRB approval for the project was also sought from Florida International University on March 23rd, 2023. One April 26th, 2023, the FIU IRB responded that the project was exempt from review. This letter can be found in Appendix C.

Current staff at the practice site include a large number of primary care providers who work as part of a multidisciplinary team to provide patient care. Although it was thought that it would advantageous to recruit all primary care providers from the facility (n = 65), a sample size of 30 was sought. As per the Central Limit Theorem, sample sizes with 30 or more participants are typically considered to be normally distributed (Mishra et al., 2019). Normality in the data will help to increase the strength of the results through the use of parametric tests to evaluate differences in knowledge before and following the educational intervention. Providers would include all staff working in primary care such as nurses, advanced practice nurses, physicians, nutritionists, and psychologists.
Procedures

The methodology utilized in this quality improvement project was a pre-/post-intervention design. The aim of this project was to improve knowledge amongst healthcare providers using an educational module covering both the impact of obesity on cancer and the benefits of obesity prevention and treatment by means of intensive medical interventions or bariatric surgery to reduce cancer incidence for patients. Primary healthcare providers at the practice site located in South Florida that accepted the invitation to participate in this project were required to complete one pre- and one post-intervention knowledge tests. One group pre-/post-intervention designs are constructed to evaluate change in a single group following the introduction of an intervention (Creswell & Creswell, 2018). Although these studies do not provide a true control group, they do provide a means for comparing the results and demonstrating that a change has or has not occurred (Creswell & Creswell, 2018).

Participant Recruitment

To recruit primary care providers from the practice site a three-step approach as proposed by Preston et al. (2016) was employed. According to these authors, the three steps involved in participant recruitment include identifying potential candidates, approaching them regarding their interest in the project, and finally acquiring candidate consent to participate in the project. Providers were recruited using an internal staff email directory from the facility. Healthcare providers working in primary care will be contacted via email with a recruitment letter outlining the specifics of the project (Appendix D). Interested staff will be asked to return the email within one week indicating their desire to participate in the project. Staff agreeing to participate in the project will be emailed a letter of informed consent (Appendix E). Staff will have one week to
read, sign, and return the informed consent form within one week. Staff who return the informed consent form will be identified as participants in the project.

**Data Collection**

Once all participants for the project had been identified, each participant was emailed two forms to complete: a demographic survey to collect characteristics of the project participants (Appendix F) and a pre-intervention knowledge assessment (Appendix G). These forms were fillable and participants were asked to download the forms, complete them, and return them within one week. Participants who did not return these forms within this time period had their data excluded from the project. The educational module was provided to participants via an online webinar created by the principal investigator. This was followed by post-intervention data collection. Post-intervention data collection entailed sending the pre-intervention knowledge assessment to participants to have them complete the form within three days of viewing the webinar. Participants were again asked to complete the post-intervention knowledge test two weeks after returning the initial first post-intervention assessment. During the post-intervention assessment, the questions from the pre-intervention (Appendix F) knowledge test were rearranged to help reduce test bias.

**Data Analysis**

Descriptive and inferential statistics were used to evaluate the results of this project. Descriptive analysis consisted of summarizing all continuous variables (pre-session (T0), and post-session (T1)) through calculating means with standard deviations, medians, and value ranges. The same approach to descriptive data analysis was used for the demographic data collected. Inferential statistics were used to assess the statistical significance of the changes in scores that result from the project. The sample size was $n = 15$ suggesting that the data was not
normally distributed and that a non-parametric test to evaluate internal data, i.e., a Wilcoxon sum rank test, was appropriate for analyzing the data. To determine whether session participants learned new information during the teaching session, the mean pre-session score (T0) and immediate post-session score (T1) were compared using a Wilcoxon sum rank test. An alpha value of > 0.05 was used to determine if statistical significance was present.

**Protection of Human Subjects**

Protection of human subjects in this project began with obtaining Institutional Review Board (IRB) approval for the project. IRB approval ensured that the project is ethically sound and does not cause harm to participants. Additionally, all participants were required to sign a letter of informed consent that indicated voluntary participation in the project and an understanding of all project risk and benefits as well as rights including the ability of participants to withdraw from the project at any time for any reason. To protect participant privacy during the project, all email communications used the blind carbon copy (bcc) feature. This ensured that participants could not identify each other during the project. Emails sent for the project were delivered through a secure email server that only included project participants and was password protected. The email account was only accessible by the principal investigator for the project.

To ensure that data from the study is deidentified, all staff signing an informed consent form were assigned a random three-digit code. The names and email addresses of participants, which constitute personal identifying information, were entered into an Excel spreadsheet and each participant was assigned a code. The Excel spreadsheet was password protected and accessible only by the principal investigator. The data was stored on a password protected laptop to which only the principal investigator had access. The codes were used on all data analysis tools to ensure that personal identifying information was not exposed. Data collected from the
project was aggregated such that no one piece of datum could linked to an individual project participant. This ensured participant privacy during the project.

**Data Management**

All data from the project was stored electronically on a password protected laptop. Each individual file needed for the project also included a password that is only known by the principal investigator. If data from the project needed to be printed, hard copy data was stored in a locked filing cabinet at the practice site and was only accessible by the principal investigator. All data will be stored for five years following the completion of the project. At this time, all hardcopy data will be shredded. Electronic data will be professionally removed from the hard drive of the computer.

**Summary**

This quality improvement project was developed to address the knowledge deficit that exists among primary healthcare providers regarding obesity, its serious healthcare implications, its association with an increased incidence of cancer, and the available preventive and treatment modalities including intensive medical therapy and bariatric surgery. The primary investigator of this project conducted a pre- and post-interventional study after recruiting n = 15 primary healthcare providers who attended an educational seminar on obesity, cancer, and weight loss interventions. Testing was conducted before the intervention to evaluate basic knowledge and immediately following the seminar to collect information about improvement in understanding following education. The expectation of this project was that a significant knowledge gap among primary care providers could be eliminated. Following the project, it is anticipated that increased provider knowledge will result in practice change to improve patient health, a reduction in cancer
incidence over time, and the willingness of providers to disseminate this knowledge to improve care beyond the current facility.
Section Four: Results

The purpose of this quality improvement project was to increase healthcare provider knowledge of obesity management for the prevention of cancer. To evaluate outcomes for this project, pre- and post-intervention knowledge scores of providers voluntarily agreeing to participate in the project were assessed and compared. This section includes a review of the results tabulated for the project. All data was tabulated using SPSS v.29 and the data presented here includes a review of the demographics of the sample as well as a descriptive and inferential analysis of the pre- and post-intervention provider knowledge scores.

Demographic Data

Demographic data was collected for this project using a standard demographic form (Appendix E). The data was collected from participant emails and entered into an SPSS datasheet. Descriptive statistics including mean, frequency, range, and standard deviation were calculated where appropriate. Demographic data collected from the sample indicates that a total of 17 healthcare providers initially agreed to participate in the project. Two of the providers were unable to complete the project, noting other time commitments. This left a total of 15 providers who participated in the project.

The demographic data for this project is reviewed here and is summarized in Table 1 below. As per the data provided in Table 1, participants ranged in age from 29 to 62 years ($M = 41.40, SD = 2.81$). The sample had more female ($n = 9, 60\%$) than male participants and a majority of the sample was White ($n = 8, 52\%$), followed by Latino/Hispanic ($n = 6, 40\%$), and African American ($n = 1, 7\%$). Participants reported working in primary care for a range of 3 to 17 years ($M = 3.89, SD = 4.76$) and a majority of participants included advanced practice nurses ($n = 11, 73\%$) followed by physician assistants ($n = 3, 30\%$) and physicians ($n = 1, 7\%$).
Providers reported seeing between 10 and 13 obese patients in practice each week and only 13% (n = 2) reported providing structured guidance or long-term support for patients with obesity.

Table 1

Demographic Data for Participants (n = 15)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (M, SD)</td>
<td>41.40, 2.81</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (40%)</td>
</tr>
<tr>
<td>Female</td>
<td>9 (60%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>8 (53%)</td>
</tr>
<tr>
<td>African American</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Latino/Hispanic</td>
<td>6 (40%)</td>
</tr>
<tr>
<td>Current Position</td>
<td></td>
</tr>
<tr>
<td>Advanced Practice Nurse</td>
<td>11 (73%)</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>3 (20%)</td>
</tr>
<tr>
<td>Physician (MD, OD, etc.)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Years Working in Primary Care (M, SD)</td>
<td>3.89, 4.76</td>
</tr>
<tr>
<td>Obese Patients Seen Each Week</td>
<td>10-13</td>
</tr>
<tr>
<td>Structured Guidance for Weight Loss (Yes)</td>
<td>2 (13%)</td>
</tr>
</tbody>
</table>

Pre-/Post-Intervention Data

Pre- and post-intervention knowledge scores were also collected for this project. This data was captured using a knowledge test (Appendix F) that was created for this project and based on the educational module. The knowledge test was based on a 20-point scale with 20 questions, each awarded a score of 1 for correct and 0 for incorrect. Data provided by participants was placed in an SPSS spreadsheet for review and descriptive statistics were evaluated for the data including mean, standard deviation, and range. Table 2 includes a review of the descriptive statistics for the pre- and post-intervention scores. The scores recorded indicate
that post-intervention knowledge scores were higher than pre-intervention knowledge scores.

Figure 1 provides a visual overview of the data.

Table 2

*Pre-, and Post-Intervention Knowledge Scores for Providers (n = 15)*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention Knowledge Score</td>
<td>7.85</td>
<td>2.55</td>
<td>3-11</td>
</tr>
<tr>
<td>Post-Intervention Knowledge Score</td>
<td>18.99</td>
<td>2.66</td>
<td>16-20</td>
</tr>
</tbody>
</table>

**Figure 1**

*Visual Comparison of Pre- and Post-Intervention Knowledge Scores (n = 15)*

Although a descriptive analysis of the knowledge data does indicate that scores did increase following education, evaluation of the data to determine its statistical significance was
also needed. To determine the most appropriate inferential test needed for the project, the normality of the data was first evaluated using a Kolmogorov-Smirnov test. This test indicated that there were significant differences in the pre- and post-intervention results suggesting that the data was not normally distributed. Because the data was normally distributed non-parametric Wilcoxon sum rank test was performed. The t-test was used to compare pre- and post-intervention knowledge score results, for a dependent sample. An alpha value of 0.05 was identified as the threshold for statistical significance. Results for the test conducted are provided in Table 3.

**Table 3**

*Comparison of Paired T-test Results (n = 15)*

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Critical Value</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-/Post-Intervention Knowledge Scores</td>
<td>-2.33</td>
<td>&lt; .000</td>
</tr>
</tbody>
</table>

There was a statistically significant difference between the pre- and post-intervention results, \( z = -2.33, p < .000 \), suggesting that the educational intervention was effective for increasing participant knowledge of the topic. These results suggest that the educational module was effective for knowledge retention among participants.
Section Five: Discussion

The purpose of this quality improvement project was to increase primary care provider knowledge of the management and treatment of obesity to prevent cancer. The results reported in the previous section indicated that a total of 15 providers working at the Cleveland Clinic completed an educational program to enhance their knowledge of the topic. A comparison of provider baseline and post-education knowledge indicated a statistically significant improvement in knowledge scores. With the results tabulated, it is now helpful to review the results and to evaluate the implications of the results for advanced nursing practice as well as for maintaining the project over the long-term.

Discussion of the Results

To begin this discussion, it is first helpful to consider the results of the project in the context of the current evidence base for the project. From the literature, it was possible to discern that there is a significant relationship between obesity and cancer (Aminian et al., 2022). This risk is of particular concern in menopausal and post-menopausal women who have an increased risk of breast and other gynecological cancers as a result of increased adipose tissue (Schauer et al., 2019). Although several different theories regarding why obesity leads to an increased risk of cancer have been postulated, the etiology of cancer in obesity may actually have several different pathways that synergistically contribute to increased cancer risk (Himbert et al., 2017). Although cancer risk is remarkably higher in patients who are obese, the current literature does indicate that with aggressive management of obesity including the use of bariatric surgery, the patient’s risk of developing cancer over the long-term can be significantly reduced (Schauer et al., 2019; Stroud, 2020). This provided the foundation for identifying the current gap in knowledge as
Evidence also indicated that providers lack knowledge of the topic (Hyer, 2019; Iwamoto et al., 2018; Nanda et al., 2021; Turner et al., 2018).

Provider lack of knowledge regarding the treatment of obesity for the prevention of cancer was illustrated in this project. Specifically, practitioner pre-intervention knowledge scores regarding the topic averaged 9.88 out of 20 points indicating that overall, the knowledge level of providers was actually quite low before education. These scores increased significantly to an average of 19.65 out of 20 following educations. Education to increase provider knowledge of effective obesity treatment in primary care has been shown in the literature to be an effective intervention (Iwamoto et al., 2018; Turner et al., 2018). Consequently, it is possible to argue that the results of this project mirror the current literature on provider education to increase knowledge of the topic and further the results of this project accurately demonstrate the dearth of provider knowledge regarding the topic.

The purpose of educating providers about the topic is to foster a change in practice such that clinicians treat obesity as a health issue. Current evidence suggests that obesity should not only be treated as a chronic health condition but also that obesity should be managed by an interdisciplinary care team (Kushner & Kahan, 2017). Despite these recommendations, obesity continues to be treated as a behavioral disorder that is primarily cosmetic in nature (Sulat et al., 2018). By prioritizing the care of obesity as a medical condition, providers may have a greater incentive to work with the patient to help reduce weight. What is made clear through the evidence-based literature is that current treatment guidelines for managing obesity are not being followed in practice, rendering current efforts to manage obesity highly ineffective. Providers who are able to treat obesity and educate patients about their risk for cancer and other disease-
related comorbidities as well as treatment options that could dramatically improve individual and population health while also improving the delivery and coordination of patient care.

**Implementation Discussion**

Overall, the implementation of the project occurred following the plan approved by the Institutional Review Boards of the Cleveland Clinic and Florida International University. Providers who were interested in learning more about the topic completed the informed consent form sent in the recruitment email. A total of 34 healthcare providers working at the Cleveland Clinic initially agreed to participate in the project, and all returned their signed informed consent forms within one week of being contacted for participation in the project. Additionally, all 34 providers completed the pre-intervention (baseline) demographic form and knowledge questionnaire. All forms were completed within one week as per the project protocol and participants were sent instructions for completing the educational module.

Although all 17 initial participants were eligible to complete the educational program, only 15 participants indicated having viewed the module within the follow-up timeframe. An effort was made to reach out to the remaining three participants to provide additional time. Over the course of a one-week period, the three participants returned an email stating that they wished to have their information removed from the project and they did not have the time to complete the educational module. As per the IRB specifications for the project, any participant could choose to have their data removed from the project for any reason. To respect the wishes of the participants, their information was removed from the project and no further project communication occurred.

Following the completion of the educational module, four of the participants expressed a desire to have the educational module provided in person so that questions could be posed in
Influencing Factors

Influencing factors that shaped the outcomes from this project included challenges in acquiring IRB approval from Florida International University as well as the short duration of the project. The process of acquiring IRB approval from FIU was streamlined through training to assist the principal investigator with the process. However, obtaining approval took several revisions and proved to be a time-consuming endeavor. Although approval was granted, the time required to achieve this milestone reduced the amount of time available for recruiting participants. Because the recruitment of participants for the project could not occur until after IRB approval, it was not possible to formally discuss the project or to identify other methods for recruiting participants: i.e., snowball sampling. While it is not possible to state with certainty that it would have been possible to markedly increase the number of participants in the project, increasing provider exposure to this educational program does seem like a worthy goal and one that could have potentially been augmented with increased time to recruit providers at the practice site.

The second influencing factor noted—the short duration of the project—also had implications for the project. The delays in securing IRB approval from FIU did reduce the amount of time available for the collection of data. The short duration of the project also limited the outcome measures that could be evaluated from the project. A secondary outcome that would have been helpful to measure for this project would be the number of overweight/obese patients
counseled about weight loss options and/or the number of overweight/obese patients agreeing to have bariatric surgery. Changes in practice would have been optimal to measure as these changes are what will ultimately lead to improvements in population health as well as enhancements in the delivery of care.

**Monitoring**

Monitoring of the project during implementation occurred through several actions. The first step taken to monitor the project was the use of a project schedule. As outlined in the methodology and in the IRB project protocol, this quality improvement project followed a schedule based on specific activities that had to be completed by participants in a given time frame. Based on this schedule, emails were sent to project participants in a timely manner, specific instructions for completing and returning forms were provided to participants, and follow-up emails were sent to participants when needed. By following the project schedule meticulously, it was possible to identify problems early, including the attrition of three participants during the educational program. Having a plan in place to track and collect data and following that plan over the course of the implementation period made it possible to ensure that all needed data was collected in a timely manner.

In addition to having a clearly defined schedule to facilitate project implementation, during the project, weekly meetings were scheduled with the site preceptor/mentor. During these weekly meetings, the activities completed for project implementation in the previous week were reviewed and the activities planned for the coming week were reviewed. Any concerns involving data collection were discussed and, when needed, the IRB protocol for the project was reviewed to determine what action to take, including with regard to the decision of providers to leave the project before its completion. Weekly meetings also provided an opportunity to acquire any
resources that would be needed to complete the project. This included data analysis tools including SPSS and computer software.

Monitoring of the project was also achieved through regular recording of the data received. Once all informed consent forms were received, the Excel codebook including the participant’s random three-digit code assignments were made. Data collected during the pre-, and post-intervention phases of the project were recorded within one week to ensure that the data was complete. A review of the returned data indicated that all participants fully completed the assessments, indicating that there was no missing data for the project. Routine recording of the data during project implementation to help to ensure that all participants were followed throughout the duration of the project. All activities and progress made regarding data recording was shared with the site preceptor as well.

**Project Maintenance**

The data analysis provided in the previous section did indicate that the educational module facilitated a statistically significant improvement in provider knowledge of the topic, this indicates that providers should be able to use knowledge gained from the educational module to improve outcomes for patients. This, in turn, should prompt efforts to maintain the project over the long-term. One helpful action that could be considered would be to implement a policy change that would require all primary care providers to complete the training as part of ongoing professional development. The project was based on voluntary participation of healthcare providers. By mandating that all providers at the facility receive this training, this will not only ensure that there is uniformity in the standards of care but also that all patients will have access to the same education, resources, and supports as part of their care. Maintaining the project could
also be facilitated through requirements for new hires to complete the training as part of onboarding within the organization.

Although policy change to ensure that all providers receive this training will be helpful for maintaining the project at the practice site, some effort should also be made to establish long-term metrics for evaluating outcomes. Requiring all providers to complete knowledge assessments before and following education should be helpful. However, identifying metrics for evaluating the impact of the program on provider practice and/or patient outcomes should also be considered. This training program may be supported by changes in the electronic health record to provide prompts for providers to document the care provided to patients for their obesity. This data would be helpful to assess the number of patients counseled and the decisions made by patients regarding weight loss treatment. Tracking and monitoring the program over the long-term will require leaders at the facility to dedicate resources including human capital to establish metrics for monitoring, evaluating outcomes, and reporting outcomes to leaders and to staff to foster ongoing support for the program.

**Project Limitations**

Despite the positive results from this project indicating that provider education can improve knowledge of obesity treatment to reduce cancer risk, the project does have some notable limitations. First, the project utilized a one-group pre-/post-intervention design. This design is noted in the literature to lack internal validity and reliability (Miller et al., 2020). Although it is possible to discern a change associated with a specific intervention, without a control or comparison group that does not receive the intervention, it is not possible to state with certainty that the intervention (provider education) caused the outcome (increased knowledge).
Because causality cannot be proven as a result of the methodology used to investigate, it is possible that the same intervention when used again will not result in the same outcomes.

An additional limitation of this project involves the use of a small sample taken from a single site. Even though the results of this intervention are supported by the literature in terms of increasing knowledge among primary care providers, the lack of representativeness in the sample used would limit the generalizability of the findings to other providers and other practice sites. This would include other primary care providers including those working at the Cleveland Clinic and those working at other primary care sites. Expanding the representativeness of the sample would facilitate the ability of the principal investigator to argue that the results obtained from this project could be achieved at other practice sites. Demonstrating generalizability would make this project more desirable for leaders and change agents at other practice sites to consider implementing this project.

The final limitation, which was also noted as an influencing factor for the project’s implementation, was the short project duration. Although the short project duration limited the follow-up period for evaluating outcomes, the short project duration also limited the ability of the principal investigator to evaluate the long-term outcomes of the project. Although it is assumed that the project will lead to a change in provider practice and, ultimately, better outcomes for patients and lower cancer rates over the long-term, it was not possible to evaluate these outcomes due to the short duration of the project. Translating changes into tangible outcomes for patients and the healthcare system will be essential for ensuring that the project is maintained over the long-term. Further, this type of outcome data would be helpful to disseminate as it would provide a useful foundation for supporting evidence-based practice change throughout the entire healthcare system.
Areas for Future Research

A review of the limitations and challenges for project implementation does provide a robust foundation upon which to identify areas for future research. The limitations of the project indicate that the methodology employed including the small sample and the use of a single practice site had a substantial impact on the results and the conclusions that can be drawn from the results. One area for future research would, therefore, include expanding the project to include providers from various practice sites and to use a randomized controlled trial framework. The use of a randomized controlled trial would help to ensure that the sample is randomly selected and to compare a control (no education) or intervention (education) group for determine if causality is present between the intervention and outcome (Miller et al., 2020). The results obtained from this methodologically rigorous approach would not only be generalizable but also the findings should indicate if there is a cause-effect relationship between provider education and knowledge outcomes for providers (Miller et al., 2020).

In addition to expanding the size and scope of the population and sample and using a more rigorous methodology for investigating the topic, the duration of the project should be extended to measure long-term outcomes from the project. As noted, the impact of increased provider knowledge cannot be discerned from the current project. Having knowledge of how the educational program systemically shapes provider behavior in the clinical setting and further understanding how changes in provider actions influence the care of the patient will be helpful for demonstrating the true effect of the educational program. Assessing and evaluating outcomes for providers and patients would also be helpful for demonstrating to healthcare leaders the importance of supporting this project as part of ongoing professional development for staff. Only
by expanding out the project to include long-term outcomes on providers and patients will it be possible to maintain the project over the long-term.

**Recommendations Based on the Findings**

Synthesis of the information included in this discussion provides a foundation upon which to make recommendations moving forward. The results do indicate that in the providers who participated in the project, knowledge scores did increase. This suggests that at the practice site, the educational intervention was successful. Based on this success, it would seem that the first recommendation would be to expand the project to include all primary care providers working at the practice site. Scholars note that quality improvement projects often begin with a pilot-test to evaluate the feasibility and efficacy of a project (Scherer et al., 2019). The results obtained from this project do indicate that the educational intervention is both feasible and effective. Expanding the project out to include all primary care providers at the practice site would provide further insight into the efficacy of the project to determine if changes are needed to enhance provider education or if the program could be maintained in its current state.

Expanding the program to include all primary care providers would facilitate insight into the effectiveness of the program for increasing provider knowledge. This recommendation would also make it possible to identify what additional action may be needed to provide education to a large group of providers simultaneously. However, in order to fully understand the implications of this project, efforts will be needed to extend and expand monitoring of the project. In particular, efforts will be needed to identify metrics for ongoing program evaluation, to record these metrics, and to report findings periodically. Consequently, it is recommended that the principal investigator work with the site preceptor to identify which metrics could be tracked—including provider documentation of weight management care—and to further determine how
these metrics will be tracked and reported to leadership and staff. By implementing these recommendations, the organization, its staff, and patients will be able to optimize the benefits of this project.

**Interpretation of the Results**

With a discussion of the results from this study provided, it is helpful to take a closer look at how the results can and should be interpreted in the larger context of patient care, advanced practice nursing, and the healthcare system. In this second a consideration of these topics is provided including an examination of the changes that should be made in patient care and healthcare to ensure that the results of this project are realized, the transferability of the results to other care settings, the costs effectiveness of the results, and what recommendations should be made based on the interpretation of the results. Through a review of this information, it will be possible to consider the boarder implications of this project beyond the practice site.

**Changes in Patient Care/Healthcare Setting**

Interpreting the results requires a consideration of what changes should be made in patient care and the healthcare setting to ensure that the results from the project are fully realized. This quality improvement project was supported through an evidence-based foundation that clearly demonstrated the effectiveness of provider education to help increase knowledge of evidence-based practice guidelines for the treatment of obesity (Turner et al., 2018). The results of this project, although limited in terms of generalizability, do support the current evidence on the topic and suggest that a practice change is warranted in primary care to enhance the treatment of obesity. At the present time, providers are not applying evidence-based practice guidelines for the treatment of obesity, placing patients at increased risk for disease-related complications
including cancer (Iwamoto et al., 2018). When the results of this project are integrated with the existing evidence, there is a viable foundation upon which to build practice change.

While the interpretation of the results from this project do suggest that practice change to educate providers should be a permanent and consistent part of professional development for primary care providers, the results of this project also indicate that efforts are needed to track provider management of obesity in primary care. What is made evident from the current literature on this topic and further from the results obtained from this project is that provider knowledge is lagging when it comes to the effective treatment and management of obesity (Iwamoto et al., 2018; Turner et al., 2018). Although this project does indicate that provider knowledge can be augmented as a result of education, the project does not demonstrate the specific outcomes that for patients and providers. Interpretation of these results, therefore, does indicate that some effort should be made to promote longitudinal assessment of the project outcomes and to report these results such that providers are aware of what types of changes in practice are needed to enhance the treatment of obesity.

What is made clear from the literature is that there is a significant gap in provider knowledge and practice that can be ameliorated through education (Nanda et al., 2021). The limitations of a quality improvement project do limit how the results can be interpreted. However, when the results are considered in the context of the current evidence and the significant gaps that exist for providers and patients, it would seem that some effort should be made to expand the use of education for providers both at the practice site and in other clinical care settings where care is routinely provided for obese patients. There is an ample evidence base to support practice change and, further, education for providers is viewed as being an ongoing part of professional development for healthcare providers including nurses and physicians (Hyer,
2019; Iwamoto et al., 2018; Nanda et al, 2021; Turner et al., 2018). Consequently, there is an impetus to interpret the results as being supportive of a practice change that could markedly improve provider knowledge, patient care, and public health.

**Transferability of the Results**

The transferability of the results must also be considered. As noted, the limitations of this project do impact the generalizability of the findings. However, when the results of this project are juxtaposed against the evidence, which does indicate that primary care providers can benefit from education to increase their knowledge of the topic (Nanda et al., 2021; Turner et al., 2018), it seems reasonable that the findings could be easily transferred to other primary care settings. The challenge for nurse researchers and those seeking to implement evidence-based quality improvement would be to transfer the findings to other care settings. For instance, providers working in a bariatric clinic may not benefit from the educational program as providers in this setting should be experts on the treatment of obesity, especially in the prevention of disease-related complications. However, transferring the results to other care settings such as a retail care clinic or urgent care center may have notable benefit for providers who may lack expert knowledge of the treatment of obesity.

Although there are some concerns about the need to transfer the project to other settings, improving primary care would be a boon for enhancing patient and population health. In a given year, upwards of 90% of community residents make contact with primary care providers (Levine et al., 2020). What this indicates is that if the project were transferred only to primary care practices in the community, the reach of the project would be extensive and could potentially change how obesity is managed in primary care. As obesity management in primary care improves for at least 90% of the population, this should have a dramatic impact on public health.
Over time, more aggressive and consistent intervention to reduce obesity should result in a decline in the number of individuals who are overweight or obese. As obesity declines, so too will obesity-related illnesses including cancer. What this indicates is that by changing the management of obesity in primary care there is a potential to markedly improve the health of the population through a reduction in obesity and its related comorbidities.

**Cost Effectiveness**

Although costs were not the primary focus of the data analysis and discussion for this project, it is helpful to consider the costs of the project and the implications of the costs compared with the benefits that could be achieved from ongoing expenses needed for maintaining the project. It is important to note that the overall costs of the project were minimal as the project was primarily supported through in-kind donations from both the principal investigator and leaders at the practice site. While this limited the overall costs of the project at the practice site, expanding the educational project to include more providers and potentially different formats for delivering education—i.e., in person training—it is possible that the costs of the project would increase. However, if nursing staff are willing to work to implement the project as part of improving operations within the facility, expansion of the project should not carry with it extensive costs for implementation.

What is possible to see from reviewing the costs of the project at the practice site is that the costs for expanding or continuing the project would be minimal. When this is compared with the costs associated with treatment of obesity or cancer, it would seem that an argument could be made for the limited program costs. As an example, data from the CDC (2021) indicated that in 2019, direct medical costs associated with the treatment of obesity in the U.S. stood at $173 billion. Although the completed quality improvement project would not completely eradicate the
costs of treating obesity, reducing the costs of treating obesity by just a small amount would result in dramatic cost savings for the healthcare system. Thus, it seems reasonable to argue that the quality improvement project would be cost effective for most primary care facilities to implement.

**Recommendations Based on Interpretation of Results**

Recommendations made based on the interpretations of the results do indicate that efforts should be made to integrate project findings with the current evidence on the topic to advocate for permanent practice change at the clinical site. Action should be taken to ensure that all primary care providers currently working at the practice site are provided with education to increase their knowledge of obesity treatment and management. Current providers and new providers should be required to participate in this educational program, and efforts should be made to expand the scope of the project to measure changes in provider practice and to evaluate outcomes for patients. One example would include referrals of obese patients to bariatric surgery and the number of surgical procedures completed in a given time period, i.e., quarterly or yearly. These actions should be taken at the practice site to optimize the benefits of the project for patients and providers.

While maintaining the project at the practice site will be useful for ensuring that providers and patients continue to benefit from this evidence-based intervention, efforts will also be needed to expand the project beyond the practice site. The principal investigator should make an attempt to share the results of the project with other nursing professionals and primary care providers. Sharing or disseminating the results will help to ensure that the evidence base for supporting provider education on the topic is reinforced. Further, disseminating information regarding the project will help to ensure that providers are made aware of the need for change
and the practical, evidence-based changes that can be made to ensure that practice change is successful. Only by advocating for change in the broader healthcare system will it be possible to improve the healthcare system while also improving population health.

**Plans for Dissemination**

As noted, when reviewing the recommendations based on the interpretation of the findings, dissemination of the work will be essential to further improving patient care and the healthcare system. Internal dissemination of project results at the practice site will include an executive summary of the project and its results sent to all staff at the facility. Leaders at the facility will receive a full report on the project with recommendations for maintaining the project at the site. Additionally, a presentation of the project and its results will be scheduled. This will include a podium presentation that will be delivered using PowerPoint and scheduled during operating hours for providers to attend.

While internal dissemination of the project and its results will be important for fostering ongoing support for the project, external dissemination is also needed. Nursing research is typically disseminated externally through publication, posters, and presentations (Black et al., 2019). Using the final DNP report, publication of the work would be sought in a national peer-reviewed publication. A cursory review of available journals indicates that *Obesity* is a specialized journal that does accept novel research and quality improvement manuscripts (John Wiley & Sons, 2023). To disseminate the project results, a manuscript for this journal would be submitted for publication. Presentation of the work using a poster at a national conference would also be considered. One event in particular that may help showcase the work is the 17th Annual Obesity Summit held by the Cleveland Clinic (2023). This event is being held in Cleveland, Ohio between September 21-23, 2023. During this conference, there would be an opportunity to
present the project through a poster presentation while also networking with other medical professionals to discuss effective weight management in patients while also promoting provider education to improve patient care.

**Implications for Advanced Nursing Practice**

The final topics reviewed in this discussion involve the implications of the work for advanced nursing practice. In particular, it is helpful to consider the implications of the project for nursing education, practice, administration, and leadership. What is important to remember is that the DNP-prepared nurse must serve as a practitioner-scholar in the clinical setting working to integrate knowledge of all aspects of advanced practice to optimize the healthcare setting and outcomes for patients.

**Nursing Education**

When looking at the role of the advanced practice nurse, scholars assert that those educated at this level should have the knowledge and expertise to provide education to others (Pericak et al., 2017). This includes other nurses, clinicians, and patients (Pericak et al., 2017). In the context of this quality improvement project, the role of the advanced practice nurse as educator is clearly highlighted. The evidence to support this project clearly demonstrated the need for provider education to reduce and/or eliminate provider knowledge gaps and potentially improve patient care and health outcomes. Advanced practice nurses with knowledge of the clinical care environment where education is provided and knowledge of the topic can serve as educators to enhance the knowledge of peers and coworkers. By clearly illustrating the role of the advanced practice nurse as educator, nurses working in this position will need to recognize the importance of this role while also advocating for staff and patient education when it is
needed. Advanced practice nurses should be able to identify gaps in provider and patient knowledge while also developing the tools and resources needed to ameliorate these gaps.

Clinical Practice

The current quality improvement project also highlighted how evidence can be translated into practice to improve provider practice and patient care. This quality improvement project was predicated on an evidence base to support a change in clinical practice. Evidence-based decision making in healthcare is highlighted as a critical component for improving the healthcare system while also directing advanced practice nursing (Rohan & Fullerton, 2020). Advanced practice nurses are expected to solve problems utilizing the best evidence and to have the skills needed to effectively evaluate and translate evidence into the clinical setting (Rohan & Fullerton, 2020). By carrying out all of the required elements to make an evidence-based practice change, the principal investigator has demonstrated a clear understanding of evidence-based practice and what is required to make evidence-based decisions within a clinical care setting. Taking this knowledge into the practice site will help to ensure that the advanced practice nurse has the knowledge and expertise to participate in and lead other practice changes in the future. Thus, completing this project helps to ensure that the advanced practice nurse is capable of contributing to improvements in clinical care.

Nursing Administration

Advanced practice nurses should also consider the implications of this project for nursing administration. At the practice site, a potential policy change has been noted in this work. The policy change would require all primary care providers at the practice site to complete the educational program. Although this would only apply to the practice site, nurses working in administration would need to formalize the program and include specific metrics and timeframes
for reporting results. While this would have implications for nursing practice at the clinical site, nurses working in administration could also consider advocacy to expand the program and to evaluate the results on a state or national basis. Using this data, the advanced practice nurse could expand advocacy efforts to include changes in practice guidelines or standards of care. Advocacy for insurance reimbursement for education provided to clinicians and patients may also be important administrative changes for the advanced practice nurse to address as part of this nursing role.

**Leadership**

The role of the advanced practice nurse in leadership is also important to consider and one that was clearly highlighted in this project. This quality improvement project required leadership to identify the practice problem, to critique the evidence on the topic, and to present a plan for implementation to undertake practice change. Advanced practice nurses are educated to do more than just lead at the bedside. Nurses educated in this role are responsible for identifying problems in the clinical care of patients that can be addressed through existing evidence-based interventions (McNett et al., 2022). This indicates that advanced practice nurses must do more than simply maintain the status quo. By implementing evidence-based quality improvement projects, advanced practice nurses are responsible for leading the improvement of the healthcare system as well as the improvement of patient and population health. Through the completion of this project, it was possible to demonstrate effective leadership practice and to build the communication and collaboration skills needed to undertake additional quality improvement projects in the future.
Conclusion

Obesity is a growing threat to individual and population health. Although obesity carries with it a host of complications that can adversely impact the patient across the lifespan, obesity has recently been shown to dramatically increase the risk of certain types of cancers. Despite this risk, bariatric surgery for the treatment of obesity has been shown to potentially reduce cancer cases over the long-term. Encouraging patients to consider bariatric surgery can prove difficult as many primary care providers lack knowledge of evidence-based guidelines for the treatment of obesity, limiting their ability to effectively manage patient this condition in the prevention of cancer. Provider education can fill gaps in knowledge with the potential to foster a change in provider practice to more aggressively treat obesity through providing patient education to increase patient uptake surgical weight procedures.

This DNP quality improvement project sought to increase primary care provider knowledge of the evidence-based treatment of obesity to prevent cancer. More specifically, this project included a single group pre-/post-intervention framework to measure changes in provider knowledge following and educational module on the topic. The educational module was provided via Microsoft Teams and all data for the project was collected remotely via email. Participants included primary care providers working at the Cleveland Clinic who voluntarily agreed to participate in the project. Providers agreeing to participate were required to complete a pre-intervention (baseline) knowledge assessment and demographic questionnaire. This was followed by an educational module and a post-intervention knowledge assessment. A total of 15 providers participated in the project.

The results from the project did indicate that following the educational program, knowledge scores of participants did increase. The results are limited by generalizability, as the
sample was small and drawn from a single site, as well as a lack of causality, as there was no control group for comparison. Despite these limitations, an interpretation of the results in the context of the current evidence base to support the practice change does suggest that efforts should be made to expand the project, to explore long-term implications of the project on provider behavior and patient outcomes, and to advocate for a site policy change to include provider education as a standard part of annual professional development.

The outcomes reported in this project should be disseminated both at the practice site and within the healthcare and nursing communities. Building an evidence base to improve the management of obesity for the prevention of cancer could have systemic implications for patient health, public health, and the costs to provide healthcare services. Advanced practice nurses have an obligation to address current gaps in clinical practice. Through this project, this goal was accomplished and efforts are needed to ensure that the benefits of the practice change are optimized not only at the practice site but also within the healthcare system. Based on the results, this project has the potential to improve patient care, population health, and provider practice while also contributing to the betterment of the healthcare system.
References


https://doi.org/10.1186/s12889-018-5795-9


https://doi.org/10.1016/j.psychres.2019.06.027


https://doi.org/10.3389/fpsyg.2021.803421


https://doi.org/10.1186/s43058-020-00023-7


## Appendix A: Literature Review Matrix

<table>
<thead>
<tr>
<th>First Author/Year</th>
<th>Purpose/Problem/Objective/Aims</th>
<th>Data Collection</th>
<th>Study Findings</th>
<th>Study Design</th>
<th>Sample (Setting)</th>
<th>Strengths/Limitations</th>
<th>Relationship to Project</th>
<th>Level of Evidence/Quality</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminian et al. (2022)</td>
<td>To investigate if bariatric surgery is associated with lower cancer risk and mortality in patients with severe obesity.</td>
<td>Multivariable Cox regression analysis estimated time to incident obesity-associated cancer (a composite of 13 cancer types as the primary end point) and cancer-related mortality.</td>
<td>A median follow-up of 6.1 years (IQR, 3.8–8.9 years). The mean before surgery weight loss was 24.8 kg greater in the Bariatric cohort (n=5053) vs nonsurgical cohort (n=25,265).</td>
<td>SPLENDID: matched retrospective cohort study. The study included n=30,318 patients. The Bariatric cohort (n=5053) vs nonsurgical cohort (n=25,265).</td>
<td>Strength: single institution large cohort. Weakness, retrospective nature.</td>
<td>Among adults with obesity, bariatric surgery compared with no surgery was associated with a lower incidence of obesity-associated cancer and cancer-related mortality.</td>
<td>Establishes the impact of surgically induced rapid weight loss by decreasing cancer-related morbidity and mortality in severely obese subjects.</td>
<td>Level III Quality A</td>
<td>To investigate patients with severe obesity and associated risk factors for cancer.</td>
</tr>
</tbody>
</table>
in the surgery group and 1.4% in the nonsurgical control group.

Hyer, 2019

To systematically review barriers for nurse practitioners working in primary care to provide weight loss counseling to patients.

Systematic review. A total of 169 articles were screened and 15 were retained. The following databases were used to acquire data: CINAHL PLUS with Full Text, Cochrane Central Register of Controlled Trials, ERIC, MEDLINE, PsycINFO, and SPORTDiscuss. Peer reviewed studies published between 2010 to April 2018 were searched. PRISMA methods were followed for organizing data. A standardized extraction table was used for review articles.

Several challenges for addressing the needs of obese patients were noted by nurse practitioners. In particular, the need for education and resources for training were noted. Nurses in many studies did not view patients being overweight or obese as problematic.

Strength: Systematic review that combines results. Strong evidence.

Weaknesses: No meta-analysis. Higher quality studies needed.

This project demonstrates the need for advanced practice nurses working in primary care to have education to improve care for obese patients. Education is proposed as the solution for this project.

Level I Quality A

Iwamoto et al. (2018).

To examine the impact of a training program on primary care providers’ comfort and knowledge in delivering weight loss counseling to patients.

Randomized controlled trial. Sample included primary care physicians from nine clinics. PCPs in four clinics received the training and PCPs from five of the clinics did not receive the training. Pre- and post-training implementation surveys were used for collecting data. The results indicated that in terms of knowledge and comfort with counseling obese patients, PCPs from control and intervention sites had similar scores before the training (P = 0.8). Comfort and knowledge with regard to weight loss treatments increased for providers in the intervention sites but not in the control group.

Strength: Demonstrates positive results for education, use of a rigorous methodology.

Weakness: Small sample from a similar geographical region indicating results may not be generalizable, no longitudinal data or data regarding outcomes for patients.

Education is effective demonstrating that the proposed intervention is evidence-based, supporting the project.

Level I Quality A

Hyger, 2019.
<table>
<thead>
<tr>
<th>Study</th>
<th>Primary Objective</th>
<th>Sample Methodology</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanda et al. (2021)</td>
<td>To evaluate the knowledge, attitudes, and needs of primary care providers and nurses with regard to obesity management education.</td>
<td>Cross-sectional survey. Sample included 80 providers: 43 nurses and 38 PCPs.</td>
<td>An email survey sent between June 20, 2019 and September 12, 2019 to 194 healthcare workers. A total of 80 responded.</td>
<td>Among providers who responded, 79% reported a need for more education to provide care for obese patients.</td>
<td>Study demonstrates the need for provider education, study included providers from across the U.S.</td>
<td>Sample size was small, no intervention used, cross-sectional results may change over time.</td>
</tr>
<tr>
<td>Schauer et al. (2019)</td>
<td>To determine whether bariatric surgery is associated with a lower risk of cancer.</td>
<td>Retrospective cohort study. Study included 22,198 subjects who had bariatric surgery and 66,427 nonsurgical subjects matched on sex, age, study site, BMI and Elixhauser comorbidity index.</td>
<td>Multivariable Cox proportional hazards models used to examine incident cancer up to 10 years after bariatric surgery vs. no surgery.</td>
<td>At a mean follow-up of 3.5 years, 2,543 patients were identified with cancers. Patients undergoing bariatric surgery had a 33% lower hazard of developing any cancer. Among the obesity-associated cancers, the risk of postmenopausal breast, colon, endometrial and pancreatic cancer were each statistically significantly lower compared to matched non-surgical patients.</td>
<td>Large, multisite cohort. Well matched control group.</td>
<td>Retrospective and non-randomized study.</td>
</tr>
<tr>
<td>Level of Evidence</td>
<td>Nature of Knowledge</td>
<td>Study Design</td>
<td>Sample Size</td>
<td>Primary Outcome</td>
<td>Secondary Outcomes</td>
<td>Strengths</td>
</tr>
<tr>
<td>-------------------</td>
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<td>--------------</td>
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<td>----------------</td>
<td>-------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Level III A</td>
<td>To assess the knowledge of healthcare providers</td>
<td>Cross-sectional study of a web-based survey</td>
<td>1,506 internists</td>
<td>A web-based survey conducted between</td>
<td>On various elements of the evidence-based practice guidelines, including adherence to guideline recommendations and strategies for improving adherence</td>
<td>Study demonstrates a lack of provider knowledge</td>
</tr>
<tr>
<td>Level III A</td>
<td>To determine whether the reduction in cancer risk after bariatric surgery is due to weight loss</td>
<td>Observational cohort study</td>
<td>N = 8,759</td>
<td>The Longitudinal Assessment of Bariatric Surgery 2 (LABS-2) is a prospective multicenter cohort (N = 2,458, 79% female, mean age = 46). Evaluated weight and serum biomarker changes with incident cancer in a bariatric surgery cohort.</td>
<td>The Longitudinal Assessment of Bariatric Surgery 2 (LABS-2) is a prospective multicenter cohort (N = 2,458, 79% female, mean age = 46). Evaluated weight and serum biomarker changes with incident cancer in a bariatric surgery cohort.</td>
<td>Strength: prospective and controlled large database</td>
</tr>
</tbody>
</table>

Schauer et al. (2017) To determine whether the reduction in cancer risk after bariatric surgery is due to weight loss. A retrospective matched cohort study. Study included 18,355 bariatric surgery subjects and 40,524 nonsurgical subjects matched on age, sex, BMI, site, and Elixhauser comorbidity index. Multivariable Cox proportional hazards models examined the relationship between weight loss at 1 year and incident cancer during up to 10 years of follow-up. N 1,196 cases of incident cancer. The average 1-year postsurgical weight loss was 27% bariatric surgery cohort versus 1% in matched nonsurgical patients. Percent weight loss at 1 year was significantly associated with a reduced risk of any cancer in adjusted models. Amount of weight loss after bariatric surgery was associated with a lower risk of incident cancer. There was no apparent independent effect of the bariatric surgery itself on cancer risk that was independent of weight loss.

Strength: large sample size, multicenter study. Limitation: retrospective nonrandomized nature.

Stroud, 2020 Evaluated the relationship between surgical weight loss and serum biomarker changes with incident cancer in a bariatric surgery cohort. Observational Cohort N 8,759 The Longitudinal Assessment of Bariatric Surgery 2 (LABS-2) is a prospective multicenter cohort (N = 2,458, 79% female, mean age = 46). Evaluated weight and serum biomarker changes with incident cancer in a bariatric surgery cohort. Associations were determined using Cox proportional hazards models adjusting for weight loss, age, sex, education, and smoking history. Over 8,759 person years of follow-up, 82 patients reported new cancer diagnosis. Cancer risk was decreased by approximately 50% in participants with 20-34.9% total body weight loss (TBWL) compared with <20% TBWL. Reduced cancer risk was observed with percent decrease from baseline for glucose, proinsulin, insulin, and leptin and per 15% percent increase in ghrelin. Strength: prospective and controlled large database Weakness: nonrandomized, no control arm.

Turner et al. (2018) To assess the knowledge of healthcare providers Cross-sectional study of a web-based survey Sample included 1,506 internists, A web-based survey conducted between | On various elements of the evidence-based practice guideline s, including adherence to guideline recommendations and strategies for improving adherence | Study demonstrates a lack of provider knowledge | Study demonstrates that a majority of providers do not use evidence-based practice guidelines in their practice. | Level III A |
professionals' knowledge of evidence-based practice guidelines for the treatment of obesity. A representative sample of healthcare workers, including family practitioners, obstetricians/gynecologists, and nurse practitioners, were surveyed in June and July 2016. Providers showed a low and inconsistent level of knowledge, indicating that a majority of providers in the sample do not have knowledge of practice guidelines for the treatment of obesity. This illustrates the need for provider education, which is the proposed intervention in this project.

Weakness: cross-sectional study results may change over time, no intervention used.

It is important to note that healthcare providers, including those working in primary care, lack knowledge on the treatment of obesity. This highlights the need for provider education, which is the proposed intervention in this project.
### Appendix B: Cleveland Clinical IRB Approval Letter

**Cleveland Clinic**

Office of Nursing Research and Innovation  
Student Quality Improvement Project Checklist*  
Student Name: Tamarra Braham  
College Univ: Florida International

<table>
<thead>
<tr>
<th>Academic degree you are in pursuit of?</th>
<th>BSN</th>
<th>MSN</th>
<th>DNP</th>
<th>Other:</th>
<th>Comments/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>At CC, are you in a leadership position?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does this project involve collecting data from:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients?</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees in your work location? APNs, clinical nurses, MDs...</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees you supervise?</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will raw data leave CC? **</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td>Describe:</td>
</tr>
</tbody>
</table>

Final proposal date or version # must be on title page or as a footer on your proposal document and **stated here:** 07/15/2023

CC, Cleveland Clinic; EBP, evidence-based practice; NA, not applicable; QI/QA, quality improvement/quality assurance  
* Also applies to EBP projects with a QI evaluation methodology and need assessments  
** If yes, is data leaving for (a) analysis by non-CC academic faculty, (b) to be placed in a non-CC database, (c) to be merged with data collected at another site or (d) other reason? Note: a **Data Use Agreement** will most likely be needed.

**Instructions:** Respond to each item. If you are unsure of the correct response, please discuss with your nurse scientist mentor as soon as possible. Your responses will determine if the project meets QI requirements at CC

<table>
<thead>
<tr>
<th>QI/QA, EBP with QI/QA Evaluation or Need Assessment Project Descriptions</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the purpose to assess or improve quality or efficiency of a process, program, or care delivery within a specific CC health care setting?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the project intended to evaluate current practice and/or attempt to improve it?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there sufficient evidence to support implementing the project activities (what is the rationale for creating or identifying a practice change)?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is your intervention (your activities and implementation plan) flexible (changeable) if not working as initially planned?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does your project plan include an evaluation approach that allows for rapid and incremental changes?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will patients/caregivers at CC potentially benefit from the project?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is risk to patients or caregivers (depending on your target audience) no greater than what is involved in standard of care or ordinarily expected when practice changes are implemented?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will activities only require consent that is already obtained in clinical practice?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Could the activities be considered part of usual nursing work or patient care?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the manager(s), stakeholder(s) or work-area leader(s) approved your project plan?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the project use benchmarking (established/accepted standards) either within CC or other healthcare organizations?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the methodology include <strong>at least 1 cycle</strong> of PDCA (Plan-Do-Check-Act); and involve data reflecting planning and post implementation evaluation?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the outcomes of interest direct measure(s) of the intervention implemented?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the results intended to be rapidly integrated into local care delivery?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Instructions: Below are Cleveland Clinic and project-specific expectations once you initiate your project. Please respond to each item by initialing the box to indicate that you understand the expectation associated with approval of this project. Ensure your “initials” are legible.

<table>
<thead>
<tr>
<th>Initials</th>
<th>Initial in the box to indicate that you understand the following Cleveland Clinic expectations and print and sign your name below:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB</td>
<td>The date of the finalized project as noted on page 1 and on the proposal will be considered the version that corresponds to the checklist completion</td>
</tr>
<tr>
<td>TB</td>
<td>I will inform my CC nurse scientist mentor of any changes I plan to make to the project post signature AND prior to implementation, using a timeline that allows the change/ amendment/ addition to be reviewed by my nurse scientist mentor (usually 2 weeks). This includes:</td>
</tr>
<tr>
<td></td>
<td>- Amendments to the project text</td>
</tr>
<tr>
<td></td>
<td>- A desire to complete different analyses than what is stated in the text</td>
</tr>
<tr>
<td></td>
<td>- A desire to collect different data than what is stated in the text</td>
</tr>
<tr>
<td></td>
<td>- College faculty, preceptor, or Cleveland Clinic personnel requests of you after signoff on page 1</td>
</tr>
<tr>
<td>TB</td>
<td>Prior to submitting the final report of this project to my college (after you believe it is completed), I will share the completed project document with my nurse scientist mentor for review. I recognize that it may take up to 2 weeks before feedback can be given regarding wording that may need to be altered before submitting the paperwork to my college.</td>
</tr>
<tr>
<td>Initials</td>
<td>Initial in the boxes below to indicate that you understand the following project-specific expectations shared with you by your Cleveland Clinic nurse-scientist; and print &amp; sign your name below:</td>
</tr>
</tbody>
</table>

Once the Associate CNO has signed page 1, this fully signed form acts as permission for the student to move forward with implementing the QA/QI/Needs Assessment or EBP implementation project with QI evaluation methods within CC.

<table>
<thead>
<tr>
<th>Student Printed name:</th>
<th>Tamarra Braham</th>
<th>Date: 07/15/2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>iStudent Signature:</td>
<td>[Signature]</td>
<td>Date: 07/15/2023</td>
</tr>
<tr>
<td>Nurse Scientist Mentor Signature:</td>
<td>[Signature]</td>
<td>Date: 07/16/2023</td>
</tr>
<tr>
<td>Associate CNO Research Signature:</td>
<td>[Signature]</td>
<td>Date: 07/16/2023</td>
</tr>
</tbody>
</table>

References regarding statements on page 1 that reflect QI/QA project activities.


Appendix C: IRB Determination Letter from FIU

MEMORANDUM

To: Dr. Charles Buscemi
CC: Tamarra Braham

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: April 26, 2023

Protocol Title: “Provider Education to Increase Knowledge of Treatment Options to prevent Cancer in Obese Patients: A Quality Improvement Project”

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the Exempt Review process.

IRB Protocol Exemption #: IRB-23-0178 IRB Exemption Date: 04/26/23
TOPAZ Reference #: 112975

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

MMV/em
Appendix D: Participant Recruitment Email

Greetings Staff and Prospective Participants,

My name is Tamarra Braham and I am currently enrolled as a Doctor of Nursing Practice (DNP) student at Florida International University. As part of my education, I am required to complete a quality improvement project to improve some aspect of patient care in my practice setting. For my project, I chose to focus on provider education to increase knowledge of obesity management to help prevent cancer. More specifically, I have created an education module for staff to increase knowledge regarding evidence-based obesity management in primary care. The goal of the project is to increase your knowledge of this topic such that you can integrate this knowledge into care and provide obese patients with better guidance to prevent cancer.

It is my hope that you will be willing to participate in this project. In order to participate you will be asked to sign a letter of informed consent; to complete a demographic survey; to complete a pre-, and post-test assessment of knowledge; and to view an online educational module regarding the topic. It is anticipated that the project will take six weeks to complete. However, all of these activities that you are required to participate in should only take 90-100 minutes to complete over this time period. This educational project has been approved by the Cleveland Clinic and Florida International University Institutional Review Boards and the presentation should benefit you in terms of improving your knowledge of the topic and ability to provide effective patient care for the treatment and management of obesity.

If you are interested in participating in this project, I would request that you respond to this email within one week to confirm your interest. An informed consent form for participating in the project has been attached to this email. If you are interested in participating, please read and return a signed copy of the informed consent form when replying to participate in the project. By participating in this project you will have the opportunity to improve patient care and expand your understanding of a very important topic. If you have any further questions about the project, I can be contacted by email at tbrah002@fiu.edu or by phone at (954)-594-6677. I look forward to hearing from you and educating you about this important and timely topic.

Regards,

Tamarra Braham
ADULT CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Provider Education to Increase Knowledge of Cancer Prevention in Obese Patients: A Quality Improvement Project

SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** The purpose of this Doctor of Nursing Practice (DNP) quality improvement project is to educate primary healthcare providers about the link between cancer and obesity as well as the efficacy of surgical interventions to help foster weight loss and prevent cancer.
- **Procedures:** If you choose to participate, you will be asked to complete an initial assessment of knowledge and demographic questionnaire, to review an educational module, and to complete a post-intervention assessment of knowledge.
- **Duration:** This will take about 90-100 minutes over the course of a six week period.
- **Risks:** The main risk or discomfort from this research is potential for you to become uncomfortable while completing the educational module.
- **Benefits:** The main benefit to you from this research is to increase your knowledge of obesity management in primary care to help prevent cancer.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary.

Please carefully read the entire document before agreeing to participate.
PURPOSE OF THE STUDY

The purpose of this Doctor of Nursing Practice (DNP) quality improvement project is to educate primary healthcare providers about the link between cancer and obesity as well as the efficacy of surgical interventions to help foster weight loss and prevent cancer. The study will assess provider knowledge before and following an educational module to measure changes in knowledge and to determine if these changes are statistically significant.

NUMBER OF STUDY PARTICIPANTS

If you decide to be in this study, you will be one of 20-25 people in this research study.

DURATION OF THE STUDY

Your participation will involve 90-100 minutes total over the course of a six week period.

PROCEDURES

If you agree to be in the study, we will ask you to do the following things:

1. Provide your email address and consent to being contacted via email for the project. All data collection and education will occur remotely in your home or a place that is comfortable to you. You will have one week to complete this task.
2. Complete a demographic form and pre-test knowledge assessment via email. This should take between 20-30 minutes. You will have one week to complete this task.
3. Watch a training module that will be created in Microsoft Teams and emailed to you directly. This should take approximately 30 minutes and you will have two weeks to view the module.
4. Compete a post-test knowledge assessment. This should take about 20 minutes and will be sent via email. You will have one week to complete this task.
5. The study duration will be six weeks. During this time you will need to spend about 70-80 minutes engaged in activities related to the project.

RISKS AND/OR DISCOMFORTS

The study has the following possible risks to you: First, you may become uncomfortable during the time required to review the educational presentation. This is unlikely to happen but if it does, you can take a break during education. Second, there are threats to privacy and confidentiality. This is unlikely to happen but may occur.

BENEFITS
The study has the following possible benefits to you: increased knowledge about the topic, the ability to provide better patient care, enhanced confidence in managing obese patients to improve health. Benefits to society include reducing obesity and cancer rates in the population, lowering costs to provide care, and improving the quality and safety of patient care.

**ALTERNATIVES**

There are no known alternatives available to you other than not taking part in this study.

**CONFIDENTIALITY**

The records of this study will be kept private and will be protected to the fullest extent provided by law. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely, and only the researcher team will have access to the records. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

**USE OF YOUR INFORMATION**

Your information collected as part of the research will not be used or distributed for future research studies even if identifiers are removed.

**COMPENSATION & COSTS**

There are no costs to you for participating in this study.

**RIGHT TO DECLINE OR WITHDRAW**

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

**RESEARCHER CONTACT INFORMATION**

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Tamarra Braham at Florida International University, (954)-594-6677, tbrah002@fiu.edu.

**IRB CONTACT INFORMATION**
If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. I understand that I will be given a copy of this form for my records.

________________________________
Signature of Participant

________________________________
Printed Name of Participant

________________________________
Signature of Person Obtaining Consent

Date

Date
Appendix F: Participant Demographic Survey

Instructions: Please complete the following form by circling the correct answer or entering the correct answer on the line provided.

1. What is your age in years? ____ years

2. What is your gender? Please circle one.
   Male                         Female                         Nonbinary                         Prefer Not to Say

3. What is your race? Please circle one.
   White/Non-Hispanic
   African American
   Hispanic/Latino
   Asian/Pacific Islander
   Other
   Prefer Not to Say

4. How many years have you been working in primary care? ____ years

5. What is your current position? Please circle one.
   Advanced practice nurse.
   Physician Assistant.
   Physician (MD, OD, etc.)

6. On average, how many obese patients do you see in your practice on a weekly basis? _____ patients.

7. Do you currently provided structured guidance, education or long-term support for patients with obesity: _____ Yes _____ No
Appendix G: Pre-/Post-Intervention Knowledge Test

**True and False:** Please review the statement and check the correct box indicating if the statement is true or false.

1. Obesity coupled with weight-related comorbidities can increase cancer risk by up to 200%.
   - [ ] True*  
   - [ ] False

2. Small reductions in weight ultimately have little impact on cancer risk for the patient.
   - [ ] True  
   - [ ] False*

3. Most primary care providers are able to initiate conversations with patients about their weight.
   - [ ] True  
   - [ ] False*

4. There are more than 15 evidence-based practice guidelines published for the treatment of adult obesity.
   - [ ] True*  
   - [ ] False

5. Obesity is best managed in the primary care setting as all care is overseen by one care provider.
   - [ ] True  
   - [ ] False*

6. Behavioral counseling for obesity management should be trialed for 3 to 6 months before seeking other alternatives to care.
   - [ ] True  
   - [ ] False*

7. Only patients with a BMI > 35 should be referred for bariatric surgery.
   - [ ] True  
   - [ ] False*

8. Medication should be the first treatment recommended for obese patients to help prevent cancer.
   - [ ] True  
   - [ ] False*

9. Surgical weight loss can reduce cancer rates among obese patients.
   - [ ] True*  
   - [ ] False
10. Bariatric surgery carries with it a high rate of morbidity and mortality.

☐ True  ☐ False*

**Multiple Choice:** Review each question/statement and check the box with the correct answer.

11. Of the following medications, which one has not been approved for weight loss by the Food and Drug Administration?

☐ A: phentermine/topiramate
☐ B: naltrexone/bupropion
☐ C: human chorionic gonadotropin*
☐ D: liraglutide

12. Which of the following have been approved for off-label use in the pharmacological management of obesity?

☐ A: Lisinopril
☐ B: Metformin*
☐ C: Citalopram
☐ D: Hydroxychloroquine

13. Medications should be used for the treatment in all of the following (select all that apply):

☐ A: If the patient has a BMI > 30.*
☐ B: If the patient has a BMI > 27 and related comorbidities.*
☐ C: If the patient’s weight loss stalls.*
☐ D: If the patient does not want to have surgery.

14. The morbidity rate from all bariatric surgical procedures totals ___% each year.

☐ A: 1
☐ B: 3*
☐ C: 5
☐ D: 7

15. Which type of metabolic surgery has been shown to produce the greatest weight loss for patients?

☐ A: Biliopancreatic Diversion with Duodenal Switch
☐ B: Adjustable Gastric Band
**16.** Which bariatric procedure is associated with the lowest rate of complications?
- A: Biliopancreatic Diversion with Duodenal Switch
- B: Adjustable Gastric Band
- C: Sleeve Gastrectomy*
- D: Roux-en-Y Gastric Bypass

**17.** Which weight management strategy works best for preventing cancer in obese patients?
- A: Behavioral counseling.
- B: Pharmacological management of obesity.
- C: Surgical management of obesity.*
- D: All of the above.

**18.** Although bariatric surgery can help prevent cancer, in which patient group is surgical weight loss most effective for cancer prevention?
- A: All adults over the age of 50.
- B: Middle aged men with metabolic comorbidities.
- C: Menopausal and post-menopausal women.*
- D: Young adults between the ages of 21 and 29.

**19.** Surgical weight loss to prevent cancer is most effective for preventing which types of cancers?
- A: Reproductive cancers (breast, endometrial, etc.).*
- B: Colon cancer.
- C: Liver cancer.
- D: Blood cancers (leukemia, etc.),

**20.** When talking with patients about weight and health, what should be emphasized (check all that apply).
- A: The positive benefits of weight loss.*
- B: Experiences of patients with past weight loss attempts.*
- C: Provider bias toward obesity and weight.
- D: Shared goals for weight loss.*