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An Intervention to Debunk Facts vs. Myths in Intermittent Fasting: A Quality Improvement Project

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DNP Project Report

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A Quality Improvement Project

A Scholarly Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University
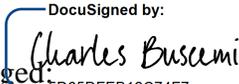

In partial fulfillment of the requirements
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By

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Supervised By

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An Intervention to Debunk Facts vs. Myths in IF: A QI Project

DNP Project Report

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Abstract

Intermittent fasting (IF) is gaining popularity as an eating regimen to promote health and optimize wellbeing. IF is the voluntary avoidance of food over a period and is not a diet, but an eating behavior (Teong et al., 2021). Despite the increased emphasis on obesity and diet-related diseases, IF education remains lacking in formal training programs and can influence HCC's attitudes and behaviors when engaging in IF dialogue with patients in clinical settings. Evidence suggests that IF is beneficial for weight loss and has been shown to have positive effects on the brain, heart, liver, muscles, intestines, blood, and various other systems. IF has also been shown to reduce risk factors associated with the development and progression of type II diabetes, neurological disorders, and cancers. Additionally, IF may boost the effectiveness of certain medical and cancer treatments (Armutcu, 2019; Phillips, 2019). The main objective is to determine if an evidence-based education program on intermittent fasting will change healthcare clinicians' knowledge, attitudes, confidence level, perception of knowledge, and behavior in communicating with adult patients about IF. The presentation aims to fill the knowledge gaps with pertinent evidence-based information, debunk common IF myths, and provide effective communication strategies to help improve HCCs knowledge, attitudes, confidence, and behavior of IF in clinical practice settings. The study is a quasi-experimental, pre-test post-test quality improvement (QI) project including 20 HCCs working at the practice site. Potential participants were identified by snow-ball samplings of various units/clinics at the site. Descriptive statistics were used to analyze the data. Results from the project indicate that mean knowledge scores compared from baseline to post-education increased, 6.8 (s.d. 3.77) and 12.65(s.d. 4.83), respectively. Based on the current evidence and the results from this quality-improvement

project, HCC education helps improve knowledge, confidence, perceptions, and behaviors of IF

in clinical practice settings to promote safe and effective communication with patients.

Keywords: intermittent fasting, obesity, healthcare clinicians, knowledge, attitudes,

behaviors

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DNP Project Report

The International Food Information Council Foundation conducted a survey and discovered intermittent fasting was the most popular diet in 2020 (Clifton et al., 2021). Intermittent fasting (IF) has been shown to have beneficial effects on weight loss, the metabolic profile, blood glucose control, insulin resistance, cancer prevention and treatment, and a variety of other organs and bodily functions. IF is the voluntary avoidance of food for a certain period of time. During fasting periods, the blood glucose levels decrease—resulting in a decrease in insulin levels. These fluctuations in blood glucose and insulin levels reduce insulin resistance. With longer fasting periods, the body depletes its glycogen reserves and resorts to utilizing fat for fuel in the form of ketones. Historically, IF has been used as a therapeutic medical practice as well as spiritual and bodily healing as it is ingrained in nearly every religion and culture (Armutcu, 2019).

As obesity becomes a worldwide health concern due to its role in the development of multiple serious health conditions, the interest in IF has been growing as a remedy for weight loss. Researchers have found IF to be also useful in other medical conditions (Armutcu, 2019; Phillips, 2019). Although IF has been studied and shown to be a safe and effective method for weight loss, there is a paucity on healthcare clinicians (HCCs) knowledge, attitudes, confidence, levels, perception, and behaviors as they relate to IF in clinical practice settings. This quality improvement (QI) project aims to assess if HCCs' knowledge, attitude, confidence level, perception, and behavior related to IF change after an evidence-based information session that focuses on debunking common IF myths. The results of this QI project will be used to develop

future programs for HCCs so they can educate patients on IF and its benefits in obesity for

appropriate populations.

Background

Obesity

Obesity is characterized as having excessive amounts of fat accumulation on the body

placing an individual's health at risk. In the United States, the current prevalence of obesity is

42.4% and has been exponentially increasing (Centers for Disease Control and Prevention

[CDC], 2022b). As of 2016, 39% of the world's adult population was overweight, while 13%

was classified as obese (World Health Organization [WHO], 2021). Each year, about 300,000

deaths can be attributed to obesity in the U.S. (West Virginia Department of Health and Human

Resources, n.d.). Obesity is a growing concern for not only the United States, but for the world.

Obesity, defined as a body mass index (BMI) $\geq$30 kg/m^2, is a complex multifactorial

health condition with major global implications and is the leading causes of morbidity and

mortality worldwide (Censin et al., 2019; CDC, 2022e). Obese individuals are disproportionately

affected by the health consequences and are at a greater risk of experiencing a premature onset of

multiple morbidities (Censin et al., 2019). Obesity is also known to be a contributing factor to

many deadly diseases such as type II diabetes, cardiovascular disease, and cancer and often

results in a decreased quality of life, increased healthcare costs, low self-esteem, and premature

death (CDC, 2022d).

Worldwide, the prevalence of obesity is highly variable and heavily reliant on physical,

social, cultural, political, economic, and biologic factors (Fox et al., 2019). As various

populations across the world experience economic growth and increased trade, the increased

accessibility to highly processed foods often results in changes in the social environment which

facilitates the development of obesity in susceptible individuals (Barquera & Rivera, 2020; Hemmingsson, 2021). As obesity rates increase, so does the economic impact and healthcare spending due to treatment of diseases attributed to obesity, psychological effects, early mortality, and absenteeism (Okunogbe et al., 2021).

Prevalence of Obesity

The prevalence of obesity has been steadily climbing globally. Obesity is currently a major health concern in the United States, with a rate of 42.4% among American adults according to the National Health and Nutrition Examination Survey (NHANES) (CDC, 2021; Prevalence, 2020). The worldwide obesity rate for adults is 39% (Stephenson et al., 2021). As of 2018, 9.2% of adults in America are considered severely obese (Monaco, 2020). In the early 1960's, the obesity rate in American adults was about 13.4% with 1% of the population classified as severely obese (Monaco, 2020). Obesity rates have been steadily climbing throughout the last six decades and shows no signs of tapering off.

The Prevalence of Obesity by Culture and Ethnicity

Culture and ethnicity impact the prevalence rates of obesity. For example, in the United States, Black non-Hispanic adults have an obesity prevalence rate of 38.4% and Hispanic adults have a prevalence rate of 32.6%, while White non-Hispanic adults have an obesity prevalence rate of 28.6% (Peterson et al., 2019). Social determinates are believed to be affected by economic and social advantages associated with race and ethnicity (Peterson et al., 2019). Multiple factors are suspected to contribute to these disparities including decreased graduation rates, increased unemployment rates, food insecurity, improved access to low quality processed foods, decreased access to healthcare, etc. (Peterson et al., 2019),

Culture and ethnicity influence diet and weight. Mexican-American adults have the highest rates of obesity with a range of 50% to 51% for men and women respectively (Monaco, 2020). This increase is believed to be the result of a change in the traditional diet which consists of mostly fresh and unrefined foods to now ultra-processed foods laden with sugar, fat, and salt (Barquera & Rivera, 2020). Non-Hispanic Asian Americans have the lowest rates of obesity with a range of 17% to 18% for men and women respectively (Monaco, 2020). In Non-Hispanic Black Americans, the prevalence of obesity is 41% in men and 57% in women (Monaco, 2020). American adults ages 40 to 59 have an obesity rate of 45% (Monaco, 2020).

BMI

During the 19th century, Adolphe Quetelet developed the BMI by studying human growth patterns (Bloniasz, 2021). This index was developed as a method of screening and estimating an individual's health risk based on their levels of excess body fat in relation to their height. Notably, variables such as age over 20 years, health status, and physical activity are not considered within the BMI screening index.

Body fat is measured by calculating the BMI, which consists of dividing a person's weight in kilograms by the height in meters squared (CDC, 2022a). A BMI index chart is used to categorize an individual's weight category. These weight categories are characterized as underweight (BMI < 18.5), healthy weight (BMI 18.5 and 24.9), overweight (BMI 25.0 and 29.9), and obese (BMI >30.0) (CDC, 2022e). Within the obesity category, there are three levels additional classifications, class 1 (BMI 30.0 to 34.9), class 2 (BMI 35.0 to 39.9), class 3 or severe obesity (BMI of 40 or more) (CDC, 2022e).

The History of Obesity

In the early 1900's Carl von Noorden, a German diabetes specialist, suggested there was an association between obesity and type I diabetes (Thaker, 2017). In 1923, Wilhelm Falta, von Noorden's student, described a diet high in carbohydrates as the only method to efficiently fatten an individual (Falta, 1923). Falta continued with the notion obesity is a result of an insular process which he proposed may cause appetite stimulation, initiating a vicious cycle of increased carbohydrate consumption triggering an increased insulin response (Falta, 1923; Noakes, 2018). According to Gary Taubes who is the cofounder of Nutrition Science Initiative, *Robert Wood Johnson Foundation Investigator Award in Health Policy Research* winner, science reporter, and author, insulin was used in the 1930's to increase body weight in underweight individuals (Noakes, 2018).

Obesity Risk Factors

Obesity rates are impacted by both modifiable and non-modifiable factors. According to the CDC (2022c), obesity is the result of various factors including behavior, the community environment, genetics, diseases, and medications. Social determinants of health also play a key role in contributing to the risk of obesity (CDC, 2022c). The state of being overweight or obese has been linked to an increased risk of developing 13 different types of cancers (CDC, 2022f).

Hormones. A variety of sources attribute the development of obesity to hyperinsulinemia and insulin resistance (Armutcu, 2019; Wondmkun, 2020). Although the precise mechanisms are unclear, it is known overfeeding, or consuming excess calories, results in an excess of insulin which results in insulin resistance (Czech, 2017). Insulin is a potent pancreatic hormone affecting multiple tissues and triggers the processing and storage of proteins, lipids, and carbohydrates (Albosta & Bakke, 2021; Page & Johnsons, 2018). For example, in the liver, insulin decreases

glucose production and increases glucose storage and fat production; in adipose tissue insulin causes an increase in fat production and a decrease in fat metabolism (Albosta & Bakke, 2021). Over secretion of insulin and the resulting insulin resistance is considered a sign of obesity and a hallmark of type II diabetes and has been linked to many disorders including type II diabetes, obesity, hypertension, and atherosclerosis (Czech, 2017; Page & Johnsons, 2018). Research has shown low levels of plasma insulin and leptin are required for fat metabolism (Perry et al., 2018). Fat cells, known as adipocytes, are also believed to contribute to this cycle of insulinemia and insulin resistance by directly stimulating beta cells in the pancreas to secrete insulin regardless of blood glucose levels (Czech, 2017).

Biological. Our genes have been shown to predispose individuals to obesity by as much as 70% (Golden & Kessler, 2020). This predisposition can manifest as metabolism, BMI, exercise response, sleep-wake patterns, appetite regulation, body-fat distribution, and even food consumption (Golden & Kessler, 2020). Obesity has been shown to be familial as the BMI is highly associated with obesity in the biological parents of an individual (Golden & Kessler, 2020).

Epigenetics. Epigenetics is a major mechanism accommodating gene-expression changes in response to gene-environment interactions (Rohde et al., 2019). In healthy tissue, the way genes are expressed is influenced by interactions between environmental and genetic factors (i.e., obesity, alcohol consumption, smoking, air pollution, etc.), which can negatively impact an individual's health status by disrupting cellular homeostasis. This interaction between an individual's genes and the environment influences an individual's risk of developing various diseases (Feinberg, 2018). Some individuals are more susceptible to the development of certain diseases and epigenetic changes can contribute to this risk.

The Microbiome. The microbiome in the gut has also been shown to influence the development of obesity. The Western diet has been shown to reduce the microbial diversity of the gut microbiome, while increasing the presence of *Firmicutes* and *Enterobacteriaceae*, which are considered harmful bacteria, and decreasing *Bacteroidetes*, known as the beneficial bacteria (Aoun et al., 2020). Exercise, high fiber, and high protein diets have been shown to increase the diversity of the gut microbiome (Aoun et al., 2020).

Cost and Economics. The wealth of a country and an individual's wealth have both been shown to directly affect BMI (Masood & Reidpath, 2017). A study completed in 2017 analyzed the wealth of 70 countries including the individual wealth of participants from each country and their BMIs (Masood & Reidpath, 2017). The data showed as the wealth of a country increased, the BMI for most of the population increased, while the wealthier 20% of the population had a decrease in BMI (Masood & Reidpath, 2017). The study also showed all low-income countries analyzed had a mean BMI of less than 25.0 (Masood & Reidpath, 2017). The researchers from this study suggest obesity increases as wealth increases in the middle- and low-income countries due to lifestyle behavior differences affecting physical activity and financial resources for food (Masood & Reidpath, 2017). The cost of eating a well-balanced diet and the availability of nutrient rich foods is often the cause of undernutrition in developing countries (Morrison, 2019). The availability of food increases as these countries develop—increasing the access to unhealthy processed foods—increasing the rates of obesity (Morrison, 2019).

Cultural. An individual's culture can play a role in the development of obesity. Other culture's view being overweight or obese as a sign of wealth due to the scarcity of food in their region (Rubin, 2016). Wallace et al. (2019), conducted an ecological study collecting data from 200 countries to analyze cultural characteristics and how they influence obesity (Wallace et al.,

2019). This study found cultures with more individualism, usually those of wealthier statures, had higher BMIs compared to cultures with more close-knit societal behaviors (Wallace et al., 2019). Wallace et al. (2019), found individualistic societies, typically those found in wealthier nations, view obesity as an individual problem incurred by personal choices related to diet and exercise—while in collectivist societies individuals work together to alter public health policies and engage in community activities such as communal eating and resource sharing. Other characteristics associated with increased BMIs included cultures who view future occurrences, such as the development of obesity as unavoidable—cultures with more freedom and less constraints, and cultures who have a short-term view of the future or place a low value on future implications and how decisions made now can affect their future (Wallace et al., 2019).

Dao et al. (2020), conducted a qualitative study to analyze how cultural influences affect intake and obesity in adults. Dao et al. (2020), discuss how eating behaviors, food culture, weight management, and attitudes towards food consumption are interconnected. Dao et al. (2020), discovered overweight individuals had frequent unsuccessful attempts at weight loss and attributed these failures with emotional eating and stress. American participants reported higher external pressures to consume larger portion sizes and a strong association of "tasty" to unhealthy foods (Dao et al., 2020). Dao et al. (2020), found French participants valued traditional food production methods and eating practices—placing high value on "natural," or unprocessed/unrefined products versus processed or industrial foods, while American participants were shown to place little value on food production methods for consumption purposes and placed more emphasis on how these methods impacted the climate.

Tekes et al. (2018), conducted an analysis to reveal the relationship between obesity and cultural values and dimensions. Tekes et al. (2018), discussed how food plays a central role

beyond nutrition such as in determining social order, hierarchy, social connections, and moral functions. Tekes et al. (2018), compared cultural roles between the United States with individualistic culture and Japan with a collectivist culture. Tekes et al. (2018), found individualistic cultures are more prone to obesity due to the associated autonomy, faster food consumption, and exposure to environmental and emotional triggers, while collectivism cultures routinely share food and view eating together as relationship and social building and is done together and at a consistent pace. Tekes et al. (2018), concluded societies more prone to obesity (i.e., individualistic cultures) should develop and implement interventions to provide social support and encourage participation in activities and programs designed to promote healthier lifestyles.

Physical. Physical factors contributing to the development and worsening of obesity have been built into our environment. These factors include the limited access to parks and other recreational facilities, the abundance of fast-food restaurants and unhealthy food items, and the reduced opportunities to exercise in neighborhoods due to safety or lack of infrastructure (Office of Disease Prevention and Health Promotion, n.d., para. 14–15). Limited access to public transportation and long commute times have been shown to be a risk factor for obesity as well (Lam et al., 2021).

Most studies included in a systematic review comparing rates of obesity among individuals residing in urban and rural areas showed a correlation with a higher BMI in more urbanized areas (Lam et al., 2021). A study completed by Lovasi et al. (2009) suggested higher socioeconomic status groups were more affected by the built environment, while individuals of lower socioeconomic status were less exposed to many of the food outlets (Lam et al., 2021).

Social media has become a highly utilized platform for interaction and communication between individuals of all ages. One study showed the promotion of food consumption was portrayed in a more positive manner than weight loss on Twitter (Park & West, 2019). This study suggests the sociocultural environment can potentially be considered a risk factor for obesity (Park & West, 2019).

Policy. The U.S. government subsidizes farmers to guarantee certain food staples are always available and affordable across the country (American College of Cardiology [ACC], 2016). The current Dietary Guidelines for Americans recommends a diet consisting of whole grains, low-fat dairy, lean protein, fruits, and vegetables (ACC, 2016). The Office of Disease Prevention and Health Promotion (2022) currently recommends adults consume a diet consisting of 45-65% carbohydrates and 20-35% total fat. According to the American College of Cardiology (2016), one problem is that financed subsidies do not support these guidelines and instead focus on supporting the production of wheat, corn, rice, soybeans, livestock, and dairy which are often converted into high fat, processed, and refined products.

A study was conducted to compare the rate of obesity among American adults with the consumption of these government subsidized foods. The study found individuals who consumed a high amount of these subsidized foods had a 37% increased rate of obesity, a 41% increase in the amount of belly fat, a 21% increase in high blood sugars, and a 14% increase in high cholesterol levels (ACC, 2016). Socioeconomic factors, such as poverty, contribute to the increased rates of obesity as the affordability of healthy food options diminishes. Each of these factors contribute to the number one cause of death of American men and women, heart disease.

The Impacts of Obesity

Obesity and Health Care Cost. With the prevalence of obesity rising each year and the total population growing steadily, the total number of cases of obesity are following the trend resulting in more spending on obesity. In the United States, according to the CDC medical costs associated with obesity are currently estimated to be over $147 billion annually (CDC, 2022c). Obesity related healthcare costs currently account for 8.5% to 11.8% of Medicare and Medicaid spending (The George Washington University, 2022). Obesity is not only costly to the healthcare system, but it also results in lost work, higher insurance premium—and there is even some correlation with decreased wages and household income (Harvard T.H. Chan, 2016).

In the United States, the cost of obesity has been rising due to its impact on health and increased utilization of health care services. According to Cawley et al. (2021), obesity related costs in the United States was $260.6 billion as of 2016. Cawley et al. (2021) found individuals with a BMI between 30-35 experienced a 68.4% increase in medical costs, while those with a BMI over 40 experienced a 233.6% increase in obesity related medical costs. Biener et al. (2017) propose this rise in costs can be attributed to three factors: (1) increases in health care costs; (2) an overall population increase; and (3) an increase in obesity rates. This information exemplifies the importance of reducing obesity rates from a healthcare perspective.

Similarly, Kim and Basu (2016), conducted an empirical analysis, systematic review, and meta-analysis on 12 articles to estimate the healthcare costs incurred by obesity in the United States. In 2016, the annual medical costs of obesity for the U.S. were $149.4 billion dollars, averaging to $1901 per obese individuals in 2014 USD (Kim & Basu, 2016). The researchers found the two factors affecting the cost estimates were the distinction between obesity linked comorbidities and age groups (Kim & Basu, 2016).

The cost of obesity is not just a health concern for the United States; this has become a worldwide health concern (Okunogbe et al., 2021). An elevated BMI is estimated to result in a global cost of US$990 billion annually (World Obesity Federation, n.d.). High-income countries face the highest economic impacts because of obesity, while low- and middle- income countries still reveal substantial impacts (Okunogbe et al., 2021). Of the eight countries analyzed, the cost of obesity is expected to increase from a current range of 0.80% - 2.42% GDP to 2.43% - 4.88% GDP by 2060 (Okunogbe et al., 2021).

Obesity and Quality of Life. The quality of life and mental health outcomes have also been shown to be diminished in obese individuals (CDC, 2022c). Like obesity, the quality of life an individual experiences is multifactorial. Stephenson et al. (2021, p. 1), conducted a study to examine how high BMI levels affect the quality of life compared to normal weight individuals. Stephenson et al. (2021, pp. 4–8), conducted a long-term cohort study collecting data on 64,631 participants and found obese and morbidly obese individuals reported a lower quality of life compared to normal and overweight individuals based on the EQ-5D summary index—a tool used to evaluate quality of life. The study also showed normal-weight individuals were significantly less prone to developing long-term mental health conditions than overweight or obese individuals (Stephenson et al., 2021, p. 4). The quality of life among those with a BMI over 25 kg/m^2 was shown to be lower than individuals with cancer, diabetes, and a history of myocardial infarction (Stephenson et al., 2021, p. 7). The quality of life among overweight and obese individuals was found to be similar among those with schizophrenia, kidney, or heart failure (Stephenson et al., 2021, p. 7). Stephenson et al. (2021, p. 8), concluded from their study, increased weight status and chronic health conditions both contribute to decreased mental health and quality of life.

Psychological Impacts and Obesity. The social stigma associated with being obese can also have detrimental effects on mental health. Individuals are often stigmatized simply because of their weight. Puhl et al. (2020), conducted a study to examine associations between weight stigma and its adverse health outcomes and explain how weight stigma is widespread and society has developed a variety of stereotypes for obese individuals. A review of 30 studies showed weight stigma resulted in maladaptive eating behaviors, which commonly result in weight gain (Puhl et al., 2020). This behavior further results in a 59% chance of the individual being inactive and are 30% less likely to participate in any type of aerobic exercise (Puhl et al., 2020). Individuals develop a negative self-image and are dissatisfied with their bodies resulting in psychological stress leading to increased inflammation and higher cortisol levels, again resulting in more weight gain (Puhl et al., 2020).

Puhl et al. (2020), describe as many as 40% of adults who report negative differential treatment or being badgered due to their weight. Puhl et al. (2020), report poorer health and life outcomes including employment disparities, reduced educational outcomes, healthcare, and relationship disadvantages. Puhl et al. (2020), found regardless of BMI, weight stigma resulted in maladaptive eating behaviors; demonstrated by experimental manipulations (i.e., stigmatizing videos or articles) on individuals with varying BMIs and found the manipulation resulted in increased food intake. This experiment showed exposure to these negative views would cause an increase in food consumption.

Similarly, Amiri and Behnezhad (2019), conducted a systematic review and meta-analysis to analyze how obesity affects anxiety symptoms. Amiri and Behnezhad (2019), found obese and overweight individuals experience more anxiety compared to individuals who are of ideal weight (BMI between 18.5 and 25). Amiri and Behnezhad (2019), also found anxiety may be a risk

factor for weight gain, especially among women, who are more likely to take part in emotional eating.

Intermittent Fasting

A method that decreases insulin levels simply by altering eating patterns is referred to as intermittent fasting (IF) (Albosta & Bakke, 2021). Intermittent fasting is the voluntary avoidance of food over a certain period of time and is not a diet, but an eating behavior (Teong et al., 2021). Individuals fast for multiple reasons including for spiritual beliefs, health benefits, and other purposes. Fasting is often completed for hours at a time. Some individuals have fasted for days and weeks with medical supervision. In 1973, Stewart and Fleming conducted a study where one individual completed a therapeutic fast with only water and vitamins for 382 days under physician supervision in an out-patient setting. This individual started the fast at 456 lbs. and lost a total of 197 lbs. and was reported to maintain his weight loss (Stewart & Fleming, 1973).

Intermittent fasting is not only beneficial for weight loss but has also been shown to have positive effects on the brain, heart, liver, muscles, intestines, blood, and various systems (Armutcu, 2019; Phillips, 2019). IF has also been shown to reduce risks factors associated with the development of type II diabetes, neurological disorders, and cancer (Armutcu, 2019). Although IF has been shown to be advantageous to human health, it is not without its risks. Those who should not participate in fasting of any kind include the elderly, women who are pregnant or breastfeeding, individuals under the age of 18 years old, those with type II diabetes or gout, individuals with a history of an eating disorder, and those who take certain medications. Resources often highlight the importance of consulting with a medical professional before beginning fasting, making this an important topic for healthcare clinicians to be knowledgeable of.

Types of Intermittent Fasting

Different methods of fasting include (1) time-restricted-eating (TRE), (2) alternate-day fasting (ADF), and (3) the 5:2 diet. The TRE method consists of eating food during a specific time frame during a 24-hour period. There are different variations of this method such as 20:4, 16:8, 14:10, 12:12. The first number signifies the number of hours spent fasting, while the second number indicates the number of hours an individual can consume food during a 24-hour period. An example of the 16:8 plan could be breakfast at 8:00am, lunch at 12:00pm, and dinner at 4:00pm, or any combination of meals within the 8-hour period, followed by a 16-hour fasting period. The ADF method consists of alternating days of eating normally with days of days of no or limited caloric intake. The 5:2 method consists of normal eating for five days each week and two days of no or limited caloric intake. The two fasting days can be spaced throughout the week or consecutive.

The History of Intermittent Fasting

Intermittent fasting has been used for centuries as a therapeutic medical practice, as a spiritual discipline by numerous cultures and nearly every religion across the world, for cleansing or purification, bodily and spiritual healing, and other health reasons (Armutcu, 2019). For example, in Islamic culture the holy month of Ramadan is a daily period of fasting from sunrise to sunset; in Jewish faith, Yom Kippur, known as the Day of Atonement, is a 25 hour fast; for Christians, fasting is practiced during Lent; and Buddhists usually fast from noon until the next day. During Ramadan, it is estimated 1.6 billion Muslims across the world participate in fasting (Puri-Mirza, 2020).

Hippocrates, the father of modern medicine, would often prescribe fasting as a medicinal treatment about 2400 years ago (Landis, 2020). According to Fung (2016), other notable

individuals who supported fasting include Plato, Aristotle, Plutarch, Benjamin Franklin, Paracelsus, and Jesus Christ (Fung, 2016). Fasting was independently developed and incorporated into a variety of cultures and religions across the world and is often implemented as a method of cleansing and healing (Swihart et al., 2022). In ancient Greece, fasting was believed to enhance cognitive abilities by maintaining a high level of blood supply to the brain and not shunting this supply to the digestive system as observed during feeding (Fung, 2016). When viewed from an evolutionary standpoint, exceptional cognitive and/or physical performance when food was scarce was advantageous when it came to natural selection as the individual, or creature, who secured the food would face improved survival odds (Mattson, 2019).

Historically, in ancient Rome, the consumption of one meal per day was the standard with additional meals viewed as a gluttonous behavior (Paoli et al., 2019). To essentially civilize the New World and provide order, the European settlers began scheduling their meals at a certain time (Olson, 2015). During the industrial revolution, the practice of consuming a meal before work became a common practice (Paoli et al., 2019). In recent years, fasting has become more popular as a weight loss method, but there are still widespread misconceptions regarding this practice.

The Science of Intermittent Fasting

The human body is physiologically adapted to fasting for longevity as humans were hunter-gatherers and often faced food scarcity on a regular basis (Phillips, 2019). During the feeding state carbohydrates are consumed and converted to glucose (Holesh et al., 2021). Naturally to counteract this rise in glucose, the body releases insulin to trigger the liver to store the glucose as glycogen (Holesh et al., 2021). Any remaining glucose is stored in muscle tissue and the liver for later use (Holesh et al., 2021). Once the glycogen stores are full, the body begins

converting and storing the remaining carbohydrates as triglycerides or other various lipid molecules (Song et al., 2018). Metabolic and physiologic processes are altered when the consumption of carbohydrates is increased or decreased beyond the preferred amounts (Holesh et al., 2021). During fasting periods—such as when we are sleeping—the pancreas secretes glucagon which reduces insulin secretion resulting in a decrease in the storage of glucose as glycogen (Sanvictores et al., 2021). After fasting for more than 12 hours, the liver begins breaking down adipose cells into ketone bodies to be used as fuel for the body (Phillips, 2019). Ketones have been shown to be a more efficient fuel source for muscles (Phillips, 2019). The brain as it has been shown to exhibit improved cognitive performance and enhanced neuron bioenergetics when utilizing ketones for energy (Phillips, 2019).

Although obesity is multifactorial, the key factor is insulin, more specifically, the resistance to insulin. With each meal, insulin levels rise with short reprieves between each meal and a longer fast while sleeping. This pulsing of insulin prevents the development of insulin resistance. When food is consumed steadily throughout the day, the insulin levels remain elevated resulting in insulin resistance. When this resistance occurs, the body becomes less reactive to the insulin while the cells become low on glucose and signal for more insulin resulting in a vicious cycle of high insulin levels and maintained resistance. Huang et al. (2020), conducted a systematic review and meta-analysis to determine if suppressing insulin secretion would reduce BMI. Huang et al. (2020), found significant decreases in body weight, fat mass, and BMI compared to the control group.

Intermittent Fasting and Weight Loss

Intermittent fasting, a method to decrease insulin levels and reduce the bodies resistance to insulin, is also an effective method of weight loss and can provide other health related

benefits. Patikorn et al. (2021), conducted an umbrella review to examine the health outcomes associated with intermittent fasting (IF) among adults and the quality and strength of the supporting evidence. The types of IF included in this review were alternate day fasting, modified alternate day fasting, the 5:2 diet, and time restricted feeding (Patikorn et al., 2021). Patikorn et al. (2021), analyzed 11 meta-analyses and found 28 statistically significant correlations positively affecting a variety of health parameters including BMI, fasting insulin, and blood pressure. Patikorn et al. (2021), concluded IF can promote cardiometabolic and anthropometric outcomes and these findings are supported by moderate to high quality of evidence.

Similarly, Ravussin et al. (2019), conducted a randomized control trial with 11 overweight adults to determine if time restricted feeding (TRF) would cause weight loss by decreasing appetite and increasing fat metabolism without affecting energy expenditure. Participants were divided into a control group who ate three scheduled meals between 8:00am and 8:00pm daily (12 hour feeding period), while the experimental group ate the same three meals between 8:00am and 2:00pm (6 hour feeding period) (Ravussin et al., 2019). The researchers found early TRF can cause weight loss by reducing appetite (Ravussin et al., 2019). The researchers also found the timing of food intake did not affect energy expenditure (Ravussin et al., 2019).

Isenmann et al. (2021), conducted a randomized control trial on 42 physically active adults to compare time restricted feeding to a macronutrient-based diet and how they affect body composition. The TRF group had an 8-hour feeding period with a 16-hour fasting period, while the other group consumed a macronutrient-based diet with 80% of the foods consumed being unprocessed and the other 20% could be processed foods (Isenmann et al., 2021). The study discovered both groups had similar effects on BMI, body mass, lean body mass, body weight,

body fat percentage, waist and hip circumference, and fat mass (Isenmann et al., 2021). The

researchers found TRF to have a lower adherence rate but found this factor to have no effect on

the end results (Isenmann et al., 2021). Overall, the researchers' stated participants were

accepting of both dietary strategies (Isenmann et al., 2021). The researchers concluded both

methods can effectively reduce body weight, BMI, fat mass, and waist and hip circumference

(Isenmann et al., 2021).

Harris et al. (2018), conducted a systematic review and meta-analysis on six studies

analyzing how intermittent fasting affects body weight in overweight or obese adults. The fasting

groups included fasting for two days per week, alternate day fasting, and fasting up to four days

each week (Harris et al., 2018). The meta-analysis revealed IF was effective for weight loss

compared to the control groups (Harris et al., 2018). The study found IF and continuous energy

restriction had no significant difference in weight loss (Harris et al., 2018). The researchers

concluded IF is an effective method for weight loss in overweight or obese adults but advise

caution in the result interpretation as there were few studies to analyze (Harris et al., 2018).

Harris et al. (2018), advise more research is needed to confirm these results.

Chair et al. (2022), conducted a randomized control trial on 101 overweight or obese,

prediabetic adults to determine if time restricted feeding (TRF) or alternate day fasting (ADF)

would affect weight loss or the cardiometabolic profile. Participants were divided into three

groups: (1) a TRF group who would have an 8-hour feeding period with a 16-hour fasting period,

(2) an ADF group, and (3) a control group (Chair et al., 2022). The ADF group could consume

600 kcal on fasting days, and their regular diet on non-fasting days (Chair et al., 2022). The TRF

groups were free to consume their regular meals within the given time frames (Chair et al.,

2022). All participants were instructed to maintain their current exercising patterns during the

study (Chair et al., 2022). The study found both the TRF and ADF groups experienced a greater amount of weight loss, reductions in triglycerides, blood glucose levels, LDL cholesterol, and waist circumference compared to the control group (Chair et al., 2022). The researchers did find ADF to have a slight benefit in weight loss and reduced BMI over TRF (Chair et al., 2022). Chair et al. (2022), concluded both ADF and TRF can potentially reduce the risk of cardiovascular disease and diabetes.

Intermittent fasting can be implemented in countless methods with various fasting times ranging from hours to months with various frequencies ranging from daily to yearly. Welton et al. (2020), conducted a study to analyze the current evidence examining the effectiveness of treating obesity with intermittent fasting (IF). Welton et al. (2020), reviewed 27 studies and found all the trials resulted in weight loss ranging from 0.9% to 13.0% of the baseline weight. Welton et al. (2020), reported glycemic control was improved among type II diabetics in five studies. Welton et al. (2020), conclude IF appears to be a useful tool for weight loss, but more long-term research is needed. With this information, the weight loss achieved would be expected to vary depending on the aggressiveness of the fasting regimen.

Another one of the factors contributing to the complexity of weight gain and obesity could be affected by the relationship of feeding to the circadian clock. Jamshed et al. (2019), conducted a randomized-control crossover study to determine if early time restricted feeding would improve blood glucose levels, and how it would affect autophagy, aging, and the circadian clock. The study was conducted on 11 healthy men and women (Jamshed et al., 2019). The study found early TRF lowered glucose levels, improved the cortisol rhythm, and affected beneficial genes and hormones responsible for autophagy and longevity (Jamshed et al., 2019). The

researchers concluded early TRF had a positive effect on cardiometabolic health, affect diurnal rhythms, and suggest possible anti-aging benefits (Jamshed et al., 2019).

Paoli et al. (2019), conducted a study analyzing how the frequency and timing of meals affects human health. Paoli et al. (2019), noted recent research has shown increased meal frequency has been linked to increased risk of disease. Paoli et al. (2019), found fewer meals consumed daily and longer overnight fasts both resulted in a lower BMI. Paoli et al. (2019), supported daily fasting of 16 to 18 hours—limiting food intake to 6 to 8 hours—to exert positive health effects and decrease disease risk. Paoli et al. (2019), also found increased fasting with eating at appropriate times was beneficial to the gut microbiome. Paoli et al. (2019), analyzed the results of a study conducted on 50,660 adults and concluded eating one to two meals per day was associated with a lower BMI compared to individuals who consumed three meals per day. Paoli et al. (2019), analyzed other studies comparing meal timing and BMI and concluded those who consumed breakfast regularly generally had lower BMI compared to those who consumed their largest meal of the day during lunch or dinner time. Paoli et al. (2019), concluded overall human health has many contributing factors and more research is needed to fully understand these relationships but agree mealtime and frequency can improve overall health.

There are other methods to reduce body weight—each with their advantages and disadvantages. Conley et al. (2018), completed a randomized pilot study comparing the effectiveness of a two-day intermittent fasting (5:2) diet per week vs a standard energy restricted diet (SERD) for weight loss in obese adult males. The study consisted of 24 participants who were randomly assigned to one of the two diet methods (Conley et al., 2018). Conley et al. (2018), found that the SERD group had a mean weight loss of about 5.5kg and mean waist circumference reduction of about 6.4cm while the 5:2 group had a mean weight loss of 5.3kg and

a mean waist circumference reduction of 8.0cm. Conley et al. (2018), concluded there was no

significant differences discovered between the two groups including fasting blood glucose levels,

blood lipid levels, or diastolic blood pressure readings. Conley et al. (2018), added further

research is needed to assess the long-term efficacy of each diet method.

IF and Diabetes

Intermittent fasting is a powerful tool affecting various body systems, including the

endocrine system. Grajower and Horne, (2019), noticed there is currently a lack of research and

medical guidelines pertaining to the treatment of diabetes with intermittent fasting (IF). Grajower

& Horne, (2019), collected the limited available data and used the results to develop expert-

based guidelines proposed for the treatment of diabetics. Grajower and Horne, (2019), analyzed

the many benefits of IF and the risks with hypoglycemia being the most prominent. Grajower &

Horne, (2019), concluded the use of IF in diabetics was shown to decrease body weight and

insulin dosage. Grajower and Horne, (2019), added the long-term effectiveness and benefits are

not fully understood and require further research.

Intermittent fasting can be very beneficial for type II diabetics, but there are risks.

Joaquim et al. (2022), conducted a review to analyze the mechanisms, risks, and benefits or

intermittent fasting (IF) on type II diabetes and metabolic syndrome. Joaquim et al. (2022),

analyzes how faulty redox function and mitochondrial dysfunction were thought to contribute to

insulin resistance and complications of diabetes. Joaquim et al. (2022), discusses how IF

stimulates autophagy and the recycling of nutrients. Joaquim et al. (2022), examines how the

timing of eating affects the circadian rhythm which can affect metabolic health ultimately

resulting in metabolic disease and obesity. Joaquim et al. (2022), analyzes how overnutrition and

low levels of physical activity result in hyperinsulinemia leading to insulin resistance and can

eventually progress to type II diabetes. Joaquim et al. (2022), recognizes the evidence of results within the last few years with IF are growing, but the long-term effects and results needs more research.

IF and Cancer

In the United States, cancer is the second most common cause of mortality and morbidity with over 600,000 cancer related deaths in 2021 (Clifton et al., 2021). The leading cancer risk factor is obesity and is responsible for about 14-20% of all mortality related to cancer (Zhang et al., 2020). Research noticed poorer outcomes are associated with excess adiposity when cancer is diagnosed (Clifton et al., 2021). The malignancies associated with excess body weight include multiple myeloma, thyroid, adenocarcinoma, renal cell, pancreatic, liver, esophageal, gastric cardia, ovarian, endometrial, meningioma, colorectal, gallbladder, and post-menopausal cancers (Clifton et al., 2021).

IF demonstrated promising results in the prevention and treatment of cancer (Antunes et al., 2018; de Groot et al., 2019; Zhang et al., 2020). Initial studies noted short-term fasting (fasting 36 hours before and 24 hours after chemotherapy) reduces fatigue, enhances quality of life, and is well tolerated among individuals undergoing chemotherapy for breast and ovarian cancer (Zhang et al., 2020). Recently, oncologists have become more interested in IF due to growing research showing IF can be used in the management and prevention of cancer (Zhang et al., 2020). Fasting proved to have protective effects on healthy cells during chemotherapy administration (Zhang et al., 2020) and may sensitize cancerous cells to chemotherapeutic agents (Clifton et al., 2021). According to Clifton et al. (2021), de Groot et al. (2019), and Antunes et al. (2018), preliminary studies revealed short term fasting can improve efficacy and tolerability of multiple chemotherapeutic agents, decrease toxicity, and possibly reduce side effects. Additional

studies are necessary to confirm the safety, risks, and benefits of IF in patients undergoing cancer treatment (Clifton et al., 2021).

IF and Non-Alcoholic Fatty Liver Disease

Intermittent fasting is not only beneficial for weight loss and diabetes, but it can also improve the health of the liver. As adipose tissue becomes saturated with fat, the excess lipids begin being deposited in other locations around the body including the liver (Page & Johnsons, 2018). Yin et al. (2021), conducted a review to analyze the effectiveness of intermittent fasting (IF) versus the control group on non-alcoholic fatty liver disease. Yin et al. (2021), reviewed a total of six systematic reviews and found IF significant differences in BMI, body weight, and liver enzymes. Yin et al. (2021), concluded IF is advantageous for improved liver enzymes and weight management, but note the long-term effectiveness and safety requires more research.

Other Benefits of IF

Intermittent fasting has been suggested as an effective method to induce autophagy, which is the stimulation of the body to recycle nutrients inside the body (Chung & Chung, 2019; Fung & Moore, 2016; Joaquim et al., 2022). This autophagic process helps to maintain cellular homeostatis and prevent the buildup of faulty macromolecules and organelles promoting physiologic alterations including cancer, neurodegenerations, and other age-related diseases (Barbosa et al., 2019). Misalignment between the circadian rhythm and food cycles has been shown to increase the risk of obesity and metabolic diseases (Joaquim et al., 2022). Intermittent fasting illustrates a correction to this disruption by realigning sleep/wake and cortisol cycles and increasing insulin sensitivity (Joaquim et al., 2022).

Cost of Intermittent Fasting

Unlike most traditional weight loss methods, IF is simply an eating behavior. This behavior does not require any specific food requirements, calorie counting, subscriptions, or weight loss programs. With IF, the most important factor is when the food is eaten. One of the perks of IF is it is completely free and surprisingly can be money saving. By decreasing the amount of meals consumed each day, the total food cost is decreased. This benefit can allow those who are participating in IF to invest in higher quality food products to further the benefits of IF.

Risks Associated with IF

One of the most important facts to understand about IF is that IF is not for everybody. There are multiple types of IF which are commonly used to achieve different outcomes including short-term weight loss, long-term lifestyle changes, decreasing risk factors for various diseases, etc. One of the safest forms of IF is time restricted feeding—as it has been proven to be safe, have excellent adherence, is well tolerated, and has not demonstrated negative effects on other parameters including bone density and lean mass (Marten et al., 2020).

IF is associated with a variety of risks, which vary from person to person depending on their current health status and comorbidities. Short-term fasts are often accompanied by side effects including headache, lightheadedness, fatigue, nausea, and insomnia (Finnell et al., 2018). Extended fasts are not recommended without direct supervision and guidance from a knowledgeable healthcare clinician. With extended fasting, vitamin and/or mineral deficiencies may develop and need to be carefully monitored and maintained throughout the fast to prevent any adverse effects.

A study published in 1968 starved 12 obese individuals for two to twelve weeks (Spencer, 1968). Two of these individuals began the study with severe heart failure and died shortly later presumably from ventricular fibrillation due to the combined effect of water loss from fasting and diuretics resulting in potassium and sodium depletion (Spencer, 1968). Other starvation studies have also reported death in some of its participants due to various reasons from heart muscle disintegration after 30 weeks of starvation (Garnett et al., 1969) and refeeding syndrome.

Research has shown the most dangerous time of a fast is when the fast is broken. Breaking an extended fast can result in refeeding syndrome, which was experienced after World War II when malnourished Japanese war prisoners resumed a regular diet after being starved for extended periods and 20% of them died as a result of refeeding syndrome (Schnitker et al., 1951). Refeeding syndrome can occur after five days of fasting or with undernutrition (Mouillot et al., 2021). Medical advances have been made to prevent refeeding syndrome with the development of refeeding protocols, recognition of warning signs, and by avoiding fasting in those at a higher risk of refeeding syndrome

Hypoglycemia is a concerning risk for diabetics and those who are taking medications that affect blood glucose levels, including insulin and sulfonylureas, due to drops in blood sugar during fasting periods (Grajower & Horne, 2019). Dehydration poses a risk for all individuals who fast, but especially for diabetics who need to maintain adequate hydration to prevent unwanted side effects (Grajower & Horne, 2019).

Another risk associated with intermittent fasting is the use of medications while fasting. Some medications are recommended to be consumed with food and not on an empty stomach. The consumption of aspirin on an empty stomach can result in the development of gastritis and ulcers (Al-Hamadiny et al., 2021). A common side effect of Metformin, which is often prescribed

to lower blood sugars in diabetics and to treat polycystic ovarian syndrome, is gastrointestinal

upset (Bonnet & Scheen, 2017). It is imperative for those taking medication or those who have

chronic conditions to consult with their provider before beginning IF, as there is currently

insufficient data analyzing IF with comorbidities.

Seeking IF Expert Guidance

There are certain individuals who should not partake in intermittent fasting and others

who should obtain guidance from a knowledgeable healthcare provider before beginning IF.

Individuals who should not fast include those who are pregnant or breastfeeding, those who are

underweight or severely malnourished, those who suffer from an eating disorder, and those under

the age of 18 (Aoun et al., 2020). Almost every culture and religion worldwide exempt pregnant

and breastfeeding women from fasting unless they choose to do so (Abolaban & Al-Moujahed,

2017). Pregnant and breastfeeding women require more nutrients for healthy development of the

fetus. Underweight and severely malnourished individuals should also avoid IF (The Institute of

Functional Medicine, 2020), in fact Dr. Fung, who is an expert in IF, recommends all individuals

with a BMI under 20 should avoid fasting to avoid wasting (Fung & Moore, 2016). Wasting is

the burning of functional tissue, such as lean muscle, to survive (MedlinePlus, n.d.).

As with pregnant and breastfeeding women, children under the age of 18 also require

more nutrition than adults (Koletzko et al., 2019). Fasting could alter proper growth resulting in

stunted growth and wasting (Hailselassie et al., 2022). During this development period, it is

crucial to teach children healthy food options to promote health and prevent obesity (Haines et

al., 2019). Individuals who have or have had an eating disorder should also avoid IF as it could

worsen their current health condition or retrigger a previous eating disorder (Cuccolo et al.,

2021).

Those who should consult with their healthcare provider before beginning IF include

those who have comorbidities such as diabetes, gout, gastroesophageal reflux disease (GERD),

and those taking medication (The Institute of Functional Medicine, 2020). Most individuals who

have diabetes are prescribed medications to control their blood sugars. Extremely low blood

sugars, known as hypoglycemia, can result with a change in diet or exercise. Monitoring blood

glucose levels and adjusting diabetic medications for those who have diabetes is critical for those

who want to participate in IF.

Gastroesophageal reflux disease, also known as GERD, is the result of stomach acid

eroding the tissue of the esophagus (National Institute of Diabetes and Digestive and Kidney

Diseases, n.d.). One cause of GERD is being overweight or obese, which applies pressure on the

stomach forcing stomach acid into the esophagus (Fung & Moore, 2016; National Institute of

Diabetes and Digestive and Kidney Diseases, 2020). According to Fung and Moore, (2016),

fasting can worsen GERD symptoms keeping the stomach empty and not having anything to

soak up the acid. For some individuals, fasting can reduce GERD symptoms by reducing the

secretion of stomach acid by avoiding food, which stimulates stomach acid secretion in

preparation for digestion (Fung & Moore, 2016). A recent study published by Jiang et al. (2021),

found a reduction in GERD symptoms with IF when using time restricted feeding with an eight-

hour feeding window. Jiang et al. (2021), recommend additional studies to confirm these results

and determine if can be used as a non-pharmacologic treatment of GERD.

Educational Interventions

Based on a current review of literature, there is a lack of studies reporting the use of

educational interventions to improve the knowledge of healthcare clinicians regarding IF;

therefore, clinicians may be ill equipped to educate and provide patient information on IF in

clinical settings. Most of the available studies are focused on specific populations during

Ramadan, and not on IF in general (Hamodat et al., 2020; Beshyah et al., 2021). One study

showed the use of educational interventions improved healthcare providers' knowledge on their

respective topics by 67.9% (Abu Farha et al., 2018). Numerous studies show an increase in

knowledge after educational interventions—though the long-term effectiveness of these

interventions is mostly unknown. By improving healthcare clinicians' foundational knowledge

on IF, they can be more confident in their knowledge and understanding on the topic.

Healthcare Clinicians' Knowledge and IF

One of the major pitfalls with obesity is the knowledge gap healthcare clinicians have

regarding IF. A study published in 2020 measured providers' knowledge gap associated with

managing patients participating in Ramadan fasting, which is a form of intermittent fasting. The

study showed less than 10% of participants felt they had received adequate training on the topic

and only 15.87% strongly agreed they had felt comfortable managing these patients (Hamodat et

al., 2020). According to Afshin et al. (2019), 11 million worldwide deaths can be attributed to

dietary factors. Crowley et al. (2019), conducted a systematic review to analyze nutritional

education as part of the medical education curriculum and found medical students are not

adequately prepared to provide effective, high-quality nutritional care and recommend the

development of nutritional competencies into the curriculum. According to a systematic review

completed by Mitchell et al. (2018), nurses also lack adequate training in nutritional knowledge.

Healthcare Clinicians' Attitudes and IF

Healthcare Clinicians' attitudes are highly influential in the management of obese and

overweight patients. Currently, there are no studies found discussing HCCs attitudes in relation

to IF. However, various studies have been conducted analyzing HCCs knowledge, attitudes, and

practice behaviors in relation to a specific topic—in this case it was on providers educating their patients about advanced directives—and found HCCs were more likely to educate their patients on the subject if they had positive attitude towards the topic of interest (Nedjat-Haiem et al., 2019).

Educational interventions can also be useful in improving attitudes by providing evidenced based information to improve the understanding of a topic and debunk false beliefs or stereotypes. One study initially started with a 78.1% positive attitude and 21.7% negative attitude pre-intervention; and a 100% positive and 0% negative attitude post intervention (EL-Khadry et al., 2020). In most instances, behavior cannot be changed without first becoming knowledgeable on the reason for the change, they need to be trained, and any barriers preventing the change must be identified and addressed. One study showed behavior was effectively changed by asking the person questions to establish the current level of knowledge and ensure understanding (Arlinghaus & Johnston, 2018).

Healthcare Clinicians' Behaviors and IF

One of the most important aspects when managing a patient is the patient-provider relationship (Ward, 2018). This relationship is built on trust and communication. It is one feat to obtain all the necessary knowledge to properly and safely care for a patient, but the real challenge is faced when this knowledge must be communicated to the patient in a manner they can understand and that is relatable. A study conducted by Amin et al. (2019), focused on patients' communication with clinicians regarding Ramadan fasting and found a lack of understanding of fasting by the clinicians and/or the recommendation not to fast would usually not prevent the patients from participating in the fast; it would simply result in an avoidance of the topic by the patient with the provider (Amin et al., 2019). Patients also reported the

avoidance of the topic of fasting during a consultation was perceived as approval to participate in fasting (Amin et al., 2019).

Patient-centered interviewing is a fundamental part of the communication process, allowing patients to share the decision making when it comes to managing their care. This involves well-developed communication skills, including active listening, which are an important part of the communication process and help strengthen the patient-provider relationship. By providing patients with the time to ask questions and actively listening to them, they can have the confidence to fully express their needs and concerns. A barrier "providers" frequently incur— many times unintentionally—is the feeling of a lack of time resulting in the patient feeling rushed. This barrier can result in decreased patient satisfaction.

The Proposed Solution

The proposed solution is to assess if an evidence-based education program on IF changes healthcare clinicians' knowledge, attitudes, confidence level, perceptions, and behaviors when communicating with adult patients in a clinical setting. This educational program intends to assess providers' baseline knowledge on IF as an effective method for weight loss in appropriate populations prior to the program—and use the knowledge gaps to create an evidence-based program on IF to increase their knowledge, attitudes, confidence, perception, and behaviors of IF for the management of obesity. This project also intends to improve the clinician's ability to communicate evidence-based information about IF in obese adults seeking healthcare services.

Summary of Literature/ Evidence Related to the Clinical Question

The literature review for this project was performed with the intent to provide information about the selected topic, help answer the PICO question, and reveal any gaps in the present evidence. This review is comprised of articles each contributing to the PICO question—

as no single article could solely address the PICO question. The purpose of this literature review is to assess healthcare providers knowledge, attitudes, and behaviors of time-restricted-feeding (TRF).

The databases utilized for the primary literature search included *PubMed*, *Medline,* and *CINAHL Plus*. The primary literature search terms included "intermittent fasting" or "alternate day fasting" or "time restricted feeding"; and "obesity" or "overweight" or "fat" or "obese" or "unhealthy weight" or "high bmi" or "weight loss" or "cancer" or "diabetes" or "cardio" or "metabolic" or "liver." Boolean and phrase search terms were used. Search limitations included articles published between 2017 and 2022, written in English, full text access, peer reviewed, the adult population, non-pregnant, human subjects, and a title including "intermittent fasting" or "alternate day fasting" or "time restricted feeding."

PubMed resulted in 31 articles. *CINAHL Plus* with full text resulted in 36 articles. *Cochran Library* generated 1 article. A total of eight articles between *CINAHL* and *PubMed* were duplicates. No grey literature was searched. When the additional filter of "systematic review" or "meta-analysis" or "randomized control trial" were added, the results were *CINAHL* [16 articles], *Cochrane* [1 article], and *PubMed* [1 article]. The search generated a total of 18 academic journal articles, and of those articles 10 were used in this literature review.

The database utilized for the secondary literature search was the FIU *Discover Database*. The secondary literature search terms included "intermittent fasting" or "alternate day fasting" or "time restricted feeding"; and "physician" or "provider" or "practitioner"; and "knowledge." Boolean and phrase search terms also were used. Search limitations—as in the primary search— included similar parameters: articles published between 2017 and 2022, articles written in English, full text access, peer reviewed, the adult population, non-pregnant, human subjects, and

a title including a word/phrase from each subset of the search terms. A total of three academic journal articles resulted, two were used in the literature review.

The database utilized for the tertiary literature search was the FIU *Discover Database*. The tertiary literature search terms included "educational intervention"; and "physician" or "provider" or "practitioner"; and "knowledge." Boolean and phrase search terms were once again using the same search limitations as the primary and secondary searches: articles published between 2017 and 2022, articles written in English, full text access, peer reviewed, the adult population, non-pregnant, human subjects, and a title including a word/phrase from each subset of the search terms. A total of 15 academic journal articles resulted, of those articles, four were used in the literature review.

Inclusion Criteria

The inclusion criteria for the primary literature search included research articles with a level of evidence of one or two and peer reviewed. The level one evidence articles were also secondary research articles and included systematic reviews and meta-analyses. The level two evidence articles were primary research articles and included randomized control trials. The inclusion criteria comprised of articles published between 2017-2022 and study participants over the age of 18 years old. The articles selected had to include "intermittent fasting" or "alternate day fasting" or "time restricted feeding" in the title and be a systematic review, meta-analysis, or randomized control trial.

Exclusion Criteria

In this literature review, articles were excluded if they did not include information specific to intermittent fasting or they were not written in English. Publications that were not full text were excluded. Duplicate articles were also excluded.

Literature Review Findings

The initial search generated a total of 68 articles: *PubMed* (n=31*); CINAHL* (n=36); and *Cochrane Library* (n=1). After inclusion and exclusion criteria were met, 10 full-text articles were analyzed in the literature review—specifically three systematic reviews with meta-analysis and seven randomized control trials.

Review of the Literature

The overall theme the articles discovered in the primary search were centered on intermittent fasting and its effects on weight loss and the metabolic profile. Other themes addressed in the primary search included how IF effected sleep quality, quality of life, cognition, mood, eating behaviors and cardiovascular risk factors. The overall theme the articles discovered in the secondary search were centered on the knowledge gap providers have regarding managing patients who practice intermittent fasting. The overall theme the articles discovered in the tertiary search were centered on educational interventions utilized to address healthcare providers knowledge, attitudes, and behaviors. The articles from the tertiary search do not pertain to IF, as there are currently no articles studying educational interventions and IF. The articles that will be discussed will focus on the effects of IF as discovered in the primary literature search and those discovered in the secondary literature search addressing the knowledge gap among healthcare providers regarding IF and the educational interventions discovered in the tertiary search. Overall, many articles found that IF has been proven to have beneficial effects on weight loss and the metabolic profile and there is currently a knowledge gap among providers in relation to IF and educational interventions can help reduce knowledge gaps among healthcare providers.

Theme 1: Intermittent Fasting and Weight Loss

Intermittent fasting has been shown to influence body weight as demonstrated by multiple randomized control trials and systematic reviews with meta-analyses. Ravussin et al. (2019), conducted a randomized control trial with 11 overweight adults to determine if time restricted feeding (TRF) would cause wight loss by decreasing appetite and increasing fat metabolism without affecting energy expenditure. Participants were divided into a control group who ate three scheduled meals between 8:00am and 8:00pm daily (12 hour feeding period), while the experimental group ate the same three meals between 8:00am and 2:00pm (6 hour feeding period) (Ravussin et al., 2019). The researchers found early TRF can cause weight loss by reducing appetite (Ravussin et al., 2019). The researchers also found the timing of food intake did not affect energy expenditure (Ravussin et al., 2019).

A similar randomized control trial was conducted by Isenmann et al. (2021), on 42 physically active adults to compare time restricted feeding to a macronutrient-based diet and how they affect body composition. The TRF group had an 8-hour feeding period with a 16-hour fasting period, while the other group consumed a macronutrient-based diet with 80% of the foods consumed being unprocessed and the other 20% could be processed foods (Isenmann et al., 2021). The study discovered both groups had similar effects on BMI, body mass, lean body mass, body weight, body fat percentage, waist and hip circumference, and fat mass (Isenmann et al., 2021). The researchers found TRF to have a lower adherence rate but found this factor to have no effect on the end results (Isenmann et al., 2021). Overall, the researchers' stated participants were accepting of both dietary strategies (Isenmann et al., 2021). The researchers concluded both methods can effectively reduce body weight, BMI, fat mass, and waist and hip circumference (Isenmann et al., 2021).

To further examine the relationship between intermittent fasting and obesity, Harris et al. (2018), conducted a systematic review and meta-analysis on six studies analyzing how intermittent fasting affects body weight in overweight or obese adults. The fasting groups included fasting for two days per week, alternate day fasting, and fasting up to four days each week (Harris et al., 2018). The meta-analysis revealed IF was effective for weight loss compared to the control groups (Harris et al., 2018). The study found IF and continuous energy restriction had no significant difference in weight loss (Harris et al., 2018). The researchers concluded IF is an effective method for weight loss in overweight or obese adults but advise caution in the result interpretation—as there were few studies to analyze (Harris et al., 2018). Harris et al. (2018), advise more research is needed to confirm these results.

To further compare different types of intermittent fasting, Chair et al. (2022), conducted a randomized control trial on 101 overweight or obese, prediabetic adults to determine if time restricted feeding (TRF) or alternate day fasting (ADF) would affect weight loss or the cardiometabolic profile. Participants were divided into three group, a TRF group who would have an 8-hour feeding period with a 16-hour fasting period, and ADF group, and a control group (Chair et al., 2022). The study found both the TRF and ADF groups experienced a greater amount of weight loss, reductions in triglycerides, blood glucose levels, LDL cholesterol, and waist circumference compared to the control group (Chair et al., 2022). The researchers did find ADF to have a slight benefit in weight loss and reduced BMI over TRF (Chair et al., 2022). Chair et al. (2022), concluded both ADF and TRF can potentially reduce the risk of cardiovascular disease and diabetes.

Theme 2: Intermittent Fasting and Metabolic Analysis

The following randomized control trials and systematic reviews with meta-analysis demonstrate the effects IF has on metabolic parameters. Parr et al. (2020), conducted a randomized control trial on 13 overweight or obese sedentary men. The goal of this experiment was to compare different time constraints of time restricted feeding (TRF) and determine how if affected blood glucose levels and dietary adherence (Parr et al., 2020). The study found short term TRF resulted in improved overnight blood glucose control compared to extended TRF (Parr et al., 2020). The study also observed participants expressed positive attitudes towards TRF and had an improved sense of well-being (Parr et al., 2020). Parr et al. (2020), described barriers to TRF that included family commitments, social events, and work schedules.

To add to the previous randomized control trial, Pureza et al. (2021), conducted a systematic review with meta-analysis on ten articles derived from nine randomized clinical trials to determine how early TRF affects the metabolic parameters of overweight or obese adults. The study found early TRF resulted in a significant reduction in fasting blood glucose, but no effect on ghrelin, lipid, or insulin levels (Pureza et al., 2021). In weight maintenance program groups, the researchers noted an increase in total cholesterol among TRF versus a control group (Pureza et al., 2021). The researchers advise caution with the results of this review as three studies demonstrated a high risk of bias, while seven studies had very low or low quality of evidence (Pureza et al., 2021). The researchers recommend further research to confirm these findings (Pureza et al., 2021).

Hutchison et al. (2019), conducted a randomized crossover trial on 15 overweight or obese men with an increased risk of developing type II diabetes to determine if TRF would affect glucose tolerance. Participants were divided into two groups, an early TRF group with a nine-

hour feeding period between 8:00am and 5:00pm and a late TRF group with a nine-hour feeding

period between 12:00pm to 9:00pm (Hutchison et al., 2019). The study found early TRF lowered

fasting glucose levels and found TRF, regardless of time window, had a positive effect on

glycemic response (Hutchison et al., 2019).

A similar randomized control crossover study was conducted by Jamshed et al. (2019), to

determine if early time restricted feeding would improve blood glucose levels, and how it would

affect autophagy, aging, and the circadian clock. The study was conducted on 11 healthy men

and women (Jamshed et al., 2019). The study found early TRF lowered glucose levels, improves

the cortisol rhythm, and affected beneficial genes and hormones responsible for autophagy and

longevity (Jamshed et al., 2019). The researchers ascertained early TRF had a positive effect on

cardiometabolic health, affect diurnal rhythms, and suggest possible anti-aging benefits (Jamshed

et al., 2019).

Theme 3: Intermittent Fasting and Other Physiologic and Psychologic Factors

A study was completed to determine if IF impacts others quality measures. Teong et al.

(2021), conducted a randomized control trial on 46 overweight or obese adult women to

determine if intermittent fasting or a calorie restricted diet would affect cognitive performance,

eating behaviors, quality of life, sleep quality, or mood. The fasting group would fast for 24

hours three days per week while the calorie restricted group would consume 70% of their

calculated energy requirement (Teong et al., 2021). The study determined there was no statistical

difference between both groups in relation to cognitive abilities, quality of life, quality of sleep,

mood, or eating behaviors (Teong et al., 2021).

Theme 4: Intermittent Fasting and Cardiovascular Disease

      IF has various effects on the human body triggering researchers to analyze how IF affects risk factors for cardiovascular disease. Allaf et al. (2021), conducted a systematic review and meta-analysis on 18 studies encompassing 1125 participants to determine if intermittent fasting (IF) can prevent cardiovascular disease. The review established IF to have beneficial short-term effects on weight loss, like the short-term results achieved with continuous caloric restriction (Allaf et al., 2021). The researchers reported the level of evidence from these studies is very low and low and they recommend further research to determine long-term outcomes, the populations who would benefit from IF, and how IF affects myocardial infarction and overall mortality (Allaf et al., 2021).

Theme 5: Knowledge Gap of Intermittent Fasting Among Healthcare Providers

      There is currently little data available analyzing healthcare providers knowledge, attitudes, and behaviors regarding IF. Much of the information obtainable pertains to Ramadan, which is the holy practice of fasting in Islamic culture. Hamodat et al. (2020), conducted a pilot program aimed at determining the comfort level, perception, and knowledge of primary care providers (PCPs) in managing patients who fast during Ramadan. Hamodat et al. (2020), used a 16-item anonymous questionnaire to assess these qualities. Hamodat et al. (2020), found most providers acknowledged the importance of fasting during Ramadan and how it could impact their patients' health, but many reported a lack of knowledge pertaining to this subject. Hamodat et al. (2020), reported the bulk of the providers felt they were inadequately trained on this subject and felt uncomfortable managing and counseling patients participating in Ramadan. Hamodat et al. (2020), concluded there is a knowledge gap among PCPs pertaining to managing patients during Ramadan.

Another study was conducted to analyze healthcare providers perceptions on a knowledge gap in managing a specific patient population fasting during Ramadan. Beshyah et al. (2021), conducted an online survey of 260 physicians across 27 countries to assess perceptions and knowledge gaps of physicians managing diabetic patients fasting during Ramadan. The study indicated providers acknowledge the presence of a knowledge gap and expressed a need for more randomized clinical trials and other studies (Beshyah et al., 2021).

Theme 6: Educational Interventions

An educational intervention can aid in altering a provider's knowledge, attitudes, and beliefs on a topic. Mydin et al. (2021), conducted a systematic review to assess the effectiveness of an educational intervention on increasing primary health care providers identification, knowledge, and management pertaining to elder neglect and abuse (ENA). A total of ten observational studies and three randomized control trials were selected for the study (Mydin et al., 2021). The educational intervention methods included simulation-based training, face-to-face, online training, and videos (Mydin et al., 2021). The study showed all educational interventions improved levels of knowledge pertaining to ENA (Mydin et al., 2021). The researchers also determined one online training module did not demonstrate a significant improvement and suggest interactive teaching modules as they were shown to have improved outcomes (Mydin et al., 2021).

To further add to the previous systematic review, Jackson et al. (2018), conducted an online educational intervention with the goal of improving primary care providers and rheumatologists' knowledge of SLS disease flares and possible treatment options. A pre- and post- assessment were completed prior to and after the 30-minute online video slide presentation

(Jackson et al., 2018). The researchers concluded the online video presentation significantly improved the participants knowledge on the topic (Jackson et al., 2018).

Similarly, a study by Redmond et al. (2019), was conducted to assess how an educational intervention would affect providers confidence and knowledge in the recognition and treatment of anaphylaxis (Redmond et al., 2019). The researchers developed a narrated online module and a pre- and post-survey as well as a simulation to analyze the effectiveness of the intervention (Redmond et al., 2019). The study indicated both the online module and the simulation improved providers knowledge after completing the intervention, while only the simulation improved confidence, and only the online module improved atypical anaphylaxis recognition (Redmond et al., 2019).

Summary of Literature

Obesity is a worldwide epidemic, steadily flourishing as countries experience economic growth and increased trade. As the obesity rates increase the cost of obesity is ensuing, waging war on the physical, emotional, and mental health of obese individuals as well as increasing healthcare expenditures on obesity related issues. Although obesity is multifactorial influencing multiple body systems, insulin resistance is a major factor in weight gain and a risk factor for the development of various diseases. Intermittent fasting is a method to reduce insulin levels, reduce body weight, and elicit numerous other health benefits. Currently, there is little available information measuring the current level of knowledge among healthcare providers regarding IF, but of the available information, a knowledge gap was described. To reduce this knowledge gap, an educational program on intermittent fasting will be developed with the goal of altering healthcare providers knowledge, attitudes, confidence level, perception of knowledge, and behaviors pertaining to IF in the treatment of obese adults.

Research Question and Hypotheses

Will an evidence-based education program on intermittent fasting (I) change healthcare clinicians' (P) knowledge, attitudes, confidence levels, perception of knowledge, and behaviors in how they communicate with obese adult patients about IF (O) as a possible treatment for obesity compared to before the program (C)?

Ho1: The evidence-based educational program on intermittent fasting will change participants knowledge, attitudes, confidence, perception of knowledge and behaviors of IF as a possible treatment for obesity.

Ha1: The evidence-based educational program on intermittent fasting will have no effect on participants knowledge, attitudes, confidence, perception of knowledge and behaviors of IF as a possible treatment for obesity.

Purpose

The purpose of this project is to help healthcare clinicians develop the knowledge and skills to provide safe, effective, and patient-centered dialogue with patients when addressing IF in clinical practice. To achieve this goal, an educational intervention with evidence-based information will be provided will aim to fill the knowledge gaps revealed on the pre-test survey, to provide other pertinent evidence-based information, to debunk common IF myths, and to facilitate effective communication strategies to help improve HCCs knowledge, attitudes, and confidence of IF in clinical practice settings.

Definition of Terms

Obesity: Obesity is the condition of having excessive amounts of fat on the body presenting a potential health risk

Intermittent Fasting (IF): a dietary regimen restricting caloric intake for a specific period of time, followed by ad libitum feeding during non-fasting (Chair et al., 2022; Varady, 2021).

Time Restricted Feeding: a type of intermittent fasting limiting caloric intake to a specific time period each day (i.e., 4 to 10 hours of the day) with the remaining hours of the day spent fasting (Chair et al., 2022; Isenmann et al., 2021).

Alternate Day Fasting: a type of intermittent fasting restricting calories on fasting days with ad libitum feeding resumed on feeding days (Chair et al., 2022).

5:2 Fasting: a type of intermittent fasting consisting of consuming a regular diet five days of the week with any two days of the week reserved for no caloric intake or a limited caloric intake (i.e., 500kcal for women and 600kcal for men) (Harris et al., 2018).

Overfeeding: the notion of feeding or eating to excess (Merriam-Webster, n.d.-b)

Insulin: a hormone released from the pancreas to aid in the use and storage of blood glucose (American Diabetes Association, n.d.)

Diet: a habitual nourishment, or an amount and type of food prescribed for a reason, or the reduction in consumption of food and/or beverages to reduce weight (Merriam-Webster, n.d.-a)

Food restriction: an altering of the food and beverages consumed

Metabolic Syndrome: a group of metabolic abnormalities including central obesity, hypertension, atherogenic dyslipidemia, and insulin resistance (Vrdoljak et al., 2022).

Autophagy: a process of cellular homeostasis involving the intracellular breakdown and recycling of misfolded proteins and damaged organelles (Antunes et al., 2018).

Theoretical Framework

Awad and Ghaziri's (2004) knowledge management lifecycle (KML) framework was

used as a guide to provide structure for the project. This project is based on the effectiveness of

converting information into knowledge (Awad & Ghaziri, 2004) and how this potential

knowledge will affect their attitudes, and confidence levels regarding the topic, which in this

case is IF. The KML framework consists of four processes, which include knowledge capturing,

organizing, refining, and transferring (Shongwe, 2016). Each of these phase's cycle through

building on and strengthening the foundation. The idea of this project is to create a foundation of

knowledge of IF for those who are unfamiliar with IF and reinforce and build on the current

knowledge for those who are familiar with IF.

Conceptual Model

Figure 1 depicts the conceptual model designed to illustrate how the theoretical

framework was utilized to guide this quality improvement project. At the center of the

conceptual model is the educational intervention, which is radiating outwards to the four

processes of the KML framework. The cycle after the educational intervention begins with

knowledge capturing, which is the process of absorbing new information. The next step is the

processing of organizing this new information, which involves linking the new information to

previously known information and organizing it into a way that is understandable for the

individual. This step is followed by the process of refining the information by filling in any

missing information to bridge knowledge gaps. The final step in this process is the transferring

phase, which involves sharing the knowledge with others. This cycle is utilized by the

individuals comprising of each of the five points of the star and includes physicians, APRNs,

PAs, nutritionist/dieticians, and nursing staff. Each of these five groups of individuals are interconnected via inter-collaboration between each of the different disciplines.

Figure 1

Conceptual Model
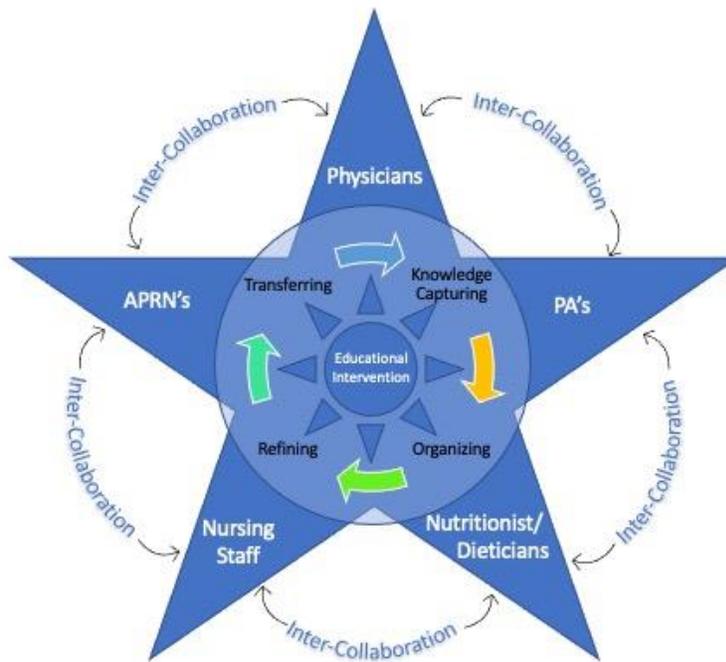
Note. The figure depicts the conceptual model designed to illustrate how the theoretical framework was utilized to guide the quality improvement project.

Methodology

Setting and Participants

The clinical immersion site for this project is the *University of Miami's Sylvester Comprehensive Cancer Center* (SCCC) located in Miami, Florida. The SCCC has 560 beds and treats both local and international patients from 84 countries. Scientists, physicians, nurse

practitioners, physician assistants, nurses, dieticians/nutritionists, and other clinical and non-clinical professionals are involved in over 288,000 outpatient visits, 1,300 inpatient admissions, about 2,500 surgical procedures, and manages over 4,400 new cancer patients each year. Some of the specialties include hematologic (blood) cancers, breast cancer, liver cancer, skin cancer, and gynecologic cancers.

The area of focus for this study will include the Hematology clinic, where patients are regularly managed before, during and after treatment during a five-year observation period; and the comprehensive treatment unit, where patients are treated with various cancer management strategies. Both locations are ideal for this quality improvement projects as the participants, depending on their current treatment status, have an excellent opportunity to be educated by staff members.

Physicians (Medical Doctors (MDs) and Doctor of Osteopathic Medicine (DOs)), nurse practitioners (APRNs), physicians' assistants (PAs), nutritionists/dieticians, and other clinical and non-clinical professionals were recruited to participate in this study. The inclusion criteria for this study includes (1) active employment at the University of Miami, (2) must be an MD, DO, APRN, PA, nutritionist/dietician, or nursing staff, (3) must be 18 years of age or older, (4) must agree to participate in the project. The exclusion criteria includes: (1) individuals not actively employed by the University of Miami, (2) individuals who are not an MD, DO, APRN, PA, nutritionist/dietician, or nursing staff, (3) under the age of 18 years old, (4) individuals who choose not to participate, and (5) those who are currently pregnant.

Procedures

The project began by acquiring permission from administrators and leaders at the practice site to provide the educational program to nurses working at the site. The site letter of support

can be found in Appendix C. Once approval for the project was obtained, Institutional Review

Board (IRB) approval for the project was sought from Florida International University (FIU) and

the University of Miami (UM) Appendix A & Appendix B includes the IRB approval letter from

FIU and UM that was granted on May 11th, 2022 and June 13th, 2022. No recruitment or practice

change activities could be undertaken until IRB approval confirmed the ethical soundness of the

project. Following IRB approval for the project, recruitment of nurses at the practice site began.

Study Design

To apply the evidence in practice such that a tangible impact on patient and community

health and care quality can be made, it was necessary to operationalize the evidence through the

selection of a methodology to implement practice change. A review of the purpose and PICO

question developed for this project indicates that an educational intervention educating health

care clinicians combined with a pre- and post-assessment of provider knowledge, attitudes,

confidence level, perception of knowledge, and behaviors would be beneficial to assess

outcomes from the intervention. The methodology did not use a control, and comparison for the

project included an assessment of baseline and post-survey knowledge, attitudes, confidence

level, perception of knowledge, and behavior scores of the project's participants; therefore, a

quantitative methodology was utilized. Since participants for this QI project were not randomly

selected and were voluntarily selected from a group of clinicians currently working at a single

healthcare site (i.e., SCCC), a quasi-experimental methodology was used.

Recruitment

For the recruitment process, participants were invited to participate by convenience

sampling of various units/clinics at the SCCC. A poster (Appendix B) was placed in the

Hematology clinic and the comprehensive treatment unit (CTU) two weeks prior to distribution

of the pre-survey. Some SCCC employees also participated by snow-ball sampling. Recruitment

of participants occurred over a two-week period and involved outreach using word of mouth and

posters to provide the HCCs with some background information regarding the quality

improvement project (Appendix D). In total, 20 HCCs, including 17 nurses and 3 unit staff,

currently working in the clinical setting agreed to participate in the project.

Intervention

To assess HCC's knowledge, attitudes, confidence level, perception of knowledge, and

behaviors prior to the intervention, a pre-survey was completed by the HCC's before the

education intervention. The educational intervention was a live presentation completed in person.

The educational seminar consisted of a 20-minute PowerPoint presentation followed by 10

minutes for questions and answers. This educational intervention was designed with the goal of

closing the knowledge gap of IF among healthcare clinicians to promote safe patient-clinician

communication about IF. The pre- and post- surveys were identical and used to assess a change

before and after the intervention. Participants were located and provided the post-survey two

weeks later. Participants were instructed to leave the surveys in a secure location for pickup.

When a post survey was delivered to the intended participant, their name was removed from the

list. The QI project was completed over three-weeks.

Ethics and Protection of Human Subjects

Prior to beginning any research procedures, the consent process was initiated. If any

questions arose, the study team was readily available to assist. No individual was forced or

persuaded to participate in the study in any way and participants were free to withdraw at any

time. Consent was voluntarily obtained prior to initiating the study. Consent was be obtained

verbally as participants were verbally informed of the aspects of the study prior to beginning the

pre-survey. Due to the nature of this study, evidence of consent to participate in the study was fulfilled on completion of the pre-survey for the study.

Potential Risks

This study is expected to result in minimal risks, if any, as the study will not place the participants at risk of liability, or be damaging to participants employability, reputation, educational advancement, or financial standing. The pre- and post- surveys will be completed anonymously. Participants can choose to not participate and/or withdrawal from the study at any time.

Potential Benefits

The participants who voluntarily choose to participate in the pre- and post- surveys and educational intervention are unlikely to experience a direct benefit from presented material but may benefit others by the newly obtained knowledge. This study aims to fill knowledge gaps and debunk common myths associated with IF. Participation in the study has the potential to provide valuable data for the general population.

Timeline

The following timeline served as a guide for this quality improvement project:

- Week 1: the pre- and post- survey were developed

- Week 2: the PowerPoint presentation was developed

- Week 3-4: the pre- survey and PowerPoint presentation were presented to participants over a two-week period. A list of names of participants were collected and stored until the post-survey was administered to ensure the same participants were surveyed.

- Week 5-6: the post survey was completed by participants who participated in the pre-survey and educational intervention. The list of names collected during week 3 was eradicated at the end of the week.

- Week 7 to 9: Data was uploaded to Microsoft Excel and analyzed. All surveys were destroyed.

Data Collection

For this study, a pre-survey was completed before the educational intervention and a post-survey was provided two-weeks after the educational intervention. The survey comprised of 30 questions utilizing multiple choice and the Likert Scale (appendix E). The survey was designed for both pen and paper distribution for in person presentations, and in Qualtrics for virtual presentations. A demographic survey was used to obtain a descriptive understanding of those participating in the study and included general information such as gender, age range, ethnicity, clinical position, and education level (Appendix E). Additionally, HCCs knowledge, attitudes, confidence levels, perception of knowledge, and behaviors were also measured.

The first five questions identify demographics. They include the following data: (1) clinical training (i.e., physician, APRN, PA, nutritionist/dietician, nurse, or other clinical and non-clinical professionals); (2) age range (i.e., 18-24, 25-40, 41-56, 57-75, and 76+ years of age); (3) gender (i.e., male, female, and prefer not to answer); (4) education level (i.e., Associates, Bachelors, Masters, and Doctorate/PhD.) and; (4) ethnicity (i.e., American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian/Other Pacific Islander, White, and prefer not to answer).

The next five questions assessed knowledge and consisted of multiple-choice selections. Each correct answer in the knowledge section will receive one point. The remaining 20 questions

assessed attitudes, perception of knowledge, confidence level, and behaviors and utilized the

Likert Scale. The Likert Scale selected for this project consists of a five-point scale including

responses of strongly agree, agree, neutral/unsure, disagree, and strongly disagree. The responses

on the Likert Scale received one point for each response. The pre- and post- surveys will be

scored with a percentage with a mean score calculated for each. The pre- and post- survey mean

percentages were compared to assess for improvement.

The Likert Scale is one of the most popular and fundamental scaling technique widely

used in research to assess an individual's predisposition (Taherdoost, 2019). Research has shown

the re-test reliability of the Likert Scale increases with higher point options (i.e., 7 to 10-point

options) and decreases with lower point options (i.e., 3-point options) (Taherdoost, 2019). The

validity of the Likert Scale was also shown to improve with higher point scales (i.e., 11-point

scales) and decreased with lower point scales (i.e., 3-to-4-point scales) (Taherdoost, 2019).

Respondents who have utilized the Likert Scale have reported 7-point scales make the survey

more ambiguous, interesting, and accurate, while also reporting 2-point scales are easier to

complete (Taherdoost, 2019). A pre-/post-test was specifically created for this project (Appendix

E).

Data Management

The only identifying information collected on the pre- and post- surveys was employee

position (i.e., MD, DO, APRN, PA, nutritionist/dietician, or nursing staff member). A list of

participants first and last names only were collected to ensure delivery of the post- survey two-

weeks after the educational intervention. This list was stored in a protected location and only

accessible to qualified individuals with need for access. This list of names and the surveys had

no identifiable or linkable factors to identify which survey belongs to which individual. The list

was destroyed after the post-surveys were administered. The data collected via the pen and paper surveys were entered in Microsoft Excel for data analysis. Once the study was complete, all the surveys were destroyed. The EBP project data was stored in a password-secured computer only accessible to the student. The project data was stored until the end of the project then destroyed.

Data Analysis

Data and analysis were obtained from the results of the pre and post survey. Data analysis for the project began with a descriptive evaluation of the demographic data collected for the project. Demographic data collected was tabulated and compared including frequency, mean, and standard deviation. This data provided a comprehensive overview of the characteristics of the sample. Descriptive data analysis including mean and standard deviations were be used to assess scores from the pre- and post-tests. This provided information regarding the directionality of the scores: i.e., if they increased or decreased. Because of the small size of the sample, (n= 20), it was not possible to demonstrate that the data collected was normally distributed (LaMorte, 2016). A paired sample t-test was completed to determine if the differences between the pre- and post- survey means were statistically significant (Kent State University, 2022). Cohen's D was used to calculate the effect size of each data set (Glen, 2022).

Results

The results of the pre/post-test survey were compared to evaluate the project's impact. Inferential statistics were used to analyze and interpret the data. Percentage and frequencies were obtained and then compared between pre-surveys and post-surveys. The data collected regarding the participants knowledge, attitudes, confidence levels, perception of knowledge, and behaviors were collected anonymously.

Demographics

Pre-Intervention Sample

Table 1 illustrates the demographic data. Of the 20 healthcare clinicians who participated in the pre-survey, 17 (85%) were female, and 3 (15%) were male. A total of 2 (10%) were between the ages of 18-24, 6 (30%) were between the ages of 25-40, 9 (45%) were between the ages of 41-56, 1 (5%) were between the ages of 57-75, 0 (0%) were over the age of 75, and 2 (10%) did not complete the question. Seven (35%) participants obtained an associate degree, 10 (50%) obtained a bachelor's degree, 1 (5%) obtained a master's degree, 0 (0%) of the participants obtained a doctorate/PhD, and 2 (10%) did not complete the question. Three (15%) participants were unit staff, while 17 (85%) were nurses. No APRN's, PA's or MD/DO's participated in the project. One (5%) participant identified as Asian ethnicity, 1 (5%) as black/African American, and 18 (90%) as Hispanic/Latino. The majority of the participants were nurses, n= 85%

All the participants who completed the pre-survey and educational intervention also completed the post-survey. Most of the demographic data collected was the same with the following exceptions: One additional participant did not response the age question as well as the education level question. Two participants did not respond to the clinical position question. For the ethnicity question one participant changed their ethnicity selection from Hispanic/Latino to white, and one did not respond to the question.

Table 1

Pre- and Post- Intervention Demographic Data

Demographic	Pre- Survey Count	Pre-Survey Percent	Post- Survey Count	Post-Survey Percent
Gender:				
Male	3	15%	3	15%
Female	17	85%	17	85%
Age:				
18-24	2	10%	2	10%
25-40	6	30%	6	30%
41-56	9	45%	8	40%↓
57-75	1	5%	1	5%
75+	0	0%	0	0%
No response	2	10%	3	15%↑
Education:				
Associates	7	35%	6	30%↓
Bachelors	10	50%	10	50%
Masters	1	5%	1	5%
Doctorate/PhD	0	0%	0	0%
No response	2	10%	3	15%↑
Clinical Position				
Unit Staff	3	15%	3	15%
Nurse	17	85%	15	75%↓
APRN	0	0%	0	0%
PA	0	0%	0	0%
MD/DO	0	0%	0	0%
No response	0	0%	2	10%↑
Ethnicity				
American Indian/Ak	0	0%	0	0%
Asian	1	5%	1	5%
Black/African American	1	5%	1	5%
White	0	0%	1	5%↑
Hispanic/Latino	18	90%	16	80%↓
Native Hawaiian/Pac	0	0%	0	0%
No response	0	0%	1	5%↑

Note: ↑ = Increase in percent change, ↓ = Decrease in percent change

Pre- and Post- Survey Results

Knowledge

The hypothesis is the educational intervention will improve participants knowledge of IF. The null hypothesis is the educational intervention will have no effect on participants knowledge of IF. The data collected from the knowledge portion of the pre- and post- survey are illustrated in **Table 2.**

Table 2

Participant's Knowledge of Intermittent Fasting Pre- and Post- Survey

Question	Pre-Survey	Post-Survey	% Change
All of the following are types of intermittent fasting except:			
Alternate day fasting	0 (0%)	2 (10%)	10%↑
5:2 method	2 (10%)	0 (0%)	10%↓
*Negative energy balance	7 (35%)	12 (60%)	5%↑
Time restricted feeding	0 (0%)	2 (10%)	10%↑
Modified alternate day fasting	1 (5%)	0 (0%)	5%↓
I don't know	10 (50%)	2 (10%)	40%↓
No response	0 (0%)	2 (10%)	10%↑
Intermittent fasting should be avoided by all the following individuals except:			
Pregnant/breast feeding	2 (10%)	0.25 (1.25%)	8.75%↓
History of eating disorder	2 (10%)	0.25 (1.25%)	8.75%↓
< 18 years old	0 (0%)	0.25 (1.25%)	1.25%↑
Underweight	0 (0%)	0.25 (1.25%)	1.25%↑
*All of the above	11 (55%)	18 (90%)	35%↑
I don't know	5 (25%)	1 (5%)	20%↓
Intermittent fasting can reduce all the following except:			
Weight	1 (5%)	0.25 (1.25%)	3.75%↓
Triglycerides	1 (5%)	0.25 (1.25%)	3.75%↓
Blood glucose levels	1 (5%)	1.25 (6.25%)	1.25%↑
*Uric acid levels	6 (30%)	13.25 (66.25%)	36.25%↑
LDL cholesterol	1 (5%)	1 (5%)	0%
I don't know	9 (45%)	1 (5%)	40%↓
No response	1 (5%)	3 (15%)	10%↑
Intermittent fasting can:			
Decrease insulin sensitivity	4 (20%)	8 (40%)	20%↑
Increase insulin resistance	1 (5%)	3 (15%)	10%↑
*Induce autophagy	1 (5%)	5 (25%)	20%↑
Increase glucose levels	1 (5%)	0 (0%)	5%↓
Induce fatty liver disease	1 (5%)	0 (0%)	5%↓
I don't know	12 (60%)	3 (15%)	45%↓
No response	0 (0%)	1 (5%)	5%↑

Table 2 (continued)

Participant's Knowledge of Intermittent Fasting Pre- and Post- Survey

Question	Pre-Survey	Post-Survey	% Change
In individuals undergoing chemotherapy, initial studies have shown short term intermittent fasting to be well tolerated and helps to:			
Reduce fatigue	0 (0%)	0.33 (1.65%)	1.65%↑
Reduce toxicity	0 (0%)	0.83 (4.15%)	4.15%↑
Protect healthy cells	0 (0%)	0 (0%)	0%
Reduce side effects	2 (10%)	0.83 (4.15%)	5.85%↓
*All the above	9 (45%)	15 (75%)	30%↑
I don't know	9 (45%)	3 (15%)	30%↓

Note: % Change = Percent Change, ↑ = Increase in percent change, ↓ = Decrease in percent

change, * Expected result

      Two-Tailed Paired Samples t-Test. To determine if the knowledge score of the

participant's pre-survey and post-survey results were significant, a two-tailed paired samples t-

Test was completed. The two-tailed paired samples t-test with an alpha value of 0.05, $t(19) =$

4.2699, $p < 0.0001$, indicating the null hypothesis can be rejected. The mean values of the

knowledge portion of the pre- and post- surveys were significantly different. The results are

illustrated in **Table 3**. The effect size was calculated with Cohen's d and found to be 1.35

meaning there was a large effect. The mean pre- and post- survey scores are illustrated in **Figure**

2.

Table 3

Two-Tailed Paired Samples t-Test Comparing the Pre-Survey and Post-Survey Knowledge of IF

Pre-Survey		Post-Survey				
M	SD	M	SD	*t*	*p*	*d*
6.8	3.77	12.65	4.83	4.2699	<0.0001	1.37

Note. N = 20. *D* represents the standard error of difference.

Figure 2

Pre- and Post- Survey Knowledge
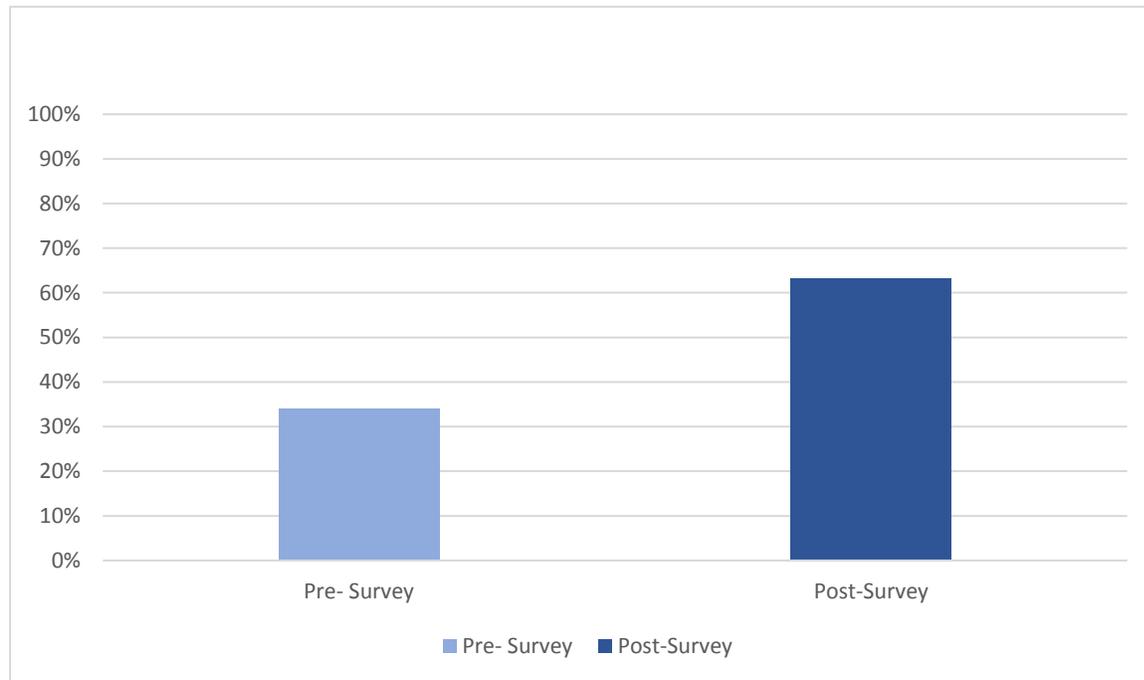
Attitudes

The hypothesis is the educational intervention will improve participants attitudes of IF.

The null hypothesis is the educational intervention will have no effect on participants attitudes of

IF. The data collected from the attitudes portion of the pre- and post- survey are illustrated in

Table 4.

Table 4

Participant's Attitudes of Intermittent Fasting Pre- and Post- Survey

Question	Pre-Survey	Post-Survey	% Change
Overall, nutrition is an important part of my patient's health management.			
Strongly Agree	15 (70%)	13 (65%)	15%↓
Agree	5 (25%)	5 (25%)	0%
Neutral	0 (0%)	1 (5%)	5%↑
Disagree	0 (0%)	0 (0%)	0%
Strongly Disagree	0 (0%)	1 (5%)	5%↑
No response	0 (0%)	0 (0%)	0%
Overall, I have a positive attitude towards intermittent fasting.			
Strongly Agree	9 (45%)	13 (70%)	25%↑
Agree	7 (35%)	4 (20%)	15%↓
Neutral	4 (20%)	1 (5%)	15%↓
Disagree	0 (0%)	0 (0%)	0%
Strongly Disagree	0 (0%)	1 (5%)	5%↑
No response	0 (0%)	0 (0%)	0%
Overall, intermittent fasting is beneficial to human health.			
Strongly Agree	10 (50%)	12 (60%)	10%↑
Agree	6 (30%)	6 (30%)	0%
Neutral	4 (20%)	1 (5%)	15%↓
Disagree	0 (0%)	0 (0%)	0%
Strongly Disagree	0 (0%)	1 (5%)	5%↑
No response	0 (0%)	0 (0%)	0%
Overall, some of my patients can benefit from intermittent fasting.			
Strongly Agree	7 (35%)	11 (55%)	20%↑
Agree	5 (25%)	6 (30%)	5%↑
Neutral	8 (40%)	2 (10%)	30%↓
Disagree	0 (0%)	0 (0%)	0%
Strongly Disagree	0 (0%)	1 (5%)	5%↑
No response	0 (0%)	0 (0%)	0%
Overall, my patient's dietary needs are managed by a dietician/nutritionist.			
Strongly Agree	8 (40%)	9 (45%)	5%↑
Agree	5 (25%)	4 (20%)	5%↓
Neutral	4 (20%)	5 (25%)	5%↑
Disagree	3 (15%)	1 (5%)	10%↓
Strongly Disagree	0 (0%)	1 (5%)	5%↑
No response	0 (0%)	0 (0%)	0%

Note: % Change = Percent Change, ↑ = Increase in percent change, ↓ = Decrease in percent

change

Two-Tailed Paired Samples t-Test. To determine if the attitude score of the

participant's pre-survey and post-survey results were significant, a two-tailed paired samples t-

Test was completed. The two-tailed paired samples t-test gave a p value of 0.1609 with an alpha

value of 0.05, t(19), indicating the null hypothesis cannot be rejected. The mean values of the

pre- and post- surveys were not significantly different. The results are illustrated in **Table 5.** The

effect size was calculated with Cohen's d and found to be 0.45 meaning there was a medium

effect. The mean pre- and post- survey scores are illustrated in **Figure 3.**

Table 5

Two-Tailed Paired Samples t-Test Comparing the Pre-Survey and Post-Survey Attitudes of IF

Pre-Survey		Post-Survey				
M	SD	M	SD	*t*	*p*	*d*
15.4	3.13	16.6	2.07	1.430	0.1609	0.839

Note. N = 20. *D* represents the standard error of difference.

Figure 3

Pre- and Post- Survey Attitudes
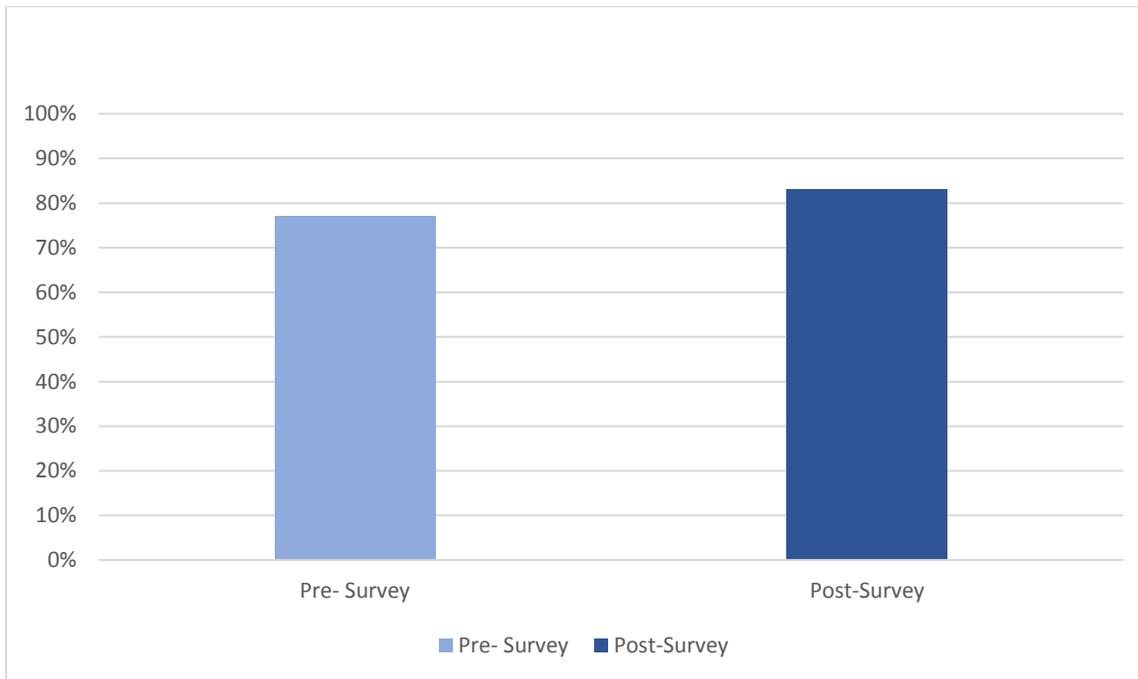
Confidence Levels

The hypothesis is the educational intervention will improve participants confidence level of IF. The null hypothesis is the educational intervention will have no effect on participants confidence level of IF. The data collected from the confidence level portion of the pre- and post-survey are illustrated in **Table 6.**

Table 6

Participant's Confidence Level of Intermittent Fasting Pre- and Post- Survey

Question	Pre-Survey	Post-Survey	% Change
Overall, I am confident on the topic of intermittent fasting			
Strongly Agree	4 (20%)	7 (35%)	15%↑
Agree	5 (25%)	8 (40%)	15%↑
Neutral	5 (25%)	4 (20%)	5%↓
Disagree	3 (15%)	0 (0%)	15%↓
Strongly Disagree	2 (10%)	1 (5%)	5%↓
No response	1 (5%)	0 (0%)	5%↓
I am not confident in my knowledge of intermittent fasting			
Strongly Agree	4 (20%)	6 (30%)	10%↑
Agree	6 (30%)	1 (5%)	25%↓
Neutral	7 (35%)	3 (15%)	20%↓
Disagree	1 (5%)	7 (35%)	30%↑
Strongly Disagree	1 (5%)	3 (15%)	10%↑
No response	1 (5%)	0 (0%)	5%↓
I feel confident discussing intermittent fasting with certain patients that may benefit from this type of diet.			
Strongly Agree	3 (15%)	6 (30%)	15%↑
Agree	3 (15%)	5 (25%)	10%↑
Neutral	5 (25%)	8 (40%)	15%↑
Disagree	5 (25%)	0 (0%)	25%↓
Strongly Disagree	3 (15%)	1 (5%)	10%↓
No response	1 (5%)	0 (0%)	5%↓
I am confident recommending intermittent fasting to patients who may benefit from it.			
Strongly Agree	4 (20%)	5 (25%)	5%↑
Agree	4 (20%)	6 (30%)	10%↑
Neutral	5 (25%)	8 (40%)	15%↑
Disagree	4 (20%)	0 (0%)	20%↓
Strongly Disagree	2 (10%)	1 (5%)	5%↓
No response	1 (5%)	0 (0%)	5%↓
I am not confident discussing intermittent fasting with patients.			
Strongly Agree	4 (20%)	6 (30%)	10%↑
Agree	6 (30%)	3 (15%)	15%↓
Neutral	6 (30%)	5 (25%)	5%↓
Disagree	1 (5%)	4 (20%)	15%↑
Strongly Disagree	1 (5%)	2 (10%)	5%↑
No response	2 (10%)	0 (0%)	10%↓

Note: % Change = Percent Change, ↑ = Increase in percent change, ↓ = Decrease in percent

change,

Two-Tailed Paired Samples t-Test. To determine if the confidence level score of the

participant's pre-survey and post-survey results were significant, a two-tailed paired samples t-

Test was completed. The two-tailed paired samples t-test with an alpha value of 0.05, t(19) =

5.067, p < 0.0001, indicating the null hypothesis can be rejected. The mean values of the

confidence level portion of the pre- and post- surveys were significantly different. The results are

illustrated in **Table 7**. The effect size was calculated with Cohen's d and found to be 1.60

meaning there was a large effect. The mean pre- and post- survey scores are illustrated in Figure

4.

Table 7

Two-Tailed Paired Samples t-Test Comparing the Pre-Survey and Post-Survey Confidence Levels

of IF

Pre-Survey		Post-Survey				
M	SD	M	SD	*t*	*p*	*d*
5.4	3.28	10.6	3.21	5.067	<0.0001	1.026

Note. N = 20. *D* represents the standard error of difference.

Figure 4

Pre- and Post- Survey Confidence Levels
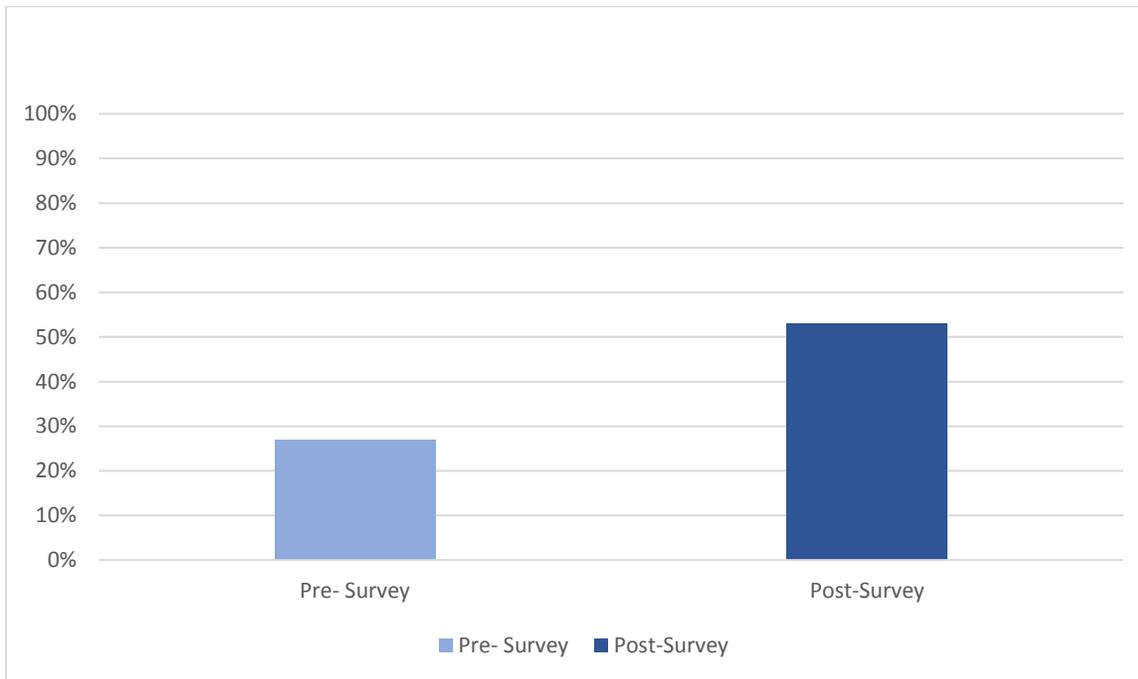
Perception of Knowledge

The hypothesis is the educational intervention will improve participants perception knowledge of IF. The null hypothesis is the educational intervention will have no effect on participants perception of knowledge of IF. The data collected from the perception of knowledge portion of the pre- and post- survey are illustrated in **Table 8.**

Table 8

Participant's Perception of Knowledge of Intermittent Fasting Pre- and Post- Survey

Question	Pre-Survey	Post-Survey	% Change
In general, I am knowledgeable of intermittent fasting.			
Strongly Agree	2 (10%)	6 (30%)	20%↑
Agree	2 (10%)	9 (45%)	35%↑
Neutral	6 (30%)	4 (20%)	10%↓
Disagree	6 (30%)	0 (0%)	30%↓
Strongly Disagree	3 (15%)	1 (5%)	10%↓
No response	1 (5%)	0 (0%)	5%↓
I know which individuals may benefit from intermittent fasting.			
Strongly Agree	3 (15%)	5 (25%)	10%↑
Agree	6 (30%)	13 (65%)	35%↑
Neutral	4 (20%)	1 (5%)	15%↓
Disagree	4 (20%)	1 (5%)	15%↓
Strongly Disagree	2 (10%)	0 (0%)	10%↓
No response	1 (5%)	0 (0%)	5%↓
I know which individuals should avoid intermittent fasting.			
Strongly Agree	2 (10%)	8 (40%)	30%↑
Agree	6 (30%)	9 (45%)	15%↑
Neutral	6 (30%)	2 (10%)	20%↓
Disagree	3 (15%)	1 (5%)	10%↓
Strongly Disagree	2 (10%)	0 (0%)	10%↓
No response	1 (5%)	0 (0%)	5%↓
I understand the potential benefits of intermittent fasting.			
Strongly Agree	3 (15%)	6 (30%)	15%↑
Agree	8 (40%)	10 (50%)	10%↑
Neutral	3 (15%)	2 (10%)	10%↓
Disagree	3 (15%)	1 (5%)	10%↓
Strongly Disagree	2 (10%)	0 (0%)	10%↓
No response	1 (5%)	1 (5%)	0%
I understand the potential risks associated with intermittent fasting.			
Strongly Agree	2 (10%)	5 (25%)	15%↑
Agree	4 (20%)	9 (45%)	25%↑
Neutral	5 (25%)	4 (20%)	5%↓
Disagree	5 (25%)	2 (10%)	3%↓
Strongly Disagree	3 (15%)	0 (0%)	15%↓
No response	1 (5%)	0 (0%)	5%↓

Note: % Change = Percent Change, ↑ = Increase in percent change, ↓ = Decrease in percent change, * Expected result

Two-Tailed Paired Samples t-Test. To determine if the perception of knowledge score of the participant's pre-survey and post-survey results were significant, a two-tailed paired samples t-Test was completed. The two-tailed paired samples t-test with an alpha value of 0.05, $t(19) = 12.008$, $p < 0.0001$, indicating the null hypothesis can be rejected. The mean values of the perception of knowledge portion of the pre- and post- surveys were significantly different. The results are illustrated in **Table 9.** The effect size was calculated with Cohen's d and found to be 3.80 meaning there was a large effect. The mean pre- and post- survey scores are illustrated in Figure 5.

Table 9

Two-Tailed Paired Samples t-Test Comparing the Pre-Survey and Post-Survey Perception of Knowledge of IF

Pre-Survey		Post-Survey				
M	SD	M	SD	*t*	*p*	*d*
7.6	2.70	16	1.58	12.008	<0.0001	0.700

Note. N = 20. *D* represents the standard error of difference.

Figure 5

Pre- and Post- Survey Perception of Knowledge
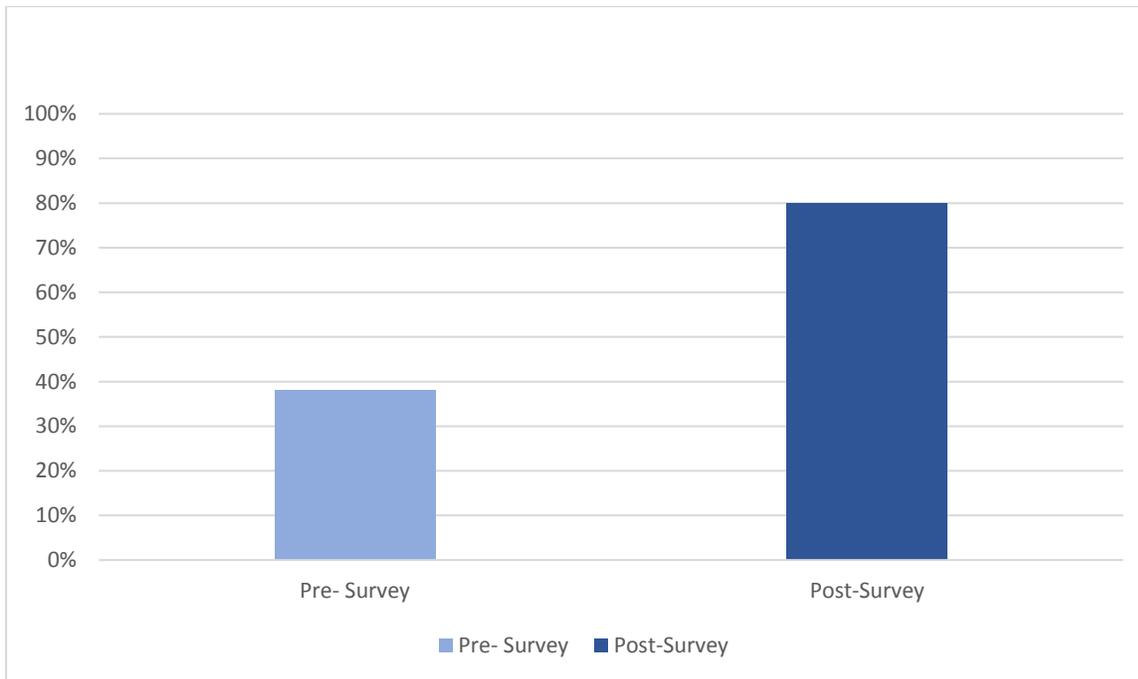
Behaviors

The hypothesis is the educational intervention will improve participants behaviors regarding IF. The null hypothesis is the educational intervention will have no effect on participants behaviors regarding IF. The data collected from the behavior portion of the pre- and post- survey are illustrated in **Table 10.**

Table 10

Participant's Behaviors Related to Intermittent Fasting Pre- and Post- Survey

Question	Pre-Survey	Post-Survey	% Change
I have practice intermittent fasting myself.			
Strongly Agree	3 (15%)	9 (45%)	30%↑
Agree	7 (35%)	8 (40%)	5%↑
Neutral	3 (15%)	1 (5%)	10%↓
Disagree	3 (15%)	0 (0%)	15%↓
Strongly Disagree	3 (15%)	2 (10%)	5%↓
No response	1 (5%)	0 (0%)	5%↓
I have recommended intermittent fasting to patients in the past.			
Strongly Agree	1 (5%)	3 (15%)	10%↑
Agree	0 (0%)	4 (20%)	20%↑
Neutral	5 (25%)	4 (20%)	5%↓
Disagree	9 (45%)	8 (40%)	5%↓
Strongly Disagree	4 (20%)	1 (5%)	15%↓
No response	1 (5%)	0 (0%)	5%↓
I plan to discuss and educate patients about intermittent fasting when appropriate.			
Strongly Agree	5 (25%)	5 (25%)	0%
Agree	2 (10%)	8 (40%)	30%↑
Neutral	8 (40%)	7 (35%)	5%↓
Disagree	3 (15%)	0 (0%)	15%↓
Strongly Disagree	1 (5%)	0 (0%)	5%↓
No response	1 (5%)	0 (0%)	5%↓
I plan to learn more about intermittent fasting.			
Strongly Agree	10 (50%)	9 (45%)	5%↓
Agree	7 (35%)	7 (35%)	0%
Neutral	1 (5%)	4 (20%)	15%↑
Disagree	0 (0%)	1 (5%)	5%↑
Strongly Disagree	1 (5%)	0 (0%)	5%↓
No response	1 (5%)	1 (5%)	0%
I do not plan to use intermittent fasting in my treatment plans when managing patients.			
Strongly Agree	3 (15%)	4 (20%)	5%↑
Agree	1 (5%)	3 (15%)	10%↑
Neutral	7 (35%)	5 (25%)	10%↓
Disagree	5 (25%)	5 (25%)	0%
Strongly Disagree	3 (15%)	3 (15%)	0%
No response	1 (5%)	0 (0%)	5%↓

Note: % Change = Percent Change, ↑ = Increase in percent change, ↓ = Decrease in percent change, * Expected result

Two-Tailed Paired Samples t-Test. To determine if the behaviors score of the

participant's pre-survey and post-survey results were significant, a two-tailed paired samples t-

Test was completed. The two-tailed paired samples t-test with an alpha value of 0.05, t(19) =

2.191, p < 0.0357, indicating the null hypothesis can be rejected. The mean values of the

behavior's potion of the pre- and post- surveys were significantly different. The results are

illustrated in **Table 11.** The effect size was calculated with Cohen's d and found to be 0.69

meaning there was a medium effect. The mean pre- and post- survey scores are illustrated in
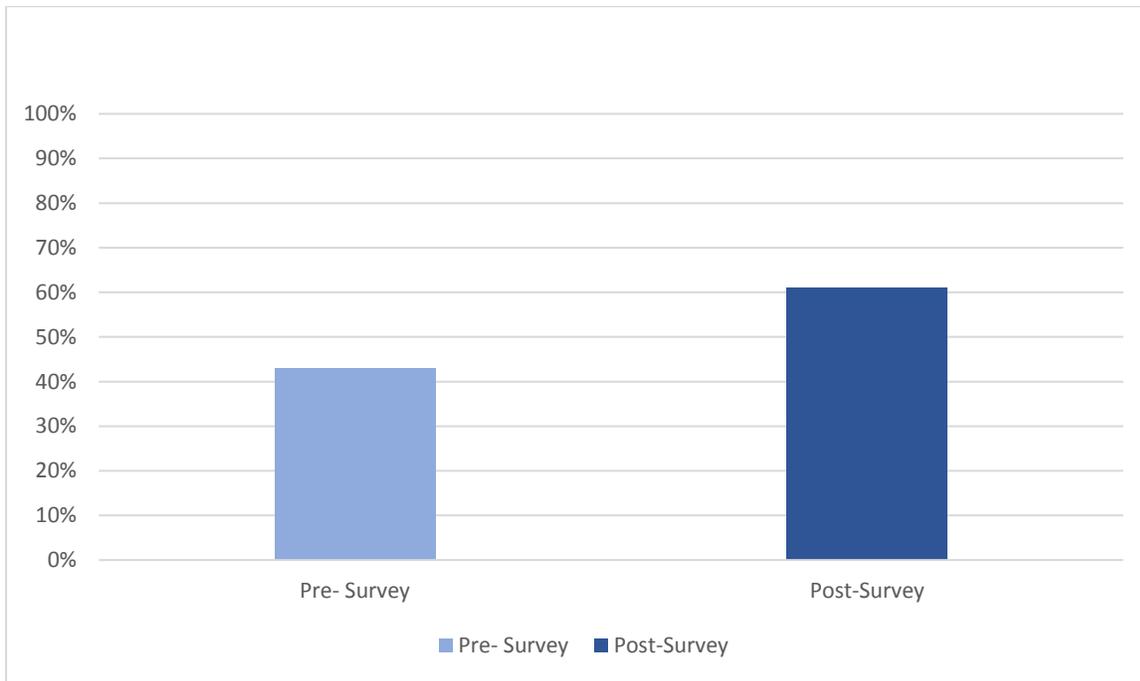
Figure 6.

Table 11

Two-Tailed Paired Samples t-Test Comparing the Pre-Survey and Post-Survey Behaviors

regarding IF

Pre-Survey		Post-Survey				
M	SD	M	SD	*t*	*p*	*d*
8.6	5.77	12.2	4.55	2.191	0.0347	1.643

Note. N = 20. *D* represents the standard error of difference.
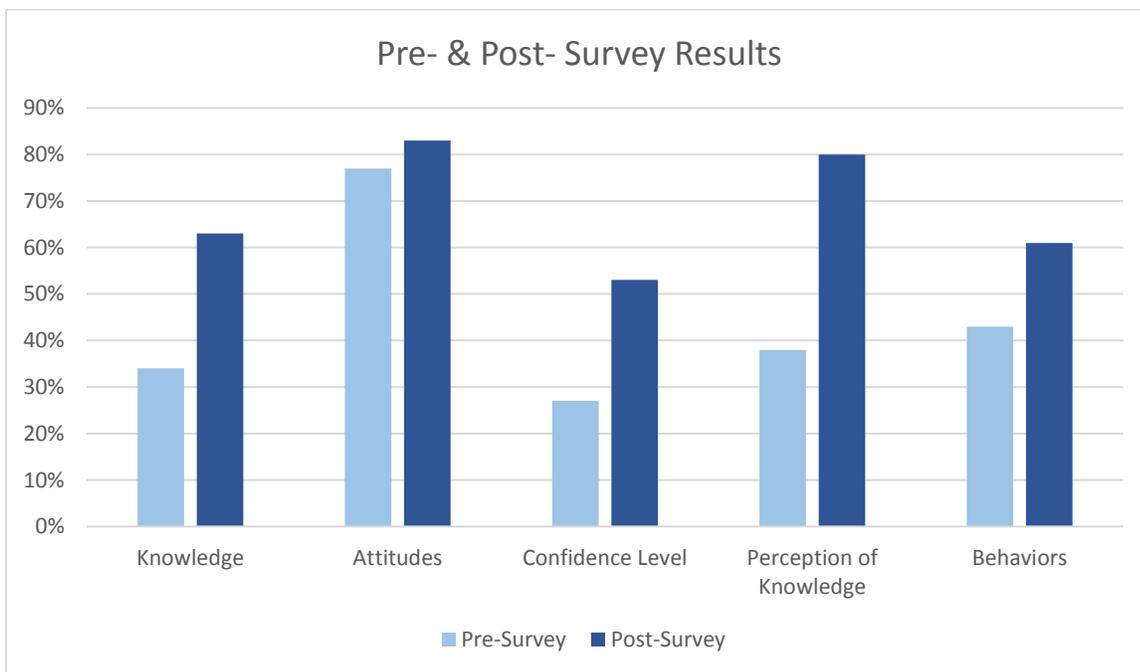
Figure 6

Pre- and Post- Survey Behaviors

Figure 7

Pre- and Post- Survey Results Summary

Discussion

This quality improvement project was designed to fill the knowledge gaps with pertinent evidence-based information, debunk common IF myths, and provide effective communication strategies to help improve HCCs knowledge, attitudes, and confidence of IF in clinical practice settings. Specifically, to evaluate the impact an educational session on IF would have on healthcare clinicians' knowledge, attitudes, and behaviors about IF. A total of twenty participants participated in the educational sessions and the pre-and post- surveys.

The post-survey results revealed significant improvements in the participants knowledge, confidence levels, perception of knowledge, and behaviors in communicating with adult patients about IF. The post-survey results also showed no significant difference in participants attitudes before and after the educational intervention. Currently, there is a lack of literature available to compare the results of this quality improvement project with.

The participants combined knowledge scores increased from 34% on the pre-survey to 63% on the post-survey. After the intervention, all five questions exhibited an increase in the selection of the correct answer. All five questions also resulted in a 20% to 45% decrease in selection of "I don't know" as their response.

The participants attitudes increased from 77% on the pre-survey to 83% on the post-survey. After the educational intervention, a total of 90% of participants agree or strongly agree IF is beneficial for human health and report having a positive attitude towards IF compared to 80% before the intervention. Post-survey, 85% of participants agree or strongly agree some of their patients can benefit from IF compared to 60% pre-survey. The participants' attitudes of IF before and after the intervention were relatively high.

The participants confidence levels increased from 27% on the pre-survey to 53% on the post-survey. Before the intervention, 45% of participants reported feeling confident on the topic of IF. After the intervention, 75% reported feeling confident on the topic. Before the intervention, 10% of the participants felt knowledgeable of IF which increased to 50% after the intervention.

The participants perception of knowledge increased from 38% on the pre-survey to 80% on the post-survey. Before the intervention, 20% of the participants felt knowledgeable of IF, while after the intervention 75% felt knowledgeable. After the educational session, 90% of participants reported knowing which individuals will benefit from IF, and 85% reported knowing which individuals should avoid IF.

The participants behaviors increased from 43% on the pre-survey to 61% on the post-survey. Before the intervention, 50% of the participants reported practicing IF, while after the intervention, 85% reported trying IF. Sixty-five percent of participants plan to discuss and educate patients about IF when appropriate, compared to 35% before the intervention. Before the intervention, 85% of participants planned to learn more about IF compared to 80% after the intervention.

As previously noted, when reviewing the data analysis approach used in this quality improvement project, the small sample size makes it difficult to state with certainty that the data is normally distributed. Consequently, a non-parametric test to compare mean scores from the pre- to post-intervention periods to show that the results are due to something other than chance, i.e., the educational module. The results of this QI project support this as there was an improvement in the mean post-survey scores compared to the pre-survey. This improvement is illustrated in **Figure 7.** Also, the statistical analysis shows statistically significant changes

knowledge, confidence levels, perception of knowledge, and behaviors. The results also demonstrated large and medium effect sizes for all five survey categories.

Limitations

This quality improvement project experienced multiple limitations including a relatively small sample size, a lack of time for the participants, and the facility the QI project was conducted. The sample (n=20) was a convenience sample recruited from two units in a single facility. The size was limited by the units selected to conduct the project, individuals' willingness to participate, and participant availability on the presentation days. Time was also a limitation for the healthcare clinicians due to the fast-paced nature of the selected units. The facility selected for the QI project specializes in treating and managing cancer patients and survivors. Due to this specialization, the generalizability and results of a similar project may differ if completed in a primary care office or in a facility specializing in the treatment and management of overweight and obese patients.

Although the research yielded valuable data, a larger sample size would be beneficial in future studies. Larger sample sizes could benefit the statistical breakdown of the data and lead to the development of more significant research outcomes. Secondly, the surveys collected minimal sociodemographic information. Additional survey questions would assess household income range, place of birth, and household size.

Although both are experimental study designs, quasi-experimental designs lack certain components of RCTs including randomization of the sample, the use of a control group, or both (Wagle, 2018). A future study could include a control group who did not partake in the educational intervention but complete the pre-and post- surveys to assess for change. To further increase the validity of the experiment, individuals could be randomized to the experimental and

control groups. Although the results of this QI project cannot be 100% certifiably true, the

statistical analysis support the results of the project are based on causality.

Implications for Advanced Practice Nursing

This quality improvement project shows HCCs perception of IF is beneficial to human

health in general and can be beneficial for their patients. Educating HCCs on the topic of IF can

provide the HCCs with the knowledge and resources needed to provide their patients with

evidence-based information. This knowledge can also be useful for HHCs to improve or

maintain their current health status. To allow the widest distribution of the information, a

computer-based learning module should be developed and assigned to all employees of the

establishment. This method will allow employees to fully participate in the module.

The curriculum for the program would include a pre-survey followed by the educational

computer-based learning module. This learning module would cover information related to IF

including what is IF, types of IF, benefits and risks, who should partake, who should avoid it,

side effects, and common myths and questions about IF. Similar to this QI project, a post-survey

will be offered two-weeks later. To assess for longitudinal effects, the post survey can be offered

again at longer intervals including 1 month, 3 months, and 6 months.

To disseminate and reinforce the information to patients and additional staff, pamphlets

and posters can be used in public areas such as waiting areas. These posters and pamphlets would

cover the same information as the computer-based learning module. The posters and pamphlets

should be available in multiple languages to ensure all individuals have equal access to the

information.

To improve the success of the project, nursing leadership and administration need to be

onboard. DNP QI projects are an important contribution to advancing scholarship and

contributing the evidence-based science shaping nursing practice (Trautman et al., 2018). This

QI project is the first step in translating research into practice.

Dissemination and Sustainability

Results of this QI project were presented at the 8th Annual FNA Nursing Research &

Evidence-Based Practice Conference in July 2022, the FNA Annual Membership Assembly held

in September 2022, at the 2nd Annual UHealth Virtual Poster Fair in October 2022, and the

Miami Dade Nurse Practitioner Council also in October 2022. Outside of the healthcare

organization, dissemination of the project will include efforts to have the work published in a

peer-reviewed journal such as the Journal of the American Association of Nurse Practitioners

(JAANP). The JAANP is a peer-reviewed monthly publication disseminating high-quality

patient-centered healthcare.

Sustainability of the project will be evaluated through data collection. This should be

recorded by future post-survey results. Sustainability will also be addressed through educating

new hires on IF. Ongoing monitoring of the project and reporting of data will be gathered

electronically when individuals complete the computer-based learning module along with the

pre-and post- surveys. The data will be analyzed with statistical methods similar to the methods

utilized in this project.

Conclusions

This quality improvement project demonstrated the benefit of increased HCC knowledge

following an educational program on IF. Evidence suggests that IF is beneficial for weight loss

and has been shown to have positive effects on the brain, heart, liver, muscles, intestines, blood,

and various other systems. IF has also been shown to reduce risks factors associated with the

development and progression of type II diabetes, neurological disorders, and cancers. Healthcare

clinicians are interested in learning about IF and agree IF can be beneficial for their patients and

many have used IF themselves. Although this quality improvement project does have some

notable limitations, there is enough evidence to support a practice change based on the current

evidence, indicating that after participating in an educational session on IF knowledge gaps were

filled with pertinent evidence-based information and common IF myths were debunked in an

effort to help improve HCCs knowledge, attitudes, and confidence of IF in clinical practice

settings.

References

Abolaban, H., & Al-Moujahed, A. (2017). Muslim patients in Ramadan: A review for primary care physicians. *Avicenna Journal of Medicine*, *7*(03), 81–87. https://doi.org/10.4103/ajm.AJM_76_17

Abu Farha, R., Abu Hammour, K., Rizik, M., Aljanabi, R., & Alsakran, L. (2018). Effect of educational intervention on healthcare providers knowledge and perception towards pharmacovigilance: A tertiary teaching hospital experience. *Saudi Pharmaceutical Journal*, *26*(5), 611–616. https://doi.org/10.1016/j.jsps.2018.03.002

Afshin, A., Sur, P. J., Fay, K. A., Cornaby, L., Ferrara, G., Salama, J. S., Mullany, E. C., Abate, K. H., Abbafati, C., Abebe, Z., Afarideh, M., Aggarwal, A., Agrawal, S., Akinyemiju, T., Alahdab, F., Bacha, U., Bachman, V. F., Badali, H., Badawi, A., . . . Murray, C. J. L. (2019). Health effects of dietary risks in 195 countries, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017. *Lancet (London, England)*, *393*(10184), 1958–1972. https://doi.org/10.1016/S0140-6736(19)30041-8

Al-Hamadiny, S. Q., Salman, R. I., Najman, S. S., Dilfy, S. H., Qurabiy, H. E. A., & Kadhim, S. J. (2021). Clinical evaluation of Aspirin effects on gastrointestinal tract and circulatory system. *Biochemistry, Genetics and Molecular Biology*, *8*(4), 5328–5343. https://www.nveo.org/index.php/journal/article/view/1167/1043

Albosta, M., & Bakke, J. (2021). Intermittent fasting: Is there a role in the treatment of diabetes? A review of the literature and guide for Primary Care Physicians. *Clinical Diabetes and Endocrinology*, *7*(3). https://doi.org/10.1186/s40842-020-00116-1

Allaf, M., Elghazaly, H., Mohamed, O. G., Fareen, M. F. K., Zaman, S., Salmasi, A.-M., Tsilidis,

K., & Dehghan, A. (2021). Intermittent fasting for the prevention of cardiovascular

disease. *Cochrane Library*, *2021*(3), CD013496.

https://doi.org/10.1002/14651858.CD013496.pub2

American College of Cardiology. (2016). *US food subsidies fuel obesity and declining health*.

CardioSmart. https://www.cardiosmart.org/news/2016/8/us-food-subsidies-fuel-obesity-

and-declining-health

American Diabetes Association. (n.d.). *Insulin basics*. https://www.diabetes.org/healthy-

living/medication-treatments/insulin-other-injectables/insulin-basics

Amin, M. E. K., Abdelmageed, A., & Farhat, M. J. (2019). Communicating with clinicians on

fasting during Ramadan: The patients' perspective. *Journal of Religion and Health*, *60*(2),

922–940. https://doi.org/10.1007/s10943-019-00910-x

Amiri, S., & Behnezhad, S. (2019). Obesity and anxiety symptoms: a systematic review and

meta-analysis. Adipositas und Angstsymptome: systematische Review und

Metaanalyse. *Neuropsychiatrie : Klinik, Diagnostik, Therapie und Rehabilitation : Organ

der Gesellschaft Osterreichischer Nervenarzte und Psychiater*, *33*(2), 72–89.

https://doi.org/10.1007/s40211-019-0302-9

Antunes, F., Erustes, A. G., Costa, A. J., Nascimento, A. C., Bincoletto, C., Ureshino, R. P.,

Pereira, G. J. S., & Smaili, S. S. (2018). Autophagy and intermittent fasting: the

connection for cancer therapy? *Clinics*, *73*, e814s.

https://doi.org/10.6061/clinics/2018/e814s

Aoun, A., Darwish, F., & Hamod, N. (2020). The influence of the gut microbiome on obesity in

adults and the role of probiotics, prebiotics, and synbiotics for weight loss. *Preventive*

Nutrition and Food Science, *25*(2), 113–123. https://doi.org/10.3746/pnf.2020.25.2.113

Arlinghaus, K. R., & Johnston, C. A. (2017). Advocating for behavior change with

education. *American Journal of Lifestyle Medicine*, *12*(2), 113–116.

https://doi.org/10.1177/1559827617745479

Armutcu, F. (2019). Fasting may be an alternative treatment method recommended by

physicians. *Electronic Journal of General Medicine*, *16*(3).

https://doi.org/10.29333/ejgm/104620

Awad, E. M., & Ghaziri, H. M. (2004). *Knowledge management*. Prentice-Hall.

Barbosa, M. C., Grosso, R. A., & Fader, C. M. (2019). Hallmarks of aging: An autophagic

perspective. *Frontiers in Endocrinology*, *9*. https://doi.org/10.3389/fendo.2018.00790

Barquera, S., & Rivera, J. A. (2020). Obesity in Mexico: Rapid epidemiological transition and

food industry interference in health policies. *The Lancet Diabetes & Endocrinology*, *8*(9),

746–747. https://doi.org/10.1016/s2213-8587(20)30269-2

Beshyah, S. A., Ali, K. F., Hajjaji, I. M., Hafidh, K., Raza, S. A., Ghour, N., & Khochtali, I.

(2021). Knowledge gaps and perceptions of future research directions on management of

diabetes during Ramadan fasting: An online survey of physicians. *Diabetes Research and*

Clinical Practice, *177*, 108923. https://doi.org/10.1016/j.diabres.2021.108923

Biener, A., Cawley, J., & Meyerhoefer, C. (2017). The high and rising costs of obesity to the US health care system. *Journal of General Internal Medicine*, *32*(S1), 6–8. https://doi.org/10.1007/s11606-016-3968-8

Bloniasz, P. F. (2021). On educational assessment theory: A high-level discussion of Adolphe Quetelet, platonism, and ergodicity. *Philosophies*, *6*(2), 46. https://doi.org/10.3390/philosophies6020046

Bonnet, F., & Scheen, A. (2017). Understanding and overcoming metformin gastrointestinal intolerance. *Diabetes, obesity & metabolism*, *19*(4), 473–481. https://doi.org/10.1111/dom.12854

Cawley, J., Biener, A., Meyerhoefer, C., Ding, Y., Zvenyach, T., Smolarz, B. G., & Ramasamy, A. (2021). Direct medical costs of obesity in the United States and the most populous states. *Journal of managed care & specialty pharmacy*, *27*(3), 354–366. https://doi.org/10.18553/jmcp.2021.20410

Censin, J. C., Peters, S. A. E., Bovijn, J., Ferreira, T., Pulit, S. L., Mägi, R., Mahajan, A., Holmes, M. V., & Lindgren, C. M. (2019). Causal relationships between obesity and the leading causes of death in women and men. *PLoS genetics*, *15*(10), e1008405. https://doi.org/10.1371/journal.pgen.1008405

Centers for Disease Control and Prevention. (2021). *Nhanes - interactive data visualizations*. https://www.cdc.gov/nchs/nhanes/visualization/index.htm

Centers for Disease Control and Prevention. (2022a). *About adult BMI*. https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

Centers for Disease Control and Prevention. (2022b). *Adult obesity facts*.

https://www.cdc.gov/obesity/data/adult.html

Centers for Disease Control and Prevention. (2022c). *Causes of obesity.*

https://www.cdc.gov/obesity/adult/causes.html

Centers for Disease Control and Prevention. (2022d). *Consequences of obesity*.

https://www.cdc.gov/obesity/basics/consequences.html

Centers for Disease Control and Prevention. (2022e). *Defining adult overweight & obesity*.

https://www.cdc.gov/obesity/adult/defining.html

Centers for Disease Control and Prevention. (2022f). *Obesity and cancer*.

https://www.cdc.gov/cancer/obesity/index.htm

Chair, S. Y., Cai, H., Cao, X., Qin, Y., Cheng, H. Y., & Ng, M. T. (2022). Intermittent fasting in

weight loss and cardiometabolic risk reduction: A randomized controlled trial. *The

Journal of Nursing Research*, *30*(1), e185. https://doi.org/10.1097/jnr.0000000000000469

Chung, K. W., & Chung, H. Y. (2019). The effects of calorie restriction on autophagy: Role on

aging intervention. *Nutrients*, *11*(12), 2923. https://doi.org/10.3390/nu11122923

Clifton, K. K., Ma, C. X., Fontana, L., & Peterson, L. L. (2021). Intermittent fasting in the

prevention and treatment of cancer. *CA: A Cancer Journal for Clinicians*, *71*(6), 527–546.

https://doi.org/10.3322/caac.21694

Conley, M., Le Fevre, L., Haywood, C., & Proietto, J. (2018). Is two days of intermittent energy

restriction per week a feasible weight loss approach in obese males? A randomised pilot

study. *Nutrition & Dietetics*, 75(1), 65–72. https://doi.org/10.1111/1747-0080.12372

Crowley, J., Ball, L., & Hiddink, G. J. (2019). Nutrition in medical education: a systematic

review. *The Lancet. Planetary health*, *3*(9), e379–e389. https://doi.org/10.1016/S2542-

5196(19)30171-8

Cuccolo, K., Kramer, R., Petros, T., & Thoennes, M. (2021). Intermittent fasting implementation

and association with eating disorder symptomatology. *Eating disorders*, *30*(5), 471–491.

https://doi.org/10.1080/10640266.2021.1922145

Czech, M. P. (2017). Insulin action and resistance in obesity and type 2 diabetes. *Nature

Medicine*, *23*(7), 804–814. http://dx.doi.org/10.1038/nm.4350

Dao, M. C., Thiron, S., Messer, E., Sergeant, C., Sévigné, A., Huart, C., Rossi, M., Silverman, I.,

Sakaida, K., Bel Lassen, P., Sarrat, C., Arciniegas, L., Das, S. K., Gausserès, N., Clément,

K., & Roberts, S. B. (2020). Cultural influences on the regulation of energy intake and

obesity: A qualitative study comparing food customs and attitudes to eating in adults from

France and the United States. *Nutrients*, *13*(1), 63. https://doi.org/10.3390/nu13010063

de Groot, S., Pijl, H., van der Hoeven, J., & Kroep, J. R. (2019). Effects of short-term fasting on

cancer treatment. *Journal of Experimental & Clinical Cancer Research*, *38*, 209.

https://doi.org/10.1186/s13046-019-1189-9

EL-Khadry, S. W., Abdallah, A. R., Yousef, M. F., M. abdeldayem, H., Ezzat, S., & Dorgham, L.

S. (2020). Effect of educational intervention on knowledge and attitude towards research,

research ethics, and biobanks among paramedical and administrative teams in the

National Liver Institute, Egypt. *Egyptian Liver Journal*, *10*(1), 1–8.

https://doi.org/10.1186/s43066-019-0010-y

Falta, W. (1923). *Endocrine diseases; including their diagnosis and treatment* (3rd ed.). P.

Blakiston's son & co.

Feinberg, A. P. (2018). The key role of epigenetics in human disease prevention and mitigation.

The New England Journal of Medicine, *378*(14), 1323–1334.

https://doi.org/10.1056/NEJMra1402513

Finnell, J. S., Saul, B. C., Goldhamer, A. C., & Myers, T. R. (2018). Is fasting safe? A chart

review of adverse events during medically supervised, water-only fasting. *BMC*

complementary and alternative medicine, *18*(1), 67. https://doi.org/10.1186/s12906-018-

2136-6

Fox, A., Feng, W., & Asal, V. (2019). What is driving global obesity trends? Globalization or

"modernization"? *Globalization and Health*, *15*, 32. https://doi.org/10.1186/s12992-019-

0457-y

Fung, J. (2016). *The obesity code: Unlocking the secrets of weight loss*. Scribe.

Fung, J., & Moore, J. (2016). *The complete guide to fasting: Heal your body through*

intermittent, alternate-day, and extended fasting. Victory Belt Publishing.

Garnett, E. S., Barnard, D. L., Ford, J., Goodbody, R. A., & Woodehouse, M. A. (1969). Gross

fragmentation of cardiac myofibrils after therapeutic starvation for obesity. *The*

Lancet, *293*(7601), 914–916. https://doi.org/10.1016/s0140-6736(69)92546-x

Glen, S. (2022). *Cohen's D: Definition, examples, formulas*. Statistics How To.

    https://www.statisticshowto.com/probability-and-statistics/statistics-definitions/cohens-d/

Golden, A., & Kessler, C. (2020). Obesity and genetics. *Journal of the American Association of*

    Nurse Practitioners, 32(7), 493–496. https://doi.org/10.1097/JXX.0000000000000447

Grajower, M. M., & Horne, B. D. (2019). Clinical management of intermittent fasting in patients

    with Diabetes Mellitus. *Nutrients*, *11*(4), 873. https://doi.org/10.3390/nu11040873

Haileselassie, M., Redae, G., Berhe, G., Henry, C. J., Nickerson, M. T., & Mulugeta, A. (2022).

    The influence of fasting on energy and nutrient intake and their corresponding food

    sources among 6-23 months old children in rural communities with high burden of

    stunting from Northern Ethiopia. *Nutrition journal*, *21*(1), 4.

    https://doi.org/10.1186/s12937-022-00759-z

Haines, J., Haycraft, E., Lytle, L., Nicklaus, S., Kok, F. J., Merdji, M., Fisberg, M., Moreno, L.

    A., Goulet, O., & Hughes, S. O. (2019). Nurturing children's healthy eating: Position

    statement. *Appetite*, *137*, 124–133. https://doi.org/10.1016/j.appet.2019.02.007

Hales, C. M., Carroll, M. D., Fryar, C. D., Ogden, C. L. (2020). *Prevalence of obesity and severe*

    obesity among adults: United States, 2017–2018.

    https://www.cdc.gov/nchs/data/databriefs/db360-h.pdf

Hamodat, H., Syed, S., Ali, M., Sardiwalla, Y., Imran, F., Jarrar, A., Rafiq, F., Zimmo, K., Eissa,

    M., & Haroon, B. (2020). Primary care physicians' knowledge, perceptions, and comfort

    level in managing patients fasting in Ramadan. *Journal of primary care & community*

    health, *11*, 2150132720933796. https://doi.org/10.1177/2150132720933796

Harris, L., Hamilton, S., Azevedo, L. B., Olajide, J., de Brún, C., Waller, G., Whittaker, V.,

    Sharp, T., Lean, M., Hankey, C., & Ells, L. (2018). Intermittent fasting interventions for

    treatment of overweight and obesity in adults: A systematic review and meta-

    analysis. *JBI Database of Systematic Reviews and Implementation Reports*, *16*(2), 507–

    547. https://doi.org/10.11124/JBISRIR-2016-003248

Harvard T.H. Chan. (2016). *Economic costs*. https://www.hsph.harvard.edu/obesity-prevention-

    source/obesity-consequences/economic/

Hemmingsson, E. (2021). The unparalleled rise of obesity in China: A call to

    action. *International Journal of Obesity*, *45*(5), 921–922. https://doi.org/10.1038/s41366-

    021-00774-w

Holesh, J. E., Aslam, S., & Martin, A. (2022). *Physiology, Carbohydrates*. StatPearls Publishing.

Huang, Z., Wang, W., Huang, L., Guo, L., & Chen, C. (2020). Suppression of insulin secretion

    in the treatment of obesity: A systematic review and meta- analysis. *Obesity*, *28*(11),

    2098–2106. https://doi.org/10.1002/oby.22955

Hutchison, A. T., Regmi, P., Manoogian, E. N. C., Fleischer, J. G., Wittert, G. A., Panda, S., &

    Heilbronn, L. K. (2019). Time☐restricted feeding improves glucose tolerance in men at

    risk for type 2 diabetes: A randomized crossover trial. *Obesity*, *27*(5), 724–732.

    https://doi.org/10.1002/oby.22449

Isenmann, E., Dissemond, J., & Geisler, S. (2021). The effects of a macronutrient-based diet and

    time-restricted feeding (16:8) on body composition in physically active individuals—A

14-week randomised controlled trial. *Nutrients*, *13*(9), 3122.

https://doi.org/10.3390/nu13093122

Jackson, E., Blatherwick, D., & Badal, K. (2018). AB0510 Improving knowledge of SLE disease

flares and treatment options among rheumatologists and primary care providers: effect of

an online educational intervention. *Annals of the Rheumatic Diseases*, *77*(Suppl 2), 1414–

. https://doi.org/10.1136/annrheumdis-2018-eular.4719

Jamshed, H., Beyl, R. A., Della Manna, D. L., Yang, E. S., Ravussin, E., & Peterson, C. M.

(2019). Early time-restricted feeding improves 24-hour glucose levels and affects markers

of the circadian clock, aging, and autophagy in humans. *Nutrients*, *11*(6), 1234.

https://doi.org/10.3390/nu11061234

Jiang, Y., Goodman, S., Sonu, I., Garcia, P., Fernandez-Becker, N., Kamal, A., Zikos, T., Singh,

S., Neshatian, L., Triadafilopoulos, G., & Clarke, J. (2021). S485   the effects of

intermittent fasting on gastroesophageal reflux disease. *American Journal of*

Gastroenterology, *116*, S214. https://doi.org/10.14309/01.ajg.0000774412.06006.67

Joaquim, L., Faria, A., Loureiro, H., & Matafome, P. (2022). Benefits, mechanisms, and risks of

intermittent fasting in metabolic syndrome and type 2 diabetes. *Journal of Physiology*

and Biochemistry, 78, 295–305. https://doi.org/10.1007/s13105-021-00839-4

Kent State University. (2022). *SPSS tutorials: Paired samples T test*. University Libraries.

https://libguides.library.kent.edu/spss/pairedsamplesttest

Kim, D. D., & Basu, A. (2016). Estimating the Medical Care Costs of Obesity in the United

States: Systematic Review, Meta-Analysis, and Empirical Analysis. *Value in*

Health, *19*(5), 602–613. https://doi.org/10.1016/j.jval.2016.02.008

Koletzko, B., Godfrey, K. M., Poston, L., Szajewska, H., Van Goudoever, J. B., De Waard, M.,

Brands, B., Grivell, R. M., Deussen, A. R., Dodd, J. M., Patro-Golab, B., & Zalewski, B.

M. (2019). Nutrition during pregnancy, lactation and early childhood and its implications

for maternal and long-term child health: The early nutrition project

recommendations. *Annals of Nutrition and Metabolism*, *74*(2), 93–106.

https://doi.org/10.1159/000496471

Lam, T. M., Vaartjes, I., Grobbee, D. E., Karssenberg, D., & Lakerveld, J. (2021). Associations

between the built environment and obesity: An umbrella review. *International Journal of*

Health Geographics, *20*(1), 1–24. https://doi.org/10.1186/s12942-021-00260-6

LaMorte, W. W. (2016). *The role of probability*. https://sphweb.bumc.bu.edu/otlt/mph-

modules/bs/bs704_probability/BS704_Probability12.html

Landis, D. (2020). *Sacred and secular affliction: Fasting in the history of the west and western*

Christianity [MA thesis, Baylor University]. https://baylor-

ir.tdl.org/bitstream/handle/2104/10855/SACRED%20AND%20SECULAR%20AFFLICTI

ON-

%20FASTING%20IN%20THE%20HISTORY%20OF%20THE%20%20%20WEST%20A

ND%20WESTERN%20CHRISTIANITY%20.pdf?sequence=1&isAllowed=y

Lovasi, G. S., Hutson, M. A., Guerra, M., & Neckerman, K. M. (2009). Built environments and

obesity in disadvantaged populations. *Epidemiologic reviews*, *31*, 7–20.

https://doi.org/10.1093/epirev/mxp005

Martens, C. R., Rossman, M. J., Mazzo, M. R., Jankowski, L. R., Nagy, E. E., Denman, B. A.,

Richey, J. J., Johnson, S. A., Ziemba, B. P., Wang, Y., Peterson, C. M., Chonchol, M., &

Seals, D. R. (2020). Short-term time-restricted feeding is safe and feasible in non-obese

healthy midlife and older adults. *GeroScience*, *42*(2), 667–686.

https://doi.org/10.1007/s11357-020-00156-6

Masood, M., & Reidpath, D. D. (2017). Effect of national wealth on BMI: An analysis of

206,266 individuals in 70 low-, middle- and high-income countries. *PloS one*, *12*(6),

e0178928. https://doi.org/10.1371/journal.pone.0178928

Mattson M. P. (2019). An evolutionary perspective on why food overconsumption impairs

cognition. *Trends in cognitive sciences*, *23*(3), 200–212.

https://doi.org/10.1016/j.tics.2019.01.003

MedlinePlus. (n.d.). *Muscle atrophy: Medlineplus medical encyclopedia*.

https://medlineplus.gov/ency/article/003188.htm

Merriam-Webster. (n.d.-a). *Diet*. https://www.merriam-webster.com/dictionary/diet

Merriam-Webster. (n.d.-b). *Overfeed*. https://www.merriam-webster.com/dictionary/overfeed

Mitchell, H., Lucas, C., Charlton, K., & McMahon, A. (2018). Models of nutrition-focused

continuing education programs for nurses: a systematic review of the evidence.

Australian Journal of Primary Health, *24*(2), 101–108. https://doi.org/10.1071/PY17088

Monaco, K. (2020). *Over 73% of U.S. adults overweight or obese*. Medical News.

    https://www.medpagetoday.com/primarycare/obesity/90142

Morrison, O. (2019). *The economics of obesity: How cheap processed food is fueling the*

    pandemic. Food navigator. https://www.foodnavigator.com/Article/2019/08/06/The-

    economics-of-obesity-How-cheap-processed-food-is-fuelling-the-pandemic

Mouillot, T., Brindisi, M.-C., Chambrier, C., Audia, S., & Brondel, L. (2021). Refeeding

    syndrome. *La Revue de Medecine Interne*, *42*(5), 346–354.

    https://doi.org/10.1016/j.revmed.2020.12.012

Mydin, F. H. M., Yuen, C. W., & Othman, S. (2021). The effectiveness of educational

    intervention in improving primary health-care service providers' knowledge,

    identification, and management of elder abuse and neglect: A systematic review. *Trauma,*

    Violence, & Abuse, *22*(4), 944–960. https://doi.org/10.1177/1524838019889359

National Institute of Diabetes and Digestive and Kidney Diseases. (2020). *Symptoms & causes of*

    ger & gerd. https://www.niddk.nih.gov/health-information/digestive-diseases/acid-reflux-

    ger-gerd-adults/symptoms-causes

National Institute of Diabetes and Digestive and Kidney Diseases. (n.d.). *Acid reflux (ger &*

    gerd) in adults. https://www.niddk.nih.gov/health-information/digestive-diseases/acid-

    reflux-ger-gerd-adults

Nedjat-Haiem, F. R., Cadet, T. J., Amatya, A., & Mishra, S. I. (2019). Healthcare providers'

    attitudes, knowledge, and practice behaviors for educating patients about advance

directives: a national survey. *American Journal of Hospice and Palliative Medicine®*, *36*(5), 387–395. https://doi.org/10.1177/1049909118813720

Office of Disease Prevention and Health Promotion. (2022). *Appendix E-3.1.A4. Nutritional goals for each age/sex group used in assessing adequacy of USDA food patterns at various calorie levels*. https://health.gov/our-work/nutrition-physical-activity/dietary-guidelines/previous-dietary-guidelines/2015/advisory-report/appendix-e-3/appendix-e-31a4

Office of Disease Prevention and Health Promotion. (n.d.). *Overweight and obesity*. https://health.gov/healthypeople/objectives-and-data/browse-objectives/overweight-and-obesity

Okunogbe, A., Nugent, R., Spencer, G., Ralston, J., & Wilding, J. (2021). Economic impacts of overweight and obesity: Current and future estimates for eight countries. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3781703

Olson, S. (2015). *How 3 meals a day became the rule, and why we should be eating whenever we get hungry instead*. Medical Daily. https://www.medicaldaily.com/how-3-meals-day-became-rule-and-why-we-should-be-eating-whenever-we-get-hungry-324892

Page, M. M., & Johnson, J. D. (2018). Mild suppression of Hyperinsulinemia to treat obesity and Insulin resistance. *Trends in Endocrinology and Metabolism*, *29*(6), 389–399. https://doi.org/10.1016/j.tem.2018.03.018

Paoli, A., Tinsley, G., Bianco, A., & Moro, T. (2019). The influence of meal frequency and

    timing on health in humans: The role of fasting. *Nutrients*, *11*(4), 719.

    https://doi.org/10.3390/nu11040719

Park, A., & West, D. S. (2019). Understanding socio-cultural factors related to obesity:

    Sentiment analysis on related tweets. *Online Journal of Public Health Informatics*, *11*(1),

    e297. https://doi.org/10.5210/ojphi.v11i1.9725

Parr, E. B., Devlin, B. L., Radford, B. E., & Hawley, J. A. (2020). A delayed morning and earlier

    evening time-restricted feeding protocol for improving glycemic control and dietary

    adherence in men with overweight/obesity: A randomized controlled trial. *Nutrients*,

    12(2), 505. https://doi.org/10.3390/nu12020505

Patikorn, C., Roubal, K., Veettil, S. K., Chandran, V., Pham, T., Lee, Y. Y., Giovannucci, E. L.,

    Varady, K. A., & Chaiyakunapruk, N. (2021). Intermittent fasting and obesity-related

    health outcomes: An umbrella review of meta-analyses of randomized clinical

    trials. *JAMA Network Open*, *4*(12), e2139558.

    https://doi.org/10.1001/jamanetworkopen.2021.39558

Perry, R. J., Wang, Y., Cline, G. W., Rabin-Court, A., Song, J. D., Dufour, S., Zhang, X. M.,

    Petersen, K. F., & Shulman, G. I. (2018). Leptin mediates a glucose-fatty acid cycle to

    maintain glucose homeostasis in starvation. *Cell*, *172*(1-2), 234–248.

    https://doi.org/10.1016/j.cell.2017.12.001

Peterson, R., Blanck, H. M., & Pan, L. (2019). *Racial and ethnic disparities in adult obesity in*

    the United States: CDC's tracking to inform state and local action. Centers for Disease

    Control and Prevention. https://www.cdc.gov/pcd/issues/2019/18_0579.htm

Phillips, M. (2019). Fasting as a therapy in neurological disease. *Nutrients*, *11*(10), 2501.

> https://doi.org/10.3390/nu11102501

Puhl, R. M., Himmelstein, M. S., & Pearl, R. L. (2020). Weight stigma as a psychosocial

> contributor to obesity. *The American Psychologist*, *75*(2), 274–289.

> https://doi.org/10.1037/amp0000538

Pureza, I. R. D. O. M., Macena, M. L., da Silva Junior, A. E., Praxedes, D. R. S., Vasconcelos, L.

> G. L. & Bueno, N. B. (2021). Effect of early time-restricted feeding on the metabolic

> profile of adults with excess weight: A systematic review with meta-analysis. *Clinical*

> *Nutrition (Edinburgh, Scotland)*, *40*(4), 1788–1799.

> https://doi.org/10.1016/j.clnu.2020.10.031

Puri-Mirza, A. (2020). *Ramadan - statistics and facts*. Statista.

> https://www.statista.com/topics/3796/ramadan-2017/#dossierKeyfigures

Ravussin, E., Beyl, R. A., Poggiogalle, E., Hsia, D. S., & Peterson, C. M. (2019). Early time-

> restricted feeding reduces appetite and increases fat oxidation but does not affect energy

> expenditure in humans. *Obesity*, 27(8), 1244–1254. https://doi.org/10.1002/oby.22518

Redmond, M., Strothman, K. R., Cortez, E., Malthaner, L., McCarthy, T., Murphy, A., Heslep, T.,

> Scherzer, D., Scherzer, R., & Leonard, J. (2019). Do educational interventions improve

> pre-hospital providers' knowledge and confidence in recognizing and treating

> anaphylaxis? *Journal of Allergy and Clinical Immunology*, *143*(2), AB145.

> https://doi.org/10.1016/j.jaci.2018.12.439

Rohde, K., Keller, M., la Cour Poulsen, L., Blüher, M., Kovacs, P., & Böttcher, Y. (2019).

    Genetics and epigenetics in obesity. *Metabolism, Clinical and Experimental*, *92*, 37–50.

    https://doi.org/10.1016/j.metabol.2018.10.007

Rubin, A. (2016). *Is obesity culturally influenced?* Health Beat.

    https://jamaicahospital.org/newsletter/is-obesity-culturally-influenced/

Sanvictores, T., Casale, J., & Huecker, M. R. (2021). *Physiology, Fasting*. StatPearls Publishing.

Schnitker, M. A., Mattman, P. E., & Bliss, T. L. (1951). A clinical study of malnutrition in

    Japanese prisoners of war. *Annals of Internal Medicine*, *35*(1), 69–96.

    https://doi.org/10.7326/0003-4819-35-1-69

Shongwe, M. M. (2016). An analysis of knowledge management lifecycle frameworks: Towards

    a unified framework. *Electronic Journal of Knowledge*

    Management, *14*(3). https://www.researchgate.net/publication/313925052_An_Analysis_o

    f_Knowledge_Management_Lifecycle_Frameworks_Towards_a_Unified_Framework

Song, Z., Xiaoli, A. M., & Yang, F. (2018). Regulation and metabolic significance of de novo

    lipogenesis in adipose tissues. *Nutrients*, *10*(10), 1383.

    https://doi.org/10.3390/nu10101383

Spencer, I. O. B. (1968). Death during therapeutic starvation for obesity. *The Lancet*, *291*(7555),

    1288–1290. https://doi.org/10.1016/s0140-6736(68)92299-x

Stephenson, J., Smith, C. M., Kearns, B., Haywood, A., & Bissell, P. (2021). The association

    between Obesity and quality of life: A retrospective analysis of a large-scale population-

based Cohort Study. *BMC Public Health*, *21*(1). https://doi.org/10.1186/s12889-021-

12009-8

Stewart, W. K., & Fleming, L. W. (1973). Features of a successful therapeutic fast of 382 days'

duration. *Postgraduate medical journal*, *49*(569), 203–209.

https://doi.org/10.1136/pgmj.49.569.203

Swihart, D. L., Yarrarapu, S. S., & Martin, R. L. (2022). *Cultural religious competence in

clinical practice.* StatPearls Publishing.

Tekeş, B., Üzümcüoğlu, Y., Hoe, C., & Özkan, T. (2018). The relationship between Hofstede's

cultural dimensions, Schwartz's cultural values, and obesity. *Psychological

Reports*, *122*(3), 968–987. https://doi.org/10.1177/0033294118777965

Teong, X. T., Hutchison, A. T., Liu, B., Wittert, G. A., Lange, K., Banks, S., & Heilbronn, L. K.

(2021). Eight weeks of intermittent fasting versus calorie restriction does not alter eating

behaviors, mood, sleep quality, quality of life and cognitive performance in women with

overweight. *Nutrition Research (New York, N.Y.)*, *92*, 32–39.

https://doi.org/10.1016/j.nutres.2021.06.006

Thaker V. V. (2017). GENETIC AND EPIGENETIC CAUSES OF OBESITY. *Adolescent

medicine: state of the art reviews*, *28*(2), 379–405.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6226269/

The George Washington University. (2020). *Fast facts: The cost of obesity*.

    https://stop.publichealth.gwu.edu/sites/g/files/zaxdzs4356/files/2022-06/fast-facts-obesity-

    related-chronic-diseases.pdf

The Institute of Functional Medicine. (2020). *Intermittent fasting*.

    https://www.richmondchironeuro.com/wp-content/uploads/2020/01/Intermittent-

    Fasting.pdf

Trautman, D. E., Idzik, S., Hammersla, M., & Rosseter, R. (2018). Advancing scholarship

    through translational research: The role of PhD and DNP prepared nurses. *Online Journal*

    of Issues in Nursing, *23*(2). https://doi.org/10.3912/OJIN.Vol23No02Man02

Varady, K. (2021). Intermittent fasting is gaining interest fast. *Nature Reviews*, *22*(9), 587.

    https://doi.org/10.1038/s41580-021-00377-3

Vrdoljak, J., Kumric, M., Vilovic, M., Martinovic, D., Rogosic, V., Borovac, J. A., Ticinovic

    Kurir, T., & Bozic, J. (2022). Can fasting curb the metabolic syndrome epidemic?

    Nutrients, *14*(3), 456. https://doi.org/10.3390/nu14030456

Wagle, K. (2018). *20 differences between Randomized Controlled Trial (RCT) and quasi-*

    experimental study design. Public Health Notes. https://www.publichealthnotes.com/20-

    differences-between-randomized-controlled-trial-rct-and-quasi-experimental-study-design/

Wallace, C., Vandevijvere, S., Lee, A., Jaacks, L. M., Schachner, M., & Swinburn, B. (2019).

    Dimensions of national culture associated with different trajectories of male and female

    mean body mass index in countries over 25 years. *Obesity Reviews*, *20*(S2), 20–29.

    https://doi.org/10.1111/obr.12884

Ward, P. (2018). Trust and communication in a doctor-patient relationship: A literature

    review. *Journal of Healthcare Communications*, *3*(3). https://doi.org/10.4172/2472-

    1654.100146

Welton, S., Minty, R., O'Driscoll, T., Willms, H., Poirier, D., Madden, S., & Kelly, L. (2020).

    Intermittent fasting and weight loss: Systematic review. *Canadian Family*

    Physician, *66*(2), 117–125. https://www.cfp.ca/content/cfp/66/2/117.full.pdf

West Virginia Department of Health and Human Resources. (n.d.). *Obesity: Facts, figures,*

    guidelines. https://www.wvdhhr.org/bph/oehp/obesity/mortality.htm

Wondmkun, Y. T. (2020). Obesity, insulin resistance, and type 2 diabetes: Associations and

    therapeutic implications. *Diabetes, Metabolic Syndrome and Obesity: Targets and*

    Therapy, *Volume 13*, 3611–3616. https://doi.org/10.2147/dmso.s275898

World Health Organization. (2021). *Obesity and overweight*. https://www.who.int/news-

    room/fact-sheets/detail/obesity-and-overweight

World Obesity Federation. (n.d.). *World obesity day: 'all countries significantly off track to meet*

    2025 who targets on obesity'. https://www.worldobesity.org/news/world-obesity-day-all-

    countries-significantly-off-track-to-meet-2025-who-targets-on-obesity

Yin, C., Li, Z., Xiang, Y., Peng, H., Yang, P., Yuan, S., Zhang, X., Wu, Y., Huang, M., & Li, J.

    (2021). Effect of intermittent fasting on non-alcoholic fatty liver disease: Systematic

    review and meta-analysis. *Frontiers in Nutrition*, *8*, 709683.

    https://doi.org/10.3389/fnut.2021.709683

Zhang, J., Deng, Y., & Khoo, B. L. (2020). Fasting to enhance cancer treatment in models: The

next steps. *Journal of Biomedical Science*, *27*(1). https://doi.org/10.1186/s12929-020-

00651-0

Appendix A

University of Miami IRB Approval Letter

UNIVERSITY
OF MIAMI

University of Miami	Ph.: 305-243-3195
Human Subject Research Office	Fax: 305-243-3328
Gables One Tower	www.hsro.med.miami.edu
1320 S. Dixie Highway, #650	
Coral Gables, FL 33146	

APPROVAL

May 11, 2022

Melissa Winch
305-243-4000
mxw855@med.miami.edu

On 5/11/2022, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	An Intervention to Debunk Facts vs. Myths in Intermittent Fasting: A Quality Improvement Project
Investigator:	Melissa Winch
IRB ID:	20220365
Documents Reviewed:	•DNP Survey.docx •Letter of Support from Elizabeth Smith •Revised Consent •Revised Recruitment Poster •Revised UM IRB Form •UM IRB Form.docx •External Team Member - FIU DNP Faculty

The IRB determined this study meets the criteria for an exemption as described in Federal Regulation 45 CFR 46.104. This determination is effective on 5/11/2022.

NOTE: Translations of IRB approved study documents, including informed consent documents, into languages other than English must be submitted to HSRO for approval prior to use.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Should you have any questions, please contact: Andre Portuondo, IRB Specialist, (phone: 786-368-5003; email: AXP2297@med.miami.edu)
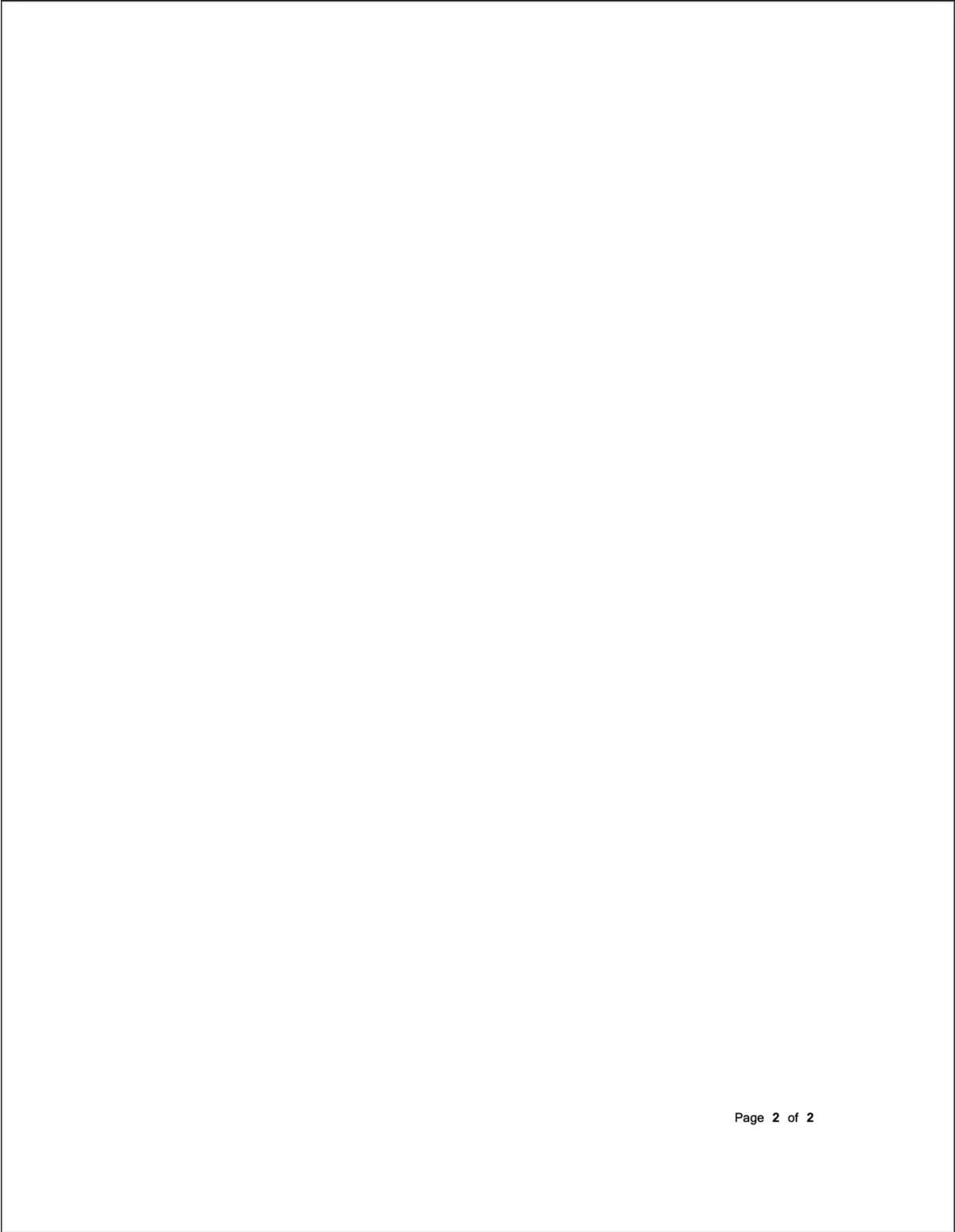
Appendix B

Florida International University IRB Approval Letter

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

Deana Goldin

Melissa Winch

June 13, 2022

"An Intervention to Debunk Facts vs. Myths in IF: A QI Project"

IRB-22-0276   06/13/22
111721

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.
                                                                                          or
discontinued.

Special Conditions: N/A

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

EJ

Appendix C

University of Miami Letter of Support

**UNIVERSITY OF MIAMI
HOSPITAL AND CLINICS**

RE: Letter of Support

Deana Goldin, PhD, DNP, APRN
Clinical Associate Professor
Nicole Wertheim College of Nursing & Health Sciences
Florida International University

Dear Dr. Goldin,

Thank you for inviting University of Miami Hospital Clinics to participate in the DNP Project of Melissa Winch. I understand that this student will be conducting this project as part of the requirements for the Doctor of Nursing Practice program at FIU. After reviewing the proposal of the project titled "An Intervention to Debunk Facts vs. Myths in Intermittent Fasting: A Quality Improvement Project" I have warranted him/her permission to conduct the project in this company.
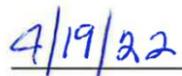
Education of healthcare providers has been shown to be one of the most effective strategies to improve the screening and diagnosis of various conditions and illnesses. This proposed quality improvement project seeks to investigate and synthesize the latest evidence on educational interventions for healthcare providers to become knowledgeable on the topic of intermittent fasting. There is clearly a need for a quality improvement that will consolidate all the available information on strategies for effective communication with patients about intermittent fasting.

We are understanding that the project will be develop in our setting and will occur for about 3 months. We are also aware of our department participation in supporting the student to complete this project, including warrant the student access to our facility, give written consent, deliver the pre-test questionnaire, provide the educational intervention and two weeks after providing the post-test to the recruited participants. We will provide a peaceful environment to safeguard our participant privacy as well as adequate area to conduct the educational teaching. The educational intervention will be classroom format and will last 20 to 30 minutes. Any data collected by Melissa Winch will be kept confidential and will be stored in a locked filing cabinet.

We expect that Melissa Winch will not interfere with the normal office performance, behaving in a professional manner and following the office standards of care. As the Chief Nursing Officer of the University of Miami Hospital Clinics, I support the participation of our facility in this project and look forward to work with you.

Sincerely,
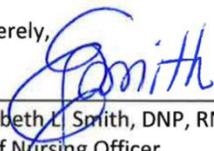
_____   4/19/22
Elizabeth L Smith, DNP, RN   Date
Chief Nursing Officer
University of Miami Hospital and Clinics
(Bascom Palmer Eye Institute, Sylvester Comprehensive Cancer Center, and UHealth Tower)

Nursing Administration Office, 1400 NW 12th Avenue, Suite 2033, Miami, FL 33136

Appendix D

Project Recruitment Poster

Appendix E

Project Pre- and Post- Survey

PRE- & POST- SURVEY

Demographics:

Gender: O Male   O Female   O Prefer not to answer

Age: O 18-24   O 25-40   O 41-56   O 57-75   O 75+

Education Level: O Associates.   O Bachelors.   O Masters   O Doctorate/PhD.

Clinical Position: O MD/DO O APRN O PA O Nutritionist/Dietician O Nurse O Unit Staff/Other

Ethnicity: O American Indian/ Alaskan Native   O Asian   O Black/African American   O White   O Hispanic/Latino   O Native Hawaiian/ Other Pacific Islander   O Prefer not to answer

Knowledge:

1. All the following are types of intermittent fasting <u>except:</u>

      a. Alternate day fasting   b. 5:2 method   c. negative energy balance

      d. time restricted feeding   e. modified alternate day fasting   f. I don't know

2. Intermittent fasting should be avoided by all the following individuals <u>except:</u>

      a. pregnant/breastfeeding   b. history of eating disorder   c. <18 years old

      d. underweight   e. all the above   f. I don't know

3. Intermittent fasting can reduce all the following <u>except:</u>

      a. weight   b. triglycerides   c. blood glucose levels   d. uric acid levels.

      e. LDL cholesterol   f. I don't know

4. Intermittent fasting can:

      a. decrease insulin sensitivity   b. increase insulin resistance   c. induce autophagy

      d. increase glucose levels   e. induce fatty liver disease   f. I don't know

5. In individuals undergoing chemotherapy, initial studies have shown short term intermittent fasting to be well tolerated and helps to:

      a. reduce fatigue   b. reduce toxicity   c. protect healthy cells

      d. reduce side effects   e. all the above.   f. I don't know

Attitudes:

1. Overall nutrition is an important part of my patient's health management.

      O strongly disagree   O disagree   O neutral   O agree   O strongly agree

2. Overall I have a positive attitude towards intermittent fasting.

      O strongly disagree   O disagree   O neutral   O agree   O strongly agree

3. Overall intermittent fasting is beneficial to human health.

      O strongly disagree   O disagree   O neutral   O agree   O strongly agree

4. Overall some of my patients can benefit from intermittent fasting.

      O strongly disagree   O disagree   O neutral   O agree   O strongly agree

5. Overall my patient's dietary needs are managed by a dietician/nutritionist.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

Confidence Levels:

1. Overall I am confident on the topic of intermittent fasting
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

2. I am not confident in my knowledge of intermittent fasting
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

3. I feel confident discussing intermittent fasting with certain patients that may benefit from this type of diet.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

4. I am confident recommending intermittent fasting to patients who may benefit from it.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

5. I am not confident discussing intermittent fasting with patients.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

Perception of Knowledge:

1. In general, I am knowledgeable of intermittent fasting.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

2. I know which individuals may benefit from intermittent fasting.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

3. I know which individuals should avoid intermittent fasting.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

4. I understand the potential benefits of intermittent fasting.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

5. I understand the potential risks associated with intermittent fasting.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

Behaviors:

1. I have practice intermittent fasting myself.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

2. I have recommended intermittent fasting to patients in the past.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

3. I plan to discuss and educate patients about intermittent fasting when appropriate.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

4. I plan to learn more about intermittent fasting.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree

5. I do not plan to use intermittent fasting in my treatment plans when managing patients.
     O strongly disagree   O disagree   O neutral   O agree   O strongly agree