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Food Addiction and Obesity

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This doctoral project, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

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A doctoral project submitted in partial satisfaction

of the requirements for the degree of

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by

Lisa Ling

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Dedication

I want to dedicate this DNP paper to my husband, Greg, for his enduring love, encouragement, and support.

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I want to acknowledge Dr. Ugochi Irikannu, my DNP chair, Drs. Rose Taylor-Lewis and Lynx McClellan, my DNP advisory committee, and the Abilene Christian University faculty. I want to acknowledge the healthcare workers during the COVID-19 pandemic and the nurse practitioners who took an additional task in supporting this project. I want to acknowledge my family and friends, and most importantly, my gratitude to God.

Abstract

The obesity rate in the U.S. adult population has increased to epidemic levels despite attempts to decrease obesity through evidence-based knowledge, clinical practice guidelines, medical interventions, and individual efforts. For certain individuals, food addiction behaviors such as food cravings, loss of control, and binge eating contribute to obesity and require a different approach to care. Little work has been done on adding the possibility of food addiction to obesity screening and treatment. This study utilized a quasi-experimental quantitative pre- and postsurvey research design based on Lewin's change theory. Nurse practitioners were surveyed regarding the provider's perceptions, attitudes, and beliefs about obesity both before and after the educational program. Due to the COVID-19 pandemic, recruitment via local resources and electronic communications resulted in only five participants during the allotted project timeline. Three out of five participants reported using the concept of food addiction in assessments. An education intervention on food addiction was administered following the initial survey, providing the participants with three evidence-based research articles and the Yale Food Addiction Scale survey and scorecard. Two weeks after the education was provided, the posteducation survey indicated no significant change in perceptions, attitudes, and beliefs about obesity. It is recommended that this project be replicated with a larger sample before concluding that education on food addiction and obesity does not change clinical practice.

Keywords: obesity, addiction, food addiction, weight loss, obesity epidemic, stigma

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Chapter 1: Introduction

Since 1990, obesity has evolved into a national threat to public health in the United States. The rapidly growing incidence of obese and overweight adults has been most evident in this same period, with numbers more than doubling to become an unstoppable health crisis and phenomenon (Hakkak & Bell, 2016; Julia et al., 2014). The combined rate of obesity and overweight persons in the U.S. population has reached epidemic dimensions affecting nearly 70% of the U.S. population, with more than 40% of the population being obese (Centers for Disease Control and Prevention [CDC], 2020a; Giardina, 2017; Nicklas et al., 2012). By 2030, obesity will affect 48.9% of the U.S. population (Ward et al., 2019).

In 2014, obesity was classified as a chronic disease that necessitated public health intervention, with 98.7 million Americans being obese and an additional 89.9 million Americans being overweight (Blumenthal & Seervai, 2018; Milken Institute, 2019). Obesity is a chronic disease that also increases the risk factor for developing other chronic diseases (Hakkak & Bell, 2016; MacInnis et al., 2020). As a result, the high cost of obesity and obesity-related conditions reached $1.4 trillion annually for the United States in 2014 (Milken Institute, 2019). Because of these factors, a new approach for comprehending obesity is imperative.

Obesity is complex and has multifactorial causes whose combination is unique to each patient, which complicates treatment. For example, weight gain can be influenced by the interaction of physical, psychological, emotional, environmental, socioeconomic, and relational factors (Brown & Wimpenny, 2011). As a result, multiple factors need to be considered, as an effective treatment of obesity would require more than one mode of comprehension (Schumacher, 2015). However, all the clinical practice guidelines recommend measuring body mass index (BMI) for obesity screening (Perreault, 2020). One theory proposes food addiction as

an explanation for one of the root causes of unhealthy eating behavior and unwanted weight gain (Fortuna, 2012; Fraser, 2013; Grosshans et al., 2011). Food addiction is an innovative theory that has plausible and neurobiological evidence supporting the role of obesity-provoking behaviors (Fortuna, 2012; Grosshans et al., 2011; Lerma-Cabrera et al., 2016). As a result, integrating addictive behaviors into the obesity screenings by primary care providers may help some patients discover their problems.

Problem Statement

The general problem addressed in this study was that obesity is a large-scale, societal health problem in the United States with significant adverse ramifications regardless of treatment, and that has been undiminished by medical efforts and individual desire to achieve sustainable weight loss. Despite exhaustive research and evidence-based findings on weight loss and weight management, U.S. obesity rates continue to increase (Brown & Perrin, 2018). The specific problem addressed in this study was a practice gap where it is unclear why obesity prevalence is increasing despite medical efforts and individual desires to achieve sustainable weight loss. For example, individuals are motivated to lose weight and maintain good health, but most cannot reach a normal weight (Gearhardt et al., 2009a). Their efforts to lose weight and sustain weight loss have been ineffective (Gearhardt et al., 2009a). Innovative theories and proposals for approaching obesity are warranted due to the high failure rate of evidence-based diet and exercise interventions to lose weight (Garner & Wooley, 1991). The overwhelming impact of obesity can be improved by allowing alternative concepts for causes of weight gain to be explored and considered. Therefore, more research is needed for “intervention approaches” for obesity prevention and treatment (National Institutes of Health [NIH], 1998, p. 98).

Background

Triple Aim Model for Treating Obesity

Trickett et al. (2016) proposed using the triple aim model for achieving long-term goals for obesity. The triple aim model focused on increasing value in health care and was created by the Institute for Healthcare Improvement (Berwick et al., 2008; Trickett et al., 2016). Its broad set of initiatives was designed to promote high-quality health care by reducing the high cost of care, improving the population's health, and increasing the patient's experience and satisfaction (Berwick et al., 2008; Trickett et al., 2016). Obesity is a candidate for improvement regarding these triple aim initiatives because the obesity crisis incurs exorbitant cost and expense from poor health outcomes, worsening health, and a lack of quality experiences in health care (Berwick et al., 2008; Trickett et al., 2016). Trickett et al. (2016) suggested integrating "shared medical visits" that recruit others involved in the interprofessional team (p. 781). These factors indicate that obesity support would benefit from nurse educators, nutritionists or dieticians, physical therapists, case managers, psychiatrists, psychology counselors, and behavioral specialists.

Preventable Chronic Disease

Obesity is a largely preventable chronic disease that increases the risk of other chronic diseases (Covington, 2017). Chronic disease, also known as chronic illness, is a long-term condition that may include one or more of the following: disability, rehabilitation, biological alteration, and permanency that requires a long period of medical treatment and health care services (Larsen, 2016). Over the past four decades, the prevalence of chronic diseases has increased significantly in the United States. Chronic disease includes obesity, heart disease, stroke, type 2 diabetes, pulmonary disease, and arthritis. Diseases that can be prevented by

modifying high-risk behaviors that influence the development and prevention of these chronic diseases include interventions involving nutrition, exercise, drugs, tobacco, and alcohol (Bemker & Ralyea, 2018). Chronic conditions and their associated complications have a high cost and make up 86% of the total health care funding and expense in the United States (Bemker & Ralyea, 2018).

Obesity in Vulnerable Populations

Vulnerable populations have significant health disparities and worse rates of obesity despite the spending on health care (American Psychological Association [APA], 2016; Joszt, 2018; "Vulnerable populations", 2006). Social determinants affect access to quality care, such as political status, education, economic level, homelessness, English literacy, age, gender, race, and culture (CDC, 2021; Joszt, 2018; "Vulnerable populations", 2006). Populations with mental illness, substance abuse, disability, and chronic disease also have higher risks for morbidity and mortality (Joszt, 2018; "Vulnerable populations", 2006). Some groups are geographically vulnerable and live in areas that can cause disparity, such as the rural areas, reservations, and high crime neighborhoods (Mennis et al., 2016; Office of Disease Prevention and Health Promotion, 2021; Rodriguez-Lonebear et al., 2020). The elderly, the very young, and the lesbian, gay, bisexual, and transgender (LGBT) groups also have higher risk factors (Joszt, 2018).

Providers often have difficulty in caring for vulnerable populations that require both physical and mental health assistance (Commonwealth Fund, 2018). The grant director for vulnerable populations designated by the Commonwealth Fund identified women, children, and rural citizens, with a disproportionate representation of racial and ethnic low-income minorities (Commonwealth Fund, 2018). These populations are likely to have few to no interactions with

the health care system and have higher chances of developing behavioral problems, experiencing isolation, and having food insecurity (Commonwealth Fund, 2018).

Obesity Stigma

Confronting the obesity stigma and bias involved with obesity is important for improving the quality of life for people with weight and weight-related problems. An obesity stigma has been widely accepted in society and perpetuated in many media outlets (Fruh et al., 2016). Weight discrimination has increased up to 66% in the United States, which is comparable to the incidence of racial discrimination (Fruh et al., 2016). Obesity-related perceived and internalized weight bias can prevent patients from seeking medical care for health conditions and avoiding their weight problems (Fruh et al., 2016). Patients perceived weight bias mostly from family members as the top source of bias, and health providers as the second most perceived source of bias (Puhl & Brownell, 2006). Obesity stigma does not encourage patients to change their eating behaviors, but it has deterred many from eating healthy (Puhl et al., 2007).

Scientific Underpinning of Food Addiction

The hypothesis of food addiction as a potential cause of obesity suggests that obesity has a neurobiological connection to addiction resulting in food cravings, loss of control, binge eating, overeating, and impulsive eating (Fortuna, 2012; Fraser, 2013; Leigh & Morris, 2018). Evidence suggests this connection includes neuropsychological interactions that occur when consuming high sugar, high fat, and highly delicious foods (Fraser, 2013; Lerma-Cabrera et al., 2016). In the neuroendocrine system, neurotransmitters have a role in regulating appetite and satiety (McCance et al., 2010). This system regulates eating behaviors, energy metabolism, and body fat, and an imbalance of these neurotransmitters has been associated with weight gain and obesity (McCance et al., 2010).

The hypothesis of food as an addiction proposes that neurological and behavioral interactions perpetuate obesity-promoting behaviors through an addiction potential caused by foods high in sugar, salt, and fat (Lerma-Cabrera et al., 2016). Therefore, recommendations to treat obesity should include psychological, behavioral, and cognitive components, as well as physical health evaluations and interventions (Grosshans et al., 2011; Lerma-Cabrera et al., 2016). The food addiction hypothesis suggests that savory foods alter the reward circuitry of the brain that causes behaviors similar to addiction, such as compulsive overeating, since obesity and drug addiction are both associated with decreased dopamine-reward system sensitivity (Ahmed & Sayed, 2017; Fraser, 2013; Gearhardt et al., 2018; Leigh & Morris, 2018; Lerma-Cabrera et al., 2016). Neural pathway changes in the mesolimbic dopaminergic of the reward system are evident with highly pleasing foods and obesity (Grosshans et al., 2011; Leigh & Morris, 2018).

Appetizing foods that induce obesity are influenced by the reward circuitry that controls the pleasure centers in a similar manner as with drug use (Grosshans et al., 2011; Leigh & Morris, 2018). The reward pathway in the brain is linked to the same response as with drugs and addiction (Ahmed & Sayed, 2017; Grosshans et al., 2011; Leigh & Morris, 2018). Dysregulated eating behavior originates from a combination of available highly flavorsome foods, high-calorie foods, increased exposure to foods, reduced activity, and increased stressors (Leigh & Morris, 2018). Junk foods and highly palatable foods are used as conveniently accessible substances for abuse (Fraser, 2013). Food cravings and binging on pleasurable foods are associated with "learning/conditioning" and "reward/motivation" in the addiction role that fuels the uncontrolled obesity rate (Sinha, 2018, p. 9). Therefore, the consumption of these foods has a similar neurological response as in drug addiction.

Purpose Statement

The purpose of this project was to evaluate the efficacy of an educational session on food addiction, directed to nurse practitioners who are primary care providers and applying the theory of change model, as evaluated using a pre- and posttest questionnaire. The project was designed to assess the primary care provider's willingness to integrate the knowledge of food addiction behaviors into obesity screenings. Primary care providers are on the frontline with their patients combating the obesity epidemic and have the opportunity and expertise to help patients in the clinical setting find answers for unwanted weight gain. The project's overall goals were to improve primary care providers' understanding of the root causes of obesity and improve patient treatment.

As part of the purpose of this project, critical factors in eating behaviors that are similar to food addiction could be identified through the primary care provider, thus helping adults with obesity to understand better their relationship with food and eating. If primary care providers could assess high-risk health behaviors that contribute to weight gain, they would be able to properly screen for obesity-provoking behaviors in addition to using the standard obesity screening tool of measuring body mass index (BMI). Accepting the food addiction hypothesis into medical practice could bring a new outlook on treating obesity and its associated behaviors.

The integrative approach to obesity acknowledges the comprehensive health aspects of an individual. By allowing integrative care to address the physical, psychological, and substance abuse components of health and obesity, innovative treatments would potentially produce worthier outcomes. The complexity and challenge of changing lifestyle behaviors should involve holistic strategies that recognize the various dimensions of an individual (Brown & Wimpenny, 2011). Treatment care plans should be individualized and specifically developed for each patient,

and tailored treatment would be necessary to accommodate the different circumstances of the patient (Grave et al., 2013; Hartman et al., 2014).

For individuals with resistant obesity, described as a failure to lose weight despite repeated attempts, successful weight loss and management involves recognizing the cause of the problem, acceptance of the problem, and proper treatment of the problem. Weight loss strategies should match the individual's treatment needs (Grave et al., 2013; Harvard T. H. Chan School of Public Health, 2014). An obesity screening that included food addiction criteria would offer some patients insight into their eating patterns and inability to lose weight.

Significance

Doctor of Nursing Practice

As listed in the Eight Essentials, one applicable responsibility of the Doctor of Nursing Practice (DNP) is to reduce the epidemic proportion of weight gain in communities that contribute to the development of chronic disease, disabilities, and a lower quality of life. The Essentials of Doctoral Education for Advanced Nursing Practice (American Association of Colleges of Nursing [AACN], 2006) described the competencies that are central and applicable for the nursing profession of all specialties. The DNP project included the AACN's (2006) Essential I–Scientific Underpinnings and Essential III–Clinical Scholarship and Analytical Methods for Evidence-Based Practice. These eight principles or essentials are the AACN's "foundational outcome competencies" (AACN, 2006, p. 9). The obesity problem is also addressed in Essential VII–Clinical Prevention and Population Health for Improving the Nation's Health (AACN, 2006).

The function of the DNP can create change. The American Nurses Association (n.d.) stated that everyone should have access to high-quality, safe health care. They advocate for

patients and health systems reform (American Nurses Association [ANA], n.d.). They stated that "health care is a basic human right" (ANA, n.d., para. 4). The DNP functions include translating evidence into practice and collaborating with other professionals and experts to generate evidence-based knowledge to integrate into clinical practice (AACN, 2006; Chism, 2016). Practice change is based on the strength of the evidence that is determined by the level and quality of evidence (Melnyk & Fineout-Overholt, 2015). Disseminating evidence-based research findings will increase professional and public awareness of the best and safest recommendations on preventing disease, maintaining health, and treating illness (Melnyk & Fineout-Overholt, 2015).

Improving Health

Preventing and effectively treating obesity is important for improving health outcomes and quality of life for many. Obesity is a preventable condition that led to the development of multiple health conditions (in order of decreasing acuity level): coronary artery disease, hypertension, stroke, diabetes, dyslipidemia, certain types of cancers, respiratory complications, sleep apnea, gallstones, osteoarthritis, infertility, and low self-esteem (Bragg & Crannage, 2016; CDC, 2020a, 2020b; National Heart, Lung, and Blood Institute, 2013). Patients with obesity also had a higher risk for psychological maladjustments and living with social stigma (CDC, 2020a; National Heart, Lung, and Blood Institute, 2013; Puhl et al., 2020). Obesity increased the risk for the development of disease and disability (Perreault & Apovian, 2020).

Maintaining a normal weight would help preserve health and mobility, prevent pain, and improve physical, mental, and emotional well-being. Prevention of obesity would benefit conditions involving chronic joint pain, physical disability, incontinence, quality of life, and

depression (Bragg & Crannage, 2016; Perreault & Apovian, 2020). Weight loss would assist those to restore good health and improve chronic disease.

Reducing Health Care Debt

The U.S. national health expenditure was expected to rise to 19.2% of the gross domestic product in 2020 (Kovner, 2015). This was problematic because the United States spent twice as much as other developed and wealthier countries on health care in 2016 but had worse population outcomes (Feldsher, 2018). Health care advancements achieved in medicine and technology did not necessarily reflect the health outcomes in the population.

Reducing the obesity problem was important because of its potential to lighten the financial burden on the nation's health care debt (Milken Institute, 2019). For example, people with obesity had higher health care costs and higher rates of absenteeism from work, therefore reducing work productivity (CDC, 2020b). In 2008, the direct and indirect costs of overweight and obesity-related health problems were $147 billion, and workplace absenteeism and productive loss from obesity-related causes were between $3.38 and $6.38 billion (CDC, 2020b; Goettler et al., 2017). Obesity contributed to the loss in finances, lower work productivity, and higher health care expenses for the individual.

In 2014, the annual U.S. national medical expense for obesity and other weight-related conditions reached $1.4 trillion (Milken Institute, 2019). In 2016, the medical costs and lost work productivity of obesity and being overweight in the United States was $1.72 trillion (Kelly, 2018; Waters & Graf, 2018). Adults over 20 years of age accounted for 39.8% (obesity) and 32.8% (overweight) of this expense (Waters & Graf, 2018).

The Nature of the Project

The study was designed to document and analyze primary care providers' attitudes and perceptions about obesity and their willingness to integrate the Yale Food Addiction Scale (YFAS) and food addiction behaviors into the obesity screening. To assist patients with weight loss during this obesity crisis, primary care providers must find alternative methods to handle obesity that may require a practice change in the primary care setting.

A rural Southwestern desert region in the United States was chosen for this DNP project because of the higher percentage of obesity and vulnerable populations present. The setting of the project was primarily rural environments in primary care practices. Rural residents had higher risks for health problems and higher rates of obesity (CDC, 2018; Rural Hub Information Center, 2020). They were disadvantaged geographically and may have lived in remote and distant locations away from adequate health care centers (Trust for America's Health, 2020). They may have lived in poverty, had limited education, lacked proper transportation, and few resources that encouraged physical activity such as fitness centers, after-school programs, and safe recreational areas (Rural Hub Information Center, 2020; Trust for America's Health, 2020).

The primary care providers would be nurse practitioners who were given a questionnaire survey covering the following topics: the obesity epidemic, patients with obesity, the failure of weight-loss interventions, general knowledge of obesity, alternative approaches to obesity (including food addiction concepts), and potential for practice change. A pre- and posttest of the same questions would be provided to the nurse practitioner. After completing the first questionnaire, an information session on the food addiction hypothesis and the YFAS would be shown to the participant. An intervention information session would consist of three research articles on food addiction, and the YFAS would be provided through electronic communication

or mail services. A contact email and phone number were provided in case the participant wished to discuss the session material. After completing the two-week information intervention, the participant would be contacted to complete the final survey postquestionnaire.

In general practice, food addiction symptoms were screened through the YFAS (Masheb et al., 2018). The YFAS was a questionnaire that related to eating, food addiction, behavior, and mental health (Masheb et al., 2018). The evidence of food addiction behaviors could be established by utilizing the self-reported questionnaire. The YFAS was appropriate for adults with obesity who were interested in losing weight, but they continued to fail in their attempts to lose weight. The YFAS used the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), measuring for substance dependence to establish the diagnosis for food addiction (Carter et al., 2019; Schulte & Gearhardt, 2017). If the DSM-IV criteria were not applied, the diagnosis for food addiction would not be valid since addiction, dependence, and abuse pertain to psychiatric and mental health definition and classification. The YFAS was studied to predict eating disorders associated with binge eating and food cravings (Carter et al., 2019).

The effects of addiction in eating behaviors on obesity were complex. Gearhardt et al. (2009a) used the YFAS to determine eating disorders with substance dependence criteria among individuals with an elevated body mass index (BMI). The food addiction hypothesis reflected Rogers' (1990; Nursing Theory, 2020) holistic concept of inseparable systems interacting and working together that included behavioral, psychological, and biological factors leading to "addictive-like eating" (Gearhardt et al., 2009a; Schulte & Gearhardt, 2017, p. 302). Masheb et al. (2018) also associated psychosocial factors with the YFAS scores that contributed to eating problems and other psychological conditions, such as depression.

Research Question

Among rural U.S. primary care providers, does presenting information on the food addiction hypothesis and providing the Yale Food Addiction Scale survey change participants' attitudes and perceptions about obesity and BMI screening, as measured using a pre- and posttest questionnaire completed prior to and two weeks after training?

PICOT Question

- P (Population): rural U.S. primary care providers.
- I (Intervention): presented information on the food addiction hypothesis and provided the YFAS.
- C (Comparison): participants' attitudes and perceptions of primary care providers on obesity and BMI screening before and after the introduction of the Yale Food Addiction Scale (YFAS) survey and the food addiction hypothesis compared to attitudes and perceptions of primary care providers on obesity and BMI screening after reviewing the YFAS concepts and related evidence-based research studies.
- O (Outcome): increased participant willingness of primary care providers to utilize and integrate the YFAS tool and its concepts in screening for obesity.
- T (Time): two weeks.

The population comprised nurse practitioners who were primary care providers currently in practice within a rural locality. They cared for patients with obesity. The population was nonspecific to gender and age, with no specific requirement of years in practice. The inquiry focused on comparing the attitudes and perceptions of the primary care providers in a pre- and posttest format after a two-week period from the introduction of the food addiction hypothesis. The outcome in provider willingness was measured.

The YFAS could change obesity screenings, treatment, and management by increasing obesity awareness among primary care providers. The integration of the YFAS in the recommended obesity screening could evaluate for food addiction and affect provider care, attitude, and approach. The YFAS could change provider beliefs and perceptions of those living and dealing with obesity.

Hypothesis (Restatement of PICOT)

The research hypothesis was that introducing information on the YFAS and food addiction behaviors to primary care providers would create practice change from using the BMI only for obesity screenings to also including the YFAS criteria with the BMI. The attitudes and perceptions of the primary care providers would be measured to show in the providers' responses to obesity after new knowledge is given. The alternate hypothesis that was sought would be provider willingness to integrate a food addiction tool into the obesity screening. The null hypothesis would be provider unwillingness to integrate a food addiction tool into the obesity screening.

Theoretical Framework of the DNP Project

Lewin's (1951) change theory was used as the theoretical framework for this project. This theory of change was applied to the practice change prompted by a DNP scholarly project. The DNP is a practice-grounded professional doctorate that emphasizes promoting change in clinical practice and health care systems to improve patient and population health outcomes. In keeping with the DNP's degree emphasis, Lewin's change theory suggests that change in clinical practice could come with establishing "new knowledge in practice" through the usage of evidence-based practice (Burson et al., 2016, as cited in Moran et al., 2020, p. 51). The DNP project was based on scientific underpinnings and used evidence-based practice in guiding and

developing care. In this project, the change of professional medical opinion was studied. Collected research data provided a measurement of provider willingness to accept the concepts of food addiction and the adaptation of YFAS into obesity screenings. The scholarly project examined the process of change involving the primary care providers' feelings, attitudes, perceptions, and behaviors in undertaking obesity in practice.

Lewin's (1951) theory of change model followed three stages: unfreezing, change, and refreezing (Udod & Wagner, 2018). The application of this change theory reflected primary care providers' perspectives and positions on obesity and their comfort levels in accepting an alternative etiology for obesity. The first stage of unfreezing enabled change from influences that were conducive to change (Udod & Wagner, 2018). The supporting factors for changing the current recommendations in addressing obesity and letting go of traditional ways of thinking were the obesity epidemic and the failure of diet, exercise, prescription drugs, and bariatric surgery to reduce obesity rates. The providers may have shown reluctance in implementing new theories into practice based solely on the scientific research findings without the direction of clinical practice guidelines, which represented a restraining force for change. The second stage of change was the actual action and shifting of behaviors, feelings, and thoughts into a new and different level (Nursing Theory, n.d.). For change to have occurred, the compelling energies must outweigh or lessen the restrictive energies (Udod & Wagner, 2018). Change might occur when the providers are directly introduced to evidence-based studies. The third stage of refreezing was establishing new behaviors and practices as a result of this initial change that leads to "stability and evaluation" (Nursing Theory, n.d., para. 6; Sutherland, 2013). Screening for food addiction in obesity would be a refreezing response with new practicing standards and recommendations in place.

Operational Definitions

Addiction. A chronic disease of the brain is described as having a failure of abstinence, increased cravings for reward, loss of control, emotional dysfunction, and diminished judgment (American Society of Addiction Medicine [ASAM], 2011).

Body mass index. A standard calculation of height and weight estimated parameters for underweight, normal, overweight, obese, and morbidly obese categories of weight (MedicineNet, 2021). Body mass index (BMI) levels were based on cardiac and metabolic risk factors in developing the disease, with more significant health risks associated with higher BMI (Perreault, 2020). Body mass index classification followed measurements obtained from weight in kilograms divided by height in meters squared (Perreault, 2020).

Nurse practitioner. An advanced practice registered nurse with a master's or doctoral degree (American Association of Nurse Practitioners [AANP], 2019). A nurse practitioner (NP) was an independent practitioner who was a health care provider with a practice in primary care, acute care, and specialty care (AANP, 2019).

Obesity. A metabolic disorder is associated with an increase in body fat (McCance et al., 2010). Obesity classification was made by having a body mass index ≥ 30 (National Heart, Lung, and Blood Institute, n.d., para. 1; Skolnik & Ryan, 2014) or 20% above the normal weight (MedicineNet, 2021).

Primary care provider. A long-term health care provider who manages common illnesses and provides referrals to specialists (MedlinePlus, 2020). A primary care provider (PCP) could be a doctor, nurse practitioner, or physician assistant (MedlinePlus, 2020).

Assumptions

The assumptions of this DNP project included:

- truthful and accurate responses from the participants,
- the written answers given represented the participants in practice,
- a level of participant expertise in obesity,
- the participant screens for obesity in practice, following the clinical practice guidelines,
- the participant recognizes obesity as a chronic public health disease that requires priority, and
- the participant has direct access, opportunity, and authority through health care services to improve the obesity rates of their patients.

Scope and Limitations

The scope included a convenience sampling of medical providers that were obtained online through voluntary participation without compensation. An obesity questionnaire regarding knowledge, practice guidelines, clinical experience, personal opinions, attitudes on and perceptions about obesity, and practice change were taken before an information session on the food addiction hypothesis that may contribute as one of the causes to the increasing obesity rate. The same questionnaire was given after the session had been completed, provided after two weeks, to allow for reflection that would compare the participants' responses.

Limitations of the study included:

- sufficient quality clinical practice-based evidence for food addiction and obesity,
- adequate sample size for practice change agents,

- application of quantitative methods to explore a complex phenomenon as obesity that cannot be explained so easily,
- different interpretations of standard measures among the participants,
- maintaining social distancing during the COVID-19 containment and restriction of in-person recruitment and education,
- extraneous factors influencing outcome measures during the two-week window between the pre- and postquestionnaire, and
- convenience sampling of easily accessible respondents that do not represent the larger population.

Conclusion

Obesity is a public health threat predicted to affect nearly 50% of the U.S. population by the next decade. Obesity remains detrimental for the individual and society in both aspects of health and finances. The obesity crisis needs innovative methods and theories for dealing with this complex circumstance. The food addiction hypothesis was one alternate theory that compels obesity. The guiding research question sought to explore if the primary care provider will implement this practice change of integrating food addiction behaviors and the YFAS into obesity screenings. A primary care provider has the capability and position to influence patients to learn and change lifestyle habits. By providing evidence-based research supporting the food addiction theory and showing a different aspect of obesity, primary care providers may modify their views and approaches to handling obesity.

Chapter 2: Literature Review

The study was designed to gain an understanding of primary care providers' attitudes and perceptions on obesity in the Southwestern rural desert region in the United States and their willingness to integrate the YFAS and food addiction behaviors into the obesity screening. Addressing obesity in the United States has been a complicated, costly, and unsuccessful endeavor. The inability to manage and prevent weight gain has shifted from an individual problem to a national public health concern. A comprehensive literature review guides inquiry into the obesity crisis and the theory of food addiction into practice.

Literature Search Methods

A literature search utilized the nursing databases from Abilene Christian University's (ACU's) Margaret and Hermann Brown Library. This search included the following nursing databases: CINAHL Complete, Medline, PubMed, EBSCO, and Health Source: Nursing/Academic Edition. The Boolean search operators were not applied, and a final list of 22 significant studies was found. Key search words and phrases included *food addiction, integrative care model obesity*, *integrative health care*, *obesity, obesity addiction*, *weight loss*, *weight-loss obesity, weight-loss strategies*, and *YFAS.*

For the focused literature review on obesity and food addiction, the search began focusing on the failure of weight loss for the population with obesity, theoretical concepts of integrative care, and food addiction. To further identify pertinent studies, the following inclusion criteria were applied: systematic reviews, meta-analysis, random controlled trials, and level I studies. Studies were excluded that did not specifically relate to strategies for obesity, weight loss, or food addiction.

The literature review included peer-reviewed articles from scholarly journals and news reports published between 1990 and 2020. The purpose of using these articles was to support the connection of obesity with food addiction and to elucidate the neurological interactions that occur when consuming high sugar, high fat, and highly delectable foods. The resulting comprehensive review describes the foundation of the obesity problem, current weight-loss strategies, common barriers to weight loss, and an examination of food addiction in obesity as demonstrated through neurological changes and scientific underpinning.

Historical Overview

In the United States, overweight and obesity rates had been gradually increasing since the 1950s, but they began to soar in the 1990s (CDC, 1999). The CDC began collecting data on adults with obesity and who were overweight in 1958 (CDC, 2011). In 1959, the obesity rate was 4.8%, and by 2010, the obesity rate had risen to 37.5% (Ogden et al., 2012, as cited in Fortuna, 2012).

In 1995, obesity was declared a global epidemic outlining public health problems from the United States (James, 2008). From 1991 to 1998, Southern states had an increase of 67% obesity, with Georgia having a 101% increase in the incidence of obesity (CDC, 1999). Physical inactivity was a major contributor to the weight gain during that same 1991 to 1998 period, and caloric consumption increased from the 1970s to 1990s for the general population (CDC, 1999).

Obesity was first understood as an individual problem, not a public health concern (Rasmussen, 2015). In the 1940s and 1950s, obesity was understood as a psychiatric addiction, an “oral fixation” that caused overeating and weight gain (Rasmussen, 2015, pp. 217–218). The resulting “weight stigma” or weight bias, was created from the belief that obesity originated from addiction and overeating and involved issues, such as the lack of self-discipline and self-reliance

(Rasmussen, 2015, p. 222). The response and treatment to obesity were weight loss groups, such as Overeaters Anonymous (founded in 1960), Calories Anonymous (founded in 1954), Fatties Anonymous (founded in 1950), and Take Off Pounds Sensibly (TOPS; founded in 1948; Rasmussen, 2015, p. 221). As a result, community and population interventions were not initiated or considered during that era in time (Rasmussen, 2015).

The older conception of obesity due to addiction placed blame on the individual as having a flaw in character (Rasmussen, 2015). For example, addiction had a negative connotation that implied "a deeply immoral character defect signaling escapism" (Rasmussen, 2015, p. 218). Amphetamine advertisements also stated that "overweight people were inadequate, self-centered, or emotionally deprived" (Rasmussen, 2015, p. 219).

Weight bias reinforces the belief that weight outcomes are from personal choices and consequences (Puhl et al., 2020). According to Puhl and Heuer (2009, as cited in Puhl et al., 2020), common perceptions of and beliefs about people with obesity and who are overweight are lack of willpower, low self-discipline, "incompetent, unmotivated to improve their health, noncompliant with medical treatment," and "lazy, gluttonous" (p. 279). By 1990, national research reported that discrimination in the United States based on weight was becoming commonplace, with women reporting more weight bias experiences than men (Puhl et al., 2020). As a result, weight stigma remains an openly accepted, inconspicuous barrier in the obesity crisis.

The Obesity Approach: Weight Loss Strategies and Barriers

Many studies have examined the treatment of obesity that successful weight-loss strategies and barriers to weight loss were identified (Grave et al., 2013; Hartman et al., 2014; Orzech et al., 2013; Ramage et al., 2014). The key concepts that emerged from practical weight

loss studies were diet and exercise, cognitive behavior counseling, social support, pharmacotherapy, and bariatric surgery (Bray & Ryan, 2012; Brown & Wimpenny, 2011; Makris & Foster, 2011; Milsom et al., 2011; Shepherd, 2010). The key barriers to weight loss were comfort eating, eating preferred foods, emotional eating, lack of adherence to a controlled diet, depression, and lack of social support (Grave et al., 2013; Makris & Foster, 2011; Orzech et al., 2013; Ramage et al., 2014).

For successful weight loss, diet and exercise were the most commonly prescribed, first-line treatments (Grave et al., 2013; Hartman et al., 2014; Orzech et al., 2013; Ramage et al., 2014). Obesity drugs helped those unable to lose weight through diet and exercise (Bray & Ryan, 2012; Laddu et al., 2011; Shepherd, 2010). Behavioral counseling and bariatric surgery were also recommended for obesity treatment if diet and exercise were not successful (Brown & Wimpenny, 2011; Grave et al., 2013; Hartman et al., 2014; Ramage et al., 2014). Other interventions were calorie counting, commercial food replacement diets, commercial weight-loss programs, health education, and tailored weight management (Grave et al., 2013; Hartman et al., 2014; Ramage et al., 2014).

Despite the knowledge that diet and exercise are the primary interventions for successful weight loss, obesity rates in the United States have continued to increase. The primary predictors for weight loss and weight maintenance are diet management and routine exercise or activity (Laddu et al., 2011). Weight loss was more dependent on calorie restriction than on modifying categories of food eaten (Laddu et al., 2011.) Investigations of weight loss failure have also reported self-management and self-efficacy as strong predictors of weight loss (Grave et al., 2013; Milsom et al., 2011). There is a lack of dialog on alternative theories of obesity, such as

the food addiction hypotheses that can possibly address the failure of weight loss and weight control.

Food Addiction and Obesity

Food addiction as a cause of obesity for some individuals is highly plausible. For example, research studies have shown a link between the problems of addiction and abuse with food and eating (e.g., Boswell & Kober, 2016; Carr et al., 2017; Sinha, 2018). In addition, the brain reward pathway reinforces pleasure and a favorable response when consuming delectable foods that are high in fat, sugar, or salt (Hyman, 2009). This suggests that people choose unhealthy foods for their taste and experience. A neurological chemical change occurs when addictive substances take over the dopamine receptor sites in the brain's reward center called the ventral striatum (Fraser, 2013). The brain then adjusts and produces less dopamine for the receptor sites, thus creating a need and craving for the addictive substance (Fraser, 2013). Symptoms similar in substance abuse and addiction are present in food cues and food tolerance (Ahmed & Sayed, 2017; Boswell & Kober, 2016).

The Hypothesis of Food Addiction and Obesity

Analogies of food addiction and the neurobiological, psychological, and behavioral aspects of drug dependence and abuse may contribute to dysregulated eating and weight-based problems (Carr et al., 2017; Gearhardt et al., 2016). From a meta-analysis study, the prevalence of food addiction was 19.9% among the studies, having a representation of those having food addiction criteria who were obese or overweight with 24.9%, and those who were of normal weight with 11.1% (Pursey et al., 2014, as cited in Carr et al., 2017). The food addiction theory and neurobiological evidence supported why people may lack interest in healthy foods and why there was a lack of adherence when eating healthier foods (Gearhardt et al., 2009a). People with

a high BMI were motivated to lose weight and made efforts to lose weight (Gearhardt et al., 2009a). The desire to have a normal weight and maintain good health was sought but remained unattainable (Gearhardt et al., 2009a). Researchers also recognized that the national investment of time and funding in confronting the obesity epidemic continues to be exorbitant and futile (Gearhardt et al., 2009a). The food addiction theory has sound cause to the loss of control over obesity for some individuals.

Reward Pathway and Palatable Unhealthy Foods

Junk food, overeating, and unhealthy foods as convenience draw on an existing link between obesity and addiction (Fraser, 2013). Foods known to heighten the senses have the potential to cause a neurobiological response. Fraser (2013) conducted a systematic review on addiction and obesity that reinforced the "brain reward system" for overeating (p. 497). Addictive substances take over the receptor sites for dopamine on the ventral striatum, thereby eliciting an exaggerated response of pleasure and satisfaction (Fraser, 2013). The reward pathway is also known as the hedonic system (Fraser, 2013). Brain circuitry adjusts to the use of this substance and decreases the release of dopamine since it appears no longer needed (Fraser, 2013). The modified brain has reinforced the effects of the substance, and a greater need will be experienced (Fraser, 2013).

The connection among fast food, soda, and binge eating with unwavering obesity has been prevalent in the last five decades since the 1960s (Fortuna, 2012). Fortuna (2012) found neurochemical evidence behind food dependence that also corresponds with the psychological problems of substance abuse and addiction in researching the obesity epidemic. Evidence suggests that a neurobiological reaction occurs in the brain's pleasure pathways when binge eating enjoyable foods (Fortuna, 2012). It is common knowledge that "sugar primes endorphin as

well as dopamine in the nucleus accumbens," causing an exaggerated hedonistic and satisfying response (Fortuna, 2012, p. 58). Endorphin is a neurotransmitter that most commonly reacts to stress and pain and interacts with opiate receptors (Conrad Stoppler & Shiel, n.d.). Opiate drugs, such as morphine, hydrocodone, and codeine, also act as an endorphin to reduce pain perception, decrease stress, and cause euphoria; however, unlike naturally occurring endorphins, opiate drugs can cause dependence and addiction (Conrad Stoppler & Shiel, n.d.).

Dopamine is a neurotransmitter involved with the reward pathways that produce pleasure, euphoria, motivation, and compulsion (Hyman, 2009). Addictive substances flood the receptor sites on the outer cell of the nucleus accumbens with dopamine, thus reducing the need for dopamine and reducing the capacity for dopamine production (Fortuna, 2012; Hyman, 2009). Addiction alters brain function by developing a dependence on the addictive substance to replenish and fulfill the need for dopamine in the reward system (Hyman, 2009). The hippocampus imprints this instant response and the experience of gratification into memory, and the "amygdala creates a conditioned response to certain stimuli" (Hyman, 2009, para. 4). This leads to the assumption that when dopamine levels are low, food cravings may be high (Grosshans et al., 2011).

Addictive disorders are dependent on physiological causes known to originate in the mesolimbic system (also called the dopamine system and the reward system; Grosshans et al., 2011; Icahn School of Medicine at Mount Sinai, n.d.). The mesolimbic system acts with the lateral hypothalamus as the regulating structure for energy homeostasis (Grosshans et al., 2011). The mesolimbic pathway releases dopamine from the ventral tegmental area to the nucleus accumbens (also referred to as the ventral striatum; Grosshans et al., 2011; Icahn School of Medicine at Mount Sinai, n.d.). The ventral tegmentum contains dopamine that communicates to

the individual if a stimulus is “rewarding or aversive” (Icahn School of Medicine at Mount Sinai, n.d., para. 3). The nucleus accumbens is the receiving site for the dopaminergic neurons that process the effects of the reward or stimulus (Icahn School of Medicine at Mount Sinai, n.d.). Peptides (“leptin, ghrelin, and orexin”) regulate appetite and the interconnected processes between the mesolimbic system and lateral hypothalamus that regulate energy homeostasis (Grosshans et al., 2011, p. 190).

From a meta-analysis review including functional magnetic resonance imaging (fMRI) and neuropsychological studies, Grosshans et al. (2011) discussed the impact of food consumption and drug addiction on the mesolimbic system. Evidence collected from the fMRI data showed activity in the nucleus accumbens from eating chocolate, activation of the mesolimbic system from drug use and associated drug dependence, and mesolimbic activity with drug “cravings and relapse” (Goldstein & Volklow, 2002; Grusser et al., 2004; Heinz et al., 2004; Small et al., 2001, as cited in Grosshans et al., 2011, p. 192). Activation in the ventral striatum was observed with visual stimulation of appetizing high-calorie foods among patients with obesity (Rothermund et al., 2007, as cited in Grosshans et al., 2011). Grosshans et al. (2011) studied left ventral striatum activation from food cue stimuli on groups of normal BMI and obese BMI participants with findings that showed a linear relationship among mesolimbic activation from food, consumption of food, and BMI status (Grosshans et al., 2011).

Food Cues

Boswell and Kober (2016) conducted a quantitative meta-analytic review that showed increased activity in the ventral striatum from food cravings triggered by food cues. Food cues correspond with drug cues in addiction, with the increased ventral striatal activity present in both (Boswell & Kober, 2016). “Food cue reactivity” can represent a physiological response to sight,

sound, smell, feel, or taste reminiscent of certain foods, or be internal stimuli that can be memories of food, hormonal changes, stress, or negative experiences (Boswell & Kober, 2016, pp. 159–160). Cues or triggers for drug use can be the mere sight of the drug, images of drug-using, people who were once associated with drug use, and a drug apparatus (Boswell & Kober, 2016).

Tonic cues appear without the need for external stimuli and emerge from interceptive responses of an individual's awareness and well-being (Paulus & Stewart, 2014). Tonic drug cravings and relapse can occur without the presence of physical triggers because "tonic measures of craving are, by nature, retrospective and capture a general subjective experience of craving over a prescribed time period when craving has not been provoked" (Ray et al., 2013, as cited in Hartwell & Ray, 2018, p. 71). Drug relapse can be triggered by emotions and feelings that lead to drug-seeking and drug-abusing behaviors (American Addiction Centers, 2021). Similar behaviors in drug addiction are present in food addiction and unhealthy eating. Increased eating and the resulting weight gain can be provoked by food cues and cravings, which suggests that approaches for obesity should be sought and developed from addiction awareness, insight, and knowledge (Boswell & Kober, 2016).

Food Addiction Behaviors

Addiction in association with food and eating behaviors pertains to control when eating and drinking certain foods and beverages that are sweet, starchy, salty, fatty, and sugary (Gearhardt et al., 2016). Difficulty in controlling eating and drinking habits of certain foods and beverages are experienced with addiction and substance dependence criteria in the following:

- eating in excessive amounts;
- extended time eating;

- failed attempts to eat less;
- excessive time obtaining, consuming, and recovering from eating episodes;
- a decrease or stoppage in important personal and social activities due to food;
- eating behaviors continue despite knowledge of consequences and negative effects;
- tolerance to the food that includes an increase in amounts eaten and a decrease in the effects of eating the food;
- withdrawal symptoms occur with abstinence, and there is a relief of withdrawal when the food is resumed;
- unable to carry out responsibilities and obligations at home, work, or school with association to eating;
- obtaining the food despite being in a harmful situation or environment;
- cravings for the food;
- clinical impairment or health problem due to food; and
- family and friends having concerns about one's eating behaviors (Gearhardt et al., 2009a; Gearhardt et al., 2016; Schulte & Gearhardt, 2017).

There is biological evidence that has shown increased neural activity in the dopamine and opioid pathways of drug abuse that are similar in food responses (Ahmed & Sayed, 2017).

Ahmed and Sayed (2017) found that food addiction behaviors, most notably food tolerance, were present in 15.7% of a random sample taken from a cross-sectional study on the occurrence of food addiction in association with body mass index (BMI; Ahmed & Sayed, 2017). The study utilized the YFAS to measure symptoms of food addiction among 801 adolescents from ages 11 to 18 in Cairo, Egypt (Ahmed & Sayed, 2017). The results of symptoms in highest to lowest order included "tolerance, withdrawal, important activities given up or reduced, tried

unsuccessfully to quit, loss of control, large amount of time spent to obtain food, continued use despite adverse consequences, clinically significant impairment, food addiction diagnoses" (Ahmed & Sayed, 2017, p. 259). Food addiction diagnosis was consistent across BMI classifications, but food addiction symptoms varied according to different BMI levels, except for tolerance (Ahmed & Sayed, 2017).

Lerma-Cabrera et al. (2016) discussed the "addictive potential" of "palatable" and high-calorie foods in the obesity predicament (p. 1). Neuroimaging studies support this theory by verifying similar brain reactions of addiction from exposure to food and drugs that are objects of abuse (Lerma-Cabrera et al., 2016). Individuals who were obese or had drug addictions had lower dopamine levels and exhibited fewer dopamine receptor sites (Lerma-Cabrera et al., 2016). The findings also found decreased mechanisms in the prefrontal and orbitofrontal cortexes of the frontal lobe that have control over eating impulses and emotional behaviors (Fuster, 2001; Lerma-Cabrera et al., 2016). Despite the current neurobiological studies linking food and drug addiction, there is also contradicting evidence that questions the validity of the food addiction hypothesis (Lerma-Cabrera et al., 2016).

Yale Food Addiction Scale

Gearhardt et al. (2009b) developed the Yale Food Addiction Scale (YFAS), a 25-item questionnaire, as a measurement tool to assess substance dependence and abuse criteria in eating behaviors. The scale was designed to quantify substance dependence criteria related to the intake of certain foods high in fat and sugar (Gearhardt et al., 2009a). Lerma-Cabrera et al. (2016) elaborated on the YFAS as being a functional instrument for identifying food addiction behaviors in individuals. The original YFAS is a self-reported questionnaire based on the criterion of substance dependence symptoms as described in the *Diagnostic and Statistical*

Manual of Mental Disorders (4th ed., text rev.; DSM IV-TR; Lerma-Cabrera et al., 2016). The survey lists questions that included "loss of control over consumption, a persistent desire or repeated unsuccessful attempts to quit, continued use despite physical and psychological problems, and clinically significant impairment or distress" (Lerma-Cabrera et al., 2016, p. 3).

Instruments for measuring food addiction criteria in behaviors are warranted to validate testing and support the clinical relevance of the findings (Lerma-Cabrera et al., 2016). Research findings on individuals with obesity after having bariatric surgery showed a negative response and weight gain from those having high YFAS scores (Lerma-Cabrera et al., 2016). In another study on obesity, high YFAS scores showed a tendency for compulsivity and "emotional reactivity" compared to the control group (Lerma-Cabrera et al., 2016, p. 3). Evidence-based studies have shown that high YFAS scores correlate with more binge eating occurrences (Lerma-Cabrera et al., 2016).

Gearhardt et al. (2009a) developed the preliminary validation of the Yale Food Addiction Scale from a stratified random sample of 353 young adult nonclinical participants who were assessed for types of food addiction, eating disorders, alcohol intake, and associated health behaviors. An initial 1,440 random undergraduates were selected as participants from a private university in the northeastern United States (Gearhardt et al., 2009a). Of the 353 participants who began the survey, 233 completed the pertinent measures (Gearhardt et al., 2009a). The demographics included the "average age of 20.11 (*SD* = 1.38), with 72.5% Caucasian, 18.5% Asian American, and 9.0% African American" (Gearhardt et al., 2009a, p. 431). Women had a higher rate of answering all the measures at 64.2%, and men made up 35.8% of the sample (Gearhardt et al., 2009a). The average self-reported BMI was 22.58 (*SD* = 3.18), with 73.5% being normal weight, 2.7% obese, 18.7% overweight, and 4.7% underweight (Gearhardt et al.,

2009a). Findings predicted binge eating better than using criteria based on eating disorder pathology (Gearhardt et al., 2009a). The study showed internal and incremental validity, reinforcing that the YFAS was a sound tool for assessing eating problems similar to addiction (Gearhardt et al., 2009a).

The Yale Food Addiction Scale Version 2.0 (YFAS 2.0) was revised due to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-V) release in 2013 (American Psychiatric Association, 2020; Gearhardt et al., 2016). The YFAS Version 2.0 accommodated the changes made in the DSM-V section concerning substance-related and addictive disorders (SRAD) to remain current with diagnostic criteria (Gearhardt et al., 2016). The DSM-V diagnosis for substance use disorder (SUD) combines abuse and dependence criteria but has omitted legal problems from the earlier DSM IV and added cravings (Hasin et al., 2013). A DSM-V diagnosis for SUD requires two or more of the following 11 criteria: "hazardous use, social/interpersonal problems related to use, neglected major roles to use, withdrawal, tolerance, used larger amounts/longer, repeated attempts to quit/control use, much time spent using, physical/psychological problems related to use, activities given up to use, craving" (Hasin et al., 2013, p. 836). Convergent validity of YFAS 2.0 with YFAS has associative measures of increased compulsive eating, more binge-eating episodes, greater fluctuations in weight, and higher BMI (Hasin et al., 2013). The limitations of screening for obesity with the YFAS 2.0 assume patients will be truthful when answering the questions. Another weakness of the YFAS and YFAS 2.0 is the lack of practice studies in the clinic setting since the survey has been primarily used for research purposes.

In a controlled nonrandomized study by Masheb et al. (2018), food addiction was examined in relationship with obesity using both versions of the YFAS. The validity of YFAS

and YFAS 2.0 was tested using overweight and obese populations seeking weight loss to determine if food addiction was prevalent (Masheb et al., 2018). The sample demographics included 126 veterans, with overweight or obesity, mean age = 61.8 years, mean BMI = 38.0, male = 89.7%, and Caucasian = 76.0% (Masheb et al., 2018). Findings of the study showed:

1. 10% of the sample had a significant correlation with food addiction;
2. food addiction inversely correlates with alcohol use disorder;
3. food addiction correlates with emotional eating, higher BMI, nighttime eating, depression screen, posttraumatic stress disorder (PTSD) screen, insomnia screen, and eating disorder; and
4. a high prevalence of food addiction (75%) with binge eating disorder (Masheb et al., 2018).

In a meta-analysis study by Leigh and Morris (2018), 10% to 25% of overweight and obese populations met YFAS criteria that overlapped food addiction and binge-eating behaviors. Current obesity interventions do not treat “dysregulated feeding behavior” and “hyperphagia, or chronic overeating” (Leigh & Morris, 2018, p. 31). “Dysregulated” eating originates from a combination of available highly palatable foods, high-calorie foods, increased exposure to foods, increased stressors, and reduced energy output (Leigh & Morris, 2018, p. 31). The study suggested a connection between obesity and dysregulated eating behaviors that stimulate binge eating, but the treatment for obesity does not address dysregulated eating behaviors.

Leigh and Morris (2018) recommended further research to differentiate food addiction and binge-eating behaviors and their neurobiological basis. Challenges exist to prove that the neurobiological changes of the dysregulated feeding pattern are associated with behaviors similar to addiction (Leigh & Morris, 2018). Recommendations are based on YFAS scores that correlate

with a specific behavioral composition and noted differences in brain function and structure (Leigh & Morris, 2018). As a new theory in obesity, food addiction gives way for potential treatment and prevention (Lerma-Cabrera et al., 2016).

Food Addiction Interventions

Obesity has physical, psychological, social, financial, and emotional consequences requiring overlapping substance abuse interventions of prevention and treatment for food addiction (Dimitrijević et al., 2015). However, there is currently no formal diagnosis for food addiction, and DSM criteria of a substance use disorder, addiction, and dependence are applicable to food and eating with the same condition that these three associated symptoms are present (Camargo da Rosa et al., 2015; Dimitrijević et al., 2015). The criteria for food addiction must include:

- eating excessive amounts of food for long periods of time,
- efforts to reduce eating large amounts of food, and
- continued eating large amounts of food despite negative effects and repercussions (Dimitrijević et al., 2015).

Suggestions for controlling food addiction included:

- avoiding food cues and triggers,
- avoiding abstinence,
- avoiding stress,
- exercise regularly to increase dopamine receptors,
- eat only when hungry, and
- maintain emotional wellness (Dimitrijević et al., 2015).

Recommended treatment management for food addiction include:

- lifestyle modifications,
- practicing mindfulness and emotional regulation,
- cognitive behavioral therapy,
- trauma therapy,
- solution-focused therapy,
- stimuli-control therapy,
- acceptance-based therapy,
- emotion-focused therapy,
- problem-solving therapy,
- support groups,
- motivational interviewing,
- a 12-Step program,
- pharmaceuticals,
- nutritional counseling,
- dietary planning with health-minded cooking instruction, and
- abstinence from addictive unhealthy foods (Chao et al., 2019; Dimitrijević et al., 2015; Leonard, 2020).

Enormous monetary amounts have funded treatment programs as an incentive for new research on obesity etiology (Dimitrijević et al., 2015). For example, a single-arm research study by Chao et al. (2019) utilized the YFAS variables in a group weight loss program that consisted of a meal replacement program and enhanced behavioral treatment for 14 weeks. Prior to the knowledge of food addiction, the primary interventions for weight loss were a combination of behavioral modifications, diet, and exercise (Chao et al., 2019). Two different weight loss

programs were compared based on YFAS criteria (Chao et al., 2019). One program included lifestyle interventions of diet and exercise and meal replacements consisting of calorie-controlled portions of food composed of prepared meals, shakes, and bars (Chao et al., 2019). The second program involved behavioral treatment supplemented with mindfulness and emotional regulation (Chao et al., 2019).

Subjects with food addiction criteria based on the YFAS also had increased food cravings and cravings for certain foods, such as highly sweetened, high fat, or very salty foods, compared to subjects with no YFAS criteria (Chao et al., 2019). A baseline measurement of YFAS criteria and food cravings was assessed for weight loss and attenuation after the 14-week program (Chao et al., 2019). The subjects were provided with medical and psychological clearances from a health practitioner and psychiatrist before initiating the study (Chao et al., 2019). The behavioral weight loss intervention consisted of 90-minute in-person group sessions for lifestyle modification instructed by a registered dietician and psychologist (Chao et al., 2019). Detailed steps were provided that included keeping a dietary intake journal, preparing the home for meal replacement necessities, and directions for meal prepping and menus (Chao et al., 2019).

Findings showed that addictive eating behaviors did not correlate with difficulties in weight loss and feelings of wearing away during the behavioral and meal replacement treatments (Chao et al., 2019). Fast food cravings and cravings for food with high sugar content, high-fat content, and high carbohydrates showed a significant decrease from pre- to posttreatment ($p <$ .001; Chao et al., 2019). Increased food cravings at the baseline showed the risk for weakened weight loss efforts that would benefit from focused therapy, such as acceptance-based and stimuli-control therapies (Chao et al., 2019).

Weinstein et al. (2015) conducted a longitudinal study based on a peer support program used by the self-help group Overeaters Anonymous that did not show measurable outcomes in controlling food addiction symptoms. Members of the group had admitted compulsive eating and met in person for peer support, help, and shared experiences (Weinstein et al., 2015). A principal treatment for overeating is abstinence (Weinstein et al., 2015). The treatment philosophy is based on the 12-step program from Alcoholics Anonymous, a support group for alcohol addiction (Weinstein et al., 2015). Members admit to loss of control with overeating and believe that willpower can enable them to eat healthier (Weinstein et al., 2015). A new member is assigned a "personal sponsor" with personal experience who provides regular contact and helps the member cope with daily issues (Weinstein et al., 2015, p. 193). Food addiction behaviors and self-efficacy were measured at baseline, at one year and five years, and the findings showed that outcome measures were not lower after one year and five years (Weinstein et al., 2015).

Lee et al. (2013) reported that the neurobiological explanation of uncontrolled eating and the food addiction hypothesis could influence societal decisions and support in the treatment for obesity. An online survey of 479 adults with 264 Australian and 215 U.S. random subjects showed substantial backing for the food addiction theory with noted support from those with obesity (Lee et al., 2013). The predominant beliefs of the participants included the following:

1. Obesity could be caused by food addiction.
2. A sample group objection to having an increase in tax on foods that cause addiction.
3. Psychotherapy was the best treatment for food addiction.
4. The best-supported policies for addressing food addiction were education and support programs.
5. Obesity was ultimately an individual responsibility (Lee et al., 2013).

The perceived plausibility of food addiction was high, but the belief of personal choice and individual responsibility in addressing obesity was stronger (Lee et al., 2013).

Bragg and Crannage (2016) conducted a meta-analysis review of pharmacotherapy for long-term treatment of chronic obesity, evaluating:

- orlistat (Xenical);
- lorcaserin (Belviq);
- phentermine or topiramate ER (Qsymia);
- naltrexone or bupropion SR (Contrave); and
- liraglutide (Saxenda).

These five U.S. Food and Drug Administration (FDA) approved obesity medications to manage chronic obesity can be prescribed in adjunction with diet and exercise interventions (Bragg & Crannage, 2016). Consideration to prescribe obesity medications can benefit patients with long-term control of obesity and weight maintenance.

Contrave (2020) is a combination drug therapy of bupropion and naltrexone that reduces appetite and works on the reward pathway of the mesolimbic system and the hunger center of the hypothalamus. Buproprion is an antidepressant that has been used for smoking cessation and was previously studied for obesity, and naltrexone is an opioid receptor antagonist that is used to treat alcohol disorders and opioid overdose (Jones & Bloom, 2015). Contrave obtained FDA approval in 2014 and European Medicines Agency (EMA) approval in 2015 (Jones & Bloom, 2015). In a Phase 3 clinical trial, a 3.2 to 5.2% greater weight loss was achieved after one year with Contrave than a placebo (Jones & Bloom, 2015). The neurochemical effects of Contrave that support weight loss are not completely understood by the manufacturer (Contrave, 2020). When

used together, a synergistic effect produces a reduction in appetite and food intake that is known to involve the food reward mechanism (Curry, 2017).

Theoretical Frameworks of Food Addiction and Obesity

Rogers' (1990) theory of unitary human beings and Bandura's (1977) social cognitive theory are beneficial for understanding obesity and food addiction and how to treat them (Bandura & Simon, 1977; Butcher, 2021; Stunkard & Penick, 1979). From Rogers' theory, Barrett's theory of power as knowing participation in change describes an interconnectedness of the human experience needed to produce change involving mindfulness, choices, and self-determination (Butcher, 2021). Treating obesity requires a person's understanding of the plan, the ability and motivation to carry out the plan, and active participation in following and continuing the care plan (Butcher, 2021). Barrett's theory is based on the Rogerian science of unitary human beings that recognizes the integration of living and nonliving contextual realms that are discernible from human and environmental interactions (Nursing Theory, n.d.). The common concepts involve energy, patterns, awareness, knowing, and action through "field pattern manifestations" to create change (Butts & Rich, 2015, p. 441).

Bandura's social cognitive theory (SCT) combines the concepts of cognitive and behavioral paradigms to guide lifestyle modifications that would be most highly effective for nutritional change (Bandura & Simon, 1977; Butts & Rich, 2015; Stunkard & Penick, 1979). Social cognitive theory provides the foundation for learning that supports the prevention and management of disease through self-care (Anderson et al., 2007). The main concept is that individuals learn from their own experiences and vicariously through others (Butts & Rich, 2015). Therefore, SCT would support obesity interventions for people to learn about healthier food options, choose foods wisely, eat within calorie limitations, and plan meals.

The theories of unitary human beings, power as knowing participation in change, and social cognitive learning lay the foundation to the experience, associations, and interrelatedness of obesity, and the potential for behavior change and positive health outcomes that can be achieved through knowledge, learning, empowerment, and self-care. Rogers refutes "causality" and the relationship between cause and effect among concepts (Fawcett, 2015, p. 15). All energy is mutual, integral, and dynamic, giving value to health patterns and well-being (Fawcett, 2015).

Conclusion

The food addiction hypothesis is an alternative strategy for confronting the obesity epidemic. New concepts in supporting people with obesity are needed. The countless evidence-based research findings on obesity and successful weight loss have not deterred the rising obesity rates. For the person having a failure of weight loss despite repeated attempts at dieting and exercise, food addiction may have a causative root in their obesity. Current research findings should be integrated into practice to be deemed useful, and primary care providers have the authority and capacity to introduce evidence-based knowledge into practice. Dhurandhar et al. (2019) found that successful weight loss is linked to patient acceptance for education and counseling regarding weight management, a diagnosis of obesity or overweight given to the patient, and open feedback and acknowledgment of weight loss efforts between the patient and health care provider. Further research is needed to support the assessment of addiction-like eating behaviors in obesity within the practice setting.

Chapter Summary

A change in primary practice to include the alternative concept of food addiction for the approach and control of obesity is essential. Obesity is predicted to reach nearly 50% of the U.S. population during the next decade (Ward et al., 2019). Research on food addiction as one of the

causes fueling the obesity crisis is evident. Key concepts in food addiction include the role of dopamine, reward pathway, unhealthy palatable foods, trigger foods (food cues), cravings, and the lack of adherence (loss of control). Neuroimaging tests have provided objective data on the reward or pleasure pathways in relation to palatable food consumption and drugs of addiction. However, Lerma-Cabrera et al. (2016) also reported discrepancies found in neuroimaging results of brain function in drug addiction and obesity. Interventions for food addiction should include modified treatments of addiction treatment for weight loss. Newer pharmacological therapies for chronic obesity may have the potential to curb the epidemic rates of obesity. Theoretical frameworks, such as Rogers' (1990) theory of unitary human beings and Bandura's (1977) social cognitive theory, compose the groundwork for obesity and food addiction and explains obesity as an all-encompassing phenomenon that requires change through acceptance, knowledge, and understanding (Bandura & Simon, 1977; Butts & Rich, 2015). This scholarly inquiry supports evidence for integrating addictive behaviors into the obesity construct. The measurement of substance abuse and addiction symptoms in relation to eating behaviors can be evaluated through the YFAS (Ouellette et al., 2018). The YFAS 2.0 is a simplified version of YFAS that has the potential to screen for food addiction symptoms in an outpatient practice setting. A practice change is vital for the successful management of obesity. Current approaches and treatment for weight loss have failed to control the obesity epidemic and to create positive changes for those living with the negative impact of obesity. Treatments for obesity can be customized for those having food addiction and substance abuse problems. Obesity is an evolving disease that can be better understood with further investigation.

Chapter 3: Research Method

This project's goal was to evaluate the efficacy of a proposed educational session on food addiction in obesity, directed to nurse practitioners who are primary care providers and applying the theory of change model. This was important because a successful, evidence-based application of food addiction theory (Gearhardt et al., 2016) depended on the willingness of primary care providers to use this evidence in practice. Participants would receive an introductory educational session on the YFAS (Gearhardt et al., 2016) and related evidence-based studies on the hypothesis of food addiction, including a recommendation that criteria for food addiction be placed into obesity screenings. Data were collected through pre- and posttest questionnaires, and a paired *t* test was used for analysis because it is an appropriate statistical test to evaluate provider willingness.

The theoretical framework for this study utilized Lewin's (1951) change theory to guide the project inquiry and narrow the problem of interest. Lewin's theory for policy change required a high level of motivation to produce a practice change: The need for change must be identified first, and then resolutions could be proposed (Keele, 2010). The process for initiating change required identifying the key stakeholders that could support and facilitate the change. In the moving stage, the change was in action (Keele, 2010) by planning and implementing the study. After a trial period in which change was implemented and evaluated, the support for change could be integrated into practice (Keele, 2010).

Further inquiry into practice studies for addressing food addiction as a factor in the obesity evolution was lacking. Data collected from current evidence and scientific knowledge support eating behaviors similar to addiction and abuse, but the findings were not translated and applied into patient care. This clinical inquiry would examine provider attitudes and perceptions

regarding the obesity epidemic and their willingness to incorporate contemporary concepts in reaching and treating patients with a focus on the addiction hypothesis.

Project Design and Purpose

This project utilized a quantitative quasi-experimental research design to obtain objective data and determine a relationship between two variables, in alignment with a convenience sample of primary care providers that would be used because it holds a low risk of bias and gives a higher level of representativeness with a larger sample size (Terry, 2018). This was important because the purpose of the study was to investigate how the YFAS and supporting studies would change primary care provider attitudes and perceptions pertaining to obesity and willingness to integrate food addiction symptoms into obesity screenings. The effects of the independent variable (food addiction hypothesis information packet) on the dependent variable (primary care providers) were measured through pre- and posttest surveys. One participant would take the same survey before and after the intervention, and the results from both surveys would be compared. The preferred outcome was a change in clinical practice by primary care providers that would benefit patients with obesity.

Institutional Review Board Approval and Process

Institutional review board (IRB) approval and processes were completed and followed in this study. Approval from the ACU IRB was obtained on August 25, 2020 (see Appendix A). In preparation for this research, I completed the mandatory training with Research Ethics, Protecting Human Research Participants (PHRP), and the ACU Human Subjects Research Protections. In accordance with IRB guidelines, the possibility of risks and benefits were explained to the participants. Similarly, participants were informed that minimal risk could be imposed, and protected health information (PHI) was not used in the study. The survey was

voluntary, and informed consent was obtained and documented. The participants and their responses will remain anonymous as their data was collected and managed through email and mail delivery services. All participants were adults over 18 years of age. No compensation was offered for participation.

Interprofessional Collaboration

This project included interprofessional collaboration with the clinical site director and NP, who are stakeholders in the project having a vested interest in the local community's health. The participants were also stakeholders in the inquiry at hand because they were clinically managing patients with obesity. Interprofessional collaboration among the director, lead NP, and ancillary staff brought together the expertise of each member of the team to create optimal quality in health outcomes.

Practice Setting

The practice setting was a rural integrative primary care community clinic in the Southwest United States that had provided a site affiliation agreement with ACU. The clinic had an interest in obesity treatment and offered weight management options for patients. However, obtaining subjects in the clinic and from the community was limited. Recruitment was conducted through formal and informal referrals and references within the local health community and nursing associations to reach a substantial number of subjects.

Target Population

The target population for this study was nurse practitioners serving as primary care providers in a rural Southwest desert region within the United States. Potential participants within this area were invited to take the survey. They were currently in practice with no stipulated years of experience required and caring for patients with obesity. The population was

adults over 18 years of age, with no gender delineation. Any potential participants who did not meet the mentioned inclusion criteria were excluded.

Risks and Benefits

There was minimal to nonexistent risk to subjects in the study. The population sample was not specifically classified as a vulnerable population, although subjects may have associated with vulnerable groups due to stratified data. No PHI would be obtained or accessed. Data in the form of electronic information were encrypted, and the papers were kept in a locked safe in an access-controlled secured location. The data will be deleted or destroyed after three years per IRB guidelines. No identifying records of the subjects or survey data will be retained after the completion and finalization of the study.

The benefits to the participants offered the possibility of integrating alternative models into the current philosophies of obesity. Both participating primary care providers and their patients were expected to benefit from an improved understanding of the weight problem. This was expected to lead to an enlightened perspective in understanding resistant obesity relating to uncontrolled weight gain and assisting patients who were having these specific symptoms.

Instrument and Measurement Tools

This study utilized a quantitative survey instrument called the new obesity survey (NOS) that was created for this study and collected answers using a 5-point Likert scale. Its 25 survey questions addressed the project objectives and shaped the outcome measures. The prequalifying and demographic questions screened people before taking the NOS. The questions met all criteria inclusive of informed consent, nurse practitioner licensure, specialty, current practice, caring for adult patients with obesity, and practice location.

The questions also inquired of age and years in practice. The survey questions pertained to obesity, food addiction behaviors, and practice change. The questions included key questions, distractor questions, supportive questions pertaining to practice, and supportive questions pertaining to attitudes and perceptions on obesity. The selection for survey responses involving attitude and perception were *strongly disagree, disagree, undecided, agree, strongly agree* (McLeod, 2019). The selection for responses involving possibility and willingness were *definitely, probably, possibly, probably not, definitely not* (McLeod, 2019). The inquiry included the following PCP:

- attitudes and perceptions on the obesity epidemic,
- perceptions of patient participation in obesity treatment,
- practice outcomes and comfort level in treating obesity,
- awareness of alternative methods for weight loss in obesity, and
- willingness to integrate innovative concepts as criteria of weight gain into obesity screenings.

The YFAS was not used as a measurement tool, but it was included in the information packet as an educational resource.

Data Collection and Management

Data were primarily collected and managed through electronic and paper forms. Consent and survey forms were given to the participants at their place of practice through mail or email. A self-addressed stamped return envelope was also provided for the convenience of delivery if mail service was chosen.

In recruiting participants, an invitation flyer was given to prospective participants that introduced the study and described the sample population required for the study. Prior to taking

the survey, the participant was informed of the purpose of the study, risks and benefits involved in the study, confidentiality protections of the participant, contact information regarding the study, and questions regarding participant rights. An informed consent was obtained. A demographics and prequalifying questionnaire verified inclusion criteria and asked for practice status, specialty, location, and age. The participant was asked to complete a pretest survey and then given an information packet on YFAS and food addiction research articles to review at leisure. After two weeks, the participant was sent another email or paper survey form and then asked to complete the same questionnaire survey. Reminders were sent throughout the timeline of the study using email, text, or letter. Differences in the surveys done before and after the intervention of food addiction education and reinforcement was compared for statistical outcomes.

Participant recruitment was based on the local medical community and a local nursing association. Nurse practitioners currently working in primary care were invited to participate in the study through electronic communication or mail delivery. Professional referrals were sought in seeking additional participants.

Data was stored in accordance with ACU (2018) and the Office for Human Research Protections (n.d.) guidelines. No identifying information will be kept, and research data will be stored in a secured university drive for graduate research (ACU, 2018). Research data will be stored for the minimum time required of three years as listed in the IRB guidelines (ACU, 2018; Office for Human Research Protections, n.d.).

Timeline

The scholarly project at ACU started in May 2018, and the collection of data began in December 2020, with an expected completion date of August 2021. A timeline table outlined

planned tasks (see Table 1). The study was conducted with the committee, affiliation clinic site, and IRB approval (see Appendix A).

Table 1

DNP Scholarly Project Plan and Timeline

Project component	Timeframe
Develop PICOT question	May 2018
Conduct search strategy, literature search	June 2018
Refine search strategy, build EBP knowledge	March 2019
Critical appraisal of evidence	June 2019
Synthesis of evidence	October 2019
Formation of DNP committee	January 2020
Identify resources and engage stakeholders	January 2020
Facility site affiliation agreement form	February 2020
Identify and address barriers	March 2020
Formulate recommendation for practice	May 2020
Proposal defense	July 2020
Gain IRB approval	August 2020
Identify or create clinical tools	October 2020
Implement project	December 2020
Analyze and summarize findings, apply to practice	March 2021
Refine recommendations for practice	April 2021
Preparation and presentation of project	August 2021

Note. Initial research of the scholarly inquiry began in 2014, providing supportive data for the project.

Methodology Appropriateness

Quasi-experiments were weaker compared to the true and standard experimental designs, but it was feasible and more appropriate in this study. This quantitative quasi-experimental study had a pre- and posttest design with outcome measurements recorded before and after an intervention (Terry, 2018). The outcomes goals stemmed from the guiding inquiry and problem of interest. The intervention of an information session on the YFAS and associated symptoms of addiction in consumption would either introduce or reinforce a familiar body of knowledge with primary care providers. Food addiction represented an alternative paradigm in the obesity framework (Rasmussen, 2015). This research inquiry would evaluate for practice change by the support of evidence-based studies and scientific underpinnings.

A quantitative research design was appropriate for this study because quantitative methods obtain valid and dependable computable measures for statistical analysis (Queirós et al., 2017). When utilizing quantitative research, data should be collected objectively, quickly, and cost-effectively (Terry, 2018), and the data gathered from participants should be factual and impartial to opinions and feelings. Conducting a survey would be more affordable and feasible to implement than incurring high financial expenses for the researcher and a long time period to spare for the participant. Potential participants may have been more willing to participate in a quick survey due to time constraints from busy work schedules. The survey tool enlisted the frontline worker, the primary care provider who provided education, screenings, and medical care management to patients (MedlinePlus, 2020). Breidert et al. (2006) provided a framework on methods showing measures of willingness with stated preference having direct surveys consisting of representative surveys and “expert judgments” (p. 3). The descriptive sample

summaries and inferential conclusions were also derived from the quantitative data (Terry, 2018).

A quasi-experiment would show the cause-and-effect relationship between the variables, such as the independent variable, intervention of a food addiction information session causing a change in the dependent variable, the primary care providers' attitudes, perceptions, and willingness of change regarding obesity (Melnyk & Fineout-Overholt, 2015). This quasi-experiment was used since an intervention was introduced, but randomization was not possible, and there was no control group (Melnyk & Fineout-Overholt, 2015). In the quasi-experimental interrupted time series design, observations in this study were obtained using a pre- and posttest among a consistent sample with the same survey questions (Melnyk & Fineout-Overholt, 2015). These observations recorded the effectiveness of the intervention in this single group design (Melnyk & Fineout-Overholt, 2015).

Feasibility and Appropriateness

The feasibility of the study was dependent on access to the sample population. The number of nurse practitioner primary care providers in a medically underserved rural community has limitations. This convenience sampling would have greater bias by representing only those who were motivated to volunteer and excluding those who did not wish to volunteer, though a representative sample should reflect the overall population (Terry, 2018).

The quantitative survey was an appropriate tool to collect data since research could be limited by time and cost (Breidert et al., 2006). The survey was administered to each participant over two weeks. The quantitative survey method would "collect data, evaluate data, identify patterns, interpret results" (Queirós et al., 2017, p. 374) with a lower time requirement. This rigid study structure could decrease developmental time and increase data collection and analysis

(Queirós et al., 2017). Quantitative methods of surveys and questionnaires could also be cost-effective and time-efficient while having the possibility of reaching masses of people (Queirós et al., 2017).

Due to the COVID-19 national emergency and social distancing restrictions, electronic communications and survey recruitment were the preferred routes; therefore, email and postal mail delivery services were used to recruit participants and obtain survey data. In-person communication was discouraged due to the high-risk contagion of COVID-19 and exposure at health care facilities. Telephone communications in the form of text and calls were also encouraged.

A disadvantage of surveys was the inability to record behavioral changes associated with emotions (Queirós et al., 2017). This quantitative study would not be biased with subjectivity from the researcher, but it could not document a comprehensive human or phenomenal experience (Queirós et al., 2017). Dealing with quantitative studies would have potential limitations that lack subjective data, including emotions and feelings, reliability of answers, and inflexibility of the design format that did not allow for extraneous influences (Queirós et al., 2017; Terry, 2018).

Analysis Plan

The one-sample paired *t* test compared measures of one same group between two periods of time in alignment with the Boston University School of Public Health (2016). The primary care provider (dependent variable) survey outcomes were compared prior to and post the food addiction hypotheses education intervention (independent variable). Interval data from the survey were collected to determine the willingness for practice change. Inferences were made from the interval measurements of this group sample that estimate the sample would be reflective

of the population (Terry, 2018). Descriptive statistics described the data of both the sample group and the measures that were collected from the sample (Terry, 2018).

The sample data consisted of inclusive criteria: nurse practitioners, primary care providers, currently active in practice, and managing patients with obesity. The demographic information collected included practice location, years in practice, specialty, and age category (Moran et al., 2020). The distribution of outcome measures for independent and dependent variables was first evaluated to determine normality (Moran et al., 2020). The relationship between the independent variables (food addiction hypothesis and associated symptoms) and dependent variables (primary care provider attitudes, perceptions, and willingness) were analyzed using the paired *t* tests (Moran et al., 2020). Quantifiable data would be displayed for analysis through line graphs (Moran et al., 2020) with sample percentages.

The Wilcoxon test had a higher statistical power compared to the *t* test with a sample size of five (Posten, 1982, as cited in de Winter, 2013). The test was based on probability distribution (Garb, 2016), and therefore, was not appropriate for this study. The Wilcoxon was a nonparametric test equivalent to the paired sample *t* test (Garb, 2016; MedCalc, 2021). Nonparametric statistics could have any distribution since the assumptions are less, and there was no expected outcome for a normal distribution (Garb, 2016).

After obtaining the data results, the significance and reliability of the findings were verified from the *p*-value of the sample *t* test. The analysis of variance (ANOVA) and chi-square were not appropriate for this study because a one-way ANOVA tests for variability among two sets of measurements but required more than two groups, and the chi-square tested the frequency relationship of variables as compared with chance occurrence for large scale studies (Terry, 2018).

Chapter Summary

The project inquiry guided practice change for primary care providers to initiate the YFAS or associated food addiction behaviors into obesity screenings. The quantitative study invited a convenience sample of subjects to partake in a pre- and postdesign Likert survey. Participant attitude and willingness were measured in the 5-point survey. Data collection and management through paper forms and electronic communications maintained participant confidentiality, and all information tied to patients remained anonymous. Project implementation began after IRB approval had been granted. Analysis of participant attitude, perception, and willingness was drawn and interpreted through inferential statistics.

This scholarly inquiry supported the change for improvements in clinical care and quality of life (Bonnel, 2017). Health practitioners could translate research findings for application in practice. Best evidence care would produce better outcomes and influence patients to achieve weight reduction and maintenance that would impact their quality of living. The primary stakeholders in the community, a clinic director, lead NP, and the participants supported health improvements for their patients and encouraged scholarship and interprofessional collaboration among health care professionals. Nurse practitioners had a primary role in healthcare and the opportunity to create change through evidence-based practice.

Chapter 4: Findings

This project was a quasi-experimental, quantitative research study designed to assess the efficacy of a learning intervention and PCP willingness to integrate food addiction symptoms into obesity screenings. The study collected objective data to determine a cause-and-effect relationship between the independent variable (food addiction education session or information packet) and the dependent variable (random convenience sample of PCPs). The findings suggested that this educational session intervention would not create a significant change in the assessment and treatment of obesity by integrating food addiction behaviors into obesity screenings. A paired *t* test was used to compare pre- and posttest survey answers from a 5-point Likert scale measuring the intensity of agreement and willingness. The significance and reliability of the findings were measured using the *p*-value, and inferential statistics were used on this convenience sample that was representative of the larger population.

The efficacy of the educational intervention was measured using participant responses to one survey prompt, using a 5-point Likert scale on willingness that asked the participant to choose from the following:

- 1 = definitely no
- 2 = probably not
- 3 = possibly
- 4 = probably
- 5 = definitely

The primary prompt was, “I would integrate the food addiction symptoms into my obesity screenings.” The survey prompt assessed PCP’s willingness or unwillingness to change obesity screenings by including addiction behavior criteria. No difference was noted from the

sample's pre- and posttest answers. The remaining prompts further investigated PCP attitudes and perceptions on obesity that would influence support or opposition of obesity approaches in screenings and treatments. After the intervention, there was no statistical sample percentage difference for the following posttest survey prompt based on the same 5-point Likert scale for willingness: "I integrate best evidence into obesity management," and "I follow the clinical practice guidelines for obesity." In using the same Likert scale, an increase was noted in the intensity of willingness for questions pertaining to "obesity is discussed with all patients" and being "up to date on innovative obesity theories."

The survey prompts that examined attitudes and perceptions regarding obesity utilized a 5-point Likert scale measuring the following intensity levels of agreement:

- 1 = strongly disagree
- 2 = disagree
- 3 = undecided
- 4 = agree
- 5 = strongly agree

A decrease in the agreement was found with the following survey prompts:

1. "Obesity is the result of patient noncompliance."
2. "Patients with obesity are responsible for their weight gain."
3. "Increasing obesity rates are due to fast food and junk food diets."
4. "The obesity epidemic is due to patient failure with weight loss and management."

The pre- and posttest survey assessments and educational session packet took approximately one to three months to complete, depending on the participant. Each participant was given two weeks after receiving the educational packet to peruse the information before they

were given the posttest survey. The education session included the following three evidence-based research studies and the YFAS:

1. The Obesity Epidemic and Food Addiction: Clinical Similarities to Drug Dependence (Fortuna, 2012).
2. Implications From Addiction Research Towards the Understanding and Treatment of Obesity (Grosshans et al., 2011).
3. Development of the Yale Food Addiction Scale Version 2.0 (Gearhardt et al., 2016).
4. The YFAS Version 2.0 with scoring instructions (University of Michigan Food and Addiction Science & Treatment Lab, n.d.).

A final sample of five PCP NP participants satisfied the inclusion criteria and completed both the learning session intervention and the pre- and posttest questionnaires. The participants were all currently in practice and caring for adult patients with obesity. There were challenges that prevented a larger sample size during the current COVID-19 situation with social distancing and limitation of access to front-line health care professionals.

Purpose of the Project

The purpose of this project was to assess the significance of an educational session on food addiction and the willingness of NPs who are PCPs to integrate knowledge of food addiction behaviors into obesity screenings. The project also examined the PCP's attitude and perception of obesity and food addiction behaviors using a pre- and posttest questionnaire design. The overall goals of the project were to expand PCP's understanding of obesity and improve obesity outcomes.

Discussion of Demographics

The sample population for this study was NPs in a rural community and Southwest desert region within the United States. The inclusion criteria for participants were being:

- 18 years or older,
- a nurse practitioner,
- a primary care provider,
- currently in practice,
- caring for adult patients with obesity, and
- located in a rural region.

Additionally, the participants similarly worked in medically underserved communities, which was not a prequalifying criterion. When the criteria were met, and consent was given, the participants proceeded to the pretest survey.

In recruiting the participants, a total of 28 flyers or invitations were sent out to nurse practitioners in the Southwest rural desert region of the United States by mail or electronic communication in the form of email or text message. Professional referrals for additional participants were also sought. Twelve participants gave written or verbal consent for the survey, of which eight began the study, and a final five participants completed all parts of the study. Seven of the original participants were excluded from the study who did not meet the inclusion criteria. There were no responses from 16 flyers or invitations from the local area and the professional referrals.

Data Analysis

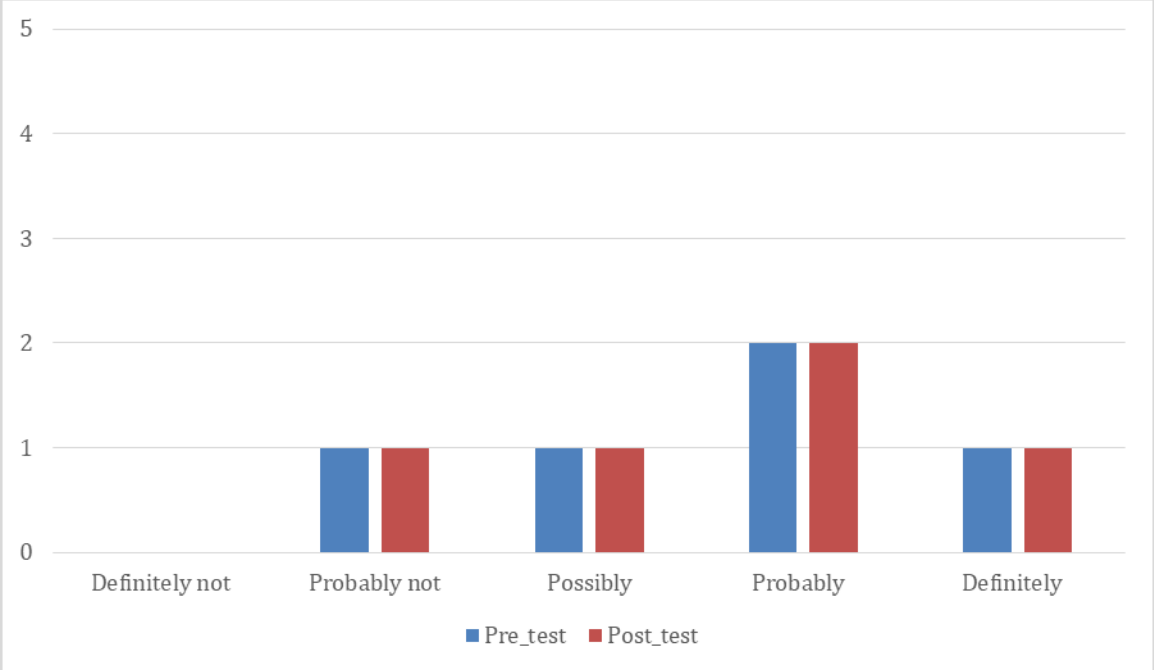
Data analysis of pre- and posttest survey data of five participants who were nurse practitioners in primary care suggested that food addiction symptoms were currently utilized in

obesity screenings, and the intervention of this educational session would not significantly change their individual practice of obesity screenings.

An educational session on food addiction behaviors and the YFAS had no significant change on nurse practitioners' decisions to modify obesity screenings in primary care. Sixty percent (three out of five) of the participants in both pre- and posttest responses showed a preference in integrating food addiction symptoms into obesity screening (see Figure 1). No difference was noted between pre- and posttest survey sample data.

Figure 1

Survey Response for the Statement "I Would Integrate the Food Addiction Symptoms Into My Obesity Screening"



A comparison of paired samples in pre- and posttest measures of the NOS survey occurred before and after the education packet or learning experience intervention on the food addiction hypothesis (Gerstman, 2016). The correlation and *t*-value were not calculatable due to

the standard error difference being zero for the key question of integrating food addiction symptoms into obesity screenings (see Table 2).

Table 2

Paired Sample Statistics

		M	*N*	*SD*	*SEM*
Pair 1	Pretest	1.0000[a]	5	.70711	.31623
	Posttest	1.0000[a]	5	.70711	.31623

a. The correlation and *t* could not be computed because the standard error of the difference was 0.

An increase from 40% (pretest) to 60% (posttest) of providers reported being up to date on innovative theories of obesity after the intervention (see Figure 2). The pretest *M* was 1.0000 with *SD* 1.000. The posttest *M* was 1.0000, with *SD* = .70711 (see Table 3).

Figure 2

Survey Response: "I Am Up to Date on Innovative Obesity Theories (e.g., Food Addiction Hypothesis, Environmental Paradigm, Circle of Discontent Homeostatic Theory)"

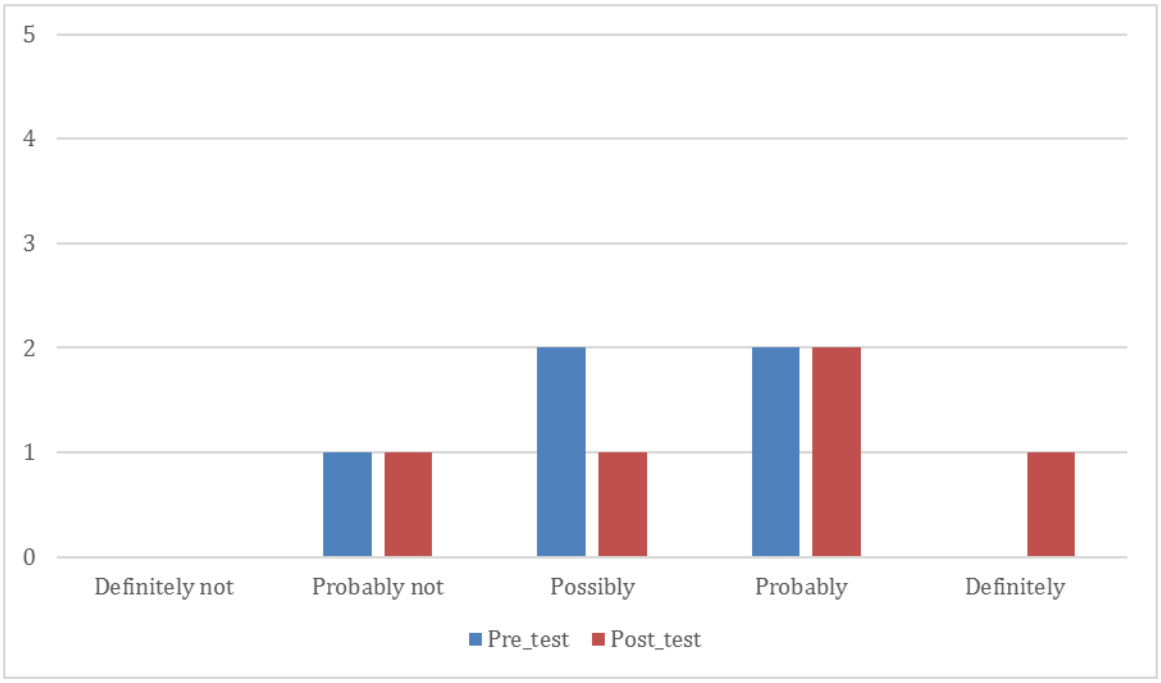


Table 3

Paired Samples Statistics for the Survey Response "I Am Up to Date on Innovative Obesity Theories (e.g., Food Addiction Hypothesis, Environmental Paradigm, Circle of Discontent Homeostatic Theory)"

		M	*N*	*SD*	*SEM*
Pair 1	Pretest	1.0000	5	1.00000	.44721
	Posttest	1.0000	5	.70711	.31623

Data analysis of the Pearson correlation coefficient was .707 (see Table 4).

Table 4

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest and Posttest	5	.707	.182

Data analysis of a paired samples *t* test was calculated to compare the mean pretest and postscore results. The *M* on the pretest was 1.0000 (*SD* = 1.00000), and the *M* on the posttest was 1.0000 (*SD* = .70711). No statistically significant difference from pretest to posttest data were found $t(5) = .000$, $p > .001$ (see Table 5).

Table 5

Paired Samples Test—Paired Differences

					95% *CI* of the Difference				
		M	*SD*	*SEM*	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Pretest and Posttest	.00000	.70711	.31623	-.87799	.87799	.000	4	1.000

A decrease from 20% (pretest) to 0% (posttest) of PCPs reported that obesity is a result of patient noncompliance after the intervention. The pretest *M* was 1.0000, with *SD* = 1.22474. The posttest *M* was 1.0000, with *SD* = 1.41421 (see Table 6).

Table 6

Paired Samples Statistics for the Survey Response "Obesity Is the Result of Patient Noncompliance"

		M	*N*	*SD*	*SEM*
Pair 1	Pretest	1.0000	5	1.22474	.54772
	Posttest	1.0000	5	1.41421	.63246

Data analysis of the Pearson correlation coefficient was .866 (see Table 7).

Table 7

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest and Posttest	5	.866	.058

Data analysis of a paired samples *t* test was calculated to compare the mean pretest and posttest results. The *M* on the pretest was 1.0000 (*SD* = 1.22474), and the *M* on the posttest was 1.0000 (*SD* = 1.41421). No statistically significant difference from pretest to posttest data were found $t(5) = .000$, $p > .001$ (see Table 8).

Table 8

Paired Samples Test—Paired Differences

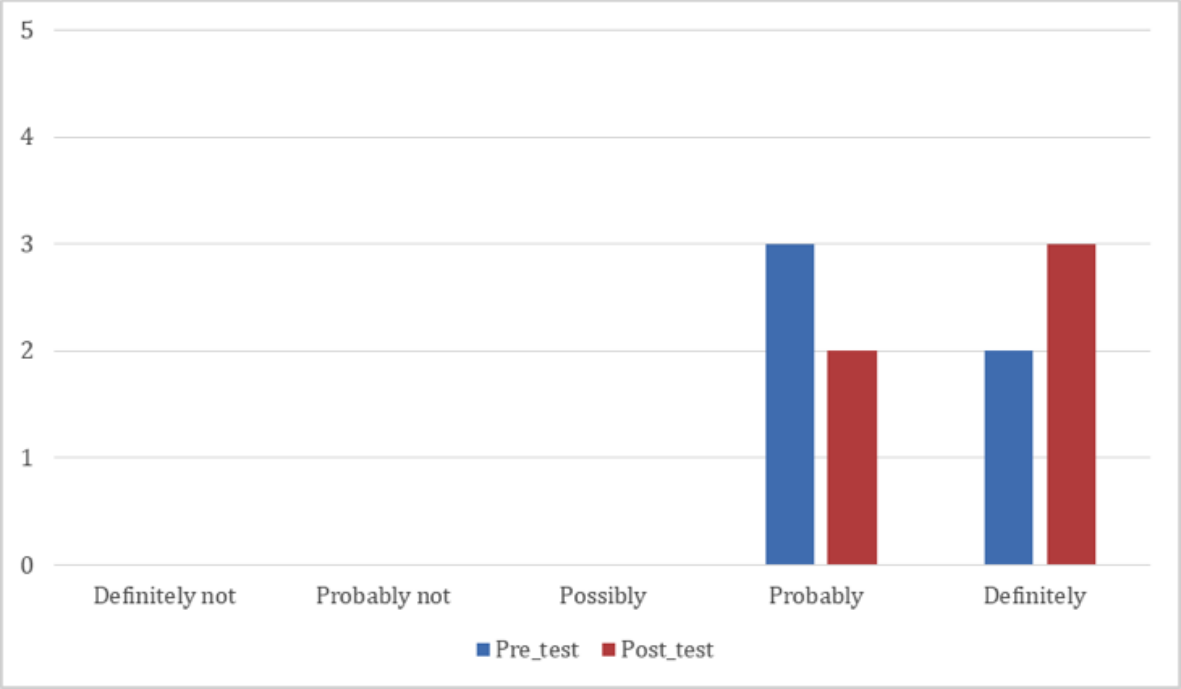
					95% *CI* of the Difference				
		M	*SD*	*SEM*	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Pretest and Posttest	.00000	.70711	.31623	-.87799	.87799	.000	4	1.000

Summary of the Survey Responses

An educational session on food addiction behaviors and the YFAS had no significant change on a PCP's decision to modify obesity screenings in primary care. Sixty percent (three out of five) of participants in both pre- and posttest responses showed a preference in integrating food addiction symptoms into obesity screenings (see Figure 1), and the same measurements of 60% (three out of five) in following clinical practice guidelines for the treatment of obesity. Up to 80% in both pre- and posttest responses integrated best practice into obesity management, and 20% in both pre- and posttest responses agreed that obesity was from lack of self-control with food. One hundred percent of both pre- and posttest responses agreed (with *probably* and *definitely*) with an increase in intensity level that obesity was openly discussed with all patients (see Figure 3). An increase from 40% to 60% of providers reported being up to date on innovative theories of obesity (see Figure 2). Only 20% in both pre- and posttest responses stated having proficiency in managing obesity, with an increase of intensity level from *disagree* to *strongly disagree* from one participant.

Figure 3

Survey Response: "Obesity Is Openly Discussed With All Patients"



There was a decrease from 100% to 80% of providers in agreement that increasing obesity rates are due to fast food and junk food diets. There was a decrease of 40% to 20% that referred patients with obesity for behavioral counseling. There was a decrease from 100% to 80% who responded that dietary and nutritional counseling was part of their obesity prevention. A decrease from 40% to 20% responded in agreement that patients with obesity were responsible for their weight gain. There was a decrease from 100% to 80% agreement that obesity was a serious medical problem. A decrease from 20% to 0% responded that obesity is a result of patient noncompliance (see Table 6). There was a decrease from 80% to 40% of providers who agreed that patients felt that weight loss and weight management were hopeless goals.

From a sample size of five participants, there were no differences between the following pre- and posttest prompts:

- Sixty percent would integrate food addiction symptoms into obesity screening.
- Sixty percent would follow clinical practice guidelines for the treatment of obesity.
- Eighty percent do integrate best practices into obesity management.
- Twenty percent agree that obesity is from a lack of self-control with food.

Change in participants' attitudes and perceptions regarding obesity was evident in the following pre- and posttest survey prompts:

- An increase from 40% to 60% of providers reported being up to date on innovative theories of obesity.
- A decrease from 40% to 20% responded in agreement that patients with obesity are responsible for their weight gain.
- A decrease from 20% to 0% responded that obesity is a result of patient noncompliance.
- A decrease from 60% to 20% believed that patients with obesity are motivated to lose weight.

After the education intervention, the second survey showed an increase in the participants' agreement of being up to date on innovative theories of obesity. The participants also had a greater decrease in agreement with more of the survey statements on obesity. Learning about food addiction and presented evidence-based studies had caused a change in a PCP's attitude and perception regarding the obesity problem. A comparison between pre- and posttest answers had a decrease in the percentage of PCPs who agreed that increasing rates of obesity were due to junk food and fast food diets, and obesity resulted from patient noncompliance.

Question Guiding the Inquiry

The PICOT question presented the guiding inquiry: Among rural U.S. primary care providers, does presenting information on the food addiction hypothesis and providing the YFAS change participants' attitudes and perceptions about obesity and BMI screening, as measured using a pre- and posttest questionnaire completed prior to and two weeks after training? A key prompt in the NOS survey was used to evaluate the population for willingness in integrating addiction behaviors into obesity screenings: "I would integrate the food addiction symptoms into my obesity screenings." The pretest questionnaire that was taken prior to the informational learning intervention showed three out of five participants (two *probably* and one *definitely*) with current knowledge of food addiction behaviors applied in practice. After the learning intervention, the comparison of posttest measures did not show an increase or decrease in willingness, but the outcome remained the same with three out of five participants (two *probably* and one *definitely*) who would integrate food addiction symptoms into obesity screenings. The study allotted a time of two weeks for each participant to complete both questionnaires and the intervention. The impact and the statistical significance of an education opportunity on food addiction, as a progressive obesity concept, was then examined.

Reliability and Validity

The significance and reliability of the paired sample *t* test would have been verified with a *p*-value if they were able to be calculated. A sample *t*-test analysis showed that the *t*-value and correlation were not able to be computed because the standard error difference was zero for the key question of integrating food addiction symptoms into obesity screenings. For the survey questions with differences between the pre- and posttest responses, statistical data for the mean, standard deviation, Pearson correlation coefficient, and *p*-value were obtainable. The *t*-test

analysis determined no statistical significance for the survey responses, and inference was based on a sample percentile comparison.

Increasing the reliability and validity of the study would require a larger sample size of participants and a more controlled environment to conduct and complete testing. In-person communication and interactions would be more appropriate to ensure the time constraints of the study. The key prompt measuring PCP willingness to modify obesity screenings showed no statistically significant difference between the following pre- and posttest measures.

This study's validity was affected by factors that indirectly altered the study's outcome measures without deliberate intention (Melnyk & Fineout-Overholt, 2015). Influences unrelated to the intervention could have been put into action during the same time of the intervention (Melnyk & Fineout-Overholt, 2015). The study had a two-week window for the intervention effect. Extraneous factors that influenced study results also included maturation that was a natural progression of change that could occur with or without the intervention (Melnyk & Fineout-Overholt, 2015). A true maturation effect reflected the gradual change that could occur throughout the two-week intervention as observed through the pretest and posttest measures (Melnyk & Fineout-Overholt, 2015). The study's validity was compromised by the unprecedented COVID-19 pandemic and the changes during 2020–2021.

Limitations

Limitations of this study included the small sample size and establishing statistical significance. The credibility of a study would be questionable with small sample sizes (de Winter, 2013). The use of the *t* test with this sample size of five participants would be feasible if the "true effect size is large" (de Winter, 2013, p. 7). The effect size could measure the level of difference between two groups, but the *p*-value would validate the effect size by determining if a

statistically significant difference existed (Sullivan & Feinn, 2012). Statistical power could improve if the correlation is high or increases (de Winter, 2013), which could also be a determinant for the effect size, such as the Pearson's coefficient (Sullivan & Feinn, 2012). The *p*-value did not validate the study.

Conclusion

The study suggested that a learning intervention on food addiction studies and the YFAS would not increase PCP willingness to integrate addiction symptoms into obesity screenings, although three out of five participants reported *probably* and *definitely* assessing these symptoms prior to the intervention. This study's statistical data analysis utilized means, standard deviation, sample percentile, Pearson's correlation, and paired sample *t* test. The results were statistically inconclusive due to the limited sample size of five participants. The challenges of finding potential participants were heightened during the COVID-19 pandemic, and recruitment strategies were restricted to online, phone, and mail communications. Face-to-face communications were discouraged, and social distancing guidelines were strictly reinforced with the target population who were caring for patients with the COVID-19 virus.

Chapter 5: Discussion, Conclusions, and Recommendations

This study's purpose was to assess the efficacy of an education session on patient food addiction for NPs in primary care and their willingness to integrate food addiction symptoms into obesity screenings. This food addiction-informed approach was an alternative method for comprehending and managing the problem of weight gain and the obesity epidemic, which was important because the recommended guidelines in the treatment of obesity and best practice evidence for successful weight loss have not impeded the progression of the obesity epidemic in the United States. Nurse practitioners in primary care were selected because they are frontline providers with the position and opportunity to improve health outcomes for their patients with obesity.

This chapter presents the inferential findings and interpretation, limitations of the study, implications of the analysis for leaders, evidence-based practice (EBP) findings and relationship to DNP Essentials I-VIII, and recommendations for future research. Data showed that food addiction symptoms associated with obesity-provoking behaviors were included in patient screenings among nurse practitioners; however, a learning intervention on food addiction did not affect increasing the sample percentage. The efficacy of the intervention was measured by the willingness to integrate food addiction symptoms into obesity screenings, and the supporting questions further explored and supported inquiry into the participants' beliefs, attitudes, and perceptions on obesity.

Interpretation of Inference From the Findings

Interpretation and inferential findings were based on descriptive statistical data, including means, standard deviation, sample percentile, Pearson's correlation, and paired sample *t*-test results. No statistical significance was determined through *t*-test analysis, and inference was

based on a sample percentile comparison. The study findings suggested there would not be an increase in participants who would integrate food addiction behaviors into obesity screenings when an education session or packet and learning experience was presented to them on food addiction studies and the YFAS. The pretest results showed that 60% of participants reported they would integrate food addiction behaviors into obesity screenings; however, the same result of 60% in the posttest results indicated no increase following the intervention. Therefore, the education and learning intervention did not increase the integration of addiction behaviors into obesity screenings. This suggested that the participants had a preexistent belief that food addiction behaviors were experienced by patients with obesity that influenced weight gain since three out of five participants reported they did assess these behaviors.

According to the pretest results, 80% of participants integrated best practice evidence in managing obesity, suggesting a preference to follow recommendations from authoritative sources. Best practice was based on disseminating evidence-based practice findings and the implied use of ideal and safe recommendations for treating obesity (Melnyk & Fineout-Overholt, 2015). The posttest results for integrating best practice evidence remained the same, with 80% showing that alternative theories to approaching and treating the obesity epidemic might not have been implemented unless it was recommended under best practice specifications.

According to the pretest results, 60% of participants followed clinical practice guidelines in the treatment of obesity, and 60% for the posttest results that suggested a consensus and consistency with the use of guidelines that are consistent with EBP research findings. There might exist an element of safety for the practitioner by reliance on guidelines in practice, which assumed that the legal standards of clinical care were represented in these guidelines (Hurwitz, 2004). However, these guidelines did not set the legal standards for care, nor were they

substitutable for an expert in care, but they could be used to set the criteria for courts to deliberate on appropriate clinical conduct (Hurwitz, 2004). Therefore, guideline interventions for the care of obesity have been perpetuated despite inefficacy of outcomes and worsening obesity rates.

Only 20% (one out of five) of pretest respondents agreed that obesity was from the lack of self-control with food, implying that the participants believed obesity was more complex and could not be so easily explained by a simple cause. The posttest results had no significant change after the education intervention, with one out of five participants who agreed that lack of self-control caused obesity. This suggested that perceptions of obesity had shifted the blame from the patient to more developed and understood biological, psychological, and environmental hypotheses, such as the food addiction hypothesis and the homeostatic theory of obesity (which is related to the circle of discontent hypothesis; Gearhardt et al., 2009a; Marks, 2015). For that reason, the practice with sensitivity in health outcomes of the participant PCP NPs would assist in decreasing and preventing obesity stigma experiences for the patient (AACN, 2006; Puhl et al., 2020).

The pre- and posttest responses were consistent across these four evaluated topics. The responses to the supporting questions suggested that participants preferred integrating best practice evidence (80%) and adhering to clinical practice guidelines (60%) in obesity care. However, the sample percentage for integrating food addiction behaviors into obesity screenings (60%) did not have the expected increase and remained the same. This suggested that professional accountability to follow clinical guidelines and integrate best practice evidence may override alternate approaches to managing obesity, even when the current guidelines and best practices have not been effective in stopping the obesity epidemic.

Some positive impacts of the project were an increase in participants reporting being up to date on innovative theories of obesity (40% to 60%). In addition, 100% of participants stated that they were willing to discuss obesity openly with patients, showing an increase in the intensity level of agreement from *probably* to *definitely*. This showed that the education session increased the PCP NP participant knowledge base and open discussion of obesity with patients.

Further exploration into the attitudes and perceptions of the participants mainly showed a decreased pre- and posttest difference of participant agreement regarding patients with obesity. In the pretest, 20% of participants agreed that obesity was a result of patient noncompliance; however, in the posttest results, none of the participants agreed with that statement. This suggested that the participants did not place the cause of obesity upon the patient, therefore, lessening the stigma of obesity on the patient. After the postintervention, none of the participants stated noncompliance as the cause for obesity that suggests obesity was perceived as a genuine medical problem rather than a character flaw, and the blame and burden for the cause of obesity had been alleviated from the patient.

In the pretest, 40% of participants agreed that patients were responsible for their weight gain; after the education intervention, the posttest results showed a decrease to 20% of participants. This suggested that the participants' postintervention perspectives of food addiction and associated behaviors shifted their understanding of the cause of unwanted weight gain away from the patient. This, in turn, suggests that food addiction, as understood through the DSM-V classification of SRAD, should be acknowledged as a genuine disease, as suggested by Gearhardt et al. (2016).

In the pretest, 60% of participants reported that patients with obesity were motivated to lose weight. This showed that participants originally believed that patients with obesity felt

encouraged and had a desire to lose weight; however, after the intervention, a significant decrease to only 20% of posttest results agreed that patients with obesity were motivated to lose weight. This suggested that participants might have felt that food addiction symptoms would eliminate any hope or motivation to lose weight because most of the participants did not believe or were unsure if patients were motivated to lose weight.

None of the participants believed that patient noncompliance was a cause of obesity, nor were patients solely responsible for their weight gain. Only 20% agreed that obesity was caused by a lack of self-control, suggesting that most PCPs would associate obesity with other causes rather than the lack of individual self-control. The food addiction education intervention supplied an alternative cause to unwanted weight gain and the worsening obesity epidemic, with potential significant findings obtained from inferential interpretation of sample percentile comparisons.

Limitations of the Study

The study limitations included delays in the planning, implementation, progression, and the participant recruitment phase presented during the COVID-19 national emergency. Participant recruitment was limited during the 2020–2021 phase of the COVID-19 pandemic, which caused difficulty in obtaining participants for the research study. Many potential participants declined to participate in the study or had long delays in returning the consent, pretest survey, or posttest survey. Many enlisted participants reported being very busy at work, engaged in another NP program, having been infected with COVID-19 and trying to recover, or handling the overall situation with family and high-risk relatives, while working in the healthcare field managing COVID-19 patients. Actively engaging the participants was challenging; therefore, courtesy reminders were sent via email and text messaging.

The accuracy of some responses was questionable, as participants may have completed the study out of courtesy and rushed through the surveys and intervention. The potential issues of having a lack of time for the study and rushing through the required steps could have produced false survey results that are not reflective of the participants' true beliefs and actions. For example, the participants would not have the time available to peruse and appreciate the learning intervention. They may have chosen not to participate in the intervention. The surveys and learning intervention required additional time, and some participants stated that they had no free time and were exhausted. Many of the participants were on the frontline working with COVID-19 patients and were faced with busier schedules and a more stressful work environment compared to the pre-COVID-19 period. As a result, none of the participants actually followed the study timeline.

Another obstacle that limited the participant sample size was the restriction to recruit potential PCP NP participants by certain health organizations and facilities. For example, a local nursing organization did not respond to email inquiries for potential participants. Their national office emailed a response that online recruitment of research participants was not allowed. A primary health facility in town did not allow recruitment of their PCP NPs to participate in independent student research studies. In addition, the study site was located in a rural region in the Southwestern United States, which had a preexisting shortage of medical workers, and the number of available PCP NPs was initially limited.

Implications of Analysis for Leaders

The analysis results suggested PCPs were inclined to integrate food addiction behaviors into assessments without needing a learning intervention and based obesity care on clinical practice guidelines and evidence-based best practice. The pretest results showed that participants

were receptive to integrating food addiction behaviors into obesity assessments before the intervention and after the intervention. The posttest results did not show an increase in the sample percentage of willingness to integrate food addiction behaviors into obesity screenings. The findings also suggested that the participants were receptive to following best practice and clinical practice guidelines in obesity care. Therefore, for the PCP NP to accept food addiction as a problem that was equivalent to drug addiction and treating patients accordingly, formal direction and guidelines should be put into place through updated clinical practice guidelines.

Clinical practice guidelines had represented the most acceptable best EBP standards in medical care; however, the obesity guidelines were ineffectual when applied in real-life situations to contain the obesity epidemic (Powell, 2003). In reality, not all providers followed evidence-based clinical practice guidelines due to various reasons, including lack of knowledge of the existing guidelines (12% to 25%) and disagreement with the content of the guidelines (17.5%) within the United States among physicians (Powell, 2003). There existed a practice gap in applying the best EBP research findings into actual practice (Powell, 2003), and basically, guideline recommendations did not work for obesity.

Currently, there is no DSM-V diagnosis for food addiction, in contrast with other eating disorders. Best practice evidence recommended diet and exercise for successful weight loss, which was still taught even though it had not resulted in large-scale improvements in curtailing the obesity epidemic. Therefore, practice changes to improve obesity outcomes should include advocating for a policy transformation that recognizes the failure of current obesity interventions, promoting innovative theories on understanding and containing obesity, modification of clinical practice guidelines, and shift of best practice for PCPs to utilize

evidence-based research findings instead of continuing the study of new knowledge without action.

The stakeholders and leaders to support this change in practice would begin with local providers and local health organizations through an interprofessional and intraprofessional team approach who recognized the existing gap between the guidelines and clinical practice within their community and area (Powell, 2003). The first step would begin with collecting scientific evidence-based research and collaboration among the local healthcare professionals. If a local change in obesity guidelines was necessary and had been implemented, then the movement for practice change could be expanded nationally if needed (Powell, 2003).

EBP Findings and Relationship to DNP Essentials (I-VIII)

The scholarly inquiry incorporated the DNP Essentials I-VIII components of doctoral education that represented the core competencies necessary for various roles and opportunities of the advanced practice nurse (AACN, 2006). Moreover, the EBP findings of this practice-focused study had significant purposes linked to each of the Essentials (AACN, 2006).

Essential I: Scientific Underpinnings for Practice

The scientific underpinnings for practice were based on the hypothesis of food addiction in promoting obesity that was supported by neurobiological and neuropsychological evidence. The brain's reward pathway exhibited similar responses from decreased dopamine sensitivity from both exposure to highly palatable foods and drug use that caused addictive behaviors (Fortuna, 2012; Fraser, 2013). This was important because the EBP findings suggested that participants had recognized the food addiction responses among their patients with obesity. Nursing practice was based on a foundation of science and knowledge developed through ethics, theories, and analysis (AACN, 2006). For the theoretical framework of the project, Lewin's

(1951) theory of change was applied. The theoretical frameworks for food addiction and obesity utilized Rogers' (1990) theory of unitary human beings and Bandura's (1977) social cognitive theory.

Essential II: Organizational and Systems Leadership for Quality Improvement

An organizational and systems leadership for quality improvement would benefit from the study's objective to reduce obesity rates. The EBP findings offered an alternative option to address the obesity epidemic through the review of food addiction to improve patient health outcomes. Therefore, the organizational and socioeconomic impact of reducing obesity rates through a change in practice would benefit the patient, communities, providers, clinics, and health care facilities. Health outcomes and quality of life for those having obesity would improve and reduce the health disparities within vulnerable populations (APA, 2016; Joszt, 2018; "Vulnerable populations", 2006). The economic impact of obesity within the United States would benefit from finding effective interventions to decreasing obesity rates and easing the exorbitantly high costs of obesity and obesity-related conditions (Milken Institute, 2019). The DNP function should utilize practice evidence to develop and propose effective health policies, including clinical practice guidelines, for improving the quality of care (AACN, 2006).

The NP-led community clinic in the study setting emphasized organizational standards of patient safety, respect for diversity, maintaining ethics, accountability in quality care, evidence-based best practice in the delivery of care, and cost-effectiveness for the patient, practice, community, and health systems. Moreover, the clinic supported the achievement of the doctoral-prepared nurse practitioner. A DNP should function as a leadership position and autonomous practitioner, serving public health needs through large- and small-scale roles.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The clinical scholarship and analytical methods for evidence-based practice began with the appraisal of literature on food addiction, obesity, and weight loss. A literature review was conducted on peer-reviewed research studies to gain insight into the elusive obesity problem. Research data were collected on the role of food addiction in weight gain and the need to develop new and alternative models to contain obesity. Despite the clinical practice guidelines and best practice-evidence of dieting and exercise to effectively reduce weight, the obesity epidemic continued to intensify in the United States (Brown & Perrin, 2018; Garner & Wooley, 1991). A systematic review was conducted online through the ACU's Margaret and Hermann Brown Library. The EBP findings also showed that the food addiction education intervention was necessary to maintain current and up-to-date knowledge on innovative theories of obesity for the participants.

In this study, a quantitative quasi-experimental design collected data from pre- and posttest surveys of measures pertaining to participant willingness to integrate food addiction behaviors into obesity screenings; therefore, modify obesity screenings that may have redirected obesity treatment. The data analyses were performed through a one-sample paired *t* test, and a participant sample percentage comparing pre- and posttest measure results. This aligned with the guideline that a DNP should function as a researcher who uses statistical data and evidence-based practice findings to acquire new knowledge and improve health care outcomes (AACN, 2006).

Essential IV: Information Systems and Technology and Patient Care Technology for the Improvement and Transformation of Health Care

The information systems and technology and patient care technology for the improvement and transformation of health care supported health care endeavors from scholarly inquiry to delivery of patient care. Both the primary care provider and the patient could access health information through web-based platforms to improve health. A variety of information technologies, including the electronic health record, e-prescribing, telemedicine, order entry systems, medical software programs, databases of evidence, and health information websites conveniently bring services and knowledge to the patient and health provider (National Academy of Engineering and Institute of Medicine, 2005).

This study utilized information technologies that encompassed many aspects in advancements through online learning, communications, research data collection, and the use of the statistics software SPSS 26.0. During the COVID-19 pandemic, the preferred methods of communication were through electronic technology with emails and cell phone texts due to social distancing. Research data collection was accessible through the nursing databases from ACU's Margaret and Hermann Brown Library. Statistical testing and analysis of data were implemented through the IBM SPSS platform. The DNP functions should include the ability to utilize health information systems and communication technologies, assess online-based sources of health information for patient education, and appraise Internet resources, tools, and data for patient care (AACN, 2006).

Essential V: Health Care Policy for Advocacy in Health Care

Health care policy for advocacy in patient care would bring awareness of the necessity for further intervention into the unrelenting obesity epidemic. The DNP should function as an

educator and advocate for policies in health care (AACN, 2006). In this study, a proposal for further development of the clinical practice guidelines for obesity was necessary since the current treatment interventions have not deterred the rising obesity rates (Brown & Perrin, 2018; Garner & Wooley, 1991). The EBP findings in this study showed that the intervention was not effective for increasing food addiction assessments among the participants. Other factors that might have influenced the participants' decision-making to modify obesity risk criteria in screenings were agreement in following clinical practice guidelines and best evidence-based practice for obesity management. For that reason, an interprofessional collaborative health systems approach and change would be required through organizational and political advocacy. As Powell (2003) stated, changing a clinical practice guideline is a "major challenge" (p. 340). Therefore, to improve the obesity rates in the United States, a revision and adjustment would be needed in the current practice guidelines and health policy.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Interprofessional collaboration for improving patient and population health outcomes addressed the complex issues of patient health needs and situations. A DNP should function as a collaborative team member who communicates effectively with the interdisciplinary care team and establishes a team function (AACN, 2006). The study findings suggested that increased interprofessional and intraprofessional collaboration are needed for improving patient population health outcomes since the participants had only 20% (one out of five) on the posttest results who referred patients with obesity for behavioral counseling. Obesity was a complex disease with multifactorial causes (Schumacher, 2015), requiring an integrative, multidisciplinary approach.

Therefore, the treatment options for food addiction-related obesity should also include the following:

- obesity guidelines,
- psychological counseling,
- holistic therapies,
- support groups, and
- nutritional counseling (Brown & Wimpenny, 2011; Chao et al., 2019; Dimitrijević et al., 2015; Leonard, 2020).

Weight loss centers and weight loss (bariatric) specialists should also be considered.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

Reducing the extent of obesity proliferation in the United States is important to meeting clinical prevention and population health for improving the nation's health. In this study, the EBP findings showed that 100% of participants in the pretest results provided dietary and nutritional counseling as part of their obesity prevention, which decreased to 80% postintervention. Obesity is a chronic disease that increases the risk of developing other additional chronic and acute conditions, including COVID-19 (Covington, 2017; Stefan et al., 2021). Due to the impact of obesity on overall health and poor survival rates from COVID-19, it was imperative that obesity is prevented and treated appropriately (Stefan et al., 2021).

In addressing the obesity epidemic, the DNP function should promote health maintenance and disease prevention for the population to improve national health (AACN, 2006). Most importantly, preventing obesity would improve health outcomes and quality of life for many in the nation. A DNP function should acknowledge the concepts of vulnerability, social determinants of health, cultural diversity, environmental health, sensitivity in health outcomes,

reducing disparities for improving population health, and addressing the national obesity epidemic (AACN, 2006).

Essential VIII: Advanced Nursing Practice

A DNP should function as an advanced practice nurse for areas of specialization (AACN, 2006). An area of expertise that would benefit the obesity epidemic was a weight loss specialist or bariatrician who treats overweight and obese patients with diet, exercise, behavioral counseling, and medications (Davis, 2021). The EBP findings suggested that the participants did not feel proficient in managing obesity, although their interventions were likely based on clinical practice guidelines: Twenty percent (one out of five) participants had proficiency in managing obesity with an increase in the intensity of disagreement. The participants were PCP NPs who are currently in practice and treating patients with obesity.

Recommendations for Future Research

Further research on food addiction as a cause for uncontrolled weight gain is imperative for addressing the current obesity epidemic in the United States. Obesity is a complex multifactorial chronic disease that can be unique in cause, which suggests plans for the treatment of obesity should be patient-centered and individualized (Brown & Wimpenny, 2011; Grave et al., 2013; Hartman et al., 2014). As a result, the common and alternative approaches to comprehending and treating obesity successfully may apply to only a certain percentage of the population.

The study should be duplicated to obtain a larger sample size when a sense of normalcy and stability has returned within the community, society, and health care field. Having freedom from the COVID-19 work demands and stress placed on potential participants will likely facilitate a larger sample size, as well as more ample time for participants to peruse the NOS

survey, research studies, and YFAS in the education intervention. Unprecedented extraneous factors influencing the outcome of the study were very evident. Repeating the study under normal circumstances is important to establish statistical significance, validity, and credibility.

Future research should explore PCP NPs' willingness in practice to change and address obesity strategies. Participants sympathize, empathize, and advocate for patients who have obesity and can recognize existing food addiction behaviors. It appears that the participants felt a professional obligation to adhere to clinical practice guidelines for the management of obesity and follow best practices, even if the recommendations are not effective. Further studies are needed to establish the effectiveness of evidence-based research findings on food addiction in clinical practice.

Ethical Considerations

In reflection of the ethical considerations, the study included ensuring the privacy and confidentiality of participants. The participants were informed that a minimal risk could be imposed, and protected health information would not be used in the study. The participants' names and their responses would remain anonymous, and after completion of the study, the raw collected data will be destroyed.

The validity of participant responses was questionable since a self-reported questionnaire could hold bias. The accuracy and truthfulness of responses might have been compromised, as certain participants appeared to complete the study out of courtesy and rushed through the surveys and intervention, which may have produced false survey results.

Another ethical concern was the continued promotion of obesity guidelines despite ineffective treatments and poor health outcomes, which implies that the problem of obesity was not being treated appropriately.

Conclusion

Obesity is a complex chronic disease and unique in every individual that would yield various causes to unwanted weight gain. The food addiction theory suggests an attributable cause to uncontrolled weight gain and the consequential obesity epidemic. An intent for addressing obesity was to improve patient health outcomes and to restrain the escalating obesity rates.

Exploring further and understanding the mechanisms causing resistant obesity necessitates introducing contemporary obesity theories such as the food addiction theory to clinical practice. This is important because current obesity strategies have not succeeded in commanding or curtailing the worsening obesity rates. Best practice and clinical practice guidelines for the management of obesity have not been effective for reducing weight-related health problems in the United States.

Following the AACN DNP Essentials, this inquiry into food addiction behaviors relied on the foundational sciences and evidence-based research studies. The hypothesis of food addiction being one of the causes for problematic obesity needs further investigation with quality clinical research studies. This aligns with the intervention goals of evaluating participant willingness to modify practice change and possibly redirect obesity care to improve patient and national health outcomes and prevent and reduce the national proliferation of obesity.

The results suggest that participants believed obesity was a more complex disease that could not be so easily explained by one simple cause. This suggested that perceptions of obesity had shifted the blame from the patient to more developed and understood biological, psychological, and environmental causes and risk factors. The participants also showed professional adherence to clinical practice guidelines for the management of obesity and followed best practices as outlined by authoritative sources, even if the recommendations were

not effective. This would explain why guideline interventions for the care of obesity would be continually promoted despite worsening rates of obesity.

The study's limitations were a sample size of five participants and the impact on prospective participants from the COVID-19 pandemic. The unprecedented COVID-19 pandemic and its impacts deterred in-person recruitment and decreased health care professional availability for the time commitment required in the partaking and completion of the study. Therefore, the *t*-test results for this small sample size were not generalizable.

The paired *t*-test analysis determined no statistical significance for the survey responses, and interpretation of inference from the findings was based on a sample percentile comparison. Survey data were compared pre- and postintervention to determine the willingness for practice change. Inferences were made from standard measurements obtained from this group sample. Descriptive statistics described the data comparison, and quantifiable data were displayed for analysis through line graphs with sample percentages. Though, the statistical significance to determine the results of the effect of food addiction knowledge on the participants was inconclusive due to a limited sample size of five participants.

Duplication of the study is recommended because of the ongoing, detrimental impact of obesity and the failure of containing the obesity epidemic in the United States. Future studies should focus on vulnerable populations who have greater risks for developing obesity and have health disparities.

Implications of analysis for health care leaders to redirect obesity care from the traditionally recommended guidelines suggested a need for policy change. The findings suggested that obesity guidelines and best practices would more likely be followed even with poor health outcomes. An interprofessional and intraprofessional collaboration are the first steps

to recognize and identify community problems and signal a need for change. Further exploration of patient health outcomes from participant adherence to the obesity guidelines and best practices should be conducted to recognize and identify these gaps in care.

Food addiction as a cause or risk factor for the development of obesity is supported by evidence-based nonclinical research studies. This approach to comprehend the driving forces of obesity has the potential to inspire and create a stage for other innovative obesity theories. Further studies are needed to establish the effectiveness of evidence-based research findings on food addiction into clinical practice.

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Appendix A: IRB Approval

ABILENE CHRISTIAN UNIVERSITY
Educating Students for Christian Service and Leadership Throughout the World

Office of Research and Sponsored Programs
320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103
325-674-2885

August 25, 2020

Lisa Llng
Department of Nursing
Abilene Christian University

Dear Lisa,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled "Food Addiction and Obesity",

(IRB# 20-114)is exempt from review under Federal Policy for the Protection of Human Subjects.

If at any time the details of this project change, please resubmit to the IRB so the committee can determine whether or not the exempt status is still applicable.

I wish you well with your work.

Sincerely,

Megan Roth

Megan Roth, Ph.D.
Director of Research and Sponsored Programs