5-11-2021

# Better Together? The Effects of Shared Medical Appointments on BMI in Obese Adults

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# BETTER TOGETHER? THE EFFECTS OF SHARED MEDICAL APPOINTMENTS ON BMI IN OBESE ADULTS

by

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**EVIDENCE-BASED PRACTICE PROJECT REPORT**

Submitted to the College of Nursing and Health Professions

of Valparaiso University,

Valparaiso, Indiana

in partial fulfillment of the requirements

For the degree of

**DOCTOR OF NURSING PRACTICE**

2021

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|---|---|---|---|
| Amanda Larson 4-29-21 | | Jamie Bump, DNP, FNP-BC | 5-11-21 |
| Student | Date | Advisor | Date |

## ACKNOWLEDGMENTS

I would like to acknowledge my project advisor, Dr. Jamie Bump. Her guidance, support, and mentorship helped make this project a reality. I would also like to thank Dr. Susan Disser, my site facilitator who helped make this project a success. Her insight and guidance were instrumental in this EBP project. I would like to thank my parents for their love and support during the past 3 years.

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## ABSTRACT

The United States (U.S.) is amidst an obesity epidemic, with Indiana ranking as the 15th worst state (Institute of Medicine, 2012; United Health Foundations, 2020). Despite current management strategies, the obesity rate in both the U.S. and Indiana continues to rise (WHO, 2020). Therefore, obesity management must change. The purpose of this evidence-based practice (EBP) project was to determine if the addition of shared medical appointments (SMAs) consisting of informational group sessions by specialists and brief individualized meetings with the provider will result in greater reduction of weight and body mass index (BMI) compared to standard care alone in those with a BMI of greater than or equal to 30 $kg/m^2$. The Iowa model of evidence-based practice was used as a framework to guide the project in a hospital-owned, primary care clinic in Central Indiana. Upon gaining organizational approval of the EBP project, specialists (registered dietician, psychologist, and bariatric nurse practitioner) were secured to provide the educational component of the SMAs. The SMAs were implemented with the support of the primary care providers (PCPs) and clinical staff. To determine if implementation of the SMAs were effective, two-group comparison and between-group comparison analyses were conducted. SMA group ($n$ = 10) data were collected prior to implementation, and at 1, 2, and 3 months post intervention. A retrospective review of non-SMA group ($n$ = 11) data were collected at baseline and at 3-months via medical records. These data were analyzed using an independent t- test and ANOVA to determine the effectiveness of the SMAs. SMAs resulted in greater reduction of BMI when compared to non-SMAs, however the results were not statistically significant ($p$ = 0.833). The results were, however, clinically significant. *T*-tests run on the difference of BMI in each group from baseline to 3 months, then compared between groups, showed statistical significance ($p$ = 0.023). Implications for practice include the use of SMAs for obesity management, especially when coupled with behavioral counseling and motivational interviewing, as they have shown to have statistically significant results.



*Keywords*: Shared medical appointments, SMA, body mass index, BMI, obesity

# CHAPTER 1

# INTRODUCTION

## Background

The world is amid an obesity pandemic. According to the World Health Organization (WHO) the prevalence of obesity from 1975 to 2016 has almost tripled with an estimated 1.9 billion adults who were overweight and over 650 million adults who were obese in 2016 (2020). Respectively, that equates to approximately 13% of the world's adult population that were obese in 2016 (WHO, 2020). The United States (US) and the United Kingdom (UK) are the two countries that lead the nations in obesity rankings (Flodgren, Goncalves-Bradley, & Summerbell, 2017). One-third of American adults are obese, which leads to the increased risk for comorbidities and medical expenses.

### Defining Obesity

According to Obesity Medicine Association (OMA), "Obesity is defined as a chronic, progressive, relapsing, multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences" (Bays, McCarthy, Christensen, Seger, Wells, Long, Shah, & Primack, 2019, slide 14). Obesity is an excess of body fat or adipose, which can be measured by using the body mass index (BMI). The WHO provides a breakdown of BMI into categories of underweight, healthy weight, overweight, and obese. A healthy weight is defined as a BMI of 18.5 to 24.9, whereas underweight is a BMI of 18.4 or less, overweight is a BMI of 25 to 29.9 and obese is a BMI of 30 or greater (WHO, n.d.). The classification of obesity can be subcategorized further into Class I, II, and II obesity. Class I obesity is defined as a BMI of 30.0-34.9, Class II is a BMI of 35.0-39.9, and Class III is a BMI greater than 40 (Bays et al., 2019).

There are many factors that contribute to the cause of obesity ranging from genetic inheritance, epigenetic inheritance, behavioral factors, societal influences, and cultural influences (Bays et al., 2019). Epigenetic factors include environment, mental stress, neurologic dysfunction, medications, and lack of physical exercise (Bays et al., 2019). Epigenetic mechanisms aid in gene expression, therefore making them important in obesity (Ling & Ronn, 2019) Research has identified as many as 2,825 genes that are associated with BMI (Ling & Ronn, 2019). Behavioral and societal factors include the oversized food portions, leading to the increase of caloric intake (National Institutes of Health [NIH], 2016) . Other factors that may influence obesity include stress and emotional factors as eating releases endorphins (NIH, 2016). A study conducted by Tuulari et al., (2017), discovered that the brain releases significant levels of endorphins in response to eating pleasurable things such as pizza or chocolate; whereas, eating bland foods resulted in fewer endorphins being released.

Obesity is linked to an increased risk of the development many chronic diseases, including cardiovascular disease, musculoskeletal disorders, diabetes, and several cancers (Bays et al., 2019; Guthrie & Bogue, 2015; WHO, 2020). Obesity contributes to the body's development of a pro-inflammatory state, which can cause significant metabolic changes (Waters & DeVol, 2016). These metabolic changes increase insulin resistance, blood pressure, triglycerides, and low-density lipoproteins (LDL) cholesterol, while decreasing high-density lipoproteins (HDL) cholesterol (Waters & DeVol, 2016). Excessive fat in the body forms networks that function as an endocrine organ releasing the hormones resistin and leptin, which cause the pancreas to release insulin, thus leading to insulin resistance, type 2 diabetes, cardiovascular disease, and increasing the risk of a variety of cancers (Waters & DeVol, 2016). According to Water and DeVol, these cancers include, but are not limited to, breast, colorectal, endometrial, esophageal, gallbladder, liver, ovarian, pancreatic, prostate, and renal cancers (2016).

## Data from the Literature Supporting Need for the Project

### National Data

The United States is amidst an obesity epidemic, leading the world in obesity rates (Guthrie and Bogue, 2015). Data from the 2017-2018 National Center for Health Statistics (NCHS) reported the prevalence of obesity to be 42.4%, up from 30.5% in the 1999-2000 report (Centers for Disease Control and Prevention [CDC], 2020). In addition, the prevalence of severe obesity has increased from 4.7% to 9.2% (CDC, 2019).

The prevalence of obesity varies based on education, race, and gender. According to the CDC (2019), obesity decreased significantly with higher educational level, with 35% obesity rating among those without a high school degree and a 24.7% obesity rating among those with a college degree (CDC, 2019). The prevalence of obesity was the highest in non-Hispanic blacks at 49.6%, followed by Hispanic adults at 44.8%, non-Hispanic whites at 42.2% and non-Hispanic Asian adults at 17.4% (CDC, 2019). There is a slight gender variation amongst non-Hispanic Asians with males having a 17.5% prevalence of obesity versus 17.2% in females. Non-Hispanic black females have a significantly higher prevalence of obesity compared to non-Hispanic black males at 56.9% to 41.1%. Similarly, non-Hispanic white males have a higher prevalence to obesity than non-Hispanic white females at 44.7% to 39.8%. Interestingly, Hispanic males and females have relatively similar prevalence rates of obesity with males at 45.7% and females at 43.7% (CDC, 2019).

Obesity also has impacts on society. Obesity and its associated comorbidities place an immense financial burden on the healthcare system. Medical costs related to obesity may account for $190 billion dollars annually in the US (Public Health, 2020). In addition, the estimated cost of medical care for obese patients is somewhere between 36-150% higher than that of non-obese patients (Public Health, 2020). Correspondingly, in 2014, the Milken Institute, a nonprofit think-tank helping people experience health and well-being, reported the cost of medical treatments for health conditions causally related to obesity amounted to $427.8 billion

(Waters & ReVol, 2016). Further expenses are compiled due to absenteeism and increased health insurance costs (Public Health, 2020; Waters & ReVol, 2016). The average firm in the US with 1,000 or more employees is estimated to lose $285,000 per year from costs associated with obesity (Public Health, 2020). In 2014, the Milken Institute estimated that indirect costs related to overweight and obesity was $988.8 billion, which, when added to the direct costs, totaled $1.42 trillion (Waters & ReVol, 2016).

**State Data**

Indiana ranks as the fifteenth most obese state in the US according to the 2019 Behavioral Risk Factor Surveillance System (BRFSS) data with 34.1% of adults being obese (United Health Foundations, 2020). In 2017, Indiana was ranked as the tenth worst state regarding obesity with 32.5% of adults being obese (United Health Foundations, 2020). Prevalence is not easily determined from gender, as obesity rating for females and males are similar at 34.2% for females and 33.9% for males. The highest obesity rating occurs in those age 45-64 at 39% (United Health Foundations, 2020). American Indians have the highest prevalence of obesity in Indiana with 57%, followed by blacks at 39.4%, Hispanics at 39.3%, and whites at 33.6% (United Health Foundations, 2020). Just as with national rankings, educational level is associated with a decreased obesity rate in Indiana with 36.4% of obese adults having less than a high school degree and 30.9% having completed college (United Health Foundations, 2020). Income, however, is less of a predictor with the highest prevalence being amongst those making $50-74,999 a year, followed by those who make less than $25,000 a year (United Health Foundations, 2020). The lowest prevalence was in those making more than $75,000 a year at 34.6% (United Health Foundations, 2020).

**Local Data**

The site for the evidence-based practice (EBP) implementation was in Hendricks County, Indiana, which had a slightly lower rate of obesity at 31.8% in 2018 compared to the entire state of Indiana (Data USA, n.d.). The neighboring county of Marion, of which several of

the participants in the project reside, has a higher prevalence of obesity at 38.6% (Altarum, 2019). Obesity was a known major risk factor to two major chronic diseases in the state of Indiana as well as Hendricks county, those being diabetes and heart disease (the mortality rate for diabetes is 30.5 per 100,000 and 156.4 per 100,000 for heart disease in 2017) (Insight Live Storied, 2019).

## Data from the Clinical Agency Supporting Need for the Project

The site for the EBP implementation was a clinic that was part of a larger medical group owned by a not-for-profit hospital located in Midwest Indiana. The providers within the clinic included: three pediatricians, a family physician, and a nurse practitioner (NP). The clinic was appointment-based, but also had a walk-in clinic. From May 2017 to April 2018, 36.7% of the adult patients seen in primary and specialty clinics had BMIs of greater than 30kg/$m^2$ (S. Disser, personal communication, July 1, 2020). Applying the national NCHS data for obesity, the group is under the national average, however it is above the average for Indiana (United Health Foundation, 2020). Additionally, in that year 62.6% of all patients seen had a BMI of 25kg/$m^2$ or greater (S. Disser, personal communication, July 1, 2020). Approximately 1/3 of the NPs practice consisted of patients seeking weight management (S. Disser, personal communication, July 7, 2020). The clinic had not engaged in shared medical appointments prior to this EBP project implementation (B. Leaman, S. Disser, and D. Hall, personal communication, July 14, 2020).

## Purpose of the Evidence-Based Practice Project

The purpose of this EBP project was to evaluate the impact of shared medical appointments in addition to standard care on BMI and obesity. Reducing obesity significant impacts overall health and prevention of many comorbidities. Thus, rethinking the way primary care helps combat obesity is imperative to the health of the country.

**PICOT Question**

Specifically, this project will address the following patient, intervention, comparison, outcome and time (PICOT) question: In adult patients that have a BMI greater than or equal to 30 kg/m$^2$ (P), would SMAs in addition to standard care (I) result in a greater reduction of BMI (O) compared to standard care alone (C) in 12 weeks (T)?

## Significance of the EBP Project

With over 40% of the population in the US being obese, primary care providers care for many patients with this disease and its corresponding sequela. Thus, primary care providers should be vigilant in combating this disease rather than treating the effects of obesity as they arise. Being proactive regarding obesity is necessary to stop the obesity epidemic. Taking proactive measures to reduce obesity will lower the effects of obesity on the individual and society. As previously addressed, the financial burden of obesity is significant. A reduction of five percent weight loss in individuals with a BMI greater than 40 kg/m$^2$ is estimated to be $2137 annually per person (Waters & ReVol, 2016).

Since primary care is often the gateway to medical care, it should be the focus for the solution. Due to the ever-increasing rate of obesity, especially in Indiana, the way this disease is managed and treated needs to be reevaluated. Shared medical appointments (SMAs) have been shown to be beneficial for both the patients and providers. Providers can see multiple patients simultaneously without the need to repeat information. In addition, multidisciplinary teams can provide educational information in a timely manner, while providing the patients with extended time with the provider and team. Patients benefit from the support of others with similar challenges and from interacting with peers (Yager, Parker, Luxenburg, and Varghai, 2019).

This EBP project implemented into practice the missing component of current best practice evidence to treat and manage obesity in the clinic. At the time of implementation, the clinic managed obesity with individualized appointments occurring every three months to

monitor progress and evaluate areas for change. The providers had already implemented the best practice of motivational interviewing, behavioral counseling, and encouraging an exercise and food log, which they implement during the appointments as tools to manage obesity. Therefore, the addition of SMAs to provide support to the patients would be beneficial. In a 2019, retrospective observational study utilizing SMAs for weight loss, approximately 40% of participants had achieved a five percent weight loss after 3 months (Yager et al., 2019). Consequently, the financial burden of obesity was reduced, and overall health was improved.

# CHAPTER 2

# EBP MODEL AND REVIEW OF LITERATURE

## Evidence-based Practice Model

The use of an EBP model aided in the design and implementation of evidence-based change by utilizing proven methods and models. The process began by identifying the problem and ended with evaluation and dissemination of results. Utilizing an EBP model provided a systematic plan for increasing the likelihood of sustained change.

### Overview of EBP Model

The Iowa Model was first developed in the early 1990s by a team of nurses from the University of Iowa Hospital and Clinics as a guide for clinicians in evaluating and implementing research into patient care (Iowa Model Collaborative et al., 2017). The model was revised to reflect the use of multiple levels of evidence and provide additional details about infusing the change (Iowa Model Collaborative et al., 2017). The Iowa Model Revised provides a practical ten-step algorithm including decision points and feedback loops, which aid in determining the feasibility of the project.

The first step of the model consists of identifying the problem or opportunity for change. Problems are often identified when questioning current practices, new data or evidence is published, or through new initiatives whether it be organization, state, or national (Iowa Model Collaborative et al., 2017). Once the problem has been identified, the next step is to determine the EBP question or purpose, which is often in the form of a PICOT question. Clearly identifying the problem, intervention, comparison, desired outcome, and time frame are imperative to prevent drifting off target. As we reach the third step, we also reach the first decision point, which questions if the topic is a priority to the organization. If organizational priorities and project goals are not aligned, funding and support for the project may not be garnered. Therefore, if the topic is not a priority for the organization, reconsidering another issue/opportunity is necessary.

Once organizational support is gained a team of stakeholders should be identified and formed to develop and implement the change, which is the fourth step. Key stakeholders are important as they communicate, support, coordinate, and evaluate the change initiative.

The fifth step is to assemble, appraise, and synthesize the body of evidence. This is done by conducting systematic searches within multiple databases and appraising the quantity, quality, and level of evidence consistent with the identified problem. The decision point associated with this step is aimed at determining if there is sufficient evidence to continue the project. If not, conducting more systematic searches is in order. Once there is sufficient evidence, the next step in the model is to design and pilot practice change. Piloting a study is an important step in the EBP process as it allows for a project to be tested before implementing it on a large scale. To design a project, consideration of  patient preferences, available resources, constraints, and any necessary approvals are key. Protocols, evaluation plans, and implementation plans must be developed for successful implementation and interpretation. Collecting baseline data is also important as to compare data to determine the rate of change. After completion of the pilot, evaluation of the process, structure, and outcomes must be completed to determine the effectiveness of the implementation plan.

The eighth step of the plan is the final decision point, which questions whether there the change is appropriate for adoption in practice or not. If not, one must consider alternative designs. If it is determined the change is appropriate for adoption into practice, focus should be on integrating and sustaining the practice change. Engaging stakeholders throughout the process s. Is key to success in both implementation and sustainability. Monitoring key outcomes through quality improvement indicators to clinicians can promote sustained integration of the change. The final step of the Iowa Model is dissemination of results, which is important for professional growth and development. Sharing results helps to promote the culture of EBP and is important to promote adoption of EBPs within healthcare (Melnyk & Fineout-Overholt, 2019).

**Application of EBP Model to DNP Project**

The Iowa Model Revised was chosen as the framework for planning and implementing this EBP project for several reasons. First, the model has been used successfully in various EBP projects over time (Cherney et al., 2020; Huether et al., 2016; Saqe-Rockoff et al., 2018). It is well suited for implementation of this project as it uses a team approach, as evidenced by the EBP project implemented by Huether et al. (2016), whereby the formation of a team was paramount to the successful implementation. The team consisted of a staff nurse, a nurse educator, student nurses, cancer survivor clinic NPs, a Doctor of Nursing Practice (DNP) student, and patients and their families (Huether et al., 2016). Additionally, the model is intuitive and easily applicable to a variety of environments and projects, ranging from improving thermoregulation in emergency rooms to improving cancer patient's quality of life and fatigue in an outpatient setting (Huether et al., 2016; Sage-Rockoff et al., 2018).

As stated previously, the first phase of the model is to identify the problem or opportunity for change. In this EBP project, the problem was the adult obesity rate in the United States, but more specifically in Indiana. Thus, the question driving the project is: In patients that are obese or with a BMI greater than or equal to 30kg/$m^2$, would shared medical appointments in addition to standard care result in a greater reduction of BMI compared to standard care alone in 12 weeks? The topic was a priority within the organization as the prevalence of obesity in the US is 42.4% (CDC, 2019). More specifically however, Indiana ranks as the 15th most obese state with 34.1% of adults being obese (United Health Foundations, 2020). This data was consistent with the data obtained from the clinic which indicates that one-third of the NPs practice is there for weight management. Determining a way to combat obesity is imperative as the obesity rate in the US went from 30.5% to 42.4% in less than 20 years (CDC, 2019).

The next step of the model is to form a team. The team consisted of the NP, MA, office manager, guest speakers such as dietician, psychiatrist, and physical therapist, and the organization's leadership. These members aided in developing and implementing the practice

change by supporting the change in appointment structure, documentation, and scheduling. The front office staff impacted the implementation of the project by blocking time for the SMAs and ensuring patients were scheduled during the appropriate time frame. The back office staff impacted the implementation and development of the project by helping to coordinate patient flow, obtaining vitals, and by managing expectations of patients during the SMAs. The primary care providers (PCPs) aided in the development of the project by allowing for adequate time being blocked for the SMAs and by recruiting participants to the project. The PCPs aided in implementation by participating in the SMAs by meeting with the participants individually either before or after the meeting. Next, systematic literature searches were performed in multiple databases and information was appraised for quality and level of evidence and selected evidence was synthesized. Sufficient quantity and quality of evidence discovered through literature searches.

The next seventh step of the model is to design and pilot the practice change. In conjunction with the stakeholders, a plan was designed considering patient preferences. Organizational resources and constraints considered and factored into the plan. IRB approval was obtained from both Valparaiso University and the clinic's larger organization. Protocol, evaluation plan, and implementation plan developed after baseline data obtained. Protocol for the project included recruitment of participants that met the inclusion and exclusion criteria, while agreeing to participate in SMAs. The implementation plan was developed based on the availability of the PCPs, specialists, and DNP student project director. The specialists were contacted to determine availability and to discuss content for discussion. Determining the order of the presentations was done based on availability of the specialists. Evaluation of the plan was completed after each meeting to determine necessary changes and at the end of the project.

**Strengths and Limitations of EBP Model for DNP Project**

The Iowa Model is a versatile model for use in almost any EBP project. The model guided the process from identifying the problem to disseminating the results. Each step

provided clear direction regarding necessary steps to be taken. Each step guided the next step creating a logical progression, which was further driven by the built-in decision points and feedback loops. The model was easy to use and was easily incorporated into a team environment. This model suited this EBP model well since the project was completed using a team of stakeholders. Many other models utilize a team approach as well, with just a few being suited for individuals. There were limitations to using the Iowa Model for this EBP project, especially since the implementation of SMAs does not allow for an adequate pilot of the project. In addition, the use of SMAs does not allow for a redesign of the implementation process. Therefore, if SMAs did not fit well into the practice environment, the project would have come to a stop rather than be open for redesign.

## Literature Search

### Sources Examined for Relevant Evidence

A literature search was performed using The Joanna Briggs Institute (JBI), Cochrane Library, TRIP, CINAHL, Medline with Full Text, and PsychINFO databases. The JBI search was conducted using title: “obes*” OR “overweight” OR “weight loss” AND keywords “reduc*” OR “decreas*” OR “manag*.” The search was limited to title and those completed within the last 3 years, from the year 2017 to July 2020. The Cochrane Library database search was conducted using keywords “obes*” OR “overweight” OR “weight loss” AND “reduc*” OR “decreas*” OR manag*.” The search was again limited to those completed from the year 2017 to July 2020 and articles in the English language. The TRIP database was conducted using title: “obes*” OR “overweight” OR “weight loss” AND keywords “reduc*” OR “decreas*” OR “manag*.” The search was limited to title and guidelines conducted from 2017 to July 2020. The CINAHL database search was conducted using keywords: MM “weight loss” OR MM “weight control” AND “reduc*” OR “decreas*” OR “manag*” AND “primary care” OR “primary health*.” The search was limited to peer-reviewed articles, research studies, those conducted within the last 3 years from the year 2017 to July 2020, participants who were all adults, and articles in the English language.

The Medline with Full Text database was conducted using keywords: MM “weight loss” OR MM “weight control” AND “reduc*” OR “decreas*” OR “manag*” AND “primary care” OR “primary health*.” The search was limited to scholarly peer reviewed articles, those with participants aged 19 and older, those completed within the last 3 years, from the year 2017 to July 2020, and articles in the English language. The PsychINFO database was conducted using keywords: DE “weight loss” OR DE “weight control” AND “reduc*” OR “decreas*” OR “manag*” AND “primary care” OR “primary health*.” The search was limited to scholarly peer-reviewed articles, those with participants aged 18 and older, those completed within the last 3 years, from the year 2017 to July 2020, and articles in the English language. The databases provided a wide range of articles evaluating various aspects of obesity management. The abstracts were read to determine relevancy to the subject. The reference lists of four articles were used to identify additional articles that may be pertinent to the topic. Based on the search dates of the systematic reviewed used in this EBP project, the date 2017 was selected to include any new publications since the most recent systematic reviews were completed.

This search strategy yielded 252 results with 2 duplicates. Articles focusing on hospitalized patients, children, surgical procedures to manage obesity or pharmacologic therapies to manage obesity were excluded. Fifty-one abstracts were reviewed, and twenty-two articles were examined in their entirety. Evidence was selected if it focused on strategies to reduce obesity or promote weight loss in obese or overweight adults. After careful consideration, thirteen pieces of evidence were selected for inclusion in this EBP project. Articles in the protocol stage were excluded as well. Table 2.1 contains a summary of the search results. Figure 2.1 contains a breakdown of the search results.

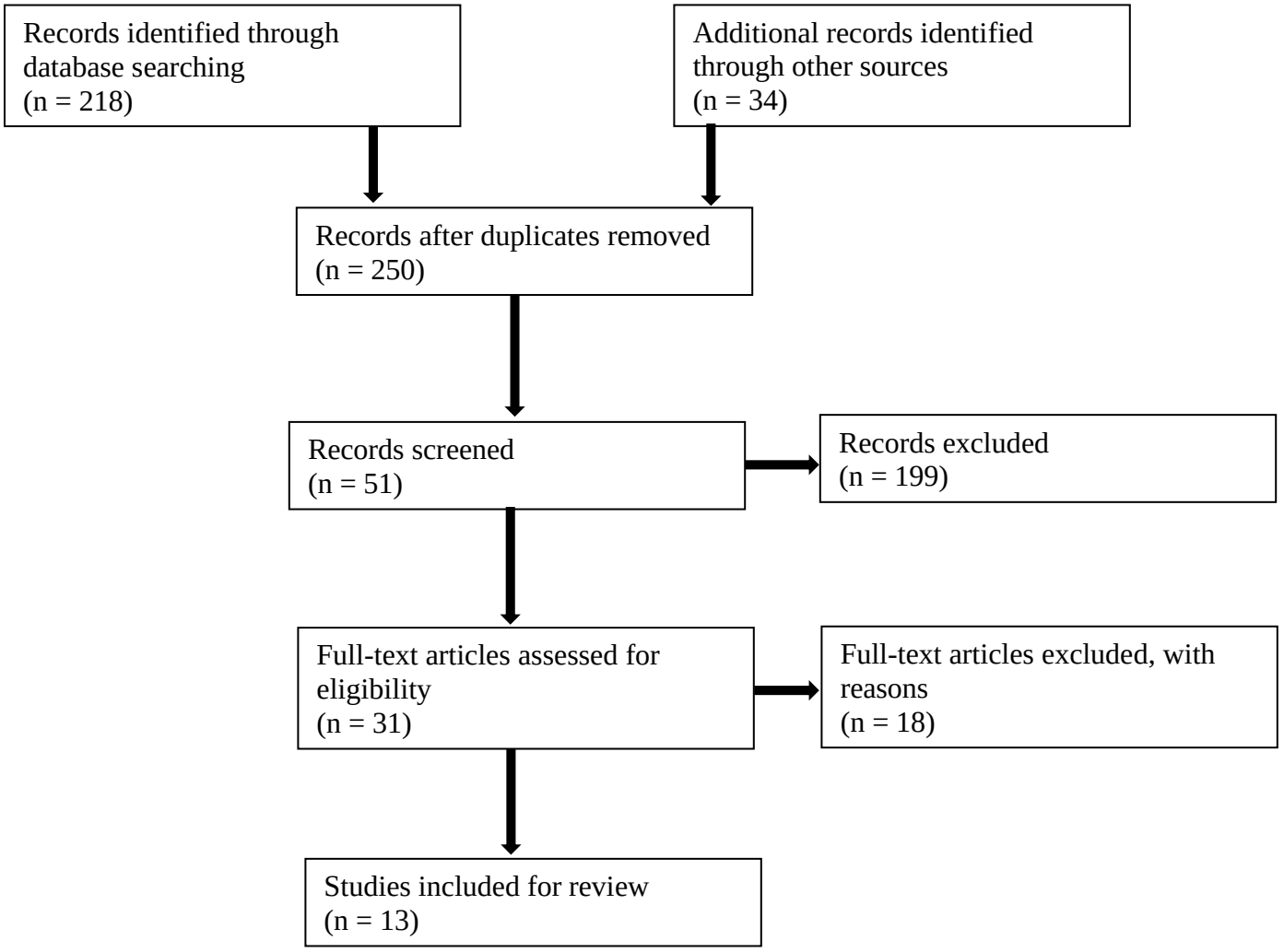
Table 2.1

LITERATURE SEARCH RESULTS

| DATABASE/ RESOURCE SEARCHED | KEYWORDS/PHRASES | LIMITERS USED | NUMBER OF RESULTS FROM SEARCH | DUPLICATES | ABSTRACTS REVIEWED | NUMBER SELECTED FOR USE |
|---|---|---|---|---|---|---|
| **JBI** | Title: obes* OR overweight OR “weight loss” AND reduc* OR decreas* OR manag* | 3 years and Title | 42 | 0 | 5 | 2 |
| **COCHRANE** | Obes* OR overweight OR “weight loss” AND reduc* OR decreas* OR mang* | 3 years, English | 75 | 0 | 4 | 1 |
| **TRIP** | (title:obes* OR overweight OR “weight loss”) AND (manag* OR decreas* OR reduc*) | Since 2017, guidelines, Title | 35 | 0 | 5 | 1 |
| **CINAHL** | MM “weight loss” (MM “weight loss”) AND (MM “weight control”) AND reduc* OR decreas* OR manag* AND “primary care” OR “primary health*” | Scholarly (Peer Reviewed), 2017-2020, English, Research Articles, All adult | 17 | 1 | 7 | 3 |
| **MEDLINE** | MM “weight loss” (MM “weight loss”) AND (MM “weight control”) AND reduc* OR decreas* OR manag* AND “primary care” OR “primary health*” | English, 2017-2020, aged 19+, scholarly (peer reviewed) | 28 | 1 | 12 | 4 |
| **PSYCHINFO** | DE “weight loss” (DE “weight loss”) AND (DE “weight control”) AND reduc* OR decreas* OR manag* AND “primary care” OR “primary health*” | 2017- 2020, English, Scholarly (Peer reviewed), aged 18+ | 21 | 0 | 8 | 2 |
| **HANDSEARCHED** | | | 34 | 0 | 10 | 0 |
| **TOTAL** | N/A | N/A | 252 | 2 | 51 | 13 |

Figure 2.1

Flow Diagram



**Levels of Evidence**

There are several different tools available for ranking evidence. The John's Hopkins Nursing Evidence-Based Practice Research (JHNEBP) Evidence Appraisal Tool was used for this EBP project, as the appraiser had some experience using the tool (Dang & Dearholt, 2017). Approval to use the tool was obtained through the Institute for Johns Hopkins Nursing. The levels of evidence range from level I to level V. Level I, the highest level of evidence is comprised of systematic reviews of randomized control trials (RCTs) with or without meta-analysis and RCT. Level II evidence is comprised of systematic reviews of RCTs and quasi-experimental studies and quasi-experimental studies alone. Level III evidence includes quantitative non-experimental studies, explanatory mixed method quantitative studies, and systematic reviews of combined RCTs, quasi-experimental, and non-experimental studies. Level IV evidence is made of clinical practice guidelines (CPG) and consensus statements. Level V evidence is the lowest level of evidence and comprised of literature reviews and quality improvement projects.

Thirteen pieces of evidence ranging from level I to level III evidence were selected for use in this EBP project. Utilizing the JHNEBP research appraisal tool, five articles were rated as level I, which included two evidence summaries, two RCTs and one systematic review of RCTs, three were rated as level II, including one quasi-experimental study and two systematic reviews of RCTs and quasi-experimental studies, and five were rated as level III, all of which were retrospective observational studies primarily cohort design. All articles were critically appraised using the JHNEBP tool to determine the quality of evidence.

**Appraisal of Relevant Evidence**

In addition to leveling the evidence, the JHNEBP tool was used to grade the evidence. The grades range from high (A), good (B), or low or major flaw (C). Grade A describes a study with sufficient sample size, adequate controls, definitive conclusions, generalizable results, and consistent recommendations (Dang & Dearholt, 2017). Grade B describes a study with a

sufficient sample size, but lacks some control, has some consistent results, and has reasonable recommendations (Dang & Dearholt, 2017). Finally, Grade C evidence represents studies without sufficient sample size, inconsistent results, and no conclusions can be drawn from the results (Dang & Dearholt, 2017). Utilizing the JHNEBP research appraisal tool, seven studies were rated as Grade A, five were rated as Grade B, and one was rated as Grade C. The one piece of evidence rated as Grade C was done so due to the small sample size, making the results hard to generalize, but not invalid. This study resulted in statistically significant change, which should not be disregarded; rather, the data should be considered in conjunction with results from higher grades of evidence.

***Level I Evidence***

**Flodgren, Goncalves-Bradley, and Summerbell (2017).** Flodgren, Goncalves-Bradley, and Summerbell (2017) conducted a good quality, high level systematic review of 12 RCTs published between 1946 and 2016. Flodgren et al. (2017) examined what interventions change the organization of care, as well as the behaviors of healthcare providers to promote weight loss in those who are overweight or obese. Seven of the studies evaluated interventions targeted at healthcare providers behaviors, while the remaining five focused on the organization of care. The interventions were multifaceted and included tailored educational interventions provided by primary care providers and dieticians, as well as the restructuring of care to include shared medical appointments. The educational interventions focused primarily on healthcare providers by providing information and training on appropriate practices and guidelines. These interventions resulted in slight reductions in body weight *(CI* -2.84 to 0.37). Interventions examined also included those in restructuring of care and these included the use of multidisciplinary teams and shared medical appointments. Utilization of multidisciplinary teams made up of primary care providers and dieticians allowed for specified individualized interventions which improved weight loss (*CI* -4.83 to -0.16). At 12 months, the weight loss from the multidisciplinary team was *M*= -6.7kg compared to *M*= -5.6kg in the primary care provider

group only. Restructuring care to include shared medical appointments in primary care resulted in lower BMI mean BMI change = -0.49 (*CI* -0.20 to -0.16). While these measurements are not interchangeable, they all represent a reduction of weight, therefore BMI.

**Graham, Tudor, Jebb, Lewis, Tearne, Adab, Begh, Jolly, Daley, Farley, Lycett, Nickless, and Aveyard (2019).** Graham et al., (2019) conducted a good quality, high level RCT to assess the effects of recommended guidelines stating clinicians should provide behavioral interventions to patients who are obese to increase participation in effective weight loss programs. The study included 1882 patients with BMIs ≥ 25kg/$m^2$ if Asian or ≥ 30kg/$m^2$ for all other ethnicities, who were seeking care from 137 general practitioners in the south of England between June 2013 and December 2014. The experimental group made up of 940 participants were referred to one of two free community weight loss programs. The control group was made up of 942 participants who received only the advice of the general practitioners to lose weight in order to optimize their health. After one year, the experimental group lost a mean of -2.43kg weight compared to -1.04kg in the control group $p = 0.039$. The study also examined the effects of socioeconomic deprivation on weight loss, which was measured using the Index of Multiple Deprivation (IMD) score. The socioeconomic deprivation score is based on income, employment, health, crime, education, and the living environment of people living with a given postcode, which may contribute to one's health. The combined effects of the intervention and IMD score revealed socioeconomic deprivation had a moderate effect on weight loss, with the experimental group having a mean *CI* 0.042 ($p = 0.040$) compared to the control group having a mean *CI* -0.012 ($p = 0.45$). While the change is not statistically significant, it is clinically significant since weight loss was obtained and maintained at 1-year post intervention. The weight loss while not significant, can decrease the risk of adverse effects and comorbidities.

**McRobbie, Hajek, Peerbux, Kahan, Eldridge, Trepel, Parrott, Griffiths, Snuggs, and Smith (2019).** McRobbie et al., (2019) conducted a high quality, high level RCT to examine whether a multimodal group intervention aimed at disadvantaged communities had better weight

loss outcomes at 1 year compared to a standard weight-loss program in primary care provided by practical nurses. The study included a total of 330 patients aged 18 and older with BMIs ≥30kg/$m^2$, who lived near London's inner borough of Tower Hamlets or Hackney between September 2012 and January 2014. The experimental group made up of 210 patients were provided multimodal interventions focused on groups, education, and support. The group intervention was a structured weight action program (WAP) which was conducted during 8 weekly meetings consisting of 10-21 participants. Educational information was provided about diet, physical exercise and self-monitoring. Support was in the form of support from peers within the group, as well as two advisors who conducted group sessions. The control group made up of 109 participants received standard care provided by practical nurses after an initial meeting with a general practitioner. The control group also was referred to a community-based exercise program. Outcomes measured were weight, BMI, waist circumference, BP, and food knowledge. Outcomes were measured 6 months after intervention. The intervention group had a mean weight loss of 5.0kg compared to the control group's mean weight loss of 2.1kg ($p$ = <0.001). The difference between groups diminished at the 12-month measurement, with the experimental group having a mean weight loss of 4.2kg compared to the control group of 2.3kg ($p$ = 0.04), which is not statistically significant, but is clinically significant. More than 40% of the participants in the control group lost more than 5% of their body weight, which is clinically significant which is expected to transfer important health benefits. Likewise, changes in waist circumference at 12-months between the groups was not statistically significant, but is clinically significant, with the experimental group's mean loss of -4.1cm compared to the control group's mean loss of -2.0cm ($p$ = 0.07). The researchers concluded that a reduction of waist circumference was clinically significant as any reduction, especially if sustained is an improvement in health.

**Slade, Ther, and Ther (2018).** Slade, Ther, and Ther (2018) conducted a Grade A JBI evidence summary to determine evidence regarding long-term weight loss maintenance while in

structured weight loss programs. The summary is compiled from 10 sources of evidence consisting of three meta-analyses, five systematic reviews, an RCT, and a retrospective cohort study. All the articles recommended using a combined diet and exercise program to produce a greater reduction in long-term weight loss. In the three meta-analyses, the average maintained weight loss was 3kg and a three percent reduction of body weight at 5 years post intervention. In addition, the articles recommend that regular clinic visits, especially in groups, should be conducted to aid in compliance, which results in approximately -6% reduction in BMI at 12 months. A systematic review showed that group meetings consisting of behavioral counseling and an education component resulted in a seven percent weight loss at 1 year.

**Swe and Edu (2019).** Swe and Edu (2019) conducted a Grade A JBI evidence summary to determine evidence about psychological interventions available for those who are overweight or obese. The summary is compiled of 7 systematic reviews consisting of 67 RCTs, 26 studies, and 12 articles. The evidence supports the use of psychological interventions such as motivational interviewing and behavioral counseling to treat obesity. In addition, behavioral treatment strategies such as session attendance can aid in adherence to lifestyle intervention programs. One of the systematic reviews revealed that weight loss was greater in groups than individuals. The summary recommended mindfulness interventions to benefit the psychological and physical outcomes of people who are overweight or obese. One of the systematic reviews notes that cognitive behavioral therapy coupled with motivational interviewing impacted weight loss by decreasing BMI by *SMD*: -0.12 ($p = 0.07$), with percentage weight change at 12 months being significantly greater ($p = 0.03$) in group-based interventions rather than individual-based interventions. Several of the systematic reviews showed a reduction in overall weight and BMI when mindfulness interventions were implemented in addition to diet and exercise, as evidenced by a decrease in effect size of 1.09 and an increase of weight loss with a mean -4.9 kg.

***Level II Evidence***

**Axten, Hawkins, Tybor, Bernoff, and Altman (2017).** Axten et al., (2017) conducted a quality observational quasi-experimental study to evaluate whether a wellness group would generate sustained weight loss and behavioral changes. The study consisted of 289 patients aged 18 and older, who have a BMI ≥ 30kg/$m^2$, who were seen at the Family Practice Group in Arlington, Massachusetts between September 2009 and January 2015. The experimental group made up of 99 patients, received a multidisciplinary educational intervention provided in groups over 20 weeks. Groups were made up of 6-15 patients who attended 15 sessions in which education regarding food quality, quantity, activity, sleep, and exercise were provided by family physicians and registered dieticians. The group environment encouraged communication on a regular basis between group members. The control group received the standard care for obesity and weight management. Outcomes measured included weight, BMI, BP, hemoglobin A1C, and lipid profiles. The experimental group had a weight loss of *M* = -13.21 compared to the control group *M* = +1.94 (*p* = <0.05). Similarly, BMI at 1 year for the experimental group was *M* = -2.21 compared to the control group *M* = +0.30 ( *p*= <0.05). After 1-year, the change in the systolic blood pressure (SBP) in the experimental group was M = -6.96, while the control group was *M* = -1.13 (*p* = <0.05). Changes in weight, BMI, and SBP were statistically significant. Additionally, though not statistically significant, after 1-year diastolic blood pressure (DBP) and triglycerides were improved in the experimental group.. Interestingly, at 1-year, Hemoglobin A1C levels were worse in the experimental group *M* = +0.18, while they were improved in the control group *M* = -0.01. The researchers discussed the possible explanation for this discrepancy may be the consumption of more fruits and more frequent eating.

**LeBlanc, Patnode, Webber, Redmond, Rushkin, and O'Connor (2018).** LeBlanc et al., (2018) conducted a high-quality systematic review comprised of 124 sources of evidence consisting of RCTs and observational studies, to determine the benefits and harms of pharmacotherapy and behavioral interventions on weight loss in adults. Four studies concluded

that the use of weight loss medications resulted in greater weight loss *M* = 5kg (*p* = <0.001) in comparison to those who did not receive weight loss medications, while not reporting any serious adverse effects or increased harm. Outcomes measured included health outcomes, weight loss, reduction in obesity related comorbidities, and adverse events. In 18 RCTs, there were limited reduction of cardiovascular disease related mortality, but no differences were noted in adults with obesity and prediabetes or prehypertension. Group interventions reported greater weight loss of *M* = -2.39kg and less weight gain of *M* = -1.59kg at 12-18 months (*p* = 90%) compared to individual interventions. The reduction of obesity related comorbidities and adverse effects was evaluated in 22 RCTs which showed that the incidence of diabetes decreased from 0-15% in the experimental group, while it was 0-28.9% in the control group. Consequently, prediabetes with weight loss interventions resulted in a lower risk of developing diabetes. Additionally, the prevalence of hypertension, metabolic syndrome, and cardiovascular disease were limited and not well reported. .

**Maciejewski, Shepherd-Banigan, Raffa, and Weidenbacher (2018).** Maciejewski et al., (2018) conducted a Grade B systematic review comprised of 26 pieces of evidence including cohort studies, prospective cohort studies, and RCTs conducted between January 2005 and December 2016. The review evaluated the Veterans Health Administration's behavioral weight program (MOVE!) to determine the association between participation and weight change. The MOVE! program consists of multimodal interventions including individual sessions, support groups, telehealth visits, and group video sessions. Interventions focus on healthy eating behaviors and increasing physical exercise, which both can be completed in individual session or group sessions. Modest to moderate improvements in weight loss were achieved as participation rates in the sessions increased.

***Level III Evidence***

**Gilis-Januszewska, Barengo, Lindstrom, Wojtowicz, Acosta, Tuomilehto, Schwarz, Piwonska-Solska, Szybinski, Windak, and Hubalewska-Dydejczyk (2018).** Gilis-

Januszewska et al., (2018) conducted a cohort study to identify factors that predict long-term successful weight loss maintenance achieved during a type 2 diabetes prevention program in patients with high risk for type 2 diabetes in primary care. The study included 175 patients aged 26 and older with a high risk of diabetes, but with no previous diagnosis of diabetes from nine primary care practices in Krakow, Poland. The intervention consisted of 20 group sessions including interdisciplinary education provided by primary healthcare nurses and physicians. Education provided was regarding diet and activity. Outcomes measured were biochemical tests such as glucose levels, lipids, BMI, weight, waist circumference, BP, and the Finnish Diabetes Risk Score (FINDRISC). Comparison between maintainers of the intervention and non-maintainers were compared at both 1 and 2 years. Maintainers are those who continued to lose weight or maintained weight loss 1 year after the intervention, whereas the non-maintainers are those who increased weight 1-year after the intervention. Two years post intervention, the mean weight loss between maintainers was -2.07 compared to the mean of non-maintainers of 4.23 ($p$ = <0.001). Similarly, after 2 years, the BMI of maintainers was $M$ = -0.69 compared to the non-maintainers $M$ = 1.63 ($p$ = <0.001), making the change in both weight loss and BMI statistically significant. Waist circumference changes at 2 years between maintainers and non-maintainers was($M$ = -4.72 in maintainers and $M$ = 4.39, respectively) not statistically significant ($p$ = 0.007). Other outcomes were improved but findings were also not statistically significant. .

**Shibuya, Ji, Pfoh, Millinovich, Weng, Bauman, Ganguly, Misra-Herbert, Hobbs, Kattan, Pantalone, Ramasamy, and Burguera (2020).** Shibuya et al., (2020) conducted a high-quality retrospective study to compare weight loss outcomes and access to anti-obesity medications between patients with obesity who are managed through SMAs versus individual appointments. A total of 2,303 patients 18 years and older who were seen for obesity at the Cleveland Clinic Institute of Endocrinology and Metabolism between September 2014 and February 2017 were divided into an experimental group made up of 310 individuals and 1,993 individuals in the control group. Propensity matching, a statistical technique to match non-SMA

members to SMA members on all measured baseline variables, was done to account for the discrepancy in the two groups. Interventions included group meetings, interdisciplinary education, and support. Education provided by interdisciplinary teams of PCPs, board certified obesity medicine provider, endocrinologist, and registered dietician discussed nutrition, exercise, appetite control, quality sleep, and stress management. Groups met monthly and consisted of 8-10 individuals who were able to provide support from shared experiences. The control group had individualized meetings with the PCP and received standard care alone. Outcomes measured was percentage of weight loss among the groups. After 6 months, the percentage of weight loss among the SMA group was 4.17% compared to the non-SMA group's 1.51% ($p$ = <0.001). Similarly, the SMA group had a 5.18% weight loss at 1 year, contrasted by the non-SMA group's 1. 76% ($p$ = <0.001). The difference at 2 years was not statistically significant, but clinically significant with the SMA group having a 3.78% loss versus the non-SMAs loss of 1.64% ($p$ = 0.02). The clinical significance is the associated improvement of cardiovascular risk factors, such as improved blood pressure and cholesterol. The researchers attribute the discrepancy between percent weight loss at 1 and 2-years among the SMA group may be due to phentermine being approved for short-term use only.

**Taylor, Olsen, McVay, Grubber, Glerisch, Yancy Jr, and Voils (2019).** Taylor et al., (2019) conducted a two-arm parallel randomized trial to assess relationships between outcomes and group cohesion. The study consisted of 324 patients aged 18-75 with BMIs ≥ 30kg/$m^2$ who attended the Durham Veterans Affairs Medical Center (VAMC) or Raleigh community-based outpatient clinic. The intervention consists of groups of 10-30 participants in groups that meet every 2 weeks. In addition, multidisciplinary education was provided by the study interventionists and a registered dietician and included education about diet and behavioral goal setting. Outcomes were measured by the group cohesion scale- revised (GCS-R) and weight. Group attendance was strongly associated with weight loss ($p$ = <0.001). Group cohesion increased by session eight ($p$ = <0.001), however this was not significantly associated

with weight loss ($p$ = 0.42). The researchers propose some reasons for the lack of association may be related to individual health behaviors and interpersonal constructs being more important than group cohesion. The percentage of weight loss at 16 weeks was $M$ = 5.2% ($SD$= 0.04).

**Tunay, Kurdak, Ozcan, Ozdemir, and Ozer (2018).** Tunay et al., (2018) conducted a low-quality nonrandomized cohort design study to investigate the effects of lifestyle changing interventions of group visits on weight management in overweight and obese women that were led by family physicians. The intervention was multimodal and included education regarding lifestyle modifications, behavioral training, diet, and exercise provided by a multidisciplinary team of a research fellow, a nurse, and a family physician. Outcomes measured included vitals such as heart rate (HR), blood pressure (BP), lipid panel, hemoglobin A1C (A1C), weight, BMI, and waist circumference. After 6 months, weight changed decreased from $M$ = 84.7 to $M$ =77.8 ($p$ = 0.001). Similarly, BMI changed from $M$ = 31.6 to $M$ = 29.0 ($p$ = 0.001), Diastolic blood pressure changed from $M$ = 74.5 to $M$ = 68.3 at 6 months ($p$ = 0.001), and waist circumference decreased from $M$ = 99.8 to $M$ = 93.7 ($p$ = 0.001) at 6 months. Clinical significance was noted in A1C ($p$ = 0.428), lipid panel ($p$ = 0.804), SBP ($p$ = 0.006), and HR changes ($p$ = 0.012), although they did not have statistically significant changes. The researchers discussed that a decrease in A1C and lipid panel decrease the risk of cardiovascular or cardiometabolic diseases. This decrease is evidenced by the improvement of BP and HR.

**Yager, Parker, Luxenburg, and Varghai (2020).** Yager et al., (2020) conducted a Grade B retrospective observational study evaluating the change in weight in patients attending shared medical appointments. The study consisted of 222 patients with a BMI $\geq$ 28kg/m$^2$ who attended a family practice clinic in Beachwood Ohio between December 3, 2015 and August 30, 2016. Participants were split into groups of 10-15 patients, that attended SMAs monthly. Education was provided by the physician, pharmacist, and registered dietician. Physicians led through behavioral interventions and motivational interviewing, while the registered dietician presented information about diet options and healthy foods. The pharmacist performed reviews

of current medications and made suggestions regarding medications that may cause weight gain. Outcomes measured were weight, BMI, hemoglobin A1C, and lipid panel. Weight change at both 3 and 9 months was *M* = -4.0 and *M* = -4.4 (*p* = <0.0001). Correspondingly, BMI change at both 3 and 9 months was *M* = 36.5 and *M* = 36.3 (*p* = <0.0001). Systolic BP and diastolic BP had statistical significance at 3 months (*p* = <0.0001). Hemoglobin A1C change at 3 months was *M* = 6.7 (*p* = 0.0058) and at 9 months *M* = 6.8 (*p* = 0.0066). While this change is statistically significant, the researchers discuss that clinically, the A1C amounted to only small changes. Similarly, change in the lipid profile is not statistically significant, but any change in lipid panel is clinically significant as it decreases the likelihood of adverse cardiovascular events.

## Construction of Evidence-based Practice

### Synthesis of Critically Appraised Literature

The prevalence of obesity is growing annually (Waters & DeVol, 2016). Primary care providers are positioned to treat patients with obesity influencing the course of the disease. Obesity is a complex disease that is multifaceted in origin. Therefore, interventions to combat obesity must also be multifaceted.

**Multidisciplinary Care.** Utilizing a multidisciplinary team to provide education to patients allows for comprehensive educational interventions. Primary care providers that utilize the expertise of other disciplines such as registered dieticians, exercise physiologists, endocrinologists, pharmacists, and board-certified obesity medicine providers saw significant weight loss that was sustained for up to 2 years (Axten et al., 2017; Flodgren et al., 2017; Shibuya et al., 2020; Taylor et al., 2019; Yager et al., 2020). For example, Axten et al. (2017) showed a reduction of weight at 1-year after receiving multidisciplinary care from a family physician and dietician was *M* = -13.21 compared to *M* = +1.94 in the control group (*p* = <0.05). Likewise, Shibuya et al. (2020) had similar results with the SMA group having a weight loss of *M* = 5.18% compared to *M* = 1.76% in the control group at 1 year (*p* = <0.001) after receiving

multidisciplinary education provided by PCP, board certified obesity medicine provider, endocrinologist, and registered dietician. Providing detailed education regarding dietary modifications, behavioral modifications, and lifestyle changes necessary for weight loss were key to sustained weight loss (Axten et al., 2017; Shibuya et al., 2020; Taylor et al., 2019; Yager et al., 2020). For example, Yager et al. (2020), revealed the key to sustained weight loss was through specialized education provided by pharmacists and registered dieticians, which resulted in a weight loss of 36.5 ± 6.1 at 3 months ($p$ = <0.0001) and 36.3 ± 6.1 at 9 months ($p$ = <0.0001). Similarly, Taylor et al. (2019) determined that diet and behavioral techniques provided by a dietician or the study interventionalist resulted in a $M$ = 5.2% weight loss at 16 weeks. Pharmacists were also utilized to review current medication lists to determine potential medications such as antidepressants and birth control that may contribute to weight gain (Shibuya et al., 2020; Yager et al., 2020). As evidenced by Yager et al. (2020), pharmacists made suggestions regarding changing medications that may cause weight gain., which could have contributed to the successful weight loss of 36.5 ± 6.1 at 3 months ($p$ = <0.0001).

**Behavioral Interventions.** Behavioral interventions are necessary for weight loss to be successful. Behavioral modifications are achieved through education regarding necessary interventions and motivational interviewing. Education regarding food quality, quantity, activity, and exercise were found to promote weight loss (Axten et al., 2017; Flodgren et al., 2017; Gilis-Januszewska et al., 2018; LeBlanc et al., 2018; McRobbie et al., 2019; Shibuya et al., 2020; Slade et al., 2018; Swe et al., 2019; Taylor et al., 2019; Tunay et al., 2018; Yager et al., 2020). For example, Axten et al. (2017) demonstrated that education regarding food quality and quantity, activity, sleep, and exercise resulted in a reduction of BMI at 1-year to be $M$ = -2.21 in the experimental group compared to $M$ = +0.30 in the control group ($p$ = <0.05). Comparatively, Gilis-Januszewska et al. (2018) revealed that focused education on diet and exercise resulted in a decrease in weight at 2 years to be $M$ = -2.07 in the experimental group compared to $M$ = 4.23

in the control group ($p$ = <0.001). Motivational interviewing is necessary to determine the actions needed to obtain behavioral modifications and change. The use of motivational interviewing and behavioral counseling lead to significant weight loss and reduction of BMI at both at 3- and 9-month intervals (Swe et al., 2019; Yager et al., 2020). As evidenced in Yager et al. (2020), behavioral counseing and motivational interviewing resulted in a decrease in BMI of 36.5 ± 6.1 kg/m$^2$ at 3 months ($p$ = <0.0001) and 36.3 ± 6.1 kg/m$^2$ at 9 months ($p$ = <0.0001).

**Shared medical appointments.** The restructuring of care has proven to be beneficial for many chronic diseases, thus it has been trialed in obesity management. Utilizing shared medical appointments of groups of patients with similar issues has provided support for the patients by allowing for communication between group members regarding shared experiences (Axten et al., 2017; Flodgren et al., 2017; Gilis-Januszewska et al., 2018; Graham et al., 2019; LeBlanc et al., 2018; Maciejewski et al., 2018; McRobbie et al., 2019; Shibuya et al., 2020; Slade et al., 2018; Taylor et al., 2019; Tunay et al., 2018; Yager et al., 2020). Graham et al. (2019) revealed that weight loss at 1-year was $M$ = -2.43kg in the experimental group compared to $M$ = -1.04kg in the control group ($p$ = 0.025). Comparably, McRobbie et al. (2019) demonstrated that weight loss at 6 months was $M$ = -5.0kg ($p$ = <0.001) after group meetings. Likewise, Taylor et al. (2019) discovered that group attendance is closely associated with weight loss ($p$ = <0.001). Additionally, commitment to the group aided in greater weight loss than individualized appointments (Flodgren et al., 2017; Gilis-Januszewska et al., 2018; Maciejewski et al., 2018; Swe et al., 2019; Yager et al., 2020). For example, Flodgren et al. (2017) revealed that SMAs resulted in lower BMI (CI -0.20 to -0.16). Similarly, Maciejewski et al. (2018) showed that weight loss was moderately improved as participation rates in SMAs increased.

## Best Practice Model Recommendation

The evidence on treating patient with obesity is extensive. Organizations on the cutting edge of best practice guidelines know that obesity is best managed through a multifaceted

approach. Utilizing motivational interviewing to determine the education and behavioral interventions needed have been utilized for obesity management, yet the problem is still worsening. This EBP project seeks to determine if the implementation of SMAs into family practice would decrease obesity. The intervention is based on the evidence synthesized through an exhaustive and comprehensive literature review.

Organizational restructuring of care to group visits, in family practice is recommended to provide support for the patients, while optimizing care delivery (Axten et al., 2017; Flodgren et al., 2017; McRobbie et al., 2019; Shibuya et al., 2020; Yager et al., 2020). Evidence supports the implementation of SMAs in addition to motivational interviewing and behavioral counseling to aid in obesity management (Axten et al., 2017; Flodgren et al., 2017; Graham et al., 2015; LeBlanc et al., 2018; McRobbie et al., 2019; Slade et al., 2018; Swe & Edu, 2019; Tunay et al., 2018; Yager et al., 2018). SMAs appear to be more effective at reduction of weight and BMI compared to standard appointments (Axten et al., 2017; Gilis-Januszewska et al., 2018; Graham et al., 2019; Guthrie & Bogue, 2015; LeBlanc et al., 2018; McRobbie et al., 2019; Shibuya et al., 2020; Tunay et al., 2018; Yager et al., 2020). The site for the EBP implementation already utilizes motivational interviewing and behavioral counseling for obesity management. Therefore, the addition of SMAs would be beneficial, as best practice as identified through the literature review, is the use of SMAs in addition to motivational interviewing and behavioral counseling to manage obesity.

**Table 2.2 Evidence Summary**

| Citation (APA) | Purpose | Design | Sample | Measurement/ Outcomes | Results/Findings | Level/ Quality |
|---|---|---|---|---|---|---|
| Axten, K., Hawkins, K., Tybor, D. J., Bernoff, J., & Altman, W. (2017). Impact of a novel wellness group visit model on obesity and behavior change. *Journal of the American Board of Family Medicine : JABFM*, *30*(6), 715–723. https://doi-org.ezproxy.valpo.edu/10.3122/jabfm.2017.06.170098 | To evaluate whether a wellness-group would generate sustained weight loss and behavioral changes | Observational Study- quasi-experimental study design | 289 patients aged ≥18 who have a BMI ≥ 30, who were seen at the Family Practice Group in Arlington, Massachusetts between September 2009 and January 2015 | **IV:**<br>**Experimental: (n= 99)**<br>**Multidisciplinary:** provided by family physician and registered dietician.<br>**Group**: 6-15 patients attending 15 sessions over 20 weeks.<br>**Education:** food quality and quantity, activity, sleep, and exercise.<br>**Support:** encourage communication on regular basis between group members.<br>**Control: (n= 190)**<br>Standard care for obesity and weight management.<br>**Outcomes:** | **Weight at 1 year:**<br>Experimental: mean -13.21 ($p$ = <0.05)<br>Control: mean +1.94<br>**BMI at 1 year:**<br>Experimental: mean -2.21 ($p$ = <0.05)<br>Control: mean +0.30<br>**Systolic BP at 1 year:**<br>Experimental: mean -6.96 ($p$ = 0.05)<br>Control: mean -1.13<br>**Diastolic BP at 1 year:**<br>Experimental: mean -5.70<br>Control: mean -4.20<br>**Hemoglobin A1C at 1 year:**<br>Experimental: mean + 0.18<br>Control: mean -0.01<br>**HDL at 1 year:**<br>Experimental: mean +2.81<br>Control: mean +0.63<br>**LDL at 1 year:**<br>Experimental: mean -0.42<br>Control: mean -5.0<br>**Total Cholesterol at 1 year:**<br>Experimental: mean -3.23<br>Control: mean -8.54 | Level II A |

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| | | | | Weight, BMI, BP, hemoglobin A1C, and lipid profile. | **Triglycerides at 1 year:** Experimental: mean -34.27 Control: mean -5.03 | |
| Flodgren G, Gonçalves-Bradley DC, Summerbell CD. Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity. *Cochrane Database of Systematic Reviews 2017*, Issue 11. Art. No.: CD000984. DOI: 10.1002/14651858.CD000984.pub3 | To determine what interventions change the organization of care and healthcare providers behaviors to promote weight loss in those who are overweight or obese. | Systematic Review | 12 studies consisting of RCTs and cluster studies published between 1946 and 2016. | Primarily multi-faceted and included tailored educational interventions provided by primary care providers and dieticians and restructuring care to include shared appointments. | -Educational interventions slightly reduce weight (*CI* -2.84 to 0.37)<br><br>-Dietician or shared care provided educational interventions improve weight loss (*CI* -4.83 g to -6.37 kg)<br><br>-Shared medical appointments in primary care results in lower BMI (*CI* -0.20 to -0.16) | Level I B |
| Gilis-Januszewska, A., Barengo, N. C., Lindström, J., Wójtowicz, E., Acosta, T., Tuomilehto, J., Schwarz, P. E. H., Piwońska-Solska, B., Szybiński, Z., Windak, A., & Hubalewska-Dydejczyk, A. (2018). | "To identify factors predicting long-term successful weight reduction maintenance achieved during a DM2 prevention program in patients with high DM2 risk | Cohort study | 175 patients aged ≥26 with high risk of diabetes, but no previous diagnosis of diabetes from nine independent primary healthcare practices in | **Intervention:**<br>**Groups**: 20 group sessions<br>**Interdisciplinary education:** provided by primary health-care nurses and physicians.<br>**Education**: diet and activity | **Weight:**<br>**Maintainers:**<br>1 year: mean -4.47 ($p$ = 0.714)<br>2 years: mean -2.07 ($p$ = <0.001)<br>**Non-maintainers:**<br>1 year: mean -4.02<br>2 years: mean 4.23<br>**BMI:**<br>**Maintainers:**<br>1 year: mean -1.74 ($p$ = 0.548)<br>2 years: mean -0.69 ($p$ = <0.001)<br>**Non-maintainers:** | Level III B |

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|---|---|---|---|---|---|---|
| Predictors of long term weight loss maintenance in patients at high risk of type 2 diabetes participating in a lifestyle intervention program in primary health care: The DE-PLAN study. *PloS One*, *13*(3), e0194589. https://doi-org.ezproxy.valpo.edu/10.1371/journal.pone.0194589 | in primary health care. | | Krakow, Poland. | **Outcomes:** Biochemical tests: glucose level, lipid panel, BMI, weight, waist circumference, BP, and FINDRISC score | 1 year: mean -1.37<br>2 years: mean 1.63<br>**Waist Circumference:**<br>**Maintainers:**<br>1 year: mean -5.93 ($p$ = 0.338)<br>2 years: mean -4.72 ($p$ = 0.007)<br>**Non-maintainers:**<br>1 year: mean -4.72<br>2 years: mean 4.39<br>**SBP:**<br>**Maintainers:**<br>1 year: mean -1.65 ($p$ = 0.463)<br>2 years: mean 2.67 ($p$ = 0.84)<br>**Non-maintainers:**<br>1 year: mean -4.57<br>2 years: mean 3.49<br>**DBP:**<br>**Maintainers:**<br>1 year: mean -1.09 ($p$ = 0.409)<br>2 years: mean -0.41 ($p$ = 0.343)<br>**Non-maintainers:**<br>1 year: mean -2.86<br>2 years: mean 1.58<br>**Fasting glucose:**<br>**Maintainers:**<br>1 year: mean 0.1 ($p$ = 0.311)<br>2 years: mean -0.05 ($p$ = 0.729)<br>**Non-maintainers:**<br>1 year: mean 0.27<br>2 years: mean -0.12<br>**FINDRISC:**<br>**Maintainers:**<br>1 year: mean -3.41 ($p$ = 0.567) | |

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| | | | | | 2 years: mean 0.15 ($p$ = 0.572)<br>**Non-maintainers:**<br>1 year: mean -2.91<br>2 years: mean 0.7 | |
| Graham, J., Tudor, K., Jebb, S. A., Lewis, A., Tearne, S., Adab, P., Begh, R., Jolly, K., Daley, A., Farley, A., Lycett, D., Nickless, A., & Aveyard, P. (2019). The equity impact of brief opportunistic interventions to promote weight loss in primary care: secondary analysis of the BWeL randomised trial. *BMC Medicine, 17*(1), 51. https://doi-org.ezproxy.valpo.edu/10.1186/s12916-019-1284-y | To assess the effects of the recommended guideline stating clinicians should make behavioral interventions with patients who are obese to increase participation in effective weight loss programs. | RCT | 1882 patients who were waiting to see 137 GPs in the south of England who had BMIs ≥ 25 if Asian and ≥ 30 for all other ethnicities between June 2013 and December 2014. | **IV:**<br>**Experimental: (n=940)**<br>-Referred to one of two free community weight loss programs<br>-Socioeconomic status measured by the Index of Multiple Deprivation (IMD) score.<br><br>**Control: (n=942)**<br>GPs advised participants to lose weight to optimize their health.<br>**Outcomes:**<br>Weight and BMI | **Weight:**<br>**Experimental:**<br>1 year: mean -2.43kg<br>**Control:**<br>1 year: mean -1.04kg<br>**IMD:**<br>**Experimental:**<br>Baseline: mean 16.4<br>**Control:**<br>Baseline: mean 15.7<br>**Weight and IMD:**<br>**Experimental:** 0.042 ($p$ = 0.040)<br>**Control:** -0.012 ($p$ = 0.45)<br><br>Socioeconomic deprivation had a moderate effect on weight loss, which is clinically significant although not statistically significant. | Level I B |
| LeBlanc, E. S., Patnode, C. D., Webber, E. M., Redmond, N., Rushkin, M., & O'Connor, E. A. (2018). Behavioral | To determine the benefits and harms of pharmaco-therapy and behavioral interventions on | Systematic Review | 124 sources of evidence consisting of RCTs and observational studies | Outcomes measured include health outcomes, weight loss, reduction in obesity related | -Group intervention reported greater weight loss compared to individual interventions.<br><br>-Behavior based interventions (group meetings) resulted in a greater mean of weight loss at 12 | Level II A |

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| and pharmacotherapy weight loss interventions to prevent obesity-related morbidity and mortality in adults: Updated evidence report and systematic review for the US preventive services task force. *JAMA : The Journal of the American Medical Association, 320*(11), 1172-1191. doi:10.1001/jama.2018.7777 | weight loss in adults. | | | comorbidities, and adverse events. | to 18 months. (*CI* -2.85 to -1.93) and less weight gain (*CI* -2.38 to -0.79).<br><br>-Prediabetics with weight loss interventions resulted in lower risk of developing diabetes. | |
| Maciejewski, M. L., Shepherd-Banigan, M., Raffa, S. D., & Weidenbacher, H. J. (2018). Systematic review of behavioral weight management program MOVE! for veterans. *American Journal of Preventive Medicine, 54*(5), 704–714. https://doi-org.ezproxy.valpo.edu/10.1016/j.amepre.2018.01.029 | Evaluates the Veterans Health Administration's behavioral weight program (MOVE!) to determine the association between participation and weight change. | Systematic Review | 26 pieces of evidence including cohort studies, prospective cohort study, and RCTs conducted between January 2005 and December 2016. | Primarily multimodal and included interventions through multiple modalities such as individual sessions, support groups, telehealth visits, and group video sessions. | Weight loss<br><br>Modest to moderate improvements were achieved as participation rates increased. | Level II B |

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| McRobbie, H., Hajek, P., Peerbux, S., Kahan, B. C., Eldridge, S., Trépel, D., Parrott, S., Griffiths, C., Snuggs, S., & Smith, K. M. (2019). Randomised controlled trial and economic evaluation of a task-based weight management group programme. *BMC Public Health, 19*(1), N.PAG. https://doi-org.ezproxy.valpo.edu/10.1186/s12889-019-6679-3 | To examine whether a multi-modal group intervention aimed at disadvantaged communities has better weight loss outcomes at 1 year compared to a standard weight program in primary care provided by practical nurses. | RCT | A total of 330 patients aged ≥ 18 with BMIs ≥30, who lived near the London inner city borough of Tower Hamlets or Hackney between September 2012 and January 2014. | **IV:**<br>**Experimental: (n=210)**<br>Group: Weight action program (WAP)- 8 weekly group meetings of 10-21 participants<br>Education: information provided about diet, physical activity, and self-monitoring.<br>Support: support from peers. 2 advisors conducted group sessions<br>**Control: (n= 109)**<br>Standard care provided by practical nurses: initial meeting with GP, follow up with nurse at 2-8 weeks, and referral to community-based exercise program.<br>**Outcomes:**<br>Weight, BMI, waist circumference, BP, and food knowledge. | **Weight:**<br>**WAP (group intervention):**<br>2 months: mean -3.2 ($p$ = 0.009)<br>6 months: mean -5.0 ($p$ = <0.001)<br>12 months: mean -4.2 ($p$ = 0.04)<br>**PNI (nurse intervention):**<br>2 months: mean -2.2<br>6 months: mean -2.1<br>12 months: mean -2.3<br><br>**Waist Circumference:**<br>**WAP (group intervention):**<br>12 months: mean -4.1cm ($p$ = 0.07)<br>**PNI (nurse intervention):**<br>12 months: mean -2.0cm | Level I A |

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| Shibuya, K., Ji, X., Pfoh, E. R., Milinovich, A., Weng, W., Bauman, J., . . . Burguera, B. (2020). Association between shared medical appointments and weight loss outcomes and anti-obesity medication use in patients with obesity. *Obesity Science & Practice, 6*(3), 247-254. doi:10.1002/osp4.406 | To "compare weight loss outcomes and anti-obesity medication access between patients with obesity managed through SMAs versus individual appointments" p. 247 | Retrospective Study | A total of 2,303 patients ≥18 years of age seen for obesity at the Cleveland Clinic Institute of Endocrinology and Metabolism between September 2014 and February 2017. | **IV:**<br>**Experimental: (n=310)**<br>-Group meetings of 8-10 patients monthly<br>-Education: multidisciplinary education provided by PCP, board certified obesity medicine provider, endocrinologist, and registered dietician.<br>Support: provided areas for shared learning experiences from peers.<br>**Control: (n=1,993; 310 after propensity matching)**<br>-individualized meetings with standard care alone<br>**DV:**<br>weight loss as measured by percentage | **Weight loss:**<br>**SMA:**<br>6 months: 4.17% ($p$ = <0.001)<br>1 year: 5.18% ($p$ = <0.001)<br>2 years: 3.78% ($p$ = 0.02)<br><br>**Non-SMA:**<br>6 months: 1.51%<br>1 year: 1.76%<br>2 years: 1.64% | Level III A |
| Slade, S., Ther, D., & Ther, M. (2018). | Summarizes evidence | Evidence Summary | 10 sources of evidence | N/A | All articles recommended using a combined diet and exercise | Level I A |

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| Evidence Summary. Weight-loss maintenance (long term): Structured weight-loss programs. *The Joanna Briggs Institute EBP Database*. JBI@Ovid. 2018: JBI631 | regarding long-term weight loss maintenance while in structured weight loss programs. | | consisting of 3 meta-analyses, 5 systematic reviews, an RCT, and a retrospective cohort study. | | program to produce a greater reduction in long-term weight loss. Additionally, regular clinic visits, especially in groups should be conducted to aid in compliance. | |
| Swe, K. & Edu, D. (2019). Evidence Summary. Obesity and overweight: Psychological interventions. *The Joanna Briggs Institute EBP Database*. JBI@Ovid. 2019: JBI752 | Summarizes evidence about psychological interventions available for those who are overweight or obese. | Evidence Summary | 7 systematic reviews consisting of 67 RCTs, 26 studies, and 12 articles. | N/A | Evidence supports using psychological interventions such as motivational interviewing and behavioral counseling to treat obesity. In addition, behavioral treatment strategies such as session attendance can aid in adherence to lifestyle changes. | Level I A |
| Taylor, S. S., Olsen, M. K., McVay, M. A., Grubber, J., Gierisch, J. M., Yancy, W. S., Jr., & Voils, C. I. (2019). The role of group cohesion in a group-based behavioral weight loss intervention. *Journal of Behavioral Medicine, 42*(1), 162–168. https://doi-org.ezproxy.valpo.edu | To measure group cohesion to "assess temporal relationships between cohesion and outcomes and the dynamic nature of cohesion" (p. 163). | Two-arm parallel randomized trial | 324 patients aged 18-75 with BMI ≥ 30 who attended the Durham Veterans Affairs Medical Center (VAMC) or the Raleigh community-based outpatient clinic. | **Intervention: Groups**: 10-30 participants in each group that met every 2 weeks. **Multidisciplinary**: led by study interventionist or registered dietician **Education**: diet and behavioral techniques **Outcomes:** Group Cohesion Scale- | Group attendance is closely associated with weight loss ($p$ = <0.001).<br><br>Group cohesion increased by session 8 ($p$ = <0.001), however this was not significantly associated with weight loss ($p$ = 0.42).<br><br>Percentage weight loss at 16 weeks: mean 5.2% | Level III A |

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| /10.1007/s10865-018-9953-4 | | | | Revised (GCS-R), Weight, | | |
| Tunay, M., Kurdak, H., Özcan, S., Özdemir, Ç., & Özer, Z. Y. (2018). Family physician-led group visits for lifestyle modification in women with weight problems: A pilot intervention and follow-up study. *Obesity Facts, 11*(1), 1–14. https://doi-org.ezproxy.valpo.edu/10.1159/000486133 | "To investigate the feasibility and effects of lifestyle-changing intervention by family physician-led group visits (GVs) on weight management in overweight and obese women" (p. 1) | Nonrandomized cohort design | 60 women aged ≥18 with a BMI between 25 and 40, who speak and read Turkish and attended the Outpatient Clinic of Cukurova University between December 2013 and January 2014. | **Intervention:**<br>**Education:** Multimodal including lifestyle modification/ behavioral training, education regarding diet, and increased exercise.<br>**Groups:** provided support and learned from one another.<br>**Multidisciplinary**: groups were led by a research fellow, a nurse, and family physician.<br>**Outcomes:** HR, BP, lipid panel, hemoglobin A1C, weight, BMI, and waist circumference. | **Weight:**<br>Baseline: 84.7 ± 13.8 kg<br>6 months: 77.8 ± 14.1 kg ($p$ = 0.001)<br>**BMI:**<br>Baseline: 31.6 ± 4.2<br>6 months: 29.0 ± 4.4 ($p$ = 0.001)<br>**Waist Circumference:**<br>Baseline: 99.8 ± 9.1<br>6 months: 93.7 ± 10.0 ($p$ = 0.001)<br>**A1C:**<br>Baseline: 5.5 ± 0.5<br>6 months: 5.4 ± 0.3 ($p$ = 0.428)<br>**Total Cholesterol:**<br>Baseline: 178.7 ± 36.9<br>6 months: 176.8 ± 31.5 ($p$ = 0.804)<br>**HDL:**<br>Baseline: 43.2 ± 10.6<br>6 months: 46.0 ± 9.6 ($p$ = 0.022)<br>**Triglycerides:**<br>Baseline: 96.8 ± 52.9<br>6 months: 86.7 ± 45.7 ($p$ = 0.258)<br>**LDL:**<br>Baseline: 115.2 ± 28.8<br>6 months: 113.5 ± 24.8 ($p$ = 0.689)<br>**Systolic BP:**<br>Baseline: 118.1 ± 13.2 | Level III C |

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| | | | | | 6 months: 111.1 ± 12.4 ($p$ = 0.006)<br>**Diastolic BP:**<br>Baseline: 74.5 ± 12.7<br>6 months: 68.3 ± 11.5 ($p$ = 0.001)<br>**HR:**<br>Baseline: 77.4 ± 13.7<br>6 months: 70.0 ± 9.2 ($p$ = 0.012) | |
| Yager, S., Parker, M., Luxenburg, J., & Varghai, N. H. (2020). Evaluation of multidisciplinary weight loss shared medical appointments. *Journal of the American Pharmacists Association: JAPhA, 60*(1), 93–99. https://doi-org.ezproxy.valpo.edu/10.1016/j.japh.2019.07.014 | To evaluate the change in weight in patients attending shared medical appointments. | Retrospective Observational Study | 222 patients in with a BMI of 28 or higher recruited from a family practice clinic located in Beachwoood, OH between December 3, 2015 and August 30, 2016. | **Interventions:**<br>-**Groups**: 10-15 patients meeting for SMAs monthly. Vitals and medications were recorded at each visit.<br>-**Education**: provided by the physician and a specialist such as pharmacist and registered dietician. Physician lead through behavioral interventions and motivational interviewing, the registered dietician presented information about diets options and good versus bad | **Weight loss:**<br>3 months: -4.0 ± 5.1kg ($p$ = <0.0001)<br>9 months: -4.4 ± 5.9kg ($p$ = <0.0001)<br>**BMI:**<br>Initial: 38.0 ± 6.1<br>3 months: 36.5 ± 6.1 ($p$ = <0.0001)<br>9 months: 36.3 ± 6.1 ($p$ = <0.0001)<br>**Systolic BP:**<br>3 months: ($p$ = <0.0001)<br>9 months: ($p$ = 0.0029)<br>**Diastolic BP:**<br>3 months: ($p$ = <0.0001)<br>9 months: ($p$ = <0.0001)<br>**A1C:**<br>Initial: 7.3 ± 2.0<br>3 months: 6.7 ± 1.7 ($p$ = 0.0058)<br>9 months: 6.8 ± 1.7 ($p$ = 0.0066)<br>**Total cholesterol:**<br>3 months: ($p$ = 0.1340)<br>9 months: ($p$ = 0.1595) | Level III B |

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| | | | | foods, and the pharmacist reviewed current medications and made suggestions regarding medications that may cause weight gain.<br>-**Support**: provided by specialist and group.<br>**Outcomes:**<br>-**Vitals**: change and percentage of weight change and BMI<br>-**laboratory values**: change in A1C and lipid panel | **Triglycerides:**<br>3 months: ($p$ = 0.0879)<br>9 months: ($p$ = 0.1123)<br>**HDL:**<br>3 months: ($p$ = 0.8751)<br>9 months: ($p$ = 0.5618)<br>**LDL:**<br>3 months: ($p$ = 0.2587)<br>9 months: ($p$ = 0.2226) | |

# CHAPTER 3

# IMPLEMENTATION OF PRACTICE CHANGE

Implementing the change into practice entailed a multifaceted approach involving various providers, beginning with offering eligible patients the opportunity to participate in the project. The implementation of this EBP project was done in a single primary care clinic in Central Indiana. Participants for the project were recruited through convenience sampling after inclusion criteria was met.

## Participants and Setting

Participants in the project included 20 patients with a BMI ≥ 30 kg/m$^2$, who were greater than 18 years of age. Inclusion criteria includes patients 18 years or older who had a BMI ≥ 30 kg/m$^2$ and were managed by a care provider at the clinic. Exclusion criteria included pregnant women, institutionalized patients, those who had undergone bariatric surgery, and those with uncontrolled metabolic or endocrine disorders. The project took place in a primary care clinic owned by a for-profit hospital system in the Midwest.

### Pre-Intervention Group Characteristics

The demographics of the population included adults with a BMI ≥ 30 kg/m$^2$, who attend a clinic in central Indiana. The SMA group consists of 20 participants with a mean BMI of 42.2 kg/m$^2$ with levels ranging from 30.5 kg/m$^2$ to 72.3 kg/m$^2$. The demographics of the SMA group was a mean age of 41,which was composed of three males and 17 females, five of which were African Americans, one Hispanic, and 14 Caucasians. The intervention group had a mean systolic BP of 111.3 mm Hg and a mean diastolic BP of 74.35 mm Hg. A variety of medications were taken by the participants in the SMA group, including 10 who took phentermine/topiramate, seven who took metformin, two who took liraglutide, three who took lisdexamfetamine dimesylate, and four who took semaglutide.

The non-SMA group was compiled of 20 participants with a mean BMI of 41.35 kg/m$^2$, with levels ranging from 30.6 kg/m$^2$ to 60.0 kg/m$^2$. The demographics of the non-SMA group was a mean age of 41.35 kg/m$^2$, which was composed of three males and 17 females, four of which were African Americans, one Hispanic, one unspecified, and 14 Caucasians. The non-SMA group had a mean systolic BP of 121.3 mm Hg and a mean diastolic BP of 79.9 mm Hg. A variety of medications were taken by the participants in the non-SMA group, including 12 who took phentermine/topiramate, nine who took metformin, and three who took semaglutide.

## Intervention

### Planning

The recruitment phase of the project occurred either in person, by phone, or by email from the DNP student director. Once participants enrolled in the project, they received a consent form outlining the project, the risks, benefits, and their rights as human subjects. The consent forms were collected at the time of enrollment and the DNP student project director reviewed the consent forms with the participants and addressed any questions or concerns. The signed consent forms were uploaded into Research Electronic Data Capture (REDCap). After consent was signed, the participant was officially enrolled into the project and their demographic data were entered into REDCap. The participants were given the option to attend the SMAs either virtually via Zoom or in person.

The DNP student project director created a detailed agenda for the SMAs and outlined the agendas for the SMAs with the specialists, PCPs, and participants (Appendix B). The multifaceted intervention included a 30-minute educational session by a specialist, as well as a 15-minute sharing time, and a brief individualized meeting with the PCP. The specialists were selected from a bariatric center associated with the Medical Group and through networking with specialists and consisted of a registered dietician, bariatric nurse practitioner, and psychologist, who provided educational vignettes one per month. The specialists all presented virtually, and the order of presentations was done based on their availability. The first to present was the

dietician who led a discussion on macronutrients, portion sizes, how to read a nutrition label, and healthy alternatives to aid in weight loss. The second presenter was the bariatric NP, who led a discussion on motivation and overcoming obstacles to weight loss. The third and final was a psychologist, who presented on the psychology behind dieting, emotions behind eating, and managing expectations to weight loss.

Two meetings per month were offered on varying days at varying times of day and included an option for virtual attendance using Zoom©. The DNP student project director setup a Zoom© account for access to the virtual meetings. Information for the virtual meetings was sent solely to those who specified virtual attendance and the meetings were password protected to adhere with the protection of privacy for the participants. Participants were weighted prior to SMA meetings and vitals were taken for those attending in person. Those attending virtually, were required to come into the office within 1 week to weight in and have their vitals taken. A brief meeting with the provider was conducted either prior to the meeting for those attending in person or immediately following the meeting for those attending virtually to discuss individualized challenges. The DNP student project director followed up with each participant monthly to schedule each participant for the appointment and format that worked best for them. The DNP student project director also followed up with the participants who attended virtually to ensure compliance with being weighed within 1 week.

## Comparison

A multifaceted approach to obesity management is necessary to combat the obesity epidemic. The use of motivational interviewing, behavioral counseling, and SMAs have shown to have greater weight loss than standard care alone (Axten et al., 2017; Flodgren et al., 2017; Gilis-Januszewska et al., 2018; Graham et al., 2019; LeBlanc et al., 2018; Maciejewski et al., 2018; McRobbie et al., 2019; Shibuya et al., 2020; Slade et al., 2018; Taylor et al., 2019; Tunay et al., 2018; Yager et al., 2020). Data were compared between pre-intervention, 1 month, 2 months, and 3 months post-intervention for the SMA group. Data from the non-SMA group was

likewise compared from the first meeting to three months later to determine change. The two groups were then compared to each other to determine if there were any significant differences between the groups.

## Outcomes

Descriptive statistics were used to present patient demographics (age, gender, and weight loss medication taken if applicable) and all outcomes data. Demographic variables were compared between the groups, shared medical appointments versus standard of care, using chi-square. The primary outcome, change in BMI, was calculated for all patients. Secondary outcomes included SBP and DBP change from the baseline to post-intervention/3 month. These deltas were compared between the groups using *t*- test analysis. Inferential tests were utilized in a one-way manner based on the prediction that the SMA group will incur greater overall weight loss and lower BMI values, statistically speaking.

Within patient comparisons were also examined. Project outcomes were compared within patients for the standard of care group between baseline and 3 month data collection time periods. The shared appointment group had data collected at baseline, 1 month, 2 month, and 3 month post-intervention time periods. These time periods were examined in a paired manner utilizing ANOVA. Statistical Package for the Social Services (SPSS) 24.0 was used for statistical analysis.

## Time

Recruitment for the project began on October 6th, 2020, after Institutional Review Board (IRB) approval was obtained from the medical group. Implementation of the SMAs start on November 11th, 2020 to allow for adequate recruitment and concluded on January 7th, 2021. Six meetings occurred during this time frame, two each month. As described in multiple pieces of evidence, a weight loss of 5 percent is obtainable by 3 months, which significantly decreases risk of comorbidities and improves health.

## Protection of Human Subjects

This project received approval from the Valparaiso University IRB on July 20, 2020. The medical group's IRB approval was received on October 6, 2020. The student project director completed the Collaborative Institutional Training Initiative (Citi Training) for principal investigators on March 31, 2020, and again on September 8, 2020 per the medical group's request (Appendix C). To protect the human subjects in the project and to comply with Health Insurance Portability and Accountability Act (HIPAA) standards, the participants' demographic information was only accessible from secure, encrypted computers located within the clinical setting. The data extracted from charts and demographic information were stored in REDCap. Participants were numbered sequentially starting with one. Data stored in REDCap is available three years from completion of the project. Data were entered into the REDCap database via a secure web interface with data checks to ensure data entry validation. REDCap is a powerful tool which supports HIPAA compliance, including audit trails, secure socket layer (SSL) encryption, and integration with the institutional Lightweight Directory Access Protocol (LDAP) server (Harris et al., 2009). The REDCap application and database was housed on a secure server behind the institutions firewall, which is maintained by the institutions Clinical Research Institute. Access to the project's data in REDCap was restricted to the members of the project team by username and password.

Utilizing Zoom© for virtual attendance required special settings to ensure privacy of subjects. The DNP student project director sent invitations for the Zoom© meetings only to those who indicated they planned on attending virtually. In addition, the meetings were passcode protected and admittance to the meeting was controlled by the DNP student project director. The presenter for the month and the DNP student project director were the only participants with the authority to share their screen. The ability to record the meetings was prohibited by the DNP student project director.

# CHAPTER 4

# FINDINGS

The purpose of this EBP project was to evaluate the effects of SMAs on the BMI and blood pressure of obese patients. The PICOT question was: "*In adult patients that have a BMI greater than or equal to 30 kg/m$^2$, would shared medical appointments in addition to standard care result in a greater reduction of BMI compared to standard care alone in 12 weeks?"* The demographics of the SMA and non-SMA groups were comparable on most attributes. Initial results did not show statistical significance between the groups but did reveal clinical significance. After factoring the difference in BMI among each group over the 12 weeks, another *t*-test was run, which showed statistically significant reduction of BMI in the SMA group.

## Participants

The preintervention demographics of the SMA group consisted of 20 participants with a mean BMI of 42.2 kg/m$^2$ with levels ranging from 30.5 kg/m$^2$ to 72.3 kg/m$^2$. The SMA group had a mean age of 41, with participants ranging in age from 21 to 60. The group was composed of three males and 17 females, 14 of which were Caucasians, five were African Americans, and one was Hispanic. The mean systolic BP was 111.3 mm Hg, while the mean diastolic BP was 74.35. All of the members of the SMA group except one, took a variety of medications for weight loss including phentermine/topiramate, metformin, liraglutide, lisdexamfetamine dimesylate, and semaglutide (see table 4.1).

The non-SMA group consisted of 20 participants with a mean BMI of 41.35 kg/m$^2$, with levels ranging from 30.6 kg/m$^2$ to 60.0 kg/m$^2$. The non-SMA group was composed of three males and 17 females, 14 of which were Caucasians, four were African Americans, one Hispanic, and one unspecified. The age of the participants in the non-SMA group ranged from 27 to 69, with a mean age of 41.35. The mean systolic BP was 121.3 mmHg, while the mean diastolic BP was 79.9 mmHg. All the participants of the non-SMA group except for four, took a

variety of medications for weight loss, including phentermine/topiramate, metformin, and semaglutide.

There were comparable attrition rates among the SMA and non-SMA groups post-intervention. The SMA group had an attrition rate of 50%, while the non-SMA group had an attrition rate of 45%. The post-intervention SMA group consisted of 10 women, 8 who were Caucasian, one African American and one Hispanic. Each of the participants took weight loss medications. The age range of participants was 23- 60 with a mean of 41.35.

The demographics of the post-intervention non-SMA group consisted of 11 women, 9 of which who were Caucasians and two who were African Americans. Each of the participants of the non-SMA group except for one took weight loss medications. The age range of participants was 32 to 69, with a mean age of 45.4.

The preintervention groups were equal on all attributes except for race, age distribution and use of weight loss medications. The non-SMA group had slightly more diversity with regards to race than the SMA group (see figure 4.1). The SMA group had a slightly younger age distribution, however the means were comparable (see figure 4.2). Similarly, the SMA group had more participants taking weight loss medications than the non-SMA group (see figure 4.3). The post-intervention groups were consistent on all variables except for age, with the non-SMA group being older than the SMA participants. The participants of the project are representative of the population as they are obese, as is a large population of Hoosiers.

Figure 4.1

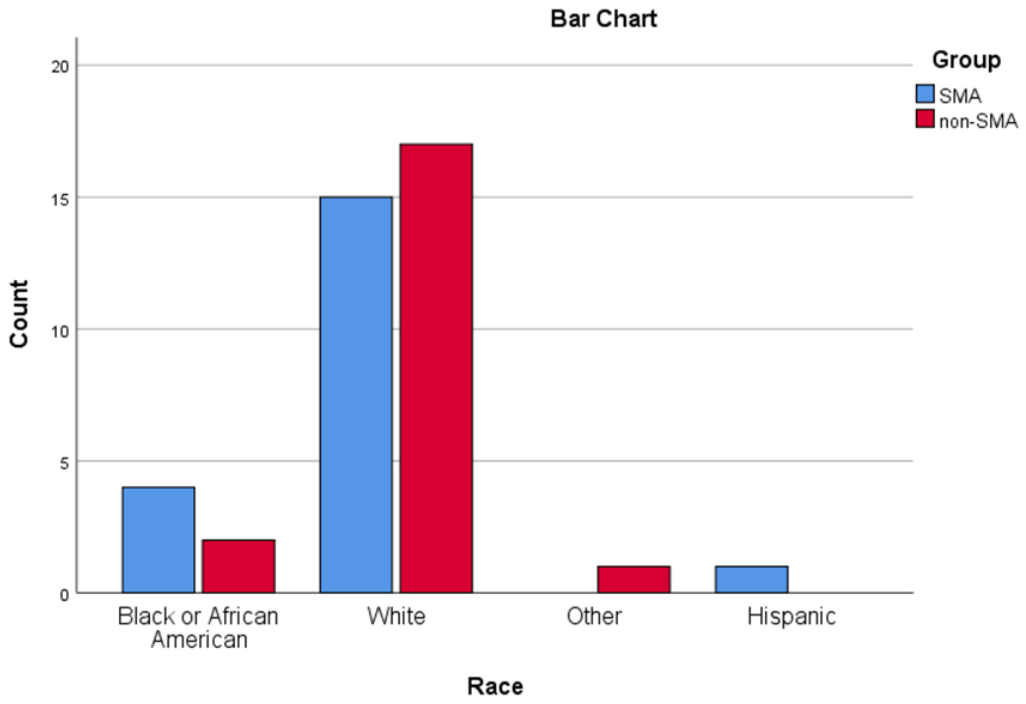



Figure 4.2

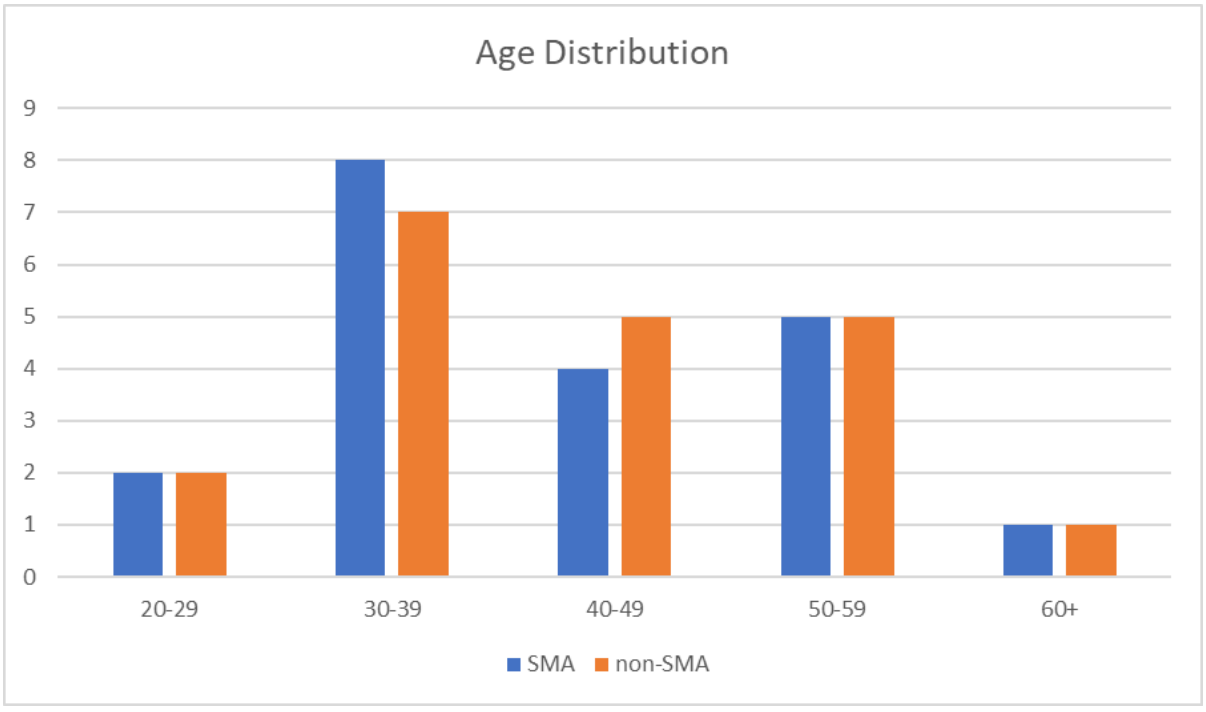


Figure 4.3

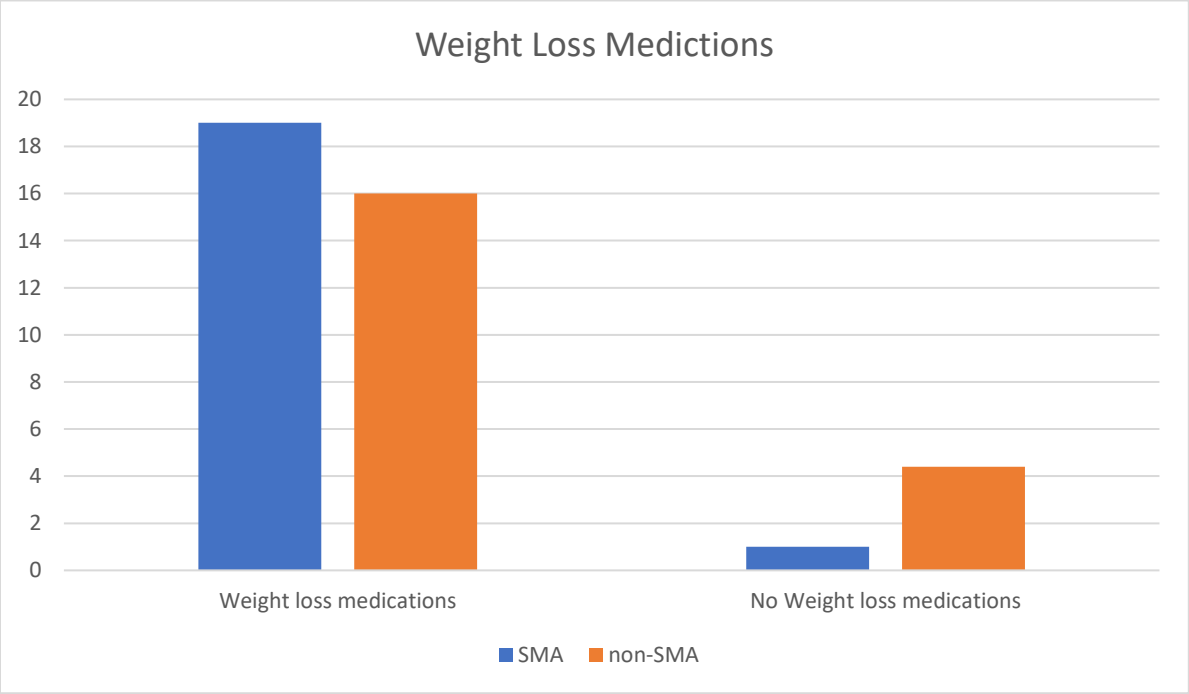



Table 4.1

*Characteristics of the Participants*

| | Pretest | | | | Total | 3 month/Posttest | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | SMA | | Non-SMA | | | SMA | | Non-SMA | | |
| | *n* (%) | *M* (SD) | *n* (%) | *M* (SD) | *N* (%) | *n* (%) | *M* (SD) | *n* (%) | *M* (SD) | *N* (%) |
| Age | | 41.3 | | 41.35 | | | 41.4 | | 45.4 | |
| Gender | | | | | | | | | | |
| Male | 3 (15) | | 3 (15) | | 6 (15) | 0 | | 0 | | 0 |
| Female | 17 (85) | | 17 (85) | | 34 (85) | 10 (100) | | 11 (100) | | 21 (100) |
| Race | | | | | | | | | | |
| African American | 4 (20) | | 2 (10) | | 6 (15) | 1 (10) | | 2 (18) | | 3 (14.2) |
| Hispanic | 1 (5) | | 0 | | 1 (2.5) | 1 (10) | | 0 | | 1 (4.8) |
| White | 15 (75) | | 17 (85) | | 32 (80) | 8 (80) | | 9 (82) | | 17 (81) |
| Other | 0 | | 1 (5) | | 1 (2.5) | 0 | | 0 | | 0 |
| Medications | 19 (95) | | 16 (80) | | 35 (88) | 10 (100) | | 10 (91) | | 20 (95.2) |

## Changes in Outcomes

### Statistical Testing and Significance

Using SPSS Version 24, parametric tests were used to compare changes of BMI, SBP, and DBP within the SMA group and between preintervention demographics of the SMA group and non-SMA group. An independent *t*-test of the two populations were used to compare the pre- and post-intervention data. Repeated measures ANOVA were used to determine the changes within the SMA group over time. A $p < .05$ for all data analyzed was used to demonstrate statistical significance.

### Findings

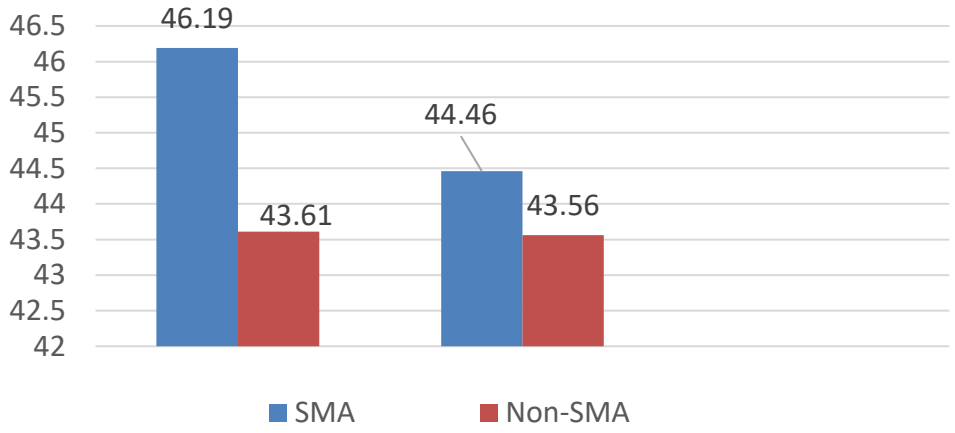
#### *Primary Outcomes*

**Change in BMI.** The change in BMI between the SMA and non-SMA group from baseline to 3-months was a pre-intervention mean for the SMA group $M = 46.19$ kg/m$^2$, compared to $M = 44.6$ kg/m$^2$ post-intervention. The mean BMI pre-intervention for the non-SMA group was $M = 43.61$ kg/m$^2$ compared to the post-intervention $M = 43.56$ kg/m$^2$. The *t* score was $t = 0.214$ and $p = 0.833$. Therefore, there was not a statistically significant difference in BMI between groups; however, these results did not factor in the difference in BMI within each group over the 12 weeks. Thus, the difference in BMI was calculated for each group from baseline to 3 months. The difference in BMI for the SMA group was -1.73 kg/m$^2$. The difference in BMI for the non-SMA group was -0.054 kg/m$^2$. The results were analyzed utilizing an independent *t*-test, which showed statistical significance ($t = 2.598$ and $p = 0.023$), thus proving the impact SMAs have on BMI (see figure 4.4).

The change in BMI within the SMA group from baseline to 1, 2 , and 3 months ranged from baseline BMI of $M = 46.19$ kg/m$^2$ to 3 months $M = 44.46$ kg/m$^2$. Mauchly's Test of Sphericity indicated that the assumption of sphericity has been violated $x^2$ (2) = 0.457, $p = < 0.001$, and therefore, a Greenhouse-Geisser correction was used. There was a significant effect

of time on BMI, $F(3, 27) = 7.589$ and $p = 0.012$. The greatest difference occurred between baseline and 2-months $p = 0.093$ and between baseline and 3-months $p = 0.098$.

Figure 4.4




***Secondary Outcome***

**Change in Blood Pressure**

***Systolic Blood Pressure.*** The change in SBP between the SMA and non-SMA group from baseline to 3-months was a pre-intervention mean for the SMA group $M = 123$ mmHg compared to $M = 123.2$ mmHg post-intervention. The mean SBP pre-intervention for the non-SMA group was $M = 122.18$ mmHg compared to the post-intervention $M = 124.0$ mmHg. The $t$ score was $t = -0.302$ and $p = 0.766$. Therefore, there was not a statistically significant change in SBP after implementing the intervention (see figure 4.5).

The change in SBP within the SMA group from baseline to 1, 2, and 3 months ranged from a baseline SBP of $M = 123$ mmHg to $M = 123.2$ mmHg at 3 months. The SPQ scores differed slightly across four time points ($F(3, 27) = 1.876$, $p = 0.157$). Therefore, there was not a significant change in SBP from baseline. The only difference between months occurred between baseline and 1 month $p = 0.174$ and between 1 month and 3 months $p = 0.354$.

***Diastolic Blood Pressure.*** The change in DBP between the SMA and non-SMA group from baseline to 3 months was a pre-intervention mean for the SMA group *M* = 81.2 mmHg compared to *M* = 76.9 mmHg post-intervention. The mean DBP pre-intervention for the non-SMA group was *M* = 82.9 mmHg compared to the post-intervention *M* = 78.54 mmHg. The *t* score was *t* = -0.537 and *p* = 0.597. Therefore, there was not a statistically significant change in DBP after implementing SMAs (see figure 4.5).

The change in DBP within the SMA group from baseline to 1, 2, and 3 months ranged from a baseline DBP of *M* = 81.2 mmHg to *M* = 76.9 mmHg at 3 months. The Sensory Perception Quotient (SPQ) scores differed slightly across four time points (*F*(3, 27) = 2.770, *p* = 0.061). Therefore, there was not a statistically significant change in DBP from baseline; however, there was a clinical significance. The greatest between months occurred between baseline and 3 months *p* = 0.264 and between 1 month and 2 months *p* = 0.219.

Figure 4.5

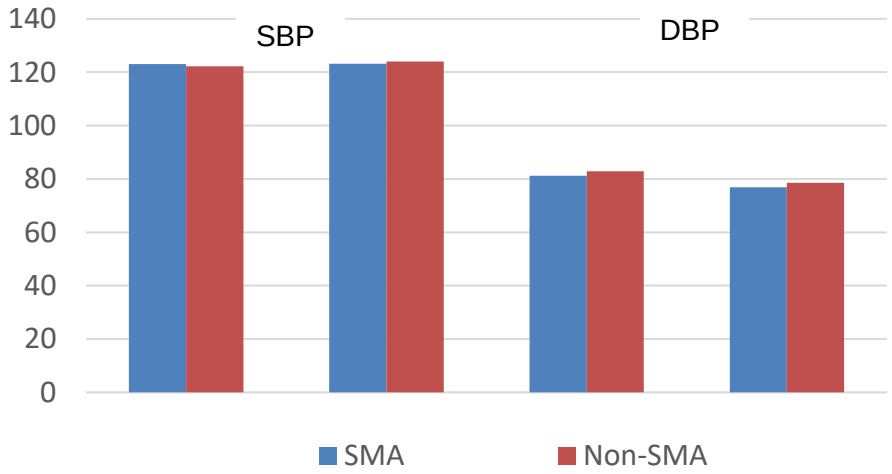


Table 4.2

Primary Outcome Measure

| | Pre-intervention | 1 month | 2 months | 3 months | *t*-score | *F*-value | *p*-value |
|---|---|---|---|---|---|---|---|
| BMI | | | | | 0.214 | | 0.833 |
| Difference in BMI | | | | | 2.598 | | 0.023 |
| SMA | *N*= 20 | *N*=10 | *N*=10 | *N*= 10 | | | |
| Baseline | | *p* =0.159 | *p* = 0.093 | *p* = 0.098 | | | |
| 1 month | | | *p* = 0.209 | *p* = 0.291 | | | |
| 2 months | | | | *p* = 1.0 | | | |
| 3 months | | | | | | 7.589 | **0.012** |
| Non-SMA | *N*= 20 | | | *N*= 11 | | | |

Table 4.3

Secondary Outcome Measures

| | Pre-intervention | 1 month | 2 months | 3 months | *t*-score | *F*-value | *p*-value |
|---|---|---|---|---|---|---|---|
| SBP | | | | | -0.302 | | 0.766 |
| Difference in SBP | | | | | -0.020 | | 0.984 |
| SMA | *N*= 20 | *N*= 10 | *N*= 10 | *N*= 10 | | | |
| Baseline | | *p* =0.174 | *p* = 1.0 | *p* = 1.0 | | | |
| 1 month | | | *p* = 1.0 | *p* = 0.354 | | | |
| 2 months | | | | *p* = 1.0 | | | |
| 3 months | | | | | | 1.876 | 0.157 |
| Non-SMA | *N*= 20 | | | *N*= 11 | | | |
| DBP | | | | | -0.537 | | 0.597 |
| Difference in DBP | | | | | -0.414 | | 0.675 |
| SMA | *N*= 20 | *N*= 10 | *N*= 10 | *N*= 10 | | | |
| Baseline | | *p* =1.0 | *p* = 0.508 | *p* = 0.264 | | | |
| 1 month | | | *p* = 0.336 | *p* = 0.219 | | | |
| 2 months | | | | *p* = 1.0 | | | |
| 3 months | | | | | | 2.770 | 0.061 |
| Non-SMA | *N*= 20 | | | *N*= 11 | | | |

# CHAPTER 5

# DISCUSSION

The purpose of this EBP project was to determine the answer to the following PICOT question: "*In adult patients that have a BMI greater than or equal to 30 kg/m$^2$, would shared medical appointments in addition to standard care result in a greater reduction of BMI compared to standard care alone in 12 weeks?"* The multi-faceted intervention included shared medical appointments with educational sessions from specialists, a sharing time between participants, and a brief individualized meeting with the PCP. The intervention was implemented in a primary care office located in Central Indiana. The data were reviewed pre- and post- intervention for the non-SMA group and preintervention and at 1 ,2, and 3 months post-intervention for the SMA group, to determine if the intervention affected the rate of BMI reduction. In addition, the secondary outcomes wanted to determine if the intervention could affect systolic and diastolic blood pressures. The results of this project and an explanation of the outcomes will be discussed in this chapter. In addition, a thorough review of factors which influenced the outcomes, limitations, and successes of the project will be addressed in this chapter. The EBP framework which guided the implementation of this project will be discussed, as well as implications for the future will be discussed and evaluated.

## Explanation of Findings

This EBP project was designed to answer the PICOT question and determine if the primary and secondary outcomes would be affected from the implementation of SMAs. The primary outcomes explored the rate of BMI reduction in obese patients to determine if the addition of SMAs resulted in a greater reduction than individualized appointments. The pre-intervention data was obtained through chart review from October 6, 2020, to November 11, 2020. Charts were hand audited by the DNP project facilitator, with the same process occurring

3 months later for the non-SMA group. Data were collected for the SMA group during each monthly meeting post-intervention.

The outcomes revealed mixed results. The implementation of SMAs resulted in an increased reduction of BMI. The difference between the SMA and non-SMA groups did not show statistically significant results ($p = 0.833$); however, the results were clinically significant with the SMA group having a reduction of BMI by $M = -1.59$ kg/m$^2$, compared to the non-SMA's group improvement of BMI by $M = -0.05$ kg/m$^2$. A post-analysis t- test of the difference in BMI showed statistically significant results ($p = 0.023$) among the groups since the starting BMIs were not equivalent. Within the SMA group, statistical significance was achieved from baseline to 3 months ($p = 0.012$).

The results of this EBP project differ somewhat from the results of the literature review; however, the post-analysis *t*-test scores mirror the results from the literature review. The evidence used in this EBP project were two evidence summaries, two RCTs, three systematic review of RCTs, one quasi-experimental study, quasi-experimental studies, and five retrospective observational studies. The various studies included in the systemic reviews and evidence summaries had many different intervention strategies making interpretating the study's results complicated, often yielding mixed results. The systemic review conducted by Flodgren et al. (2017) supports the use of a multi-faceted intervention to combat obesity, although some of the individual RCTs in the review revealed mixed results. These RCTs demonstrated improvement in at least one outcome but not in all, which were similar to the findings in this EBP project. Flodgren et al. (2017) explained this discrepancy may be due to the lack of consistency when implementing the interventions. This EBP project provided consistent communication through monthly SMAs; however, communication was shared between the various specialists.

The two JBI evidence summaries used in this project provided support for a multi-faceted intervention with regular group meetings. This EBP project showed results consistent with Slade et al. (2018) and Swe & Edu (2019). Slade et al. (2018) noted compliance with

obesity management was improved with regular group clinic visits. Swe & Edu (2019) showed session attendance in addition to behavioral counseling and motivational interviewing can result in obesity improvement.

Shibuya et al. (2020) noted that a limitation of the study was the members of the SMA differed from those in the non-SMA group, the number of visits, and the discussions regarding weight management. In this EBP project, there was only one PCP who saw the patients, thereby reducing the effect of differing discussions on weight loss. Additionally, the number of visits did differ between the SMA group and non-SMA group, but they were consistent based on the groups. Shibuya et al. (2020) revealed that SMAs resulted in greater weight loss occurred when multidisciplinary education was provided by specialists during monthly group meetings, which is consistent with the results of this EBP project.

While the results from this EBP project were mixed, they are consistent with the results from the literature review, several issues may have confounded the results of this EBP project. The small sample size of both groups may have led to bias and contributed to skewed results. The EBP project occurred during the holidays, when eating and dieting tends to be more challenging.

Subjects for this EBP project were self-selected, which could lead to selection bias. The patients that decided to participate in this project may have an increased interest or motivation in losing weight. This could affect the outcomes, especially when compared to patients that do not have an interest or motivation to lose weight.

The secondary outcomes analyzed during this EBP project were the change in SBP and DBP. There was minimal change in both SBP ($p = 0.766$) and DBP ($p = 0.597$) between the groups from baseline to 3 months. These results were consistent with the findings in the studies conducted by Axten et al. (2017) and Gilis-Januszewska et al. (2018). These studies demonstrated that weight loss and reduction of BMI did not result in statistically significant reduction in SBP and DBP, apart from SBP being significantly reduced at 1 year according to

Axten et al. (2017). On the contrary, the studies conducted by Tunay et al. (2018) and Yager et al. (2020), demonstrated statistically significant reduction of both SBP and DBP when weight and BMI are reduced. The inconsistencies of these results and the results of this EBP project support increased further research on the effects of weight loss and reduction of BMI on blood pressure.

## Evaluation of the Application of the EBP Framework

The Iowa Model Revised provided the methodology for the implementation and dissemination of the project. Utilizing this framework provided structure, direction, and guidance to implement the project.

### EBP Framework

The Iowa Model Revised was used to provide the outline for the implementation of the EBP project. The Iowa Model Revised was well suited for this project since it is easily applicable to a variety of environments and utilizes a team approach. The model provides a practical ten-step algorithm including decision points and feedback loops (Iowa Model Collaborative et al., 2017).

The Iowa Model was a good fit for this project, having mirrored the process from identifying a problem and conducting a literature review to disseminating the results of the project. The algorithm of steps of this model breaks the EBP process into smaller tasks, while ensuring adequate evidence, resources, and support.

The first step of this process began in the summer of 2020. This was the preparation stage, where several ideas were devised during this stage, and the initial problem was developed. The problem was identified, and initial research was completed seeking evidence on the topic. The second and third steps were also completed in the summer of 2020, having developed the PICOT question and the formal search strategy. In July 2020, a team of key stakeholders was formed once the topic was determined to be a priority.

The next step of the process was completed in July and August 2020, which included appraising, synthesizing, and assemble the evidence (Iowa Model Collaborative et al., 2017). A formal literature review and the critique and synthesis of evidence occurred during this period utilizing the John's Hopkins Nursing Evidence-Based Practice Research (JHNEBP) Evidence Appraisal Tool (Dang & Dearholt, 2017). It was determined there was a sufficient amount of evidence to support the advancement into the next step of the project, which was piloting the change.

The seventh step of the model occurred in the fall of 2020, from November 11, 2020, to February 12, 2021. The Iowa Model Revised suggests engaging patients, developing a protocol, considering resources, collecting baseline data, and collecting post-pilot data. This EBP project incorporated all the suggested strategies into the multi-faceted intervention of SMAs. Evaluation of the pilot occurred during this step as well. Upon completion of the pilot phase, it was determined that the change was appropriate for adoption into practice.

The 9th step of the model occurred from February 13, 2021 to March 23, 2021. This step focused on the integration and sustainability of the practice change. The model suggests identifying and engaging key personnel, monitoring key indicators through quality improvement, and hardwiring change into the system (Iowa Model Collaborative et al., 2017). Strategies to support the change into practice was encouraged through meeting with key stakeholders to identify potential conflicts and discover tactics to overcome them. The final step of the model, disseminate the results, will take place with the publication of this report and through education at the organizational, state, and federal levels.

In this EBP project, the Iowa Model provided guidance for the implementation of the intervention; however, the process required some unexpected deviations. While all the subjects that attended the SMAs received motivational interviewing, education regarding lifestyle changes, and individualized meetings with the providers, there were some glitches with the virtual meetings. Counteracting this discrepancy required ensuring a secure connection for the

participants, as well as ensuring meetings participants were logged on prior to the meeting starting. Another limitation of this model in this EBP project was the lack of a clear evaluation time and process. According to the model, step seven outlines the formation of an evaluation plan, but does not specify when the implementation of the plan occurs.

One of the major strengths of the Iowa Model Revised in implementing this EBP project is the step-by-step guide. In addition, the model has built-in decision points and feedback loops to ensure the sustainability of a project to influence change. During the evaluation of an identified problem in the summer of 2020, it was determined by the first decision point that a lack of evidence was available for the progression of the project. Therefore, leading to the reassembling of the issue and ultimately the changing of the project focus.

## Strengths and Limitations of the DNP Project

### Strengths

There were several strengths to this EBP project, beginning with the support for the project from the organization, PCP, and office staff. The PCP at the primary care office, served as the site facilitator. The manager of practice operations and the scheduler provided support with resources and scheduling assistance. The project timing coincided with organizational goals on restructuring obesity management. Thus, this was the right project for the right time, in the right organization. The final evaluation revealed compliance to both the organization's IRB and Valparaiso's IRB.

The subjects were all obese adults; however, the BMIs ranged greatly. The design of this EBP project to focus on obese adults in Central Indiana mirrors the statistics of Indiana. There was a good mix of ages between the subjects. The age ranged from 20 to 69. The data was not analyzed based on age, but it could be analyzed in the future to determine if those factors affect the rate of BMI reduction. Additionally, the subjects were all female, which may affect the generalizability of the project. The high attrition rate of the SMA (50%) and non-SMA (45%) groups may have been influenced the results of this EBP project.

The participants were open to the education provided at the SMA sessions. The educational sessions lead by the specialists were well received and generated considerable discussion and interaction. The variety of specialists who presented at the SMAs provided a well-rounded view of obesity management. The monthly SMAs were well received by the participants, specialists, PCPs, and key stakeholders. Written education from the SMAs were provided to the participants for future reference. If this EBP project were repeated in the future, modifications would need to be made.

**Limitations**

There were several limitations of this EBP project. Considering COVID-19 restrictions, the implementation of shared medical appointments was challenging. Utilizing Zoom® for the virtual meetings provided an avenue for socially distanced group meetings, but lacked the personal interaction gained from being in person. The SMAs were all completed in a mixed fashion with some attending in person and others attending virtually. Consequently, discussions were limited due to the variation in attendance. In the future, utilizing a camera and microphone in the room for those attending in person would help facilitate discussions with those attending virtually. Alternatively, the SMAs could be held solely in person or virtually, instead of combined meetings.

The sample size and selection were other limitations in this project. The sample size of the SMA group was 20 participants who were self-selected by the DNP student director. This process of self-selection created bias. Those who opted to participate may be more invested in their health and motivated to gain results. As a result, they may be more inclined to change their lifestyle. The small sample size is too small to draw any definitive conclusions. In addition, the large attrition rate complicated the reliability of the project; however, the attrition rate was similar among the SMA and non-SMA groups.

Another limitation of this EBP project was the time frame in which it occurred. The EBP project occurred over 12 weeks. The timing of this project unfortunately occurred over

Thanksgiving, Christmas, and New Year's. The complications of the project occurring over the holidays may have skewed the results. The results may have been different had the project completed in January thru March.

## Implications for the Future

### Practice

There are many practice implications for the future which have been brought to light by this EBP project. The way obesity management is addressed may be better accepted if the organization of care changes to a group setting. Doctoral prepared APRNs can lead the change by developing, organizing, and implementing practice changes in many settings. DNPs are skilled in identifying problems or needs for change, finding evidence to support the changes, developing a plan for implementing change, and leading the change. This EBP project supports the reorganization of obesity management to provide greater results.

### Theory

This EBP project is regarding change, which is a complicated process. Change is necessary to combat obesity. Utilizing the Iowa Model Revised as a blueprint for the implementation of the project ensured adequate evidence was available for sustainable change. This EBP framework provided structure for the project and will continue to provide structure through the dissemination of results. If the organization continues with the use of SMAs as proposed by this EBP project, the organization will need to use the same principles that guided this project to continue to guide the program. Future projects involving change should ensure adequate evidence is available to support the project. One way this can be done, is by utilizing an EBP framework and/or theoretical framework. A lack of a framework could jeopardize the entire change process as frameworks provide step-by-step guidance to ensure each step is adequately met before moving forward. Future projects need to use a framework that fits their project and allow adequate time to meet each step, which ensures a greater likelihood of sustainable change.

**Research**

This EBP project had mixed results and was implemented based on a thorough literature review. A more extensive study with a larger sample size or including more clinical sites would be beneficial to determine the effect of the intervention. Ideally, future studies should occur during a different time frame and over a longer timeframe to determine the sustainability of the change. Future studies should either focus on in-person SMA meetings or solely virtual meetings, which would improve communication among the participants and possibly improve outcomes. This EBP project did not require a specific nutrition plan; however, a similar project conducted by Shibuya et al., (2020) noted greater results in the SMA group when a specified nutrition plan was implemented. Also, future research should attempt to reduce sample bias by eliminating self-selected subjects.

**Education**

As with any change process, there is educational needs. A major component of this EBP project was the inclusion of educational sessions by specialists as part of the SMAs. While the education provided was basic information regarding obesity management, the participants voiced benefits from the reminders. In the future, providing patients with more education regarding obesity management would be beneficial, especially if the education encompassed ideas more than just consuming less and burning more calories.

Obesity is a complex disease which often leads to many co-morbidities. Treating this disease takes a significant amount of time and resources. Educating providers regarding the multi-faceted interventions which can lead to improved obesity would be beneficial. This EBP project utilized multiple specialists to provide education to the participants, resulting in a greater reduction of BMI compared to the non-SMA group. Expanding providers views to incorporate alternative treatment plans such as SMAs could impact the trajectory of obesity within Indiana and the US.

## Conclusion

This EBP project answered the PICOT question: "*In adult patients that have a BMI greater than or equal to 30 kg/m$^2$, would shared medical appointments in addition to standard care result in a greater reduction of BMI compared to standard care alone in 12 weeks?"* As discussed, the results of this EBP project were mixed with regards to the primary and secondary outcome measures. Utilizing a multi-faceted approach to obesity management including SMAs can result in a greater reduction of weight and BMI. The evidence showed mixed results on the effect of weight loss on SBP and DBP. Further research should be conducted to determine a correlation between weight loss and blood pressure. The addition of SMAs to the management of obesity was low-cost, which had a positive impact on the PCP. SMAs decreased the repetition of educational components provided by the PCP. Therefore, support for the continuation of the project with addition follow-ups should be recommended.

In addition to applying evidence to improve BMI in obese patients, this EBP project highlighted the ability of a DNP student to serve as a team leader, conceiving, developing, and implementing a plan for change. The DNP student also served as outreach director gathering the specialists to present at the SMAs. The DNP student identified the need for change, found the evidence to support the change, and evaluated the outcomes of the change process. Obesity is a complex disease affecting numerous patients each year and leading to numerous co-morbidities.

The trajectory of obesity could be impacted by altering the manner in which providers approach obesity management. SMAs allow for not only education regarding necessary lifestyle changes, but also collaboration among patient and multiple disciplines, while also providing accountability. SMAs by reducing obesity rates, could help eliminate some of the comorbidities associated with obesity. DNPs are well suited to lead changes at the organizational, state, and national levels by providing education regarding EBP changes.

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# BIOGRAPHICAL MATERIAL

**Amanda M. Larson**

Ms. Larson graduated from Ivy Tech State College with a Technical Certificate as a licensed practical nurse in 2005. She worked in various outpatient settings before enrolling at Fortis College to obtain her Associate of Science in Nursing in 2012. Since then, she has been employed as a registered nurse on the orthopedic trauma unit at a Level I trauma center in Indianapolis, Indiana. In 2014, she graduated from Western Governor's University with her Bachelor of Science in Nursing. In 2018, she enrolled at Valparaiso University where she is currently pursuing her Doctor of Nursing Practice (DNP). Amanda is a member of Sigma Theta Tau International- Zeta Epsilon chapter. Through her journey of furthering her education, Amanda has developed a passion for caring for those with complex medical conditions such as trauma and orthopedic patients. Ms. Larson has worked with this population for many years and has recognized that caring for these patients requires a holistic view to provide treatment through all avenues, including not just physical, but also spiritual, cultural, social, emotional, and psychological means. As a future Advanced Practice Registered Nurse (APRN), Amanda hopes to use her skills and knowledge in the mission field.

## ACRONYM LIST

A1C: Hemoglobin A1C

BMI: Body Mass Index

BP: Blood Pressure

BRFSS: Behavioral Risk Factor Surveillance System

CDC: Centers for Disease Control and Prevention

Citi Training: Collaborative Institutional Training Initiative

CPG: Clinical Practice Guideline

DBP: Diastolic Blood Pressure

DNP: Doctor of Nursing Practice

EBP: Evidence-Based Practice

FINDRISC: Finnish Diabetes Risk Score

GCS-R: Group Cohesion Scale- Revised

HDL: High-Density Lipoproteins

HIPAA: Health Insurance Portability and Accountability Act

HR: Heart Rate

IMD: Index of Multiple Deprivation

IRB: Institutional Review Board

JBI: Joanna Briggs Institute

JHNEBPR: John's Hopkins Nursing Evidence-Based Practice Research

LDAP: Lightweight Directory Access Protocol

LDL: Low-Density Lipoproteins

NCHS: National Center for Health Statistics

NIH: National Institutes of Health

NP: Nurse Practitioner

OMA: Obesity Medicine Association

PCP: Primary Care Provider

PICOT: Patient, Intervention, Comparison, Outcome and Time

RCT: Randomized Control Trial

REDCap: Research Electronic Data Capture

SBP: Systolic Blood Pressure

SMA: Shared Medical Appointment

SPQ: Sensory Perception Quotient

SPSS: Statistical Package for the Social Services

SSL: Secure Socket Layer

UK: United Kingdom

US: United States

VAMC: Veterans Affairs Medical Center

WAP: Weight Action Program

WHO: World Health Organization

# APPENDIX A

## Curriculum

10:00am- 10:20am or 2:00pm- 2:20pm: Those attending SMA in person will meet with the provider (PCP) for 5-minutes each from 8am until 8:20am. If more than four participants attend in person, the other participants will meet with the provider after the meeting.

10:20am-10:30am or 2:20pm- 2:30pm: Sharing time among the participants

10:30am- 11:00am or 2:30pm- 3:00pm: Educational session provided by one of three specialists as listed below:

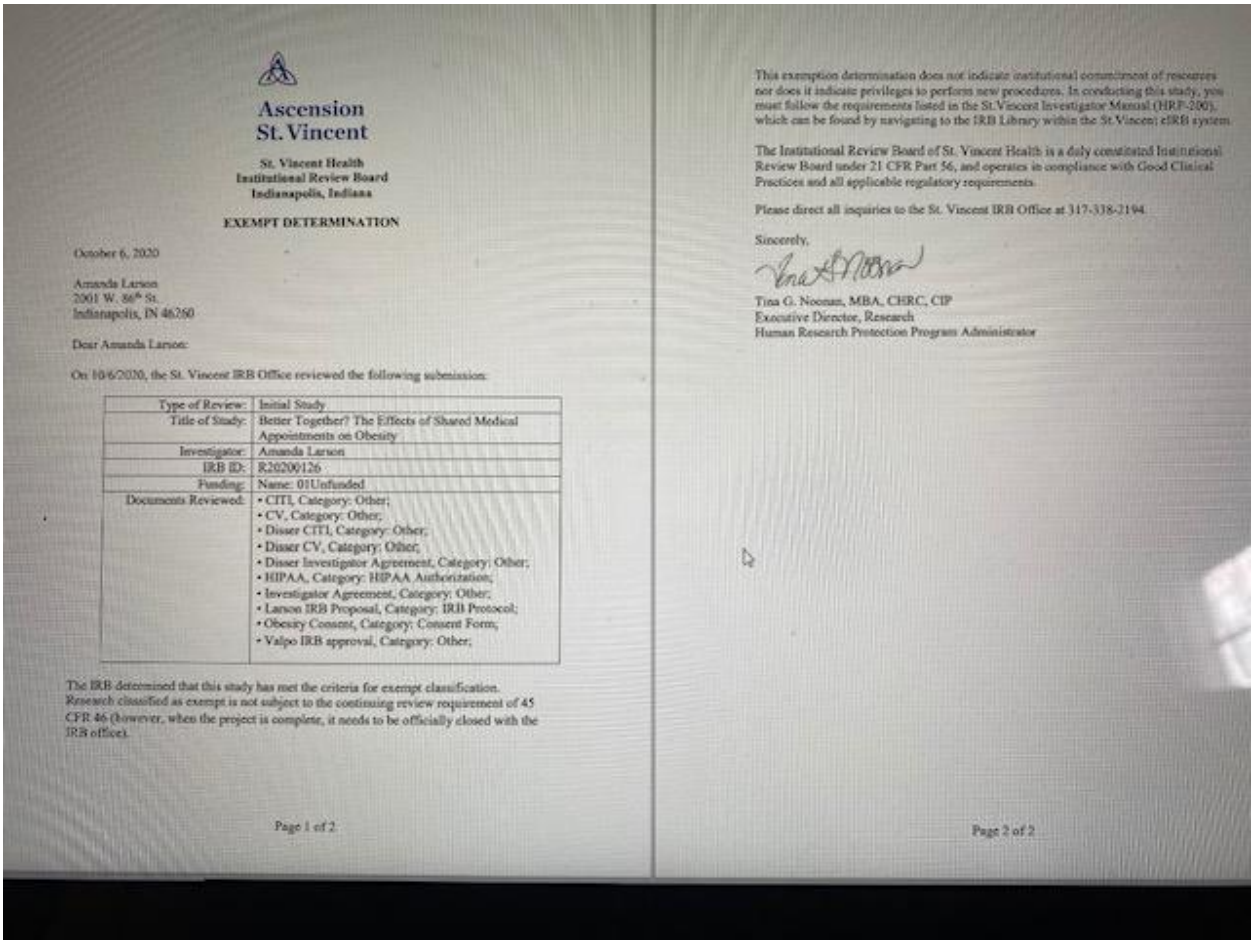
- Meeting 1: Dietician- providing information on reading food labels and various dietary modifications for weight loss
- Meeting 2: Bariatric NP- providing information regarding overcoming obstacles, lifestyle modifications, and community support
- Meeting 3: Psychiatrist- providing information on the psychological battle of obesity.

11:00am-11:10am or 3:00pm- 3:10pm: question and answer time

11:10am- 11:30am or 3:10pm- 3:30pm: Those attending the SMA online and/or those attending in person who did not meet with the provider prior to the SMA will have their 5-minute individualized meeting.

## APPENDIX B

## Ascension IRB Letter



Ascension
St. Vincent

St. Vincent Health
Institutional Review Board
Indianapolis, Indiana

EXEMPT DETERMINATION

October 6, 2020

Amanda Larson
2001 W. 86th St.
Indianapolis, IN 46260

Dear Amanda Larson:

On 10/6/2020, the St. Vincent IRB Office reviewed the following submission:

| | |
|---|---|
| Type of Review: | Initial Study |
| Title of Study: | Better Together? The Effects of Shared Medical Appointments on Obesity |
| Investigator: | Amanda Larson |
| IRB ID: | R20200126 |
| Funding: | Name: 01Unfunded |
| Documents Reviewed: | • CITI, Category: Other;<br>• CV, Category: Other;<br>• Disser CITI, Category: Other;<br>• Disser CV, Category: Other;<br>• Disser Investigator Agreement, Category: Other;<br>• HIPAA, Category: HIPAA Authorization;<br>• Investigator Agreement, Category: Other;<br>• Larson IRB Proposal, Category: IRB Protocol;<br>• Obesity Consent, Category: Consent Form;<br>• Valpo IRB approval, Category: Other; |

The IRB determined that this study has met the criteria for exempt classification. Research classified as exempt is not subject to the continuing review requirement of 45 CFR 46 (however, when the project is complete, it needs to be officially closed with the IRB office).

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This exemption determination does not indicate institutional commitment of resources nor does it indicate privileges to perform new procedures. In conducting this study, you must follow the requirements listed in the St.Vincent Investigator Manual (HRP-200), which can be found by navigating to the IRB Library within the St.Vincent eIRB system.

The Institutional Review Board of St. Vincent Health is a duly constituted Institutional Review Board under 21 CFR Part 56, and operates in compliance with Good Clinical Practices and all applicable regulatory requirements.

Please direct all inquiries to the St. Vincent IRB Office at 317-338-2194.

Sincerely,

Tina G. Noonan, MBA, CHRC, CIP
Executive Director, Research
Human Research Protection Program Administrator

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# APPENDIX C

## CITI Certification