A Standardized Plan of Care for Obesity Management in the Primary Care Setting

Amirose Cardines

Rutgers University

DNP Project Chair: Dr. Ann Bagchi, PhD, DNP, APN

DNP Project Member: Dr. Irina Benenson, DNP, FNP-C, CEN

Table of Contents

Introduction……..4
Background & Significance……4
Problem Statement……...7
Needs Assessment……8
Aims & Objectives……...9
Review of Literature……9
Theoretical Framework……..16
Methodology……..17
Setting……17
Study Population……17
Subject Recruitment……...18
Consent Procedure……18
Risk/Harms……18
Subject Costs and Compensation……...18
Study Interventions……18
Outcome Measures……19
Project Timeline……20
Resources……...20
Evaluation……..20
Data Maintenance & Security……20
Data Analysis……21
Results……21
Discussion……..23
Implications……24
Conclusion……26
References……..28
Tables……33
Figures……35
Appendices……38

Abstract

The aim of this project was to deliver a provider-focused intervention that promotes an effective plan of care for treating obesity in the primary care setting. A 30-minute in-service about the 5As for obesity management was provided to a primary care office in Central New Jersey. A total of 60 random patient charts with documented BMI scores of ≥ 25 kg/m² were reviewed pre- and post-implementation of the 5As which included both male and female patients between the ages of 18 and 65 who are overweight (25 – 29.99 kg/m²) or obese (≥ 30 kg/m²). The project yielded statistically significant high scores post-intervention $Z = 146$, $p<.034$. Post-intervention data also suggests that there is a positive correlation between the documentation of overweight or obesity diagnosis and weight management interventions, $r = 0.488$, $n = 30$, $p= 0.006$. In conclusion, the project supports the evidence that the 5As model is an effective plan of care to manage overweight and obese patients in the primary care setting.

Keywords: obesity; overweight; 5As model for obesity management; primary care; body mass index;

A Standardized Plan of Care for Obesity Management in the Primary Care Setting

Obesity is a chronic disease that has become a major health issue in the United States (U.S.). It causes or worsens cardiovascular conditions, diabetes and even cancer, leading to preventable, premature death (Centers for Disease Control & Prevention [CDC], 2018a). Obesity affects millions of adults and children and amounts to billions of dollars of healthcare costs (CDC, 2018a; Revels, Kumar, & Ben-Assuli, 2017). Technology, socioeconomic status, and the fast-food culture has made unhealthy foods easily accessible and physical activity unnecessary (CDC, 2011).

To prevent and manage obesity, primary care providers monitor patients' body mass index (BMI) and waist circumference. Those who are overweight and obese are then educated on proper nutrition and lifestyle modifications. Despite these efforts, obesity continues to trend upwards in the U.S. (National Center for Health Statistics [NCHS], 2017). There is a lack of patient follow through and adherence with counseling on diet and exercise alone. Evidence suggests that the 5As (Assess, Advise, Agree, Assist and Arrange) model helps providers treat obesity in the primary care setting by strategically providing brief counseling, recognizing and referring care for medical and psychosocial issues associated with poor weight loss outcomes, and building a multidisciplinary team that will address the patient's needs for successful weight management (Fitzpatrick et al., 2016). The purpose of this DNP project is to test the effectiveness of this model in promoting provider compliance in obesity counseling, diagnosis, treatment, and referral in the primary care setting.

Background and Significance

Obesity is defined as excess body weight for a given height due to fat accumulation (World Health Organization [WHO], 2019). BMI is the universal formula used to determine

healthy weight-to-height ratios and differentiates between overweight (25 - 29.9 kg/m²) and obese (≥ 30 kg/m²) (Gadde, Martin, Berthoud, & Heymsfield, 2018). There are several negative health effects from obesity. It has been linked to hypertension, hypercholesterolemia, Type 2 diabetes mellitus, coronary artery disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, cancer, mental illness, and pain (CDC, 2015). The excessive visceral fat distribution in obese patients alters the body at the hormonal, inflammatory, and endothelial levels, which disrupts metabolic homeostasis and increases the risk for chronic metabolic, cardiovascular, and inflammatory conditions (Kusminski, Bickel, Scherer, & Kusminski, 2016; Seravalle & Grass, 2017).

An epidemic of global proportions, obesity affected 10% of the world's population and contributed to 4 million deaths in 2015 (Friedrich, 2017). In the U.S. alone, the NCHS (2017) reported that 93.3 million adults (39.8% of the adult population) and 13.7 million children and adolescents (18.5% of the population) were obese, per data obtained between 2015-2016. Rates were higher among non-Hispanic blacks and Hispanic adults and children when compared to their white counterparts (NCHS, 2017).

The prevalence of elevated BMI levels in the U.S. has been attributed to a reduced rate in mortality improvement and decreased life expectancy in comparison to other wealthy countries, with 186,000 excess deaths recorded in 2011 (Preston, Vierboom, & Stokes, 2018). Data obtained from the National Health and Nutrition Examination Survey suggests that there is a reduction in life expectancy of obese individuals aged 40 by 0.9 years (Preston et al., 2018). Obese adults aged 45 to 64 years old have an increased risk for all-cause and cardiovascular disease-specific mortality, advancing death by at least 1.6 years (Borell & Samuel, 2014).

The chronic medical conditions caused or exacerbated by obesity also negatively impact national healthcare expenditures. About 10% of healthcare costs today are spent on BMI-related issues, including hospital stays, doctor visits, and prescription medications (Revels et al., 2017). Diabetes, for example, is an outcome of obesity that cost Americans $176 billion in medical care in 2012 (Revels et al., 2017). Obesity can also affect indirect medical costs. Absences from work, disability, and premature death contribute to productivity loss. Social costs associated with a poorer standard of living can lead to a shorter life span (Revels et al., 2017). By 2035, Revels et al. (2017) predict that the proportion of obese individuals will increase by 45%. By that time, healthcare costs are expected to be as high as $5.5 trillion with $550 million associated to obesity.

There are multiple strategies to prevent and manage obesity. Ultimately, it requires a multidisciplinary approach that originates from the individual but can include the legislative level to create an environment conducive to healthy lifestyle changes. The U.S. Preventive Services Task Force (USPSTF) created recommendations to promote evidence-based practice in achieving weight loss and preventing premature death in adults due to obesity. In 2018, they concluded that healthcare providers should screen all adults for obesity and refer those with a BMI of 30 or greater to intensive, multicomponent behavioral interventions (USPSTF, 2018). These include group or individual counseling on dietary changes, increased physical activity, weight self-monitoring, utilization of weight loss tools, such as pedometers, and pharmacotherapy. Achieving a 5% to 7% weight loss is associated with significant health benefits by reducing plasma glucose levels and decreasing the incidence of diabetes among obese individuals (CDC, 2018b).

The 5As model is a team-based approach by Fitzpatrick et al. (2016) which provides clinicians with an algorithm to maximize their impact on obesity in the primary care setting. The process begins with the provider assessing the patient's BMI and comorbidities that interfere with weight loss. Patients with elevated BMIs are then educated by the provider on the benefits of weight loss and the provider then discusses treatment options with those who are ready and willing to make a change. The patient and the provider then reach an agreement to proceed with weight loss management, which can include a physician-delivered intensive behavioral weight loss counseling session and referral to an intensive weight management program. Lastly, the provider arranges for further follow-up on referrals made to other providers, as appropriate. The 5As model has shown a twofold increase in obesity management and has been associated with increased motivation among patients with following a healthier lifestyle (Fitzpatrick et al., 2016). This project provided education on utilization of the 5As counseling framework as a to manage obesity in primary care.

Problem Statement

Despite the high level of evidence to support these recommendations, the management of obesity in the primary care setting is substandard. A study by Fitzpatrick and Stevens (2017) found that weight management counseling declined significantly from 33% to 21% between 2008-2009 and 2012-2013. This can be attributed to the abundance of evidence-based interventions which vary in effectiveness from patient to patient. The USPSTF recommendations do not offer practical strategies for providers in busy primary care settings who would rather focus on other chronic conditions with established pharmacological treatments. It takes time, experience, and familiarity with resources in the community to provide a successful intensive behavioral treatment for obesity (Yanovski, 2018). A standardized plan of care for obesity

management in the primary care setting will promote successful provider implementation of best practices and patient adherence to lifestyle changes.

Needs Assessment

Obesity is affecting people of all ages around the world. Its prevalence has doubled in 73 countries and has increased in the past three decades causing chronic health problems such as cardiovascular disease (Friedrich, 2017). In 2015, 4 million deaths were associated with an elevated BMI, which is an increase of 28.3% in BMI-related global mortality (Friedrich, 2017). Among 20 of the most populated countries, the U.S. has the highest level of childhood obesity in 2015 (Friedrich, 2017). There were more than 20% obese adults in 2017 (CDC, 2019). The highest prevalence of self-reported obesity was in the South (32.4%) and the Midwest (32.3%), followed by the Northeast (27.7%) with New Jersey at 25% (CDC, 2019).

The USPSTF, American Heart Association, American College of Cardiology, and The Obesity Society have collectively recommended obesity screenings on all patients and referrals to intensive behavioral counseling especially among those with risk factors for cardiovascular disease (USPSTF, 2018). The Centers for Medicare and Medicaid Services (CMS, 2011) is offering reimbursement for primary care physicians who offer intensive behavioral therapy to patients with a BMI >30 kg/m². Documentation in the electronic health record of the patient's BMI as well as a follow-up treatment plan are also reimbursable (CMS, 2011).

Despite the evidence-based policies and recommendations, primary care weight management has been insufficient. According to Fitzpatrick and Stevens (2017), after reviewing the 2008-2009, 2010-2011, and 2012-2013 National Ambulatory Medical Care Surveys, there was a significant increase in BMI screening. However, there was also a 5% decrease in obesity

diagnosis. This suggests that although patients are being screened for obesity frequently, their needs are seldom addressed and patients are infrequently provided with treatment.

Obesity management in the primary care setting is being overlooked. There has been a decline in weight loss counseling at the primary care level in the U.S. (Fitzpatrick & Stevens, 2017). Between 2008 and 2013, less than 1/3 of Medicare patients received weight counseling each year (Fitzpatrick & Stevens, 2017). Evidence translation on utilizing a standardized plan of care for obesity management is deficient in primary care and, therefore, is contributing to the rising rates of obesity and obesity-related deaths in the U.S.

Clinical Question

The following clinical question guided this DNP project: In adults with elevated BMI, how does the 5As model affect obesity screening and intervention in the primary care setting?

Aims and Objectives

The overall aim of this DNP project is to improve weight management planning in the primary care setting following a standardized, evidence-based model. This aim was achieved through specific objectives as follows:

- Deliver a provider-focused intervention that promotes an effective plan of care for treating obesity in the primary care setting.
- Evaluate provider-focused intervention and its effect on frequency of BMI screening, obesity diagnosis, weight counseling, and referral to intense weight management programs.

Review of Literature

The project's principal investigator (PI) completed a strategic review of the literature to identified evidence for the proposed clinical question. Databases searched included Medline

(Ovid), CINAHL, the Joanna Briggs Institute, and the National Institute of Health website using Medical Subject Headings (MeSH) and keywords, including *5As model, 5 A's model, Health Behavior, obesity screening, Body Mass Index, Waist Circumference, Body Weight, Primary Health Care, Office Visits,* and *doctor's office*. Boolean operators *AND* and *OR* were applied to describe the relationships between terms in an effort to obtain an expanded range of relevant results. Date delimitations were 2013 to the present to acquire evidence that is up-to-date with current research on the topic. The number of studies yielded were 47,797. After applying the inclusion criteria as outlined below, there were 1,797 studies remaining.

Inclusion criteria were scholarly/peer-reviewed articles in the English language with human subjects. After eliminating duplicates and including studies that examined the implementation of the 5As model, the search results were narrowed down to 42. There were limited sources found on the use of the 5As model on obesity alone. Therefore, studies that showed the implementation of the 5As model on other chronic health issues, such as smoking cessation, hypertension, and diabetes, were included to substantiate its contribution on provider care management. Full-text article eligibility focused on the effect of the 5As model on provider screening and intervention. Eighteen studies were included for qualitative and quantitative synthesis: one case report, three pre-post studies, three expert opinions, one cross-sectional study, two observational studies, one clinical guideline, one qualitative study, two case-control studies, one non-controlled quasi-experimental study, two cluster randomized control trials (RCTs), and one systematic review. A majority of these studies were conducted in the United States, used adult healthcare providers as participants, and occurred in the primary care setting. Aside from observational studies, most of the interventions presented involved educating providers about the implementation of the 5As model. No gray literature fit the inclusion criteria.

Studies with the Highest Level of Evidence

The PI evaluated the methodological quality of the studies using the John Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool (The Johns Hopkins Hospital/Johns Hopkins University, n.d.). Despite the variety of studies acquired from the literary search, only a few can be appraised as of high level of evidence, namely one systematic review and two RCTs. The systematic review by Sherson, Yakes Jimenez, and Katalanos (2014) identified 15 cross-sectional studies with quantitative research data, which included a description of current physician practice patterns while using the 5As model for obesity management. Physicians were found to Advise and Assess more frequently than Agree, Assist, and Arrange in contrast with their patients' expectations for Arrange followed by Advise, Agree, and Assist. The review concluded that this gap between patient needs and physician practices affect obesity management. Sherson et al. (2014) indicated the significant limitations in available evidence on the use of the 5As model in relation to patients' desire to receive them from their physicians during weight loss discussions and physicians' frequency of utilization. They addressed the lack of longitudinal designs and failure to account for physician and patient characteristics when interpreting study results.

The two RCTs explored the impact of technology in facilitating proper and adherent use of the 5As model in smoking cessation and weight loss management, respectively. Satterfield et al. (2018) investigated the effect of a computer-facilitated 5As (CF5As) program on primary care provider behavior. Patients were assigned to CF5As or usual care and were later interviewed to assess their physicians' adherence to the 5As. The RCT concluded that CF5As increased adherence to the 5As clinical guideline for tobacco cessation. Welzel et al. (2018) also conducted a cluster RCT to implement and evaluate an online tutorial for obesity management using the

5As approach in the primary care setting. Their results were consistent with Satterfield et al. (2018) wherein the use of the 5As for weight counseling was associated with doctor-patient interaction and motivation to lose weight. Both studies were appraised to be of highest level of evidence according to their manipulation of independent variables, inclusion of a control group, and randomization of participants.

Provider Perceptions of the 5As Model

Other studies included in the literature review evaluated provider perceptions on the application of the 5As model, scrutinized each step of the 5As process, explored the use of technology in promoting its implementation, and specified recommendations in improving process delivery. Carroll et al. (2018) performed a multimodal trial to improve hypertension management incorporating the 5As model with self-determination theory and adopting a pragmatic approach. They developed a brief clinician training session to demonstrate the key skills involved. The healthcare professionals in the study responded favorably towards applying the 5As in hypertension management, with 29% commending its practical use and 21% recognizing its value in engaging patients to discuss their blood pressure.

Chen et al. (2015) conducted a pre-post study that surveyed healthcare professionals on their perception of the application of the 5As model in smoking cessation. After a 4-hour training session on the adaptation of the 5As according to the clinical practice guidelines, participants indicated significant improvements in their overall perceived ability in helping patients quit smoking, as well as an overall very good to excellent ability to provide cessation treatment.

Iyer, Jay, Southern, and Schlair (2018) also used the 5As framework in evaluating obesity counseling competence among residents in a primary care training program. They delivered a 3-hour obesity curriculum and conducted a pre-post survey to highlight residents' self-assessed

competence. Their curriculum increased obesity counseling competence among residents especially in the Assess, Advise, and Assist domains.

5A Variations in Implementation

Four studies analyzed how healthcare providers implemented each step of the 5As model. However, the definition of the 5As varied. Some of the studies have the 5As start with Asking the patient for permission to discuss their weight and their readiness for change while lacking Arrange as the last step. Others concluded with Arranging a plan for follow-up while lacking Ask as the first step. Martinez et al. (2017) adapted the Ask-Assess-Advise-Agree-Assist model and conducted a cross-sectional study involving health care workers enrolled in a smoking cessation training course. They assessed self-reported application of the 5As and determined that it was not performed completely. They concluded that participants performed Ask, Advise, and Assess more often than Assist and Arrange due to barriers, such as lack of provider overall preparedness in the use of smoking cessation drugs, lack of familiarity with practice guidelines, lack of previous positive experiences in helping to quit, and the perception of a lack of support by their organizations. The consistency in implementing Assist and Arrange were found to be dependent on the healthcare setting, with brief interventions to be more applicable in acute hospitals.

Mulder, van Belzen, Lokhorst, and van Woerkum (2015) adapted the Assess-Advise-Agree-Assist-Arrange model and conducted an observational study on audio-recorded observations of self-management consultations for type 2 diabetes. They assessed the counseling quality of seven nurses and how they applied the 5As. They also found a high prevalence of Assessing current health behaviors and struggled with Assisting patients in identifying and overcoming barriers. They attributed this finding with the lack of specificity in identifying

current patient health behaviors and assessment of patient beliefs that are crucial in bringing about behavioral change. They viewed Assess as the foundation of the 5As model, which can hamper the subsequent As of the model if the Assess domain is inadequately implemented.

Payne et al. (2014) obtained the same results in their pre-post study of the use of the 5As model in tobacco cessation. Their findings are consistent with Mulder et al. (2015) in that they also found higher gains in Assess and Assist by healthcare providers post-training. They also found Arrange to have increased in frequency but it remained the least frequently implemented domain due to provider-reported barriers.

On the other hand, the observational study conducted by van Dillen et al. (2015) contradicts the aforementioned studies. After reviewing 100 video-taped consultations of practice nurses giving weight loss counseling in a primary care office, they found that Arranging follow-up was frequently practiced together with Assess and Advise. They attributed this inconsistent finding with the fact that regular follow-up appointments at the study site were usually scheduled.

Technological Implementation of the 5As Model

Four studies discussed the use of technology either in training or in acquiring feedback about the use of the 5As model. Napoles, et al. (2016) introduced the concept of using the CF5As model to provide smoking cessation counseling. This pre-implementation qualitative study evaluated providers' perceptions of the usefulness of tablets in administering health behavior counseling in the primary care setting. Administrative staff, clinical staff, and care providers from primary care clinics were interviewed in person and perceived its ease of use as dependent on clinic workflow, patient volume, and patient characteristics. The participants

viewed that staffing levels and smoking cessation resources and training will facilitate adherence to the model, while visit time constraints and complex healthcare needs may hinder them.

Pollak et al. (2016) used an online intervention to teach physicians from community-based practices about the 5As when discussing weight with overweight and obese adolescents. They recorded 527 encounters and compared physicians who were electronically prepared on the 5As model with physicians who were not. They found that the online intervention helped increase physician use of the 5As, specifically Assess, Assist and Arrange.

Rueda-Clausen, et al. (2013) also utilized technology to implement a 90-minute online training session about the use of the 5As in obesity management. They concluded that the implementation of the 5As can be done in a short period of time and still acquire promising results. The study found that the 5As implementation tool contributed to a twofold increase in the number of interactions between healthcare providers and their patients about weight management. Welzel et al. (2018) also implemented and evaluated an online tutorial for obesity management based on the 5As approach in the primary care setting. Their findings were consistent with the previous aforementioned studies in that their intervention also increased physician-patient interaction and motivation to lose weight.

The 5As According to the Experts

Jensen et al. (2014), Fitzpatrick et al. (2016), Gudzune (2016), and Kahan, Wilson, and Sweeney (2017) offered guidelines to successfully implement the 5As model in primary care. Jensen et al. (2014) summarized guideline recommendations on the use of the 5As model in the primary care setting. Fitzpatrick et al (2016) emphasized building a multidisciplinary team to address patients' psychosocial issues and chronic comorbidities associated with obesity treatment failure; delivering intensive counseling, which consists of goal setting; self-monitoring; and

problem solving, as well as connecting patients with community resources that may assist in adhering to lifestyle changes. Gudzune (2016) addressed the passive or active role of clinicians in using an evidence-based behavior change strategy such as the 5As to guide assessment and counseling in managing obesity. Kahan et al. (2017) claimed that the 5As approach for weight management counseling in primary care will help healthcare providers structure their clinical interactions and maximize their impact in obesity treatment.

Theoretical Framework

The Knowledge to Action (KTA) theoretical framework was used to guide this DNP project. Ian Graham and his colleagues from [redacted] Canada developed the KTA framework to provide a conceptual map in translating current research into practice. Implementation of research-based knowledge into real life healthcare scenarios can pose unforeseen barriers. KTA aims to synthesize research data, review the resulting knowledge, and tailor it to overcome specific barriers prior to implementation (Graham et al., 2006).

The KTA framework includes two distinct components: knowledge creation and the action cycle. Each component has several phases which are dynamic and can overlap and influence each other. The knowledge creation component is divided into three phases: knowledge inquiry, synthesis, and tools/products. It is shaped like a funnel, which represents how major types of knowledge or research become more refined and useful to stakeholders as they move along. The action cycle represents the activities needed for knowledge application. It is made up of phases that can occur in a sequence or simultaneously and may be impacted by the knowledge phases. The action phases are: (1) identifying the problem that needs addressing; (2) identifying, reviewing, and selecting the knowledge or research relevant to the problem; (3) adapting the identified knowledge to local context; (4) assessing barriers to using the knowledge;

(5) selecting, tailoring, and implementing interventions to promote the use of knowledge; (6) monitoring knowledge use; (7) evaluating the outcomes; and (8) sustaining ongoing knowledge use (Graham et al., 2006).

The 5As model for obesity management in primary care is not a new concept. There is a considerable body of knowledge already available to support its efficacy in practice. However, this knowledge is somehow lost in translation. The KTA theoretical framework is appropriate to synthesize knowledge about the 5As model, identify the necessary tools for its implementation, recognize current and potential barriers, and ultimately customize its method of dissemination to better reach its intended users (See Theoretical Framework in Figure 1).

Methods

This DNP project used a quasi-experimental study design where in a chart review before and after a 30-minute in-service about the 5As model for obesity management was provided to clinicians of a primary care office.

Setting

The study was implemented at a small, suburban primary care practice in Central New Jersey. The patients in this office are primarily Black or African-American and Hispanic. The practice sees approximately 10,000 patients a year. Approximately 80% of the patients from this practice are identified as either overweight or obese.

Study Population

This study included the random review of electronic medical records (EMR) among patients with documented BMI scores of ≥ 25 kg/m². Inclusion criteria included both male and female subjects between the ages of 18 and 65 who are overweight (25 – 29.99 kg/m²) or obese (≥ 30 kg/m²). Exclusion criteria included current documentation of normal (18.5 – 24.99 kg/m²)

and below-normal BMI (≤18.49). Using the Sample Size Calculator from Raosoft, Inc. (2004) and assuming a 5% margin of error and 95% confidence level, the recommended sample size was 28 charts.

Subject Recruitment

No subjects were recruited for this quasi-experimental prospective study. EMRs were identified for this study in the manner described above.

Consent Procedure

Consent was not necessary for this chart review project. Instead, an information sheet enumerating the details of the study was provided to the primary care office staff prior to participating in the 30-minute in-service.

Risks/Harms

There was no direct contact or harm to the patients whose EMR profiles qualified them for inclusion in this study. No patient identifiers were used upon completion of this project. Patient privacy and confidentiality were maintained. The data extracted to a data collection sheet will be shredded after results of this project have been presented.

Subject Costs and Compensation

There were no costs incurred by subjects involved in this project. Subjects did not receive monetary compensation after participating in the 30-minute in-service.

Study Interventions

This evidence-based intervention was completed after reviewing 30 random EMRs of primary care visits that occurred within the two months prior to the initial EMR review. Data was extracted using the inclusion and exclusion criteria stated above until the desired sample size was achieved. The EMR review enabled extraction of data on the frequency of overweight or

obesity diagnosis and corresponding documentation on interventions following the 5As, such as weight goal-setting, identifying strategies and barriers in weight loss, identifying social and environmental support, use of prescription medication, provision of multidisciplinary referrals for weight management, and/or specifying plans for follow-up.

After acquiring data from the initial EMR review, the PI led a 30-minute in-service with the three primary care office staff: a nurse practitioner, an office manager, and an office secretary. The session started with a definition of the 5As model using an evidence-based visual tool (see Fitzpatrick et al. 5As Flow Chart in Figure 2), followed by a 5-minute discussion of each individual "A" and how it can be applied in practice. At the end of the in-service, the primary care office staff were given the opportunity to ask questions and address barriers to the 5As model in managing obesity. The same visual tool was minimized and posted on the top right corner of each computer monitor in all patient exam rooms for educational reinforcement.

The final EMR review commenced two months after the 30-minute in-service. The same inclusion and exclusion criteria were applied. Thirty random EMRs of primary care visits within the two months post-intervention were reviewed. Frequency of overweight and obesity diagnosis and intervention were also measured. A comparative analysis was performed between the initial and final EMR review to conclude the study intervention.

Outcome Measures

The PI performed pre- and post- EMR review using a data collection tool which extracted data on patient demographics, namely gender, age, and ethnicity, BMI scores, overweight or obesity diagnosis, and whether providers offered any intervention(s) (see Data Collection Tool in Appendix B). Statistical analysis tested for changes in outcome measures between the pre- and post-intervention periods.

Project Timeline

This project proposal was submitted for IRB approval May 8, 2019. It was approved by the IRB on July 17, 2019. Due to project modifications in response to changes in the primary care office providers and schedule conflict, implementation was delayed until August 28, 2019. Pre- and post EMR review, study intervention, and data collection took two months to complete. Data analysis, finalization of the project, and the dissemination of findings were conducted over the following months to fulfill all the requirements by Graduation day on May 20, 2020 (see Gantt Chart of Project Timeline in Figure 3).

Resources

Costs included those related to printing educational materials and traveling to and from the primary care office where the study took place. There were also research expenses, which included the purchase of a statistical analysis software. The accumulated costs incurred for this project were the sole responsibility of the PI (see Project Budget in Table 1).

Evaluation

Data Maintenance and Security

After IRB approval was obtained, data collection concluded in October 2019. The analytic file excluded patient names or any other personally identifying patient information that would violate patient privacy rules in research. Each patient EMR reviewed were de-identified using an alphanumeric code for the sole purpose of this study. Only the PI had access to this information. This document was saved as a Word document file in a computer hard drive at the study site that is encrypted and password-protected. The file will be permanently deleted per Rutgers IRB guidelines.

Data Analysis

The demographics of sampled patient records acquired from the EMR review were described using univariate statistics. Descriptive statistics were also used to compare chart review findings for the percentage of patients who are overweight or obese according to their BMI score and the percentage of patients with proper documentation of such diagnoses. The Wilcoxon Signed-Rank test was utilized to examine the difference in the proportion of overweight and obese patients who received weight management intervention pre- and post-implementation of the 5As. Bivariate statistical analysis was used to determine the relationship between the documentation of overweight or obesity diagnosis and intervention on weight management. The statistical software package SPSS was used to complete the data analysis.

Results

Using the data collection tool, a total of 60 random EMRs were reviewed pre- and post-implementation of the 5As for obesity management. Demographic data is demonstrated in table format (see Characteristics of Participants in Table 2). The frequency of documented interventions was scored according to how many of the 5As were used to manage the patient's weight. For example, if the patient's BMI score was the only element documented, the EMR would be scored 1 out of 5 because only Assess was used out of the 5As. If the patient had documentation of BMI score, weight goal-setting, strategies and barriers to weight loss, social and environmental support, prescription medication for weight loss, multidisciplinary referrals for weight management and/or specifying plans for follow-up, then the EMR would be scored 5 out of 5 because all of the 5As were used.

Pre-intervention chart review accrued 18 (60%) female and 12 (40%) male patients. There were 16 (53%) Black or African American, 6 (20%) Hispanic, 3 (10%) White or Caucasian, and 2 (6%) Asian patients; 3 (10%) patients were classified as Other. Eleven (37%)

of these patients were overweight and 19 (63%) were obese, according to their BMI score. From this sample, only 16 (53%) charts had documentation of overweight or obesity diagnosis. Only 2 (6%) charts had documentation on all 5As, 25 (83%) had Assess only and 3 (10%) had Assess and Assist.

Post-intervention chart review accrued 23 (77%) female and 7 (23%) male patients. There were 18 (60%) Black or African American, 4 (13%) Hispanic, 4 (13%) Asian, 4 (13%) Other, and none were White or Caucasian. Comparable to the pre-implementation data, 11 (37%) were overweight and 19 (53%) were obese according to their BMI score. From this sample, 19 (63%) had documentation of overweight or obesity diagnosis. From this sample, 8 (27%) charts had documentation on all 5As, 16 (53%) had Assess only and 6 (20%) had Assess and Advise.

To evaluate the effect of the 30-minute in-service about the 5As for obesity management, a Wilcoxon Signed-Rank test was conducted to examine the difference in the proportion of overweight and obese patients who received weight management pre- and post-intervention. Pre-intervention, the mean score of patients who received weight management according to the 5As model was 1.4. Post-intervention, the mean score was 2.3. The Wilcoxon Signed-Rank test indicated that the median post-intervention scores were statistically significantly higher than the median pre-intervention scores $Z = 146$, $p<.034$.

Bivariate statistical analysis was used to determine the relationship between the documentation of overweight or obesity diagnosis and weight management intervention. Post-intervention data suggests that there is a positive correlation between the two variables, $r = 0.488$, $n = 30$, $p= 0.006$. In conclusion, an increase in documentation of obesity or overweight diagnosis is correlated with increased weight management intervention.

Discussion

The project demonstrated that delivery of a provider-focused implementation of the 5As model is effective in addressing weight management in overweight and obese patients in the primary care setting. The results of this project have shown an increase in BMI screening, obesity diagnosis, weight counseling and referral to weight management specialists with the use of the 5As model. These are consistent with results in previously reported studies which concluded that the 5As model can guide healthcare providers assess and counsel patients regarding weight management (Gudzune et al., 2016). It also supports the non-controlled quasi-experimental study conducted by Rueda-Clausen et al. (2014) that the 5As model increases healthcare provider initiation of weight management with their patients. In addition, findings of this project revealed that documentation of overweight or obesity diagnosis according to patients' BMI scores prompts healthcare providers to discuss weight management with their patients leading to timely interventions and referrals.

The project obtained statistically relevant results; however, some limitations were noted. The sample size is relatively small, which may reduce the confidence that the study may be representative of the general patient population. In addition, the random selection of patients according to the inclusion/exclusion criteria yielded a homogeneous sample that is predominantly women and of Black or African American descent, contributing to a narrower generalizability of results. The project had a short follow-up period of two months post-intervention, so the sustainability of the implementation of the 5As model for obesity management in the primary care setting cannot be determined. Lastly, the limited scope of the project prevented further evaluation of clinically important outcomes, such as patients' reduction in weight or BMI scores over time, decreased incidence or exacerbation of medical conditions, and decreased healthcare costs.

Despite the limitations of this project, the key facilitators of its achievements in the clinical setting can be mostly attributed to the primary care office staff's compliance with implementation of the 5As. Their interest in the study and motivation to help patients greatly contributed to the study's significant outcomes. The study site follows a systematic patient triage process that is favorable to the addition of the 5As despite its busy patient appointment schedule. Its small staff size allowed for an easy dissemination of information about the implementation process. As a result, there were no unintended positive or negative consequences experienced upon completion of this project.

Implications for Clinical Practice

The results of this project showed a statistically significant increase in the use of the 5As model to manage obesity in the primary care setting. Healthcare providers should utilize this standardized plan of care to strategically treat overweight and obese patients through assessment of BMI scores and comorbidities that interfere with weight loss, advising weight maintenance or educating on benefits of weight loss, discussing weight loss treatment options after agreeing to treatment, assisting in behavioral weight loss counselling and arranging follow up to regularly assess progress and follow through with multidisciplinary referrals. All patients should be weighed each visit to monitor their BMI score and an overweight or obesity diagnosis should be documented accordingly. Results of this project suggest that proper documentation of these diagnoses can lead to increased documentation of weight management interventions by clinicians.

Implications for Healthcare Policy

Today, most U.S. healthcare policies on obesity are aimed towards prevention. They range from improving nutritional standards and increasing physical activity in child-care settings

to healthy food marketing and promotion. On the other hand, healthcare providers of already obese adults are only guided by recommendations to refer to behavioral counseling and motivated by monetary incentives of insurance reimbursement. Obesity is a serious disease that kills millions of Americans every year. Legislative action should require healthcare providers to deliver appropriate and timely interventions to overweight and obese patients as soon as they are identified through their BMI score. These interventions should be documented not only to follow criteria for reimbursement but also to be held accountable for this legally binding policy. The results of this project support that the 5As model can increase the percentage of BMI screening and obesity treatment interventions in primary care. This tool can help enact this healthcare policy, as well as combat this deadly epidemic.

Implications for Quality/Safety

Primary care providers recognize the need to sufficiently educate and counsel overweight and obese patients towards a healthier lifestyle. However, this also requires specific interventions that demand more time. Primary care practices should adopt the 5As model into their patient triage procedure prior to being seen by the licensed provider. The triage staff member can initiate assessment of BMI and comorbidities that may interfere with weight loss by obtaining height and weight and reviewing past medical history. If a patient has been identified as overweight or obese, he/she will be flagged to alert the provider to perform the necessary interventions according to the 5As model. This project supports that with an efficient screening process and a specific plan, a safe and quality standard of care in managing overweight and obese patients can be achieved.

Implications for Education

The 5As model was originally designed as a framework for promoting smoking cessation. Today, it has developed into a universal approach for encouraging behavioral change. This project supports it as effective in obesity management in the primary care setting by increasing the frequency of documentation of diagnosis and interventions. However, studies on its efficacy in primary care are still lacking. Its compatibility with the primary care workflow, effect on weight or BMI scores over time, effect on patients with multiple comorbidities, and influence on healthcare costs need to be evaluated through further research. Findings of this research will hopefully confirm its validity for inclusion in universal healthcare policies and standards of practice.

Plans for Future Scholarship

The findings of this project will be shared and submitted for publication with the *Journal of Obesity and Weight Loss Therapy*. It is an open access, peer-reviewed journal that provides new and reliable information about current developments in the field of obesity and weight loss. Findings will also be submitted for poster presentation at the 2020 New Jersey League for Nursing Convention at Atlantic City, New Jersey in March.

Conclusion

Obesity is a complex, worldwide problem that needs a strategic, multidisciplinary solution. The 5As model is an evidenced-based, behavioral intervention approach that can be adapted for successful weight management within primary care. It supports patient-physician collaboration for early discussion of weight-management strategies initiated by simple assessment of BMI and comorbidities that may interfere with weight loss. Successful implementation of the 5As model by primary care providers can maximize their impact on

obesity through early detection and timely intervention while increasing motivation among patients with following a healthier lifestyle.

References

Carroll, J., Fiscella, K., Cassells, A., Sanders, M., Williams, S., D'Orazio, B., … Tobin, J. (2018). Theoretical and pragmatic adaptation of the 5As model to patient-centered hypertension counselling. *Journal of Health Care for the Poor and Underserved*, *29*(3), 975–983. Retrieved from https://muse.jhu.edu/article/700996

Centers for Disease Control & Prevention. (2019). *Adult obesity prevalence maps.* Retrieved from https://www.cdc.gov/obesity/data/prevalence-maps.html

Centers for Disease Control & Prevention. (2018a). *Adult obesity facts.* Retrieved from https://www.cdc.gov/obesity/data/adult.html

Centers for Disease Control & Prevention. (2018b). *National diabetes control program*. Retrieved from https://www.cdc.gov/diabetes/prevention/index.html

Centers for Disease Control & Prevention. (2015). *The health effects of overweight and obesity.* Retrieved from https://www.cdc.gov/healthyweight/effects/index.html

Centers for Disease Control & Prevention. (2011, July 15). *The obesity epidemic* [Video file]. Retrieved from https://www.youtube.com/watch?v=vCORDl4bqDE&t=14s

Chen, T., Hamlett-Berry, K., Watanabe, J., Bounthavong, M., Zillich, A., Christofferson, D., … Hudmon, K. (2015). Evaluation of multidisciplinary tobacco cessation training program in a large health care system. *American Journal of Health Education, 46*(3), 165–173. doi:10.1080/19325037.2015.1023475

Fitzpatrick, S., & Stevens, V. (2017). Adult obesity management in primary care, 2008–2013. *Preventive Medicine, 99*, 128–133. doi:10.1016/j.ypmed.2017.02.020

Fitzpatrick, S., Wischenka, D., Appelhans, B., Pbert, L., Wang, M., Wilson, D., & Pagoto, S. (2016). An evidence-based guide for obesity treatment in primary care. *The American Journal of Medicine, 129*(1), 115. doi:10.1016/j.amjmed.2015.07.015

Friedrich, M. (2017). Global obesity epidemic worsening. *Journal of the American Medical Association, 318*(7), 603–603. doi:10.1001/jama.2017.10693

Gadde, K., Martin, C., Berthoud, H., & Heymsfield, S. (2018). Obesity: Pathophysiology and management. *Journal of the American College of Cardiology, 71*(1), 69–84. doi:10.1016/j.jacc.2017.11.011

Graham, D., Logan, B., Harrison, E., Straus, E., Tetroe, E., Caswell, E., & Robinson, E. (2006). Lost in knowledge translation: Time for a map? *Journal of Continuing Education in the Health Professions, 26*(1), 13–24. doi:10.1002/chp.47

Gudzune, K. (2016). Dietary and behavioral approaches in the management of obesity. *Gastroenterology Clinics of North America, 45*(4), 653–661. doi:10.1016/j.gtc.2016.07.004

Iyer, S., Jay, M., Southern, W., & Schlair, S. (2018). Assessing and counseling the obese patient: Improving resident obesity counseling competence. *Obesity Research & Clinical Practice, 12*(2), 242–245. doi:10.1016/j.orcp.2018.02.007

Jensen, D., Ryan, H., Apovian, M., Ard, D., Comuzzie, G., Donato, A., … Yanovski, Z. (2014). 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: A report of the American College of Cardiology/American Heart Association task force on practice guidelines and the obesity society. *Circulation, 129*(25_suppl_2 Suppl 1), S102–S138. doi:10.1161/01.cir.0000437739.71477.ee

Kahan, S., Wilson, D., & Sweeney, A. (2018). The role of behavioral medicine in the treatment of obesity in primary care. *Medical Clinics of North America, 102*(1), 125–133. doi:10.1016/j.mcna.2017.09.002

Kusminski, C., Bickel, P., Scherer, P., & Kusminski, C. (2016). Targeting adipose tissue in the treatment of obesity-associated diabetes. *Nature Reviews*: *Drug Discovery, 15*(9), 639–660. doi:10.1038/nrd.2016.75

Martinez, C., Castellano, Y., Andrns, A., Fu, M., Anton, L., Ballbe, M., … Fernandez, E. (2017). Factors associated with implementation of the 5A's smoking cessation model. *Tobacco Induced Diseases, 15*(1), 41. doi:10.1186/s12971-017-0146-7

Mulder, B., van Belzen, M., Lokhorst, A., & van Woerkum, C. (2015). Quality assessment of practice nurse communication with type 2 diabetes patients. *Patient Education and Counseling*, *98*(2), 156–161. doi:10.1016/j.pec.2014.11.006

Nápoles, A., Appelle, N., Kalkhoran, S., Vijayaraghavan, M., Alvarado, N., Satterfield, J., & Nápoles, A. (2016). Perceptions of clinicians and staff about the use of digital technology in primary care: Qualitative interviews prior to implementation of a computer-facilitated 5As intervention. *BMC Medical Informatics and Decision Making*, *16*(44), 44–44. doi:10.1186/s12911-016-0284-5

National Center for Health Statistics. (2017). *Prevalence of obesity among adults and youth: United States 2015-2016* [PDF file]. Retrieved from https://www.cdc.gov/nchs/data/databriefs/db288.pdf

Park, E., Gareen, I., Japuntich, S., Lennes, I., Hyland, K., Demello, S., … Rigotti, N. (2015). Primary care provider-delivered smoking cessation interventions and smoking cessation

among participants in the national lung screening trial. *JAMA Internal Medicine*, *175*(9), 1509–1516. doi:10.1001/jamainternmed.2015.2391

Payne, T., Gaughf, N., Sutton, M., Sheffer, C., Elci, O., Cropsey, K., … Crews, K. (2014). The impact of brief tobacco treatment training on practice behaviours, self-efficacy and attitudes among healthcare providers. *International Journal of Clinical Practice*, *68*(7), 882–889. doi:10.1111/ijcp.12386

Pollak, K., Tulsky, J., Bravender, T., Østbye, T., Lyna, P., Dolor, R., … Alexander, S. (2016). Teaching primary care physicians the 5 A's for discussing weight with overweight and obese adolescents. *Patient Education and Counseling*, *99*(10), 1620–1625. doi:10.1016/j.pec.2016.05.007

Preston, S. H., Vierboom, Y. C., & Stokes, A. (2018). The role of obesity in exceptionally slow US mortality improvement. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(5), 957-961.

Revels, S., Kumar, S., & Ben-Assuli, O. (2017). Predicting obesity rate and obesity-related healthcare costs using data analytics. *Health Policy and Technology*, *6*(2), 198–207. doi:10.1016/j.hlpt.2017.02.002

Rueda-Clausen, C., Benterud, E., Bond, T., Olszowka, R., Vallis, M., & Sharma, A. (2014). Effect of implementing the 5As of obesity management framework on provider–patient interactions in primary care. *Clinical Obesity*, *4*(1), 39–44. doi:10.1111/cob.12038

Satterfield, J., Gregorich, S., Kalkhoran, S., Lum, P., Bloome, J., Alvarado, N., … Vijayaraghavan, M. (2018). Computer-facilitated 5A's for smoking cessation: A randomized trial of technology to promote provider adherence. *American Journal of Preventive Medicine*, *55*(1), 35–43. doi:10.1016/j.amepre.2018.04.009

Servile, G., & Grassi, G. (2017). Obesity and hypertension. *Pharmacological Research, 122*, 1–7. doi:10.1016/j.phrs.2017.05.013

Sherson, E., Yakes Jimenez, E., & Katalanos, N. (2014). A review of the use of the 5 A's model for weight loss counselling: Differences between physician practice and patient demand. *Family Practice*, *31*(4), 389–398. doi:10.1093/fampra/cmu020

The Johns Hopkins Hospital/Johns Hopkins University. (n.d.). Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool. Retrieved from https://www.mghpcs.org/eed_portal/Documents/PI_EBP/Jon_Hopikins_Tools/Research_Evidence_Appraisal_Tool_fillable.pdf

U.S. Preventive Services Task Force. (2018). Behavioral weight loss interventions to prevent obesity-related morbidity and mortality in adults. *Journal of the American Medical Association, 320* (11). doi:10.1001/jama.2018.13022

van Dillen, S., Noordman, J., van Dulmen, S., & Hiddink, G. (2015). Quality of weight-loss counseling by Dutch practice nurses in primary care: An observational study. *European Journal of Clinical Nutrition*, *69*(1), 73–78. doi:10.1038/ejcn.2014.129

Welzel, F., Stein, J., Pabst, A., Luppa, M., Kersting, A., Bluher, M., … Riedel-Heller, S. (2018). Five A's counseling in weight management of obese patients in primary care: A cluster-randomized controlled trial (INTERACT). *BMC Family Practice*, *19*(1), 1–9. doi:10.1186/s12875-018-0785-7

World Health Organization. (2019). *Obesity.* Retrieved from https://www.who.int/topics/obesity/en/

Yanovski, S. (2018). Weight management in adults with obesity: What is a primary care clinician to do? *JAMA*, *320*(11), 1111–1113. doi:10.1001/jama.2018.11031

Table 1.

Project Budget

Expense	Cost
8.5”x11” Multipurpose Paper	$14
HP 63 Black/Color Ink Cartridges	$46
Transportation	$46
Statistical Analysis Software	$200
Binding of Final Project (4 copies)	$200
Dissemination Posters	$75
Lunch Tray	$50
Total Budget	**$631**

Table 2.

Characteristics of Participants

Characteristic	Pre-intervention	Post-intervention
Gender		
Female	18 (60%)	23 (77%)
Male	12 (40%)	7 (23%)
Race		
Black or African American	16 (53%)	18 (60%)
White or Caucasian	3 (10%)	0 (0%)
Hispanic	6 (20%)	4 (13%)
Asian	2 (6%)	4 (13%)
Other	3 (10%)	4 (13%)
BMI Classification		
Overweight	11 (37%)	11 (37%)
Obese	19 (53%)	19 (53%)
Overweight or Obesity Diagnosis		
Documented	16 (53%)	19 (63%)
Undocumented	14 (47%)	11 (37%)

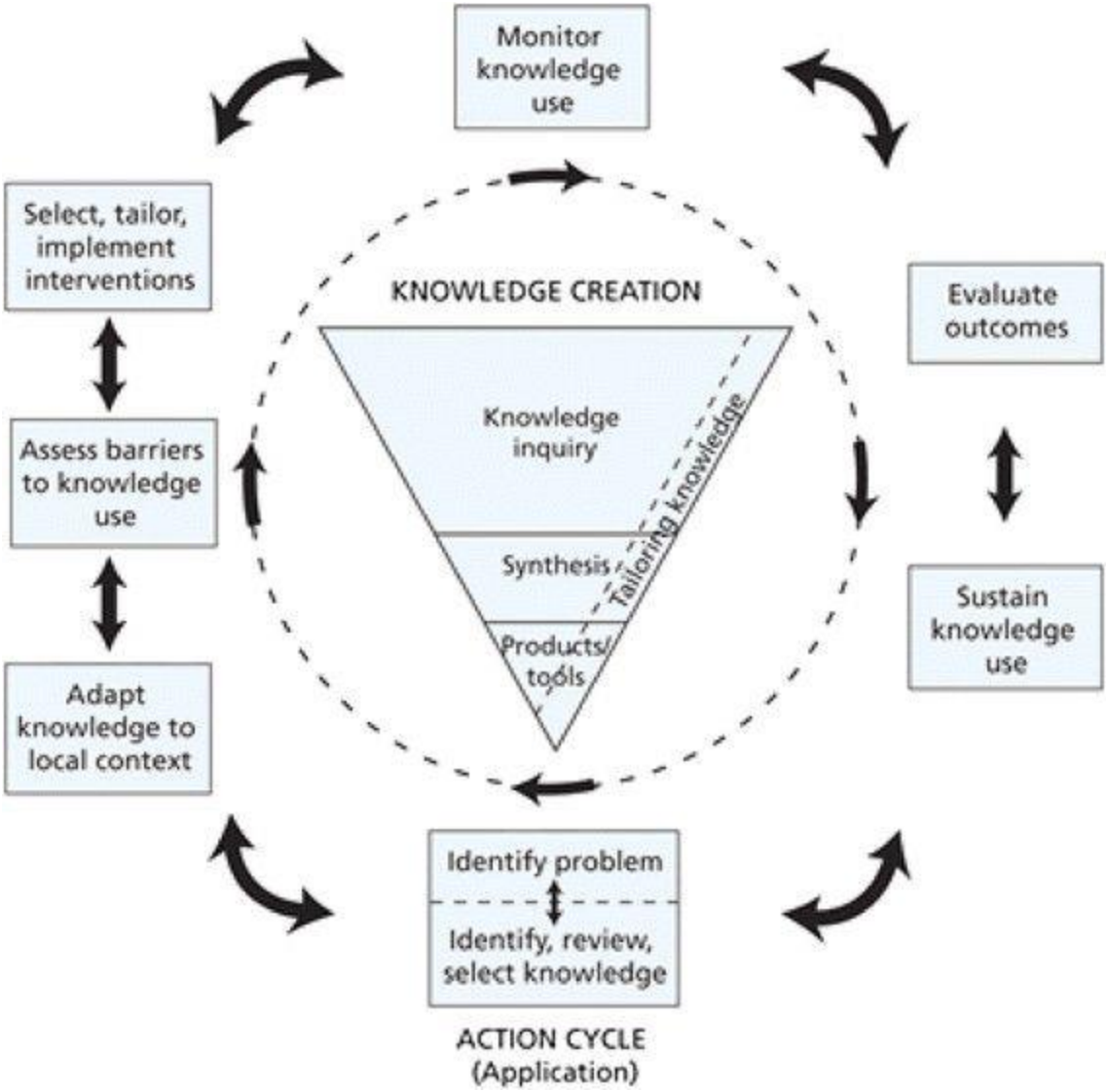


Figure 1. Theoretical Framework

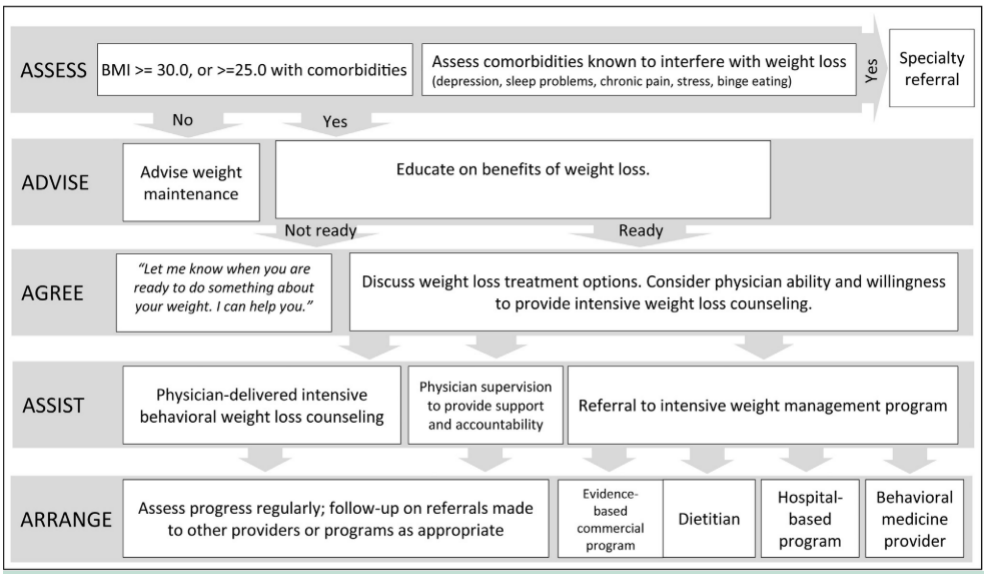
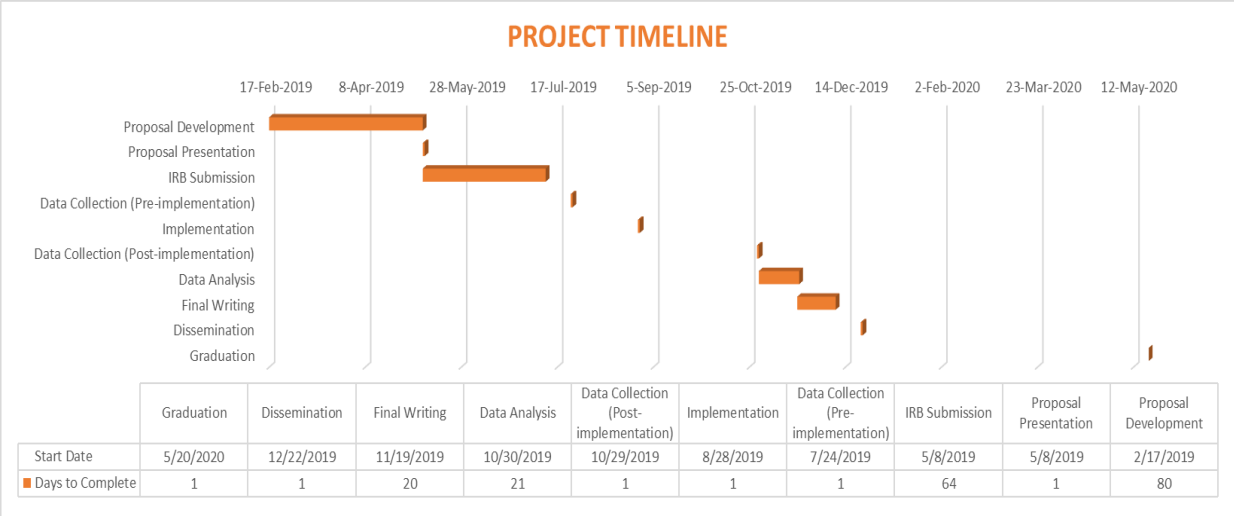


Figure Flow chart for 5As model of obesity management in primary care. The flow chart allows for the categorization of patients according to their readiness to lose weight within the 5As model. Of note, the physician is able to consider comorbid conditions that may interfere with weight loss and provide appropriate referrals for other professionals as needed within this model. BMI = body mass index.

Figure 2. Fitzpatrick et al. 5As Flow Chart



	Graduation	Dissemination	Final Writing	Data Analysis	Data Collection (Post-implementation)	Implementation	Data Collection (Pre-implementation)	IRB Submission	Proposal Presentation	Proposal Development
Start Date	5/20/2020	12/22/2019	11/19/2019	10/30/2019	10/29/2019	8/28/2019	7/24/2019	5/8/2019	5/8/2019	2/17/2019
Days to Complete	1	1	20	21	1	1	1	64	1	80

Figure 3. Gantt Chart of Project Timeline

Appendix A. Evidence Table

EBP Question: In adults with elevated BMI, how does the 5As model affect obesity screening and intervention in the primary care setting?

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Study findings that help answer the EBP question	Limitations	Evidence Level & Quality
1	Carroll et al. (2018)	Case report	73 clinicians and staff members across 12 FQHC sites	FQHC clinicians responded favorably to applying 5As to hypertension management; 29% reported the practical use of 5As; 21% reported asking the patient to engage in discussing their blood pressure was most valuable	No control group	V
2	Chen et al. (2015)	Pre-Post Study	205 nurses, pharmacists, psychologists, physicians, social workers, dietician, addiction therapist, physical therapist and dentist from 5 Veteran Affairs facilities	Significant improvement in overall ability to help patients quit tobacco $t(203)=12.35$, $P<.0001$; 52% of participants rated their overall ability to provide cessation treatment as very good or excellent; No differences observed between groups on posttraining rating of overall ability, $F(3,162)=1.039$, $P=0.377$; Participant reported significant increases in ability to counsel for addiction, $t(203)=10.06$, $P=<.0001$ and also demonstrated in improvement in possession of sufficient therapeutic knowledge of the pharmaceutical products for tobacco cessation, $t(203)=11.94$, $P<.0001$	30% of participants did not complete the survey, reporting bias, no control group, low number of attendees, reliability and validity testing not conducted	IV

3	Fitzpatrick et al. (2016)	Expert Opinion	Primary care setting	5As is a counseling framework that will help physicians maximize their impact on obesity care; Recommends that physicians use the 5As model to build a multidisciplinary team to assist with intensive counseling, address psychosocial issues and medical/psychiatric comorbidities related to obesity treatment failure and connect patients with available community resources	N/A	V
4	Gudzune et al. (2016)	Expert Opinion	Clinical practice setting	Using an evidence-based behavior change strategy such as the 5As can help guide assessment and counseling regardless of whether the clinician takes an active or passive role	N/A	V
5	Iyer et al. (2018)	Pre-Post Study	28 all PGY-level residents at [redacted] Bronx, NY	Positive impact on residents' ability to perform obesity counseling; Significant improvement in the Assess, Advice, Assist of the 5As domains; The proportion of residents with a lower level self-assessed counseling competence decreased.	Lack a control group; small sample size; limited ability to generalize to other physician populations.	IV
6	Jensen et al. (2014)	Clinical Practice Guidelines	Primary care setting	Summary of recommendations correlate with the 5As model	Literature search limited to 2000-2011. Focused on specific subpopulations with a disease or condition.	IV

7	Kahan et al. (2017)	Expert Opinion	Primary care setting	The 5As approach can help HCPs structure their clinical interactions and maximize their impact on obesity treatment; Some considerations: respectful and autonomy-supportive counselling, recognize structural/economic settings, social norms, national local policies that pose a challenge on weight management, acknowledge the challenge to ease patients' fears and build rapport, use patient-centered language		V
8	Martinez et al. (2017)	Cross-sectional Study	580 clinical health workers enrolled in an online cessation training course in Catalonia, Spain	Healthcare workers (HWs) reported a higher level of performance in Ask, Advice, and Assess compared to Assist and Arrange when approaching smokers about quitting; Having positive experiences and organizational support has a positive correlation with the 5As delivery; Higher levels of confidence due to previous training is related to higher performance of the 5As	Cross-sectional survey, unable to reach direct causal conclusions, self-reported responses, HWs smoking cessation practices/status were not verified, participants do not represent the general characteristics of HWs in Catalonia, possible compliance bias	V
9	Mulder et al. (2015)	Observational Study	7 Practice nurses, 64 recorded	The nurses did Assess and Arrange more often than Advice, Assist and	Cannot be generalized with	V

			consultations, 66 patients in a Dutch healthcare system	Agree; Assess did not reflect the patient's current health behaviors or beliefs which hampered Advice and the subsequent As; Advice was not patient-specific; Agree did not reflect collaborative goals and Assist did not discuss strategies for behavioral change	other healthcare systems, structural factors that limit communication between nurses and patients, small provider sample	
10	Napoles et al. (2016)	Qualitative Study	35 clinical staff from 3 primary care clinics in the San Francisco Bay Area	Computer-assisted 5As (CF5As) model was perceived useful in performing a variety of administrative and health behavior counseling functions, obtaining patient data in a confidential manner and delivering patient education during appointment wait times; CF5As dependent on clinic workflow; Primary care providers view CF5As as a potential burden	Small sample size	V
11	Park et al. (2015)	Case-control Study	3,336 NLST participants	Delivery of 5As after 1 year of smoking cessation screening were 77.2% Ask, 75.6% Advice, 63.4% Assess, 56.4% Assist, and 10.4% Arrange for follow-up	Limited generalizability	III
12	Payne et al. (2014)	Pre-Post Study	488 healthcare providers from 10 inpatient/outpatient facilities in Southern U.S.	Modest levels of tobacco treatment with limited direct intervention (Assist) or follow-up (Arrange) efforts; Training showed substantial and sustained impact on 5As Practice Behavior ratings and other clinical indicators (all Pre vs. Post and Pre vs.	Single-group design, unclear generalizability, possible bias, survey methodology, emphasized	IV

				Follow-up comparisons $p < 0.001$); Self-Efficacy at post training predicted practice behaviors at follow-up (for ADVISE, ASSESS, ASSIST and ARRANGE: all p's < 0.05)	frequency of occurrence	
13	Pollak et al. (2016)	Case-Control Study	46 primary care physicians; academically-affiliated and community-based practices	An online intervention increased physician's use of 5A's when discussing weight with adolescents.	Limited to patients who agreed to the study and showed up to their appointment on time; small sample size.	III
14	Rueda-Clausen et al. (2014)	Non-Controlled Quasi-experimental (before and after) Study	25 healthcare providers (HCPs) from SCPCN clinics in the south side of Calgary, Alberta, Canada	Implementation of the 5As was associated with a twofold increase in number of interactions, in which HCPs initiated the weight management discussion	Lack of randomization and blinding, small sample size, short period of time between intervention and follow-up, not applicable to severely obese patients,	IIB
15	Satterfield et al. (2018)	Cluster Randomized Control Trial	221 providers and 961 patients from 3 urban, adult primary care clinics	Computer-facilitated 5As program increased provider adherence to the 5As clinical guidelines for tobacco use disorders in the intervention group; Intervention providers were	Recall bias, overrepresentation of white patients, more generalizable to urban, low-income populations, nearly a quarter of	I

				more likely to Assess and Assist their patients as well as Arrange follow-up	the sample did not complete post-visit interview	
16	Sherson et al. (2014)	Systematic Review	15 quantitative research data from cross-sectional studies	Physicians most frequently Advised and Assessed but rarely Agreed or Arranged	Only 1 database used for search, poor search term strategy, quality of evidence found	II
17	van Dillen et al. (2015)	Observational Study	100 videotaped real-life consultations	Practice nurses frequently Arranged follow-up, Assessed risk and current behavior and Advised; They rarely Assisted in addressing barriers and securing support	Only 1 consultation studied, majority of population were diabetic, no reliable factor for Assess risk and current behavior, limited generalizability	V
18	Welzel et al. (2018)	Cluster Randomized Control Trial	172 patients, 20 general practitioners from a primary care setting in central Germany	The 5As present physicians with a simple mnemonic for patient counseling; The use of 5As associated with improved doctor-patient interaction and motivation to lose weight	None stated	I

Appendix B. Data Collection Tool

Data Collection Tool

#	Subject ID	Sex (M/F)	Race	Age	BMI score	Overweight/ Obese	Diagnosed (Y/N)	Intervention(s)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								