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DEVELOPMENT OF A COMMUNITY-BASED PLAN FOR AN EFFECTIVE BEHAVIORAL INTERVENTION TO REDUCE CHILDHOOD OBESITY IN A RURAL APPALACHIAN COMMUNITY

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THESIS

A thesis submitted in partial fulfillment of the
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By

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2023

ABSTRACT OF THESIS

DEVELOPMENT OF A COMMUNITY-BASED PLAN FOR AN EFFECTIVE BEHAVIORAL INTERVENTION TO REDUCE CHILDHOOD OBESITY IN A RURAL APPALACHIAN COMMUNITY

Rural children experience increased rates of obesity and reduced access to specialized weight management facilities, which makes receiving the recommended frequency of care difficult. Clinical-community partnerships, recommended by the American Academy of Pediatrics (AAP) to expand access, have been shown to be a feasible strategy of care delivery. Examination of literature and stakeholder interviews were used to inform the development of a collaborative pediatric weight management program in a rural, Appalachian community. Screening articles as well as intervention articles were reviewed. Outcomes of screening articles reviewed included BMI measures (3), screening practices (7), and referral practices (4). Common outcomes of intervention articles included BMI (24), parent BMI (7), diet (17), physical activity (16), quality of life (9), and sleep/sleep quality (7). Key results from these outcomes varied in each article. Clinical referral was seen in 23 studies and family-centeredness was seen in 25 of the 32 intervention articles reviewed. The majority of intervention studies that reported improved outcomes included both clinical referral and family-centered interventions. Interview guides were developed using the Consolidated Framework for Implementation Research (CFIR). Structured stakeholder interviews were conducted among implementation partners (n=4), community partners (n=1), and individuals (parents/caregivers) (n=1). Interviews were transcribed and a thematic analysis was conducted. Themes that emerged during thematic analysis included Barriers, Facilitators, Need for Intervention, Incentives, Receptivity, Setting Characteristics, and Implementation Considerations. Barrier sub-themes included transportation, childcare, adherence, time, and financial barriers. Facilitators sub-theme included complementary programs and processes. Incentives were grouped into monetary and non-monetary incentives sub-themes. Receptivity included community and organizational receptivity sub-themes. Setting characteristics included community and organizational setting characteristics sub-themes. Community site considerations (spaciousness, access, and familiarity); overlapping financial and adherence barriers; provision of program-specific incentives; and positive program framing to improve receptivity and participation were notable characteristics examined among themes and should be considered in future program development. Preliminary research, establishing factors that may influence implementation within the specified community, is of great importance to ensure efficacy; thus, the findings of this study will present critical information for program development and delivery.

KEYWORDS: [Clinical-Community Collaboration, Clinical-Community Partnership, Pediatric Obesity, Pre-Implementation, Family-Centered Program, Pediatric Weight Management Program]

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October 25, 2023

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CHAPTER 1. INTRODUCTION

1.1 Background

Childhood obesity has increased in the United States to 19.7%, affecting about 14.7 million children and adolescents from 2017 to 2020 (Stierman et al., 2021). Childhood obesity is of great consequence, putting children at risk of serious comorbidities, including type 2 diabetes, hypertension, dyslipidemia, obstructive sleep apnea, nonalcoholic fatty liver disease, as well as other diseases (Kumar & Kelly, 2017). Psychological well-being is also of concern in this population, as childhood obesity is associated with depression, anxiety, low self-esteem, lower self-reported quality of life, and social problems such as weight-based stigmatization and bullying (Halfon et al., 2013; Morrison et al., 2015). In addition, children with obesity are more likely to have obesity in adulthood, putting them at risk of serious health conditions throughout their lives (Kumar & Kelly, 2017).

Health disparities related to childhood obesity exist throughout the United States. Rural versus urban childhood obesity prevalence is one such disparity, as obesity rates are higher among rural children than among urban children in the United States (Johnson III & Johnson, 2015). Not only are rural children more likely to develop obesity, but rural children also face barriers to receiving adequate care due to lack of resources (Bettenhausen et al., 2021). Although community programs may assist in reducing these barriers, providing recommended care and contact hours, clinicians face limitations in referring patients to these programs. Healthcare providers may be unaware of programs meeting clinical recommendations and, therefore, may not refer patients to available programs (Imoisili et al., 2019). A possible solution to effectively link clinician referral

with community programming is a collaborative pediatric weight management program. Clinical-community collaboration may be a promising strategy for providing accessible pediatric obesity care in various settings (Bala et al., 2019; Hoffman et al., 2018; Taveras et al., 2017; Tripicchio et al., 2018). Not only does evidence convey the feasibility of a collaborative approach, but the American Academy of Pediatrics (AAP) recommends partnerships among healthcare and community organizations to improve the accessibility of evidence-based pediatric obesity treatment programs (Hampl et al., 2023).

1.2 Problem Statement

Children residing in rural communities experience high rates of obesity as well as barriers to receiving adequate care. The United States Preventative Service Task Force (USPSTF) recommends that "clinicians screen for obesity in children and adolescents 6 years and older and offer or refer them to comprehensive, intensive behavioral interventions to promote improvements in weight status" (Grossman et al., 2017, p. 2417). The AAP recommends similar intensive behavioral interventions as part of obesity treatment for children in the 2-5-year range (Hampl et al., 2023). These recommendations are incredibly challenging for those residing in rural communities to meet, as specialized weight management facilities are less accessible and, if available, likely unaffordable (Bettenhausen et al., 2021; Bolin et al., 2015; Findholt et al., 2013; Shaikh et al., 2011). Community programs may be used to deliver and meet the recommended frequency of care; however, healthcare providers experience barriers in referring to these programs. Better integration between referral and programming is essential for providing care to rural children facing health disparities. Establishing a collaborative weight management program is a possible strategy for reducing care barriers and referral limitations, thus

providing adequate care to rural children. This study provides data to inform the development and delivery of a clinical-community collaborative pediatric weight management program in a rural, Appalachian community.

1.3 Statement of Purpose

The purpose of this study is to inform the development and implementation of an effective clinical-community collaborative pediatric weight management program in a rural, Appalachian community.

1.4 Research Aims

Aim 1: Examine existing literature related to screening approaches to reduce childhood obesity, connecting clinical care with community settings.

Aim 2: Examine existing literature related to comprehensive behavioral interventions to reduce childhood obesity, connecting clinical care with community settings.

Aim 3: Define barriers, facilitators, and key setting components for delivery of a comprehensive behavioral intervention plan with screening among key stakeholders.

1.5 Hypothesis

Variability in community readiness to adopt a family healthy weight program will influence the implementation plan.

1.6 Justification

The AAP recommends multi-level clinical-community partnerships to "expand access to evidence-based pediatric obesity treatment programs" (Hampl et al., 2023, p. 4). Clinical-community collaborative pediatric weight management programs have been shown to be a feasible approach to care delivery (Bala et al., 2019; Hoffman et al., 2018;

Taveras et al., 2017; Tripicchio et al., 2018). Linking clinical with community programming allows for the provision of accessible care to those experiencing healthcare barriers in rural settings, combatting health disparities while reducing healthcare provider referral limitations. There is currently a lack of collaborative family-centered healthy weight programs in rural communities, as well as a lack of research for such programs in rural settings (Bettenhausen et al., 2021; Shaikh et al., 2011). By providing community input, we may establish an implementation plan to deliver an effective collaborative pediatric weight management program in a rural, Appalachian community.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

Childhood obesity has increased in epidemic proportions in the United States, putting children at risk of serious comorbidities, including type 2 diabetes, hypertension, dyslipidemia, obstructive sleep apnea, nonalcoholic fatty liver disease, as well as other diseases (Kumar & Kelly, 2017). Mental health is of concern within this population as well, as childhood obesity is associated with low self-esteem, reduced self-reported quality of life, and social issues (bullying and stigmas based on weight) (Halfon et al., 2013; Kumar & Kelly, 2017; Morrison et al., 2015). These serious health concerns may persist throughout life, as pediatric obesity increases the risk of adulthood obesity (Ogden et al., 2010; Sanyaolu et al., 2019).

Obesity is more prevalent among rural children than urban children in the United States (Johnson III & Johnson, 2015). Health disparities affecting children in rural areas are underrecognized and need to be addressed (Bettenhausen et al., 2021). Rural children experience reduced access to specialty care due to decreased healthcare providers as well as transportation-related barriers (Bettenhausen et al., 2021). The prevalence of childhood obesity in rural communities as well as barriers to receiving adequate care makes clinical-community collaboration a promising strategy to obtain the recommended contact hours as defined by USPSTF guidelines (≥26 contact hours over 2-12 months) as well as clinical practice guidelines (CPG) supported by the AAP (≥26 contact hours over a 3-12 month period) (Grossman et al., 2017; Hampl et al., 2023).

Clinical-community partnerships can be conducted in various contexts/community settings to increase accessibility and reduce barriers. Clinicians may

refer patients to programs at local parks, community centers, schools, primary care offices, health departments, telehealth services (direct contact or on-site), as well as other community settings. By working together, these programs may supplement care, provide adequate contact hours, deliver recommended care/activities supporting behavioral changes, and ultimately improve care and accessibility. There is a need for further research concerning the delivery of clinical-community collaborative interventions in rural communities. Further research may provide feasible strategies to reduce childhood obesity, and thus health disparities, in rural areas. The aims of this study are to:

1. examine existing literature related to screening approaches to reduce childhood obesity, connecting clinical care with community settings,
2. examine existing literature related to comprehensive behavioral interventions to reduce childhood obesity, connecting clinical care with community settings, and
3. define barriers, facilitators, and key setting components for delivery of a comprehensive behavioral intervention plan with screening among key stakeholders utilizing Consolidated Framework for Implementation Research as our guide.

2.2 Obesity and Health Consequences

Obesity has been well-documented to be associated with numerous severe health conditions, including type 2 diabetes, hypertension, dyslipidemia, coronary heart disease, stroke, fatty liver disease, gallbladder disease, osteoarthritis, sleep apnea, cancer, and mental disorders (NIDDK, 2018). In Kentucky, an estimated 36.6% of adults reported having obesity based on Body Mass Index (BMI) screening, higher than the United States

prevalence of 31.9% (CDC, n.d.). This trend is localized within the eastern Kentucky region, with 43.8% of adults with obesity (KyBRFS, 2020). This statistic is unsurprising, as eastern Kentucky is a rural region facing health disparities. Rural residence is associated with lower income levels and higher poverty rates, which are socioeconomic variables contributing to health disparities (Long et al., 2018). Low-income groups may experience food access issues and poor quality of built environments, both of which are social environment mechanisms that may increase the risk of obesity and poor health outcomes (Krueger & Reither, 2015).

2.2.1 Etiologies

Obesity has various contributing etiologies, including nutrition, physical activity, and sleep; social determinants of health (SDOH); genetics; as well as illnesses and medications (CDC, 2022a; Kumar & Kelly, 2017). Social determinants of health are defined as "the conditions in environments where people are born, live, learn, work, play, worship, and age" that impact health outcomes (ODPHP, n.d.-b, para. 1). Obesity prevalence has been found to increase with increasing SDOH burden (Javed et al., 2022). Some examples of obesogenic SDOH factors include limited education, low income and economic instability, low socioeconomic status, as well as poor food and built environments (Cockerham, 2022; Cockerham et al., 2017; ODPHP, n.d.-c). These systemic causes of obesity are consistent with previously mentioned health disparities. It is important to consider supportive community programs that assist in reducing health disparities and thus promoting health equity by addressing SDOH factors. Expanding healthcare access is one way to reduce SDOH burden in rural communities (Douthit et al., 2015; ODPHP, n.d.-a).

2.3 Childhood and Adolescent Obesity Prevalence

Childhood obesity is a significant problem in the United States, with a prevalence of 19.7% in children and adolescents aged 2-19 years in 2017-2020 (Stierman et al., 2021). Almost 32% of children in the United States have overweight or obesity (Grossman et al., 2017). According to the 2019 High School Youth Risk Behavior Survey (YRBS), 18.4% of high school-age children have obesity in Kentucky, compared to 15.5% in this age group within the United States (CDC, 2019). In Kentucky, 15.3% of children aged 2 to 4 participating in WIC have obesity (CDC, n.d.). Additionally, 25.5% of children ages 10-17 years have obesity (95th percentile or above), ranking Kentucky as the second highest obesity prevalence within this age range among all states (Data Resource Center for Child and Adolescent Health, 2020-2021). The enormous prevalence of childhood obesity, as well as the resulting poor health outcomes, helps to convey the importance of focusing on prevention and intervention strategies within this group.

2.3.1 Rural Health Disparities

Childhood obesity is influenced by complex, interconnected variables, including socioeconomic status, dietary behaviors, and rural/urban residence (Johnson III & Johnson, 2015). Children living in rural areas of the United States have been found to have greater prevalence and greater odds of developing obesity (Johnson III & Johnson, 2015). Children residing in rural areas have a 26% greater likelihood of having obesity relative to their urban counterparts (Johnson III & Johnson, 2015). Rural children ages 10-17 are more likely than their urban counterparts to meet physical activity recommendations; however, obesity rates among children are still reportedly higher in these rural communities (HRSA Maternal & Child Health, 2022). This disparity between

rural and urban children could be attributed to various factors seen within rural environments, including nutrition knowledge deficits, limited access to healthy foods and resources, and reduced physical activity among children in the rural setting (Premkumar & Ramanan, 2019). Rural populations are at increased risk of poor health outcomes compared to those in urban settings; this disparity and the challenges rural communities face warrant additional attention and resources (CDC, 2017). Additional screenings and intervention strategies may be of assistance in these communities to promote the health and well-being of residents, ultimately reducing health disparities.

2.4 Screening and Referral for Overweight and Obesity Among Children: Measures and Recommendations

Body mass index (BMI) is the recommended screening test for obesity (Grossman et al., 2017). For children 2 years and over, BMI is plotted on a growth chart and determined taking both age and sex into account. A BMI-for-age percentile of 85th to 94th is considered overweight, while a BMI-for-age percentile of 95th or greater is considered obese (Styne et al., 2017). The USPSTF previously found that age- and sex-specific BMI percentile is acceptable for overweight/obesity detection in children and adolescents, as it is reliable, realistic for use in primary care settings, and associated with obesity in adulthood (Grossman et al., 2017; Whitlock et al., 2005). The USPSTF found that early screening is of moderate benefit and the harms of screening using BMI are minimal in children six years and older (Grossman et al., 2017).

USPSTF recommends that clinicians screen for obesity in children and adolescents 6+ years of age and refer them to comprehensive, intensive behavioral interventions (≥ 26 contact hours) with the goal of improving weight status (Grossman et

al., 2017). The AAP recommends assessment of BMI percentile using age- and sex-specific CDC growth charts at least annually for all children ages 2-18 to screen for overweight, obesity, and severe obesity (Hampl et al., 2023). The AAP recommends that clinicians provide or refer children with overweight/obesity 6 years and older (strong evidence) as well as children 2-5 years of age (moderate evidence) with overweight/obesity to intensive health behavior and lifestyle treatment (IHBLT) (Hampl et al., 2023).

The USPSTF describes effective weight management interventions consisting of sessions targeting both the parent and child, offering family or group sessions, providing nutrition and safe exercise education, encouraging behavior change techniques, and physical activity sessions (Grossman et al., 2017). CPGs supported by the AAP describe similar intensive treatment (IHBLT), incorporating nutrition, physical activity, and behavior change support (Hampl et al., 2023). Intensive interventions typically involve specialized weight management referrals outside of the primary care setting (Grossman et al., 2017). The USPSTF and AAP recommendations of ≥ 26 contact hours of comprehensive, intensive behavioral intervention may prove difficult to implement, as the requirements are not well-suited for healthcare settings, set up for brief, infrequent visits (Barlow et al., 2021).

2.5 Evidence of Screening for Obesity Among Children and Adolescents

Excess adiposity in childhood is associated with an increased risk of adulthood obesity, which may result in severe health issues; thus, screening in childhood and early intervention is recommended and considered a necessary step to promote current health status and prevent adverse future health outcomes (Buscot et al., 2018; Grossman et al.,

2017; Kumar & Kelly, 2017). There are a multitude of screening practices; however, as aforementioned, BMI is the recommended screening method for the pediatric population (Grossman et al., 2017; Hampl et al., 2023). Other examples of anthropometric screening methods for adiposity detection include skinfolds, waist-to-hip ratio, and waist circumference; more advanced techniques, such as dual-energy x-ray absorptiometry (DXA), ultrasound, and air displacement plethysmography (ADP) may also be used as detection methods (DeLacey & Josefson, 2022; Orsso et al., 2020).

When choosing a suitable screening method, it is important to consider factors such as feasibility, technical skill needed, accuracy, validity in the specified population, availability of reference data, and additional costs/benefits (Kuriyan, 2018). The USPSTF has weighed the costs/benefits within the target population and found "no direct evidence on the benefits or harms of screening children and adolescents for excess weight" (O'Connor et al., 2017, p. 2438). Although using BMI as a screening tool has its limitations, such as not assessing body composition, it has been found to correlate with health outcomes and cause-specific mortality (Khanna et al., 2022). This, along with ease of use in the primary care setting, makes it a widely used method and is currently recommended by USPSTF as well as AAP (Grossman et al., 2017; Hampl et al., 2023; Khanna et al., 2022).

BMI is the recommended screening tool and is used as a marker of negative future health outcomes in children (Khanna et al., 2022). The goal of comprehensive multidisciplinary intervention is to promote a healthy and active lifestyle, focusing on behavior modifications, resulting in the reduction of BMI (Brown & Perrin, 2018). In addition to screening and referral, BMI can be used as an outcome indicator to evaluate

the success of weight management interventions due to its feasibility and its ability to assess disease risk (USPSTF, 2003). BMI is used as an outcome indicator in several interventions; however, BMI may not capture the overall impacts of these programs and reductions in BMI may take time (Pasquale et al., 2020). Other indications of program success include behavior change, physiological outcomes, and psychosocial effects (Pasquale et al., 2020). Factors such as physical activity, quality of life, self-esteem, diet, sleep quality, and anthropometric measures of adiposity may be used to evaluate program success, as additional benefits may be seen in these areas apart from BMI reduction (Kubik et al., 2021; Partridge et al., 2020; Pasquale et al., 2020). Success should not be measured in BMI reduction exclusively, as overall healthy behavior changes should be encouraged by clinicians (Brown & Perrin, 2018).

2.6 Evidence of Referral for Obesity Among Children and Adolescents

Healthcare providers are situated to both screen and refer patients to weight management interventions as recommended. This practice has become increasingly accepted among primary care pediatricians over the years, as providers are now significantly more likely to calculate and plot BMI at well-child visits (Belay et al., 2019). Although routine BMI screening in pediatric primary care is improving, weight management program referral is limited (Imoisili et al., 2019). In order to adhere to the USPSTF referral recommendation, awareness and access to weight management programs is necessary (Imoisili et al., 2019). Many clinicians may be unaware of community programs meeting the USPSTF criteria (≥26 contact hours comprehensive, intensive behavioral interventions), so despite high rates of obesity screening, clinicians are unable to refer to these interventions (Grossman et al., 2017; Imoisili et al., 2019).

When knowledgeable of such programs, the likelihood of referral increases (Imoisili et al., 2019); therefore, programs meeting USPSTF recommendations partnering with healthcare facilities may reduce the barrier of referral by increasing clinician awareness.

Collaborative clinical-community programs typically rely upon screening and referral services from clinicians. Referrals may take place in primary care clinics, which screen and then refer patients directly to partner community weight management programs, taking place in federally qualified health centers, YMCAs, local parks, schools, and other accessible community sites (Fiechtner et al., 2018; Messiah et al., 2016). Primary care physicians may also refer to community programs embedded directly within the clinic setting (Tripicchio et al., 2018). Additionally, primary care providers may screen for obesity and refer patients to specialized weight management facilities, as is the recommendation in stage three treatment, comprehensive multidisciplinary care (Pietrobelli et al., 2009). The specialized weight management facilities may serve as recruitment sites for community programs meeting the criteria. This can be seen in the partnership between Duke Healthy Lifestyles clinic and Durham Parks and Recreation's Bull City Fit program (Hoffman et al., 2018). In this case, the specialized weight management clinic referred/recruited patients to the collaborative program to achieve the recommended contact hours (Hoffman et al., 2018). Screening and referral may also occur in the school setting. School nurses may conduct BMI screenings and refer children to community programs meeting the criteria (Kelleher et al., 2019).

Although there are a variety of possible referral mechanisms, patients referred from individual providers, specialty clinics, and community wellness clinics may have greater odds of attending weight management programs when compared to patients

referred by primary care providers (Alexander et al., 2021). Additionally, greater attendance can be seen in cohort-based programs when compared with open enrollment (Alexander et al., 2021). Effective communication is essential in clinical-community interventions, so strategies to improve communication, such as providing a connector, clinical champion, or referral coordinator, may be used (Alexander et al., 2021). A referral coordinator may manage referrals for physicians, enroll participants, schedule visits, and track participation, ultimately facilitating the linkage between clinical and community partners through streamlined referral processes (Tripicchio et al., 2018). This supplemental strategy has been found to contribute to program success (Tripicchio et al., 2018). In addition to creating a streamlined referral system, coordinators may facilitate interactions between practices, community programs, and families, improving communication (Ariza et al., 2013). Clinicians have conveyed satisfaction with the use of referral coordinators in this way (Ariza et al., 2013).

2.7 Treatment of Obesity in Children and Adolescents

The AAP previously outlined four treatment stages for children who have overweight or obesity (Barlow & Committee, 2007). The recommended stages are as follows: (1) prevention plus, (2) structured weight management, (3) comprehensive multidisciplinary intervention, and (4) tertiary care intervention/treatment (Pietrobelli et al., 2009). Stage 1, prevention plus, focuses on promoting healthy lifestyle activities, intending to eventually reduce BMI percentile (Brown & Perrin, 2018). This stage emphasizes care coordination through the chronic care model and patient-centered medical home (PCMH) (Brown & Perrin, 2018). The chronic care model framework emphasizes the necessity of support from school, family, community, and the medical

system. PCMH similarly incorporates community support and delivers primary care in a family-centered manner (Brown & Perrin, 2018). Motivational interviewing is a strategy used within the prevention plus stage (Brown & Perrin, 2018).

The next stage, structured weight management, involves further structure, goal setting, and multidisciplinary care, incorporating dietitian services and physical/exercise therapists; referrals for community resources are required (Brown & Perrin, 2018). Stage 3, comprehensive multidisciplinary care, includes care provided by a physician, registered dietitian, physical/exercise therapist, and behavioral counselor, with visits weekly for 8 to 12 weeks and then monthly (Brown & Perrin, 2018). Tertiary care includes weight loss medications and surgeries (Brown & Perrin, 2018). Structured weight management, comprehensive multidisciplinary intervention, and tertiary care interventions may prove difficult to implement due to barriers including insufficient time, lack of supporting resources/providers to refer patients to, lack of availability in rural areas, and challenging intensive engagement (Brown & Perrin, 2018).

The AAP released updated clinical practice guidelines (CPG) in 2023. Similar to previously established guidelines, the updated CPG recommends pediatricians and other pediatric care providers treat overweight and obesity in children and adolescents following PCMH and the chronic care model (care coordination models), using a family-centered and non-stigmatizing approach acknowledging obesity's various drivers (Hampl et al., 2023). The updated guidelines convey the importance of multilevel care, stating that obesity treatment should be delivered by healthcare providers in collaboration with community partners as well as other healthcare specialists (Hampl et al., 2023).

Another similarity between previously established and new guidelines includes the importance of motivational interviewing, intensive health behavior and lifestyle treatment (IHBLT) referral after the age of 2 years, and eventual pharmacology treatment methods and bariatric surgery referral if necessary (dependent on severity) (Hampl et al., 2023). IHBLT, the most effective known behavioral treatment, includes nutrition, physical activity, and behavior change support delivered through collaboration among pediatric healthcare providers, specialists, and community partners (Hampl et al., 2023). The effectiveness of IHBLT increases with greater contact hours and is most effective when ≥26 hours of treatment is provided over a 3-12 month period (Hampl et al., 2023). The new guidelines consider the impact of social determinants of health on obesity outcomes (Hampl et al., 2023). The guidelines promote a holistic approach, considering the child's health status, family and community contexts, and resources, thus producing an individualized intervention strategy (Hampl et al., 2023).

2.7.1 Community Care

As previously mentioned, the chronic care model framework emphasizes the necessity of support from school, family, and community as well as the medical system (Brown & Perrin, 2018). The chronic care model requires patient-centered care to be delivered within existing community systems considering household/familial influences, access to resources (nutritious foods and environmental influences), as well as other social determinants of health (Hampl et al., 2023). The importance and necessity of community resource referral can be seen in all levels of treatment and is recommended in updated AAP guidelines.

Community programs may supplement recommended clinical treatment hours, using strategies recommended by the AAP and USPSTF, ultimately providing specialized, accessible care to patients who experience barriers to treatment. This is of particular importance in rural communities where meeting the recommended frequency of care is especially difficult, with reduced accessibility to both primary and specialty care due to decreased healthcare providers as well as geographic and transportation-related barriers (Bettenhausen et al., 2021). Specialized weight management centers are less accessible in rural communities, making clinical-community collaboration a possible strategy to combat childhood obesity within this population (Bettenhausen et al., 2021; Bolin et al., 2015; Findholt et al., 2013; Shaikh et al., 2011).

2.8 Clinical-Community Collaborative Approaches

Clinical-community collaboration has been shown to be a promising strategy for increasing contact hours and enhancing patient care. A study evaluating the effectiveness of an integrated clinic-community partnership in treating childhood obesity concluded that collaboration was a feasible approach to care delivery (Hoffman et al., 2018). The study found that an integrated clinic-community model provides more treatment hours, improved physical activity, and improved quality of life compared to multidisciplinary treatment alone (Hoffman et al., 2018). Through this collaborative model, clinicians performed medical screenings and treatment while community partners provided facilities to deliver physical activity sessions, cooking classes, and group activities for participants (Hoffman et al., 2018). This study was successful in the development of a clinical-community partnership, supporting treatment through increasing contact hours and accessibility; collaboration was established between a specialized weight

management clinic and local parks and recreation department (Hoffman et al., 2018). Upon revisiting this project, it was found that the integrated clinical-community treatment model may have positive long-term benefits for children with obesity in terms of BMI and health behaviors (Pasquale et al., 2020). This conveys the sustainability of a collaborative approach.

2.8.1 School-Based

Collaborative approaches can be conducted using resources in various community settings. School-based clinical-community partnerships may be a strategy to increase contact hours, as children spend most of their time in the school setting. Additionally, schools typically employ healthcare providers (registered nurses). A study using this strategy assessed the impact of a school nurse-delivered obesity prevention intervention on weight status among children (Kubik et al., 2021). The study concluded that delivery approaches that incorporate clinician and school-nurse collaboration should be considered (Kubik et al., 2021). Another collaborative intervention coordinated care between pediatricians, parents/caregivers, and children, allowing pediatrician referral to an evidence-based park-based afterschool program (Messiah et al., 2016). Both school/afterschool interventions were conducted to reduce barriers to receiving care using a coordinated approach (Kubik et al., 2021; Messiah et al., 2016).

2.8.2 Primary Care

Clinical-community collaboration was found to be feasible in the primary care setting as well. Specialized weight management facilities are not readily available in rural areas (Bettenhausen et al., 2021; Bolin et al., 2015; Findholt et al., 2013; Shaikh et al.,

2011); however, primary care offices are a possible setting for accessible care delivery. A study assessing the impact of a family-based treatment program within the primary care setting concluded that "clinical-community partnerships might be a promising strategy to improve retention and reduce child weight status" in underrepresented populations (Tripicchio et al., 2018, p. 141). Another study evaluated evidence-based programs embedded in primary care, finding that parenting programs focusing on behavioral and physical health are appropriate for the primary care setting (Berkel et al., 2020). The family-based and parenting programs described may help to reduce barriers and health disparities in rural communities. In4Kids, integrating dietitian services in the primary care setting, is another program that may reduce barriers by facilitating structured weight management in the primary care setting (Silberberg et al., 2012).

2.8.3 Telehealth

Additionally, telehealth services are a promising solution to improve the accessibility of specialized care. Patients are more likely to receive the recommended care and contact hours when specialized care is delivered in more convenient community settings (e.g. primary care offices) (Marcin et al., 2016). One such program is TeleFIT, in which pediatric offices installed telemonitors on site, linking a specialized multidisciplinary pediatric obesity clinic (Brenner FIT) to a rural pediatric clinic (Irby et al., 2012). The program resulted in positive outcomes, including similar attrition rates and improvements in weight status when compared to patients in conventional, onsite treatment (Irby et al., 2012).

Telehealth services may improve health behaviors while reducing barriers to accessing care (Bettenhausen et al., 2021; Irby et al., 2012). Through the use of

telehealth, clinicians are able to conduct live consultations, transmit medical images, and monitor chronic diseases in rural children who typically must travel great distances to receive specialized care (Bettenhausen et al., 2021). Telehealth consultations may occur in community settings to ensure connectivity while remaining accessible to patients (Bettenhausen et al., 2021).

A study examining the effect of two clinical-community interventions on child BMI, child health-related quality of life, and parental resource empowerment found that telehealth interventions resulted in improvements in both child BMI and parent-reported outcomes for childhood obesity (Taveras et al., 2017). This study used a family-centeredness evaluation tool (mFCCA) that was examined in a separate study, which found that the tool exhibited good validity and reliability for family-centered care assessment; thus, individualized health coaching was found to be a family-centered approach to childhood obesity treatment (Simione et al., 2020). Family-centered care, supported by the AAP, fosters partnership among families and healthcare providers through respect, trust, open communication, and shared decision-making (Hampl et al., 2023; Simione et al., 2020). This finding is significant, as family-centered care is imperative for "improved clinical decision-making, better follow-through, and more effective communication," which results in improved outcomes and satisfaction (Simione et al., 2020, p. 1).

Health coaching was used in several studies to provide family-based behavioral childhood obesity intervention. One such study found high patient engagement and reported satisfaction with the offering of telehealth services (health coaching, text messaging, and resource guide), which conveys the feasibility of using telehealth to

supplement care for children with obesity (Bala et al., 2019). Telehealth services have been used to deliver pediatric weight management care in both urban and rural settings, reducing barriers to obtaining adequate treatment, such as transportation, time, and financial challenges (DeSilva & Vaidya, 2021). Lack of access to dietitians and weight management clinics makes meeting USPSTF recommendations difficult; however, telehealth may improve access to specialized care through the reduction of logistical barriers as aforementioned (DeSilva & Vaidya, 2021). Telemedicine sessions targeting pediatric weight management have been conducted in community clinics and schools, as well as direct contact (DeSilva & Vaidya, 2021). Telehealth is a promising strategy for supporting and linking clinical care with community resources, which is significant for those in rural communities facing health disparities.

2.9 Public Health Impact

Childhood obesity is a significant public health concern within the United States, impacting about 14.7 million children and adolescents (CDC, 2022b). Childhood obesity is associated with psychological and physical health consequences (Sanyaolu et al., 2019). Potential adverse psychological outcomes of childhood obesity are anxiety, depression, poor self-esteem, reduced health-related quality of life, and behavioral as well as learning difficulties (Halfon et al., 2013; Kumar & Kelly, 2017; Morrison et al., 2015; Sanyaolu et al., 2019). Negative physical health outcomes include insulin resistance, type 2 diabetes, hypertension, dyslipidemia, asthma, obstructive sleep apnea, precocious puberty, orthopedic complications, and nonalcoholic fatty liver disease (Kumar & Kelly, 2017; Lakshman et al., 2012; Sanyaolu et al., 2019; Skinner et al., 2010). Pediatric

obesity increases the risk of adulthood obesity and thus increases the risk of future poor health outcomes (Ogden et al., 2010; Sanyaolu et al., 2019).

The etiology of childhood obesity is highly complex, as there are multiple contributing factors. Some obesogenic behavioral factors include diet, physical activity, sleep, and screen time (Smith et al., 2020). These behaviors are influenced by interconnected variables, including poverty/socioeconomic status, genetics, environment, community, and interpersonal relationships (Smith et al., 2020). The obesity epidemic disproportionately affects racial/ethnic minorities as well as those residing in rural areas (Johnson III & Johnson, 2015; Krueger & Reither, 2015). These etiologies, contributing factors, and health disparities make childhood obesity difficult to treat through clinical care alone. A multifaceted approach may be warranted, emphasizing accessible, low-cost interventions that target low-SES and minority populations (Krueger & Reither, 2015).

Childhood obesity (measured using BMI) may result in adverse mental and physical health outcomes and is associated with obesity in adulthood, and thus, serious health risks later in life (Sahoo et al., 2015; Simmonds et al., 2016). The AAP recommends annual BMI screening for children ages 2 and older and provision or referral of children with overweight/obesity to IHBLT (≥26 contact hours) (Barlow & Committee, 2007; Brown & Perrin, 2018; Hampl et al., 2023). Additionally, the USPSTF recommends screening for children ages ≥6 years and referring to comprehensive, intensive behavioral interventions (≥26 contact hours) (Grossman et al., 2017). Obtaining the recommended ≥26 contact hours may be difficult, especially for children facing health disparities in rural communities (Srivastava et al., 2021).

The AAP recommends collaboration among healthcare systems and community organizations to "expand access to evidence-based pediatric obesity treatment programs and to increase community resources that address social determinants of health in promoting healthy, active lifestyles" (Hampl et al., 2023, p. 4). Integrated community-based services with healthcare is a recommended treatment delivery method for improving access and achieving recommended USPSTF contact hours (Wilfley et al., 2017). Clinical-community collaboration may increase referrals to programs meeting recommended contact hours by increasing clinician awareness (Alexander et al., 2021).

Implementation of an integrated clinical-community model should be considered, as it is a feasible care delivery method and may improve weight status as well as other health-related outcomes (Hoffman et al., 2018; Tripicchio et al., 2018; Wilfley et al., 2017). These linkages may require additional resources, such as referral coordinators, to be successful (Alexander et al., 2021). There are a variety of possible community partners dependent on setting and accessibility. Childhood obesity interventions using a clinical-community collaborative approach in the rural setting should be conducted with use of the resources and strategies suggested by previous research. The prevalence and consequences of obesity in childhood and adolescence, as well as the promise of current clinical-community collaborative approaches, make further research regarding this strategy necessary in effectively combatting the pediatric obesity public health crisis and diminishing rural health disparities.

CHAPTER 3. METHODOLOGY

3.1 Study Design and Setting

This qualitative study with secondary data analysis was designed to assess strategies for improving outcomes associated with childhood obesity using a clinical-community collaborative approach as well as how best to implement the strategies within a specific rural, Appalachian community. A narrative review was conducted to complete aims 1 and 2: examining existing literature related to screening approaches as well as comprehensive behavioral interventions to reduce childhood obesity, connecting clinical care with community settings. Summary statistics were utilized to complete these aims. Structured interviews were then conducted to achieve aim three: investigating barriers, facilitators, and key setting components for effective program implementation. This study is a supplemental project through the Centers for Disease Control and Prevention High Obesity Program (HOP). The research was conducted in Martin County, Kentucky, a rural community in eastern, KY.

Martin County experiences reduced resources, geographic isolation, socioeconomic issues, and rural health disparities due to barriers in receiving specialized health care. These attributes can be seen in the table of key characteristics (table 3.1). The tentative clinical-community family-centered healthy weight program will be implemented among all counties indicated on figure 3.1. These include Bell, Knox, Floyd, McCreary, Martin, Clinton, Grayson, Logan, Pendleton, and Hopkins. Table 3.1 describes resources within each of these communities. Martin County is being used for research purposes, as it shares characteristics seen among the indicated counties. As conveyed on the table, Martin County has a population of 11,287, of which almost half (41%) are below the

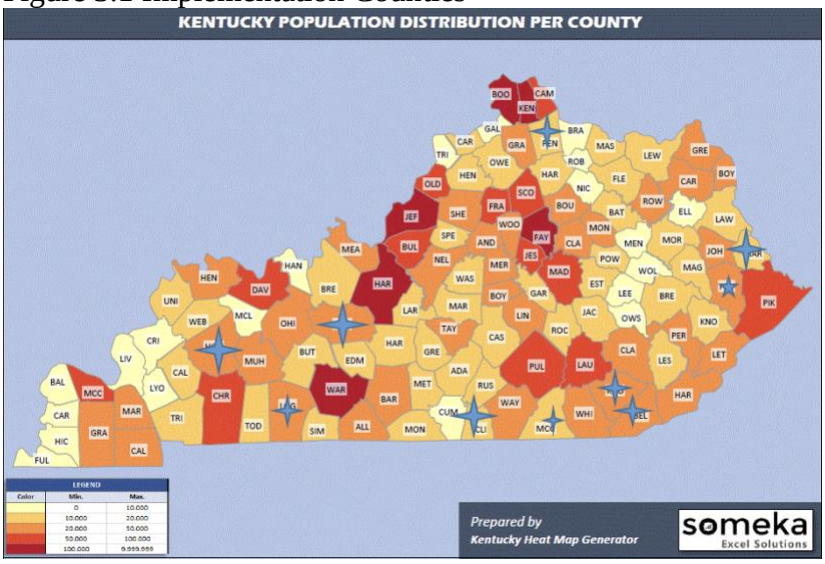
poverty line. Martin County has two grocery stores and no farmers' market; 19% of the population are food insecure, meaning they lack consistent access to adequate nutritious food (U.S. Department of Agriculture, 2022). The county has only one Appalachian Regional Healthcare (ARH)/clinic. The closest specialized pediatric weight management clinic is located in Lexington, KY, which is 140 miles from the county seat of Inez, Kentucky. Research was conducted in Martin County to inform the development of a family-centered healthy weight program, so that it may be effectively implemented throughout other communities that share attributes and experience similar barriers (counties depicted on figure 3.1/resources described on table 3.1).

Table 3.1 Description of Counties and Resources

County Name	Pop	White (%)	Poverty (%)	PI (%)	Food Insecurity (%)	# Grocery Stores/ Food City (FC)	Farmers Markets	# Food Pantries	Prescription/ Vouchers	Coalition	# ARH or Other Clinics
Bell	24,097	93	32	40	20	8 stores 2 FC	no	3	yes – OK FARMACY	yes – ARH	1
Knox	30,193	95	35	38	21	3 stores 0 FC	yes	3	Double Dollars	yes – ARH	2
Floyd	35,942	97	28	36	20	3 stores 1 FC	yes	2 or 3	no	yes – ARH	4
McCreary	16,888	91	34	41	19	3 stores 0 FC	no	2	no	no	2
Martin	11,287	91	41	34	19	2 stores 0 FC	no	3	no	yes	1
Clinton	9,253	95	23	38	16	3 stores 0 FC	yes	1 or 2	no	yes	2
Grayson	26,420	94	18	36	16	3 stores 0 FC	yes	2	yes – farmers market	yes	1
Logan	27,432	87	17	32	12	4 stores 0 FC	yes	3	Senior vouchers	yes	3
Pendleton	14,644	95	15	32	14	2 stores 0 FC	yes	2	no	yes	2
Hopkins	45,423	87	19	33	15	5 stores 0 FC	yes	3	no	no	1

Sources: Kentucky Census, Behavioral Risk Factor Surveillance System (Kentucky County Health Rankings), Map the Meal Gap, USDA ERS and Farmers Market AG Department, Community stakeholders report
Note(s): All percentage values are rounded, PI indicates Physical Inactivity

Figure 3.1 Implementation Counties



3.2 AIMS 1 & 2: Key Word Search

A narrative review utilizing summary statistics was completed to examine existing literature related to screening approaches as well as comprehensive behavioral interventions to reduce childhood obesity, connecting clinical care with community settings. PubMed was used as the database for obtaining articles. For screening approaches, key search terms used were “screening pediatric obesity”. Using these terms, 6,192 articles were displayed. All articles not obtained directly through the key word search were obtained indirectly through reviewing “similar articles” on PubMed or reviewing references within previously discovered articles. The number of articles found this way was not quantified. Screening articles reviewed can be seen in table 4.1.

For screening approaches, articles were included that involved screening for obesity in a pediatric population. Studies that incorporated obesity screening and referral to community programs or programs promoting accessible treatment were included. In

addition, articles providing screening recommendations, methods, and protocols were included. Articles were excluded that did not involve screening for pediatric obesity.

PubMed database was also used to obtain relevant articles for review of intervention publications. Key search terms used for intervention approaches were "childhood obesity and intervention and community and clinical," which resulted in 1,056 articles displayed. The terms "intervention childhood obesity clinical community combined" resulted in 79 articles. "Childhood obesity clinical community program" resulted in 581 articles. The terms "clinical community partnership childhood obesity intervention" resulted in 58 articles displayed. "Primary care and community partnership children overweight obese" displayed 36 articles. "Pediatric overweight obesity primary care community program intervention" displayed 164 articles. "Obesity pediatric clinical care community program" displayed 225 articles. "Clinical-community childhood obesity intervention" displayed 7 articles. "Primary care prevention treatment childhood obesity clinic and community-based" displayed 27 articles. "Community engagement pediatric obesity clinicians" displayed 11 articles. "Integration of clinical community treatment childhood obesity" displayed 100 articles. "Tertiary care and school interventions childhood obesity" displayed 114 articles. "Tertiary care and community interventions childhood obesity" displayed 17 articles. "Clinical community intervention access childhood obesity" resulted in 82 articles. Much like with screening approaches, all articles not obtained directly through the key word search were obtained indirectly through reviewing "similar articles" on PubMed or reviewing references within previously discovered articles. The number of articles found this way was not quantified. Intervention articles reviewed can be seen on table 4.2/4.3.

Articles were included that incorporated clinical-community collaborative pediatric weight management interventions, family-based interventions, programs linking specialized services to rural communities, or strategies that used innovative methods that reduce barriers to health care delivery (ex: telehealth initiatives in rural communities). Articles excluded were those that were clinical treatment only, community treatment only, or not focused on the pediatric population/families. PRISMA formatting was utilized for methodology (Page et al., 2021).

3.3 AIM 3: The Consolidated Framework for Implementation Research

The Consolidated Framework for Implementation Research (CFIR) is a theoretical framework designed to identify factors that may influence intervention implementation (Damschroder et al., 2009; Keith et al., 2017). We used CFIR to guide the development of our implementation plan of a clinical-community collaborative pediatric weight management intervention to reduce barriers of care in a rural community.

CFIR includes a variety of constructs within five domains: intervention characteristics, outer setting, inner setting, characteristics of individuals, and process of implementation (Damschroder et al., 2009). The constructs within CFIR were developed using existing published implementation theories and have since been updated to reflect user consensus feedback (Damschroder et al., 2022). CFIR may inform future implementation strategies, predict implementation outcomes, or explain implementation outcomes post-intervention by examining factors within implementation settings (Damschroder et al., 2022). Using CFIR, researchers may select relevant constructs to guide implementation context assessments, evaluate progress, and help explain research findings (Damschroder et al., 2009).

According to the updated CFIR article, respondents used CFIR in healthcare and public health settings most often (Damschroder et al., 2022). CFIR was used for various purposes, including guiding data collection, data analysis, data interpretation, and designing implementation strategies (Damschroder et al., 2022). CFIR can be applied at any implementation phase (pre-, during, or post-implementation). A review evaluating CFIR application in implementation research showed that most users employed mixed or qualitative methods and used CFIR post-implementation (Kirk et al., 2015). Common qualitative methods utilizing CFIR included key informant interviews and focus groups (Kirk et al., 2015). Pre-implementation use of the framework is most appropriate for our purposes of investigating barriers and facilitators to implementation.

CFIR has been widely used in studies to guide the implementation of programs focused on reducing barriers to healthcare. One such study examined telehealth use for obesity treatment in rural settings using CFIR to evaluate barriers and facilitators to program participation, implementation, and delivery (Batsis et al., 2020). The study aimed to provide contextual information in the pre-implementation phase to assist in future rural obesity care delivery, which is similar to the strategy used in our research (Batsis et al., 2020). In addition to telehealth programs, CFIR has been used to guide clinical-community interventions specific to pediatric obesity treatment. One such study used CFIR to engage stakeholders to inform the development of a successful pediatric weight management intervention (PWMI) and to identify barriers and facilitators to implementation and dissemination (Persaud et al., 2022). Within this study, the CFIR interview guide was modified to fit PWMIs; interviews using the revised guides were conducted during the pre-implementation period (Persaud et al., 2022). This study

completely aligns with our use of CFIR and has similar program characteristics (pediatric weight management intervention). The use of the Consolidated Framework for Implementation Research in each of these studies conveys the feasibility of use within our research.

The aims of our study are to examine existing literature related to screening as well as comprehensive behavioral interventions to reduce childhood obesity using a clinical-community collaborative approach and to define barriers, facilitators, and key setting components for the delivery of a comprehensive behavioral intervention. Although examining existing literature provides information regarding these intervention delivery approaches, each setting has diverse characteristics and, thus, differing barriers and facilitators. Further understanding of barriers, facilitators, and setting characteristics is imperative to determine how best to implement the intervention. CFIR is a widely used and researched implementation assessment tool, which provides consistent definitions within constructs, assisting in greater understanding and organization of findings (CFIR, n.d.-b). As previously described, many similar programs have used CFIR as an implementation tool in this way. By using the CFIR implementation tool, we will be able to understand barriers, facilitators, and setting components and thus ensure more effective delivery of a clinical-community pediatric weight management program. By obtaining the necessary data during the pre-implementation phase, we may inform future strategies to increase intervention effectiveness.

3.4 AIM 3: Development of CFIR-based Interview Guides

The Consolidated Framework for Implementation Research was used during the pre-implementation period. We aimed to investigate barriers/facilitators to

implementation of an evidence-based program, Mind, Exercise, Nutrition… Do it! 2-5 (MEND 2-5); thus, pre-implementation CFIR use was most appropriate for our purposes (Kirk et al., 2015). CFIR guided in our aim of identifying and defining barriers, facilitators, and key setting components for program delivery among key stakeholders. We used the interview guide tool and selected applicable domains and constructs (CFIR, n.d.-a). Stakeholders were separated into three groups: implementation partners, community partners, and individuals. Implementation partners included healthcare and extension workers assisting in future program implementation; community partners included community members currently working with the population of interest (children 2-5 years of age); and individuals included parents/caregivers of children 2-5 residing in the community (Martin County, Kentucky).

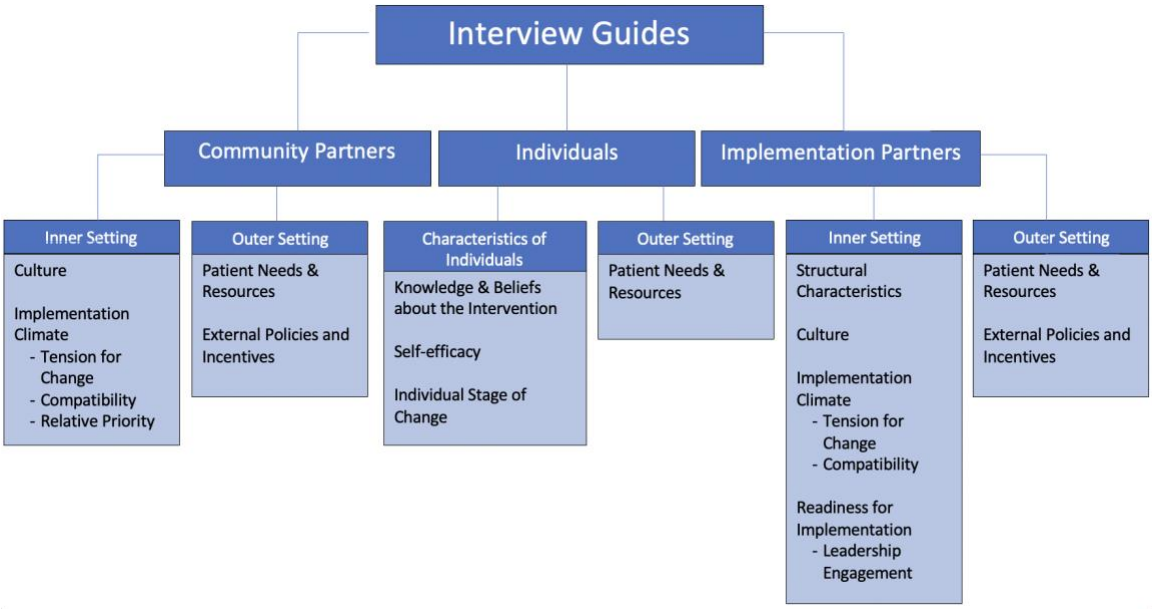
A separate guide with relevant constructs was developed for each group (Figure 3.2 Conceptual Model). We individualized the domains and constructs to each group, only including interview questions that were applicable to their role. After choosing relevant domains and constructs for each guide, the interview guide questions were modified to assist in comprehension and application among stakeholders. After the initial choosing of applicable domains and constructs and modification of interview questions, we wrote interview scripts for each guide. The scripts included necessary research information as well as a brief overview of what the proposed program, MEND 2-5, would entail.

The Community Partners interview guide included both Inner and Outer Setting domains. Inner setting constructs used were Culture and Implementation Climate. Implementation Climate sub-constructs used included Tension for Change,

Compatibility, and Relative Priority. Outer Setting constructs used for the Community Partners guide included Patient Needs & Resources and External Policies and Incentives. For the Individuals interview guide, Characteristics of Individuals domain was used, which included Knowledge & Beliefs about the Intervention, Self-efficacy, and Individual Stage of Change constructs. In addition, the Outer Setting domain was used, which included the Patient Needs & Resources construct. The Implementation Partners interview guide included both Inner and Outer Setting domains. Outer Setting included Patient Needs & Resources as well as External Policies and Incentives constructs. Inner Setting domain included Structural Characteristics, Culture, Implementation Climate, and Readiness for Implementation constructs. Sub-constructs under Implementation Climate included Tension for Change and Compatibility. Sub-constructs used under Readiness for Implementation included Leadership Engagement.

Figure 3.2 conveys the domains, constructs, and sub-constructs included in each interview guide. As previously stated, after choosing domains, constructs, and sub-constructs for each guide, the questions were modified to aid in understanding and individualization to each interviewee (individual, community member, implementor).

Figure 3.2 Conceptual Model



3.5 Data Collection and Analysis

The narrative review of literature was conducted on multiple dates through the months of September 2022 – December 2022. Common primary outcomes among research articles were listed and key results of outcomes reported. Summary statistics were utilized and reported. After the interview guides were developed and revised, they underwent IRB approval. The interviews were conducted through the month of April 2023. Structured interviews were conducted among implementation partners, community partners, and individuals (parents/caregivers). Interviewees/participants in all three categories were obtained through contacts utilized in previous projects completed through the CDC HOP.

Implementation partners included healthcare workers and extension workers that will assist in implementation of the tentative collaborative family-centered healthy weight program within the community. Community partners included members of the

community currently working with the population of interest (children in the 2–5-year age range). Individuals interviewed included parents/caregivers residing in Martin County, Kentucky. Snowball sampling was utilized for parent/caregiver participation.

Six interviews were conducted total by a graduate student. Interviewees included one individual, one community partner, and four implementation partners, meeting the goal of at least one interview for each category/role. The interviews lasted 10-25 minutes and were conducted and recorded through Zoom. The resulting audio recording was submitted on Rev to produce a transcript (Rev, n.d.). The interview transcripts were then analyzed using NVIVO software (Lumivero, 2022). Using the data provided by NVIVO, a thematic analysis was conducted by a graduate student using inductive coding methods.

CHAPTER 4. RESULTS

4.1 AIM 1: Examine existing literature related to screening approaches to reduce childhood obesity, connecting clinical care with community settings

Articles assessed included research studies as well as reviews, guidelines, and recommendation statements. BMI measures, screening practices, and referral practices were common outcomes among articles. BMI measures were reported on in 3 studies, screening practices were reported on in 7 studies, and referral practices were reported on in 4 studies. Key results of each outcome can be seen in table 4.1. Participants were most often screened by clinicians, including medical providers available at the specified sites (e.g. school nurses). Screening recommendations in the articles included using BMI as a screening tool, including use of BMI percentiles, and the use of behavioral screening (screening based on lifestyle factors). Many screening recommendations aligned with USPSTF recommendations (screening children ages 6 years and older using BMI measurement) (Grossman et al., 2017). Key results showed referral to be rare/difficult in the majority of studies examined that included referral outcomes.

Table 4.1 Screening Review

Article Citation (Author, date)	Article Objective	Study Design/Article Type	BMI	Screening practices	Referral practices	Key results	Screening Recommendations	Screened by:
(Armstrong et al., 2018)	Pediatric weight management intervention	2-group RCT	1	0	0	BMI: no change	N/A	Clinicians
(Grossman et al., 2017)	USPSTF recommendations	Recommendation Statement	N/A	N/A	N/A	N/A	USPSTF recommendations	N/A
(Imoisili et al., 2019)	Adherence to USPSTF recommendations	Cross-sectional study	0	1	1	Screening: Majority of health providers screen children for obesity as recommended by USPSTF, Referral: Only half of providers refer children with obesity to WMP	USPSTF recommendations	Clinicians
(Jin, 2017)	USPSTF recommendations	Patient Page	N/A	N/A	N/A	N/A	USPSTF recommendations	N/A
(Kelleher et al., 2019)	Pediatric weight management intervention (referral assessment)	Qualitative (utilized semi-structured interviews and draw-and-write)	0	0	1	Referral: PHN experienced difficulties	Provision of screening tools for families recommended	School PHNs

Table 4.1 Cont.

(Krebs et al., 2007)	Pediatric obesity screening assessment	Supplement Article	N/A	N/A	N/A	N/A	BMI and behavioral screening recommended	N/A
(Kubik et al., 2021)	Pediatric weight management intervention	RCT	1	0	0	BMI: no improvement	N/A	Clinicians
(Madsen, 2011)	Pediatric obesity screening assessment (school-based screening)	Statewide natural experiment	1	0	0	BMI: no change	School-based screening and parental report is not recommended	School-based
(O'Connor et al., 2017)	USPSTF recommendation assessment	Systematic Review	N/A	N/A	N/A	N/A	USPSTF recommendations	N/A
(H. J. Smith et al., 2021)	USPSTF recommendation assessment	Special Article	N/A	N/A	N/A	N/A	USPSTF recommendations	N/A
(Staiano et al., 2017)	Evaluation of childhood obesity screening and treatment practices	Cross-sectional study	0	1	1	Screening: Obesity and T2DM screening were common, Referral: referral and provision of weight management services for children with obesity remained rare among pediatric	USPSTF recommendations	Clinicians

Table 4.1 Cont.

						healthcare providers		
(Styne et al., 2017)	Clinical practice guidelines	Clinical Practice Guideline	N/A	N/A	N/A	N/A	BMI screening recommended	N/A
(Van Cleave et al., 2012)	Assessment of pediatric obesity screening and follow-up services	Review	0	1	0	Screening: Several interventions appear to be effective in increasing the quality of screening in pediatric primary care	BMI screening recommended	N/A
(Whitlock et al., 2005)	USPSTF recommendation assessment	Summary of Evidence	N/A	N/A	N/A	N/A	BMI screening recommended	N/A
(Polacsek et al., 2009)	Pediatric weight management intervention	Nonrandomized controlled trial	0	1	0	Screening: Increased BMI assessment, BMI percentile for age and gender, use of behavioral screening tool and weight classification	BMI and behavioral screening recommended	Clinicians

Table 4.1 Cont.

(Pomietto et al., 2009)	Pediatric obesity quality improvement	Case study	0	1	1	Screening: Increased BMI measurement and weight classification, Referral: Increased	BMI screening recommended	Clinicians
(Dunlop et al., 2007)	Evaluation of childhood obesity screening and treatment practices	pretest-posttest	0	1	0	Screening: Improved documentation of recommended practices	BMI and behavioral screening recommended	Clinicians
(Flower et al., 2007)	Evaluation of barriers and facilitators to BMI screening for pediatric obesity	Qualitative	0	1	0	Screening: Barriers included low access to BMI charts and inaccurate anthropometric data and facilitators included automatic BMI incorporation into EMR systems	BMI incorporation into EMR recommended	Clinicians
			3	7	4			

4.2 AIM 2: Examine existing literature related to comprehensive behavioral interventions to reduce childhood obesity, connecting clinical care with community settings

A total of 32 articles related to comprehensive behavioral interventions to reduce childhood obesity, connecting clinical care with community settings, were examined. BMI, parent BMI, diet, physical activity, quality of life, and sleep/sleep quality were common outcomes among the articles. BMI was reported on in 24 studies, parent BMI was reported on in 7 studies, diet was reported on in 17 studies, physical activity was reported on in 16 studies, quality of life was reported on in 9 studies, and sleep/sleep quality was reported on in 7 studies. Key results of each outcome can be seen in table 4.3, while other descriptors can be seen in table 4.2. Altogether, 25 of the 32 articles described family-centered interventions. Clinical referral was seen in 23 studies. The majority of studies reporting improvements in outcomes included both clinical referral and family-centered interventions. Sample BMI for the studies ranged from underweight to obese; however, the BMI range most common among the studies was the overweight/obese category. Locations included various community sites. Interventions included text message support, telehealth, family-based behavioral interventions, parent-centered, prevention, and clinical-community collaboration.

Table 4.2 Intervention Review

Article Citation (Author, date)	Sample Size	Ages	Location of Study	Clinical referral	Intervention type	Study/intervention Design	Sample BMI range	Family
(Alexandrou et al., 2023)	552	2.5 to 3 years	Telehealth	1	Text message support	Type 1 hybrid effectiveness-implementation RCT	N/A	0
(Andrews et al., 2018)	171	2-17 years	Parks and recreation facility + weight management clinic	1	Clinical-community partnership	Mixed-methods retrospective cohort analysis	BMI ≥95th percentile	1
(Ariza et al., 2013)	46	2-17 years	Health center, private practices, health department, parks, YMCA, extension office, camps	1	Clinical-community partnership (utilizing practice community coordinator)	Cross-sectional study	Overweight/obese	0
(Armstrong et al., 2020)	270	5-18 years	Clinic + community center	1	Clinical-community partnership	RCT (study protocol)	BMI ≥95th percentile	1
(Armstrong et al., 2018)	101	5-12 years	Pediatric weight management clinic	1	Text message support with standard care	2-arm, parallel-group, single-blinded RCT	BMI ≥95th percentile	1
(Bala et al., 2019)	721	2-12 years	Community health center + telehealth	1	Telehealth	RCT	BMI ≥85th percentile	1

Table 4.2 Cont.

(Barlow et al., 2021)	392	2-18 years	YMCA	1	Clinical-community partnership	Mixed-methods retrospective analysis	N/A	1
(Berkel et al., 2020)	240	6-12 years	FQHC	1	Parent-centered intervention	Type 2 hybrid effectiveness implementation trial	Elevated BMI	0
(Esquivel et al., 2020)	34	2-17 years	Pediatric clinic + farmers market	0	Clinical-community partnership	Qualitative analysis	Poor nutrition based on growth assessment or BMI percentile above 85 or below 5	1
(Fiechtner et al., 2018)	400	6-12 years	FQHC or YMCA	1	Clinical and community evidence-based interventions	RCT (study protocol)	BMI ≥85th percentile	1
(Gorin et al., 2014)	150	2-4 years	Clinic + home visits	0	Clinical-community partnership (utilizing community health worker)	RCT (study protocol)	N/A	0
(Hoelscher et al., 2015)	1614, 576	2-12 years	Clinic, school, various community locations	0	Primary and secondary prevention intervention	Quasi experimental and RCT (study design)	Overweight/obesity	1
(Hoffman et al., 2018)	97	5-11 years	Parks and recreation facility	1	Clinical-community partnership	Prospective, 2-group, nonblinded, RCT	BMI ≥95th percentile	1
(Irby et al., 2012)	35	2-18 years	Pediatric clinics	1	Telehealth	Retrospective cohort	BMI ≥95th percentile	1

Table 4.2 Cont.

(Kubik et al., 2021)	132	8-12 years	School or home visits	0	School nurse-delivered, secondary obesity prevention intervention	RCT	BMI ≥75th percentile	1
(Kummer et al., 2021)	44	5-11 years	Telehealth	0	Telehealth	Mixed-methods, parallel group RCT (study protocol)	Overweight/obese	1
(Lek et al., 2021)	155	4-19 years	Various community locations	1	Clinical-community partnership (utilizing health coach)	Prospective, longitudinal cohort study	Overweight/obese	1
(Messiah et al., 2016)	50	6-14 years	Pediatric clinics + local parks	1	Clinical-community partnership	Prospective, cohort study	BMI ≥85th percentile	1
(Partridge et al., 2020)	150	13-18 years	Telehealth	1	Text message support	Single-blind RCT (study protocol)	Overweight	0
(Pasquale et al., 2020)	97	5-11 years	Parks and recreation facility + weight management clinic	1	Clinical-community partnership	Qualitative retrospective analysis	BMI ≥95th percentile	1
(Rieder et al., 2018)	35	11-14 years (6th-8th grade)	School	0	Clinical-community partnership	Quasi experimental	N/A	0
(Savage et al., 2018)	290	≥37 weeks gestation to 6 months old	Primary care + WIC clinics	0	Parent-centered intervention	RCT (study protocol)	N/A	0

Table 4.2 Cont.

		(mother-infant dyad)						
(Schwartz et al., 2012)	42	6-11 years	YMCA	0	Family-based behavioral treatment	Pilot study	BMI >85th percentile	1
(Shaikh et al., 2014)	288	2-11 years	Primary care clinics	1	Telehealth	Prospective observational pre-post study	Overweight/obese	1
(Sherwood et al., 2015)	60	2-4 years	Primary care clinic + telephone coaching	0	Family-based behavioral treatment	RCT	BMI 50th-85th percentile (with at least one overweight parent)	1
(Simione et al., 2020)	721	2-12 years	Clinic + telephone or in-person visits with health coach	1	Clinical-community partnership	RCT	BMI ≥85th percentile	1
(J. D. Smith et al., 2021)	240	6-12 years	FQHC	1	Family-based behavioral treatment	Type 2 hybrid effectiveness-implementation randomized trial	BMI ≥85th percentile	1
(Stark et al., 2018)	151	2-5 years	Clinic + home visits	1	Family-based behavioral treatment	3-arm, parallel, RCT	BMI ≥95th percentile	1
(Taveras et al., 2017)	721	2-12.9 years	Clinic + telephone or in-person visits with health coach	1	Clinical-community partnership	2-arm, blinded, RCT	BMI ≥85th percentile	1
(Taveras et al., 2015)	750	2-12.9 years	Clinic + telephone or in-person visits with health coach	1	Clinical-community partnership (utilizing health coach)	2-arm, blinded, RCT (study design)	BMI ≥85th percentile	1

Table 4.2 Cont.

(Tripicchio et al., 2018)	46	2-16 years	Primary care clinic	1	Clinical-community partnership family-based behavioral treatment	Single-arm prospective study	BMI ≥85th percentile	1
(Wilfley et al., 2021)	208	5-12 years	Primary care clinic	1	Family-based behavioral treatment	Non-randomized multisite matched-comparison design (study protocol)	BMI ≥95th percentile	1
				23				25

Table 4.3 Intervention Review Outcomes and Key Results

Article Citation (Author, Date)	BMI	Parent BMI	Diet	Physical Activity	Quality of Life	Sleep/sleep quality	Key results
(Alexandrou et al., 2023)	1	0	1	1	0	0	BMI: no change, diet: improved, physical activity: no change
(Andrews et al., 2018)	0	0	0	0	0	0	N/A
(Ariza et al., 2013)	0	0	0	0	0	0	N/A
(Armstrong et al., 2020)	1	0	0	1	1	0	N/A
(Armstrong et al., 2018)	1	1	0	0	0	0	BMI: no change, parent BMI: no change
(Bala et al., 2019)	0	0	0	0	0	0	N/A
(Barlow et al., 2021)	1	0	0	0	0	0	BMI: decreased (improved)
(Berkel et al., 2020)	0	0	0	0	0	0	N/A
(Esquivel et al., 2020)	0	0	0	0	0	0	N/A
(Fiechtner et al., 2018)	1	0	1	1	0	1	N/A
(Gorin et al., 2014)	1	0	1	1	0	0	N/A

Table 4.3 Cont.

(Hoelscher et al., 2015)	1	1	1	1	1	0	N/A
(Hoffman et al., 2018)	1	1	1	1	1	0	BMI: no change, parent BMI: no change, diet: increase in sugar intake, PA: improved, QOL: improved
(Irby et al., 2012)	1	0	0	0	0	0	BMI: no change
(Kubik et al., 2021)	1	0	1	1	1	0	BMI, diet, PA, QoL: no difference
(Kummer et al., 2021)	1	0	1	1	0	1	N/A
(Lek et al., 2021)	1	0	0	0	1	0	BMI: decreased (improved), QoL: improved
(Messiah et al., 2016)	1	0	0	0	0	0	N/A
(Partridge et al., 2020)	1	0	1	1	1	1	N/A
(Pasquale et al., 2020)	1	0	1	1	0	0	BMI: slightly increased, PA: increased, diet: improved
(Rieder et al., 2018)	1	0	1	0	0	1	N/A
(Savage et al., 2018)	0	0	1	0	0	1	N/A

Table 4.3 Cont.

(Schwartz et al., 2012)	1	0	1	1	0	0	BMI: decreased (improved), diet: improved, PA: increased (improved)
(Shaikh et al., 2014)	0	0	1	1	0	0	Diet: improved, PA: improved
(Sherwood et al., 2015)	1	1	1	1	0	0	BMI, parent BMI, diet, PA: no difference
(Simione et al., 2020)	0	0	0	0	0	0	N/A
(J. D. Smith et al., 2021)	1	0	1	1	0	1	BMI: no change, diet: improved, PA: improved, sleep: improved
(Stark et al., 2018)	1	1	0	0	0	0	BMI: decreased (improved), parent BMI: improved
(Taveras et al., 2017)	1	0	0	0	1	0	BMI: decreased (improved), QoL: improved
(Taveras et al., 2015)	1	0	1	1	1	1	N/A
(Tripicchio et al., 2018)	1	1	0	0	0	0	BMI: decreased (improved), parent BMI: no reduction
(Wilfley et al., 2021)	1	1	1	1	1	0	N/A
	24	7	17	16	9	7	

Note(s): N/A (not applicable) indicates that outcomes were not measured within the study to produce key results. Study designs/protocols were included, so although outcome indicators were outlined, results were not reported.

4.3 AIM 3: Define barriers, facilitators, and key setting components for delivery of a comprehensive behavioral intervention plan with screening among key stakeholders

The following section includes results of the structured interviews. Themes were identified through data analysis and conveyed in table 4.4. The table provides illustrative quotes from the structured interviews within each theme as well as frequency of themes mentioned.

4.3.1 Barriers

Barriers consisted of any obstacle preventing program participation and/or implementation. Barriers mentioned included transportation challenges, lack of childcare options, challenges related to continued adherence to program outcomes after participation, time barriers, and financial barriers. Sub-themes were generated from each of these specific barriers. Illustrative quotes from each of these sub-themes, as well as descriptions and frequency of theme occurrence, can be viewed in table 4.4. The most referenced sub-theme was Transportation Barrier. An implementation partner shared, “I think one of the biggest barriers that you’re going to find is probably transportation. We’re very geographically bound and isolated, with no form of public transportation. It may be harder for people to get to the cities, from outside, in the counties, to come to some events.”

An individual noted, “So that leads into the prices of foods right now. A lot of us in this community are on SNAP or on WIC. WIC, of course, is healthy. They only are allowed to get healthy foods, but with SNAP, it’s more of a, ‘How much can I get for what I’m allowed to get?’ so it’s more of a convenience versus what’s good for me or

what's going to be enough." This illustrative quote was categorized under both the Financial Barrier sub-theme and the Adherence Barrier sub-theme, as it addresses how program adherence may be challenging due to financial factors. This overlapping relationship between Financial and Adherence Barriers was a notable characteristic among Barriers.

4.3.2 Facilitators

The Facilitators theme consists of elements that make program participation easier, ultimately increasing participation. Facilitators include complementary programs and processes within the community or organizations that may assist in program participation or implementation. The Facilitators sub-theme, Complementary Programs and Processes, was identified among all transcripts. An implementation partner shared, "… we've done some nutrition education in Head Starts. We have some school programs that teach about a lot of other keeping healthy habit programs…" This illustrative quote conveys a program/process within the setting that may allow for possible increased participation in in similar programs due to the complementary nature.

4.3.3 Need for Intervention

The Need for Intervention theme conveys how essential/necessary the program would be within the community if implemented. This theme was referenced within all transcripts. Overall, the theme emerged a total of 16 times. An implementation partner shared, "Our healthcare has been so fragmented based on individuals, and as we all know, children are individuals but very connected to another system within their family. So some of the issues that I see or some of the barriers that I see in clinic may not

necessarily reflect the individual child, but maybe some characteristic of the family as a whole. So I think addressing the family as a unit is a great first step, especially in this young age group that are so dependent on their parents and maybe other caregivers." This illustrative quote conveys the essential nature of the program based on family-centeredness and age-range.

4.3.4 Incentives

Incentives are defined as provisions that motivate/encourage community member participation in the intervention. Incentives fell within two sub-themes: Monetary Incentives and Non-monetary Incentives. Monetary Incentives are defined as using money/financial means to increase participation, including any gift card or voucher of definitive monetary value. An implementation partner noted, "Obviously I think vouchers, money, or gift cards is probably the first thing that comes to mind. I hear a lot from patients or parents that healthy whole fresh types of foods are expensive and that's their perception, whether that's reality or not, that is what they perceive them to be, so maybe offering some type of discount or voucher for certain types of foods that maybe they wouldn't normally buy." Non-monetary Incentives are defined as utilizing things other than money/financial means to increase participation. Another implementation partner stated, "People will come for meals. If you're going to present them a healthy meal, that I know has helped us in the past. If they know that they're going to get dinner or lunch fixed for them each time, then they'll come for that."

Both Monetary and Non-monetary Incentives sub-themes included program-specific incentives. For instance, provision of healthy meals and healthy food vouchers

(mentioned in illustrative quotes) are both incentives that ultimately relate to program specific outcomes. This is a notable characteristic among these themes.

4.3.5 Receptivity

Receptivity is defined as the willingness of the organization and/or community members to consider/accept the program, implementing and participating accordingly. This theme was split into Community Receptivity and Organizational Receptivity sub-themes. Community Receptivity is defined as the willingness of community members to participate in the program or the readiness of individuals to change and thus to participate in the program. A community partner shared, "… focusing on two to five, there's a very active population, grandparents, and parents, especially that age group, very involved. We have story time here at the library, it's very well attended. We have our summer reading program. Those age groups, people are very involved…"

A notable characteristic within the Community Receptivity sub-theme was framing of the program. The interviewees reported that community receptivity was dependent on how the program was framed. An implementation partner stated, "I think it really depends on how it's presented to them, which group that you choose to market to and how you approach the person. I think if it's done correctly, I don't want to say delicately, but almost, then I think most parents should be on board with it." Another implementation partner stated, "I think it really depends on how the program is projected. So, if you offer things like fun programs for those toddlers, if you offer things like Mommy and Me cooking classes, those things are going to go over much better and get people into your program as opposed to asking parents if their child is obese and whether or not they need one-on-one counseling. It's different and it can be a very touchy subject

for parents, especially if they themselves are overweight. And so, I think it's all in how you frame it. If you frame it as fun activities, learning activities, and things that your families can do together to engage, I think that's a better way to go about it."

Organizational receptivity is defined as willingness of those within the organization to assist in program implementation. An implementation partner stated, "I think that our staff is very, very receptive and I see a lot of referrals that could come from this program, from our providers too." All implementation and community partners conveyed positive organizational receptivity.

4.3.6 Setting Characteristics

All interviewees mentioned Setting Characteristics, as the theme was referenced within all 6 transcripts. Setting characteristics are defined as qualities within the community/organization that may influence program implementation and participation. Sub-themes under Setting Characteristics include Community Setting Characteristics, which are community characteristics influencing program participation, and Organizational Setting Characteristics, which are organizational characteristics influencing program implementation. These themes included descriptions of the specified setting on a cultural level.

An illustrative quote in reference to Community Setting Characteristics was reported by an implementation partner who stated, "I think the culture of Eastern Kentucky is very clannish, I guess you would say. And so, we have a lot of generational poverty and a lot of generational unhealthy habits that have to be broken… I think that we tend to stick together in Eastern Kentucky, as family is very, very important to us.

And health is not as important as it should be to most people. And I think that it is, again, just something that we have grown up with; eating unhealthily, not a lot of opportunity for physical activity, indoor or outdoor." In reference to Organizational Setting Characteristics, an implementation partner stated, "… Our organizational values are trust, innovation, collaboration, compassion, and service. And I think that all five of those values, which we have kind of implemented and pushed out to all our employees and our community, really fall in line with this program, especially collaboration."

4.3.7 Implementation Considerations

The Implementation Considerations theme is defined as factors that should be considered or organizational modifications that need to be made to accommodate for the intervention. This theme was referenced by implementation partners 7 times within 4 transcripts. Location and access were some of the accommodations discussed. Additionally, physical layout/infrastructure considerations for the program setting were mentioned within Implementation Considerations. An implementation partner noted, "I think you'll have to have a big enough space to hold the meeting, and I think it needs to be someplace that parents are familiar with coming. If you had a community center or someplace like that you could hold it in that they're used to coming to already, that would be perfect."

Table 4.4 Primary themes from qualitative analysis among community partners, implementation partners, and individuals interviewed (n = 6)

Theme	Sub-theme	Description	Illustrative Quotes	# of Interviews That Mention This Theme	# of Times This Code Was Used
Barriers		An obstacle preventing program participation and/or implementation.		6	26
	Transportation Barrier	Transportation as a barrier to program participation and/or implementation.	"I think one of the biggest barriers that you're going to find is probably transportation. We're very geographically bound and isolated, with no form of public transportation. It may be harder for people to get to the cities, from outside, in the counties to come to some events."	5	7
	Childcare Barrier	Childcare as a barrier to program participation and/or implementation.	"Childcare is an issue. If they have someone under the age of two, what can be done? If they have a child that's school age, but school is canceled that day…"	3	4
	Adherence Barrier	Barriers to using tools (family learning materials and resources for children and parents/caregivers) to make healthy choices at home.	"And then eventually, after the program, to be able to continue that same lifestyle, we just have a lot of inavailability of healthy food choices in our community, I guess. We don't have a lot of options as far as grocery stores. Our farmer's market is very miniscule right now."	3	4
	Time Barrier	Time as a barrier to program participation and/or implementation.	"I think a lot of parents, in general, will have trouble with time, especially if they work, trying to get in everything if their kids are involved in sports.	4	8

Table 4.4 Cont.

			I know this is geared towards the smaller children, but if they have siblings, they may be running with them."		
	Financial Barrier	Money as a barrier to program participation and/or implementation.	"…gas is expensive. Everything really is expensive. And then, it's also hard to teach people to eat healthy if healthy foods are so expensive. So I think that just general household income is going to be a barrier in getting people healthier, especially people that are trying to teach toddlers how to eat all their fruits and vegetables."	3	3
Facilitators		Something that makes program participation easier. Facilitators increase participation.		6	20
	Complementary Programs and Processes	Current processes or programs within the community or organization that may assist in or complement the proposed intervention.	"So as I mentioned, we've done some nutrition education in Head Starts. We have some school programs that teach about a lot of other keeping healthy habit programs…"	6	20
Need for Intervention		How essential/necessary the program would be within the community if implemented.	"Our healthcare has been so fragmented based on individuals, and as we all know, children are individuals but very connected to another system within their family. So some of the issues that I see or some of the barriers that I see in clinic may not necessarily reflect the individual child, but	6	16

Table 4.4 Cont.

			maybe some characteristic of the family as a whole. So I think addressing the family as a unit is a great first step, especially in this young age group that are so dependent on their parents and maybe other caregivers."		
Incentives		Provisions that motivates/encourages community members to participate in the intervention.		4	9
	Monetary Incentives	Using money/financial means to increase participation. This includes any gift card or voucher of definitive monetary value.	"Obviously I think vouchers, money, or gift cards is probably the first thing that comes to mind. I hear a lot from patients or parents that healthy whole fresh types of foods are expensive and that's their perception, whether that's reality or not, that is what they perceive them to be, so maybe offering some type of discount or voucher for certain types of foods that maybe they wouldn't normally buy."	3	4
	Non-Monetary Incentives	Using things other than money/financial means to increase participation.	"People will come for meals. If you're going to present them a healthy meal, that I know has helped us in the past. If they know that they're going to get dinner or lunch fixed for them each time, then they'll come for that."	3	5

Table 4.4 Cont.

Receptivity		Willingness of the organization and/or community members to consider/accept the program, implementing and participating accordingly.		6	29
	Community Receptivity	Willingness of community members to participate in the program. Readiness of individuals to change and thus to participate.	"… focusing on two to five, there's a very active population, grandparents, and parents, especially that age group, very involved. We have story time here at the library, it's very well attended. We have our summer reading program. Those age groups, people are very involved…"	6	17
	Organizational Receptivity	Willingness of those within the organization to assist in program implementation.	"I think that our staff is very, very receptive and I see a lot of referrals that could come from this program, from our providers too."	5	12
Setting Characteristics		Qualities within the community/organization that may influence program implementation and participation.		6	11
	Community Setting Characteristics	Community characteristics that may influence program participation.	"I think the culture of Eastern Kentucky is very clannish, I guess you would say. And so, we have a lot of generational poverty and a lot of generational unhealthy habits that have to be broken… I think that we	5	6

Table 4.4 Cont.

			tend to stick together in Eastern Kentucky, as family is very, very important to us. And health is not as important as it should be to most people. And I think that it is, again, just something that we have grown up with; eating unhealthily, not a lot of opportunity for physical activity, indoor or outdoor."		
	Organizational Setting Characteristics	Organizational characteristics that may influence program implementation.	"… Our organizational values are trust, innovation, collaboration, compassion, and service. And I think that all five of those values, which we have kind of implemented and pushed out to all our employees and our community, really fall in line with this program, especially collaboration."	4	5
Implementation Considerations		Factors that should be considered or organizational modifications that need to be made to accommodate for the intervention.	"I think you'll have to have a big enough space to hold the meeting, and I think it needs to be someplace that parents are familiar with coming. If you had a community center or someplace like that you could hold it in that they're used to coming to already, that would be perfect."	4	7

CHAPTER 5. DISCUSSION

5.1 Study Overview

The purpose of this study is to inform the development and implementation of an effective clinical-community collaborative pediatric weight management program in a rural, Appalachian community. Our qualitative findings provide insight into how to implement a clinic-community weight management program for children. Other studies have reported on collaborative family-centered weight management programs; however, our qualitative findings enhance previous findings, as they are centered within the context of a specific rural, Appalachian community.

This research reflects the essentiality of integration between referral and program implementation. While all examined screening and referral articles reported on the use of BMI as a screening tool, referral was a concern within some of the articles reviewed. As previously stated, many clinicians may be unaware of community programs meeting the USPSTF criteria (≥26 contact hours comprehensive, intensive behavioral interventions), so despite high rates of obesity screening, clinical referral remains limited (Grossman et al., 2017; Imoisili et al., 2019). Collaboration between clinics and community programming is a possible strategy to provide clinicians the opportunity to refer patients to a community program meeting established recommendations. Examination of intervention review articles showed that clinical referral was seen in 25 of 32 studies, conveying the feasibility of referring patients when a collaborative approach is utilized. Additionally, the majority of studies reporting improvements in outcomes included both clinical referral and family-centered interventions; thus, clinical referral, as established in collaborative programs, may result in improved outcomes.

Family-centered behavioral treatment approaches have been found to produce significant improvements in clinical outcomes. Previous studies have highlighted the role of parental involvement in early success in childhood obesity treatment (Heinberg et al., 2010). Additionally, family-based interventions have been shown to be more effective than non-family-based interventions in the achievement and sustainability of child BMI reduction (Berge & Everts, 2011). Our research corroborates these findings, as an implementation partner interviewed relayed the importance of family-centeredness when explaining intervention necessity (table 4.4), thus the key component of parent and caregiver involvement was conveyed in both our study and those previously published. These findings convey the importance of family-centeredness within the tentative program. In accordance with these findings, the proposed community program component, Mind, Exercise, Nutrition… Do It! (MEND 2-5), uses a family-centered approach, involving parents in all program activities (SNAP, 2022).

Thematic analysis for aim 3 used structured interviews among key stakeholders to provide information regarding barriers, facilitators, and key setting components to delivering a collaborative pediatric weight management program within the community. Barriers mentioned were transportation, childcare, adherence to program outcomes, time, and financial challenges. Another pre-implementation study examining barriers to the delivery of a pediatric weight management intervention found transportation, childcare, time, and financial challenges as well (Persaud et al., 2022). The most referenced barrier in our research was transportation challenges, which is unsurprising, as previous research has reported on transportation within rural communities as a barrier to receiving adequate

healthcare (Bettenhausen et al., 2021). In fact, transportation was cited as a challenge in another study assessing barriers and facilitators to healthy behavior change among preschool-age children (2-5 years of age) in underserved, rural communities (Pope et al., 2023). Due to the consistency of these findings, future collaborative program delivery should consider all aforementioned challenges, with a focus on transportation, prior to program implementation to promote barrier reduction.

Adherence barriers overlapped with financial factors on occasion, as program adherence may be challenging due to financial barriers. For instance, a lack of money for nutritious foods may result in a reduced ability to continue adhering to program outcomes. The relationship between reduced income and non-adherence to healthy behavior change is something that has been addressed in other studies, one of which cites extrinsic factors, including cost and access as potential, specific reasons for the association (Campbell et al., 2014). Another study examined the effects of unmet social needs on pediatric weight management intervention adherence, finding that increased unmet social needs (including parental stress, parental depression, food insecurity, and housing insecurity) reduced adherence among participants (Atkins et al., 2020). Due to the high rate of food insecurity and poverty in Martin County, Kentucky (table 3.1) it is imperative to consider this association before program implementation.

Community members as well as implementors described a great need for the intervention within the community, mentioning high obesity rates as well as general fragmented care. Childhood obesity prevalence in rural communities is concerning and steps should be taken to improve health equity within this population (Bettenhausen et al., 2021). Research shows increased obesity rates among children in rural communities

when compared to their urban counterparts (Johnson III & Johnson, 2015). Additionally, research has been conducted regarding a lack of healthcare accessibility in rural communities (Bettenhausen et al., 2021). Accessibility of specialized pediatric weight management facilities, where programming and treatment typically occur, has been cited as a challenge in a study evaluating barriers and facilitators to pediatric weight management interventions (Persaud et al., 2022). Literature has established this challenge is pronounced in rural areas, with increased SDOH burden (Findholt et al., 2013; Singh et al., 2017). Establishing partnerships while considering SDOH factors is recommended by the AAP to provide more accessible care (Hampl et al., 2023). The necessity of establishing a community-based collaborative pediatric weight management program, as reported in the qualitative findings of our study, is supported by relevant literature.

Pediatric weight management intervention studies have noted the existence of complementary programs within the community, reinforcing healthy behavior change, as a facilitator, as these processes may be beneficial in achieving positive outcomes (Hoelscher et al., 2010). One such study used a multifaceted approach with a variety of complementary community programs/processes to enhance the childhood weight management program curriculum (Economos et al., 2007). Children participating in the program receiving complementary community support resulted in further reduced BMI and positive trends in health-related behaviors when compared to children receiving the curriculum-only (Economos et al., 2007). Complementary programs and processes were mentioned by all stakeholders in our research. The existence of these complementary programs and processes within the organizational and community context conveys the promise of more effective program delivery.

Establishing appropriate incentives provided throughout pediatric weight management interventions may reduce barriers and increase program engagement (Jacob-Files et al., 2018; Wright et al., 2019). Monetary and non-monetary incentives, as described in our research, have been utilized and evaluated in previous pediatric healthy behavior change interventions (Atkins et al., 2020; Belot & James, 2022; Jacob-Files et al., 2018; Wright et al., 2019). Parental preferences for family-based weight management program incentivization have been studied to assess ideal incentives for reducing program attrition (Jacob-Files et al., 2018; Wright et al., 2019). One study noted that some parents may prefer financial incentives when provided in sufficient amounts to cover program expenditures whereas other parents prefer non-monetary program-specific incentivization to reduce barriers to program adherence (Jacob-Files et al., 2018). This was similarly reported in another study, wherein parents preferred increased monetary incentives or lower-value incentives if the incentives provided positive reinforcement for healthy behavior change (promoting program outcomes) (Wright et al., 2019). Program-specific incentivization to overcome barriers and increase engagement was also noted in our research.

Program-specific incentives, mentioned by a number of stakeholders interviewed, are defined in our research as the provision of materials that assist in the achievement of program outcomes. Stakeholders mentioned providing incentives (both monetary and non-monetary), such as gas coupons, nutritious meals, or food vouchers, which may increase the achievement of program outcomes. This idea has been established in previous research, reporting on the provision of non-cash incentives to promote healthy lifestyles as well as offering financial incentives, such as gift cards, coupons, or vouchers,

that are reflective of program outcomes (covering sports costs, gym memberships, grocery store gift cards/vouchers, etc...) (Jacob-Files et al., 2018). While some of these examples (e.g. gym memberships) may not be applicable to rural communities, other program-specific incentives may be more appropriate for the setting. Program-specific incentives, as described, can be viewed as two-fold, serving as a possible strategy to both incentivize and reduce barriers to participation, further reinforcing program outcomes. The aforementioned research conveys promise in the use of program-specific incentivization.

The community was described as very family- and community-oriented with difficulties in changing behaviors due to cultural norms/habits. Community receptivity and readiness to change, addressed in other weight management pre-intervention studies (Teeters et al., 2018; Whelan et al., 2019), are important considerations when implementing a family-based behavioral intervention. Our findings conveyed that community members are likely to be highly receptive to the proposed program (especially given the specified age-group); however, framing was found to be a consideration. A number of stakeholders mentioned the importance of framing the program in a less weight-centered manner, focusing more on health as well as positive program attributes and activities. In this way, receptivity to the program is dependent on how the program is initially framed to potential participants.

The idea of positive program framing, with a focus on health rather than weight, corresponds with the topic of weight stigmatization. Weight stigmas have been shown to reduce healthcare utilization among individuals (Phelan et al., 2015; Puhl & Heuer, 2010). Stigma-related barriers to participation in pediatric weight management programs

have been reported on in several studies (Kelleher, Davoren, et al., 2017; Kelleher, Harrington, et al., 2017; Parikh et al., 2016; Wild et al., 2020; Wittmeier et al., 2019). Additionally, positive, empathetic communication with a health focus has been a consideration for previous pediatric weight management recruitment studies (Barlow et al., 2017; Parikh et al., 2016). A study focusing on recruitment for pediatric weight management interventions cited stigma as a deterrent to participation (Parikh et al., 2016). The study reported on the use of health-promoting rather than obesity-related language as a facilitator to the stigmatization recruitment barrier (Parikh et al., 2016), which was a solution reiterated in another study (Wittmeier et al., 2019). Weight is a sensitive topic, and discussions about weight or obesity are likely to produce emotional responses, thus it is important to provide validation and support, which can be accomplished by keeping the focus on the child's health (Hampl et al., 2023).

Positive organizational receptivity was conveyed among all community and implementation partners. Organizational receptivity is an important factor to gauge prior to program delivery to ensure effective partnerships and successful implementation (Golden et al., 2021; Persaud et al., 2022; Teeters et al., 2018; Weiner et al., 2008). The AAP recommends establishing partnerships among healthcare and community organizations (Hampl et al., 2023). Clinical-community partnerships require organizational commitment and support for their sustainability (Olmos-Ochoa et al., 2021); therefore, positive organizational receptivity, described throughout stakeholder interviews, conveys the promise of successful partnerships.

Organizational setting characteristics described within our research aligned well with the collaborative nature of the tentative program. An implementation partner

provided organizational values, one of which included collaboration (table 4.4). Fragmentation in care, as described by an implementation partner, can contribute to poor quality of care (Piña et al., 2015). In recognizing this challenge, organizational culture has been described, which includes care coordination, collaboration, and community orientation elements, all of which are indicators of program outcomes in healthcare delivery (Piña et al., 2015); therefore, the corresponding organizational values (e.g. collaboration) found in our research may promote future collaborative program delivery and reduce fragmentation.

Implementation considerations reported on were largely infrastructural and physical location considerations. Large enough space at the community site was mentioned, as well as community familiarity with the site. Community sites used for similar collaborative programs, found in the intervention review, provide some possible sites of program delivery for this specific intervention. Sites utilized for pediatric weight management programs included parks and recreation facilities, clinics, YMCAs, health centers, schools, and community centers (table 4.2). Telehealth was also utilized in many studies in flexible locations. While some sites, such as YMCAs, are not applicable for this specific rural community, clinics, parks, community centers, and schools are possible locations that may meet considerations (space, access, and familiarity) established by implementation partners.

In summary, this research establishes the necessity of a collaborative family-centered program; provides possible effective intervention approaches that may be useful in delivery of a collaborative, family-centered pediatric weight management program; and provides insight into development and delivery of such a program within a rural,

Appalachian community. Key take-aways include community site considerations (site spaciousness, familiarity, and access), overlapping financial and adherence barriers, provision of program-specific incentives, and positive program framing to increase participation. These findings should be considered during program development and implementation to ensure more effective delivery.

5.2 MEND

Mind, Exercise, Nutrition… Do It! (MEND) is the proposed evidence-based community program intended to increase contact hours in collaboration with specialized clinical services. Barriers and facilitators to MEND implementation have been assessed in a number of previous studies. These factors are important to consider before implementation, as the program itself may present specific challenges. It is essential to review community aspects, reported throughout this research, as well as program aspects to further reduce barriers and promote desired effects.

Some reported barriers to MEND include timing; unsuitable venues; and costs associated with maintaining healthy behaviors after MEND participation (Law et al., 2014; Wolman et al., 2008). These considerations were similarly mentioned in our stakeholder interviews, as time barriers; implementation considerations (including spaciousness, access, and familiarity of community site); adherence barriers; and financial barriers were all themes that emerged during analysis. Overlapping financial and adherence barriers was a notable characteristic among themes. Additional barriers reported for MEND 2-5 include poor parental perception of child weight status within this age range (Wolman et al., 2008). However, this barrier may be reduced through positive program framing (less weight focus) to increase receptivity, which was a notable

characteristic within our research and a recommendation reported in a previous study (Wolman et al., 2008).

As aforementioned, one way to possibly reduce barriers during program implementation is provision of program-specific incentives. Other ways to reduce barriers include choosing an appropriate space, considering timing of sessions, and ensuring proper training among community partners delivering the program. Although MEND includes training sessions for the delivery team (MEND, 2023), studies report challenges in perceived quality of delivery and facilitator knowledge (Law et al., 2014). Further trainings or a comprehensive review of training materials may be necessary to increase knowledge among facilitators.

Community facilitators may also need additional trainings on the use of person-first, sensitive language when speaking with parents and children during sessions. A study evaluating MEND efforts reported challenges faced by the delivery team regarding the appropriate language to use when speaking with parents about their child's weight (Liu et al., 2020). Weight stigma is extremely problematic, resulting in psychological, social, and physical health consequences (Pont et al., 2017). Children are incredibly vulnerable, as negative weight-based stereotypes have been reported to begin as early as pre-school age (Pont et al., 2017; Su & Aurelia, 2011). Due to the negative public health implications associated with weight stigmatization, community facilitator training is essential in future collaborative program implementation.

5.3 Public Health Implications

This study provides information to assist in the implementation of a clinical-community collaborative family-centered healthy weight program in a rural, Appalachian

community. The AAP recommends that pediatricians and other providers should provide/refer children 6 years and older as well as children 2-5 years of age with overweight/obesity to intensive health behavior and lifestyle treatment (IHBLT) (Hampl et al., 2023). IHBLT effectiveness is dependent on contact hours, with the most effective treatment providing "26 or more hours of face-to-face, family-based, multicomponent treatment over a 3- to 12-month period" (Hampl et al., 2023, p. 3). Similarly, the USPSTF recommends that "clinicians screen for obesity in children and adolescents 6 years and older and offer or refer them to comprehensive, intensive behavioral interventions to promote improvements in weight status" (Grossman et al., 2017, p. 2417). Obtaining this amount of contact hours is unmanageable for families and children experiencing SDOH risk factors and rural health disparities, with a lack of sufficient healthcare in the area.

The AAP also recommends clinical-community partnerships to "expand access to evidence-based pediatric obesity treatment programs and to increase community resources that address SDOH in promoting healthy, active lifestyles" (Hampl et al., 2023, p. 4). In order to comply with this recommendation, providing collaborative healthcare services to patients in rural eastern KY, it is important to establish effective clinical-community partnerships and success in implementation of a family-centered healthy lifestyle program. Therefore, pre-implementation research is used to inform development, ensuring the program is accepted and delivered successfully. By examining existing literature on collaborative programs and establishing barriers, facilitators, and key setting components through stakeholder interviews we were able to obtain information for program development. This study will serve as preliminary efforts in reducing health

disparities and promoting health equity for childhood obesity in rural, low-income communities, by providing accessible care in an effective manner.

5.4 Strengths and Limitations

The use of two methods of data collection, which included a narrative review of literature and qualitative interview findings, is a strength of this study. The secondary data analysis provided broader insight into clinical-community collaborative program implementation, whereas the structured interviews provided more community-specific information on program development and implementation. By gathering general and specific information, rather than focusing on one aspect, we obtained greater detail within our research. An additional strength of our research is the focus on the 2–5-year age range. Children ages 2-5 are an under-researched population. The newly established AAP Clinical Practice Guidelines have limited evidence and thus a weaker (grade c) recommendation for pediatric obesity treatment for children ages 2-5 when compared to children ages 6+ (Hampl et al., 2023). Additionally, no guidance is provided by the USPSTF regarding pediatric obesity care for children ages 2-5 due to the lack of research in this area (Grossman et al., 2017). The USPSTF identified behavioral interventions to treat children ≤5 years of age as a gap in the research (Grossman et al., 2017). This gap/need is addressed within our research, gathering preliminary information for the development of a behavioral intervention to treat childhood obesity, focusing on children ages 2-5.

This study faced various limitations, including limited sample size and convenience sampling for interview participants. A small sample size was used, as only six stakeholder interviews were completed. Interviewees consisted of four implementation

partners, one community partner, and one individual. A larger number of community partners and individual community members (parents/caregivers) would have provided better insight into community and individual factors influencing participation. The limited sample size among community and individual stakeholders may be due to a lack of incentives, which is another limitation of our research. Additionally, a larger sample size in general would have been beneficial to provide more information for research purposes. The interviews were limited, and thus the data achieved was limited due to the small sample. The sampling method was a limitation as well. Convenience sampling was used to obtain participants for interviews with ease; however, this may have led to biases or a lack of variety in responses. No clinicians who typically conduct screenings were included, which is an additional limitation noted within the study.

5.5 Recommendations for Future Research

More research should be conducted relating back to incentives. This concept should be investigated to determine which incentives are more advantageous and why within this specific region. Another theme that arose that could be investigated further was receptivity, specifically the impact of program framing. Further research should be conducted regarding how best to approach potential participants to encourage program participation. This might provide information on specific communicative recruitment strategies that could be used to increase participation in a family-centered healthy weight program within the community.

APPENDICES

[APPENDIX 1. Community Partners Interview Guide]

Interview Guide (Community Partners)

Introduction Script:

Good morning/afternoon. Thank you for taking the time to be here. I will be interviewing you today for research being conducted through the University of Kentucky funded by Centers for Disease Control and Prevention High Obesity Program. Participation in this interview is completely voluntary; you are free to skip any questions or discontinue at any time. Throughout the interview, I will be asking questions regarding a family-centered healthy lifestyle program, MEND.

MEND is a program designed to manage overweight and obesity in children 2-13 years old as well as their families (SNAP, 2022). The program combines physical activity, nutrition, and behavior change to allow for safe, effective weight management and lasting lifestyle change among families (SNAP, 2022). The program runs for 16 weeks and at least one parent or caregiver must be present (SNAP, 2022). MEND is split into different age groups within the 2–13-year range; the program we are proposing is focused on ages 2-5. MEND 2-5 includes 90-minute weekly fitness and weight management sessions based in community settings (SNAP, 2022).

We are interested in learning how the program described might be effectively implemented within the community to improve the health and wellbeing of children and families. By providing responses, you will give us a greater understanding of barriers and

facilitators to implementing a family-centered healthy lifestyle program within your community. The interview will take about 30-45 minutes to complete. Your responses will be kept confidential and when writing about the study you will not be identified. This interview will help us to recognize needs for future programs in your community and, once again, we thank you for being here.

Outer Setting [domain]

A. Patient Needs & Resources [construct]

1. How well do you think a family-centered healthy lifestyle program will meet the needs of the individuals served in your community?
2. How do you think the individuals served by your organization will respond to the healthy lifestyle program?
3. What barriers will the individuals served by your organization face to participating in the intervention?

B. External Policies & Incentives [construct]

1. What kind of financial or other incentives would influence others to participate in a family-centered healthy lifestyle program?

Inner Setting [domain]

A. Culture [construct]

1. How would you describe the culture of your community? Of your own setting or unit?

B. Implementation Climate [construct]

1. What is the general level of receptivity in your organization to help promote the program?

- **Tension for Change [sub-construct IC]**

  (1) Is there a strong need for this intervention?

  (2) How essential is this intervention to meet the needs of the individuals served by your organization or other organizational goals and objectives?

- **Compatibility [sub-construct IC]**

  (1) How well does this intervention fit with existing work processes and practices in your setting?

  (2) Will the intervention replace or complement a current program or process?

- **Relative Priority [sub-construct IC]**

  (1) What kinds of high priority initiatives are already happening in your setting?

  (2) Describe activities or initiatives that (appear to) have highest priority for you (for the organization)?

End Script:

Thank you very much for taking the time to answer our questions. It is important for us to understand how this healthy lifestyle program might be effectively delivered to improve the health and wellbeing of children and families within the community. Your answers are essential and we greatly appreciate your input today.

[APPENDIX 2. Implementation Partners Interview Guide]

Interview Guide (Implementation Partners)

Introduction Script:

Good morning/afternoon. Thank you for taking the time to be here. I will be interviewing you today for research being conducted through the University of Kentucky funded by Centers for Disease Control and Prevention High Obesity Program. Participation in this interview is completely voluntary; you are free to skip any questions or discontinue at any time. Throughout the interview, I will be asking questions regarding a family-centered healthy lifestyle program, MEND.

MEND is a program designed to manage overweight and obesity in children 2-13 years old as well as their families (SNAP, 2022). The program combines physical activity, nutrition, and behavior change to allow for safe, effective weight management and lasting lifestyle change among families (SNAP, 2022). The program runs for 16 weeks and at least one parent or caregiver must be present (SNAP, 2022). MEND is split into different age groups within the 2–13-year range; the program we are proposing is focused on ages 2-5. MEND 2-5 includes 90-minute weekly fitness and weight management sessions based in community settings (SNAP, 2022).

We are interested in learning how the program described might be effectively implemented within the community to improve the health and wellbeing of children and families served by your organization. By providing responses, you will give us a greater understanding of barriers and facilitators to implementing a family-centered healthy

lifestyle program. The interview will take about 30-45 minutes to complete. Your responses will be kept confidential and when writing about the study you will not be identified. This interview will help us to recognize needs for future collaborative programs and, once again, we thank you for being here.

Outer Setting [domain]

A. Patient Needs & Resources [construct]

1. How well do you think a family-centered healthy lifestyle program will meet the needs of the individuals served by your organization (extension/clinic)?

2. How do you think the individuals served by your organization (extension/clinic) will respond to the healthy lifestyle program?

3. What barriers will the individuals served by your organization face to participating in the intervention?

B. External Policies & Incentives [construct]

1. What kind of financial or other incentives would influence others to participate in a family healthy lifestyle program?

Inner Setting [domain]

A. Structural Characteristics [construct]

1. How will the infrastructure of your organization (social architecture, age, maturity, size, or physical layout) affect the implementation of the intervention?

2. What kinds of infrastructure changes will be needed to accommodate the intervention?

B. Culture [construct]

1. How would you describe the culture of your community? Of your own setting or unit? **(Apply to community-based implementor ONLY)**

2. How do you think your organization's culture (general beliefs, values, assumptions that people embrace) will affect the implementation of the intervention?

C. **Implementation Climate [construct]**

1. What is the general level of receptivity in your organization to implementing the intervention?

- **Tension for Change [sub-construct IC]**

(1) Is there a strong need for this intervention?

- **Compatibility [sub-construct IC]**

(1) How well does the intervention fit with your values and norms and the values and norms within the organization?

(2) How well does this intervention fit with existing work processes and practices in your setting?

(3) Can you describe how the intervention will be integrated into current practices?

(4) Will the intervention replace or complement a current program or process?

D. Readiness for Implementation [construct]

- **Leadership Engagement [sub-construct RI]**

(1) What kind of support or actions can you expect from leaders in your organization to help make implementation successful?

End Script:

Thank you very much for taking the time to answer our questions. It is important for us to understand how this program would be effectively implemented within the community. Your answers are essential and we greatly appreciate your input today.

[APPENDIX 3. Individuals Interview Guide]

Interview Guide (Individual)

Introduction Script:

Good morning/afternoon. Thank you for taking the time to be here. I will be interviewing you today for research being conducted through the University of Kentucky funded by Centers for Disease Control and Prevention High Obesity Program. Participation in this interview is completely voluntary; you are free to skip any questions or discontinue at any time. Throughout the interview, I will be asking questions regarding a family-centered healthy lifestyle program, MEND.

MEND is a program designed to manage overweight and obesity in children 2-13 years old as well as their families (SNAP, 2022). The program combines physical activity, nutrition, and behavior change to allow for safe, effective weight management and lasting lifestyle change among families (SNAP, 2022). The program runs for 16 weeks and at least one parent or caregiver must be present (SNAP, 2022). MEND is split into different age groups within the 2–13-year range; the program we are proposing is focused on ages 2-5. MEND 2-5 includes 90-minute weekly fitness and weight management sessions based in community settings (SNAP, 2022).

We are interested in learning how families would feel about participating in a family-centered healthy lifestyle program for 16 weeks, such as the one described. During this program, there would be someone working with you and your family to make these healthy choices. Your responses will help us to understand barriers and facilitators to

participation in this family-centered healthy lifestyle program. The interview will take about 30-45 minutes to complete. Your responses will be kept confidential and when writing about the study you will not be identified. This interview will help us to recognize needs for future programs in your community and, once again, we thank you for being here.

Characteristics of Individuals [domain]

A. Knowledge & Beliefs about the Intervention [construct]

1. What do you know about family-centered healthy lifestyle programs?

    a. These types of programs usually focus on helping families move more, make nutritious choices when possible, and other actions that support overall health of the family.

2. Do you think this type of program would be helpful for your family?

3. How do you feel about a program like this being conducted in your community?

B. Self-efficacy [construct]

1. How confident are you that you would be able to participate in the program?

2. How confident are you that you will be able to use the tools to make healthy choices in your family?

    a. These tools would include family learning materials and resources for children and parents/caregivers.

C. Individual Stage of Change [construct]

1. How prepared are you to sign up for a family-centered healthy lifestyle program?

2. How prepared are you to attend a healthy lifestyle program?

Outer Setting [domain]

A. Patient Needs & Resources [construct]

1. How well do you think a family-centered healthy lifestyle program will meet the needs of the families within your community?

2. How do you think the families in your community will respond to the healthy lifestyle program?

3. What barriers will families within your community face to participating in the intervention?

End Script:

Thank you very much for taking the time to answer our questions. It is important for us to understand how effective a family-centered healthy lifestyle program would be within your community. Your answers are essential and we greatly appreciate your input today.

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