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Using Multi-Theory Model (MTM) To Predict Intention To Promote Physical Activity by Primary Care Providers

Shirley McClendon
Walden University

Walden University

College of Health Sciences and Public Policy

This is to certify that the doctoral dissertation by

Shirley McClendon

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee
Dr. Manoj Sharma, Committee Chairperson, Health Services Faculty
Dr. Donna Clews, Committee Member, Health Services Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
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Abstract

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by

Shirley McClendon

MA, Bellevue University, 2013

BS, Albany State University, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Services Leadership

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Abstract

Physical inactivity persists as a public health concern worldwide and results in more than

a million deaths per year. This modifiable behavior can result in improved health when

primary care providers (PCPs) communicate recommendations to patients and behavior

change is supported. In this study, a quantitative cross-sectional design was used to

investigate the intentions of PCPs in providing physical activity counseling, using the

constructs of the multi-theory model (MTM) of health behavior change as the theoretical

framework. An anonymous 37-item electronic survey was administered to participants

practicing primary care and family medicine from rural areas in the Southeastern region

of the United States (n=217). The data received from the survey were evaluated using

multiple linear regression analysis to show the significance of each construct to influence

intentions and actual counseling about physical activity by PCPs. The results indicated

that participatory dialogue ($p < 0.001$) and changes in the physical environment ($p <$

0.001) were significant predictors of actual PCP counseling about physical activity and

explained 44.5% of the variance. Behavioral confidence was not found to be a significant

predictor ($p > 0.05$). The findings have important implications for positive social change

as these lend credence to the MTM in designing educational interventional studies for

PCPs so that they can counsel their patients regarding physical activity. These findings

also show that policymakers should devote more resources toward educating PCPs about

counseling and behavior change techniques.

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Dedication

I dedicate this dissertation in memory of my late parents, Hozell and Jeanette Daniel, for their love and support. I especially thank my mother for her sacrifice of time, talent, and vigor to ensure that my 10 siblings and I learned to live with purpose. I thank her for speaking the affluence of wisdom and health into my life and for praying for my protection and guidance as I navigated through my journey. I will forever be indebted. I also dedicate this dissertation to my children, and especially thank them for believing in me wholeheartedly, for loving me unconditionally, and for praying for me unceasingly. Lastly, I thank God Almighty for being "my all-and-all". I could not have done this without you. I am *GRATEFUL*.

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I am grateful for this opportunity and for all the people that played a role in guiding me through this journey. To my chair and committee, and to all faculty, staff, and administrators at Walden University who provided instruction, guidance, support, and encouragement, I am appreciative. To my family, loved ones, and friends who carried me throughout this process with unending prayers, generosity, and emotional support, I will forever be grateful. To my children, thank you for believing in me and for allowing me to surrender precious time and attention away from you as I worked and attended school to complete this dissertation. You never allowed me to take this journey alone. You wouldn't let me give up. You stayed with me through the good and the bad. Your sacrificial love, prayers, and ceaseless encouragement brought me through. Last, but certainly not least, I thank God Almighty, for giving me the strength of body and mind to complete this task. God sustained me financially, physically, mentally, and emotionally. *I am Truly Blessed*.

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Chapter 1: Introduction to the Study

Physical activity has long been a topic of interest for health officials in the United States. In the past, several reporting agencies coupled physical activity with nutritional habits as a guiding force for disease prevention and improved health. The U.S. Department of Agriculture (1995) considered physical activity as a part of its normal advisory publication, Dietary Guidelines for Americans, in 1995, but as developing scientific evidence revealed the overall benefit of physical activity on health, the U.S. Department of Health and Human Services (HHS) developed its own guidelines in solidarity with those of dietary concerns (HHS, 2008). Khan et al. (2012) defined physical activity as "any bodily movement produced by skeletal muscles that results in energy expenditure" (p. 61). The World Health Organization (WHO: 2017) further delineated this definition by explaining that energy-expending activities include such actions undertaken while working, playing, carrying out household chores, traveling, and engaging in recreational pursuits" (para. 3).

Over the past several decades, physical activity has been seen as a preventive and therapeutic approach to the health crises around the world. Public health officials have recognized physical activity as a dually appropriate and cost-effective tactic for addressing sedimentary behaviors and lifestyles that intensify biological factors that lead to an increase in noncommunicable diseases (Colley et al., 2011; WHO, 2008, 2009a). In an effort to address the implications of inactivity and sedentary behaviors of populations globally, recommendations were made for people to become more active to improve and maintain health, as shown in Figure 1. It was recommended that children between the

ages of 5 and 17 years of age get at least 60 minutes of physical activity that ranges from

moderate to vigorous in intensity daily. For adults between the ages of 18 and 64 and

adults 65 years and older, WHO (2017) recommended at least 150 minutes of physical

activity, including muscle strengthening activities, balance, mobility, and fall prevention.

Figure 1

WHO Recommendations for Physical Activity

Age Group	Recommendations
5y - 17y	For children and young people, physical activity includes play, games, sports, transportation, chores, recreation, physical education, or planned exercise, in the context of family, school, and community activities. 1. Children and youth aged 5-17 should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. 2. Amounts of physical activity greater than 60 minutes provide additional health benefits. 3. Most of the daily physical activity should be aerobic. Vigorous-intensity activity should be incorporated, including those that strengthen muscle and bone at least 3 times per week.
18y - 64y	In adults aged 18-64, physical activity includes leisure time physical activity, transportation (e.g. walking or cycling), occupational (i.e. work), household chores, play, games, sports, or planned exercise, in the context of daily, family, and community activities. 1. Adults aged 18-64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate - and -vigorous-intensity activity. 2. Aerobic activity should be performed in bouts of at least 10 minutes duration. 3. For additional health benefits, adults should increase their moderate intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate - and vigorous-intensity activity. 4. Muscle-strengthening activities should be done involving major muscle groups on 2 or more days a week.
65y +	In older adults of the 65 years and above age group, physical activity includes leisure time physical activity, transportation (e.g. walking or cycling), occupational (if the individual is still engaged in work), household chores, play, games, sports, or planned exercise, in the context of daily, and community activities. 1. Older adults should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. 2. Aerobic activity should be performed in bouts of at least 10 minutes moderate intensity. 3. For additional health benefits, older adults should increase their moderate intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate-and vigorous-intensity activity. 4. Older adults, with poor mobility, should perform physical activity to enhance balance and prevent falls on 3 or more days a week. 5. Muscle-strengthening activities, involving major muscle groups, should be done on 2 or more days a week. 6. When older adults cannot do the recommended amounts of physical activity due to health conditions, they should be as physically active as their abilities and conditions allow.

Courtesy: World Health Organization. http://www.who.int/dietphysicalactivity/leaflet-physical-activity-recommendations.pdf?ua=1

The Centers for Disease Control and Prevention (CDC, 2015) submitted that the health benefits of physical activity are not discriminatory or exclusive to age, ethnicity, shape, or size, and it has potential to result in weight control, strengthened bone and muscle, improved mood and mental health, fall prevention, and reduced risk factors for heart disease, diabetes, and cancer. Unfortunately, less than 20% of adults and adolescents meet physical aerobic and muscle strengthening guidelines (Garcia-Hermoso et al., 2023). In addition, less than 5% of adults actively participate in 30 minutes of physical activity each day, only one in three children are physically active each day, and only 29% of Americans 6 years and older are physically active (Fitness.org, n.d.).

These facts are important, especially when considering the current state of health in the United States. Ward and Schiller (2013) stated that almost half of the adult population has one or more chronic conditions that result in adverse health outcomes, increased health care needs, and consequently higher costs for care (p.1). It is reported that chronic diseases are mainly responsible for poor health, disability, and death in the United States. It is also reported that this burden of disease results from factors that can be controlled and limited through lifestyle changes, such as poor diet, physical inactivity, and tobacco and alcohol use (Bauer et al., 2014).

In response to the prevalence and significant consequences of chronic conditions, the HHS has focused much of its time and attention on prevention options and opportunities in addition to treatment (Ward & Schiller, 2013). The CDC supplements these efforts using strategies to monitor trends, promote health and support healthy behavior, develop interventions to improve effective use of clinical and preventive

services, and connect community resources and clinical services to sustain improved

management of these noncommunicable diseases. More importantly, it is believed that

these strategies, along with collaboration between health care providers and the public

health sector can make a difference by promoting health and health behaviors that yield

sustainable lifestyle changes and effective management (Ward & Schiller, 2013, p. 45).

Healthcare providers play a significant role in patient understanding, compliance, and

trust in their treatment plan options, and therefore, their behavior, attitudes, and intentions

are of even greater significance.

This study is important because increased commitment is needed from physicians

and other healthcare providers in increasing understanding and compliance with

preventive treatment plans that involve physical activity through counseling at every

encounter. In addition to understanding physical activity and its benefits, patients should

be introduced to the concepts of behavioral change and trained to implement these

changes in their lives. There are many factors that influence or inhibit physical activity at

different levels, but change can be meaningful and sustained if effort is expended across

multiple systems, specifically the healthcare system. Lowe et al. (2017) reported that

every healthcare contact is an opportunity to influence a patient's health positively and is

often done pragmatically through brief interventions. Healthcare providers have

opportunities to counsel on preventive treatment during every patient encounter.

In this study, I sought to explore those opportunities by applying the constructs of

the multi-theory model (MTM) for health behavior change to predict providers' intention

to promote physical activity. Chapter 1 of this dissertation includes the introduction and

subsequently an explanation of the study background, problem statement, explanation of the research questions, hypotheses, and purpose of the study. It also includes an explanation of the theoretical framework and nature of the study. The limitations, delimitations, and assumptions for the study are clarified and the significance of the study elucidated. Chapter 1 also includes an explanation of operational definitions of terms and theoretical constructs.

Chapter 2 of this dissertation includes an extensive review of the literature along with a comprehensive discussion of the theoretical framework of MTM constructs and its multicomponent structure employed to investigate behavioral and lifestyle changes. To predict the intention of health care professionals to counsel and promote preventive behaviors (Nahar et al., 2016), I will present in-depth and extensive discussion on the utility of the constructs of the MTM in this chapter.

Chapter 3 of this dissertation includes the methodology used for the study, the design, strategy for selecting samples, the instrument used for collecting data, and the method of inquiry, the study design, the sampling strategy, the instruments for data collection, and the justification for my choice of the design and methodology for this study. Chapters 4 and 5 include the findings of my study, the results, and the analysis of those findings, a discussion and conclusion as well as any recommendations for the future inquiry.

Background of the Study

There are many health benefits of physical activity, both short and long-term; however, individuals often choose to live sedentary lives. Physical activity is one of the

most important components needed to improve the health of the United States (HHS, 2008). It has been vital in reducing and preventing life-threatening conditions such as cancer, cardiovascular disease, depression, diabetes, hypertension, obesity, and stroke (HHS, 2008, 2015, 2018).

Noncommunicable diseases have globally burdened society and are steadily increasing in number and significance, slowly developing during the early years of life, and manifesting during the older years of life (Riley et al., 2016). Although multiple factors contribute to the development and longevity of these conditions, they are chiefly caused by poor diet, alcohol consumption, smoking, and physical inactivity (Bijnen et al., 1994; Rehm et al., 2013; Reiner et al., 2013; WHO, 2009c). Researchers focused on the connection between lifestyle behaviors and disease development and progression propose physical activity as a key factor in improving overall health and preventing noncommunicable diseases (Kelishadi, 2019; Reiner et al., 2013). According to the CDC (2018), physical activity, when performed as recommended, can be engaged in to manage and control weight, strengthen bones and muscles, improve mental health, improve ability to perform activities of daily living, reduce risks of falls, reduce risk factors for cardiovascular disease, diabetes, and some cancer, and increase chances of living longer.

Prior intervention researchers focused on unhealthy lifestyle, smoking, poor diet, alcohol consumption, and physical activity have provided convincing evidence for the important role of physical activity in the treatment and improvement of chronic health conditions (Holtz et al., 2013; Maas et al., 2008; Vogel et al., 2009). However, only a few researchers have reviewed awareness and perception about the benefits of physical

activity on an individual level. In addition to its cost-effectiveness and benefit to any age group or setting, it is suggested that promoting physical activity in the clinical setting is ideal, believed to be both a primary care and system-wide issue (Sallis et al., 2015).

Primary care provider intention to counsel on physical activity has not been prominently studied, nor is the current data encouraging (Behrens & Harbour, 2014). Overall, physicians are not counseling on physical activity as they should, showing less than 60% of physician engagement (VanWormer et al., 2009). Consequently, further delineation of physician barriers and behavioral determinants is necessary. Historically, those barriers were identified as the physician's lack of practical tools, time, reimbursement, knowledge, and confidence (Meriwether et al., 2006), all of which contribute today as the basis for which interventions are planned (Behrens & Harbour, 2014). Because these determinants may have varied geographically, identifying these determinants, specific to a specific population, would contribute to the development and implementation of any interventions tailored toward encouraging patients to become physically active, thus increasing physician intention to counsel on such (Behrens & Harbour, 2014).

Previous researchers have suggested that there are factors that influence primary care professionals' resistance in implementing primary prevention and health promotion. Primary care physicians and nurses in a 5-level model, the ecological framework, have identified some barriers and facilitators in more recent studies. They include intrapersonal (physician's beliefs and motivation), interpersonal (beliefs and motivation of others) and institutional (biomedical models that favor treatment over prevention, financial

incentives, tools and guidelines). Other factors include community (social, cultural and community context where the patient-physician interaction occurs and university curriculum-lack of training), and public policy (socioeconomic and political context and the affects the distribution of resources as well as position of individuals or groups hold within societies) with intrapersonal appearing most prominently (Rubio-Valera's et al., 2014).

Primary care provider beliefs, attitudes, and perceptions about physical activity counseling are deemed to be key factors that result in physician reluctance in counselling on physical activity. In a systematic review of quantitative and qualitative research studies, Hébert et al. (2012) identified barriers and enablers of physician counseling and showed that primary care providers are uncertain about physical activity effectiveness, felt uncomfortable in providing advice, and note several organizational barriers to preventive practice. Researchers have addressed factors that influence the initiation and continuation of physical activity interventions in primary healthcare (Huijg et al., 2015). Support, resources, collaboration, flexibility, intervention materials, knowledge, positive attitudes, and beliefs as well as training, assistance, and reinforcement were all identified as perceived prerequisites for initiation and continuation of physical activity intervention (Huijg et al., 2015).

Researchers have used theory as a framework to identify factors that either hinder or facilitate behavior performance, and in doing so, investigators often mistake relationships between variables (Ajzen & Albarracín, 2007). The theory of planned behavior (TPB) has been used to examine intention of at-risk populations to participate in

physical activity with some measure of success. This theory has received acclaim for defining physician actions concerning various health conditions but there is very little data available, at this point, showing its successful use in studies regarding physician behaviors of intent to counsel patients on physical activity (PA; Behrens & Harbour, 2014; Godin et al., 2008). Nonetheless, it has led to the establishment of a unique precedence in contributing to the variance in the intention of providers to counsel patients on physical activity (Behrens & Harbour, 2014).

The health belief model (HBM) is another historical model applied in studies concerning behavior change. This theory has been exclusive to health behaviors and has been instrumental in disease and injury avoidance (Becker, 1974), but like many other health behavior theories, it does not have adequate predictive power, cultural versatility, or changing health behavior (Ogden, 2003; Sharma, 2015). The known health behavior theoretical models are restricted in their adequacy for predictive ability; therefore, researchers have developed an alternative framework for a new theory.

This new framework is used to focus on the initiation and sustenance of health behavior change while integrating cognitive, conative, and environmental empirically tested components of existing theories (Sharma, 2015). According to Sharma (2015), the MTM is "exclusive for health education; has empirically tested "constructs" for health behavior change; is parsimonious; affects cognitive, conative, and environmental domains; has constructs that are malleable; caters to both one-time and long-term behavior change; works at individual, group, and community levels; and is applicable

across cultures" (Sharma, 2015, p. 3). I used the MTM to assess primary care provider intention for counseling on physical activity.

Statement of Problem

In response to the present and forecasted increase in the number of people with chronic illnesses, the strategies posed to best control and flatten the trajectory are prevention and management by multidisciplinary teams in public health and primary care (Bodenheimer et al., 2009). Bodenheimer et al. (2009) stated that an abundance of evidence demonstrates that multidisciplinary teams within the primary care setting can indeed improve care, and although primary care has the potential to improve patient care and health status, very few patients have their symptoms under control. This outcome is due, in part, to the lack of prevention, health promotion and management, which incorporates lifestyle changes in both diet and physical activity (CDC, 2009). Durstine et al. (2013, p. 4) stated that physical activity and exercise are considered a principal intervention for primary and secondary disease prevention.

Regular physical activity has short- and long-term effects on health (Nahar et al., 2016), and when performed consistently, can significantly relieve the burden of disease at the individual, community, and public health levels (Behrens & Harbour, 2014, p. 1). On the contrary, the lack of physical activity can have devastating outcomes, being regarded as the fourth leading cause of death worldwide (Lobelo & de Quevedo, 2016). Healthy People 2030 proposed several initiatives to address this issue and reduce physical inactivity, suggesting an increase in counseling of physical activity by the primary care provider as priority (Health.gov, n.d.). Primary care providers are positioned to better

facilitate improvements, and they have the capacity to tackle health inequalities through evidence-based advice and behavior/lifestyle modifications (Yusuf et al., 2016). It has been shown that physician counseling can be instrumental in improving the lifestyle of patients and has potential for years of health and disease improvement in patients (Lobelo & de Quevedo, 2016). Although healthcare physicians may directly control and deliver preventive care and fundamentally concur with the preventive care guidelines, there has been slow and inadequate progress in adopting these guidelines into practice. This noncompliance translates to lost opportunity (Mirand et al., 2003), and shows that physicians and patients alike decide their behaviors based on their knowledge, beliefs, attitudes, and values concerning the importance and ease of engagement (Yusuf et al., 2016).

Previous researchers suggested that behavior change counseling in the primary care setting is a core function of the clinical encounter but that this counseling is potentially inhibited due to an inadequate focus on patient education and counseling that help patients to identify and understand the relationship between health risks and adequate physical activity (Lin & Mann, 2012). Other factors contributing to a lack of preventive counseling are the lack of knowledge of behavioral change techniques, inability to apply and implement them effectively or sustainably, and time restraints, which consequently account for so few physicians actively counseling patients on physical activity and lifestyle changes (Lin & Mann, 2012). When considering the data, it was found that approximately 60% of physicians fail to counsel their patients on physical activity during an encounter (VanWormer et al., 2009). The 2010 National Health

Interview Survey showed that only 32.4% of patients who visited their health care provider received physical activity counseling during the office visit (Barnes & Schoenborn, 2012). Thus, to change this phenomenon, investigators advise and support the utilization of theory to evaluate and predict physician behavior, with the intent of informing knowledge for developing useful interventions to increase physical activity counseling (Behrens & Harbour, 2014).

Purpose of the Study

My goal for this study was to increase understanding of the predictive intentions of primary care providers concerning counseling on physical activity. I examined the predictive intentions of primary care providers to counsel patients on physical activity using the constructs of the MTM for health behavior change. I conducted a literature review to develop an understanding of previous behavior theories and their failure to exhibit predictive power for health behavior change. I also introduced a new theory with measurable constructs that have predictive power. I used a quantitative, cross-sectional methodology and multiple regression analysis in this study. Findings form this study may be used to develop interventions for primary care providers to promote physical activity in their patients.

Research Questions

Research Question 1 (RQ1): To what extent do MTM initiation constructs (participatory dialogue, behavioral confidence, changes in the physical environment) predict intention of primary care providers to initiate counsel about physical activity to their patients?

Null Hypothesis ($H_0$1)MTM initiation constructs; participatory dialogue, behavioral confidence, changes in the physical environment are not associated with the prediction of primary care providers' (health care providers) intention to initiate counsel about physical activity to their patients.

Alternative Hypothesis (H_a1): MTM initiation constructs; participatory dialogue, behavioral confidence, changes in the physical environments are associated with the prediction of primary care providers' (health care providers) intention to initiate counsel to patients on physical activity.

Research Question 2 (RQ2): To what extent do MTM sustenance constructs (emotional transformation, practice for change, changes in the social environment) predict sustenance of intention of primary care providers to counsel about physical activity to their patients?

Null Hypothesis ($H_0$2): MTM sustenance constructs: emotional transformation, practice for change, changes in the social environment are not associated with the prediction of primary care providers' sustenance of intention to counsel about physical activity to their patients.

Alternative Hypothesis (H_a2): MTM sustenance constructs; emotional transformation, practice for change, changes in the change in social environment are associated with prediction of primary care providers' sustenance of intention to counsel about physical activity to their patients.

Research Question 3 (RQ3): How do MTM initiation constructs influence actual primary care provider counseling about physical activity?

Null Hypothesis ($H_0$3): MTM initiation constructs; participatory dialogue, behavioral confidence, changes in the physical environment do not influence the actual counseling about physical activity by primary care providers.

Alternative Hypothesis (H_a3): The MTM initiation constructs; participatory dialogue, behavioral confidence, and changes in the physical environment influence the actual counseling about physical activity.

Theoretical Framework

According to Rudestam and Newton (2015), "each social science discipline and set of investigators seem to have its own favored approach to generating knowledge" (p. 29). The research design determines what knowledge will be generated and how it will be done. Quantitative research designs are used to test objectional theories (Creswell, 2009), and the theoretical framework serves as the core for research. The theoretical framework is used to support the study, the problem statement, purpose, significance and research questions, literature review, methods, and analysis. Grant et al. (2014) further stated that a theoretical framework is an intertwining of varying ideas, concepts, beliefs, and predispositions that can be used to construct meaning and structure for a study (Grant et al., 2014). The theoretical framework is used as a scope to develop empirical findings.

The MTM is a fourth-generation model that is used to address health behavioral change. Sharma (2015) derived this model as a product of scientific research and empirical experiences from a variety of behavioral theories. Critics argued that earlier theories of health behavior were deficient (and limiting in their capacity for addressing various health behavior challenges (Sharma et al., 2017).

The theoretical base for this study was the MTM for health behavior change. MTM is a fourth-generation theory proposed to provide needed theoretical constructs exclusive to health behaviors and postured to have predictive power that is applicable at the individual, group, and community levels, and cross-culturally (Sharma, 2015). This theory is ideal in that it incorporates a combination of empirically tested constructs that are otherwise singularly distinguishable in other theories previously applied in health education and health promotion, particularly the health belief model, transtheoretical model, and PRECEDE-PROCEDE models. The MTM includes differentiated constructs according to their influences on the initiation and sustainability of a changed behavior (Sharma, 2015; Sharma et al., 2017).

MTM is a theoretical model posed to provide the practical and predictive power that is missing from theories used previously to assess and identify factors affecting health behavior change. Researchers can apply this model on different population levels and groups for exclusive prediction of one-time and long-term health behavior change (Nahar et al., 2016). MTM contains a dichotomy of constructs: (a) initiation of behavior change and (b) sustenance of behavior change. In the initiation of behavior change, people adopt and influence new or different behavior through participatory dialogue, behavioral confidence, and changes in physical environment (Sharma, 2015). Figure 2 shows the constructs of the initiation component of MTM. Three factors influence the sustenance of the component of health behavior change: emotional transformation, practice for change, and change in social environment (Sharma, 2015). Figure 3 shows the constructs of the sustenance component of MTM.

Figure 2

Constructs of the Initiation Component of MTM
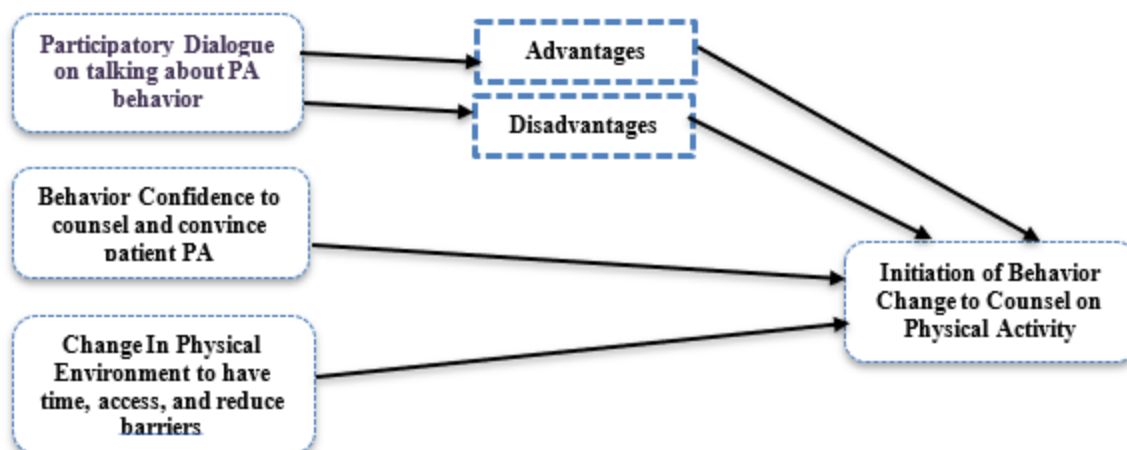
Figure 3

Constructs of the Sustenance Component of MTM
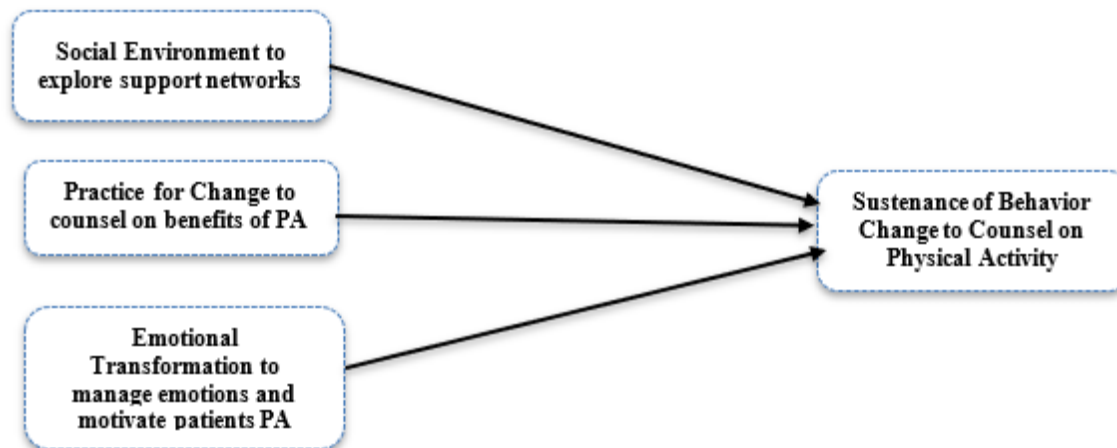
Different researchers have tested the constructs of MTM and showed that they provide a robust framework for making predictions about health behavior change. Previous researchers have shown that compared to the percentage of variance predicted by the model comparable with health belief model and the theory of planned behavior

(Knowlden et al., 2017), the constructs of initiation and the constructs of sustenance do not have much shared variance and are independent of each other (Sharma et al., 2016a). In addition, the constructs of each model are mutually exclusive (Bashirian et al., 2019; Nahar et al., 2016; Sharma et al., 2016a). Similarly, in another study, researchers used MTM to predict the water consumption as an alternative to sugar-sweetened beverages, and this theory showed adequate predictive variances for initiation (61.8%) and sustenance (58.3%) of drinking water and practice for change (Sharma et al., 2017).

In examining the utility of MTM as a fourth-generation theoretical model for health behavior change, the predictive powers of its constructs continue to show validity and promise. In one study, Nahar et al. (2016) assessed the predictive power of MTM for initiation and sustenance of PA, and the results showed that MTM provides an adequate framework for predicting initiation and sustenance of a changed behavior with variances of 26% and 29.7%. Intervention programs using MTM as the theoretical framework were efficacious and worthy of duplicating across different levels of populations and cultures, affirming the effectiveness of this model for predicting a range of health behaviors. Recent researchers applying this framework have focused on interventions for water consumption, fruit and vegetable consumption, and stress management (Brown et al., 2018; Hernandez, 2019; Sharma et al., 2017).

In recent studies, researchers used MTM as a theoretical framework to examine physical activity behaviors specifically within different populaces and cultures. In one such study, Nahar et al. (2020) used the constructs of MTM to predict PA behavior among osteopathic medical students enrolled in a university located in the Southeastern

part of the United States. In this cross-sectional study, 135 students completed a self-reported online survey, and using descriptive statistics and multiple linear regression, the researchers showed that behavior confidence was significant, accounting for 25.8% variance in the intention for the initiation of PA (Nahar et al., 2020). This significance is consistent with another study conducted to predict PA behavior in college students that showed a predicted variance of 26%, which is significant for behavioral studies. In both studies, changes in environment and emotional transformation were significant showing variance for sustenance of PA behavior, with the latter construct also significant for practice of change (Nahar et al., 2016, 2020). The findings of these studies may provide a framework for interventions that support PA as a health behavior change synonymous to a preventative treatment for noncommunicable and chronic diseases.

Health promotion interventions rely on studies with sound theoretical frameworks. MTM provides strong empirical evidence that makes it useful in assessing predictive efficacy. This study serves as another means to provide theoretical evidence to inform the intentions and practices of primary care providers in counseling their patients on PA.

Definition of Terms

Behavioral Confidence: This construct is considered a strong predictor for projecting future behavior change. I used this construct in this study to determine the confidence of providers to counsel on PA.

Changes in Physical Environment: This construct is used to assess how available resources impact people's willingness to make changes to obtainability, availability,

accessibility, convenience, and readiness of resources. I used this construct to assess provider surety of having/making time to provide PA counseling to each patient, having access to appropriate/beneficial information, and suggesting ways to reduce and/or manage barriers.

Changes in Social Environment: This construct encompasses the provider's surety and ability to explore and create social support networks within the environment.

Emotional Transformation: This construct is a measure of the conversion or transformation of emotions towards the health behavior change.

Multi-theory Method: A multi-theory method is a theoretical model that is used to explain and predict one-time and long-term health behavior change in provider intent for counseling patients on physical activity. It is compartmentalized into the initiation component of behavior change and the continuation (sustenance) component of behavior change (Sharma et al., 2016a).

Initiation of Behavior Change: Initiation to behavior change is the first component of the MTM of health behavior change that addresses adoption of behavior and consists of three constructs (participatory dialogue, behavioral confidence, and physical environment change) that influence the initiation of providers' counseling of their patients on PA.

Instrument: The MTM instrument is a questionnaire used as a tool to gather data (information) from research participants.

Noncommunicable diseases (NCD): NCD refers to preventable health conditions such as hypertension, cardiovascular disease, cancer, chronic respiratory disease, and diabetes. These conditions are chronic and noninfectious.

Participatory Dialogue: Providers can initiate a mutual conversation focusing on the perceived advantages and disadvantages of health behavior change.

Physical Activity (PA): PA is any bodily movement produced by skeletal muscles that results in energy expenditure (Khan et al., 2012).

Physical Activity Counseling: The five A's (Assess, Advise, Agree, Assist, and Arrange) model is a strategy recommended for PA counseling in the primary care setting.

Practice for Change: According to the MTM of health behavior change, this construct is important in sustenance of behavior change and entails constantly thinking about the health behavior change and making mid-term rectifications to one's strategy, overcoming barriers, and remaining focused on health behavior change.

Primary Care Physician: A primary care physician specializes in family medicine, internal medicine, and pediatrics. They also serve a defined population of patients at first point of contact and continue responsibility for chronic, preventive, and acute care in both inpatient and outpatient settings. Primary care physicians are advocates for the patient in coordinating the use of the entire health care system to benefit the patient (American Academy of Family Physicians, 2018).

Primary Health Care/Primary Care Practice: Primary care practice is the first point of entry into the health care system. It also serves as a point of continuity of care for all health care services. Its functions include provision of health promotion, disease

prevention, health maintenance, counseling, patient education, diagnosis, and treatment of acute and chronic illnesses in a variety of health care settings (e.g., office, inpatient, critical care, long-term care, home care, day care, etc.). Primary care practice is generally located in the community of patients being served (American Academy of Family Physicians, 2018).

Sustenance of Behavior Change: This construct is the second component of the MTM of health behavior change that addresses continuation of a behavior consists of three constructs (emotional transformation, practice for change, and changes in social environment) that influence the sustenance or modification of providers' counseling to their patients on PA.

Variables

I used the constructs of MTM to represent the independent variables, which I then measured and scored using a multi-item questionnaire containing a 5-point item scale. I used regression analysis to indirectly measure scores between the independent variables (constructs of MTM) and the dependent variable (provider intention). I also collected covariates and sociodemographic variables such as age, gender, ethnicity, physician office routine, number of hours worked per day, number of patients encountered per day, and the average time spent per patient encounter.

Nature of Study

My goal for this study was to predict the intention of primary care providers to counsel and promote PA utilizing constructs of MTM, and thus this study followed a quantitative cross-sectional research design. Creswell (2009) stated that quantitative

research is used to examine the relationship between variables for testing objective theories. Using quantitative measures to assess the factor that influence primary care provider intentions encompasses the primary focus of the study. Although qualitative research is beneficial in understanding the base factors that trigger behavior, quantitative studies are useful for identifying these factors. For this research and the use of the MTM, I considered a quantitative design suitable given the choice of data collection and analysis.

Significance of the Study

Provider-patient relationships can have either positive or negative effects on health outcomes. When the patient and provider collaborate effectively and share beliefs about patient participation, the patient is satisfied with care, complies with treatment regimens, and meets their expectations, which are all linked to positive health outcomes (Jahng et al., 2005). Studies show that primary physicians have the potential to be powerful role models to their patients and counsel them on PA, especially when they are physically active themselves (Lobelo & de Quevedo, 2016). Research also suggests that patients do not know what to do to manage their conditions and often display negative feelings and demotivation towards change. Thus, they rely on their primary care provider to advise and initiate the discussion on preventive measures, council on physical activity, and assess current state, which in turn, could positively impact health outcomes (Behrens & Harbour, 2014).

My goal for this study was to provide empirical evidence for MTM' implied construct of predictive power, which would advance further identification of the leading

factors in further research of other constructs within this new theory. Nationally, this research could serve as a catalyst for increasing physician counseling on PA and for increasing the current number of people engaged in PA to facilitate the goals of Healthy People 2020 in the prevention and treatment of chronic disease (Behrens & Harbour, 2014). The practical implications for positive social change comprise the potential for comprehensible and acceptable health education to improve the quality of life of populations with chronic diseases. It also includes initiation, adherence, and sustainability of physical activity practices, which may potentially decrease healthcare costs, the burden of disease, and healthcare disparity while improving physician and patient preventive behaviors, the quality of primary healthcare, and encouraging better intervention. Even though primary health care provider-based PA interventions have been proved to be effective in research settings, their implementation has been less than optimal. Thus, this research serves to close the gap between research and practice in an effort to increase the impact of effective preventive interventions needed to increase prevention counseling in the primary care setting (Huijg et al., 2015).

Assumptions

Primary care is defined as care provided by a physician in an office or clinic on a routine basis, and a primary care provider is classified as the point of contact for patient care. Their primary function is to help manage the patients' health by providing routine preventive care (physicals, screenings, diagnoses, and counseling) and diagnosing and managing many common chronic conditions. They are skilled in a broad range of health and can treat both illness and injury. Primary care physicians are often referred to as

family physicians, family medical doctor, pediatricians, or general medicine internist (Kronenfeld et al., 2012). Thus, the first assumption was that physicians met this inclusionary criterion by responding honestly and of their own will to the demographic questions on the survey instrument. I also assumed that participants would satisfy representation of target population with fidelity, exclusive of coercion or manipulation, to convey the purpose of the study. I assumed that the study participants who met inclusion criteria would consent to participation to limit selection bias. Given that the participants in the study were educated professionals, I assumed that they could read and respond to each survey question with clarity and comprehension. Chapter 3 contains the details of controls to limit bias. I also assumed that the responses and self-reporting of data would be a truthful and accurate measure of the participants' thoughts and behaviors as it relates to PA counseling practices.

<div align="center">**Delimitations**</div>

This study was delimited to the selection criteria as it relates to the scope of practice and responsibilities of the participants. Primary care physicians are one of several practitioners that practice general medicine. The responsibilities and scope of practice for the primary care physician is synonymous in many ways to the general practitioner, family practitioner, general medicine internist, doctor of osteopathic medicine, and medical residents, as they are all trained as medical doctors who practice all areas of medicine. I also considered nurses, physician assistants, and nurse practitioners due in part to their formal training in basic disease prevention and health promotion. Other bases for the delimitation of this study were the physician's age, race,

gender, qualified years of service, and place of practice, such as individual or group

practice, hospital practice group, and outpatient clinic.

Limitations

My goal for this study was to assess intention of primary care providers to counsel

on PA using the constructs of MTM. Although I planned the study with good intention,

certain limitations occurred. The first limitation relates to sample size and participation. I

anticipated that the number of participants would exceed 200, but this number was not

reached due to factors such as time constraint, disinterest, and inclusion bias or omission

bias. To mitigate the effect of this limitation, I considered including a variety of

practitioners, not limited to age, gender, or ethnicity, who provided general medical

services in an outpatient setting, and disseminating the survey via the internet and postal

mail all over the state of Georgia to increase sample size. I also avoided procedural bias

by requesting that participants use downtime to complete the questionnaire rather than

during regular workday and made the questionnaire accessible via the internet to avoid

time restraint barriers. This approach also potentially prevented biased and unreliable

response data. Other limitations included measurement bias due to self-reporting,

potentially leading to the biases of over- and under-reporting, false reporting, and even

dishonesty.

Summary

I provided a thorough overview of this research study in Chapter 1, emphasizing

the global significance of physical activity on public health. I also discussed and

reiterated the profound potential for the prevention of disease and the promotion of

counsel patients on alternative treatment. I sought empirical findings to support the impact that MTM constructs of initiation and sustenance have in the attainment of actual physician intention to counsel patients on PA.

Chapter 2: Literature Review

Introduction

Research has shown the numerous health benefits of regular PA in the prevention

and treatment of disease as well as the sustainability of good health (Reiner et al., 2013).

Unfortunately, a significant number of people continue to live sedentary lifestyles while

placing a substantial burden of care on the healthcare system. In this study, I evaluated

the predictive intentions of primary care providers to counsel patients on physical activity

using the constructs of the MTM.

As part of the 2018 Physical Activity Guidelines Advisory Committee Scientific

Report, the Department of Health and Human Services (HHS) acknowledged major

theories and conceptual frameworks that have made gains in understanding health

behavior change as it relates to physical activity. Theories such as the health belief model

(HBM), social cognition theory (SCT), transtheoretical model (TTM), and the social

ecological framework (SEF) have been used to gain insight for social environmental

influences, behavior change processes, behavior intention and action differences, and

initiation and maintenance of behavior change over long periods of time (HHS, 2018).

However robust these theories may be, they do not contain the constructs needed to

examine intention to counsel on physical activity. Researchers have suggested that health

care providers are in the best position to counsel patients on physical activity, thus

referring to them as physical activity role models for their patients (Lobelo & de

Quevedo, 2016). Currently, this practice is moderately affective, because patients may

initiate the behavioral change but do not sustain it over a period of time (Lobelo & de Quevedo, 2016).

The purpose of this quantitative cross-sectional research study was to determine the prediction intention of primary care providers to counsel patients on physical activity using the constructs of initiation and sustenance as defined in the MTM for health behavior change. I designed and administered a 34-item questionnaire to numerous primary care providers located in Georgia. My examination of previous research provided an understanding of common behavior theories and their failure to exhibit predictive power for health behavior change and details of the MTM constructs, including the exclusive and autonomous characteristics of its constructs, and consolidated MTM as an ideal foundation for underpinning preventative and promoting public health programs.

Literature Search Strategy

My literature search strategy began with defining the search questions by highlighting the key concepts of my research questions, which led to identifying descriptive words and phrases to describe the key concepts. The search strategy that I used required an organized and structured process for identifying key terms and phrases that generated titles relevant to my research study. The search terms included *physical activity, primary healthcare providers*, *communication, MTM, physician intent, provider intent, PA counseling, health behavior theories, health behavior change,* and *theoretical framework*. I used phrases such as *predicting physician intent using theories of behavior, utilizing MTM to predict intention to counsel on physical activity,* and *factors influencing healthcare providers' intent to counsel patients* to generate a healthy exploration of the

literature. I used this process, in combination with key concepts embedded within my research question, to search several databases in an effort to retrieve precise and succinct results.

I explored the terms, phrases, and key concepts using the Walden Library, which led to additional subject-specific databases most commonly used to find journal articles, peer-reviewed articles, dissertations, and other published work that inform research studies by providing background knowledge, context in identifying knowledge gaps, theoretical foundation, and methodological support. The databases I used included PubMed, ProQuest, CINAHL, MEDLINE, ProQuest Health & Medical Collection (& Allied Health Source), and PsycINFO. I conducted comprehensive searches on other databases and resources, which included Google Scholar, general internet search, the Journal of Research in Health Sciences, Health Promotion and Perspectives, Journal of Health and Social Sciences, the Journal of Family and Community Health, and Webmedcentral Plus. My literature search also included relevant information extracted from global health agencies (CDC, WHO, and AHA), books, internet resources, electronic documents, proposal presentations from health associations, and student dissertations.

Theoretical Framework

Theories are important to research because they address trends and specific attitudes, actions, or conditions of a study. Creswell (2009) defined a theory as "an interrelated set of constructs (or variables) formed into propositions, or hypotheses, that specify relationship among variables" (p. 51). Researchers use theories concerning health

promotion to identify, explain, and even predict intentions as it relates to health behavior change. Health promotion theories have evolved since the early 1970s and 1980s, with theorists focusing on demographic characteristics, risk factors, life stages, and eventually behaviors in the perspective of a social, physical, and environmental framework (Allensworth & Fertman, 2010). As these health theories continued to evolve, the need for health promotion increased, and thus healthcare providers looked to these theories to confront chronic health conditions by way of health intervention programs (Allensworth & Fertman, 2010). More current and influential theory use was focused on determinants of health and health behaviors (WHO, 2010). Health behavior theorists contribute to ongoing research to bridge the divide of research with practice (Glanz & Bishop, 2010).

Theories that influence the scope of practice for behavioral health research and provide guidance for professionals are plentiful, but only a few of them have relevance today or acquired acclaim through numerous publications and authorships (Glanz & Bishop, 2010). The four most notable theories and most widely used theoretical models are HBM, TTM, SCT, and the social ecological model (SEM). Each of these models target health behaviors and beliefs using a specific set of constructs with the common goal of shaping behaviors that are favorable for sustainable change and prevention. Although they have been used to provide theoretical models for public health interventions, there is yet to be discovered the ideal theory that is exclusive to health behaviors (Sharma, 2015).

The theoretical framework for this study is aligned with the core of the research and includes related concepts, beliefs, and susceptibilities that broaden the significance of

the research study. Many commonly used theories address health behavior, health education, and health promotion, but each has limitations rendering them nonexclusive and nonapplicable across cultures. To impact health education and health promotion, practitioners need interventions grounded in theories that have predictive powers for health behavior change, are exclusive to health behaviors, and are applicable to individuals or groups of varying levels and cultures (Sharma, 2015).

The Multi-Theory Model (MTM) of Health Behavior Change

Sharma et al. (2017) derived MTM from a combination of former and commonly used behavior and cognitive theories that have influenced scientific research and empirical experiences of practitioners. Sharma et al. applied and modified evidence-based constructs of commonly used theories to develop a theory that is exclusive to health behaviors, employs predictive powers, incites initiation and substantiation of behavior health change, and is applicable across multiple levels and cultures (Sharma, 2015; Sharma et al., 2016b). MTM has potential to significantly influence public health programs, such as PA intervention, by authenticating ideal capabilities for bridging the gap between knowledge and practice, which is believed to hinder the impact of primary care health-based PA interventions (Huijg et al., 2015).

Given that primary care physicians lead the conversation during patient encounters and serve as experts on health management, it is essential for them to understand factors that influence their intention to initiate and sustain counsel about PA with their patients. MTM can be used to predict physician intention using constructs for health behavior change that are exclusive yet autonomous in their application. Increased

provision of PA counseling by primary care providers can improve health outcomes at the individual, community, and population level and will assist in aligning health care provider practice with public health recommendations for behavior change.

Initiation Component of MTM

The initiation component of MTM is the introduction to understanding behavior health change. This stage of behavior change is articulated in previous literature as lacking as it relates to having an impact on public health. Huijg et al. (2013) posited that primary health care professionals should establish an effective way to introduce PA interventions into their practice. They also believed that this introduction ensues in stages and takes a commitment from health care organizations and providers to change their behavior (Huijg et al., 2013). The initiation component of MTM behavior change addresses this issue directly, as it involves transitioning from a familiar or common behavior to a different behavior.

The initiation of a behavior change is described as a singular event, without repetition or follow-up (Sharma, 2015; Sharma et al., 2017). This component of MTM is useful for delineating the likelihood that primary care providers will initiate discussion with their patients about PA during an encounter. MTM differentiates the components of initiation and sustenance of health behavior by suggesting that each component has autonomous constructs that influence one or the other but not both. The initiation component of behavior change has three influential constructs: participatory dialogue, behavioral confidence, and changes in physical environment. Similarly, the sustenance

component of behavior change has three influential constructs: emotional transformation, practice for change, and change in social environment.

Participatory Dialogue

The participatory dialogue construct received commendation through the work of Freire's model of adult education (1970) encouraging a communication exchange while exploring the advantages and disadvantages of behavior change. This construct is exclusive because it embodies the concepts of pros and cons of the transtheoretical model and perceived benefits and barriers of the HBM and combines them with Freire's model of two-way conversation (participatory) to make it ideal for health behavior change. (Freire, 1970; Nahar et al., 2016; Sharma et al., 2016b, 2017). For the purpose of this research study, I used the participatory dialogue construct to emphasize participatory communication that can be initiated by the healthcare provider and inform the belief that health care providers hold (beneficial or nonbeneficial) about providing PA counseling to their patients, which is associated with their intention.

Behavioral Confidence

This construct is a strong predictor of future behavior change more so than present behavior change. This construct is drawn from the concepts of self-efficacy (Bandura, 1986) and perceived behavior control (Ajzen, 1991), except that the focus is on changing behavior and having confidence that is not exclusive to confidence obtained by internal sources. Behavioral confidence can be dispersed from external sources, such as God, influential people in a person's life, and healthcare providers (Sharma, 2015). This construct is perceived to have more predictive power in the United States than the other

constructs of the initiation component because of its cultural-specific behavior confidence

and closeness and due to its simplicity (Knowlden et al., 2017).

Researchers posit that physicians (health care providers) are the agents of

behavior change for their patients, and provider counseling is influential in patients

engaging in healthy behaviors (Elley et al., 2003; Grandes et al., 2009). Due to research

and evidence-based practice, reimbursement for delivery of physical activity counseling

with exercise-prescriptions has been incentivized to promote and encourage its practice

(Labarthe et al., 2016). However, barriers prevent primary care physicians from

counseling on lifestyle changes, one of which being physician attitude and belief that they

do not possess sufficient knowledge about counseling and/or that they believe that

counseling is ineffective with changing patient behavior (Diehl et al., 2015; Douglas et

al., 2006; Hébert et al., 2012; Walsh et al., 1999).

Changes in the Physical Environment

This is the final construct within the initiation component of MTM, and it is

related to system-level barriers that affect provider intent to provide lifestyle counseling.

However, its perspective is solely from the physical aspect, such as reimbursement for

PA counseling and lack of resources and time (Abramson et al., 2000; Diehl et al., 2015;

Douglas et al., 2006; Goodman et al., 2011; Hébert et al., 2012; Josyula & Lyle, 2013;

Kristi et al., 2015; Labarthe et al., 2016; Lin et al., 2014; McKenna & Collins, 1998;

Walsh et al., 1999). Researchers derived this construct from Prochasksa's environmental

re-evaluation construct, Bandura's environment construct, and Fishbein's environmental

factors within the integrative model. This construct necessitates only making changes in

the physical environment by way of obtainability, availability, convenience, and

readiness of resources (Nahar et al., 2016; Sharma, 2015; Sharma et al., 2017). For the

purpose of this study, I used this construct to predict physician's surety in having/making

time to counsel patients, gather appropriate and beneficial resource materials, and suggest

ways to reduce/manage barriers.

Sustenance of Continuation Component of MTM

The sustenance of continuation is the second component of MTM. Researchers

used this component to predict the continuation of a behavior change based on three

constructs: emotional transformation, practice for change, and change in social

environment (Nahar et al., 2016; Sharma, 2015).

Emotional Transformation

The emotional transformation construct is derived from concepts of the MTM,

which involves altering emotions and directing them to invoke change. The model of

emotional intelligence (EI) surpasses the traditional scope of cognitive abilities and

considers personality constructs of self-awareness, mood management, self-motivation,

empathy, and managing relationships. The constructs of EI coupled with social support is

believed to impress the behavior of health educators and their influence to facilitate

health behavior change (Branscum et al., 2016), essentially their self-motivation.

Practice for Change

Researchers have identified physical inactivity as one of the most critical, yet

changeable risk factors associated with noncommunicable disease (Lynch & Cohn, 2016;

WHO, 2009b, 2009c), and it remains one of the most challenging from both the patient

and the health educator perspectives. This challenge is partly due to reasons more intrinsically complex than merely deciding to comply with recommendations (Jallinoja et al., 2010). One proposed solution is self-monitoring or self-regulating, which has an influence on lifestyle behavior change and sustenance (Teixeira et al., 2015). The origin of the practice for change concept is Freire's adult education model based on active reflection of changing a behavior. Consistently modifying the approach for changing the behavior, removing barriers that hinder maintaining the changed behavior, keeping a record of progress, and taking action connotes the depth of this construct (Sharma, 2015; Sharma et al., 2016b, 2017). For the purpose of this study, physicians needed to be confident in their belief that counseling on PA is beneficial in addressing limitations they face in counseling on PA and modifying behavior change. I used this construct to determine how dedicated the health care physician was to developing and maintaining good practice for counseling on PA.

Changes in the Social Environment

This construct is the final construct in the sustenance of continuation component of MTM. This construct includes the social support, the construct of the environment, and meaningful relationships. As a health educator, the physician and other primary care providers can assist patients with this construct, naturally or artificially. Behrens and Harbour (2014) posited that physicians are motivated to adjust their behavior by what they perceive others think they should do in their practice. This peer influence has the potential to sway the attitude and belief of physicians about counseling on PA (Behrens & Harbour, 2014).

Sharma et al. (2015) developed MTM for health behavior change to provide a theoretical model for addressing health-related behaviors that are multifaceted and complex. MTM is a robust model designed exclusively for health education and health promotion, particularly due to its presumed power to predict the initiation and sustenance of a changed behavior and its applicability at multiple levels (individual, group, and community) cross-culturally. MTM consists of a combination of empirically tested constructs from a range of theoretical models that lack the ability to cover all bases needed to design successful health behavior change programs (Murray-Johnson et al., 2006). The limitations of several theoretical models used in PA research collaboratively underpinned the framework for MTM, highlighting it as the best fit to predict intention and sustenance for behavior changes.

Theories Related to Theoretical Framework

Researchers have used several theoretical models in the science and research on health behavior, notably for PA. The theorists designed these models for unique and distinct purposes, namely as a compass for understanding health behaviors and as a model for creating health interventions. Social cognition models are used to bring understanding to health behaviors. They are also useful for understanding individuals' perceptions about illness and control mechanisms (mental and physical well-being) along with level of awareness and perceptions for the purpose of forecasting forthcoming health-related behaviors and outcomes (Conner & Norman, 2005). Such models include the SCT, theory of reasoned action/planned behavior, HBM, transtheoretical model, the protection motivation theory, and models of ecological perspective.

Similarities exist among the different theories, and their key concepts, at times, seem to overlap. For example, the construct of perceived outcomes includes benefits and barriers (HBM) and outcome expectations (SCT, TPB); the influence of perception of control over behavior include self-efficacy (HBM, SCT) and perceived behavioral control (TPB); social influence includes concepts of observational learning (SCT), perceived norm (theory of reasoned action and planned behavior), social support, and interpersonal influences (ecological perspective). In this section, I explore the constructs of theoretical models used commonly in PA research along with their suggested capacity for predicting intention behavior as well as their limitations in comparison to the constructs of MTM.

Theory of Planned Behavior (TPB)

Ajzen developed TPB in 1980 as an addition to the theory of reasoned action (Ajzen, 1985, 1988; Ajzen & Fishbein, 1980). According to the theory of reasoned action, the intention to perform a behavior drives an individual's actual performance of that behavior and the attitude about the behavior. Another tenet of this theory is that the influence from the social environment collectively establishes intention (CDC, 1999; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Ajzen developed TPB because the theory of reasoned action could not be used to explain behaviors that individuals could not willfully control. As a result, an additional construct of TPB was introduce that appraised the perceived ease or difficulty in executing a behavior, termed perceived behavioral control (Ajzen, 1991).

Ajzen's goal for developing TPB was not to explain behaviors for which individuals had control over but mainly to predict behavior intent, the objective for doing

something to change a behavior based on thoughts and beliefs about the outcome. A premise of TBP is that intention (motivation) and ability (behavior control) are responsible for behavior achievement. Currently, six constructs of TPB exist that collaboratively embody personal behavior control. They include attitudes (positive or negative thoughts about the behavior and outcome); behavior intention (motivation); subjective norms (thoughts about others perceptions of the behavior- approval seeking); social norms (normal behavior for a group or culture); perceived power (factors that support or deter the behavior); perceived behavior control (apparent struggle exertion or comfort with behavior performance) (LaMorte, 2019).

TPB has earned credibility in the public health sector, more so than other theories, in that it has successfully clarified physician behavior in several aspects of health concerning their patients. Consequently, few researchers have examined physician's behavioral intent nor intervention development as it relates to PA counseling. Nevertheless, researchers have recently conducted studies to demonstrate ability in evaluating intention of primary care physicians to counsel patients on PA. This research is important because intention is an assumed indicator of forethought, willingness, and commitment to carry out a particular behavior, and in this case, PA counseling. One such study conducted by Behrens and Harbour (2014) who used TPB as a theoretical framework to evaluate physician intent to perform PA counseling using results from a pilot TPB questionnaire.

In this cross-sectional study, the Behrens and Harbour (2014) analyzed questionnaire results of 26 primary care providers (42.31% male, 57.69% female, and

84.6% Caucasian), consisting of family medicine physicians, general internists, and family medicine residents using descriptive statistics to assess provider characteristics (age, graduation year, practice type, PA scores) and multiple regression analysis for measurement of construct statistics for their influence on intention. For the intention analysis, Behrens and Harbour used a forward selection find a best-fit model for identifying the variables with significant variance and correlation statistics. From this analysis, subjective norms ($p \leq 0.01$) accounted for 43.33% of the variance for intention score and composite score for perceived behavior ($p \leq 0.01$). Because they added variables in the forward regression analysis, there was little improvement in intention prediction. Using the theory model, the researchers conducted second regression analysis using only direct measures of intention and found 51.0% variance, which was due to subjective norms ($p \leq 0.05$), and a decrease in impact of predictor variables. The researchers concluded that TPB is a useful framework for predicting intention, as it helped them develop prediction equations with two predictor variables, subjective norms, and indirect measures for perceived behavior control (composite score) in highest correlation for intention without minimizing significance in the predictor variables. The constructs were for individual intent, which the investigators researchers attributed to the intention questionnaire they developed (Behrens & Harbour, 2014).

The subject norms were significant for predicting PA counsel intention in this study, which translated to physician-perceived social pressure of having little control over the behavior and may be not being reimbursed for it or being mandated to perform it. Although this study was an important breakthrough for the current body of literature

pertaining to PCP intent to counsel PA, it had constraints such as lack of reliability

testing, physician time restraints for answering questions, a lack of bias control, and a

small sample size.

Although TPB has shown more utility in public health than the other models, it is

still limited in its predictive ability. Researchers may not use this model to predict

environmental (Behrens & Harbour, 2014; LaMorte, 2019) and economic influences

(LaMorte, 2019). Physicians in this study might be me more inclined to engage in PA

counseling if the clinic environment was conducive for PA counseling, if PA counseling

was the norm for every clinic, and if there was reimbursement for PA counseling like

every other service provided. Another limitation of Behrens and Harbour's (2014) study

was that they did not consider the different factors that influence or hinder the initiation

of counseling nor the sustenance of the behavior continuing over time. TPB may not be

used to explain what takes place between the time the physician decides to provide

counseling and the time the counseling actually takes place. Behrens and Harbour (2014)

reiterated the need for a more robust theory that could be used to predict the short and

long-term practice of PA counseling.

Health Belief Model (HBM)

A group of social psychologists who were committed to inducing knowledge

about the underutilization of preventive health programs and screening developed HBM

in the early 1950's. Hochbaum and his colleagues, influenced by contemporary learning

theory and cognitive theory, incorporated the application of theoretical models found in

behavioral science to understand and predict health behavior. HBM underlined a person's

perception of the value and expectation of an outcome before deciding to take a course of action. Its concepts included a desire to avoid an illness or to treat it successfully and the expectation to influence prevention or self-care (Clemow, 2004). HBM was a useful framework for gaining insight into personal beliefs and how they impact individual involvement in preventative measures. Over time, HBM has progressed in its application, and recent researchers have used this model to influence decisions about individual health behaviors, set the foundation for many health prevention programs, and identify opportunities for further research and practice with health behaviors.

The HBM model is a well-defined model used to understand individual perception and motivation to move forward and change a health behavior with expectation of a better health outcome (Sundstrom et al., 2018). This model consists of several constructs that predict individual perception and influence as it relates to a preventative health behavior (Glanz et al., 2008). The first construct is the perceived threat (susceptibility and severity), which refers to what a person believes about developing a health issue or worsening an existing condition and the seriousness or physical and social consequence of leaving that condition unmanaged. The second construct includes perceived benefits, which refer to individual conviction that preventive behavior is advantageous for lessening the serious effects or harmfulness of the condition if action is taken and that the scope of benefit is not solely health-related. The third construct includes perceived barriers, which refer to perceived negative consequences and factors that hinder individual acceptance and adoption of a new behavior, such as cost fear and worsening pain or discomfort. The fourth construct

includes cues to action, which refer to internal or external factors that encourage or stimulate a behavioral action, such as thoughts or bodily state or a defining event. The fifth construct is self-efficacy, which refers to the confidence an individual has that the needed behavior can be performed successfully resulting in desirable outcomes (Bandura, 1977; Clemow, 2004; Jones et al., 2014; Rosenstock et al., 1988).

The HBM has been operational for a long time and instrumental in influencing several contemporary health behavior theoretical models. It is empirically sound regarding its application in research concerning health education and health promotion since the 1950s. Marshall Becker, in 1974, conducted an extensive search and review of previous research to validate the predictive power of HBM's constructs within the health behavior domain. This research was later followed by the work of Becker and Nancy Janz in 1985, denoting an extension of the application of this model to cancer and genetic screening, cardiovascular risk factor screening, self-management, and prevention behaviors. The integration and application of variables from HBM with concepts from Bandura's SCT as well as the TPB and theory of reasoned action has served as the source of most of the current heath behavior models (Clemow, 2004).

Evidence from past meta-analyses studies showed that the constructs of HBM are disproportionate and have low predictive power for health behavior change. Harrison et al. (1992) considered 16 studies and concluded that overall effect sizes for the four major constructs of HBM were statistically significant (susceptibility 0.15, severity 0.08, benefits 0.13, and barriers -0.21) but minor and weak having only a 4% variance. In addition, the researchers found apparent inconsistency with effect size among the studies

rendering these findings weak for predictive ability (Harrison et al., 1992). To reiterate this point, a meta-analysis of 18 studies performed by Carpenter (2010) showed that severity, barriers, and benefits were likely predictors of performing a health behavior and perceived susceptibility had little to no variance. This result contradicted Janz and Becker's (1984) claim that susceptibility had greater predictive power than the other constructs, severity having the least predictive value (Carpenter, 2010; Janz & Becker, 1984). Researchers also conceded that perceived susceptibility was not a contributor to prediction of health behaviors (Carpenter, 2010; Harrison et al., 1992). HBM is useful in understanding and explaining health behavior change, it has weak and inconsistent predictive power and is not ethnically adaptable (Ogden, 2003; Sharma, 2015).

Social Cognitive Theory (SCT)

Patient behavior toward healthy lifestyle changes is thought to be related to physician behavior, attitudes, and beliefs about healthy behaviors. Researchers have also poised that before a behavior is acted upon, the thought about engaging in that behavior must first commence. It is for this reason that theory is needed to inform research of how to best implement interventions to support patients in making informed and healthy behavior changes. SCT is reflected in that regard because it includes a consideration for social foundations of thought and explanation of human behavior (reciprocal determinism, Glanz, 2016). Human behavior is a product of the interaction between personal factors (individual set of learned experiences), environmental influences (external social context), and behavior (responses to stimuli to achieve goals) mutually and repeatedly interact (Glanz, 2016; LaMorte, 2019; Zayas et al., 2009).

Bandura (2011) first articulated SCT as the social learning theory (SLT) in the 1960 and further developed it in 1968 with unique features to assess the manner in which behaviors are acquired and maintained in relation while emphasizing attending to the social environment and an individual's past experiences. The constructs of SCT help inform behavior adjustments under particular circumstances with positive reinforcement with the goal of initiating and sustaining a healthy behavior change. They include behavioral capacity (true capability to execute a behavior with the understanding of what to do and how to do it); reciprocal determinism (mutual dealings relationship between the individual, environment, and behavior); and observational learning (model the effective behavior of others). Other constructs include reinforcements (internal or external responses that determine the likelihood of repeating or stopping a behavior); expectations (expectations of good or bad outcomes based on experiences and future value); self-efficacy (self-confidence in performing a behavior).

Dai and Sharma (2014) operationalized three constructs of SCT to understand its role in predicting change in four behaviors among 222 Taiwanese obese children in elementary school. Targeted activities and expectation included PA improvement to 60 minutes, 2-hour reduction in screen time, consumption of food and vegetables to five cups, and increased consumption of water in exchange for sugary drinks. These targeted behaviors are problematic and predispose children to becoming obese. The 57-item survey instrument was reliable and valid (Sharma et al., 2016a) and had been used across several cultural settings including the United States (Canavera et al., 2009), China (Murnan et al., 2006), and India (Sharma et al., 2009).

The results showed that self-efficacy and self-control were significant predictors of PA at $p \leq 0.5$, which has been confirmed in previous study studies (Murnan et al., 2006; Sharma et al., 2016a), without confirmation for expectation. Of the 222 students, 62.2% reported to have participated in 30 minutes of exercise at home, showing similarity to 60% of elementary students who did the same in a study conducted by the Minister of Education of Taiwan in 2009 (Dai & Sharma, 2014; Minister of Education of Taiwan, 2009). The results for limiting time for television viewing to less than 2 hours per day showed significance for self-efficacy at a value at $p \leq 0.001$, showing 60% compliance, which was slightly higher than the 75.7% compliance for students watching only 1.8 hours per day in a previous study (Murnan et al., 2006). This percentage was slightly lower than the 40% of students who spent 1.6 hours a day watching television in another study (Dai & Sharma, 2014; Sharma et al., 2009).

Researchers also reported that self-efficacy as the only predictor of both drinking water and eating more fruits and vegetables, with synonymous values of $p < 0.001$. Age was also an important factor in increasing water consumption. The findings showed increased performance in drinking water and consuming fruits and vegetables than in previous studies, with participants consuming 5.6 glasses of water compared to 3.59 glasses in previous study (Sharma et al., 2016b). This finding was consistent with the results from other studies concerning fruit and vegetable consumption in children in India (Sharma et al., 2009), in China (Murnan et al., 2006), and the United States (Sharma et al., 2016b). Fruit and vegetable consumption was 5.9 servings but at 20%. This level was low and within proximity of CDC's report of the 22% servings (CDC, 2015; Dai &

Sharma, 2014). These results were limited by sampling bias due to the participant selection process. These studies confirmed that SCT exhibits some predictive power but is limited in that only a few of its constructs show variance. Thus, SCT is not an ideal theory for predicting intention because it does give much attention to emotion or motivation, both of which play important roles in behavior change.

Application of the Multi-Theory Model in Previous Research

Sharma (2015) MTM was developed out of necessity for finding a theory solely dedicated to health behaviors; one that had predictive power for health behavior change, was empirically evidenced, prudent, and culturally applicable across various levels of individuals and populations. This theory is an ideal model for health education and health promotion while incorporating existing theories to reinforce its capacity for predicting health behavior change as a one-time event and long-term endeavor (Sharma, 2015; Sharma et al., 2016a). Researchers have tested MTM in empirically studies for a number of health behaviors and proven its adaptability and investigative features as a reliable research tool in studies with the following aims:

1. Predict the initiation and sustenance of portion size control in consumption of food among college students (Sharma et al., 2016a).

2. Predict initiation and sustenance of adequate sleep behavior (Knowlden et al., 2017)

3. Utilize MTM to predict intention for initiation and sustenance of smoking cessation (Nahar, Wilkerson, Patel et al., 2019).

4. Explore the use of the MTM of health behavior change in predicting intention for veterinary students to begin relaxation practices each day (Nahar et al., 2020).

5. Test MTM in predicting initiation and sustenance of physical activity behavior among college students (Nahar et al., 2016).

6. Predict PA behavior in African American females (Hayes et al., 2018).

7. Determine efficacy of an intervention based on MTM for health behavior change for initiating and sustaining PA among African American women (Hayes et al., 2019).

8. Use MTM to predict initiation and sustenance of PA behavior in medical students (Nahar et al., 2020).

Researchers have used MTM in several empirically studies to test the validity of its constructs. In a cross-sectional study, Sharma et al. (2016b) used the initiation and sustenance constructs to predict small portion sizes consumed by college students attending a sizeable public university located in the southern part of the United States. The researchers used an online sampling procedure to recruit a sample of 135 participants, which they deemed to be an appropriate size for evaluating the hypothesized measurement models. The students were either undergraduate or graduate students over the age of 18 who professed eating a large portion-sized meal within the specified 24-hour period.

The participants were administered an electronic 35-item questionnaire with questions on the standard socio-demographics information such as gender, age, ethnicity,

class level, current grade point average, location of living, and work status, in seven

questions and measurement items on MTM initiation and sustenance constructs in the

remaining 28 questions. Each item in the initiation model was measured on a five-point

Likert scale, with a maximum score of 20 for participatory dialogue (advantages and

disadvantages), 20 for behavior confidence, 8 for change in physical environment, and 4

for the measure of initiation. Likewise, the maximum score for student responses in the

sustenance model was 12 for emotional transformation, 12 for practice for change, 12 for

changes in social environment, and 4 for the measure of sustenance.

Sharma et al. (2016b) performed stepwise multiple regression modeling and

descriptive statistics using SPSS. The participants were 23.27 (SD: 6.11) years in age

with 62.2% being women and 77.8% being White. Six experts in the field of health

behavior research conducted face validity and content through qualitative evaluation and

revision. In addition, the researchers used Flesch Kincaid Reading Ease and the Flesch

Kincaid Grade level of the instrument, and found a scale of 47.4 and 8.5, respectively,

deeming it satisfactory for the population of participants in the study. Construct validity

was determined by chi-square, root mean square error of approximation (RMESA),

comparative fit index (CFI), and standardized root mean square residual (SRMR), which

all included reliable values. They tested reliability using Cronbach's alpha.

The results showed that age affected the initiation of consuming smaller portions,

suggesting that as age increases so does the likelihood of initiation because of proposed

weight gain. The research also showed a 37% variance for initiation of eating smaller

portions consistent with the constructs of behavioral confidence and participatory

dialogue. Gender was also a factor and accounted for the inclination that women were more likely to initiate eating smaller portions than men due to their keen consciousness for dieting. The results also revealed a 20% variance for sustained consumption mostly due to emotional transformation, changes in social environment, and race, suggesting that Whites were less likely to maintain the practice of eating small portions. Overall, the results revealed that the intention to initiate and sustain behavior change towards the consumption of small portion size was low in this target population. This study also solidified MTM as an adept theory for health behavior change, as its results showed evidence for the autonomous and equally exclusive properties of each construct (Sharma et al., 2016a).

Sleep adequacy is another behavior recommended as a good health habit with solid evidence showing it to have meaningful effect on hard-hitting health conditions, such as chronic disease development and incidence. The CDC (2018) reported that sleep inadequacy has been associated with chronic disease and that good sleep health is important in the development and management of chronic conditions. As sleep health has not been on the forefront of public health concern as a contributor to prevention, Perry et al. (2018) raised awareness to the importance of adequate sleep, in duration and quality, and the view that it is as important as proper diet and physical activity in managing health conditions. In this article, the authors suggested that sleep is a health behavior that can be improved by implementing strategies including screening and counseling efforts, public education, surveillance, and delayed school times for high school students (Perry et al., 2018).

Knowlden et al. (2017) used MTM to predict sleep behavior of college students attending an urban Midwestern university, as college students are at a higher risk of being sleep depraved in both quality and duration. In this cross-sectional study, 151 participants met the inclusion criteria and were administered a 38-item survey instrument, which included four items of eligibility, seven items related to demographic characteristics, and other items for operationalizing the constructs of the initiation and sustenance models of MTM. In the initiation model, the behavior confidence construct was used to predict variance of 24.4% for intention to initiate adequate sleep behavior with the constructs of change in physical environment and participatory dialogue not making a significant contribution. In the sustenance model, all the constructs were significant in predicting intention to continue the changed behavior with a combined variance of 34.2% for emotional transformation, practice for change, and changes in social environment. The results were similar to previous studies using HBM and theory of planned behavior, highlighting the usefulness and strength of MTM as a sensible theory of health behavior change.

Other researchers also validated MTM's predictive capabilities. For example, Nahar et al. (2019) conducted a study done to predict the initiation and sustenance of the cessation behaviors of smokers. The 148, majority White (95.9%) and male (58.1%), participants were selected using convenience sampling of shoppers at a mall in rural Appalachian Kentucky, who reported to have smoked for an average of 16.4 years, and had a mean age of 35.5 years. The participants were administered a 38-item survey, successfully evaluated for face and content validity, with the nine items used to assess

smoking status and demographic factors and the remaining 29 items used to assess

constructs for initiation and sustenance models of MTM. Hierarchical multiple regression

analysis in the initiation model revealed that participatory dialogue and behavioral

confidence, collectively accounting for 23.6% variance, were important predictors of

initiation for smoking cessation behavior and that in the sustenance model, emotional

transformation, accounting for 23.3% variance, was an important predictor of sustenance

for smoking cessation behavior. Although the findings from this study did not show that

the constructs of MTM preceded smoking cessation behavior, they suggested that MTM

has utility for predicting health behavior change and that the constructs would be ideal for

use in health behavior change interventions (Nahar et al., 2019).

      Likewise, the constructs of MTM were supported in a cross-sectional study

performed to explore the effectiveness of MTM in predicting the initiation and

sustenance of stress managing behaviors in 140 eligible veterinary students at a

veterinary school located in Southeastern United States (Nahar et al., 2020). The

researchers collected data using a 54-item valid and reliable survey instrument

administered online and analyzed them using hierarchical multiple regression.

Descriptively, the majority of the students were in their second year of school (30.7%),

had high grade point average over 3.0 (70%), were married (80%), reported no children

(95.7%), were unemployed (88.6%), and lived off campus (95%). Average stress levels

were measured at 21.64% (range 0-40), and 60% had anxiety with 32.9% with

depression. Nahar et al. (2020) monitored stress, depression, and academic classification

in the first round of regression and showed noteworthy bivariant relationship with

initiation and sustenance of relaxation behavior. In the initiation model, low-order predictors included depression and academic classification, whereas behavioral confidence was the only construct that showed notable correlation with a full model predicted 49.5% of variance in the initiation of mindful relaxation behavior. In the sustenance model, perceived stress and academic classification were lower-order predictors, whereas emotional transformation was the only construct that showed notable correlation with a full model predicted 50.4% of variance in the sustenance of deliberate relaxation behavior. Although this study had a few limitations, these drawbacks did not negate the recommendation that MTM is a useful theoretical foundation for interventions focused on conscious relaxation practices (Nahar et al., 2020).

The findings of the aforementioned studies show MTM as a robust theoretical framework for a variety of health behaviors. In the subsequent section, I review literature to recapitulate this finding while focusing the research solely on PA as the health behavior to be investigated. Researchers have proven that PA has both short and long-term benefits, including reducing the risk of heart disease, diabetes, cancer, obesity, and chronic disease, which makes it a relevant and accessible behavior to consider for applying the utilities of MTM.

Researchers first assessed the predictive efficacy of MTM in health behavior research by predicting PA behavior with college students attending a large university located in the southern part of the United States. Using a cross-sectional design, 141 students were electronically administered a 37-point questionnaire with seven questions dedicated to socio-demographic information and the remaining 30 items dedicated to

assessing the constructs of MTM. Participants were majority Caucasian (70.9%) female (72.3%) graduate students (33.3%), with an average age of 24.56 years and an average GPA of 3.50-4.00 (54.6%). Approximately 76% of all the participants reported living off campus and approximately 57% were currently working. Participants also reported that they did not do more than 150 minutes of moderate to vigorous intensity aerobic PA and did not have any impeding condition to interfere with their participation in the study.

Nahar et al. (2016) tested the instrument for face and content validity using a panel of experts in the area of health behavior research (two experts in PA and three experts in college students) as well as experts in theoretical models in health education and instrument development. The experts utilized the Flesch Kincaid Reading Ease of Instrument (47.4) and the Flesch-Kincaid Grade level of instrument (8.5) along with two rounds of minor modifications in wording without removing any item to confirm validity. The experts tested the construct validity of this instrument using a confirmatory factor analysis (CFA) to analyze covariance and four indices (chi-square, root mean square error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean square residual (SRMR) to assess the suitability of the model to data. The model was confirmed to have an adequate suitability. Nahar et al. (2016) confirmed the reliability using the Cronbach alpha, obtaining alpha coefficient values of over 0.60, which is an acceptable value for subscales and recommended measurement value for new scales.

The results of descriptive statistical analysis of the constructs showed mean values of 14.29 for construct of advantage, 8.56 for construct of disadvantage, 6.25 for

behavioral confidence, and 7.32 for changes in physical environment. The overall mean score was 1.59 for initiating the behavior, leading to the conclusion that participants were less likely to increase their aerobic PA to 150 minutes in coming week. In addition, the mean values were 5.11 for construct of emotional transformation, 3.67 for practice for change, and 2.88 for changes in social environment, which culminated a mean score of 1.39 for continuing the behavior. As a result, Nahar et al. (2016) concluded that the participants were less likely to increase their aerobic PA to 150 minutes every week from that point onwards. Stepwise multiple regression analysis showed a variance of 26% for the initiation model and a variance of 29.7% variance for the sustenance model. Thus, it was concluded that the empirical testing of the constructs for initiating and sustaining a behavior health change were found to be predictive of PA behavior. Based on the findings of this study, the researchers also established that the constructs of MTM are autonomous and equally absolute, which supports MTM application to other health behaviors (Nahar et al., 2016).

Subsequent studies performed showed the significance in application of MTM for predicting intention for behavior change. In a cross-sectional study, Hayes et al. (2018) assessed PA behavior among 156 African American women, ranging from 18 to 80 years of age (averaging 42.67), majorly employed, and residing in Jackson, Mississippi. The participants did not have any impeding conditions and had not had more than 150 minutes of PA in the past week. Using a valid and reliable 38-item questionnaire, adapted to suit this study, data were collected from the participants. Descriptive statistical analysis showed constructs of initiation with mean scores of 13.55 for advantages, 7.73 for

disadvantages, 8.5 for behavior confidence, and 6.72 for change in physical environment, collectively yielding a mean score of 1.75 for the initiation of the behavior, suggesting that the participants would be somewhat likely to begin PA in the coming weeks.

Descriptive statistical analysis showed constructs of sustenance with mean scores of 6.40 for emotional transformation, 4.88 for practice for change, and 4.72 for change in social environment, collectively yielding a mean score of 1.65 for the sustenance of the behavior, indicating that the participants would be less likely to maintain 150 minutes of aerobic PA long term. Regression analysis showed an approximate 32.7% variance for initiating PA, which the researchers attributed to all constructs in the initiation model predicting initiation of PA. It also showed 38.8% variance for maintaining PA, which was attributed to the emotional transformation and a change in social environment constructs predicting intent to continue PA behavior (Hayes et al., 2018).

Past and recent studies have paralleled the implication that MTM is effective in predicting a range of health behaviors and that it is applicable across diverse levels and populations of people. Of particular interest to this study was how effectively the constructs of MTM could predict the intention of behavior change among physicians. Physicians pose as a leading source of information for the public regarding preventative behaviors and lifestyle changes that are advantageous for improving health. Consequently, one of the barriers that physicians face in providing PA counseling to their patients is their own personal PA habits (Lobelo et al., 2008). Research has shown that as physicians actively practice healthy habits, their attitude towards the behaviors is influenced, rendering them more inclined to counsel and encourage their patients to

accept their advice and become active. To further implicate this practice as a standard for physicians, medical schools should employ students to embrace and maintain the habit of regular PA in an attempt to increase the rate and quality of PA counseling offered by physicians (Lobelo et al., 2008).

In a more recent study, Nahar et al. (2019) evaluated the efficacy of MTM, a newly designed fourth-generation theoretical framework, in predicting the intention of osteopathic medical students to begin and continue engagement in PA behavior. The researchers recruited 135 eligible participants, mostly first year, including 52.6% women and 67.7% Caucasian, enrolled in a university located in the Southeastern part of the United States. The participants were administered a valid and reliable, 38-item instrument for which the first and second questions were qualifiers for participation, verifying students did not participate in the recommended 150 minutes of PA and that students did not have any medical issues hindering their participation in PA. Items three through nine covered demographic information such as age, gender, race/ethnicity, class level, grade point average, housing, and work status. The last 29 questions covered the constructs of the initiation component (participation dialogue, behavioral confidence, and change in physical environment) and the sustenance component (emotional transformation, practice for change, and changes in social environment) of MTM.

The multiple regression analysis revealed a 25.8% variance for initiation of PA indicating behavioral confidence as a statistically significant predictor of initiation with a p-value less than 0.001 ($p < 0.001$). The sustenance of PA was dually significant accounting for 41.7% variance, with p-values in changes in social environment ($p = $

0.002) and emotional transformation ($p < 0.001$) being statistically significant predictors of sustenance of PA behavior change. The findings of this study further iterate the importance of self-confidence, the internally or externally motivated belief that one can execute a behavior and exert control over their own motivation and behavior, in predicting the intention to initiate PA (Sharma et al., 2017). The findings also show that social support and the redirection of feelings towards setting a goal are important when predicting intention to continue engaging in PA (Nahar et al., 2016).

The outcomes of the aforementioned studies support the thought that MTM is a genuine and reasonable theoretical framework for predicting intention for health behavior change for PA. Consequently, numerous individuals still do not engage in regular PA as recommended by the Centers for Disease Control (CDC), worsening the burden of chronic disease on the healthcare system and increasing the need for theory-based intervention.

Categories of Physical Activity and Definitions

PA has often been confused with physical fitness and exercise; however, there is past and present consensus that PA is different. PA is defined as "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen et al., 1985; CDC, 2017). Exercise and physical fitness are characterized as subsets of PA. "Physical activity that is planned, structured, repetitive, and has an objective for improvement or maintenance of physical fitness is exercise, and physical fitness refers to a state of health achieved as a result of attributes that people as it relates to their ability to do physical activity" (Caspersen et al., 1985, p. 130).

PA has been categorized into groups according to when and how these activities take place during the course of a day: while sleeping, while working, and at leisure, indicating the amount of total energy expended during the activity attributing to the caloric contribution in each group (Caspersen et al., 1985). The CDC (2017) extends these categories and defines them as follows:

- Leisure-time PA: Exercise, sports, and physically active hobbies done in one's leisure time.

- Occupational activity: PA undertaken as part of one's employment. This does not include exercise or physical activities engaged in at employer sponsored gyms or other facilities.

- Transportation-related activity: PA undertaken by moving from place to place, which may include walking, jogging, biking, or any other physically active method of getting from one place to another.

- Light-moderate physical activities: These activities might include moderately paced or leisurely walking or bicycling, slow swimming or dancing, and simple gardening.

- Vigorous physical activities: These activities might include fast walking, fast bicycling, jogging, strenuous swimming or sports play, vigorous aerobic dance, or strenuous gardening.

PA Recommendations

The U.S. Department of Health and Human Services (2018) published the second edition of the Physical Activity Guidelines for Americans issuing the following key

recommendations for children and adolescents, adults and older adults, adults with

chronic health conditions and disabilities and for safety:

- Preschool aged children (3 to 5 years): Physically active throughout the day

  through active play and structured activities.

- Children and Adolescents (6 to 17 years): 60 minutes or more of moderate-to-

  vigorous PA daily (aerobic, bone and muscle strengthening).

- Adults: Move more and sit less during the day with 150 minutes to 300 minutes a

  week of moderate intensity or 75 minutes to 150 minutes a week of vigorous

  intensity aerobic PA or a combination with additional benefit beyond the stated

  recommendation. Other recommendation is for moderate to greater intensity of

  muscle-strengthening activity 2 or more days a week.

- Older adults: Same as adult recommendation along with balance training,

  ensuring that activities are not performed above ability to perform or that chosen

  activities do not exacerbate current condition.

- Adults with chronic conditions: Same as adult and older adult recommendations

  with adjustments made when deemed necessary; according to ability with advice

  to consult healthcare provider for appropriate activity, level of intensity, and

  duration.

Implications of Physical Activity for Health

PA is not a new resolve for reducing health issues that concern public health

leaders worldwide. Research has shown that regular PA will substantially improve health

outcomes, subsequently the quality of life for everyone, and provide economic relief for

healthcare systems. Unfortunately, a decline in PA has led to an increase in sedentary behaviors, resulting in an overwhelming rate of physiological, psychological, and psychosocial deterioration (Hills et al., 2015).

Health Risks of Physical Inactivity

Unhealthy lifestyle behaviors, particularly physical inactivity, have harmful effects on the body and are linked to increased risk of cardiovascular disease, diabetes, and premature death (Bailey & Phad, 2019). WHO reported physical inactivity to be fourth among the leading factors of mortality worldwide, accounting for approximately 3.2 million deaths per year (WHO, 2010), often ranking highest in prevalence to other contributing factors (Brown et al., 2015). It is reported that only 1 in 3 children are physically active each day; 1 in 4 U.S. adults and 1 in 5 high school students engage in the recommended amount of routine PA. It also reported that more than 80% of adults do not meet the guidelines for both aerobic and muscle-strengthening activities, and more than 80% of adolescents do not do enough aerobic PA to meet guidelines for youth (CDC 2019; HHS, 2018). This unhealthy habit leaves a detrimental trajectory of societal decline in health and economic stability. Heart disease, diabetes, cancer, and obesity, among other conditions, are all byproducts of physical inactivity. Physical inactivity has burdened the healthcare system and accounts for approximately $117 billion every year spent towards cost of care (CDC, 2019). Physical inactivity is a behavior that is highly avoidable and affects everyone, regardless of age, race, gender, or nationality.

The benefits of PA have been well established for over a century, yet a quarter of the global adult population is insufficiently active (WHO, 2018). Physical inactivity

remains a global health issue responsible for nearly five million deaths worldwide

(WHO, 2018; British Heart Foundation, 2017). Rated as the fourth leading risk factor for

mortality, physical inactivity accounts for 10% of the global burden of disease from colon

cancer, 10% of breast cancer, 7% of type II diabetes, and 6% of coronary heart disease

(Lee et al., 2012).

Benefits of Physical Activity

The U.S. Department of Health and Human Services (2018) stated that everyone

benefits from engaging in physical activity on a regular basis. Individuals in good health

can sustain a healthy status and prevent adverse health problems. Those at risk for

developing chronic conditions are likely to reduce the probability and reverse the disease-

forming process, and those with current chronic illness and other health frailties have

opportunity for improvement if the recommendation for regular PA is realized (HHS,

2018). PA, if executed as recommended, has many contributory qualities, such as (CDC,

2019):

- Promotes to normal growth and development

- Improves sleep

- Increases ability to perform everyday activities

- Improved cognitive ability and reduces risk of dementia

- Improved bone and musculoskeletal health

- Reduces risk of chronic disease

- Aides better physiological and psychological functioning

- Fosters better sleep

- Prevents type 2 diabetes

- Reduces arthritis pain

Research evidence for the benefits of regular PA continues to provide insight at individual, community, societal, and worldview levels for people of all ages and nationalities. Review of numerous research articles have shown that for older adults without obvious frailties, regular PA is acutely associated with reduction in preventable chronic diseases, improved quality of life, more functional skills, less difficulty with activities of daily living, and more satisfaction with life through the aging process (Parra-Rizo & Sanchis-Soler, 2020; Svantesson et al., 2015).

Studies have shown that some older adults perceive PA to be only beneficial to the younger population (Burbank et al., 2002; Schutzer & Graves, 2004). However, there is compelling evidence that the requirement for PA does not end in later life (Bherer et al., 2013; Public Health Agency of Canada, 2011). Findings from longitudinal studies show that engaging in regular physical activity can improve the capability to perform daily tasks, (i.e., functional ability) (Blair & Wei, 2000; Cadore et al., 2013) and cognitive ability among older adults (Bherer et al., 2013). Physical activity has also been linked to the prevention of several risk factors and adverse conditions including osteoporosis (McKenna & Ludwig, 2008), falls, and fear of falling (Canning et al., 2015), hip fractures (Feskanich et al., 2014; Lai et al., 2013), and depression (Mammen & Faulkner, 2013). Many researchers have reported associations between physical inactivity and loss of mobility and independence in later life (Franco et al., 2015; Horne et al., 2013; Takagi et al., 2015).

Facilitators and Barriers of PA Behaviors

Despite efforts to promote regular PA, initiation and sustenance of consistent PA remain problematic. In response to these findings, research has been directed towards identifying barriers that inhibit adherence to national recommendations. In a recent mixed methods research study, the researchers surveyed the facilitators and barriers of PA among primary care patients with prediabetes, and found identified barriers associated with PA, including the lack of family member support, medical conditions, the lack of knowledge/skill, and the lack of time and facility within the neighborhood. The investigators identified family and peer influence, good health, and education counseling by healthcare professionals as facilitators to meeting recommendations (Tar Lim et al., 2020). The researchers also emphasized the opportunity and influence that primary care physicians have as frontline educators. A systematic review of 10 research studies between 2007 and 2017, including participants among minority Black and ethnic groups in the UK, revealed six themes including awareness of effect on health, communication with physician, expectation, appropriate location (physical environment), and practical challenges (Ige-Elegbede et al., 2019).

Physician Role in PA Counseling

In response to the global pandemic of physical inactivity, public health officials find ways to counteract the problem using available evidence and recent developments identifying key contributors for behavior health change. WHO has advanced its efforts by proposing policies and recommendations for PA globally, focusing primarily on prevention of noncommunicable diseases. The World Health Assembly has followed suit

by setting targets to reduce premature mortality from NCDs to 25% and 10% for decrease in insufficient PA by year 2025. The new global action plan will require concerted efforts from health, education, environmental, sports, and technology sectors to hasten growth and achievement, dependent on current scientific knowledge of evidence-based practices concerning PA (WHO, 2018). In the Revision of the Healthy People 2020 campaign, the effort to increase counseling on PA by primary care physicians is identified as an objective for responding to treatment and prevention options for the national chronic disease problem.

Research has shown that physicians and other healthcare providers can make a difference at the system level by promoting PA into the healthcare system and providing health information and PA counseling to their patients (Barnes & Schoenborn, 2012; Lowe et al., 2017; Ribeiro et al., 2007). Doctor visits are a convenient and cost-effective opportunity for healthcare providers to initiate lifestyle changes to improve patient conditions and quality of life. The systematic synthesis of the literature in previous studies has shown that PA counseling initiated by health care professionals has potential short tenure for improvements in patient PA levels (Elley et al., 2003; Orrow et al., 2012; Petrella & Lattanzio, 2002). In addition, HCPs are more prone to provide more reliable and encouraging PA counseling when they actively engage in regular PA themselves (Lobelo & de Quevedo, 2016).

The Healthy People 2010 agenda along with the United States Preventive Services Task Force have urged healthcare professionals to make counseling a customary practice; however, during doctor visits, 22% to 48% of elderly patients with chronic

illness received counseling, 56% of patients are asked about PA habits, and only 34% actually received some form of counseling (Ribeiro et al., 2007). A report from the U.S. Department of Health and Human Services examined trends in the number of U.S. adults receiving PA counseling during a healthcare visit to a physician or other healthcare professional over a 12-month period. The report revealed an upward trend in each category, most notably with one in three adults (32.4%) being counseled to begin or continue PA behaviors leading to an increase from 22.6% to 32.4% over a 10-year period (40% of overall increase). Although the data revealed a marked progression towards meeting a health objective of Healthy People 2020, the prevalence of PA counseling from healthcare professionals remains well below the amount needed to achieve a substantial benefit across populations (Barnes & Schoenborn, 2012).

Research shows that only about 40% of physicians actually counsel on PA (Lobelo & de Quevedo, 2016). To further efforts to change the current dynamics, researchers have relied on theoretical models to identify barriers and facilitators to PA counseling among primary healthcare professionals. Although much insight has been gained from such theories, there remains a gap between knowing and doing. Thus, MTM is a potentially useful framework for bridging this gap and providing a theoretical scope for promoting PA and increasing engagement.

Summary

Physical inactivity remains a public health problem and continues to grow as one of the leading causes of premature death. Because of its predominance across many cultures and ethnicities, age and gender, it has been difficult to find effective mechanisms

for putting an end to the epidemic of inactivity. Physicians and other primary care providers can provide relief and serve as catalysts of change in this situation. PA counseling and promotion is key to changing the behavior of inactivity. Every encounter with a patient provides the perfect opportunity to educate, encourage, and engage. Previous research studies have shown that physicians are role models and that patients trust their judgment and advice.

Previous studies have shown that although prevention programs founded on theoretical frameworks of health behavior change are necessary, they have not had much success. Patients may initiate behavior change for engaging in PA but fail to sustain the behavior for several reasons. This outcome is indicative of a lack of robustness in theoretical constructs to capture the full essence of starting a behavior and continuing that same behavior. This fact proves the need for a theory that will not have the limitations of previous theories but one that will combine effective constructs to create a theoretical foundation that is exclusive to health behavior, has predictive ability, reaches populations cross culturally, and is consistent with individual, group, and community application.

After thoroughly searching the literature and identifying common theories used in behavior change research, I discussed the elements of the MTM, a fourth-generation theory that was ideal for this study due to its ability to predict intention. Considering the constructs of MTM, it was thought that these constructs could be used to explain the initiation and sustenance of physician behavior towards counsel and promotion of PA. This chapter was used to set the foundation for Chapter 3, which includes information

detailing the method for inquiry of this study, the study design, sampling strategy,

instrument, data collection and rationale or the choice of research method.

Chapter 3: Research Method

Introduction

In this chapter, I will discuss the research methodology I chose for this investigation. This chapter includes the purpose of the study, a detailed description of the research design, and rationale and motivation for the study's approach. Also included in this section is the sample population described by the selection process, sample size, and recruitment strategies. I will also discuss the development and deployment of instrument, collection of data, plan for data analysis, validity, and ethical considerations in this chapter.

Purpose of the Study

My goal for this study was to examine MTM constructs for their ability to predict the intention of primary care providers to promote physical activity. I explored the six constructs of the initiation and sustenance components of MTM to determine their suitability for predicting behavior change among health care providers. I also analyzed the constructs of the initiation component, participatory dialogue, behavioral confidence, and changes in physical environment to verify their capacity for predicting the initiation of the behavior change of primary care provider intention to promote physical activity with each patient office encounter. Likewise, I evaluated the constructs of the sustenance component, emotional transformation, practice for change, and change in the social environment to confirm their legitimacy for predicting the behavior change of primary care physicians' intention to sustain a practice of promoting physical activity to their patients during each office encounter. Finally, I assessed the influence that MTM

initiation constructs of participatory dialogue, behavioral confidence, and change in physical environment have on primary care providers for counseling patients on physical activity.

<div align="center">**Research Design and Rationale**</div>

I chose a quantitative cross-sectional design for this study to investigate the intentions of primary care providers to counsel and promote physical activity using the constructs of MTM. This study was a nonexperiential study and was indicative of a study for utilization in quantitative study models. The quantitative research design is effectively used to acquire knowledge of general occurrences of behaviors or circumstances that have potential for individual, communal, and global affects (Smith, 2019). Quantitative research methodologies are posited as deductive and generalized yielding to predictive explanation and understanding of behaviors and/or circumstances (Smith, 2019). I used this approach for this study because, according to Smith (2019), the nature of quantitative studies is objective lending to fact-based data that are measurable and liable.

I used a cross-sectional design with a survey to extrapolate information concerning prevalence of behavior within a particular population at a precise time. Creswell (2013) explained that a survey is one of three design options offered within the scope of quantitative research . I chose this design due to its appropriateness and strength of inference, cost-effectiveness, ease of implementation, and timeliness of data collection. I used a self-constructed instrument consisting of closed-end questions and a cross-sectional design to examine the legitimacy of MTM variables in predicting the intention of primary care providers to promote physical activity during regular patient visits. In this

study, I did not manipulate the variables, because the design was not conducive to cause-and-effect; however, as Fink and Brayman (2006) explained, the MTM model does render conclusive assumptions.

Methodology and Materials

Sampling Procedure

I used convenience sampling to select participants. Convenience sampling is a type of nonprobability sampling that is described as including individuals that are available, easily accessible, and willing to participate (Fink & Brayman, 2006). Researchers use this sampling procedure when the testing is both "basic and universal and can be generalized beyond such a narrow sample" (Trochim, 2001, p. 57). To accommodate the purpose, the research demanded a sampling process that targeted participants with similar traits and characteristics related to job function and responsibility. Primary care providers have job functions that are comparable in nature to those of other nonspecialty practitioners, such as internist, pediatricians, practitioners of family medicine, physician assistants, nurse practitioners, and nurses.

Sample Size, Target Population, and Recruitment Procedure

Sample size is key to an empirical study (Wang & Chen, 2020). Using an unbiased representation of a population to make assumptions about a larger population requires a sample size that will provide sufficient statistical power (Wang & Chen, 2020). The population for this study included primary healthcare providers located within the Southeastern region of the United States, specifically the state of Georgia. I sought the participation from primary healthcare providers whose job function was to provide

routing preventive care services in addition to diagnosing and managing common and

chronic conditions. The participants are defined as being skilled in a broad range of

health care and can treat both illness and injury. Inclusion criteria for primary healthcare

providers included physicians such as family physicians, family medical doctors,

pediatricians, internal medicine physicians, primary care physicians, physician assistants,

nurse practitioners, and nurses. These professionals are advocates for the patient

(Kronenfeld et al., 2012) in primary care centers or in private practice. The practitioners

who care for patients with common and nonemergent conditions, provide preventive care,

and promote healthy living include nurse practitioners, physician assistants, obstetricians,

gynecologist, and geriatricians (Everett et al., 2013). Registered nurses, advance practice

nurses, and clinical nurse specialists also fit the profile and inclusion criteria for this

study. According to the 2018 update of the Cochrane review, nurses were found to have

obtained patient outcomes that were equal and better, in some cases, when compared to

that of primary care physicians when providing primary care services to their patients

(Laurant et al., 2018).

The recruitment process began with an introduction of the research by sending

electronic announcements and letter of invitation spaced at 1-week intervals. Included in

the announcement was information explaining the participant requirements, along with

any risks and benefits associated with participation. Participants were provided a

declaration of anonymity along with a request for participation. Upon agreement,

participants secured their participation and were allowed to proceed to the survey. This

process continued for several weeks with other methods of recruitment employed to

obtain a sufficient number of participants. I solicited provider contact information from

the American Medical Association, the Healthcare Workforce of Georgia, and Georgia

Composite Medical Board. Specialty physicians were excluded from this study.

When determining a sufficient sample size, I used G*power to calculate an

acceptable representation of the consenting respondents. Using a small to medium effect

size of 0.06, a significance level of $p=0.05$, and a statistical power of 0.80 with six

predictors, the calculated sample size was 233 participants. Assuming the unlikelihood of

securing a sufficient number of participants, other considerations included acquiring data

from Statistica.com, Association of American Medical Colleges, the Health Resources

and Services Administration, and the Agency for Healthcare Research and Quality.

Previous studies have shown several methods for recruiting participants that are

successful with little bias. These include posting of announcements for participants on

websites and physical facilities, classified ads, discussion forums, and commercial

websites and editorials (Alessi & Martin, 2010). For this research, I considered medical

(hospital, organization, agency, community, and university) websites and facilities.

Data Collection Process

Data collection is a crucial part of a research study. Careful consideration and

implementation of the collection process is fundamental to the quality of the research

study and determines its longevity. Although data can be gathered using numerous

conventional methods, such as cold calling, printed surveys by mail, and interview,

research has shown that using traditional methods of data collection does not always

yield favorable results in a timely and cost-effective manner, but that technological

advancement has made it possible to achieve both. The increase in internet accessibility and utilization makes it a feasible and intuitive platform for collecting data and a current trend that is preferred by most research participants (Faleiros et al., 2016). However, data collection by paper can be advantageous in ensuring the maximum number of respondents needed to satisfy the study. Additional advantages in collecting data via paper surveys is the non-requirement for electronic devices, the ease of distribution to a significantly large pool of respondents, and the trust that respondents have in the researcher for maintaining anonymity (Papersurvey.io, 2021).

I chose to use a mixed web and paper survey approach for data collection. This determination was based on accessibility, cost, time, ease of use, and flexibility. I anticipated that the data collection process would take no longer than 1 to 2 months, considering the methods that would be employed for distributing the research instrument and for gathering the data. I used the internet to increase responsiveness and facilitate immediate and confidential communication between myself and participants. I also used paper surveys to broaden the scope of participation and increase the number of respondents. Before administering the survey, the I tested instrument for face and content validity using a panel of experts familiar with the theory and the targeted population.

I used an internet tool that was user-friendly, adaptable to different distribution platforms, specific to the user, and compatible to SPSS. Tools that have all or most of the aforementioned capabilities are Qualtics XM, Google Forms, Survey Monkey, and Formsplus, all of which have been used in scientific research. These tools are specifically

designed to manage, analyze, and store large data sets, rendering them useful for this research study. Paper surveys were distributed via postal mail and delivery.

In addition to the above-mentioned benefits of using an online tool, the use of the internet to distribute the survey is the most timesaving and cost-effective method and most favored and safe during this time of COVID-19 pandemic outbreak. It also increases participation. Participants received a confidentiality statement at the start of both electronic and paper surveys to educate and secure informed consent prior to the participants beginning the survey. I used the online and paper survey format to set questions as "required" to be answered before continuing to the next question. Participants could not submit the survey electronically if required information was not provided, and survey responses received by paper were not counted if all necessary information was not present.

Instrumentation

The instrument that I used for this study was a 37-item scaled survey developed to evaluate the intentional promotion of PA by primary care providers using the constructs of the MTM of health behavior change. I designed the instrument to address the research questions of this study using the constructs of MTM, a fourth-generation theoretical model posed to have predictive powers for forecasting the intentions of initiating and sustaining behavior health change. While conducting the literature review, I found no survey that I could use to analyze predictability of primary care provider intention using the MTM. Therefore, I developed this instrument for this study.

There are several elements required when developing an instrument for research. According to Sharma and Petosa (2014), the first steps for developing a precise instrument before its use include defining the purpose for its development, reviewing existing instruments, identifying, and defining objects of interest, prioritizing the number of objects to be measured, and choosing the scale of measurement. The purpose for developing this instrument was to examine the intentional behaviors of primary care providers to promote physical activity using the constructs of MTM. Although there was research available that sought to measure intention behaviors of physicians, I found no instruments specific for constructs of MTM. The defined objects of interest for this study were constructs of both the initiation and sustenance models of MTM for a total of six objects. The scale used for scoring items in this instrument was the Likert scale, which was rated on a 5-point scale, including *never* (0), *hardly ever* (1), *sometimes* (3), *almost always* (3), and *always* (4) and from *not at all sure* (0) to *slightly sure* (1), *moderately sure* (2), *very sure* (3), and *completely sure* (4). I chose the Likert scale because it contained a pool of answers from which test takers could selected a response. Researchers use this scale to identify, differentiate, distinguish, or match objects (Sharma & Petosa, 2014).

The first section of the questionnaire screened participants for appropriateness of participation by identifying their current occupational scope of practice as well as their counseling practices. Participants were first asked if they were a practicing primary care provider. If the answer was "no," the participant was directed to stop the questionnaire. If the participant answers "yes," they were directed to the next question. In the next

question, the participants were asked about their scope of practice to determine if they were a a) primary care physician, b) family medicine physician, c) physician assistant, d) medical resident, e) nurse practitioner, f) nurse, or g) other.

Questions 4 through 9 included a question-response option with logical answer choices to gather demographic information, such as gender, age, and race/ethnicity as well as provider norms for number of patients served and time spent per encounter. I used this information to define and identify the participants more precisely and provide a clearer understanding of the data. The question-response options strategy is beneficial to research, as the researcher can use them to data (Dobson et al., 2018). I used Questions 7 through 10 to address the amount of time spent in the office per day, provider-patient contact, including the number of patients seen per day and the amount of time spent per encounter, and PCP counseling practices. This information is relevant because past research has shown that the lack of time is a common barrier to physical activity counseling and promotion among physicians (Alahmed & Lobelo, 2019; Hébert et al., 2012; Pang et al., 2018).

The remaining 27 items were dedicated to measuring the strength of MTM constructs for predicting the initiation and sustenance of providers' behavior for promoting physical activity during patient encounters. There were two components of MTM: initiation of behavior change and sustenance of behavior change, which refer to the predictability of intention of a primary care provider to initiate discussion/counsel on behavior change concerning physical activity and the likelihood that they can sustain that behavior. I assessed these components using items 26 and 27, respectively.

Component I: Initiation

Participatory dialogue, the first construct of the initiation component, involves talking to patients about the potential advantages of behavior change regarding physical activity and providing insight about their behavior, which aids the provider in prescribing appropriate physical activities. I used items 1-4 to measure this construct and items 5-8 to measure the disadvantages associated with participatory dialogue as it relates to provider thoughts and beliefs about counseling on physical activity, whether it is thought to be a waste of time, a deviation from the main issue, impractical or irrelevant. I used a 5-point scale to rate both the advantages and disadvantages of the construct, including *never* (0), *hardly ever* (1), *sometimes* (2), *almost always* (3), and *always* (4). I calculated the score for this construct by subtracting the score for disadvantage from the advantage score, yielding a possible minimum and maximum score ranging from -16 to +16. The higher the participatory dialogue measure the higher the probability of physicians initiating PA counseling conversations with patients.

Behavior confidence, the second construct, is important because it addresses the provider belief (trust) of whether they can provide PA counselling and convince patients to become physically active within or without time limitations. I assessed this variable using four survey questions, items 9-12, with the following responses: *not at all sure* (0), *slightly sure* (1), *moderately sure* (2), *very sure* (3), and *completely sure* (4), for a total possible score of 0 to 16.

Changes in physical environment, the final predictive variable of the initiation component, is important because it addresses behavior change as it relates to

obtainability, availability, accessibility, convenience, and readiness of resources. In this study, I used this construct to assess provider surety of having/making time to provide PA counselling, of having access to appropriate/beneficial information, and suggesting ways to reduce and/or manage barriers. Physicians report that having time, resources, and skill affect their decision to provide PA counseling. I used a 5-point scale with items 13-15 to measure this construct, with total scores of 0-12. A higher score indicated physician willingness and confidence in making necessary adjustments for time, resources, and skill to facilitate PA counseling to their patients.

Component II: Sustenance

Emotional transformation, one of three constructs of the sustenance component, is important for maintaining change and entails altering emotions toward the behavior change. In this study, I used this construct to evaluate how sure a provider is in directing emotions or feelings towards the goal of PA counseling, motivating patient in becoming physically active, and managing any self-doubt in counseling the patient. I measured this construct on a 5-point Likert scale using items 23-25, yielding potential scores of 0-12.

Practice for change is a second construct in the sustenance model that necessitates constantly thinking about the health behavior change and making mid-term modifications to one's strategy, overcoming barriers, and remaining focused on the health behavior change. I used this construct was used to measure the provider confidence with assisting patients in action planning, remaining continuously physically active, utilizing daily opportunities, addressing limitations, and making appropriate adjustments. I measured this construct with items 19-22, on a 5-point Likert scale with a total score of 0-16.

Changes in social environment, the final construct of the sustenance component, involves creating social support from the environment. In this study, I used this construct to assess the provider's surety and ability to explore support networks with the patient involving the providers, the staff, family members, and friends. Support networks provide encouraging relationships, connections, and interactions that foster, assist, and support behavior change. Patients who feel supported in making changes are less likely to lose motivation and fail to meet their goals. Instead, they are more likely to engage in regular fitness activity. According to Sullivan and Lachman (2017), "facilitating social connections seem beneficial for encouraging lasting changes in behavior and creating accountability for otherwise unmotivated individuals" (p. 4). I used a 5-point Likert scale with items 16-18 to measure this construct, with potential total score of 0-12.

Modeling initiation dependent variable [Item 26] and modeling sustenance dependent variable [27] corresponded simultaneously to responses to the questions "How likely is it that you will counsel each patient on physical activity in the upcoming weeks?" and "How likely is it that you will counsel each patient on physical activity from now on?" I measured both variables on a 5-point Likert scale with the following responses: *not at all likely* (0), *somewhat likely* (1), *moderately likely* (2), *very likely* (3), and *completely likely* (4), for a total score of 0-8.

After drafting the instrument, I emailed and hand delivered the survey questions along with operational definitions to numerous experts with the expectation of securing a panel of six experts to review the instrument for readability and also content and face validity. The instrument underwent reviews requiring only a revision of words without

removing any survey items. I completed the draft for final validation considerations and validation with values from the Flesch Kincaid Reading Ease of Instrument (55.1) and the Flesch-Kincaid Grade level of instrument (7.3) deemed acceptable for intended participants. Upon ethical approval by the Institutional Review Board (IRB), I began reliability testing.

Before distributing the survey, I informed the participants that their participation in the online survey was voluntary and assured them of their confidentiality. I analyzed the collected data using SPSS and calculated Cronbach's alpha to establish internal consistency. This activity was the 14th step in instrument development, which I used to assess the relevancy of items within and across the scale. An acceptable range for Cronbach's alpha value was 0.70 or higher with a value closer to 1 being most favorable. I used the test-retest method to establish the stability of the instrument by administering the instrument to a sample of 30 physicians from the target population two times within a two-week period (Nunnally & Bernstein, 1994) and calculating the correlation coefficient, ranging from -1 to +1 (highest stability). A value of .70 is adequate, but higher values are more preferred. It is recommended that conditions surrounding the testing and retesting be as closely duplicated as possible to prevent low coefficient values acceptable (Sharma & Petosa, 2014).

One of the most important steps in developing an instrument is to determine construct validity. Sharma and Petosa (2014) described construct validity as the degree to which an instrument measures the same theme under study (Polit & Hungler, 1999, as cited in Sharma & Petosa, 2014, p. 134). I took this precautionary step to determine if the

questions in the survey are appropriate for assessing the concepts of my research.

Researchers also recommend conducting this step to determine if there is theoretical

significance and relationship with other concepts (Ruel, 2019). After administering the

instrument to the sample population, I performed confirmatory factor analysis on all the

subscales to determine the correlation between items being measured, as advised by

Sharma and Petosa (2014).

Internal and External Threats to Validity

Maintaining validity is essential for measuring the intended constructs in this

research study. It is what connects instrumentation (methodology) with the design of the

research (Frankfort-Nachmias & Nachmias, 2000). To ensure that the research measures

what is expected, the instrument must be free from bias and repeated measurement

inaccuracies. External validity ensures generalizability of results and can only be

achieved with internal validity (Fink & Brayman, 2006; Price et al., 2004).

Possible threats to internal validity include language barriers, which I addressed

by performing readability testing to ensure understanding of instrument items. Threats

related to environmental factors were beyond my control, except instrument delivery

time. To address the threat of omission of psychometric factors to establish validity and

reliability (Litwin, 2003), I used a panel of experts to validate the instrument and

performed test-retest for stability reliability. The lack of proper instrument structure

related to improper formatting and layout, sequencing of items, and lengthy instructions

is rectified by designing an instrument (Price et al., 2004; Sharma & Petosa, 2014). For

my study, I minimized this study by verifying the readability and content and face validity of the instrument.

I addressed possible threats to external validity, including inadequate sampling and low survey return by developing an instrument that could be delivered and administered electronically, allowing for large number of surveys to be sent simultaneously. I used this approach to achieve adequate participation and ensured anonymity for each participant. To avoid poor response to the survey, I tested the instrument to ensure the understanding of the items and validity and reliability of the data. I predetermined sample size using statistical calculations, and data collection involved an internet survey due to ease of access and probable maximum response rate (OECD, 2012).

Processing and Analyzing the Data

I processed data collected from all respondents as numerical estimates and used descriptive and inferential statistics in SPSS, a statistical software, for comparison analysis. Descriptive statistics is defined as an analysis of data that helps to describe the data and allows the data to be presented in a more meaningful way, thus yielding interpretations that are much easier to understand. The data can then be displayed in a variety of ways, including tables, graphs, charts, and discussion in the results section of the research (Statistica.laerd.com, 2018). Inferential statistics are used to generalize about a population. I employed inferential statistics employed in this study, including coefficient intervals and regression. These statistics are used to depict the correlation between independent and dependent variables (Frost, n.d.).

Multiple linear regression analysis is used to examine the interrelationships between a set of independent variables paired with one continuous dependent variable (Ong & Puteh, 2017). I used this method to evaluate and verify variables of MTM for the subsistence of connection and relationship between variable and provider likelihood to initiate and sustain providing PA counseling services to patients. Once responses were received, I used IBM SPSS to perform confirmatory factor analysis along with consistency diagnostic testing to ensure construct authenticity and consistency of the survey instrument. I performed independent sample t-test along with the Pearson's correlations test to determine relationship between the variables.

Ethical Considerations

Ethical considerations are explored mainly in the data collection process where the rights of individuals are respected, and the privacy is protected, as well as in the results section (Harris, 2010). To ensure that ethical standards are being met, this study was subjected to a review investigation by Walden University's Institutional Review Board (IRB) due to the involvement of human subjects. In anticipation of ethical issues, Creswell (2009) suggested that integrity and trust be maintained with participants, misconduct and impropriety be managed, and a willingness to handle any problems that arise be shown (Creswell, 2009). Creswell also posed that ethical concerns that arise should be addressed in several sections of the research, such as in the formulation of the research problem, purpose, and questions, the data collection process, and in analysis and interpretation.

Careful planning and practice helped me avoid breach of any of the items listed on the Ethical Compliance Checklist on page 21 of the Publication Manual of the American Psychological Association 6th Edition. They include obtaining permission to use an unpublished instrument, properly citing works within my proposal, answering questions about my study, obtaining informed consent from participants, protecting confidentiality (American Psychological Association, 2013). I obtained consent for surrounding hospitals and medical centers engagement as needed. The consent contained information about the participants' willingness to participate, confidentiality of person, and anonymity of information given on the research survey.

Summary

In this chapter, I have provided an overview of the methodology components of the research with explanation and consideration of application. The introduction included an overview of the methodological process for this study. The purpose of the study along with rational and design included background information and significance of this study. I also included insights into the theoretical framework and foundation for the study. In the methodology and materials section of this study, I provided a bridge from the population that was studied to the instrument developed to measure the constructs of MTM.

The sampling procedure was explicit in providing sample size and target population for this study. The data collection and analysis processes included ethical considerations for the study. I also provided a discussion on the internal and external threats that threatened the integrity, reliability, and validity of the constructs and the

study design. I further discussed the ethical considerations and with the ways I used to avoid ethical issues that arose in this study. I wrote the following chapters, Chapters 4 and 5, at the conclusion of the data collection process, leading to a full report of analysis of the data and result dissemination followed by conclusion and recommendation for further study.

Chapter 4: Results

Introduction

My goal for this study was to examine primary care clinicians' predictive intentions to counsel patients on physical activity using the elements of the MTM for health behavior change. I examined the six dimensions of MTM's initiation and sustenance components to determine if they could predict behavior change among health care practitioners. My aim was to gain a better understanding of primary care providers' predictive intentions regarding physical activity counseling, and thus provide empirical evidence for MTM's implied construct of predictive power, which would advance further identification of the leading factors in future research of other constructs within this new theory.

In this study I examined the following RQs:

RQ1:   To what extent do MTM initiation constructs (participatory dialogue, behavioral confidence, changes in the physical environment) predict intention of primary care providers to initiate counsel about physical activity to their patients?

H_01: There is no statistically significant relationship or predictive effect between MTM initiation constructs (participatory dialogue, behavioral confidence, changes in the physical environment) and the intention of primary care providers to initiate counsel about physical activity to their patients.

H_a1: There is a statistically significant relationship or predictive effect between MTM initiation constructs (participatory dialogue, behavioral confidence, changes in the

physical environment) and the intention of primary care providers to initiate counsel about physical activity to their patients.

RQ2: To what extent do MTM sustenance constructs (emotional transformation, practice for change, changes in the social environment) predict sustenance of intention of primary care providers to counsel about physical activity to their patients?

*H0*2: There is no statistically significant relationship or predictive effect between MTM sustenance constructs (emotional transformation, practice for change, changes in the social environment) and the sustenance of intention of primary care providers to counsel about physical activity to their patients.

*Ha*2: There is statistically significant relationship or predictive effect between MTM sustenance constructs (emotional transformation, practice for change, changes in the social environment) and the sustenance of intention of primary care providers to counsel about physical activity to their patients.

RQ3: How do MTM initiation constructs influence actual primary care provider counseling about physical activity?

*H0*3:   MTM initiation constructs participatory dialogue, behavioral confidence, and changes in the physical environment do not statistically influence actual primary care provider counseling about physical activity.

*Ha*3:   MTM initiation constructs participatory dialogue, behavioral confidence, and changes in the physical environment do statistically influence actual primary care provider counseling about physical activity.

The findings of the analyses were aligned with the study's research questions in this chapter. In this chapter, I present, the study's findings including a description of the data collection processes, demographic characteristics of the sample population, descriptive statistics for the key variables included, and the results of the multiple linear regression analysis. This chapter includes an introduction, data collection, data analysis results, and chapter summary.

Data Collection

A total of 217 participants were recruited for this study, with a minimum sample size of 233 calculated. This meant that the study did not meet the minimum sample size, which can have an impact on the statistical power and generalizability of the study results. Faber and Fonseca (2014) stated that lower statistical power results in larger confidence intervals and larger margins of error. I acknowledge and evaluate these limitations of the study's smaller-than-planned sample size in the following Chapter 5 of discussion, conclusions, and recommendations. The participants mostly filled out an online survey that ran from October 2021 to September 2022. Table 1 summarizes the demographic characteristics of the participating clinicians. The majority of clinicians (78.2%) offered nonspecialty primary patient care and were mostly nurses (44.8%) and nurse practitioners (17.0%). The majority of clinicians (32.1%) had 20 years or more of professional experience, with those with 5 to 9 years coming in second (19.3%). In terms of gender, 89.3% of the participants were female, with more than half (52.9%) being under the age of 45. The Black/African American race/ethnicity was strongly represented and constituted the majority (68.6%). Half of the participants (50.7%) worked 8 hours or

fewer each day in the office, with a significant number (38.6%) working 9 to 12 hours per day. The majority of participating medical practitioners reported seeing more than 20 patients (30.0%) every day and spending more than 25 minutes with these patients (29.3%). The majority of providers (63.6%) consistently inquired about patients' physical activity habits and gave guidance in this area.

Table 1

Demographic Characteristics

	n	%
Are you a clinician who currently provides primary patient care (nonspecialty)?		
No	36	21.8
Yes	129	78.2
What is your role in the primary care setting?		
Family Medicine Physician	8	4.8
Medical Resident	1	0.6
Nurse	74	44.8
Nurse Practitioner	28	17.0
Physician Assistant	10	6.1
Primary Care Physician	5	3.0
Other	39	23.6
What is your practice setting?		
Hospital-based	39	27.9
Individual Practice	21	15.0
Large-Group Practice (≥6 physicians)	10	7.1
Small-Group Practice (≤5 physicians)	26	18.6
Other	44	31.4
How many years have you provided care?		
< 5 years	28	20.0
5 - 9 years	27	19.3
10 - 14 years	23	16.4
15 - 19 years	17	12.1
20 years or more	45	32.1
What is your gender?		
Female	125	89.3
Male	15	10.7
What is your age today?		
35 or younger	35	25.0
36 – 45	39	27.9
46 – 55	33	23.6
56 – 65	24	17.1
66 or older	9	6.4
What is your race/ethnicity:		
American Indian	1	0.7
Asian or Asian American	3	2.1
Black/African American	96	68.6
Hispanic American	3	2.1
White/Caucasian American	34	24.3

	n	%
Other	3	2.1
Typically how many hours are you in the office per day?		
≤ 5 hour	10	7.1
6 - 8 hours	61	43.6
9 - 12 hours	54	38.6
> 12 hours	15	10.7
Average number of patients you treat in your office per day?		
≤5 patients	26	18.6
6 - 10 patients	24	17.1
11 - 15 patients	29	20.7
16 - 20 patients	19	13.6
>20 patients	42	30.0
Average time spent per patient encounter?		
≤10 minutes	15	10.7
11 - 15 minutes	40	28.6
16 - 20 minutes	30	21.4
21 - 25 minutes	14	10.0
> 25 minutes	41	29.3
Do you routinely ask about physical activity behavior in patients and provide counseling in this regard?		
No	51	36.4
Yes	89	63.6

Results

Validity and Reliability of the Data

The MTM arose from the need to construct a theory solely dedicated to health

behaviors; one that was empirically proved, prudent, and culturally adaptable across

multiple levels of individuals and populations, as well as one that had predictive power

for health behavior change (Sharma, 2015). This theory presents an optimal paradigm for

health education and promotion while merging existing theories to strengthen its potential

for forecasting health behavior change as a one-time event and long-term endeavor

(Sharma, 2015; Sharma et al., 2016b). Face validity and content validity for a similar tool

was previously conducted by six experts in the field of health behavior research and clinical practice through qualitative evaluation and revision, as well as the use of the Flesch Kincaid Reading Ease and Flesch Kincaid Grade level of the instrument (Nahar et al., 2020). The results showed a scale of 47.4 for Flesch Kincaid Reading Ease and 8.5 for the Flesch Kincaid Grade level of the instrument, deeming it satisfactory for the population of participants in the study (Nahar et al., 2020). Face validity and content validity for my instrument was deemed acceptable for the population of participants through a panel of experts and readability statics from the Flesch Kincaid Reading ease (55.1) and Flesch Kincaid Grade level of instrument (7.3)

I used the reliability analysis to analyze the internal consistency of the study's tool, the MTM. The instrument was a 37-item scaled survey designed to assess primary care clinicians' purposeful promotion of physical activity using the dimensions of the MTM of health behavior change. I created the instrument to answer the study's research questions by applying the constructs of MTM, a fourth-generation theoretical model ostensibly capable of forecasting the goals of initiating and maintaining behavior health change. I created the six constructs with individual questions and used multiple-item Likert scales to investigate if they could be used to predict behavior change among healthcare practitioners. I computed the responses to the various Likert items to obtain a composite score that represented the participant's overall attitude or opinion of the construct under consideration. I used Cronbach's alpha to calculate the reliability of the constructs of the tool. Cronbach's Alpha is commonly between 0 and 1; a value of 1 suggests good measurement consistency, whereas a value of 0 shows complete lack of

consistency. Although negative coefficients are uncommon, they can suggest faulty

scoring, for as when a negative-worded survey question is not appropriately reversed

scored (Cho & Kim, 2015). Table 2 highlights the reliability test results, which revealed

that all of the constructs had Cronbach's Alpha values more than the recommended cut-

off value of 0.70, with the exception of participatory dialogue (combined), which had a

slightly lower value of 0.662. These data indicate that the tool, through the various

constructs, had high internal consistency, with higher scores indicating greater

dependability.

Table 2

Cronbach's Alpha Reliability Statistics

	n	n Items	Item Mean	Scale Mean	Cronbach's Alpha
Component I: Initiation	123	15	2.171	32.57	0.826
Participatory Dialogue	123	8	1.942	15.54	0.662
Advantages	123	4	3.000	12.00	0.905
Disadvantages	123	4	0.884	3.54	0.903
Behavioral Confidence	123	4	2.636	10.54	0.838
Changes in the Physical Environment	123	3	2.163	6.49	0.810
Component II: Sustenance	117	12	2.262	27.15	0.943
Changes in the Social Environment	119	3	1.880	5.64	0.920
Practice for Change	119	4	2.458	9.83	0.879
Emotional Transformation	119	3	2.303	6.91	0.853

I used confirmatory factor analysis (using the maximum likelihood estimation

(MLE) approach) to assess construct validity. The overall model fit chi-square test value

of the model shown in Figure 4 was 594.882 with 264 degrees of freedom. The null

hypothesis of the model fitting the data was rejected because the probability value of the

chi-square test was less than the.05 level employed by convention. The model's goodness

of fit, which describes how well it matches a set of observations, was.0.742. The closer

this value is to 1, the better the model's fit.

Figure 4

*Confirmatory Factor Analysis*
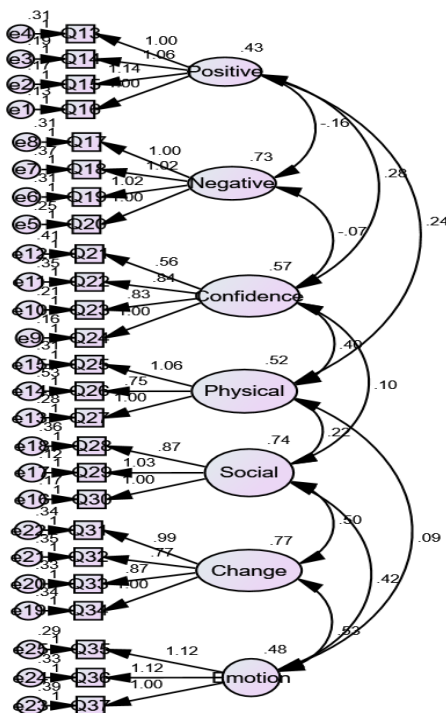
Assumption Analysis

I used multiple regression analysis for inferential analysis involving the dependent

and independent variables to determine whether there was a statistically significant

relationship between primary care clinicians' predictive intentions to counsel patients on

physical activity and the elements of the MTM for health behavior change. However, to

use multiple regression analysis definitively and obtain acceptable findings, the data must always meet certain assumptions. Although multiple regression analysis is extremely robust, it is generally a good practice to assess the quality of the results by evaluating the degree of divergence from these assumptions. I tested the following assumptions: linear relationship, variances must be heteroscedastic, data should not exhibit multicollinearity, no significant outliers, and the residuals (errors) should be roughly normally distributed.

I used scatter plots to verify the assumption of a linear relationship between the dependent variable and each of the independent variables, followed by a visual evaluation of the scatter plots to ensure linearity. The normal P-P Plot of regression (Figure 5) shows that all of the independent variables had a linear relationship with the dependent variable, with all data values close to the line of regression.

Figure 5

Normal P-P Plot of Regression Showing Linear Regression

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Intentions
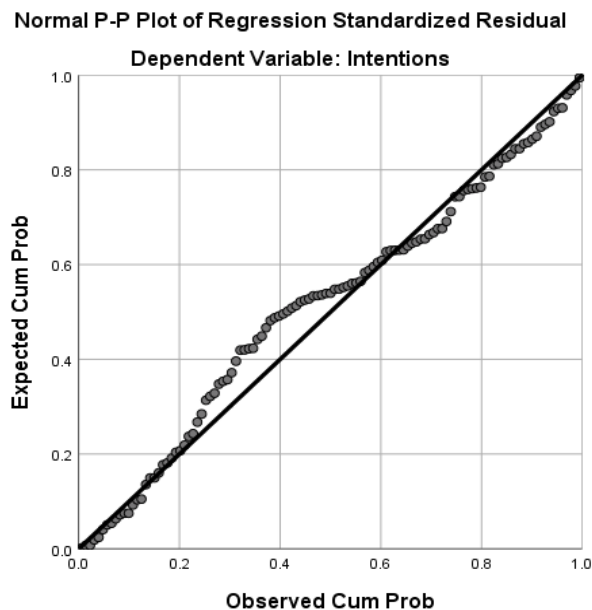
     I confirmed the assumption of heteroscedastic variances, which means that the distribution of residuals around the regression line must be consistent across the predicted dependent variable's whole range, visually using residual scatter plots (Figure 6). In regression analysis, heteroscedasticity refers to a scenario in which the variability of the error term (residuals) varies across different levels or values of the independent variables (Astivia et al., 2019). In other words, the spread or dispersion of the residuals varies among the predictor variables. This variation makes determining the individual effects of predictor variables on the response variable harder, and it can also increase standard errors. I performed a visual inspection of the diagram sets, which revealed no evidence of a systematic pattern or cluster of scores, indicating that the assumption was not broken.

The imaginary line in this graph is approximately at the mean on the y-axis and the mean on the x-axis, which indicates roughly equal number of points above and below the mean on the y-axis and to the left and right of the mean on the x-axis. This result indicates that the level of homoscedasticity is low.

Figure 6

Scatter Plots of Partial Regression
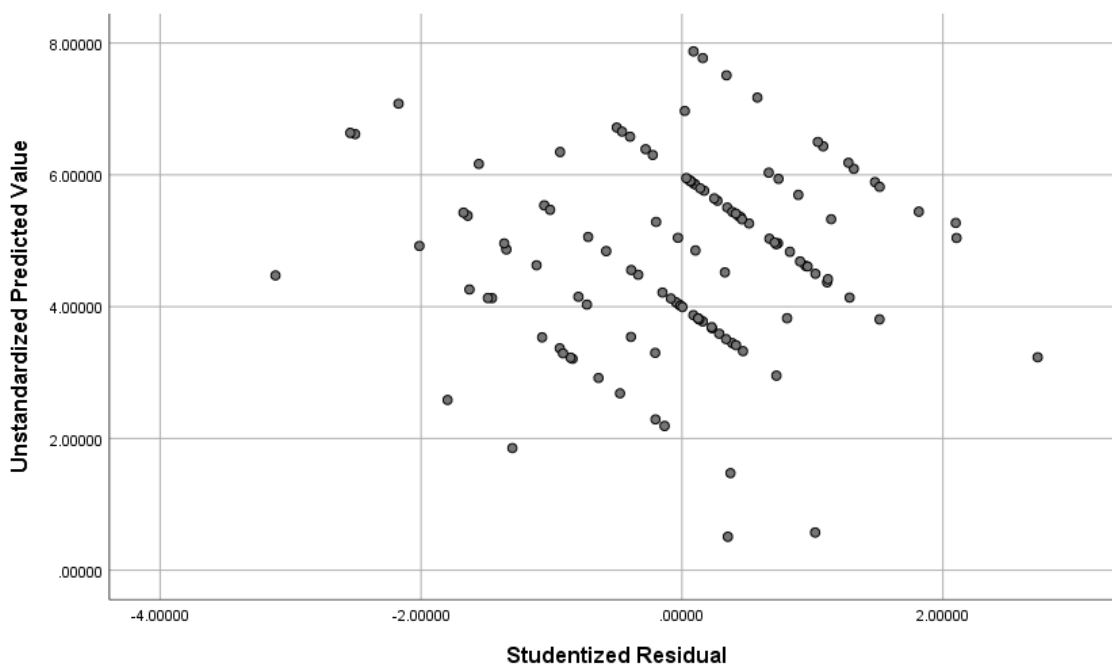
I used variance inflation factor (VIF) to test the premise that the data should not display multicollinearity. This assumption suggests that the two independent variables should not be correlated with each other. In regression analysis, multicollinearity refers to a situation in which two or more predictor variables in a model are substantially associated with each other. It denotes a linear relationship between predictor variables, which can have numerous implications for the regression model and its interpretation, such as making determining the individual impacts of predictor variables on the response

variable harder and increasing standard errors (Vatcheva et al., 2016). Multicollinearity

increases the variance of the estimated regression coefficient for an independent variable,

as evaluated by the VIF. A VIF score of 1 implies that there is no multicollinearity

between the variables, but a number close to 5 or more indicates that there is significant

multicollinearity between the variables and the assumption is not met. The data had all

values less than 5, indicating that the assumption was not violated (Table 3).

Table 3

Collinearity Statistics

	Tolerance	VIF
Participatory Dialogue	0.830	1.205
Behavioral Confidence	0.437	2.288
Changes in the Physical Environment	0.288	3.466
Changes in the Social Environment	0.343	2.914
Practice for Change	0.342	2.925
Emotional Transformation	0.277	3.612

The next assumption I examined was that there should be no significant outliers,

high leverage points, or very influential points. I investigated Cook's distance in addition

to a visual inspection of box plots to test the undue influence of outliers on the results

(Figure 7). I found outliers in three of the six independent variables. Cook's distance is a

regression analysis measure used to identify influential data points or outliers and it

quantifies the effect of each observation on the regression model's estimated coefficients

(Eledum, 2021). Cook's distance is used to quantify the change in parameter estimations

in the model when a specific observation is removed from the study. A bigger Cook's

distance value implies that eliminating that observation would have a greater impact on

the model's coefficients, implying a stronger influence on the regression findings. The

Cook's distance range for this model was 0.000 to 0.185, which was much below the 1.0

or higher values considered troublesome (Gress et al., 2018). Thus, the assumption was

not violated.

Figure 7

Box Plots of Independent Variables Showing Distribution of Values
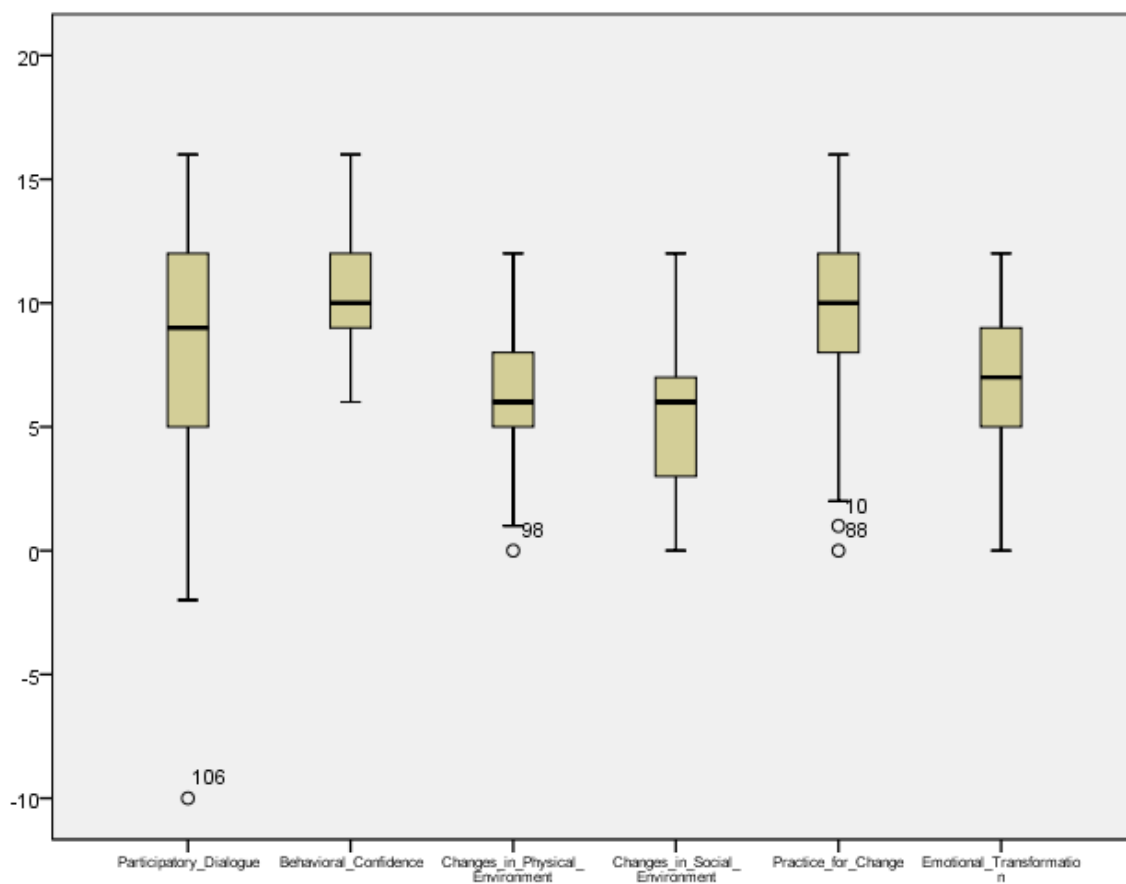
Descriptive Statistics

Table 4 shows descriptive statistics for the main variables used in the analysis.

The table contains a summary of the measures of dispersion of mean, median, and

standard deviation as well as measures of the distribution of skewness and kurtosis. The

standard deviation values were low, showing that the majority of the data clustered around the mean. The kurtosis and skewness values were in the -1 to +1 range, indicating that these data were most likely from a regularly distributed population.

Table 4

Descriptive Statistics of Main Variables

	n	Min	Max	M	SD	Mdn	Kurt	Skew
Initiation	123	20	60	32.569	7.361	32	1.831	1.039
Participatory_Dialogue	123	-10	16	8.463	5.132	9	0.210	-0.524
Advantages	123	4	16	12.000	2.906	12	-0.432	-0.342
Disadvantageous	123	0	16	3.537	3.590	3	2.287	1.446
Behavioral_Confidence	123	6	16	10.545	2.708	10	-0.518	0.534
Changes_in_the Physical_Environment	123	0	12	6.488	2.467	6	0.070	-0.068
Sustenance	119	2	48	27.067	9.529	27	-0.040	-0.108
Changes_in_the Social_Environment	119	0	12	5.639	2.925	6	-0.494	0.329
Practice_for_Change	119	0	16	9.832	3.413	10	0.052	-0.317
Emotional_Transformation	119	0	12	6.908	2.630	7	-0.250	-0.276
Initiation of behavior change	117	0	4	2.325	1.065	2	-0.765	-0.162
Sustenance of behavior change	117	0	4	2.444	1.046	3	-0.356	-0.379

Research Question 1

RQ1 was "To what extent do MTM initiation constructs (participatory dialogue, behavioral confidence, changes in the physical environment) predict intention of primary care providers to initiate counsel about physical activity to their patients?" I used standard multiple linear regression, $\alpha = 0.05$ (two-tailed), to examine the impact of

participatory dialogue, behavioral confidence, and changes in the physical environment in predicting intention of primary care providers to initiate counsel about physical activity to their patients. The independent variables were participatory dialogue, behavioral confidence, and changes in the physical environment. The dependent variable was the intention of primary care providers to initiate counsel. I conducted preliminary analyses to assess whether the assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were met, and noted no serious violations. The model as a whole was able to significantly predict the intention of primary care providers to initiate counsel, $F(3,113) = 13.327$, $p < 0.0001$, adjusted $R^2 = 0.241$. The adjusted R^2 value indicated that approximately 24.1% of variation in the intention of primary care providers to initiate counsel is accounted for by the linear combination of the predictor variables (participatory dialogue, behavioral confidence, and changes in the physical environment). In the final model (Table 5), participatory dialogue and changes in the physical environment were statistically significant with changes in the physical environment ($\beta = 0.185$, $p < 0.001$) accounting for a higher contribution to the model than participatory dialogue ($\beta = 0.055$, $p = 0.003$). Behavioral confidence did not cause any significant variation in the intention of primary care providers to initiate counsel about physical activity to their patients.

Table 5

Multiple Regression Analysis of MTM initiation Constructs

| | Unstandardized Coefficients | | 95% Confidence Interval for B | | | |
	B	Std. Error	Lower Bound	Upper Bound	t	p

(Constant)	0.995	0.350	0.301	1.689	2.841	0.005
Participatory Dialogue	0.055	0.018	0.019	0.090	3.072	0.003
Behavioral Confidence	-0.031	0.046	-0.122	0.060	-0.683	0.496
Changes in the Physical Environment	0.185	0.048	0.090	0.280	3.868	0.000

Research Question 2

The question was, "To what extent do MTM sustenance constructs (emotional

transformation, practice for change, changes in the social environment) predict

sustenance of intention of primary care providers to counsel about physical activity to

their patients?" I used multiple regression analysis to test if the MTM sustenance

constructs were a significant predictor of the sustenance of the intention of primary care

providers to counsel about physical activity to their patients. The results of the regression

in Table 6 indicated the three predictors explained 54.4% of the variance (adjusted R^2

=0.277, F(3,113)= 15.794, $p < 0.001$). The results showed that emotional transformation

was a significant predictor of the sustenance of intention ($\beta = 0.123$, p = 0.027). Practice

for change and changes in the social environment were not significant predictors.

Table 6

Multiple Regression Analysis of MTM Sustenance Constructs

	Unstandardized Coefficients		95.0% Confidence Interval for B			
	B	Std. Error	Lower Bound	Upper Bound	t	p
(Constant)	0.685	0.265	0.161	1.209	2.589	0.011
Changes in the Social Environment	0.032	0.044	-0.055	0.118	0.725	0.470
Practice for Change	0.062	0.042	-0.020	0.145	1.501	0.136
Emotional Transformation	0.123	0.055	0.014	0.232	2.235	0.027

Research Question 3

RQ3 was "How do MTM initiation constructs influence actual primary care provider counseling about physical activity?" I calculated multiple linear regression to predict actual primary care provider counseling about physical activity based on MTM initiation constructs. The results of the multiple linear regression indicated that there was a collective significant effect between the MTM initiation constructs, ($F(3, 113) = 19.423$, $p < 0.001$, adjusted $R^2 = 0.445$). The individual predictors were examined further, and the results indicated that participatory dialogue ($t = 3.678$, $p < 0.001$) and changes in the physical environment ($t = 6.086$, $p < 0.001$) were significant predictors in the model (Table 7).

Table 7

Multiple Regression Analysis of MTM initiation Constructs

	Unstandardized Coefficients		95.0% Confidence Interval for B			
	B	Std. Error	Lower Bound	Upper Bound	t	p
(Constant)	0.536	0.294	-0.046	1.119	1.825	0.071
Participatory Dialogue	0.055	0.015	0.025	0.085	3.678	0.000
Behavioral Confidence	-0.013	0.039	-0.089	0.063	-0.340	0.734
Changes in the Physical Environment	0.244	0.040	0.165	0.324	6.086	0.000

Summary

My aim for this study was to gain a better understanding of primary care providers' predictive intentions regarding physical activity counseling, and thus provide empirical evidence for MTM's implied construct of predictive power, which would advance further identification of the leading factors in future research of other constructs within this new theory. I examined the six dimensions of MTM's initiation and sustenance components to determine if they were predictors of behavior change among health care practitioners. I explored the main research questions, and the results generated based on multiple linear regression showed that participatory dialogue, changes in the physical environment, and emotional transformation had a significant impact on sustenance of intention.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to substantiate the capability of MTM constructs to predict the intention of primary care providers to promote PA. I intended to evaluate the predictive capacity of the six dimensions of MTM's initiation and sustenance components concerning behavior modification among healthcare professionals. In this regard, I provided empirical evidence for the predictive power of the MTM construct by analyzing primary care providers' predictive intentions concerning PA counseling. This would augment the identification of primary determinants in prospective investigations of additional constructs within this novel theoretical framework. I employed a quantitative cross-sectional approach in this study consistent with forecasting the inclination of primary care providers to advise and encourage PA using MTM constructs. According to Bloomfield and Fisher (2019), using quantitative measures is appropriate for investigating the correlation between variables and testing objective theories. In line with this view, I evaluated the factors that impact these intentions using quantitative measures. Although qualitative research is useful in comprehending the fundamental drivers of behavior, this investigation underscores the significance of quantitative research in detecting these aspects. After carefully considering the options for data collection and analysis, I deemed the MTM and a quantitative design as suitable for this study.

This study yielded several important findings. Firstly, the data collected using the MTM tool demonstrated high validity and reliability. I assessed and confirmed the internal consistency and stability of the tool using confirmatory factor analysis with a

goodness of fit of 0.742 and Cronbach's Alpha values, and all constructs, except for participatory dialogue, surpassed the recommended threshold of 0.70 when combined. This indicated that the tool was dependable and produced consistent results. The assumption analysis for the multiple regression analysis revealed that the necessary conditions were met. These conditions included a linear relationship, heteroscedastic variances, no multicollinearity, no significant outliers, and an approximately normal distribution of residuals. Scatter plots confirmed the linear relationship, whereas residual scatter plots confirmed the presence of heteroscedastic variances. The variance inflation factor (VIF) values indicated no significant multicollinearity among the variables. Although outliers were identified in three independent variables, they did not violate the assumptions.

When addressing the research questions, it was found that participatory dialogue and changes in the physical environment were significant predictors of primary care providers' intention to initiate counseling about PA in RQ1. However, behavioral confidence did not significantly contribute to this intention. In RQ2, emotional transformation emerged as a significant predictor of primary care providers' persistence in intending to counsel patients about PA. On the other hand, practice for change and changes in the social environment did not prove to be significant predictors. Regarding RQ3, I observed that participatory dialogue and changes in the physical environment significantly influenced the actual counseling provided by primary care providers regarding PA. However, behavioral confidence did not significantly impact the actual counseling outcomes.

Interpretation of Findings

Regarding the validity and reliability of the data, I used the MTM tool, which demonstrated high validity and reliability. This finding confirms the recommendations of Sharma and Petosa (2014), emphasizing the importance of using reliable and valid measurement tools in research related to PA and health outcomes. The assessment of internal consistency using Cronbach's Alpha values aligned with the recommended threshold, indicating that the tool produced consistent results. This finding extends the knowledge by demonstrating the applicability and effectiveness of the MTM tool in the context of primary care providers' counseling about PA.

The assumption analysis conducted for multiple regression analysis in the study met the necessary conditions, including a linear relationship, heteroscedastic variances, no multicollinearity, no significant outliers, and an approximately normal distribution of residuals. These findings are consistent with previous studies that confirmed the importance of meeting these assumptions when conducting regression analysis (Ong & Puteh, 2017). Confirming linear relationships through scatter plots and heteroscedastic variances through residual scatter plots aligns with the suggestions of Kim (2019). According to Kim (2019), researchers can employ residual plots to verify three fundamental assumptions of linear regression: linearity, equal variance, and normality. The absence of significant multicollinearity, as indicated by the VIF values, further supports the existing knowledge. Although outliers were identified in three independent variables, their nonviolation of assumptions adds to the understanding that outliers may not always invalidate the analysis.

For RQ1, participatory dialogue and changes in the physical environment were found to be significant predictors of primary care providers' intention to initiate counseling about PA. This finding aligns with the hypothesis by Sharma (2015) who highlighted the importance of social and environmental factors in promoting PA counseling. Several studies have highlighted the role of these MTM constructs in influencing behavior change by demonstrating statistical significance in all constructs, including participatory dialogue and changes in the physical environment such as evidenced for predicting quitting behaviors in vaping among young adults in the United States (Sharma et al. 2022). However, the nonsignificant contribution of behavioral confidence to this intention contrasts with other MTM studies by Sharma et al. (2022) evidencing behavior confidence, participatory dialogue, and changes in the physical environment as significant predictors for initiating mammography behavior among Hispanic American women as well as results of Peterson and Cheng (2013) who emphasized the role of self-efficacy and confidence in healthcare providers' counseling behaviors. This could be explained due to the general high self-confidence levels of PCPs which would have interfered with behavior specific confidence. Also, lack of time on the part of the PCPs could have played a role in the non-significance of this construct.

For RQ2, emotional transformation was found to significantly predict the persistence of primary care providers' intention to counsel patients about PA. This finding confirms and extends the findings of Nahar et al. (2020), highlighting the influence of emotional factors in sustaining counseling behaviors and the findings of Wells et al. (2022) evidencing emotional transformation as a statistically significant explanatory

factor in the intentional continued use of telehealth/telemedicine by veterinarians. On the

other hand, the nonsignificant predictive power of practice for change and changes in the

social environment diverge from other MTM studies conducted by Shirotriya et al.

(2022) that evidenced statistically significant constructs for predicting sustaining

behavior for PA among university students in the Fiji Islands as well as the results of

Maugeri et al. (2020) who emphasized the role of these factors in promoting PA

counseling. Nahar et al. (2019) further evidenced changes in the environment and

emotional transformation as having significant variance for sustenance of PA behavior

and practice for change among osteopathic medical students.

For RQ3, participatory dialogue and changes in the physical environment were

found to significantly influence the actual counseling provided by primary care providers.

This finding confirms the importance of social interactions and environmental factors in

shaping counseling behaviors (Nahar et al., 2020). However, the nonsignificant impact of

behavioral confidence on actual counseling outcomes contrasts with other MTM studies

such as evidenced by Nahar et al. (2020) highlighting behavioral confidence notable

correlation with 49.5% variance for initiating mindful behavior in veterinary students to

manage stress as well as the results of Di Maio et al. (2021) who emphasized the role of

self-efficacy in translating intention into action.

The findings of this investigation provide insights into the applicability and

effectiveness of the MTM in predicting primary care providers' intentions and behavior

related to counseling patients about PA. I found that the data collected using the MTM

tool demonstrated high validity and reliability, indicating that the tool is dependable and

produces consistent results. Regarding the research questions, the findings indicate that participatory dialogue and adjustments in the physical environment were significant predictors of primary care givers' intention to initiate counseling about PA. However, behavioral confidence did not significantly contribute to this intention. This suggests that engaging in participatory communication and addressing system-level barriers related to the physical environment are important factors in motivating primary care providers to initiate discussions about PA with their patients (Hall et al., 2022).

For the persistence in intending to counsel patients about physical activity, emotional transformation emerged as a significant predictor, whereas practice for change and adjustments in the social environment did not prove to be significant predictors. This implies that emotional factors are crucial in sustaining primary care providers' intention to counsel patients about PA, which is consistent with the findings from Coull and Pugh's (2021) study. Regarding the actual counseling provided by primary care providers, participatory dialogue and changes in the physical environment had a significant influence, whereas behavioral confidence did not have a significant impact. This suggests that creating opportunities for participatory communication and addressing environmental barriers are key factors in translating intention into actual counseling behaviors, which is consistent with Anaby et al.'s (2022) findings.

The theoretical framework of MTM provides a comprehensive understanding of the constructs and factors influencing behavior change in health promotion (Hayes et al., 2019). It combines elements from various behavior and cognitive theories to develop a model specific to health behaviors, applicable across multiple levels and cultures, and

capable of bridging the gap between knowledge and practice in public health programs (Hayes et al., 2019). The initiation component of MTM focuses on the introduction to behavior change and highlights the importance of factors such as behavioral confidence, participatory dialogue, and adjustments in the physical environment (Nahar, Wilkerson, Stephens et al., 2019). These constructs address the need for effective ways to introduce physical activity interventions in primary care practice and overcome barriers related to provider attitudes, beliefs, and available resources. On the other hand, the sustenance of the continuation component emphasizes factors like emotional change, practice for change, and transformation in the social environment (Nahar et al., 2019). These constructs recognize the ongoing nature of behavior change and the role of emotional intelligence, self-regulation, and social support in sustaining behavior change efforts.

<div align="center">**Limitations**</div>

In this research, I used a cross-sectional design, which is commonly used in studies that seek to collect and analyze data at one time, unlike longitudinal studies. Cross-sectional studies require less time and resources to complete and have little to no ethical issues. However, these studies are susceptible to limitations and biases not common to other research designs such as sample size inadequacy as well as informational, procedural, and sampling biases (Wang & Chen, 2020). It is important to consider the potential impact of the limitations on the observed results. One key limitation is the potential for inadequate sample size and participation. If the sample size is insufficient or there is bias in participant selection, it may affect the generalizability of the findings (Ross & Bibler Zaidi, 2019). Therefore, although the findings suggest the

significance of participatory dialogue and adjustments in the physical environment, it is important to interpret these results cautiously and consider the potential limitations in sample representation.

Another limitation is the potential procedural bias, where participants may have varying levels of availability or motivation to complete the questionnaire during their downtime. This limitation may introduce bias and affect the representativeness of the sample. Consequently, the findings related to primary care providers' intentions and behavior may be influenced by this bias, and the generalizability of the results may be impacted.

Lastly, the limitation of measurement bias due to self-reporting should be considered (Jager et al., 2020). Self-report measures can introduce biases such as over- or under-reporting, false reporting, or dishonesty (Jager et al., 2020). Because this study relied on self-reported data, the findings related to the predictors of intention and behavior in counseling about physical activity should be interpreted with awareness of the potential biases introduced by self-reporting.

Recommendations for Further Research

A noteworthy limitation pertains to the possibility of insufficient sample size and participation, potentially affecting the results' generalizability. In order to effectively tackle this issue, future researchers should endeavor to augment the sample size and guaranteeing a more heterogeneous and inclusive selection of participants. By implementing this approach, the outcomes may possess greater generalizability to a wider demographic. An additional constraint that has been brought to attention is the likelihood

of procedural bias arising from discrepancies in the extent of accessibility or incentive to fulfil the survey. The presence of bias in the sample could compromise its representativeness (Vella, 1998). This impacts the results of the intention and behavior of primary care providers. To address this constraint, it is recommended that researchers adopt standardized protocols for administering questionnaires and proactively involve participants to improve their motivation and adherence.

Furthermore, it is important to recognize the potential for measurement bias resulting from self-reported data. Self-report measures can introduce various biases, including but not limited to over-reporting, under-reporting, false reporting, and dishonesty (Jager et al., 2020). Future investigators should include objective indicators of PA, such as accelerometers or fitness trackers, to provide more precise and dependable data. Objective measures can enhance the interpretation of the findings about the predictors of intention and behavior in counseling for PA.

To advance this field, it is imperative for researchers to undertake extensive research on a larger scale, incorporating diverse samples, reducing procedural bias, and employing objective metrics to assess physical activity. Future researchers can offer a more comprehensive comprehension of the impact of participatory dialogue, adjustments in the physical environment, and healthcare providers' role in promoting PA by addressing these limitations. By considering the suggestions above, researchers will make a valuable contribution to establishing counselling practices grounded in empirical evidence. These efforts can lead to better health outcomes for the general populace and an overall enhancement of their quality of life.

Implications for Social Change

By implementing measures to mitigate physical inactivity and advocating for consistent physical exercise, discernible improvements can be obtained for these strata. Regular PA confers many health and well-being benefits at the individual level. Regular PA has been demonstrated to mitigate the likelihood of chronic illnesses, enhance cognitive performance, promote bone and musculoskeletal health, and facilitate improved physiological and psychological functioning (Yang, 2019). Regular PA can enhance general health, heighten functional capacity, improve sleep patterns, and decrease susceptibility to diverse health conditions (Eckstrom et al., 2020). These favorable consequences have the potential to augment substantially the standard of living for individuals.

Encouraging PA within the family unit can potentially lead to a ripple effect of positive outcomes. Establishing a health and wellness culture can be facilitated by the consistent participation of family members in physical exercise. Providing support and motivation among family members can result in heightened PA levels for all parties involved (Dasso, 2019). These outcomes can result from a collective effort to promote health and well-being. In turn, better health can lead to enhanced familial dynamics and fortified interpersonal bonds.

Incorporating PA promotion into diverse institutions and workplaces can significantly transform the organizational level. Organizations can establish policies and initiatives that foster employee participation in PA during their workday. They can also offer fitness amenities or rewards and advocate for a healthy balance between work and

personal life. Organizations can improve employee health, well-being, productivity, and job satisfaction by creating a conducive atmosphere for PA.

Addressing PA at the societal and policy level necessitates a comprehensive approach involving multiple stakeholders' collaboration. According to Gelius et al. (2020), policies and initiatives can be formulated to establish conducive settings that facilitate and encourage engagement in PA. The proposed measures encompass enhancing communal areas' availability and security, establishing walking and cycling facilities, advocating for physical education in academic institutions, and integrating PA directives into healthcare frameworks. By establishing a conducive atmosphere and implementing empirically supported measures, communities can potentially realize diminished healthcare expenditures, enhance public health outcomes, and heighten general welfare.

The methodological implications of this study entail the use of a quantitative cross-sectional research approach to investigate the correlation among variables and evaluate objective theories. The quantitative cross-sectional design facilitates the acquisition of quantitative data via surveys or questionnaires (Bryman, 2006). This enables the researcher to evaluate the determinants that impact the inclinations of primary care providers to advise and endorse physical activity. In this study, the researcher employed quantitative measures to analyze the collected data to identify patterns, relationships, and predictors of the intention to counsel on PA. This methodology involved a systematic and thorough approach to examining the subject matter.

Using the MTM as a guiding framework in the study gave rise to theoretical implications. The MTM includes diverse behavior change theories, offering a systematic methodology for comprehending and forecasting alterations in behavior (Hayes et al., 2019). My goal was to obtain insights into the determinants that impact the intentions and behaviors of primary care providers regarding PA counseling, utilizing the MTM approach. This theoretical framework facilitated a thorough investigation of the subject matter, taking into account various variables that could potentially impact the behaviors of providers.

The results of this study have empirical implications, which add to the current knowledge base on the promotion and counseling of physical activity in healthcare environments. By scrutinizing the associations between the model's constructs and the intentions and behaviors of primary care providers, I obtained empirical evidence for the efficacy of the MTM in predicting and comprehending PA counseling practices. The above findings can be used to guide subsequent investigations and steer evidence-based interventions towards enhancing physical activity counseling among primary care practitioners.

The practical implications of this study have significance for healthcare systems and policymakers. My goal for this study was to identify the factors that promote or hinder physical activity counseling among primary care providers. The results of this investigation can be used to create interventions to improve counseling practices and encourage PA at the healthcare system level. This information can facilitate the execution of strategies that promote incorporating PA counseling into routine patient interactions by

primary care providers. Furthermore, the research findings may underscore the necessity of supplementary instruction and assistance for primary healthcare practitioners in order to provide proficient advice to patients on physical exercise, resulting in enhanced patient results and overall public health.

Recommendations for Practice

First, it is imperative to create customized training programs specifically tailored to primary care providers. In these programs, the augmentation of their participants' knowledge and competencies in PA counseling should be prioritized, while integrating empirically supported strategies and methodologies. By providing appropriate resources and education, healthcare providers can proficiently encourage PA within their patient population. Albert et al. (2020) also reached a similar conclusion.

Incorporating the evaluation of PA into customary practice is deemed a pivotal suggestion. It is recommended that primary care providers incorporate the regular evaluation and discussion of their patient's PA levels into their consultations. The implementation of standardized screening tools or questionnaires can facilitate the identification of patients at risk of physical inactivity or who would benefit from increased PA (Wattanapisit et al., 2020). Incorporating PA evaluation as a routine element of healthcare consultations, healthcare professionals can proactively address the issue and instigate conversations regarding its significance in promoting holistic well-being.

The establishment of conducive surroundings is imperative. Establishing supportive environments facilitating PA counseling requires collaboration among

healthcare organizations, policymakers, and community stakeholders (Laddu et al., 2021). Implementing policies within healthcare settings aimed at promoting PA entails the provision of resources and educational materials on PA for both healthcare providers and patients. In addition, implementing referral systems to link patients with nearby PA resources and community programs can facilitate a smooth transition from healthcare facilities to community-based initiatives.

Encouraging cross-disciplinary cooperation is an additional approach. Facilitating collaboration among primary care practitioners, exercise specialists, and other pertinent healthcare professionals may result in formulating integrated care strategies for patients. Through interdisciplinary collaboration, healthcare professionals can access specialized knowledge and resources that can augment the efficacy of PA counseling. The scope of this collaboration can transcend healthcare professionals and encompass community organizations and fitness professionals, thereby advocating a comprehensive strategy towards promoting and facilitating physical activity.

Finally, primary care providers must engage in ongoing professional development. Facilitating continuous professional development avenues, such as workshops, conferences, and continuing education courses, can aid practitioners in keeping abreast of current research and optimal approaches to PA counseling, as similarly suggested by Coombes et al. (2021). The focus of these opportunities ought to be on strategies for behavior change that are grounded in empirical evidence, as well as effective communication techniques. Healthcare systems can ensure the provision of

high-quality PA counseling to patients by investing in the professional development of providers.

Conclusion

My goal for this quantitative cross-sectional study was to examine the variables that affect primary care providers' intentions and actions when counseling patients about physical activity. According to the findings, participatory dialogue and changes in the physical environment were significant predictors of primary care providers' intention to initiate counseling about PA. Further, emotional transformation was significantly found to predict the persistence of primary care providers' intention to counsel patients about physical activity. Finally, participatory dialogue and changes in the physical environment were significant predictors of actual PCP counseling about PA. The findings have important implications for positive social change as these lend credence to the MTM in designing educational interventional studies for PCPs so that they can counsel their patients on PA. These findings are also significant to policymakers to devote more resources towards educating PCPs about counseling and behavior change techniques.

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Appendix A: Letter and Operational Definitions

[Date]

Dear Dr. [Expert],
I am a doctoral student at Walden University, and I am conducting a study entitled, "Using Multi-Theory Model (MTM) To Predict Intention To Promote Physical Activity by Primary Care Providers". Based on your expertise in the areas of [expertise], you have been identified as an expert to help me establish the face and content validity of my instrument. The Multi theory model of behavior change is a recent model being theoretically tested in several areas of behavior change. In this letter, I have provided an operational definition for each construct and attached my instrument. Please read the operational definitions and consider the corresponding items subscale to determine …

Face validity: Does each item appear to measure the intended construct as operationally defined?

Content validity: Do the items in each subscale adequately assess the construct within the universe of content as operationally defined?

Readability: Is the meaning of each item clear and language appropriate for primary care providers? Present Flesch-Kincaid Reading Ease is 55.1 & Flesch-Kincaid Grade level is 7.3.

Please respond to all aspects and return the instrument with your comments to Shirley McClendon within the next two weeks, [date]. Upon receipt of your comments and input from other experts, I will revise the instrument and return an amended copy in two weeks, [date] for a second review with feedback on return to me in two weeks, [date]. The criteria for this school term is to have my instrument validated by the end of the term, [date]. If you have any questions or concerns, please reach out to me.

I am extremely grateful for your time, and I am thankful for your expertise and consideration in support of my research. I look forward to reading your comments on my research instrument.
Sincerely,

Shirley McClendon
enc. Instrument draft and operational definitions

Operational definitions:

Initiation of behavior change: The multi-theory model of health behavior change is divided into two components: Initiation and Continuation (Sustenance) with each consisting of different constructs predicting these two phases. In my study, the predictability of intention of primary care physicians to initiate discussion/counsel on behavior change concerning physical activity will be assessed using item 26.

Sustenance of behavior change: In this study sustenance of long-term behavior consistent with initiation will be assessed using item 27. This definition refers to the likelihood that physicians can sustain their behavior of counseling patients on physical activity.

Advantages through participatory dialogue: According to multi-theory model of health behavior change, this construct is important in initiation of behavior change. In my study, an advantage of talking about physical activity behaviors give insight to patients about their behavior and aids physician in prescribing appropriate physical activities. This construct is measured in items 1-4.

Disadvantages through participatory dialogue: According to multi-theory model of health behavior change, this construct is important in initiation of behavior change and is negatively associated with behavior change. In my study, this construct will assess a physician's thoughts and beliefs about counseling on physical activity, whether is thought to be a waste of time, a deviation from the main issue, impractical or irrelevant. This particular construct is measured in items 5-8.

Behavioral confidence: According to multi-theory model of health behavior change, this construct is important in initiation of behavior change and is similar to self-efficacy with the difference being that it is focused on future behavior change not currently present. In my study, this construct will seek to determine the confidence of physicians to counsel on the importance of physical activity, even in situations where there is less time to spend with patients. This construct is being measured in items 9-12.

Changes in physical environment: According to multi-theory model of health behavior change, this construct is important in sustenance of behavior change and entails making changes to obtainability, availability, accessibility, convenience, and readiness of resources. In my study, this construct is used to assess physician's surety of having/making time to counsel on physical activity to each patient, having access to appropriate/beneficial information, and suggesting ways to reduce and/or manage barriers. This construct is being measured in items 13-15.

Emotional transformation: According to multi-theory model of health behavior change, this construct is important in sustenance of behavior change and entails converting or transforming emotions toward the health behavior change. In my study, this construct will

help to assess the physician's emotions/feelings towards preventive counseling on physical activity, his/her motivation for becoming physically active, and his/her management of self-doubt in counseling patients. This construct is being measured in items 23-25.

Practice for change: According to multi-theory model of health behavior change, this construct is important in sustenance of behavior change and entails constantly thinking about the health behavior change and making mid-term rectifications to one's strategy, overcoming barriers, and remaining focused on health behavior change. In my study, this construct is being used to assess physician's comfort and confidence in assisting patients in action planning, remaining continuously physically active, utilizing daily opportunities, and addressing limitations and making appropriate modifications. This construct is being measured in items 19-22.

Changes in social environment: According to multi-theory model of health behavior change, this construct is important in sustenance of behavior change and entails creating social support from the environment. In my study, this construct is used to assess the physician's surety and ability to explore support networks with the patient involving the physician him/herself, the staff, family members and friends. This construct is being measured in items 16-18.

Support networks provide encouraging relationships, connections, and interactions that foster, assist, and support behavior change. Such support networks may include establishing buddy systems amongst family and friends, families being physically active together, participation in community, faith, and/or school-based activities that involve being physically active, physicians and or staff offering regular guidance and counseling on how to incorporate physical activity into daily routines and teaching behavior skills such as goal setting and problem solving, regularly scheduled assessments and monitoring disease prevalence as it relates to physical activity to demonstrate the relationship between physical activity and wellness, connecting patients with community programs/partners and places that yield access to safe physical activities, and physician/staff monitoring through virtual coaching and wellness applications.

Appendix B: Survey Instrument

MEASURING PROVIDER INTENT TO COUNSEL ON PHYSICAL ACTIVITY QUESTIONNAIRE

1a. Are you a clinician who currently provides primary patient care (non-specialty)?

Yes_____   No_____

If you answered NO you may stop this questionnaire and thank you for your time. If you answered YES please proceed to question 1b.

1b. What is your role in the primary care setting? _____

Primary Care Physician
Family Medicine Physician
Physician Assistant
Medical Resident
Nurse Practitioner
Nurse
Other _____

2. What is your practice setting? _____

Individual Practice
Hospital-based
Small-Group Practice (≤5 physicians)
Large-Group Practice (≥6 physicians)
Other _____

3. How many years have you provided care? _____

<5 years
5-9 years
10-14 years
15-19 years
20 years or more

4.What is your gender?   Male _____
Female _____
Other _____
5. What is your age today? _____

35 or younger
36-45
46-55
56-65
66 or older

6.What is your race/ethnicity: _____

White/Caucasian American
Black/African American
Asian or Asian American
American Indian
Hispanic American
Other

7.Typically, how many hours are you in the office per day? ____

≤5 hours
6-8 hours
9-12 hours
> 12 hours

8.Average number of patients you treat in your office per day? ____

≤5 patients
6-10 patients
11-15 patients
16-20 patients
> 20 patients

9. Average time spent per patient encounter? ____

≤ 10 minutes
11-15 minutes
16-20 minutes
21-25 minutes
>25 minutes

10.Do you routinely ask about physical activity behavior in patients and provide counseling in this regard?

Yes_____   No_____

Component I: Initiation

	Never	Hardly Ever	Sometimes	Almost Always	Always

A. Participatory Dialogue

During a patient encounter talking about physical activity behavior will…
1. …be beneficial to the patient.
2. ---give me more insight about his/her behavior.
3. ---help me counsel him/her better.
4. ---help me suggest/prescribe appropriate physical activities.

During a patient encounter talking about physical activity behavior will …
5. ...be a waste of time.
6. …be a deviation from the main issue.
7. …be impractical.
8. …be irrelevant.

	Never	Hardly Ever	Sometimes	Almost Always	Always

B. Behavioral Confidence

During the visit encounter, how confident are you that you …
9. …can counsel patients on the importance of physical activity?
10. …can counsel patients on the importance of physical activity even if you have less time?
11. …can convince patients to become physically active?
12. …can convince patients to become physically active even if you have less time?

	Not at All sure	Slightly sure	Moderately sure	Very sure	Completely sure

---

C. Changes in Physical Environment

How sure are you that you will…
13. …have time to provide counseling on physical activity to each patient?
14. …have access to correct information such as suggesting location for physical activity, type of physical activity, etc. to each patient?
15. …suggest ways to reduce physical environment barriers for the patient to be physically active?

Component II: Sustenance

	Not at All sure	Slightly sure	Moderately sure	Very sure	Completely sure

A. Changes in Social Environment

How sure are you that you can explore support networks…
16…with the patient for involving yourself or your staff
in getting him/her regular with physical activity?
17…with the patient for involving family members in
physical activity?
18…with the patient for involving friends in physical activity?

	Not at All sure	Slightly sure	Moderately sure	Very sure	Completely sure

B. Practice for Change

How sure are you that you can…
19…assist patients in designing an action plan?
20…counsel on consequences of continued
physical inactivity?
21…counsel on everyday opportunities for physical activity?
22…address limitations and provide modifications to
physical activity regimen?

	Not at All sure	Slightly sure	Moderately sure	Very sure	Completely sure

C. Emotional Transformation

How sure are you that you can…
23…direct your emotions/feelings towards the goal of
counseling on physical activity?
24…motivate the patients to become physically active?
25…manage any self-doubts in counseling the patient?

	Not at All likely	Somewhat Likely	Moderately Likely	Very Likely	Completely Likely

Initiation of Behavior Change

How likely is it that you will …
    26…counsel each patient on physical activity in the
        upcoming weeks?

Sustenance of Behavior Change

How likely is it that you will…
    27…counsel each patient on physical activity from
        now on?

SCORING

Participatory Dialogue construct score: Calculate by subtracting disadvantage construct score from advantage construct score. A positive score indicates behavior change.

Construct of advantages: Scale: Never (0), Hardly Ever (1), Sometimes (2), Almost Always (3), and Always (4). Score of Items 1-4. Possible range of 0-16 with high score indicating likelihood of initiation of behavior change.

Construct of disadvantages: Scale: Never (0), Hardly Ever (1), Sometimes (2), Almost Always (3), and Always (4). Score of Items 5-8. Possible range of 0-16 with low score indicating likelihood of initiation of behavior change.

Construct of behavioral confidence: Scale: Never (0), Hardly Ever (1), Sometimes (2), Almost Always (3), and Always (4). Score of Items 9-12. Possible range of 0-16 with high score indicating likelihood of initiation of behavior change.

Construct of changes in physical environment: Scale: Not At All Sure (0), Slightly Sure (1), Moderately Sure (2), Very Sure (3), and Completely sure (4). Score of Items 13-15. Possible range of 0-12 with high score indicating likelihood of initiation of behavior change.

Construct of changes in social environment: Scale: Not At All Sure (0), Slightly Sure (1), Moderately Sure (2), Very Sure (3), and Completely sure (4). Score of Items 16-18. Possible range of 0-12 with high score indicating likelihood of initiation of behavior change.

Construct of practice for change: Scale: Not At All Sure (0), Slightly Sure (1), Moderately Sure (2), Very Sure (3), and Completely sure (4). Score of Items 19-22. Possible range of 0-16 with high score indicating likelihood of initiation of behavior change.

Construct of emotional transformation: Scale: Not At All Sure (0), Slightly Sure (1), Moderately Sure (2), Very Sure (3), and Completely sure (4). Score of Items 23-25. Possible range of 0-12 with high score indicating likelihood of initiation of behavior change.

Modeling initiation dependent variable (Item 26) and Modeling sustenance dependent variable (27): Not At All Likely (0), Somewhat Likely (1), Moderately Likely (2), Very Likely (3), and Completely Likely (4).

Appendix C: Expert Panel List

Dr. Srikanta Banerjee, MD, PhD, MPH, MAS, CPH, MCHES
Core Faculty/Clinical Biostatistician/Epidemiologist
School of Health Sciences
Walden University
Minneapolis, Minnesota 55401

Dr. Burton, MD
Burton Medical Group LLC
210 Mercer Junction
Macon, Georgia 31210

Kendra Richardson, FNP
Family Nurse Practitioner/Adjunct Instructor
Westside/Southeast Medical Group
Macon, Georgia 31220
School of Nursing
Fort Valley State University
Fort Valley, Georgia 31030

Dr. Vinayak K. Nahar, MD PhD, MS
Assistant Professor & Director of Clinical Research
Department of Dermatology
School of Medicine
University of Mississippi Medical Center

Dr. Diana Naser, PhD
Contributing Faculty/Health Services
School of Health Sciences
Walden University
Minneapolis, Minnesota 55401

Dr. Richard C. Palmer, PhD
Contributing Faculty/Public Health
School of Health Sciences
Walden University
Minneapolis, Minnesota 55401