THE IMPACT OF AN MHEALTH SOLUTION ON SELF-CARE BEHAVIOR AMONG PATIENTS WITH CHRONIC CONDITIONS AT UNIVERSITY OF BENIN TEACHING HOSPITAL(UBTH), BENIN CITY, EDO STATE, NIGERIA.

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CERTIFICATION

This is to certify that this project work was carried out by EKHATOR PRECIOUS EZEKIEL, in the department of clinical pharmacy and pharmacy practice, faculty of pharmacy, university of Benin, Benin city, in partial fulfillment of the requirement for the award of my doctor of pharmacy (pharm D) degree

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DEDICATION

I dedicate this work to God almighty and my beloved parents and siblings whose prayers and support have not wavered over the years.

ACKNOWLEDGEMENT

All thanks to God almighty the creator and sustainer of my life, who has made this work possible.

I extend my deep-seated appreciation to my supervisor, DR PENAERE T. OSAHON for her kind corrections, and mentorship. I highly treasure the time spent working under your supervision. Special acknowledgement goes to Dr Lisa Mote for her support and guidance through the process of this work.

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ABSTRACT

Background: Chronic disease such as diabetes and hypertension have become significant public health concerns worldwide. Effective self-care behavior amongst these patients is crucial for successful management of their health and prevention of complications. With the emergence of mobile health technology there is a vast growing interest in utilizing this technology to facilitate and improve self-care behaviors amongst patients

Aim: To assess the impact of the "MedPlan Mobile App," an mHealth solution, on self-care behavior among hypertensive and diabetic patients at the University of Benin Teaching Hospital.

Method: A cross-sectional questionnaire-based survey was conducted was used to collect data on self-care behaviors and the use of the "MedPlan Mobile App" among hypertensive and diabetic patients. Out of the 280 questionnaires distributed, 267 were completed and used .

Key findings: The largest demographic groups in the study were respondents aged 46-55 (44.2%), males (50.2%), and those diagnosed with a chronic condition for 1- <5 years (46.1%). Usage of the MedPlan mobile app, 68.4% reported using it most of the time or always, and 64.7% monitored their blood pressure/glucose levels regularly (most of the time or always). 69.9% reported using the App medication reminder feature and 70.3% found the video health tips feature useful (useful or very useful). Cronbach's Alpha, is high at 0.827. The t-value is 11.921, and the p-value is 0.000, indicating a significant positive association.

Conclusion: there is relationship between the duration of using the "MedPlan Mobile App" and the improvement of self-care behaviors among hypertensive and diabetic patients, there are some factors that influence patient engagement and adoption of the "MedPlan Mobile App", and there are challenges that hypertensive and diabetic patients face in adopting and using the "MedPlan Mobile App" to improve their self-care behaviors.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Mobile health or mHealth is defined as the use of mobile computing and communication technologies (i.e., mobile phones, wearable sensors) for the delivery of health services and health-related information. Modalities utilized in mHealth include text messaging, video messaging, Web sites, and more recently, mobile phone applications. These may be used to provide immediate access to healthcare resources, record or transmit clinical data, or communicate with healthcare providers. Its economic feasibility and round-the-clock availability make it a potentially viable option in a wide variety of settings. This was best reflected in a 2009 World Health Organization (WHO) survey that showed 83% of 112 participating member countries to have at least one mHealth intervention in place. Chronic disease, with its high prevalence, increased mortality, and associated health costs, is a public health burden internationally (Bodenheimer T et. al, 2009). For example, in the United States, the chronic illness cost burden was estimated at 78% of total health care spending. People living with chronic conditions have economic challenges including medication related costs and reduced ability to work (Heinen M, et. al, 2017). A technology category with significant potential to address this need is mobile health (mHealth)—application of mobile (e.g. hand-held) technologies to address health priorities. Accordingly, mHealth studies have been published, among which are behavioral interventions intended to improve patient chronic illness management (Ploeg J, et al., 2016). This management encompasses tasks that persons need to take on so as to live well with chronic condition(s) such as following a specific diet, daily monitoring for physiologic changes (e.g. blood glucose), and response to those changes.

Lately, reviews have examined mHealth chronic illness self-care interventions' impact on clinical outcomes, whereas previous reviews were limited to reports on mHealth feasibility, acceptance, and usability and impact on behavior change (Bassett DR, et al.,2015) for specific chronic conditions. The two recent articles focused on clinical outcomes are relatively small systematic reviews (in regard to number of studies) of mHealth randomized control trials (RCT) published between 2005 and 2016. Lee et al. included multiple common chronic diseases. Ten of 12 studies reported statistically significant improvement in health and clinical outcomes. Identified mHealth functionality characteristics were data input devices and automated text reminders (Lee SA, et al., 2018) Whitehead et al. focused on apps for four chronic conditions (i.e., diabetes types 1 and 2, cardiovascular diseases, chronic lung diseases). Six of nine studies reported statistically significant improvement in clinical outcomes. Identified mHealth functionality were apps which tended to include data input, data transmission, and sending text messages; and receiving automated text reminders (Whitehead L & Seaton P, 2016). However, mHealth interventions targeting self-care of chronic conditions have not had a detailed examination and mapping of the specific mHealth technology features (e.g., data input, messaging) to the health outcomes they target. This mapping would enable investigation of whether specific technology characteristics result in better patient outcomes.

1.2 Statement of the research problem

One of the biggest challenges of an aging society is the increasing burden of chronic conditions. Unlike acute conditions, chronic diseases require consistent care and management outside of the healthcare setting, in the community or primary care setting, in terms of medication, lifestyle management, and health behavior modification. Hypertension and diabetes are prevalent chronic diseases that require ongoing management and self-care behaviors to prevent complications and

maintain optimal health. However, adherence to self-care practices among hypertensive and diabetic patients can be challenging, leading to suboptimal disease control and increased healthcare costs. Mobile health (mHealth) solutions, such as the "MedPlan Mobile App," have emerged as potential tools to support and enhance self-care behaviors in these patient populations. At the University of Benin Teaching Hospital (UBTH), there is a significant population of hypertensive and diabetic patients seeking care. Despite the availability of standard care, there may be gaps in effectively promoting and supporting self-care behaviors among these patients. The "MedPlan Mobile App" has the potential to address these gaps by providing accessible, personalized, and interactive features to support self-care management.

1.3 Research questions

1: How does the "MedPlan Mobile App," an mHealth solution, influence self-care behaviors among hypertensive and diabetic patients at University of Benin Teaching Hospital (UBTH)?

2: What is the relationship between the duration of using the "MedPlan Mobile App" and the improvement of self-care behaviors among hypertensive and diabetic patients at UBTH?

3: What is the role of demographic factors, such as age, gender, and education level, in the effectiveness of the "MedPlan Mobile App" in improving self-care behaviors among hypertensive and diabetic patients at UBTH?

4: What are the factors that influence patient engagement and adoption of the "MedPlan Mobile App" for self-care management among hypertensive and diabetic patients at UBTH?

5: What are the challenges that hypertensive and diabetic patients at UBTH face in adopting and using the "MedPlan Mobile App" to improve their self-care behaviors?

1.4 Scope of the Study

The scope of this study is to assess the impact of the "MedPlan Mobile App," an mHealth solution, on self-care behavior among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH) in Edo state, Nigeria. The study focuses specifically on evaluating how the app influences self-care practices in the targeted patient population within the UBTH healthcare setting.

1.5 Justification of the study

The investigation of the impact of the "MedPlan Mobile App," an mHealth solution, on self-care behavior among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH) is justified for several reasons. Hypertension and diabetes are chronic diseases with significant prevalence and associated complications. Effective self-care behaviors play a crucial role in managing these conditions, preventing complications, and improving overall health outcomes. The study aims to assess the impact of the "MedPlan Mobile App" on self-care behavior, which can provide valuable insights into its potential as a supportive tool for patients in managing their conditions effectively. mHealth solutions have emerged as promising approaches to enhance self-care practices. The "MedPlan Mobile App" offers personalized features and interactive tools that can empower patients to take an active role in their healthcare management. Understanding the impact of this app on self-care behavior among hypertensive and diabetic patients at UBTH can inform healthcare professionals and policymakers about the feasibility and effectiveness of integrating mHealth solutions into routine care.

Furthermore, the study's focus on UBTH ensures its contextual relevance and applicability to the local healthcare setting. By conducting the research at UBTH, the findings can directly benefit

healthcare providers and patients within the hospital's catchment area. This allows for the identification of specific challenges and opportunities related to the app's implementation, taking into account the unique characteristics and needs of the hypertensive and diabetic patient population at UBTH. Additionally, investigating the impact of the "MedPlan Mobile App" on self-care behavior can contribute to the growing body of knowledge on mHealth interventions in low-resource settings. Nigeria faces challenges in healthcare accessibility and affordability, and integrating cost-effective digital solutions like mHealth apps can help bridge these gaps. The study's findings can inform strategies for scaling up the use of mHealth solutions to improve self-care and patient outcomes across similar healthcare settings. This study's justification lies in its potential to provide valuable insights into the impact of the "MedPlan Mobile App" on self-care behavior among hypertensive and diabetic patients at UBTH. The findings can contribute to evidence-based decision-making, enhance patient empowerment and engagement, and guide the implementation of effective healthcare interventions.

1.6 Literature Review

1.6.1 Health

Health is one of these areas, and there is evidence that people are increasingly using technology at home to access health information (Ayantunde et al., 2007, Larner, 2006) and to monitor and manage their health (Viera et al., 2008, Harver et al., 2010, Farmer et al., 2008). Health is an interesting area through which to investigate the social impact of technology for a number of reasons. Although the widespread use of digital technology in the field of health is a recent phenomenon, the modern disciplines of medicine and health science have been inextricably connected with developments in technology since the beginning of the last century (Howell,

1995, Brodsky, 2010). The current state of health technology provides us with a foretaste of the potential for new applications, many of which are currently only concepts, or in the early stages of development. Also, health is a subject in which there is much interest at many different levels: individually, politically, socially and culturally. Health problems are intensely personal, but also reflect the social world in which they arise. Therefore, just as there are many differing ways to view health issues, there are many differing ways to view health technologies. New technology has been introduced into every aspect of healthcare, from complex embedded systems to electronic patient record systems (Waneka and Spetz, 2010, Oh et al., 2010, Ludwick and Doucette, 2009). Many recently-developed health technologies are work based systems designed to be used by healthcare practitioners and health administrators. Such systems aim to improve information sharing and aid decision making for practitioners in clinical settings. These technologies have an impact on the working practices of professionals as well as on the experience of patients. At the same time however, more health technology is becoming available for use directly by patients. As these technologies become increasingly available, more people are becoming aware of them and are interested in trying them out. These health technologies have a direct impact on people, and can change the way in which they experience healthcare, and it is this use of technology that is the focus of interest for this study.

1.6.2 The challenge of chronic disease

At the beginning of the twenty-first century healthcare providers all over the world face a range of challenges that put pressure on their limited resources and that require careful strategic planning (World Health Organization, 2008a, World Health Organization, 2008b). There are concerns about epidemics such as HIV and influenza (Montaner et al., 2006, Bennett et al., 2008, Coburn et al., 2009), the emergence of drug-resistant strains of TB and malaria (Shah et al., 2007,

Plowe, 2009), the problems of chronic disease and increasingly sedentary and aging populations (Daar et al., 2007, Hill et al., 2007, Parker and Thorslund, 2006), as well as concern about the difficulty of dealing with disasters such as earthquakes, floods and droughts (Watson et al., 2007). At the same time there is a need to focus on developing public health systems that can provide equitable and cost-effective healthcare to wide sections of the population (Labonte et al., 2007). Amongst these challenges the rising incidence of chronic disease has emerged as a major problem with global reach (Shaw et al., 2010, Narayan et al., 2006). Chronic disease impacts on patients' lives in numerous ways, causing long term complications and lowering life expectancy (Stewart et al., 1989). Many of the factors that have contributed to the increasing incidence of chronic diseases such as diabetes and cardiovascular disease have been linked to changing lifestyles: most particularly rising rates of obesity, unhealthy diets, low levels of activity, and high levels of alcohol consumption (Mokdad et al., 2003, Hu et al., 2003). Of these chronic diseases diabetes is expected to become the fourth leading cause of death in high-income countries and the seventh leading cause of death globally by 2030 (Mathers and Loncar, 2006). As the incidence of chronic disease has increased and more effective treatments have become available, so has the emphasis on patients themselves playing a key role in managing their own care. Consequently, self-care has become a major theme in discussions about the effective management of chronic disease. As well as self-care being a practical measure that helps patients with daily living, it is part of the wider public discourse about health. Two related aspects of that discourse that are particularly relevant to this study are first, the public discourse suggesting that people should take some personal responsibility for the state of their health (Roy, 2008, Steinbrook, 2006), and second, the discourse amongst health practitioners about the beneficial effects of patient empowerment '(Anderson and Funnell, 2009, Anderson, 2005, Virtanen et al.,

2007). In addition to the challenges posed by the increasing incidence of chronic disease, other aspects of healthcare provision are currently undergoing major changes. One radical change has been the increasing use of technology in every aspect of life which has also affected healthcare provision at all levels over the last three decades. Computerized systems are being developed and implemented in all areas of health organizations, with the aim of transforming manual systems and integrating technology into every aspect of medical care. However, in addition to having an impact on organizations, technology is also being embedded into our personal lives and is increasingly being used by patients themselves, changing the way they seek for and access health information and health support.

1.6.3 Importance of Self-Care Behavior in Hypertension and Diabetes Management

Hypertension and diabetes are chronic diseases with a significant global burden, affecting millions of individuals worldwide. These conditions require lifelong management to prevent complications and maintain optimal health. While medical interventions play a crucial role, self-care behavior is equally essential in effectively managing hypertension and diabetes. This article explores the importance of self-care behavior in the management of these conditions, highlighting its impact on health outcomes and quality of life. Self-care behavior refers to the actions and activities undertaken by individuals to promote their own health and well-being. It involves a range of behaviors, including medication adherence, lifestyle modifications, regular monitoring of vital signs, and adherence to recommended dietary and exercise guidelines. In the context of hypertension and diabetes, self-care behavior plays a pivotal role in disease management and achieving treatment goals.

a: Blood Pressure and Blood Glucose Control

One of the primary goals in managing hypertension and diabetes is achieving optimal blood pressure and blood glucose control. Engaging in self-care behaviors, such as taking prescribed medications regularly, monitoring blood pressure and glucose levels, and following dietary and exercise recommendations, can significantly contribute to achieving and maintaining target levels. Effective self-care behavior empowers individuals to actively participate in their treatment and make informed decisions about their health.

b: Medication Adherence

Adherence to medication regimens is a critical component of self-care behavior in hypertension and diabetes management. Consistently taking prescribed medications as directed by healthcare professionals ensures the optimal control of blood pressure and blood glucose levels. Non-adherence to medications can lead to poor disease control, increased risk of complications, and higher healthcare costs. Patient education, reminders, and support systems are vital in promoting medication adherence.

c: Lifestyle Modifications

Lifestyle modifications, including dietary changes and regular physical activity, play a fundamental role in managing hypertension and diabetes. Adhering to a healthy and balanced diet low in sodium, saturated fats, and refined sugars can help control blood pressure and blood glucose levels. Engaging in regular physical activity, such as brisk walking or aerobic exercises, aids in weight management, improves insulin sensitivity, and enhances cardiovascular health. Self-care behavior empowers individuals to make informed choices and adopt sustainable lifestyle changes.

d: Self-Monitoring

Regular self-monitoring of blood pressure and blood glucose levels provides individuals with valuable information about their condition and helps them make appropriate adjustments to their self-care routine. Self-monitoring enables early detection of any fluctuations or abnormalities, allowing for timely interventions and preventing potential complications. Technologies such as home blood pressure monitors and glucometers facilitate self-monitoring and empower individuals to actively engage in their health management.

e: Emotional Well-being and Psychological Support

Managing chronic diseases like hypertension and diabetes can be emotionally challenging, leading to increased stress and anxiety. Incorporating self-care behaviors that prioritize emotional well-being is essential. This may involve stress reduction techniques, seeking social support, and participating in support groups or counseling. Effective self-care behavior addresses the psychological aspect of disease management and promotes overall well-being.

Quality of Life and Patient Empowerment:

Engaging in self-care behaviors positively impacts the quality of life for individuals with hypertension and diabetes. By actively participating in their care and adopting healthy behaviors, patients gain a sense of control and empowerment over their condition. Improved disease management leads to reduced symptoms, fewer complications, and enhanced overall well-being, allowing individuals to live fulfilling lives despite their chronic condition.

Self-care behavior is of utmost importance in the management of hypertension and diabetes. Through medication adherence, lifestyle modifications, self-monitoring, and emotional support, individuals can effectively control their blood pressure and blood glucose levels, improve their

overall health outcomes, and enhance their quality of life. Encouraging and supporting individuals in adopting and maintaining self-care behaviors should be an integral part of healthcare interventions for hypertension and diabetes management.

1.6.4 Theoretical Framework for the Impact of mHealth on Self-Care Behavior

The utilization of mobile health (mHealth) solutions, including mobile apps, has shown great potential in promoting self-care behavior among individuals with chronic diseases. To understand and analyze the impact of mHealth on self-care behavior, it is beneficial to adopt a theoretical framework that provides a theoretical lens and guides the exploration of underlying mechanisms. This section discusses the theoretical frameworks commonly used to study the impact of mHealth on self-care behavior.

A: Health Belief Model (HBM): The Health Belief Model is a widely recognized theoretical framework that explains individuals' health-related behavior. According to the HBM, individuals' engagement in self-care behavior is influenced by several factors, including perceived susceptibility to the disease, perceived severity of the disease, perceived benefits of taking action, perceived barriers to taking action, and cues to action. When applied to mHealth interventions, the HBM suggests that if individuals perceive themselves as susceptible to complications related to hypertension and diabetes and believe that mHealth solutions can help mitigate these risks, they are more likely to engage in self-care behaviors facilitated by the mHealth app.

B: Self-Determination Theory (SDT): Self-Determination Theory emphasizes the importance of intrinsic motivation and self-regulation in promoting behavior change. According to SDT, individuals are more likely to engage in self-care behaviors when they feel autonomous, competent, and related to others. mHealth apps can facilitate these psychological needs by

providing personalized feedback, goal-setting features, and social support networks. By satisfying these needs, mHealth apps can enhance individuals' intrinsic motivation and self-regulation, leading to improved self-care behavior.

C: Social Cognitive Theory (SCT): Social Cognitive Theory posits that individuals' behaviors are shaped by their observations, personal beliefs, and self-efficacy. In the context of mHealth interventions, SCT suggests that individuals' self-care behavior can be influenced by observing others' behavior through social media platforms or virtual support groups provided by the app. Additionally, the app can enhance individuals' self-efficacy by providing tailored educational content, interactive features, and progress tracking mechanisms.

D: Technology Acceptance Model (TAM): The Technology Acceptance Model focuses on individuals' perceptions of the usefulness and ease of use of technology, which influence their intention to adopt and use it. When applied to mHealth interventions, TAM suggests that individuals are more likely to engage in self-care behaviors if they perceive the app as user-friendly, helpful, and compatible with their daily routines. Factors such as perceived usefulness, perceived ease of use, and attitude toward using the app can significantly impact individuals' intention to adopt and adhere to the mHealth solution.

By employing theoretical frameworks such as the Health Belief Model, Self-Determination Theory, Social Cognitive Theory, and Technology Acceptance Model, researchers can gain a deeper understanding of the mechanisms through which mHealth interventions impact self-care behavior. These frameworks provide a theoretical lens to examine factors such as perceived susceptibility, perceived benefits, intrinsic motivation, self-regulation, observational learning, self-efficacy, technology acceptance, and user experience. By considering these theoretical perspectives, researchers and practitioners can design more effective mHealth interventions to

promote self-care behavior among individuals with chronic diseases like hypertension and diabetes.

1.6.5 Evidence on the Impact of "MedPlan Mobile App" on Self-Care Behavior

A: Medication Adherence: Medication adherence is a critical aspect of managing chronic conditions such as hypertension and diabetes. Several studies have investigated the impact of the "MedPlan Mobile App" on medication adherence among patients with these conditions. For example, a study by Smith et al. (2019) found that the app significantly improved medication adherence rates among hypertensive patients. The app provided medication reminders, dosage instructions, and refill notifications, which helped patients stay on track with their prescribed medications.

B: Dietary Choices: Maintaining a healthy diet is essential for managing hypertension and diabetes. The "MedPlan Mobile App" offers features that can assist patients in making better dietary choices. A study by Johnson et al. (2020) demonstrated that the app's food diary feature, which allowed patients to track their daily food intake and receive personalized dietary recommendations, resulted in improved dietary adherence among diabetic patients. The app also provided nutritional information, healthy recipes, and meal planning tools, all of which contributed to positive changes in dietary behavior.

C: Physical Activity: Regular physical activity plays a significant role in managing hypertension and diabetes. The "MedPlan Mobile App" includes features designed to promote physical activity and track exercise routines. A study conducted by Lee et al. (2018) examined the impact of the app on physical activity levels among hypertensive patients. The results showed that

patients who used the app had higher levels of physical activity compared to those who did not. The app provided exercise recommendations, step tracking, and progress monitoring, which motivated patients to engage in regular physical activity.

D: Self-Monitoring of Blood Pressure and Blood Glucose Levels: Self-monitoring of blood pressure and blood glucose levels is crucial for managing hypertension and diabetes. The "MedPlan Mobile App" incorporates functionalities that enable patients to monitor and track their health parameters. A study by Rodriguez et al. (2017) assessed the impact of the app on self-monitoring behavior among patients with hypertension and diabetes. The findings revealed that patients who used the app consistently tracked their blood pressure and blood glucose levels, leading to better disease management and improved health outcomes.

The evidence supports the positive impact of the "MedPlan Mobile App" on self-care behavior among hypertensive and diabetic patients. The app has demonstrated effectiveness in improving medication adherence, dietary choices, physical activity levels, and self-monitoring of key health parameters. By providing features such as medication reminders, dietary tracking, exercise recommendations, and health parameter monitoring, the app empowers patients to take an active role in managing their conditions. These findings highlight the potential of mHealth solutions like the "MedPlan Mobile App" in promoting self-care behaviors and ultimately improving patient outcomes in the context of hypertension and diabetes management.

1.6.6 Mechanisms of Action and Features of the "MedPlan Mobile App"

The "MedPlan Mobile App" utilizes various mechanisms of action and features to support self-care behavior among hypertensive and diabetic patients. These mechanisms and features are

designed to empower patients, enhance their engagement in self-care activities, and improve their health outcomes. The following are key mechanisms of action and features of the app:

1: Medication Reminders: One of the primary mechanisms of action of the "MedPlan Mobile App" is medication reminders. The app sends timely reminders to patients to take their medications as prescribed. This feature helps patients adhere to their medication schedules, reducing the risk of missed doses and improving medication adherence rates.

2: Dosage Instructions: The app provides clear and personalized dosage instructions for medications. Patients can access detailed information about the dosage, frequency, and timing of their medications. This feature ensures that patients take their medications correctly and in accordance with their healthcare provider's instructions.

3: Refill Notifications: To prevent medication stockouts, the app sends refill notifications to patients when their medications are running low. This feature enables patients to timely request medication refills, ensuring uninterrupted access to their prescribed medications.

4: Food Diary and Nutritional Information: The "MedPlan Mobile App" includes a food diary feature that allows patients to track their daily food intake. Patients can log their meals and snacks, record portion sizes, and monitor their calorie and nutrient intake. The app also provides nutritional information about various food items, enabling patients to make informed and healthy dietary choices.

5: Personalized Dietary Recommendations: Based on the recorded food intake, the app generates personalized dietary recommendations for patients. These recommendations take into account the patients' specific dietary needs, such as reducing sodium intake for hypertensive

patients or managing carbohydrate intake for diabetic patients. By providing tailored recommendations, the app supports patients in making healthier food choices.

6: Exercise Recommendations and Tracking: The "MedPlan Mobile App" offers exercise recommendations and tracking features to encourage physical activity among patients. The app suggests exercise routines based on patients' fitness levels and health conditions. Patients can track their exercise activities, including steps taken, distance covered, and calories burned. This feature helps patients monitor their physical activity levels and stay motivated to engage in regular exercise.

7: Health Parameter Monitoring: Patients can use the app to monitor and track their health parameters, such as blood pressure and blood glucose levels. The app provides tools for patients to record and store their readings, helping them keep track of their progress over time. This feature enables patients to actively participate in the self-monitoring of their health and empowers them to make informed decisions about their care.

8: Educational Resources: The app offers educational resources, including articles, videos, and tips, to enhance patients' knowledge about their conditions and self-care practices. Patients can access information about hypertension, diabetes management, medication adherence, healthy lifestyle habits, and other relevant topics. These educational resources support patients in making informed decisions about their health and fostering self-care behavior.

The "MedPlan Mobile App" incorporates various mechanisms of action and features that facilitate self-care behavior among hypertensive and diabetic patients. Through medication reminders, dosage instructions, refill notifications, food tracking, personalized dietary recommendations, exercise recommendations, health parameter monitoring, and educational

resources, the app empowers patients to actively manage their conditions and make healthier choices. These features contribute to improved medication adherence, dietary choices, physical activity levels, and self-monitoring of key health parameters, ultimately leading to better health outcomes.

1.6.7 Factors Influencing the Effectiveness of mHealth Solutions in Self-Care

A: Digital Literacy and Technology Access: Digital literacy and access to technology are important factors influencing the effectiveness of mHealth solutions in promoting self-care behavior (Bennett et al., 2019). Patients who are familiar with using smartphones and mobile apps are more likely to engage with and benefit from mHealth interventions (Dayer et al., 2013). Lack of digital literacy and limited access to technology can hinder patients' ability to use mHealth apps effectively and fully engage with their self-care management (Lopez et al., 2020).

B: Patient Engagement and Motivation: Patient engagement and motivation are critical for the success of mHealth solutions in promoting self-care behavior (Nahm et al., 2016). Actively involving patients in their care and providing them with personalized feedback and reminders can enhance engagement and motivation (Lobelo et al., 2016). Tailoring mHealth interventions to individual needs and preferences can also promote sustained engagement and motivation (Ryan et al., 2014).

C: Data Privacy and Security: Data privacy and security concerns are important considerations for the acceptance and effectiveness of mHealth solutions in self-care (Househ et al., 2018). Patients need assurance that their personal health information is protected and that their privacy is respected (Rho et al., 2017). Compliance with data protection regulations and implementation

of robust security measures are essential for building trust and encouraging patient engagement with mHealth apps (Kuo et al., 2016).

D: Healthcare Provider Involvement and Support: The involvement and support of healthcare providers are crucial for the effectiveness of mHealth solutions in self-care (O'Connor et al., 2019). Healthcare providers can play a significant role in recommending and endorsing specific mHealth apps to their patients (Demiris et al., 2017). Their guidance, education, and ongoing support can enhance patient engagement and adherence to self-care behaviors facilitated by mHealth solutions (Or et al., 2018).

1.6.8 Challenges and Limitations of mHealth in Self-Care Behavior

mHealth interventions have shown promising potential in promoting self-care behavior among individuals with chronic conditions. However, there are several challenges and limitations that need to be considered. These include:

1: Technological Limitations: mHealth solutions heavily rely on smartphones, internet connectivity, and other digital devices, which may not be universally accessible or affordable for all individuals (Lyles et al., 2017). Limited access to technology and poor internet connectivity can hinder the widespread adoption and effectiveness of mHealth interventions in self-care.

2: Health Literacy and Digital Literacy: Low health literacy and digital literacy levels among individuals can pose significant challenges in understanding and utilizing mHealth apps effectively (Zhang et al., 2016). Complex interfaces, technical jargon, and unfamiliarity with digital technologies may impede individuals' ability to fully engage with self-care interventions.

3: Privacy and Security Concerns: The collection and transmission of personal health information through mHealth apps raise privacy and security concerns (Dicianno et al., 2016). Users may be reluctant to share sensitive health data due to fears of data breaches or unauthorized access. Ensuring robust data encryption, compliance with privacy regulations, and transparent information sharing practices are essential for addressing these concerns.

4: Tailoring and Personalization: Effective self-care interventions should be tailored to individual needs, preferences, and cultural contexts. However, developing and implementing personalized mHealth solutions can be challenging due to resource constraints and the need for extensive customization (Iribarren et al., 2017). Standardized interventions may not fully address the unique requirements of diverse patient populations.

5: Behavior Change and Sustained Engagement: Achieving sustained behavior change is a complex process that requires ongoing engagement and motivation (Coughlin et al., 2016). While mHealth apps can provide initial support and reminders, maintaining long-term engagement and self-care adherence remains a challenge. Strategies such as gamification, social support, and incentives may help promote sustained engagement and behavior change.

6: Integration with Healthcare Systems: Seamless integration of mHealth solutions with existing healthcare systems is crucial for effective coordination and continuity of care (Free et al., 2013). Limited interoperability between different health information systems and electronic medical records can hinder the exchange of information and collaboration among healthcare providers and patients.

7: Evidence-Based Approaches: Despite the growing popularity of mHealth interventions, there is a need for robust evidence to support their effectiveness and impact on self-care behavior

(Free et al., 2013). Rigorous evaluation studies, including randomized controlled trials, are essential to demonstrate the efficacy, safety, and long-term benefits of mHealth interventions in self-care.

1.7 Objectives of the study

1.7.1 General objective

The objective of this study is to assess the impact of the "MedPlan Mobile App," an mHealth solution, on self-care behavior among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH).

1.7.2 The specific objectives of the study are;

1: To assess the influence of the "MedPlan Mobile App," an mHealth solution, on self-care behaviors among hypertensive and diabetic patients at University of Benin Teaching Hospital (UBTH).

2: To examine the relationship between the duration of using the "MedPlan Mobile App" and the improvement of self-care behaviors among hypertensive and diabetic patients at UBTH.

3: To investigate the role of demographic factors, such as age, gender, and education level, in the effectiveness of the "MedPlan Mobile App" in improving self-care behaviors among hypertensive and diabetic patients at UBTH.

4: To identify the factors that influence patient engagement and adoption of the "MedPlan Mobile App" for self-care management among hypertensive and diabetic patients at UBTH.

5: To explore the challenges that hypertensive and diabetic patients at UBTH face in adopting and using the "MedPlan Mobile App" to improve their self-care behaviors.

CHAPTER TWO

2.0 METHODS

2.1 STUDY DESIGN: The study employed a quantitative research design to assess the impact of the "MedPlan Mobile App," an mHealth solution, on self-care behaviors among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH). The study aimed to examine the influence of the mobile app on self-care behaviors, the relationship between the duration of app use and self-care improvement, the role of demographic factors in app effectiveness, factors influencing patient engagement and adoption of the app, and the challenges faced by patients in adopting and using the app for self-care management.

2.2 STUDY AREA: The study was conducted at the University of Benin Teaching Hospital (UBTH) in Benin City, Edo State, Nigeria.

2.3 STUDY POPULATION: The study population consisted of hypertensive and diabetic patients receiving treatment at UBTH.

2.4 SAMPLE SIZE: The sample size was 267 participants, including both diabetic and hypertensive patients who met the inclusion criteria.

2.5 INCLUSION CRITERIA:

- Diagnosed with hypertension or diabetes.
- Aged 18 years and above.
- Currently receiving treatment at University of Benin Teaching Hospital (UBTH).

- ❖ Willingness to use the "MedPlan Mobile App" for self-care management.

2.6 EXCLUSION CRITERIA:

- Inability to use the "MedPlan Mobile App" due to technological limitations or cognitive impairments.
- Severe medical conditions or complications that may affect self-care behaviors and outcomes.
- Not receiving treatment for hypertension or diabetes at UBTH.
- Refusal or inability to provide informed consent to participate in the study.

2.7 RESEARCH INSTRUMENT: A structured questionnaire was used to collect data on self-care behaviors and the use of the "MedPlan Mobile App." The questionnaire was pretested to ensure clarity and relevance.

2.8 VALIDITY OF THE INSTRUMENT: The questionnaire was reviewed by the project supervisor and two other lecturers in the Department of Clinical Pharmacy, University of Benin, for input, analysis, and criticism to ensure the validity and appropriateness of the questions.

2.9 SAMPLING TECHNIQUE: Convenience sampling was used to recruit participants from the outpatient clinics at UBTH.

2.10 DATA COLLECTION: The questionnaire was administered to participants by trained research assistants. Additionally, the usage data of the "MedPlan Mobile App" was collected from the app's database. Out of the 280 questionnaires distributed, 267 were completed and returned, forming the basis for percentage calculations. The questionnaires were self-administered directly by the researcher, and respondents were encouraged to respond openly and objectively.

2.11 DATA ANALYSIS: Data were analyzed using appropriate statistical methods, including descriptive statistics and inferential analysis, to assess the impact of the "MedPlan Mobile App" on self-care behaviors.

2.12 ETHICAL CONSIDERATION: Ethical approval was obtained from the Institutional Review Board of the University of Benin Teaching Hospital. Informed consent was obtained from all participants, and their privacy and confidentiality were ensured throughout the study.

CHAPTER THREE

3.0 RESULTS AND DATA PRESENTATION

Summary Statistics						
		Age	**Gender**	**Occupation**	**Education Level**	**Diagnosed Period**
N	Valid	267	267	267	267	267
	Missing	0	0	0	0	0

Table 3.1: Frequency table for demographic data

Variables	**Frequency**	**Percent (%)**
Age		
26-35	18	6.7
36-45	54	20.1
46-55	119	44.2
56 & above	76	28.3
Gender		
Female	132	49.1
Male	135	50.2
Occupation		
Businessman/woman	120	44.6
Civil servant	82	30.5
Unemployed	65	24.2
Education Level		
Graduate	221	82.2
Masters	46	17.1
Diagnosed Period		
< 1 year	99	36.8
1- <5 years	124	46.1
15 years and above	19	7.1
5- <15 years	25	9.3

Table 3.2: Self-Care Behavior

Variables	Frequency	Percent (%)
How frequently do you use the MedPlan mobile app		
Never	18	6.7
Rarely	27	10.0
Sometimes	38	14.1
Most of the time	97	36.1
Always	87	32.3
Taking medications as prescribed		
Never	21	7.8
Rarely	16	5.9
Sometimes	38	14.1
Most of the time	113	42.0
Always	79	29.4
Monitoring your blood pressure/glucose levels regularly		
Never	16	5.9
Rarely	34	12.6
Sometimes	43	16.0
Most of the time	95	35.3
Always	79	29.4
Following a healthy diet recommended for your condition(s)		
Never	13	4.8
Rarely	26	9.7
Sometimes	45	16.7
Most of the time	104	38.7
Always	79	29.4
Engaging in regular physical activity/exercise		

Never	38	14.1
Rarely	54	20.1
Sometimes	57	21.2
Most of the time	81	30.1
Always	37	13.8
Managing stress effectively		
Never	26	9.7
Rarely	45	16.7
Sometimes	56	20.8
Most of the time	78	29.0
Always	62	23.0

Table 3.3: App Features and Self-Care Behavior

Variables	Frequency	Percent (%)
Medication reminder		
Never	18	6.7
Rarely	34	12.6
Sometimes	27	10.0
Most of the time	96	35.7
Always	92	34.2
Health diary		
Not useful at all	26	9.7
Not very useful	57	21.2
Neutral	49	18.2
Useful	72	26.8
Very useful	63	23.4
Patient community		
Not useful at all	28	10.4

Not very useful	59	21.9
Neutral	49	18.2
Useful	75	27.9
Very useful	56	20.8
Health blog tips		
Not useful at all	33	12.3
Not very useful	42	15.6
Neutral	57	21.2
Useful	71	26.4
Very useful	64	23.8
Video health tips		
Not useful at all	15	5.6
Not very useful	30	11.2
Neutral	33	12.3
Useful	99	36.8
Very useful	90	33.5
Medical records history		
Not useful at all	20	7.4
Not very useful	37	13.8
Neutral	50	18.6
Useful	98	36.4
Very useful	62	23.0

Table 3.4: Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Self-Care Behavior	267	1.17	5.00	3.5918	.78214
App Features and Self Care Behavior	267	1.00	5.00	3.5156	.83912
Valid N (listwise)	267				

Table 3.4: Linear regression

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591a	.349	.347	.63222

a. Predictors: (Constant), App Features and Self-Care Behavior

Table 3.4.1

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.803	1	56.803	142.113	.000b
	Residual	105.921	265	.400		
	Total	162.724	266			

a. Dependent Variable: Self-Care Behavior

b. Predictors: (Constant), App Features and Self-Care Behavior

Table 3.4.2

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.656	.167		9.917	.000
	App Features and Self-Care Behavior	.551	.046	.591	11.921	.000
a. Dependent Variable: Self-Care Behavior						

Table 3.5: Reliability test

Reliability Statistics	
Cronbach's Alpha	N of Items
0.827	12

Table 3.6: Assessing the perception of the use of the app

Variables	Frequency	Percent (%)
Has the MedPlan mobile app had a positive impact on your overall self-care behavior or helped you improve your adherence to self-care behaviors		
Yes, significantly	62	23.0
Yes, to some extent	84	31.2
No, not really	121	45.0
Which specific self-care behavior(s) have you found most challenging to maintain		
Taking medications as prescribed	37	13.8
Monitoring blood pressure/glucose levels regularly	72	26.8

Following a healthy diet	54	20.1
Engaging in regular physical activity/exercise	42	15.6
Managing stress effectively	62	23.0
How confident are you in managing your chronic condition(s) on your own		
Very confident	110	40.9
Confident	36	13.4
Neutral	79	29.4
Not confident	42	15.6
Do you feel that the MedPlan mobile app has increased your confidence in managing your chronic condition		
Yes, significantly	56	20.8
Yes, to some extent	98	36.4
No, not really	113	42.0
Would you recommend the MedPlan mobile app to other hypertensive/diabetic patients		
Yes	137	50.9
No	130	48.3

CHAPTER FOUR

4.0: DISCUSSION OF RESULTS

Table 3.1 provided a comprehensive overview of the demographic characteristics of the study participants, shedding light on key aspects that influenced the impact of the MedPlan Mobile App on self-care behavior among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH).

Firstly, in terms of age distribution, it was evident that the majority of participants fell within the 46-55 age group, comprising 44.2% of the total. This middle-age group represented a substantial portion of the study population, and it was worth noting that this age range often coincided with an increased risk of chronic health conditions. Gender balance was notable in this study, with nearly equal representation of females (49.1%) and males (50.2%). This equilibrium was vital for ensuring that the findings of the study did not exhibit gender bias, as both genders were equally engaged in evaluating the mHealth solution. Regarding occupation, "Businessman/woman" stood out as the most common occupation, accounting for 44.6% of participants. This implied that individuals engaged in business activities had a particular interest in health and self-care, possibly due to the demanding nature of their work. "Civil servant" was the next most frequent category at 30.5%, followed by "Unemployed" at 24.2%. Education level was another crucial demographic factor. A significant majority of participants were "Graduates" (82.2%), indicating a relatively high level of education within the sample. This higher educational background could potentially have impacted their readiness to engage with and benefit from mHealth solutions like the MedPlan Mobile App. "Masters" degree holders made up 17.1% of the participants, demonstrating a diverse educational profile. When considering the duration of diagnosis, the majority of participants had been diagnosed for "1- <5 years," comprising 46.1% of the sample.

This suggested a substantial number of recently diagnosed individuals who may have been more receptive to adopting new healthcare technologies. A smaller proportion had been diagnosed for "5- <15 years" (9.3%) and "15 years and above" (7.1%). This demographic analysis revealed a diverse and balanced participant population in terms of age, gender, occupation, education level, and duration of diagnosis. These demographic factors were essential to consider when assessing the impact of the MedPlan Mobile App on self-care behavior, as they significantly influenced user engagement, adoption, and the overall effectiveness of the mHealth solution in the context of hypertensive and diabetic patients at UBTH.

In Table 3.2, the self-care behavior of the study participants was detailed, encompassing their utilization of the MedPlan mobile app and their adherence to various self-care practices. According to the data, it was reported that the frequency of app usage varied among participants. The highest figure in this category was noted as "Most of the time," accounting for 36.1% of the responses. This indicated a substantial portion of participants actively engaged with the MedPlan mobile app on a regular basis. Additionally, a significant 32.3% of respondents reported using the app "Always," highlighting a strong commitment to its consistent use for self-care management. Conversely, a smaller percentage, amounting to 6.7%, reported that they had never used the app. Regarding adherence to prescribed medications, it was reported that a substantial number of participants claimed to follow their medication schedules "Most of the time," with this category representing 42.0% of the responses. The second-highest figure was in the "Always" category, indicating that 29.4% of participants consistently adhered to their prescribed medication regimen. However, it was concerning to note that 7.8% reported "Never" taking medications as prescribed. For the essential practice of monitoring blood pressure or glucose levels regularly, it was reported that the highest figure appeared in the "Most of the time"

category, with 35.3% of participants indicating their commitment to regular monitoring. Additionally, 29.4% of participants reported doing this "Always." Nevertheless, it was a matter of concern that a notable proportion reported either "Never" or "Rarely" monitoring their levels, constituting 5.9% and 12.6%, respectively. When considering the adoption of a healthy diet recommended for their conditions, the data indicated that "Most of the time" and "Always" categories each represented 29.4% of participants, highlighting a strong commitment to dietary recommendations. However, it was noteworthy that a significant number, 16.7%, reported adhering to these recommendations only "Sometimes," and a smaller percentage admitted to "Rarely" or "Never" following a healthy diet, at 9.7% and 4.8%, respectively. In terms of engaging in regular physical activity or exercise, it was reported that the categories of "Sometimes" and "Most of the time" made up a substantial portion of respondents at 21.2% and 30.1%, respectively. However, it was noteworthy that 14.1% reported "Never" engaging in physical activity, while only 13.8% claimed to do so "Always." Concerning effective stress management, it was reported that the "Sometimes" category was the highest, at 20.8%, indicating that stress management posed a challenge for a significant portion of participants. Although a substantial number reported managing stress "Most of the time" (29.0%), it was concerning that 9.7% reported "Never" managing stress effectively. Based on the reported data, a substantial proportion of participants actively utilized the MedPlan mobile app for self-care management, with "Most of the time" being the most common usage frequency. Medication adherence and regular health parameter monitoring were generally strong among participants. Dietary adherence was relatively high, but challenges were noted in terms of physical activity and stress management, with notable percentages reporting low engagement in these areas. Recognizing the need for interventions to promote physical activity and stress management is imperative to

enhance the overall effectiveness of chronic disease management programs like the MedPlan Mobile App in this patient population.

In Table 3.3, the exploration of how specific features within the MedPlan mobile app influenced the self-care behavior of the study participants sheds light on several key factors influencing their engagement and satisfaction with these features. Medication Reminder feature garnered substantial usage, with 35.7% using it "Most of the time" and 34.2% using it "Always." These figures underscore its pivotal role in supporting medication adherence, especially for those with chronic conditions like hypertension and diabetes. The low usage percentage of 6.7% who reported "Never" using this feature suggests that there may be room for improvements in user engagement strategies, such as personalized reminders or educational content explaining its benefits. Health Diary was considered "Useful" by 26.8% and "Very useful" by 23.4% of participants. However, 9.7% found it "Not useful at all," and 21.2% regarded it as "Not very useful." These contrasting responses point to potential areas for improvement in its functionality or user interface. User feedback indicating specific challenges or barriers to effective self-monitoring could inform enhancements to this feature. Similarly, the Patient Community, Health Blog Tips, and Video Health Tips received mixed feedback, with appreciative users finding them valuable while others did not. These variations in perception emphasize the importance of content relevance, presentation, and customization. Developers could benefit from tailoring these features to better match users' diverse preferences and health literacy levels, ensuring that they address the varying information needs and interests within the target population. Medical Records History feature received positive feedback from a significant portion of users, suggesting its utility in supporting self-care behaviors. However, the 7.4% who found it "Not useful at all" and 13.8% who rated it as "Not very useful" point to potential improvements

needed in terms of user-friendliness or functionality. Incorporating user feedback to refine this feature could enhance its overall usability and perceived value.

The descriptive statistics presented in **table 3.4** reflect key insights into the self-care behavior of the study participants and their perceptions of how app features influence this behavior.

Moderate Self-Care Behavior: The mean self-care behavior score of 3.5918 suggests that, on average, participants in the study demonstrated a moderate level of self-care behavior. This moderate score could be attributed to several factors. Participants might have varying degrees of motivation and commitment to self-care, influenced by factors such as the severity of their health condition, their level of health literacy, or access to healthcare resources. Additionally, the relatively low standard deviation of 0.78214 indicates that the self-care behavior scores were clustered around the mean, indicating a degree of consistency in self-care practices among participants. This consistency might be due to the fact that many individuals were receiving healthcare services at the same institution (University of Benin Teaching Hospital), potentially leading to standardized guidance and practices among the patient population.

Perceived App Impact: The mean score of 3.5156 for the perceived impact of app features on self-care behavior suggests that, on average, participants believed that the app had a moderately positive effect on their self-care activities. However, the higher standard deviation of 0.83912 indicates more variability in participant perceptions. This variability can be attributed to several factors as well. Firstly, individual differences in how participants used the app features or the extent to which they integrated the app into their self-care routines could contribute to varying perceptions. Secondly, user satisfaction and perceived effectiveness of app features can be influenced by personal preferences and expectations. Some participants may have had high expectations for the app's impact, while others may have had more modest expectations based on

their prior experiences with health-related apps or their level of comfort with technology. Variability in perceived impact may also be related to the specific features participants found most beneficial and those that may have fallen short of their expectations.

The results presented in **table 3.4**, which includes linear regression analysis, provide valuable insights into the relationship between the perceived impact of app features on self-care behavior and the actual self-care behavior of the study participants.

Model Summary: The linear regression model **in table 3.4** explains the relationship between the "App Features and Self-Care Behavior" variable and the "Self-Care Behavior" variable. The R-square value of 0.349 indicates that approximately 34.9% of the variance in self-care behavior can be explained by changes in the perceived impact of app features. This suggests that the perceived effectiveness of app features is moderately associated with actual self-care behavior. The adjusted R-square value of 0.347, which is very close to the R-square, indicates that the model's fit is consistent, and the addition of the predictor variable (App Features and Self-Care Behavior) significantly contributes to explaining the variance in self-care behavior.

ANOVA: The analysis of variance (ANOVA) in **table 3.4.1** further supports the significance of the linear regression model. The regression sum of squares (56.803) is statistically significant with an F-statistic of 142.113 ($p < 0.001$). This suggests that the model as a whole is a good fit for explaining the relationship between the predictor variable (App Features and Self-Care Behavior) and the dependent variable (Self-Care Behavior).

Coefficients: The coefficients table (**table 3.4.2**) provides information about the specific parameters of the linear regression model. The constant term (1.656) represents the estimated self-care behavior score when the perceived impact of app features (App Features and Self-Care

Behavior) is zero. In this context, it's not directly interpretable because the perceived impact of app features is unlikely to be zero. The coefficient for the "App Features and Self-Care Behavior" variable is 0.551, indicating that for every one-unit increase in the perceived impact of app features, the self-care behavior score is expected to increase by 0.551 units. This coefficient is statistically significant ($p < 0.001$), highlighting that there is a positive and substantial relationship between the perceived impact of app features and actual self-care behavior. The standardized coefficient (Beta) of 0.591 indicates that this relationship is relatively strong, and it underscores the importance of app features in influencing self-care behavior among the study participants. The linear regression analysis demonstrates that the perceived impact of app features is a significant predictor of self-care behavior among the study participants. Approximately 34.9% of the variance in self-care behavior can be explained by changes in the perceived impact of app features, and this relationship is statistically significant. This finding suggests that enhancing the perceived effectiveness of app features in supporting self-care may lead to improvements in actual self-care behavior among hypertensive and diabetic patients.

Table 3.5 presented the results of a past-tense reliability test, specifically Cronbach's Alpha, which aimed to assess the internal consistency of a scale consisting of 12 items. The reported Cronbach's Alpha value of 0.827 is notably high and falls within the range considered "very good" for research purposes. The standard range for Cronbach's Alpha typically extends from 0 to 1, with values above 0.70 deemed acceptable, values above 0.80 considered very good, and values above 0.90 regarded as excellent. In this context, the Cronbach's Alpha value of 0.827 demonstrated a strong level of internal consistency among the 12 items in the scale.

The significance of this result lies in the scale's ability to reliably measure the intended construct, whether it pertains to self-care behavior, the perceived impact of app features on self-care, or a

related concept. The high internal consistency indicated that participants' responses to the 12 items consistently reflected a common underlying theme or construct. This result, while affirming the quality of the data collected through the scale, also reinforces the scale's validity for the study's objectives. Researchers can confidently utilize this scale for their analyses, knowing that it consistently and dependably measures the construct of interest.

Table 3.6 provided an in-depth analysis of participants' past perceptions regarding the impact of the MedPlan mobile app on their self-care behavior, particularly in managing chronic conditions like hypertension and diabetes. One noteworthy finding that warranted significant emphasis was the 23.0% of participants who had reported that the app had a "Yes, significantly" positive impact on their overall self-care behavior or had improved their adherence to self-care behaviors. This figure represented a substantial portion of participants who, in retrospect, had experienced a notable and meaningful enhancement in their self-care efforts due to the app's utilization. It underscored the app's potential effectiveness in assisting individuals in managing chronic conditions, aligning seamlessly with the core objectives of mHealth solutions aimed at enhancing healthcare outcomes. The "Yes, significantly" response underscored a significant and tangible benefit derived from the app, indicating that it had played a pivotal role in improving participants' adherence to self-care practices. While 23.0% reported a significant impact, a considerable 31.2% indicated a "Yes, to some extent," and 45.0% responded with "No, not really." These diverse responses underscored the varying experiences and perceptions among participants. Some individuals may have experienced incremental improvements in their self-care behaviors, while others may not have perceived substantial changes through app usage. Additionally, the table revealed specific self-care challenges, diverse levels of confidence in self-management, and varying recommendations regarding the app, highlighting the necessity for

personalized and adaptable mHealth solutions to cater to the distinct needs and preferences of individuals managing chronic conditions like hypertension and diabetes.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

This study aimed to assess the impact of the MedPlan Mobile App on self-care behaviors among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH). The findings suggest that the app holds promise in positively influencing self-care behaviors among these patients. Moreover, the study revealed a positive correlation between the duration of app usage and improved self-care, emphasizing the importance of sustained engagement. Demographic factors, including age, gender, and education level, were found to play a role in the app's effectiveness. Additionally, the study highlighted factors influencing patient engagement and identified challenges faced by patients in adopting and using the app. These insights underscore the potential of mHealth solutions like the "MedPlan Mobile App" in enhancing patient self-care, while also emphasizing the need for tailored strategies to address specific patient demographics and challenges to maximize the app's impact in a clinical setting.

5.2 RECOMMENDATION

Based on the findings of this study on the impact of the "MedPlan Mobile App" on self-care behavior among hypertensive and diabetic patients at the University of Benin Teaching Hospital (UBTH), several recommendations can be made to enhance the effectiveness and usability of the app:

- The development team should consider regular updates and enhancements to the app's features based on user feedback. This should include improving the user interface, adding

new functionalities, and ensuring the app remains aligned with the evolving needs of hypertensive and diabetic patients.

- Implement personalized engagement strategies within the app to cater to the specific needs and preferences of individual users. This can include tailored reminders, educational content, and self-care recommendations based on each user's health profile and progress.
- Provide comprehensive user training and support resources within the app. This can include tutorials, FAQs, and a responsive support team to assist users with any issues or questions they may encounter while using the app.
- Collaborate with healthcare providers at UBTH to actively promote the app to eligible patients during their clinical visits. Ensuring that patients are aware of the app and its benefits can encourage greater adoption.
- Consider incorporating behavioral incentives within the app, such as gamification elements or rewards for consistent engagement and adherence to self-care behaviors. These incentives can help motivate and sustain user participation.
- Recognize the diversity of users, including varying levels of digital literacy and access to mobile devices. Ensure that the app is accessible and usable by a wide range of patients, regardless of age, gender, or educational background.
- Establish a systematic process for collecting user feedback and suggestions for app improvement. This can be achieved through surveys, in-app feedback forms, or user focus groups.

- Maintain a robust data security and privacy framework to protect users' sensitive health information. Assure users that their data is handled with the utmost care and compliance with privacy regulations.
- Implement a long-term monitoring system to assess the sustained impact of the app on self-care behaviors and health outcomes. This will provide valuable insights into the app's long-term effectiveness.
- Foster collaboration between the app developers and healthcare providers at UBTH to ensure seamless integration of the app into the clinical care pathway. This can include data sharing mechanisms to enable healthcare providers to monitor and support patients effectively.

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APPENDIX

THE IMPACT OF "MEDPLAN MOBILE APP", AN MHEALTH SOLUTION, ON SELF-CARE BEHAVIOR AMONG HYPERTENSIVE AND DIABETIC PATIENTS AT UNIVERSITY OF BENIN TEACHING HOSPITAL (UBTH)

Thank you for taking the time to participate in this research study. The purpose of this questionnaire is to gather information on the impact of the "MedPlan Mobile App," an mHealth solution, on self-care behavior among individuals diagnosed with hypertension and diabetes. The MedPlan Mobile App is designed to enhance chronic disease self-management in patients managing such conditions.

Your participation in this study will help us understand the effectiveness of the MedPlan Mobile App in promoting self-care behaviors and managing chronic conditions. Your responses will remain confidential and will only be used for research purposes. Please answer the following questions to the best of your knowledge and based on your experiences with the MedPlan Mobile App and self-care behaviors. Your input is crucial and will contribute to improving healthcare interventions for individuals with chronic diseases.

Section 1: Demographic Information

1: Age: a. 18-25 [ ] b. 26-35 [ ] c. 36-45 [ ] d. 46-55 [ ] e. 56 and above [ ]

2: Gender: a. Male [ ] b. Female [ ]

3: Occupation: a. Civil servant [ ] b. Businessman/woman [ ] c. Student [ ] d. Unemployed [ ]

4: Education Level: a. Undergraduate [ ] b. Graduate [ ] c. Masters [ ] d. PhD [ ]

5: How long have you been diagnosed with hypertension/diabetes? a. < 1 yr [ ] b. 1- <5 yrs [ ]
c. 5- <15 yrs [ ] d. 15 yrs and above [ ]

Section 2: Self-Care Behavior

6. How frequently do you use the MedPlan mobile app?

a. Multiple times a day

b. Once a day

c. A few times a week

d. Once a week

e. Rarely/Never

7. How frequently do you engage in the following self-care behaviors for managing your chronic

condition(s)? (Hypertension/Diabetes)

i. Taking medications as prescribed

a. Always

b. Most of the time

c. Sometimes

d. Rarely

e. Never

ii. Monitoring your blood pressure/glucose levels regularly

a. Always

b. Most of the time

c. Sometimes

d. Rarely

e. Never

iii. Following a healthy diet recommended for your condition(s)

a. Always

b. Most of the time

c. Sometimes

d. Rarely

e. Never

iv. Engaging in regular physical activity/exercise

a. Always

b. Most of the time

c. Sometimes

d. Rarely

e. Never

v. Managing stress effectively

a. Always

b. Most of the time

c. Sometimes

d. Rarely

e. Never

Section 3:App Features and Self-Care Behavior

8. Please rate the usefulness of the following features of the MedPlan mobile app in managing

your chronic condition(s) (Hypertension/Diabetes):

i. Medication reminder

a.Very useful

b. Useful

c.Neutral

d. Not very useful

e.Not useful at all

ii. Health diary

a.Very useful

b. Useful

c.Neutral

d. Not very useful

e.Not useful at all

iii. Patient community

a.Very useful

b. Useful

c.Neutral

d. Not very useful

e.Not useful at all

iv. Health blog tips

a.Very useful

b. Useful

c.Neutral

d. Not very useful

e.Not useful at all

v. Video health tips

a.Very useful

b. Useful

c.Neutral

d. Not very useful

e.Not useful at all

vi. Medical records history

a.Very useful

b. Useful

c.Neutral

d. Not very useful

e.Not useful at all

Section 4: Assessing the perception of the use of the app

1: Has the MedPlan mobile app had a positive impact on your overall self-care behavior or helped you improve your adherence to self-care behaviors?

Yes, significantly [ ] b. Yes, to some extent [ ] c. No, not really [ ]

2: Which specific self-care behavior(s) have you found most challenging to maintain? (Choose all that apply)

a. Taking medications as prescribed [ ] b. Monitoring blood pressure/glucose levels regularly [ ] c. Following a healthy diet [ ] d. Engaging in regular physical activity/exercise[ ] e. Managing stress effectively [ ]

3: How confident are you in managing your chronic condition(s) on your own?

Very confident [ ] b. Confident [ ] c. Neutral [ ] d. Not confident [ ]

4: Do you feel that the MedPlan mobile app has increased your confidence in managing your chronic condition(s)?

a. Yes, significantly [ ] b. Yes, to some extent [ ] c. No, not really [ ]

5: Would you recommend the MedPlan mobile app to other hypertensive/diabetic patients?

a. Yes [ ] b. No [ ]