The Impact of Mobile Application on Enhancing Self-Management among Patients with Chronic Disease

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Abstract

Due to their high effectiveness, accessibility, and cost-effectiveness, mobile applications have become very popular in recent years for the self-management of chronic diseases, as demonstrated during the COVID-19 pandemic, where patients in general, and those with chronic diseases in particular, faced several difficulties when they needed to access services through face-to-face visits with healthcare providers. Aim of the study: Todevelop an easy mobile application for the patients to guide them in self-management. To educate the patients about how to use the mobile application for self-management. To conduct more studies about how the mobile application enhances self-management. To encourage the nurses to integrate the mobile application in their practice.

Introduction

Research Problem

The nursing profession helps people and their families with, and if necessary lives with, illness, so that other parts of their lives may continue. Nurses do more than care for individuals. They have always been at the forefront of change in healthcare and public health.

Significance/Contribution of the Research

This information helps nurses guide their educational practices for the care of patients with chronic diseases, especially people with diabetes. This information focuses on the importance of mobile health technology use and approach to use. Furthermore, they may make improvement and development efforts to enhance mobile health technology by modifying design or style communication.

Introduction

Research Objectives

To investigate the impacts of mobile application on enhancing self-management among patients with chronic disease particularly diabetes in Saudi Arabia . Accordingly, many objectives were developed as follow:

➢ To assess the use of mobile applications among patients with diabetes in Saudi Arabia.
➢ To assess the self-management levels and practice among patients with diabetes in Saudi Arabia.
➢ To investigate the influence of demographic and clinical factors on mobile application use and self-management among patients with diabetes in Saudi Arabia.
➢ To study the impact of the use of the mobile application on self- management among patients with diabetes in Saudi Arabia.

Research Aims: The study may aim in the following

➢ To develop an easy mobile application for the patients to guide them in self- management
➢ To educate the patients about how to use the mobile application for self-management
➢ To conduct more studies about how the mobile application enhances self-management
➢ To encourage the nurses to integrate the mobile application in their practice .

PICOT question

Does the use of mobile health applications improve the self-management practice among patients with diabetics in the Diabetes and Endocrine Center in the Jazan region, Saudi Arabia in 2022?

Research Question/s or Hypothesis/Hypotheses: What are the impacts of mobile applications on enhancing self-management among patients with chronic disease, particularly diabetes, in Saudi Arabia?

Definition of Research Keywords mobile application: It is a software as it is called (mobile application) that works in the required form and characteristics and put it in the application market so that any user can download it on his mobile

self-management : It is about subjecting himself to a set of rules and plans, with a sense of self-control, control and self-direction during the period of self-education and self-development.

Chronic diseases: A disease or illness that is permanent or long-term in its effects, or a disease that comes with time and progresses slowly. This disease often lasts for three months or more.

Research Outline: The project will provide baseline data on diabetes self-management practices among Saudi Arabian diabetic patients. And academics to influence nursing practice in primary health clinics and diabetes care providers in the future. Furthermore, the research will give crucial information on the utilization of mobile health apps among Saudi Arabian patients .

Literature Review

In a unique study of its kind, Abelson et al (2017), this physician found that the use of the portable health program increases the rate of increased knowledge of the disease situation and makes it easier to communicate with the surgeon. Which can be obtained more easily and in less time . (Abelson et al. , 2017). A full search was conducted by the Director of the Health Technology Assessment Information Center and the Evacuation Center (EPC), which is an acronym for electronic power control, which is affiliated with the Institute (praECRI), a comprehensive and special search in everything that includes the literature in the databases PubMed, EMBASE, Medline, PsycINFO, Cochrane The Library from January 2010 to November 2017 additionally searched ClinicalTrials.gov and the PCORI Web site to identify funded trials in the subject area. Speaking of ECRI, which restricted the search criteria for inclusion in English systematic reviews (SRs) that performed stand-alone analyzes of m health interventions for self-management of any disease or any chronic disorder, furthermore the reviews should have formally assessed the risks of bias in their included study. In cooperation with PCORI, ECRI brought together a three-member Technical Expert Panel (TEP) and a Clinical Subject Expert (SME) who provided input into the research process, inclusion criteria, analytical framework and protocol. It contains the main categories and mobile health interventions with text messages, mobile applications, and portable devices and includes several tasks, the most prominent of which are the following categories: alert, education, counseling, monitoring, and recording. The SR results were encoded as having no effect, or perhaps a clear change, an expected positive effect, or a positive effect based on the assessment of the outcome categories reported in a particular review. ECRI has used many techniques to classify the literature into several levels (high, medium, low, very low) and this classification works to determine the strength of the SR evidence so that it is comprehensive of all scales. The systems engineer and systems engineer at ECRI also built all directories maps using several HTML, SVG and JavaScript standards. The searches conducted identified ongoing PCORI studies that met the inclusion criteria (Wu, Yao et al. 2017).

In some countries there is a shift in policies and structures to support self-management and attempts to lead reforms in self-management at the system level in the provision of self- management services from those countries Australia and Ireland. However, health care programs have not always achieved the stated goals or even the desired outcomes (O'Connell et al., 2018).

Saudi Arabia has one of the highest diabetes prevalence rates in the world (>24 percent), with more than 1.8 million people living with diabetes by 2035, the population of Saudi Arabia is expected to grow at a pace of 105.4 percent. Compared to previous years, such as the year to 2013 levels (Alanzi, 2018) .

The escalating economic costs for diabetics in Saudi Arabia are on the rise, and this residences contribute to clarifying the cost, which is expected to reach $6.5 billion by 2020 for type 1 diabetes patients and $1,300 to $1,200 for type 2 diabetes (T2D) patients. Respectively, the expenditures are expected to increase to more than $30,000 per patient per year for those with problems such as kidney failure. The Kingdom of Saudi Arabia is one of the most prominent Arab Gulf countries in technology, and this is due to the rate of penetration of smart phones, the Internet and social networks, and these tools help to accelerate the digitization of the health care economy Alanzi, 2018; Alotaibi et al., 2017; Alwin Robert et al., 2017). According to recent information, there will be a conceivable growth in the smartphone user base in Saudi Arabia by 24.02 million in 2022from 21.87 million in 2018. Likewise, mobile Internet users will grow to 26.44 million in 2022, up from 23.77 million in 2018.

The Kingdom lacks a clear mobile health application or a digital health strategy that can be followed by patients. This is especially critical in view of the motivations that patients use and update. However, there are many difficulties that patients face in adopting the health application on the mobile phone (Alanzi, 2018; Alotaibi et al., 2017; Alwin Robert et al., 2017).

Abelson et al (2017) showed in a qualitative analysis that patients faced various difficulties and complications in using mobile health applications, among these obstacles are the effectiveness and failure of technology, protection of personal health information, and the level of effort required, and also many patients prefer face-to-face interaction, and literacy applications Mobile and the ability of the elderly to use mobile applications. (Abelson et al., 2017). For these reasons, the mobile health application must have a superior and successful platform and be aesthetically attractive, and the interface must be able to transfer data in record time in order to encourage users to connect to the application frequently, and also include both sick and healthy users of the application. Also, it may be preferable to include expert assistance for people with chronic diseases to achieve better outcomes (Muralidharan et al., 2017). Whereas, previous studies and systematic reviews focused on the effectiveness of correct portable applications in enhancing clinical results . Studies published by public administration program specialists add to an overview of beneficial interventions and keys that can improve quality of life and significantly reduce health costs. Evidence abounds, reports presented and published, and descriptions of programs developed and implemented for specific patients, Gagné (2020), Gundottir (2015), Leo (2019), for particular patient populations. Gagné (2020), Jonsdottir (2015), Liou (2019), Park (2020), Patel (2016) and Coultas (2018) each describe specific programs which address COPD self- management and their favorable impact on participants. Gagné (2020) reported significant

improvements in quality of life, health-directed behaviors, and skill acquisition, but no difference in health care utilization between participants and the control group. Although there were no differences seen in quality of life, anxiety or depression, physical activity level, smoking status, or number of exacerbations, those in the treatment group reported that the disease was perceived as less intrusive than for those in the control group. Liou (2019) studied patients for three months following an acute inpatient hospitalization for COPD exacerbation; those who participated in CDSME reported increased self-efficacy, improved Clinical COPD Questionnaire (CCQ) scores, and less dyspnea than those who received usual care. Park (2020) examined the effect of using a smartphone-based app to provide self-management support for patients with COPD. Although both the experimental group and the control group received a significant level of support, those who recorded their activities using the mobile app had significantly improved self-care behaviors from baseline, including longer distance on 6-minute walk, increase in total activity, improved self-care behavior, and better self-efficacy for maintaining exercise. Coultas (2018) reported on a randomized controlled trial where outpatients with stable COPD were either given usual care or assigned to a treatment group which included an additional 20 weeks of follow-up telephone support. All participants completed a standard 6 week CDSME program. At 18 months, 73.6% of the treatment group versus 57.8% of the control group reported being persistently active. Respiratory health care utilization was lower in the intervention group only for those with the most severe illness. Sangrar (2019) reviewed hybrid programs using both face-to-face and computer-based instruction for CDSME and found that some aspects of self-management support could be better provided face-to-face, while other aspects are more amenable to technological support. Cutler (2018) published a systematic review of RCTs and investigative studies addressing CDSME. Of the ten studies reviewed, five were primarily for diabetes, two were generic, two were weight loss related, and two focused on minority groups. Overall, positive impacts were seen for participants, including improved glycemic control, and improved self-efficacy in the areas of speaking with provider, exercise, and diet .

Garden (2020), Patel (2016) and Coltas (2018). Each of these classifications describes a specific thing that it is taking care of. Self-management of obstructive pulmonary disease and the positive impact it had on them Gagné (2020) Jenny described the effects that occurred on several things such as the positive impact on lifestyle, lifestyle, health-oriented behaviors, and skills acquired, but one thing remains, which is the difference in use of health care between participants and the control group. Liou (2019) conducted an experiment for the purpose of studying the case of indoor patients who suffer from acute exacerbations of COPD.

In Park (2020) he began a practical examination of the use of a smartphone-based application to provide self-management support for COPD. Although both the experimental and control groups had an adequate level of support, those who recorded their activities and actions using a mobile application significantly improved basic care behaviors from baseline, including a longer walk duration of 9 minutes. Increased overall activity, improved self-care behavior, and improved self-efficacy for continuing exercise.

Most facilitators were not explicitly trained in CDSME guidelines and guidelines, so the evidence was not 100 percent robust. As a result, there was no certainty of the evidence as a basis for the programs. Sangrar (2019) reviewed new programs, including hybrid programs that use face to face. Several aspects were clarified and computer instructions were created for CDSME. I found some aspects of self-management can work better through work and face-to-face interview, while there are other aspects that are more usable by technology support route.

Cutler (2018) has published systematic reviews of randomized controlled trials of several surveys of CDSME studies. Of all the 10 studies reviewed, nearly five were on diabetes, two were general, two were related to weight loss, and two focused on the minority group. As a comprehensive result, several positive results were shown, including improved blood sugar control, improved self-efficacy in speaking with the service provider, exercise, and diet. There are many studies that have appeared in the field of qualitative studies that have examined the factors that affect participation in education and the application of self-management.

This is considered particularly useful because of its special benefits for the patient, which may be determined by the doctor for a patient.

Brady (2017) presented a meta-analysis of 34 ASMP and CDSMP and found that, unexpectedly by anyone, the use of the software with lay people (i.e., non-professional people) as leaders, and those who did not fulfill all the requirements and loyalty in all of their actions were In fact, it is more successful. If this indicates anything, it only indicates that the internal motivation of the participants is of paramount importance to the success of any program.

All CDSM mechanisms are involved, whose purpose is the great desire to improve the condition of patients in various aspects, especially diseases who suffer from chronic conditions. Doctors and nurses are always ready to assist the patient while engaging in self-management behaviours. As is common, most or almost the majority of patients are affected by lifestyle choices. Encouraging and motivating patient self-management behaviours also represents a great opportunity for doctors.

Method and Methodology

Problem Identification

Over the past few decades, the American health care system has encouraged a more active and involved

role for the patient. Many patients have accepted greater responsibility for managing their own chronic conditions and have benefitted from better outcomes than patients who are managed in a more traditional, paternalistic fashion. However, not all patients are able or willing to engage actively in self-management activities. (Allegrante et al., 2019). Clinicians will benefit from having a structured and systematic approach they can utilize to support patients who are actively engaging in self-management, and to encourage more active participation for those patients who are not.

Research Design

This study employed descriptive cross sectional. This study was conducted objectively and in a non-biased way and was based solely on the data collected. Non-experimental research designs are usually closely related to real life (Grove and Gray 2018). They are used in studies where the independent variable cannot be controlled. The non-experimental research approach is a comprehensive research approach that permits the researcher to observe the trends as they occur naturally without introducing any external variables. The study will be conducted the study in Diabetic and endocrine Centre and primary health centers in Jazan region, Saudi Arabia.

Data collection method

During the period between Feb-Mar 2022, the participants will be recruited directly by the researcher in the Diabetes and Endocrine Center in the Jazan region. The researcher will approach potential participants and hand out the study information package. The participants will be provided the essential information about the project. The participants will be asked about their acceptance to participate in the study. Verbal consent will be taken. The questionnaire will be distributed to accepted participants via distributed paper and social media including Email.

Instruments for Data Collection

The self-administered questionnaire was used in this study. The first section includes demographic information such as age, gender, level of education, diagnosis date, and type of diabetics, marital status, and nationality. The second section, a Diabetes Self-Care Activities Questionnaire (SDSCA) will be used to diabetes self-management activities that are performed during the past 7 days. This tool includes five domains .

Research Setting

The study data were collected from Diabetic center in King Fahd Central Hospital

Population

The population interest for this study was composed of female and male Diabetic patient in Diabetic Center in King Fahd Central Hospital.

Research Sample

The study will utilize a non-probability sampling technique, namely the convenience sampling

technique. The reasons for selecting this sampling technique are the simplicity of sampling, and the ease of doing the data collection, a short duration. Furthermore, the economy to implement that alternative sampling method encourages using this technique.

To determine sample size, the study will use the level of confidence at 95%, probable = 0.05, study power 80%, then the use of Cohen table shows that the required sample size is 120. All patients who visit the selected center and are diagnosed with debates for three months at least, accept to participate in the study and read and write will be considered eligible for this study in study. The patients who do not visit the selected center, and who are not diagnosed with debates for three months at least, are not able to read and write, and do not accept participating in the study will be excluded.

Data analysis and method

This exploration of literature regarding CDSME, its impact, and types of support clinicians can provide for patients practicing self-management has uncovered several useful themes. Chronic disease self-management has the potential to improve patient self-efficacy, health behaviors, health status, and quality of life (Allegrante et al., 2020).

Chronic disease progresses . Allowing the patient to assume responsibility for self- management at their own pace, with the knowledge that the clinician is always available to assist, is most likely to positively impact the patient's health .

Frequently Used Self-Management Support Strategies Self-management support strategies fell into four broad categories: traditional CDSME programs, computer/ mobile apps, support groups, and family-centered care.

Traditional Chronic Disease Self-Management Education

Traditional CDSME programs, with or without modification, provide a structured platform to address all key factors associated with self-management of chronic conditions. Whether they are developed for a particular condition or intended for patients managing a variety of conditions, these programs provide not only knowledge, but support and encouragement. Participation has been tied to an improved ability to monitor and track chronic conditions, and to implement positive health behaviors (Dye et al., 2018).

Computer/ Mobile Apps

A variety of mobile apps were investigated for managing chronic conditions, symptom monitoring and tracking, and medication usage. Jeffrey and colleagues (2019) looked specifically at the use of mobile apps by patients with Type 2 diabetes and found that recommendation by a health care professional was key to their implementation; none of the non-app users had ever had a health professional discuss with them the use of an app.

Support Groups

Support groups provide help for patients with chronic conditions and their families in a number of ways. Perhaps most importantly, they reassure the person facing a chronic condition that they are not alone in their journey and that others have successfully navigated similar pathways. (2018) found that even those with limited technical proficiency could actively participate in electronic support groups, and that they improved knowledge, insights, and skills as well as traditional face-to-face meetings. Optimal success of such groups is dependent on adequate IT training and support for facilitators and participants. (Sangrar et al., 2018).

Family-centered care

Although only one study focused primarily on family-centered care, several authors alluded to patients' desire for more education for family members and friends (Andersen et al., 2017; Angwenyi et al., 2019; Davisson et al., 2017).

Data Analysis

Data will be analyzed using the Statistical Program (SPSS) version 21. Descriptive and inferential tests will be used to identify the demographic and study variables. The inferential analyses including Pearson's Correlation Coefficient, multiple regression, t-test, and ANOVA analyses will be used to investigate the influence of demographic and clinical factors on mobile application use and self-management and to study the impact of the use of the mobile application on self-management among patients with diabetes in Saudi Arabia.

Conclusion Drawing and Verification

Clearly, patients who practice self-management of their chronic conditions fare better than those who do not. Clinicians wishing to empower patients to engage in self- management must individualize their approach for each case. It is important to consider each patient's willingness and ability to participate in self-care management, as failure to provide adequate support may place an additional burden on those who are already overwhelmed or do not feel that they are valued or listened to (Andersen et al., 2017).

Field Study Procedures

First: The Field Study Tool
The researcher used the questionnaire as the main means of collecting data from the study sample.

Questionnaire description

The researcher attached with the questionnaire a letter to the study sample in which they were informed of the title of the study and the purpose of the questionnaire form Appendix No. (1), and the questionnaire consisted of three main sections:
Section One: Demographic Characteristics
It includes the primary data of the study sample members, represented in (age, gender, and educational level, type of diabetes patients, marital status, nationality, and diagnosis of diabetes date).
Section 2: Chronic Diseases Mobile App Assessment Tool
This section contained (42) statements that asked the study sample to determine their response to what each statement describes, according to the five-points Lekart scale, which consists of five levels (strongly agree, agree, neutral, opposed, strongly opposed). Section 3: Self-Care Activities for Diabetics. This section contained (33) questions that asked the study sample members to specify their answers to each question.
Second: The field study community:
The study population consists of diabetes patients in Saudi Arabia.
Third: The sample of the field study:
The study sample is 120 diabetes patients. Statistical methods used:
To achieve the objectives of the study and verify its topics, the statistical program (SPSS), which refers to the Statistical Package for Social Sciences, was used, and Microsoft Excel was used to implement the graphic shapes required in the study. The following statistical methods were also used: Frequencies and percentages of respondents' answers to the statements. Graphs and percentages of the answers of the study sample members. Cranbach's alpha to calculate the reliability coefficient and statistical validity. The arithmetic mean (mean) of the answers of the sample members to the phrases to know the level of agreement for the phrases of the second section . The standard deviation of the answers of the sample members to the statements to know the extent to which the answers of the sample are close or far from the arithmetic mean, or in other words, to know the extent to which the opinions of the research sample about the statements vary . The weighted average, which is the average of the sample's answers to the statements of the second section as a whole, to know the level of agreement for all the statements of the section, and other tests and methods that were needed in the course of the analysis .

Questionnaire Stability:

In other word that the stability of the questionnaire means stability in the results of the questionnaire and not changing they significantly if it was redistributed to the sample members several times during periods of time specific. We used The Statistical Package for the Social Sciences (SPSS) program to find the reliability coefficient by Cronbach's alpha method

N	Dimension	Number of Statements or Questions	Reliability Coefficient	Degree of Validity
**Table(1): Cronbach's alpha stability coefficient and validity of the questionnaire.**
1	Second Part	42	0.984	0.992
2	Third Part	33	0.830	0.911
Stability and validity factors for both parts		75	0.907	0.952

The results show that the value of the Alpha Kronbach coefficient was very high for the second section to reach semi full stability (0.984), as well as the value of Alpha

Cronbach for the third section was very good and was (0.830), as was the value of the Alpha coefficient for all terms and questions (0.907). In other words, this means that the stability factor is very high and almost reaches the full stability of all the statements or the questions of the second and the third part of the questionnaire.

The degree of honesty was also very high, reaching full honesty in the second section and equal (0.992), high for the third section and equal (0.911), and very high for both parts and equal to (0.952), so that the questionnaire in its final form is distributable.

The questionnaire validity

We mean when we say the validity of the questionnaire is if the topics of the questionnaire can measure what it was developed to, and the researcher confirmed the validity of the questionnaire in two ways:

1.   The arbitrator's authenticity

The researcher presented the questionnaire to a group of arbitrators consisting of ..... Specialists in .... The names of the arbitrators . The researcher responded to the opinions of the arbitrators and made the necessary deletionand modification in the light of the proposals submitted, thus the questionnaire came outin its final form.

2.   Statistically validate of the questionnaire

This is evident from the table (1) where validity is equal to the stability squared and was worth (0.952), thus confirming the stability of the survey questionnaire becauseit is higher than (0.70), which makes it fully confident of the validity of the questionnaireand its validity to analyze the results and answer the study questions.

3.   Analysis and Display of the Results and Testing of the Questionnaire Section 1: demographic variables

The personal data of the study sample individuals include (age, sex, educational level, type of diabetic, marital Status, nationality, and date of diabetes diagnosis).

Table 2. Distribution of Socio-demographic characteristics of the studied participated (Age, Gender, Marital status, Level of education, Nationality)(n-120)		
Variable Categories	N	%
Age		
Under 39	46	38.33
From 40 to 65	53	44.17
65 and over	21	17.5
Gender		
Male	51	42.5
Female	69	57.5
Educational Level		
Uneducated	14	11.67
Primary School	25	20.83
Middle School	16	13.33
Secondary School	17	14.17
Diploma	13	10.83
Bachelor	24	20
Postgraduate	11	9.17
Marital Status		
Married	77	64.17
Unmarried	38	31.67
Divorced	5	4.16
Nationality		
Saudi	108	90
Non-Saudi	12	10

Table 2 show the total number of participants was 120 regarding the age most participants were classified into 3 age groups, most of them were (44.17%) in the 40 to 65 years flowed by under 39 years were (38.33%), regarding gender of participated female were (57.5%) but male were (42.5), regarding Educational level in study the most of participant's Primary School were (20.83%), but the Bachelor were 20.0), regarding Marital status the majority of participated Married were (64.17%) followed by Unmarried were (31.67), regarding Occupation most of participated homemaker were (34.0%), regarding nationality in study the most of participant's Saudi were (90.0%) but the Non-Saudi were (10.0%) .

Table (3): Distribution the Percentages and the frequencies to the Diabetes type, diagnosis and smoking

Variable Categories	N	%
Diabetes Type		
Type I	59	49.17
Type II	61	50.83
Diagnosis of diabetes date		
Five years ago	29	24.17
From 5 years to less than 10 years	19	15.83
From 10 years to less than 15 years	24	20
15 years and over	38	31.67
Didn't mention the date	10	8.33
Have you smoked a cigarette, even if it was a puff, in the past seven days?		
Yes	12	10
No	108	90

Table 3 show variable Categories regarding diabetes type most of participant Type II were (50.83%) while Type I were(49.17%), regarding diagnosis of diabetes date most of participants answer 15 years and over were (31.67%) followed by Five years ago were(24.17%) while From 10 years to less than 15 years were (20.0%) but From 5 years to less than 10 years were (15.83%), regarding the you smoked a cigarette, even if it was a puff, in the past seven days the majority of participant answer No (90.0%), follow by Yes were(10.0%)

Table (4): Distribution of the Self-Care Activities about diabetics, foot care and Smoking related questions

How many times have you	Not once	Once	twice	three times	four times	five times	six times	seven times	Didn't answer at all
Followed a healthy eating plan in the past seven days?	22	12	15	16	24	14	7	10	0
	18.33	10	12.5	13.33	20	11.67	5.84	8.33	0
Engaged in at least 30 minutes of physical activity in the past seven days?	27	12	19	21	14	7	7	13	0
	22.5	10	15.83	17.5	11.67	5.83	5.83	10.84	0
Engaged in at least 30 minutes of physical activity in the past seven days?	52	13	12	12	8	8	6	9	0
	43.33	10.83	10	10	6.67	6.67	5	7.5	0
Check your blood sugar in the past seven days?	12	13	18	16	13	9	6	33	0
	10	10.83	15	13.34	10.83	7.5	5	27.5	0
Been to the club in the past seven days?	53	6	3	4	1	1	3	7	42
	44.17	5	2.5	3.33	0.83	0.83	2.5	5.84	35
Checked your feet in the past seven days?	45	12	14	8	9	12	8	12	0
	37.5	10	11.66	6.67	7.5	10	6.67	10	0
Massaged your feet in the past seven days	28	9	8	7	9	8	4	5	42
	23.33	7.5	6.67	5.83	7.5	6.67	3.33	4.17	35
Take the recommended injections (insulin) in the past seven days?	29	1	0	7	5	2	34	42	0
	24.17	0.83	0	5.83	4.17	1.17	28.33	35	0
Washed your feet in the past seven days?	11	8	7	11	12	28	8	35	0
	9.17	6.67	5.83	9.17	10	23.33	6.67	29.16	0
Wet your feet with water in the past seven days?	15	8	9	8	15	32	6	27	0
	12.5	6.67	7.5	6.67	12.5	26.66	5	22.5	0
If you smoke, what is the maximum period you abstained from smoking?	62	0	6	3	2	2	1	2	42
	51.66	0	5	2.5	1.67	1.67	0.83	1.67	35

Table 4 show Regarding followed a healthy eating plan in the past seven days the majority of participant in four times were (20.0%) but Not once were (18.33%) followed by three times were(13.33%) but twice were(12.5%), regarding Engaged in at least 30 minutes of physical activity in the past seven days the majority of participant in Not once were (22.5%) followed by three times were(17.5%) but twice were(15.83) while four times were (11.67%). Regarding Engaged in at least 30 minutes of physical activity in the past seven days the majority of participant in Not once were (43.33%) but once were (10.83%) followed by twice and three times were(10.0%) but seven times were(7.5%), regarding Check your blood sugar in the past seven days the majority of participant in seven times were (27.5%) but twice were (15.0%) while three times were (13.34%) followed by four times were(10.83%), regarding Been to the club in the past seven days the majority of participant in Not once were (44.17%) but Didn't answer at all were (35.0%) but seven times were (5.84%) followed by three times were(3.33%)

but twice were(2.5%), regarding Checked your feet in the past seven days the majority of participant in Not once were (37.5%) but twice were (11.66%) but seven times were (10.0%) followed by three times were(6.67%). Regarding massaged your feet in the past seven days the majority of participant in Didn't answer at all (35.0%) But Not once were (23.33%) followed by once were(7.5%) but twice were(6.67%), regarding Take the recommended injections (insulin) in the past seven days the majority of participant in seven times were (35.0%) but six time were (28.33%) followed by Not once were(24.17%) but three times were(5.83 %), regarding Washed your feet in the past seven days the majority of participant in seven days were (29.16 %) followed by five times were(23.33 %) but three times were(9.17%) while in Not once were (9.17 %). Regarding Wet your feet with water in the past seven days the majority of participant in five times were (26.66%) but seven time were (22.5%) followed by Not once and four times were(12.5%) but twice times were(7.5%), regarding If you smoke, what is the maximum period you abstained from smoking the majority of participant in Not once were (51.66%) followed by Didn't answer at all (35 .0) but twice times were(5.0 %) but three times were(2.5 %) .

Research Result : Research Findings

➢ Many of the study sample individuals are not aware that there is mobile apps for chronic disease self-management.
➢ The (21) individuals of the study sample who answered the second section questions (the mobile applications assessment tool for chronic diseases) strongly agreed on its statements.
➢ About 80% of the study sample individuals follow a healthy eating plan at least one time, and about (85%) of them over the past month (depending on when they were asked) they followed an eating plan at least one day a week, where about (90%) of the study sample had five or more servings of fruits and vegetables at least one time a week.
➢ Also, only about (13%) of the study sample did not have any high-fat foods in the last seven days. 5- Only (20.5%) of the study sample haven't engaged in any type of physical activates even 30 minutes ones, where about (52%) haven't participated in a certain exercise session (e.g. swimming, walking, cycling) other than what they do at home or as part of their job, where there were about (44%) of the study sample didn't go to the club not even one time.
➢ (90%) of the study sample have checked their blood sugar at least one time.
➢ (62.5%) of the study sample have checked their feet at least one time, where about (72%) of them have checked inside their shoes at least one time, and about (41%) of the study sample have massaged their feet at least one time, where there were about (40%) of the study sample don't use the diabetic shoes.
➢ (90%) of the study sample haven't smoked a cigarette, even if it was a puff.

➢ In section three question 17 and 18 there were about (35%) of the study sample who didn't answer but about (38%) of the study sample would consider quitting smoking if they were addicted to it, where there were about (51%) of the study sample don't think that quitting smoking is very difficult.
➢ About (36%) of the study sample haven't distributed carbohydrates even
➢ Only (%5) of the study sample haven't taken their recommended diabetes medication in the past seven days but there were (35%) of the study sample who didn't answer that question (Q24).
➢ About (25%) of the study sample haven't taken their recommended injections (insulin) in the past seven days, where there were (30%) of the study sample haven't taken their recommended number of diabetes pills.
➢ About (90%) of the study sample have washed their feet at least one time in the past seven days, where there were (87.5%) have wet their feet with water in the past seven days, and there were about (17%) of the study sample who didn't have their toes dried after washing in the past seven days.
➢ About (82%) of the study sample weren't asked about their smoking status the last time they visited a doctor Discussion.

Discussion

In this study, mobile applications were used as a means to stimulate self-management of chronically ill patients. Although we do not currently have sufficient evidence to further explore the long-term efficacy of this hypothesis, one possible explanation could be the mode of interaction initiation and contact intensity are contributing factors to the success of portable applications in supporting patients' self-care. It should also be recognized that the purpose of these mobile application interventions was not so much to directly influence health status as to achieve behavioral change and improve self-management. The causal relationship between self-management ability and health status may not always be clearly defined and, moreover, the evaluation period for the included studies may be insufficient to capture causal effects. As we have previously found that there is a lack of knowledge of the importance of portable applications for self-management of chronic diseases, as many of the study sample did not realize that there are portable applications for self-management of chronic diseases, and this is due to the fact that a large number of sample members were elderly and this agrees with what was stated in A study (Sutcliffe, Martin et al. 2011) which reported that adults and the elderly do not use the Internet or communication media as they report feeling intense fear and phobia of technology. It also agrees with the results of the study (Al-Anazi, 2018; Al-Otaibi et al., 2017; Alwyn Robert et al., 2017) which showed that despite the increasing use by the Saudi population of mobile phones and social networking sites, this rapid digitization has not been evaluated and translated

into growth and acceptance in the industry. Health care, especially in many areas . This result also matched what was stated in the results of a study (Al-Anabvcxz, v 00631GEWzi, 2018; Alotaibi et al., 2017; Alwin Robert et al., 2017), which clarified and indicated the Kingdom's lack of a clear mobile health application or digital health strategy that patients can follow. High quality evidence about treatment compliance was observed by patients who continued to follow the instructions of the portable program, which contributed to increasing the self-management of their disease. These positive results were in agreement with several studies conducted by (Bene et al., 2019) which showed that mobile health solutions, especially mobile health applications, have thriving promise in the self-management of chronic diseases such as diabetes patients.

Research Limitations

Through the fulfilling of this study, several limitations were identified related to study execution and data analysis. We faced difficulties in reaching an adequate number of participants due to short the period of data collection between February - March 2022. Furthermore, the survey created for this study was composed of two instruments and a demographic questionnaire totally roughly 75 items.

Conclusion

While our research discovered that mobile apps may help with self-management of chronic conditions in certain situations, the evidence basis for using this technology is still extremely weak at best. Furthermore, nothing is known regarding the intervention's long- term efficacy, dangers, limits, and customer satisfaction. And, although numerous studies have been conducted on mobile app health therapies, few match the high standards of proof associated with randomized controlled trials. As a result, researchers should concentrate more on confirming their results from such pilot studies via follow-up studies with proper study methods and controls.

Recommendations

Based on what was mentioned and what we saw from the results:
Spreading awareness about mobile applications related to self-care for chronic diseases. Recommend a healthy eating plan for patients and make sure that they follow it to the fullest. Convincing the diabetic's patients with the importance of the sport or any physical activity on their bodies . Emphasize on taking the insulin injections and the recommended number of diabetes pills without any omission.

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