International Journal of Management Innovation Systems
ISSN 1943-1384
2023, Vol. 8, No. 1

Drivers and Barriers to the Adoption of Telemedicine among Persons with Chronic Health Conditions in Ghana

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Received: October 18, 2022 Accepted: November 23, 2022 Published: August 25, 2023

doi:10.5296/ijmis.v8i1.20370 URL: https://doi.org/10.5296/ijmis.v8i1.20370

Abstract

Telemedicine has been established as a major technological breakthrough in health delivery as it is expected to influence the growth in virtual health delivery procedures with continuous advancements in technology and improved internet connectivity. Per the increasing cases of chronic diseases in the global population, telemedicine can ease routine treatment and reduce expenditure on treatment. With all the strong research support for the adoption of telemedicine, developing countries in Africa are yet to benefit from telemedicine due to technology and other gaps. The study investigates the adoption of telemedicine for treating chronic diseases in Ghana. A quantitative research method was adopted using a linear hierarchical regression model to measure relationships between variables of the behavioral change model (health belief model) concerning telemedicine adoption. The study results

show that perceived benefits, perceived severity and perceived self-efficacy have positive effects on the adoption of telemedicine. However, perceived barriers and cues to action negatively affect telemedicine adoption. Cues to action again have negative effects on perceived benefit and perceived self-efficacy. The researchers recommended that efforts should be made to reduce barriers to telemedicine adoption by improving internet connectivity, reducing language barriers between medical staff and patients and providing the right information about telemedicine procedures to patients.

Keywords: Telemedicine, Chronic Diseases, Ghana, Drivers of Telemedicine, Barriers to Telemedicine, Adoption of Telemedicine

1. Introduction

Access to health delivery remains a major challenge to improving the quality of life in Ghana and other African countries (Msiska, Smith, & Fawcett, 2014). Though the state is trying to get primary healthcare services to the doorsteps of Ghanaians, the increasing population and dwindling foreign aid to the health sector are truncating these objectives (Asiedu, Jin, & Kanyama, 2015). Currently, most developing countries in sub-Sahara Africa have an increasing disease burden due to the upsurge in chronic health issues, which many health experts have pronounced as the next pandemic (Geldsetzer et al., 2020).

Ironically, some developed and some developing countries in Asia are eliminating infectious diseases and mainly grappling with chronic diseases (Edoh et al., 2016). The weak health systems of sub-Sahara African countries, which have health financing and health professional gap, are facing what can be termed as double jeopardy that is recording an upsurge in both infectious and noninfectious diseases (Newman et al., 2015; Matcha & Erasmus, 2019). All these, coupled with delayed and poor treatment of common diseases, have enabled growth in people living with chronic health conditions (Yimer et al., 2021).

Telemedicine has been mentioned as a major game changer in health delivery; per several research findings; telemedicine can help improve the quality of health delivery in many developing countries and resolve some of the daily problems faced in the health systems in developing countries (Mbarika, 2002; Yimer et al., 2021). Though there are gaps between technological breakthroughs in health delivery in developing countries and developed countries, there are a lot of basic telemedicine procedures that, if properly implemented in developing countries, can resolve basic health delivery setbacks (Iyengar, Jain, & Vaishya, 2020). Issues of cloudy and delay in seeking treatment in the hospitals, poor access to expert services, expensive transportation costs to hospitals and poor efficacy of persons with chronic health conditions to perform routine treatment by themselves can be partially resolved with telemedicine (Abuzeineh et al., 2020; Mouchtouris et al., 2020).

The health belief model has been used to access the uptake of health interventions, including telemedicine, in both developed and developing countries (Adesina et al., 2021). Its usefulness in accessing the drivers and barriers to the uptake of health interventions, including telemedicine, has shaped implementation procedures and improved existing services (Soleymanian et al., 2014). Studies have focused on the concepts of the health belief model to evaluate the usage of the health projects to improving service delivery to persons with chronic health conditions, while others explore telemedicine in other fields using the technology adoption model (Le et al., 2021).

Telemedicine is seen as a means to give chronic patients easy routine treatment while eliminating most barriers to their care by improving their efficacy and giving them easy access to health experts without them traveling a distance to meet them at the hospital (Cengiz & Ozkan, 2021).

2. Literature Review and Hypotheses Development

The health belief model developed in the 1950s (Syed et al., 2021) has been extensively used

to drive the adoption of several public health interventions due to its efficacy in deriving driving factors and barriers that impede the successful implementation and uptake of these public health interventions (Zamanzadeh et al., 2013). Perceived susceptibility as first concept of the HBM draws the attention of target population about their vulnerability to negative health condition (Zhou et al., 2021). However, in the study of existing interventions in line with the health belief model, some of the concepts may not be useful; for example, in interventions in which the target population has already recognized susceptibility to a condition, the concept of perceived susceptibility is mostly not given much attention (Adesina et al., 2021).

In studying the adoption of telemedicine in association with persons with a chronic health conditions, the perceived susceptibility construct of the health belief model mostly influences the adoption of health-related interventions (Cadilhac et al., 2019). Some studies that use the health belief model to evaluate intervention may overlook perceived susceptibility because the targeted population was already defined as having been susceptible to the condition under study (Juárez-García, de Jesús García-Solís, & Téllez, 2020). This study focuses on chronic patients' adoption of telemedicine for treatment; hence, all the respondents were chronic patients, thus reducing the effects of perceived susceptibility on these kinds of studies (Kousoulou, Suhonen, & Charalambous, 2019).

2.1 The Effects of Perceived Severity of Chronic Disease Condition on Adoption of Telemedicine.

Perceived severity is one of the major components of the health belief model, and it explores how the fear of pain that accompanies the disease condition influences the target population to adopt or reject health intervention (Adesina et al., 2021). Perceived severity occurs when the target population knows how devastating a disease condition can be (Adjei et al., 2013). It is perceived when one has not experienced the condition at its worst form; persons with specific disease conditions and persons without the disease can all perceive how severe the condition will be if all have not experienced the condition at its crisis levels (Syed et al., 2021).

Informing the targeted population about the severity of the disease condition mostly drives the adoption of preventive measures; hence in many studies, perceived severity positively affects the adoption of health interventions (Ritsner et al., 2018). In other studies, the effects of perceived severity are termed as using the fear approach to drive people toward behavioral change (Azriful et al., 2021). Perceived severity is built on fear and the harmfulness of negative health conditions, the likelihood of people accepting interventions is based on the level of fear they perceived, as the intervention become means of preventing the occurrence of what they fear (Msiska, Smith, & Fawcett, 2014).

In terms of using telemedicine as a treatment model for persons with chronic health conditions, perceived severity is deduced from how painful some chronic health conditions can be on the individual (Roos, 2016). The impact of these chronic health conditions on the individual family as a whole, the impact on the finances of the individuals and the impact on social life can all be drivers of adoption of telemedicine (Chironda & Bhengu, 2019). Most

chronic health conditions have a severe impact on people; people with diabetes at some level must take injections daily and avoid eating a whole chain of foods. All these are parts of the severity mentioned (Davison & Jhangri, 2013).

Acknowledging the severity of chronic disease in chronic patients is easier when the patient has experienced the chronic condition at its crisis level (Chudasama et al., 2020). In comparison, the person who has not experienced or witnessed the pain of chronic conditions is educated about the painful future experience to enable them to take precautionary measures that will prevent them from getting to the worse levels of their conditions (Centers for Disease Control and Prevention, 2017). In the case of telemedicine, severity of chronic disease can drive adoption, as telemedicine has the ability to limit discomfort and pain or prevent chronic patients from getting to the crisis level of their conditions (Hewison et al., 2020)?

Telemedicine has been established to provide respites for chronic health patients in developed countries; persons who seek routine treatment have the choice to visit a medical specialist or receive treatment in the comfort of their homes (Wesson et al., 2020). Telemedicine prevents or reduces the severity of chronic diseases' impact on patients by easing access to treatment, reducing the cost of treatment and providing information to patients about how to reduce the risk of getting into crisis with their conditions (Davison & Jhangri, 2013). In South Africa, telemedicine was found to have reduced the severity of the HIV/AIDS pandemic on patients, as patients do not have to travel long distances to access routine care (Kruse et al., 2020). In other African countries, telemedicine has created access to guidance and counseling for persons with chronic health conditions and enabled them to take steps that will not worsen their condition (Abuzeineh et al., 2020).

With telemedicine reducing the severity of the impacts of chronic diseases on chronic patients by bringing routine care closer to their doorsteps and providing quick access to experts at the time of crisis, there is a high possibility of perceived severity driving the adoption of telemedicine among persons with chronic health conditions (Azriful et al., 2021)..

H1: Perceived Severity Has Positive Effect On Adoption Of Telemedicine By Persons With Chronic Health Conditions.

2.2 The Effects of Perceived Self-Efficacy of Telemedicine Usage and Perceive Benefits of Telemedicine on Telemedicine Adoption

Perceived self-efficacy and perceived benefits are two constructs of the health belief model; studies have shown that these constructs mostly move in the same direction as they all influence the uptake of health interventions (Shin & Park, 2018). Self-efficacy explores the ability of an individual to perform an intervention with fewer difficulties and with no or less support from others (Fathian-Dastgerdi et al., 2021). Achieving self-efficacy in personal routine treatment is paramount to improving the health condition of persons with chronic health conditions (Shin & Park, 2018).

The essence of special self-efficacy in chronic care was topical during the critical time of the covid-19 pandemic since chronic patients have less access to treatment due to the burden

brought to health facilities and healthcare professionals during the critical parts of the pandemic (Suess et al., 2022). Coupled with several restrictive measures, most chronic patients were expected to improvise the work of healthcare professionals by providing routine care (Yuen et al., 2021).

The increasing number of patients in developing countries demand for self-efficacy in applying basic routine treatment effective solution to patients well-being (Kwok et al., 2021). Self-efficacy has been a driver of the uptake of health interventions that have to do with technological items (Kim et al., 2017). Nonetheless, self-efficacy drives telemedicine adoption in developed and developing countries; high illiteracy levels, poor access to technological items, and less technological knowledge are impeding people's self-efficacy in using telemedicine for treatment in most developing countries (Qiu et al., 2019).

A low level of self-efficacy in the use of telemedicine is likely to have negative effects on the adoption of telemedicine; hence using telemedicine in developing countries may call for more education and tanning to enable chronic patients the know-how to use telemedicine effectively (Wang et al., 2019).

Self-efficacy in telemedicine cannot be limited to the application of technological gadgets alone; chronic patients' ability to read and understand medical communications are also key in improving self-efficacy in telemedicine usage (Mbarika, 2002). The training for persons with chronic diseases to be self-efficacy in the use of telemedicine need to be extended to medical professionals as well since they need to re-engineer their communications to break down medical terminologies to the understanding of chronic patients (Kapoor et al., 2020).

Another construct of the health belief model that drives the adoption of health interventions' is perceived benefits which examine the gains and individual will make from accepting health intervention (Roncero et al., 2020). It is logical for people to accept whatever is beneficial to them and perceived benefits in the health belief model follow such logic. Equally, adoption is not mostly encouraged when the targeted population perceives the benefits of accepting the intervention to be less than the gains from existing practice (Edoh et al., 2016).

Perceived benefits influence the education of the targeted population about health intervention to enable them to evaluate the benefits (Azriful et al., 2021), this education is useful when community mobilization and community engagement tactics are well employed (Barney et al., 2020). Educating persons with chronic health conditions about the benefits of telemedicine has been established to drive the adoption of telemedicine (Aljaeed, Altuwaijiri, & Albohairy, 2019). Hence studies have called for project implementers in the areas of telemedicine to emphasize the benefits of telemedicine which include reduction in the cost of treatment, less exposure of chronic patients to infectious environments such as hospitals, facilitation of direct communication to health experts, easy access to health care, reduction in transportation risk and others (Gutkin et al., 2020).

It is estimated that knowing all the above benefits of telemedicine for persons with chronic health conditions, the likelihood for them to adopt telemedicine as a treatment model remains high (Haider, 2010). In the same vein, self-efficacy mostly drives the adoption of health

interventions, including telemedicine uptake.

H2: Perceived Benefit Has Positive Effects On Telemedicine Adoption Of Telemedicine As Treatment Model For Chronic Patients.

H3: Perceived Self-Efficacy Has Positive Effects On Telemedicine Adoption As Treatment Model For Chronic Patients.

2.3 The Effects of Perceived Barriers and Cues to Action on Adoption of Telemedicine

Many challenges have hindered the use of technology in developing countries (Azriful et al., 2021). To a large extent, most developing countries in Africa do not benefit from the global technological innovation that is easing activities in the service and manufacturing sectors (Han et al., 2019). Like other industries, the health services sector is yet to receive the needed technology gains as most service delivery is still done manually (Ahoto & Wang, 2022). However, telemedicine has been recognized to resolve most challenges in the health sector, and hospitals in sub-Sahara Africa are yet to take advantage of the numerous technology changes in the health sector (Mbarika, 2002).

The perceived barrier as a component of the health belief model defines the factors that impede the uptake or adoption of health interventions (Mishra et al., 2021). In line with connecting the above variables to the adoption of telemedicine to treat chronic diseases, there are some personal barriers that the health belief model overlooked (Wang et al., 2019). Unlike any other technological innovations, telemedicine in treating chronic cases is faced with normal technological adoption barriers in developing countries and ethical issues in both developed and developing countries (Edoh et al., 2016).

Ethical barriers that hamper telemedicine usage are not limited to developing countries; issues of protecting patient information remain paramount in many countries (Abuzeineh et al., 2020). There is a high perception that telemedicine can make patient information protection fragile as information-hungry firms can intercept patients' data for usage (Conde-blanco et al., 2020). Again, telemedicine reduces the human feeling between patients and health workers as patients meeting the medical doctor in person create some bonding that aid discussions (Edoh et al., 2016). Telemedicine reduces nonverbal communication clues such as observation of body language between health workers and patients (Negrini et al., 2020).

Again the barrier to the smooth usage of telemedicine in developing countries is the high level of illiteracy that exists in these countries; however, there are reductions in illiteracy rate, the huge number of people in developing countries still have deficiencies in reading and writing (Davison & Jhangri, 2013). Telemedicine demands that patients read and interpret basic medical communication from health workers. At the same time, health workers can also reduce the communication barriers to telemedicine by reducing the use of medically technical terms when communicating with patients (Matsha & Erasmus, 2019). The irony is that some patients cannot read and understand normal sentence; hence using telemedicine become difficult (Carretero et al., 2021).

Coupled with the illiteracy barrier are the language barriers between healthcare workers and citizens in developing countries (Centers for Disease Control and Prevention, 2017). while many people in developed countries have a common language that drives national cohesion in communication, several African countries have multiple languages. Apart from English and French, which are official languages in most countries, there are several tribal languages (Azriful et al., 2021). These become barriers to health delivery when the health professionals cannot speak and understand the languages of the communities they work (Fischer et al., 2010). Language barriers affect the adoption of telemedicine as they make interactions between patients and health professionals difficult (Chironda & Bhengu, 2019).

The last set of barriers impeding the use of medicine in developing countries is technological (Fischer et al., 2011). They range from poor technology literacy, lack of money to acquire the right technology, poor technological education, expensive data cost and poor internet connectivity (Chironda & Bhengu, 2019). Most of these technological barriers harming telemedicine usage are peculiar to developing countries, mostly in Africa (Yoon et al., 2022). Most of these challenges to telemedicine adoption have been eliminated in developed and some developing countries in Asia (Fischer et al., 2010). It is empirical that telemedicine holds the key to eliminating many barriers to access to health delivery in Africa. However, without reducing these barriers, it will be difficult for African countries to achieve the needed benefits of telemedicine (Maule et al., 2020).

Cues to action are factors that trigger chronic patients to use telemedicine as treatment models (Fischer et al., 2011). These may include the availability of information about telemedicine, the speed of health delivery that telemedicine provides or evidence from friends who has experienced service delivery through telemedicine (Chudasama et al., 2020). Cues to action mostly have multiple relationships with the adoption of health interventions, unlike perceived barriers that mostly have negative relationships with the adoption of intervention (Benton, 2016).

Miscommunication from media sources about interventions is an aspect of cues to action. Hence cues to action can impact the adoption of intervention poorly. Developing the right communication strategy and education of the target population toward the usage of telemedicine will generate positive triggers, which make cues to action have positive effects on adoption (Suess et al., 2022; Fithian-Dastgerdi et al., 2021).

H4: Perceived Barriers Negatively Affect Telemedicine Adoption as Treatment Mode for Chronic Patients.

H5: Cues To Action Positively Affect Telemedicine Adoption as Treatment mode for Chronic Patients.

2.4 Mediating Effects of Cue To Action on Relationships Between Other Variables and Telemedicine Adoption

Though most implementers of health interventions focus on educating the target population about the benefits of their interventions, it is well noticed that there are triggers that can have positive or negative effects on the goal one has targeted to achieve (Yuen et al., 2021). These

triggers that are referred to as cues to action sometime happen as eventualities, a view expressed by an opinion leader can trigger certain favorable reactions to health interventions, and in the same way, it can also derail efforts made (Alagili & Bamashmous, 2021).

Cues to action can have positive effects on the benefits of adoption of health interventions depending on the expression (Soleymanian et al., 2014). On the other hand, self-efficacy sometimes triggers adoption as a person with the ability to use interventions is most likely to share positive news about the intervention, triggering positive responses from the targeted population (Juárez-García, de Jesús García-Solís, & Téllez, 2020).

The slippery role of cues to action in adopting health intervention made it a suitable variable for mediating effects (Soleymanian et al., 2014). Though cues to action remain an unplanned aspect of the health belief model, its effects on other relationships remain vital after the implementation of an intervention (Shin & Park, 2018). Cues to action can affect any of the other five variables of the health belief model. However, in the adoption of telemedicine, its effects on perceived benefits and self-efficacy in the adoption of telemedicine remain vital relationships of investigation (Azriful et al., 2021).

H6: There is a positive relationship between cues to action and perceived benefits of adopting telemedicine as a treatment model for chronic disease.

H7: There is a positive relationship between cues to action and self-efficacy in using telemedicine as a treatment model for chronic diseases.

H8: Cues to action mediate the relationship between perceived benefits and adoption of telemedicine as a treatment model for chronic diseases.

H9: Cues to action mediate the relationship between self-efficacy and adoption of telemedicine as a model of treatment for chronic diseases.

3. Methodology

The study is cross-sectional and adopted a quantitative method for data collection and analysis.

3.1 Measurement Tools

The researchers adapted tools developed by (Kautsar, Putu, & Haryanthi, 2016) to measure four concepts of the health belief model**. The perceived benefit** was measured with 1. “Use of telemedicine provide me with quick and easy access to the health professionals” 2. “Use of telemedicine reduce the cost and dangers of transportation to the hospital” 3. “Use of telemedicine reduce the risk of exposure to infections in the hospital” 4. “Telemedicine enables access to limited number of specialized services per schedule” 5. “Telemedicine empowers me to know more about my own health condition.”

Perceived self-efficacy was measured with five items: 1 “I can read and understand messages sent by health workers” 2. “I can use self-monitory medical equipment” 3. “I questioned the health professionals for explanation about any ambiguity in their instruction” 4. “I can apply medications on time and according to volume prescribed” 5. “I know when to visit the

hospital for further examinations or when in crisis" (Wu et al., 2021)

Perceived barriers were measured as follows 1. "Sometimes I miss that physical connectivity with medical staff" 2. "Poor internet connectivity prevent smooth communication of health professionals sometimes" 3. "Some of the medical terms used during my communications with health professionals are difficult to understand" 4. "some of the equipment needed to take ones medical information and communicate to the health professionals break down easily and are sometimes expensive to buy new ones" 5. "Health professionals only communicate in English language instead of our local dialects, and this affect easy understanding of their instruction" (Rahi, Khan, & Alghizzawi, 2021)

Perceived severity was measured with1. "Chronic disease reduce my performance of physical activities" 2. "My expenditure on treatment is affecting my ability to care for the family" 3. "Serious health complications as associated with my condition" 4. "My conditions are not improving" (Syed et al., 2021).

Cues to action were measured with four items developed by (Kautsar, Putu, & Haryanthi, 2016) 1. "Friends spoke about how good telemedicine is" 2. "Social media say bad things about telemedicine" 3. "I have had more good information about telemedicine" 4. "I am good at doing what is instructed through telemedicine procedures".

The adoption of telemedicine was measured using six variables (Rahi et al., 2021; and Wu et al., 2021). These are 1"The use of telemedicine services will assist me in managing my health more actively," 2 "The use of telemedicine health services is good for my health," 3 "I like the idea of monitoring my health using telemedicine health services." 4 "I plan to use telemedicine services," 5 "I plan to use telemedicine systems to obtain relevant medical information," and 6 "I will not hesitate to provide information to a telemedicine system." all the questions were scaled with a 5point Likert scale.

3.2 Data Collection and Sampling

The study focused on the person living with chronic conditions within the Ga-west community of the greater Accra region of Ghana. To select our respondents, the researchers and field officers first met with leaders of chronic disease peer groups and explained the purpose of the study to them. Four out of six group leaders contacted agreed to participate in the study and led us to communicate with their members. A stratified sampling technique was adopted by selecting 344 from the four groups. Each member selected used their routine treatment records to show that they are live with a chronic health condition.

After selecting the respondents, the field officers scheduled a convenient time for them and data were collected through a face-to-face approach. The use of the face-to-face approach enabled the researchers to personally explain any ambiguities about the questions to the respondents, as that will help generate responses based on right understanding (Rolnik et al., 2020). A total of 25days were spent on data collection due to the distances between the respondents and the field assistants.

3.3 Data Analysis

Data were analyzed using the statistical package for social science (SPSS Version 23). Econometric models of hierarchical linear regression and correlation were employed. The hierarchical linear regression model was used due to its ability to check multiple relationships and mediating effects of variables (Fathian-Dastgerdi et al., 2021; Wang & Ahoto, 2022).

3.4 Ethical Clearance

Since the study does not involve any vulnerable groups, human or animal experiments, it falls among studies with ethical clearance waivers. The study design involved anonymous and voluntary answers to health worker questionnaires, but no offensive sampling or cohesive methods were applied. All the participants read and signed informed consent with a clear statement of their right to participate, not to participate, leave questions unanswered or opt out of any time. The study was conducted in all accordance with Ghana health service ethical standards.

4. Results

4.1 Profile of Respondents

The majority of respondents (61.7%) were females, and 38.3% were males; the ages respondents; 18% were aged 25 to 35years, 39.5% from 36 to 45years, 32.0% from 46 to 55 years, and 10.5% were above 55years. The educational qualifications of respondents are as follows, 8.1% had no formal education or ended their education at the primary school level, 18.0% were junior high school graduates, 44.0% were senior high school graduates, and 29.9% were educated to the tertiary level. Regarding occupation, 20.7% were self-employed while others 79.3% employed. The following responses were generated when asked about the number of years a person has been living with chronic disease; 9.9% have been diagnosed with chronic condition in the past two years, 29.9% in the past three years, 38.0% in the past four years and 22.5 have been with chronic health condition over four years.

4.2 Initial Analysis

Table I shows correlations, Mean and Standard Deviation (SD) of research constructs and the background variables of the respondents. Most of the constructs were positively correlated, except cues to action and perceived barriers that negatively correlated with other variables. Means and standard deviation variables are as follow, adoption (mean 3.6046, STD: .81506), perceived severity (mean 3.6340, STD: .80885), perceived benefit (mean 3.5524, STD:.85267), perceived self-efficacy (mean: 3.5628, STD:.84683), perceived barriers (mean:2.9980, STD:.53887) and cue to has (mean: 2.8678, STD:.55384)

Table I. Means, Standard Deviation and Correlation Matrix

		Mean	STD	1	2	3	4	5	6	7	8	9	10	11
1	Age	3.35	.928	1										
2	Gender	1.39	.488	-.181**	1									
3	EDU	2.95	.918	.225**	-.294**	1								
4	OCCUP	1.79	.407	.249**	-.300**	.335**	1							
5	NYC	2.71	.924	.034	-.053	.191**	.138**	1						
6	ADP	3.6046	.81506	.128*	.088	.088	.187**	.066	1					
7	PS	3.6340	.80885	.105*	.076	.061	.203**	.065	.919**	1				
8	PBE	3.5524	.85267	.129*	.069	.096	.135*	.035	.907**	.839**	1			
9	PSE	3.5628	.84683	.181**	.093	.095	.166**	.091	.894**	.809**	.864**	1		
10	PBA	2.9980	.53887	.062	.023	.080	.083	.129*	-.084	-.059	-.088	-.068	1	
11	CTA	2.8678	.55384	.069	-.001	.098	.090	.114*	-.081	-.068	-.095	-.074	.981**	1

Note. *p< 0.05, **p<0.01, ***p<0.00, EDU= Educational Levels; OCUP= Occupation; NYC= Number of Years individual has been diagnosed with Chronic disease; PS= Perceived Severity; PBE = Perceived Benefits; PSE= Perceived Self-Efficacy; PBA= Perceived Barriers; CTA= Cues to Action. ADT= Adoption.

4.3 Hypotheses Testing

The Hypotheses of the study are tested in table 2 below using Hierarchical Linear Regression Model. Hypotheses, H1 to H5, were tested in different models in table 2 by controlling the background variables of the respondents as shown in model1 of table 2. The result from the model2 in table 2 show that perceived severity has a positive effect on the adoption of telemedicine; from the model3 in table2, the result shows that perceived benefit has a positive effect on the adoption of telemedicine, and model 4 in table2 also indicated that perceived self-efficacy has a positive effect on adoption of telemedicine. Model5 in table2 indicated that perceived barriers negatively affect the adoption of telemedicine, while mode6 in table2 indicated that cues to action negatively affect the adoption of telemedicine. Hypotheses H1, H2, H3 and h4 are supported, but hypothesis H5 is not supported.

Table 2. Hypotheses Testing (H1-H5)

Variables	**Model1 Adoption β (t)**	**Model2 Adoption β (t)**	**Model3 Adoption β (t)**	**Model4 Adoption b(t)**	**Model5 Adoption β (t)**	**Model6 Adoption β (t)**
(Constant)	1.983 (6.069) ***	.024(.172)	.134(.908)	.489 (3.133) **	2.585 (6.586) ***	2.542 (6.587) ***
Age	.088 (1.835) *	.027(1.402)	.004(.171)	-.040(-1.805)	.112* (2.239)	.112 (2.240) *
Gender	.301 (3.213) **	.055(1.419)	.080(1.964)	.021 (.474) *	.259(2.757) **	.255(2.711) **
EDU	.041(.793)	.034(1.629)	-.015(-.688)	.002(.100)	.047(.898)	.048(.923)
OCUP	.032(.675)	.001(.045)	.025(1.255)	-.019(-.900)	.021(.427)	.019(.383)
NYC	.392 (3.400) **	-.018(-.374)	.164 (3.284) **	.113 (2.107) *	.365(3.099) **	.364(3.088) **
PS		.920(41.715) ***				
PBE			.853(39.050) ***			
PSE				.860(35.747) ***		
PBA					-.172(-2.106) *	
CTA						-.161(-2.032) *

R square	.072	.848	.830	.804	.079	.078
Adjusted R square	.058	.845	.827	.801	.060	.059
F	5.300***	316.827***	278.196***	233.832***	4.266***	4.212***

Note. β=beta, t=t-value *p< 0.05, **p<0.01, ***p<0.001, EDU= Educational Levels; OCUP= Occupation; NYC= Number of Years individual has been diagnosed with Chronic disease; PS= Perceived Severity; PBE = Perceived Benefits; PSE= Perceived Self-Efficacy; PBA= Perceived Barriers; CTA= Cues to Action. ADT= Adoption

Hypothesis H6-H9 were tested in table3 below; the model1 in table 3 indicated that cues to action negatively affect the perceived benefit of telemedicine. Cue to action has the same negative effects on perceived self-efficacy of using telemedicine as shown in model2 on tbale3, indicating that hypotheses H6 and H7 were not supported. Cue to action negatively mediates the relationship between perceived benefit and adoption of telemedicine as indicated by the significant change in R square as shown in model3 in table3. However, cues to action positively mediate the relationship between perceived self-efficacy and adoption of telemedicine by the significant change in R square shown in model4 table 4. The two mediating effects on model3 and model4 in table3 represent hypotheses h8 and h9, respectively.

Table 3. Hypotheses Testing (H6-H9)

Variables	**Model1 Cues to Action**	**Model2 Cues to Action**	**Model3 Adoption**	**Mode4 Adoption**
	β (t)	**β (t)**	**β (t)**	**β (t)**
(Constant)	2.433 (9.285) ***	2.39(9.280) ***	.302 (1.708) *	.700(3.638)***
Age	.043(1.196)	.048(1.319)	.019(.871)	-.037(-1.527)
Gender	.062(.909)	.066(.959)	.060(1.462)	.013(.284)
EDU	.048(1.282)	.046(1.214)	-.022(-.977)	.004(.155)
OCCUP	.059 (1.702) *	.064 (1.838) *	.022(1.059)	-.028(-1.209)
NYC	.105(1.230)	.108(1.258)	.151(2.954) **	.115(2.023)
PBE	-.081 (-2.142) *		.828(36.407) **	
PSE		-.078(-2.010) *		-.021 (-.550) *
CTA			-.008(-.225)	.828 (32.032) ***
R Square	.042	.040	.830	.792
Adjusted R Square	.023	.021	.826	.787
F	2.186*	2.092*	208.898***	162.524***
R Square Change			.830***	.792***

Note. β=beta, t=t-value, *p< 0.05, **p<0.01, ***p<0.00, 1 EDU= Educational Levels; OCUP= Occupation; NYC= Number of Years individual has been diagnosed with Chronic disease; PS= Perceived Severity; PBE = Perceived Benefits; PSE= Perceived Self-Efficacy; PBA= Perceived Barriers; CTA= Cues to Action. ADT= Adoption.

5. Discussion

The potential of telemedicine is being explored globally (Ong et al., 2020). Though many benefits have been established, the outbreak of covid-19 has highlighted the need for nations to adopt telemedicine to augment their health delivery models (Ismail et al., 2021). Developed and some developing countries are in an advanced stage of using telemedicine as they have made it core components of their health systems (Jones et al., 2021). In some parts of Europe and North America, patients can seek treatment through the remote telemedicine model or visit the doctor in person. However, it cannot be said about Africa as only a handful of countries have tried telemedicine on the continent (Hacker et al., 2021).

This study explores the adoption of telemedicine as a treatment model for chronic patients. Several studies have demonstrated how effective telemedicine is in caring for chronic patients to ease their routine care, provide them access to medical specialists and reduce the risk of traveling to the hospital regularly (Aljaeed et al., 2019; and Mouchtouris et al., 2020). Using the five health belief model constructs, the researchers established that perceived severity and perceived benefits positively affect telemedicine adoption among persons with chronic health conditions.

The above findings have been consistent with several findings that have regularly established that when the targeted population is educated about the benefits they can derive from health intervention, the ease of acceptance increased (Kapoor et al., 2020; and Hacker et al., 202). The study carried out in southern Africa about using the health belief model to drive uptake of HIV/AIDS treatment shows an upsurge as patients realize the benefits of the intervention (Adepoju, 2020). The effects of severity on uptake of health intervention remain skeptical as some studies provided evidence that perceived severity influence uptake while others provided contrary evidence (Wang et al., 2019; Africa, 2008). Our finding that perceived severity influences telemedicine adoption among persons with chronic health conditions is similar to the findings of (Asiedu, Jin, & Kanyama, 2015), who demonstrated similar results.

The study again established that perceived self-efficacy positively affects telemedicine adoption, while perceived barriers and cues to action affect telemedicine adoption negatively. Self-efficacy is the demonstration of chronic persons to use telemedicine procedures; with technological awareness, many people can effectively use some basic telemedicine practices such as real-time-telemedicine or store-and-forward telemedicine (Kruse et al., 2020; Hsu et al., 2021). Knowledge about these procedures and the availability of user-friendly telecommunication gadgets increase patients' efficacy in telemedicine; hence, self-efficacy promotes telemedicine adoption in many developing countries (Mayston et al., 2020; Austermann et al., 2014).

Barriers are blockades to the adoption of interventions; our finding is in line with studies that have consistently established that perceived barriers negatively affect the adoption of telemedicine as a treatment model in Africa (Asundep et al., 2013). The consistent effects of barriers impeding telemedicine adoption in Africa are due to the technological knowledge gap, illiteracy and poorly equipped health facilities on the continent (Feder, Britton, & Chaudhry, 2018). Gain poor socioeconomic status of the continent, which is empirical in the level of

poverty and multiple linguistic situations that made communication between patients and health workers difficult equally heighten the barriers to telemedicine adoption (Kruizinga et al., 2017).

Cue to action though vital to the adoption of health interventions, it is sometimes beyond the control of the project implementers (Syed et al., 2021). The study established that cues to action negatively affect the adoption, perceived benefit and perceived self-efficacy of telemedicine adoption. These findings are tantamount to the findings of Azriful et al. and Juárez-García et al., their studies demonstrated that cues to action could send wrong signals sometime to the target population (Azriful et al., 2021; Juárez-García et al., 2020). With cues to action, messages from hear-sayers, media platforms and other unregulated sources can be negatively promote the adoption of interventions (Syed et al., 2021). Especially in developing countries where people are used to maintaining old systems, cues to action mostly negatively affect the uptake of health intervention, as a community member can be wrongly informed by hear-sayer or media platform that have less knowledge on the subject (Alagili & Bamashmous, 2021; and Shin & Park, 2018).

The negative effects of cues to action on adopting telemedicine for treating chronic diseases were established stronger as it negatively mediates the relationship between the perceived benefits and the adoption of telemedicine. Pointing to the fact that many factors can negatively trigger chronic patients not to adopt telemedicine as a treatment model (Juárez-García, de Jesús García-Solís, & Téllez, 2020). This was also stated by studies that investigated the adoption of tuberculosis treatment in sub-Sahara Africa (Matsha & Erasmus, 2019; Hatcher et al., 2019).

6. Conclusion

Telemedicine is key to improving health delivery to persons with chronic health conditions in Ghana. Though perceived benefits, perceived severity and self-efficacy influence the adoption of telemedicine, barriers and cues to action can limit the desire of persons with chronic conditions to accept telemedicine. Paying attention to the barriers and influence of other factors will help improve telemedicine adoption.

7. Recommendation

The Ministry of Health should educate people on the benefits of telemedicine through social media and community social structures. Social media must be monitored to defuse all wrong information about telemedicine in the public domain. Satisfied telemedicine tools should be made available at a low price to drive self-efficacy. Improved and cheaper internet connectivity must be provided, and health professionals should be given some training to boost their understanding and usage of telemedicine.

References

Abuzeineh, M. et al. (2020). Telemedicine in the Care of Kidney Transplant Recipients With Coronavirus Disease 2019: Case Reports. *Transplantation Proceedings, 6*. https://doi.org/10.1016/j.transproceed.2020.07.009

Adepoju, P. (2020).Africa turns to telemedicine to close mental health gap. *The Lancet Digital Health, 2*(11), e571-e572. https://doi.org/10.1016/s2589-7500(20)30252-1

Adesina, E. et al. (2021). Health belief model and behavioural practice of urban poor towards COVID-19 in Nigeria. *Heliyon, 7*(9), e08037. https://doi.org/10.1016/j.heliyon.2021.e08037

Adjei, P. et al. (2013). Epilepsy & Behavior Beliefs on epilepsy in Northern Ghana. *Epilepsy & Behavior*. https://doi.org/10.1016/j.yebeh.2013.07.034.

Ahoto, A. T., & Wang, W. (2022). Effects of COVID-19 Outbreak on Persons with Chronic Health Conditions in Anglophone West Africa: A Qualitative Study Involving Key Stakeholders. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing 59*, 1-11. https://doi.org/10.1177/00469580221092830

Alagili, D. E., & Bamashmous, M. (2021). The Health Belief Model as an explanatory framework for COVID-19 prevention practices. *Journal of Infection and Public Health, 14*(10), 1398-1403. https://doi.org/10.1016/j.jiph.2021.08.024

Aljaeed, R., Altuwaijiri, S., & Albohairy, T. (2019). Telemedicine in Riyadh region, Saudi Arabia. *Journal of Infection and Public Health,* 0-7. https://doi.org/10.1016/j.jiph.2019.04.006

Asiedu, E., Jin, Y., & Kanyama, I. K. (2015). The impact of HIV/AIDS on foreign direct investment: Evidence from Sub-Saharan Africa. *Journal of African Trade, 2*(1-2), 1. https://doi.org/10.1016/j.joat.2015.01.001

Asundep, N. N. et al. (2013). Determinants of access to antenatal care and birth outcomes in Kumasi, Ghana. *Journal of Epidemiology and Global Health, 3*(4), 279-288. https://doi.org/10.1016/j.jegh.2013.09.004

Azriful et al. (2021). Health Belief Model on women's cancer recovery (a phenomenological study on cancer survivors). *Gaceta Sanitaria, 35*, S9-S11. https://doi.org/10.1016/j.gaceta.2020.12.003

Barney, A. et al. (2020). The COVID-19 Pandemic and Rapid Implementation of Adolescent and Young Adult Telemedicine: Challenges and Opportunities for Innovation. *Journal of Adolescent Health, 67*(2), 164-171. https://doi.org/10.1016/j.jadohealth.2020.05.006

Benton, A. D. (2016). Understanding the diverging paths of stayers and leavers: An examination of factors predicting worker retention. *Children and Youth Services Review, 65*, 70-77. https://doi.org/10.1016/j.childyouth.2016.04.006

Cadilhac, D. A. et al. (2019). Outcomes for Patients With In-Hospital Stroke: A Multicenter Study From the Australian Stroke Clinical Registry (AuSCR). *Journal of Stroke and Cerebrovascular Diseases, 28*(5), 1302-1310. https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.01.026

Carretero, G. J. et al. (2021). Obesity is a chronic disease. Positioning statement of the Diabetes, Obesity and Nutrition Workgroup of the Spanish Society of Internal Medicine

(SEMI) for an approach centred on individuals with obesity. *Revista Clínica Española (English Edition), 221*(9), 509-516. https://doi.org/10.1016/j.rceng.2020.06.013

Cengiz, Z., & Ozkan, M. (2021). Applying the health belief model to the rational use of drugs for hemodialysis patients: A randomized controlled trial. *Patient Education and Counseling,* (xxxx), 1. https://doi.org/10.1016/j.pec.2021.06.024

Centers for Disease Control and Prevention. (2017). *CDC's Chronic Disease Prevention System | About the Center | Chronic Disease Prevention and Health Promotion | CDC.* Centers for Disease Control and Prevention, pp. 45-52.

Chironda, G., & Bhengu, B. (2019). Barriers to management of Chronic Kidney Disease (CKD) CKD in a renal clinic in KwaZulu-Natal Province, South Africa – A qualitative study. *International Journal of Africa Nursing Sciences, 10*(April), 116-123. https://doi.org/10.1016/j.ijans.2019.04.001

Chudasama, Y. V. et al. (2020). Impact of COVID-19 on routine care for chronic diseases: A global survey of views from healthcare professionals. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews, 14*(5), 965-967. https://doi.org/10.1016/j.dsx.2020.06.042

Conde-blanco, E. et al. (2020). Epilepsy & Behavior Emergency implementation of telemedicine for epilepsy in Spain : Results of a survey during SARS-CoV-2 pandemic. *Epilepsy & Behavior, 111*, 107211. https://doi.org/10.1016/j.yebeh.2020.107211

Davison, S. N., & Jhangri, G. S. (2013). The relationship between spirituality, psychosocial adjustment to illness, and health-related quality of life in patients with advanced chronic kidney disease. *Journal of Pain and Symptom Management, 45*(2), 170-178. https://doi.org/10.1016/j.jpainsymman.2012.02.019

Edoh, T. O. C. et al. (2016). Predicting telemedicine system user satisfaction in sub-Saharan Africa. *ICT Express, 2*(4), 163-167. https://doi.org/10.1016/j.icte.2016.10.006

Fathian-Dastgerdi, Z. et al. (2021). Factors associated with preventive behaviors of COVID-19 among adolescents: Applying the health belief model. *Research in Social and Administrative Pharmacy, 17*(10), 1786-1790. https://doi.org/10.1016/j.sapharm.2021.01.014

Feder, S. L., Britton, M. C., & Chaudhry, S. I. (2018). They Need to Have an Understanding of Why They're Coming Here and What the Outcomes Might Be. Clinician Perspectives on Goals of Care for Patients Discharged From Hospitals to Skilled Nursing Facilities. *Journal of Pain and Symptom Management, 55*(3), 930-937. https://doi.org/10.1016/j.jpainsymman.2017.10.013

Fischer, M. J. et al. (2010). Sociodemographic factors contribute to the depressive affect among African Americans with chronic kidney disease. *Kidney International, 77*(11), 1010-1019. https://doi.org/10.1038/ki.2010.38

Fischer, M. J. et al. (2011). Elevated depressive affect is associated with adverse cardiovascular outcomes among African Americans with chronic kidney disease. *Kidney International, 80*(6), 670-678. https://doi.org/10.1038/ki.2011.153

Geldsetzer, P. et al. (2020). Articles Mapping physical access to health care for older adults in sub-Saharan Africa and implications for the COVID-19 response: A cross-sectional analysis. 32-42. https://doi.org/10.1016/S2666-7568(20)30010-6

Gutkin, P. M. et al. (2020). Telemedicine in Radiation Oncology: Is It Here to Stay ? Impacts on Patient Care and Resident Education. *Radiation Oncology Biology, 108*(2), 416-420. https://doi.org/10.1016/j.ijrobp.2020.06.047

Hacker, K. A. et al. (2021). COVID-19 and Chronic Disease: The Impact Now and in the Future. *Preventing Chronic Disease, 18*, 1-6. https://doi.org/10.5888/PCD18.210086

Haider, M. (2010). Analysis of neonatal health in South Asia. https://doi.org/10.1108/17506121011036024

Han, E. et al. (2019). The role of community-based nursing interventions in improving outcomes for individuals with cardiovascular disease: A systematic review. *International Journal of Nursing Studies*, 103415. https://doi.org/10.1016/j.ijnurstu.2019.103415

Hewison, A. et al. (2020). European Journal of Oncology Nursing Experiences of living with chronic myeloid leukaemia and adhering to tyrosine kinase inhibitors: A thematic synthesis of qualitative studies. *European Journal of Oncology Nursing, 45*(September 2019), 101730. https://doi.org/10.1016/j.ejon.2020.101730

Ismail, H. et al. (2021). The impact of the COVID-19 pandemic on medical conditions and medication adherence in people with chronic diseases. *Journal of the American Pharmacists Association*. https://doi.org/10.1016/j.japh.2021.11.013

Iyengar, K., Jain, V. K., & Vaishya, R. (2020). Diabetes & Metabolic Syndrome : Clinical Research & Reviews Pitfalls in telemedicine consultations in the era of COVID 19 and how to avoid them. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14*(5), 797-799. https://doi.org/10.1016/j.dsx.2020.06.007

Jones, V. A. et al. (2021). Rescuing medical education in times of COVID-19. *Clinics in Dermatology, 39*(1), 33-40. https://doi.org/10.1016/j.clindermatol.2020.12.010

Juárez-García, D. M., de Jesús García-Solís, M., & Téllez, A. (2020). Adaptation and Validation of the Health Belief Model Scale for Breast Self-Examination in Mexican Women. *Value in Health Regional Issues, 23*, 30-36. https://doi.org/10.1016/j.vhri.2019.11.006

Kapoor, S. et al. (2020). Developing a pediatric ophthalmology telemedicine program in the COVID-19 crisis. *Journal of AAPOS*. https://doi.org/10.1016/j.jaapos.2020.05.008

Kautsar, G., Putu, L., & Haryanthi, S. (2016). Construct validity of test instruments for Health Belief Model (HBM) in cervical cancer screening behavior. *Cervical Cancer Screening Behavior,* 19-33.

Kim, H. J. et al. (2017). supervisor, coworker, and organizational support on. *Cuadernos de Economía y Dirección de la Empresa, 20*(2), 124-136. https://doi.org/10.1016/j.brq.2016.11.002

Kousoulou, M., Suhonen, R., & Charalambous, A. (2019). Associations of individualized nursing care and quality oncology nursing care in patients diagnosed with cancer. *European Journal of Oncology Nursing*, *41*(December 2018), 33-40. https://doi.org/10.1016/j.ejon.2019.05.011

Kruizinga, R. et al. (2017). Towards a fully-fledged integration of spiritual care and medical care. *Journal of Pain and Symptom Management*. https://doi.org/10.1016/j.jpainsymman.2017.11.015

Kruse, C. S. et al. (2020). Telemedicine and health policy: A systematic review. *Health Policy and Technology.* https://doi.org/10.1016/j.hlpt.2020.10.006

Kwok, A. P. K. et al. (2021). What shapes people's willingness to wear a face mask at the beginning of a public health disaster? A qualitative study based on COVID-19 in China. *International Journal of Disaster Risk Reduction*, *65*, 102577. https://doi.org/10.1016/j.ijdrr.2021.102577

Le, H. T. C. H. et al. (2021). Using the health beliefs model to explore children's attitudes and beliefs on air pollution. *Public Health, 196*, 4-9. https://doi.org/10.1016/j.puhe.2021.04.026

Matsha, T. E., & Erasmus, R. T. (2019). Chronic kidney disease in sub-Saharan Africa. *The Lancet Global Health, 7*(12), e1587–e1588. https://doi.org/10.1016/S2214-109X(19)30467-X

Maule, S. P. et al. (2020). Chronic Kidney Disease and Pregnancy Outcomes in Africa: A narrative review. *Kidney International Reports.* https://doi.org/10.1016/j.ekir.2020.05.016

Mayston, R. et al. (2020). Social Science & Medicine Explanatory models of depression in sub-Saharan Africa: Synthesis of qualitative evidence. *Social Science & Medicine*, *246*(June 2019), 112760. https://doi.org/10.1016/j.socscimed.2019.112760

Mbarika, V. W. A. (2002). Telemedicine in Sub-Saharan Africa: A Proposed Delphi Study.

Mishra, M. et al. (2021). Effectiveness of diabetes education including insulin injection technique and dose adjustment through telemedicine in hospitalized patients with COVID-19. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *15*(4), 102174. https://doi.org/10.1016/j.dsx.2021.06.011

Msiska, G., Smith, P., & Fawcett, T. (2014). International Journal of Africa Nursing Sciences Exposing emotional labour experienced by nursing students during their clinical learning experience: A Malawian perspective. International Journal of Africa Nursing Sciences, 1, pp. 43–50. https://doi.org/10.1016/j.ijans.2014.07.001

Negrini, S. et al. (2020). Feasibility and Acceptability of Telemedicine to Substitute Outpatient Rehabilitation Services in the COVID-19 Emergency in Italy : An Observational Everyday Clinical-Life Study. *Archives of Physical Medicine and Rehabilitation*, 1-6. https://doi.org/10.1016/j.apmr.2020.08.001

Qiu, F. et al. (2019). Effects of physical exercise on negative emotional susceptibility in young adult females: An event-related potential study. *Brain Research, 1722*(January),

146382. https://doi.org/10.1016/j.brainres.2019.146382

Rahi, S., Khan, M. M., & Alghizzawi, M. (2021). Factors influencing the adoption of telemedicine health services during COVID-19 pandemic crisis: An integrative research model. *Enterprise Information Systems, 15*(6), 769-793. https://doi.org/10.1080/17517575.2020.1850872

Ritsner, M. S. et al. (2018). Assessment of health needs, satisfaction with care, and quality of life in compulsorily admitted patients with severe mental disorders. *Psychiatry Research, 267*(January), 541-550. https://doi.org/10.1016/j.psychres.2018.05.030

Rolnik, D. L. et al. (2020). Coronavirus testing in women attending antenatal care. *Women and Birth,* (xxxx), 24-27. https://doi.org/10.1016/j.wombi.2020.09.024

Roncero, C. et al. (2020). The response of the mental health network of the Salamanca area to the COVID-19 pandemic: The role of the telemedicine. *Psychiatry Research, 291*(June), 113252. https://doi.org/10.1016/j.psychres.2020.113252

Roos, N. (2016). Best Practice & Research Clinical Obstetrics and Gynaecology Why do maternal and newborn deaths continue to occur?

Shin, N., & Park, J. (2018). The Effect of Intentional Nursing Rounds Based on the Care Model on Patients' Perceived Nursing Quality and their Satisfaction with Nursing Services. *Asian Nursing Research, 12*(3), 203-208. https://doi.org/10.1016/j.anr.2018.08.003

Soleymanian, A. et al. (2014). Development and validation of a health belief model based instrument for measuring factors influencing exercise behaviors to prevent osteoporosis in pre-menopausal women (HOPE). *BMC Musculoskeletal Disorders, 15*(1), 2-9. https://doi.org/10.1186/1471-2474-15-61

Suess, C. et al. (2022). Using the Health Belief Model to examine travelers' willingness to vaccinate and support for vaccination requirements prior to travel. *Tourism Management, 88*(December 2020), 104405. https://doi.org/10.1016/j.tourman.2021.104405

Syed, M. H. et al. (2021). Application of the health Belief Model to assess community preventive practices against COVID-19 in Saudi Arabia. *Saudi Pharmaceutical Journal, 29*(11), 1329-1335. https://doi.org/10.1016/j.jsps.2021.09.010

Wang, X. et al. (2019). Impact of Telemedicine on Healthcare Service System Considering Patients' Choice.

Wesson, D. E. et al. (2020). A population health dietary intervention for African American adults with chronic kidney disease: The Fruit and Veggies for Kidney Health randomized study. *Contemporary Clinical Trials Communications, 17*, 100540. https://doi.org/10.1016/j.conctc.2020.100540

Wu, D. et al. (2021). Individual motivation and social influence: a study of telemedicine adoption in China based on social cognitive theory. *Health Policy and Technology, 10*(3). https://doi.org/10.1016/j.hlpt.2021.100525

Yimer, N. B. et al. (2021). Cervical cancer screening uptake in Sub-Saharan Africa: A systematic review and meta-analysis. *Public Health, 195*, 105-111. https://doi.org/10.1016/j.puhe.2021.04.014

Yoon, S. et al. (2022). Spillover Effects of COVID-19 on Essential Chronic Care and Ways to Foster Health System Resilience to Support Vulnerable Non-COVID Patients: A Multistakeholder Study. *Journal of the American Medical Directors Association, 23*(1), 7-14. https://doi.org/10.1016/j.jamda.2021.11.004

Yuen, K. F. et al. (2021). Cruise transport service usage post COVID-19: The health belief model application. *Transport Policy, 111*(July), 185-196. https://doi.org/10.1016/j.tranpol.2021.08.002

Zamanzadeh, V. et al. (2013). Emotional Labour of Caring for Hematopoietic Stem Cell Transplantation Patients: Iranian Nurses' Experiences. *Asian Nursing Research, 7*(2), 91-97. https://doi.org/10.1016/j.anr.2013.04.004

Zhou, C. et al. (2021). Self-efficacy and mental health problems during COVID-19 pandemic: A multiple mediation model based on the Health Belief Model. *Personality and Individual Differences, 179*(March), 110893. https://doi.org/10.1016/j.paid.2021.110893

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