The Role of mHealth for Equitable Access to Healthcare for Rural Residents

Completed Research

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Abstract

While Mobile Health (mHealth), and medical applications offer the possibility of pervasive and improved delivery of healthcare services, their adoption in rural communities remains limited. Following an overview of the potential of mHealth applications to support improved access to equitable healthcare by rural residents, this paper offers an analysis of perceptions held by rural residents relating to their use technologies in a rural Midwestern community. Using data from a sample of 1,667 rural residents, a descriptive statistics analysis of rural residents' use of mobile applications to support equitable access to healthcare is carried out. The findings suggest that mHealth applications can support equitable access to healthcare for rural residents by offering specific functionalities for communicating with providers, searching for health information and tools for addressing common symptoms. The contribution of this paper is in offering key concepts relating to equitable healthcare provision through the use of internet enabled mobile devices.

Keywords

Mobile health (mHealth), health equity, rural residents, equitable healthcare provision.

Introduction

There is a sense that the equitable provision of healthcare is central to achieving development in any society. The need for health equity arises from inequalities in health status, health care utilization and health care financing (Sen, 2002). The provision of equitable healthcare for rural residents is challenging because of the aging population, migration to rural areas, and limited resources. One in three adults in rural areas are in poor to fair health and nearly fifty percent revealed a chronic illness (“Health Care Disparities”, 2005). In addition, only 9% of doctors practice in rural areas (Bolin et.al, 2015). The diverse group of people in rural America face declining access to healthcare because of several reasons. These reasons include lack of transportation, longer travel times to clinics, and lack of availability of healthcare workers. As the aging rural population grows, transportation becomes an issue as more people are unable to drive to seek medical care. Furthermore, these people have a much higher rate of obesity compared to the urban population. In fact, the obesity crisis in rural America has surfaced since 1980. Prior to 1980, the rural population had a much lower rate of obesity than the urban areas (Tai-Seale & Chandler, 2003). In addition, if the baby boomers follow past life-cycle age related migration patterns to rural areas, 30 percent more adults ages 55-75 will live in rural areas by 2020 (Cromartie & Nelson, 2009).

Mobile healthcare applications are helping people become healthier and may potentially bridge the gap among rural residents. By 2012, at least 40,000 health related apps were available to download to help people research and manage their health (Boulos, Brewer, Karimkhani, Buller, Dellavalle, 2014). These apps ranged from chronic disease management, ability to access relevant health care information, exercise and food intake tracking, follow-up care and basic diagnostics for minor medical issues (Silvia, Rodrigues, Diez, Lopez-Coronado, Saleem, 2015).
Given the low adoption of mobile applications among rural residents, it appears that their healthcare needs may not be met by these applications. Smartphone access among rural residents is notable increasing (Kurti, Logan, Manini, Dallery 2015). According to the Pew Internet and American Life Project, 65% of rural Americas own a smartphone with 91% owning some type of cell phone. Rural residents, who have been online for 3 or more years, are more likely to pursue health information online than residents in urban areas. However, about 20% of rural residents have been online less than three years and are less likely to use the internet for health related information (Pew Internet and American Life Project, 2010).

This paper identifies the key challenges facing rural residents as they attempt to access healthcare. The research question investigated in this paper is: How can mHealth applications support equitable access to healthcare for rural residents? The following sections offer a theoretical background of that state of rural healthcare, access to healthcare by rural residents, their health information and awareness and mobile health for equitable healthcare provision. The analysis draws upon two sets of data. The first is qualitative data from a survey of rural residents’ access to healthcare and awareness of how they may use technology to improve their health outcomes. The second dataset is from a sample of 1,667 rural residents collected by the Princeton Survey Research Associates International for Pew Research Center’s Internet, Science & Technology Project Information Engaged and Wary Survey 2016. The results illustrate the perceptions of rural residents as they endeavor to use internet enabled mobile technology to access health information and their healthcare providers. We found a correlation between the use internet-enabled mobile technology by rural residents and their propensity to trust their healthcare providers. The implications of this research lie in the key functionalities needed in mHealth applications to be able to offer equitable healthcare provision to rural residents. The contribution of this research is in the concepts that help uncover the ways in which mHealth applications may be implemented to offer health equity.

**Theoretical Background**

What defines a rural area? Several definitions exist, and no single definition covers all policy intentions. According to the Office of Management and Budget (OMB), a metropolitan statistical area is defined as an area with at least one urbanized part and outlying areas where 25 percent of the population commutes to and from a metro area for work. In contrast, the U.S. Census Bureau defines rural as a population of less than 50,000 people who live in a total land area of greater than two square miles, with a population density of less than 500 people per square mile (Selected Historical Decennial Census Urban and Rural Definitions and Data, 2008). The Economic Research Service defines rural by using a census tract classification system built by the University of Washington. The census tract system is called Rural-Urban Commuting Area system (RUCAs) (What is Rural, 2010).

For the purpose of this research, a rural community will be defined as a geographical area with a population of less than 50,000 people and a population density of less than 500 people per square mile, with growth of less than 12 percent in the last ten years. Research suggests that our understanding if internet usage specific to health related online activities in rural areas is incomplete. In order to address this gap, this study analyses rural residents’ interest in health or medical news, ownership of mobile phones, types of mobile phones they own and their level of trust from healthcare providers.

**Health Information and Awareness**

Rural residents’ interest in health or medical news may be related to the content available on the internet. As the adoption of the internet increases, so does the content. Some health care providers criticize the amount of inaccurate information on the internet. Many feel that it negatively affects the relationship between the patient and provider (Schiavo, 2007). The increased availability of the internet has improved that ability of both patients and the general public to participate in health related activities and discussions (Schiavo, 2007). Between 50 and 80 percent of mature Internet users seek health related opinions and information online (Baker, Wagner, Singer, & Bundorf, 2003). The number of mature adults looking for health related information has more than tripled to 175 million in 2010 up from 50 million in 1998 (Caramenico, 2010). According to a 2010 Harris Poll, people seeking health related information online are satisfied with what they find. Another interesting finding indicates that only eight percent of people felt the information they found on the internet was unreliable, and half of the people have discussed information they found online with their health care provider (The Harris Poll, #95, 2010).
According to the Pew Internet and American Life project, a 20 percentage gain, from 49 percent to 69 percent, was seen in adults (users and non-users) for sending and receiving email. In addition, the use of a search engine increased from 52 percent in 2002 to 68 percent in 2009. Also, playing online games grew from 18 percent in 2000 to 20 percent in 2007 (Pew Internet and American Life Project Tracking Surveys, 2007).

In addition, many people are worried if they start interacting with their provider digitally, the personal touch of care will be lost. Companies with a financial stake in certain treatments, such as pharmaceutical companies, sponsor certain products and services which may not be in the best interest of the patient (Miller & West, 2007). Nevertheless, researchers have concluded that the use of communication, whether online and in-person, is essential for health and wellness. If used properly for the intended audience, the internet can play an essential role in the adoption of new health services, modifying health behavior, and the overall management of health. One of the keys to proper health can be achieved by focusing on established customer centered communication models (Schiavo, 2007, Miller & West, 2007).

**Mobile Health for Equitable Healthcare**

We pose that rural residents who have access to smart phones and internet infrastructures, are more likely to have equitable access to healthcare resources. The ability of rural residents to access equitable healthcare will depend on their ownership of mobile phones, types of mobile phones they own and their level of trust in their healthcare providers. The concept of health equity arose from the belief that differences in social and economic backgrounds of people lead to differences in their ability to access health care. In other words, groups of people who are already socially disadvantaged due to their poverty, gender, racial, ethnic or religious backgrounds are further disadvantaged with respect to their health (Qureshi 2016). Braveman and Gruskin (2003) offer a conceptual definition that they operationalize as follows:

“equity in health is the absence of systematic disparities in health (or in the major social determinants of health) between groups with different levels of underlying social advantage/disadvantage—that is, wealth, power, or prestige…. health is essential to wellbeing and to overcoming other effects of social disadvantage.” (Braveman & Gruskin 2003, p.254).

Equity in healthcare represents both physical and mental wellbeing in which key social determinants include household living conditions, conditions in communities and workplaces and access to healthcare (Braveman & Gruskin, 2003).

An area in which mobile healthcare provision is becoming more equitable is in enabling care to become more patient centered. Studies have shown that the outcomes of patient centered care have reported better recovery from their discomfort and concern, better emotional health, and fewer diagnostic tests and referrals (Cliff 2012, Gabriel and Normand 2012). Additional studies have also shown that the use of mHealth applications for patient centered care reduce the cost of care significantly (Boulos et. al. 2011, Payne et.al. 2012). mHealth has been defined as the use of portable electronic devices for mobile voice or data communication over a cellular or other wireless network of base stations to provide health information (Kahn, Yang, & Kahn, 2010). Patient centered care transpires when the patients’ needs and desires are in the forefront of the health care decisions and outcomes. Medical applications make smartphones useful tools in the practice of evidence-based medicine at the point of care (Mosa et.al. 2012). Motivated by rising costs of healthcare, patients can achieve significant improvements in their health outcomes at reduced costs when they use mobile applications. There are currently between 3,000 to 7000 mobile healthcare applications available through Google Playstore and Apple Store to patients all over the world that support lifestyle changes such as fitness, calorie counting and Body Mass Index (BMI) calculation used to control diabetes (Boulos et.al. 2011, García-Gómez et.al. 2014, Kailas et.al. 2010). Such uses of mobile health applications give people more choices as to how they may go about leading healthier lives. Kahn et.al. (2010) argues that mHealth may also have a non-health benefit: fostering local economic development beyond health care.

Evidence suggests that motivated patients can achieve significant improvements in their health outcomes when they use mobile applications (Garcia-Gómez et.al. 2014). Internet enabled mobile applications allow active patient participation in decisions affecting their health status, health information, linking people and information through multiple digital devices to allow for person-to-person communication, and
participating in support groups (Boulos et.al. 2011). The use of such mobile applications is transforming the relationship between physicians and patients offering greater equity in outcomes. While the successful cases of mHealth offer hope to those in need of basic healthcare, it is not clear if at all they can be sustained, scaled up, or even replicated in rural communities.

**Methodology**

In order to understand the role of mobile phones in achieving equitable health outcomes for rural residents, this research follows an inductive approach in which both qualitative and quantitative data is analyzed. The first stage, qualitative inductive research is carried out in four counties within Midwestern rural communities to 1) ascertain access to healthcare providers and 2) perceptions held by rural residents relating to their use of technologies to communicate with their healthcare providers.

Access to healthcare providers and the ability to reach healthcare providers with the use of information technology was investigated though the use of structured and open ended questions. Questions using the Likert scale were also used in the area of access. Participants were asked three questions about access. The first question was “the internet is a good resource for finding health information.” The next question was “having access to healthcare will allow me to remain healthy.” The last question regarding access was “I feel that technology creates a barrier for me to maintain my health.”

Understanding perceptions is integral in understanding how users would react with the introduction of mHealth technologies. In this research, perceptions among the participants were identified. These perceptions ranged from perception about their use of technology to contact their healthcare provider, the type of care they receive, and what they feel about their health. These questions were intended to gain an understanding of how perceptions can help, and/or hinder the introduction of technology. The first question was “how does technology allow you to manage your health.” Question using the Likert scale were also used in the area of health awareness.

In order to determine if these results can be applied to the use of mobile applications to support equitable access to healthcare for rural residents, the second stage of this study carries out descriptive statistics analysis of rural residents’ interest in health or medical news (Q1f), ownership of mobile phones (INTMOB), types of mobile phones (SMART1), and level of trust from healthcare providers (Q6g). The dataset is from the Princeton Survey Research Associates International for Pew Research Center’s Internet, Science & Technology Project Information Engaged and Wary Survey (2016). The data was collected from September 2, 2016 to October 30, 2016. Overall there are 3,000 participants who finished the survey. A sample 1,667 subjects from small cities (towns) or rural areas was selected for this analysis.

**Results**

The average age of participants was between 56 and 65, and most of the people surveyed had lived in a rural community most of their lives. While all 60 participants stated that living in rural Nebraska is the ideal living situation, they also noted that access to healthcare can be challenging. The majority of people have to travel 30 miles one way to see a healthcare provider. While most participants indicated no major healthcare issues or trouble traveling long distances to see a doctor, most agreed that as they get older traveling could become a problem.

Seeking routine medical care on a yearly basis was the most often cited reason for seeing a doctor. In fact, only two had a chronic illness. The two illnesses noted were diabetes, and macular degeneration. In addition, 84 percent of people had visited the doctor in the last year. This finding was slightly lower than research conducted by Miller and West in 2007. In general, most people with healthcare issues relied on family, and friends to transport them to health related appointments. Most residents in rural areas had used a computer to look at health related information, and Google was the most popular search engine indicated by participants. In contrast, people who have no computer felt that computers were of no use, and were not interested in learning how to use a computer. However, when asked how technology allows them to manage their health, most participants were divided between looking up health information and not seeing technology as an asset.
Access to Healthcare by Rural Residents

Previous research indicated that people discuss information they find online with their health care provider (Miller & West, 2007). According to a 2010 Harris Poll, people seeking health-related information online were pleased with what they found. The findings of this research indicate the same. The concern noted was about the speed of the internet. In fact, some participants said they would seek more health-related information if the internet was not so slow. In this research, some residents noted slow internet access as a factor of why they did not use the internet as much as others. Additionally, 24 percent of the participants did not have access to a computer. Depending on the type and method of mHealth delivery to these rural areas, mHealth has the potential to have a positive impact in rural areas. This is because patients could possibly limit or eliminate travel to see a healthcare provider. Some of the responses relating to access to care by rural residents is as follows:

“I have a special form of Macular degeneration was caused from an injury. No pharmacy in town. DO have G.P’s, but they don’t do anything. They just send you to a specialist somewhere that is at least 40 miles away.”

“The local gp’s are not very helpful. They usually just refer everyone to a specialist in Norfolk.”

The majority of rural residents had to travel thirty miles one way to see a healthcare provider. This did not currently pose a problem for the majority of people. However, many of the participants under the age of 65 said that as they get older and their health changes, travel could become an issue. In contrast, residents older than 65 most often conveyed the distance of traveling to see a healthcare provider as a problem. Many of these people do not have the ability to drive anymore. Therefore, they have to rely on family or friends. In most instances public transportation was not an option. Additionally, based on the results people currently residing in rural areas do not have much confidence in healthcare providers that are close to them. Most participants surveyed felt that in order to see a good doctor and/or specialist they would have to travel 60 to 100 miles one-way.

mHealth has the ability to close this gap. For example, in the patient-centered home model, the patient’s health can be managed remotely from the comfort of that patient’s home. mHealth relies heavily on technology to delivery healthcare to people in the most remote areas. In this study, the majority of people had access to a computer and the internet. Many people used the internet to search for health related information. They majority also strongly disagreed that technology creates a barrier to maintain good health. This means that people would have the ability to take advantage of mHealth as long as the infrastructure supported the specific mHealth component(s) people wanted to access.

Rural Residents’ Health Awareness and Experience with Technology

The results thus far suggest that people are open to using technology to enable better access to healthcare. However, most people surveyed do not know how technology can be used to facilitate better healthcare. Experience and use play a key role in how people interact with computers and technology.

From the results, many rural residents noted a lack of confidence in their local physician. If high speed internet is available in the rural communities, and rural residents have basic computer knowledge, then confidence could be restored. To boost confidence in local physicians’ abilities, rural residents should be empowered with the uses and advantages of mHealth. Then, physicians need to partner with specialists using mHealth, and should strengthen the partnership with their patients.

This study found that most participants felt that computers were useful or extremely useful. This is important as some mHealth interactions use a computer or computer type equipment as a medium (Hill & Powell, 2009; Miller & West, 2007). Only seven of the participants had experience with electronic health record/personal health records. The majority agreed that this electronic type of communication was useful in maintaining their health. The majority of participants felt that a face-to-face interaction was the best for accurate medical diagnosis. Yet, the respondents were keen to be able to use technology to help them diagnose their own conditions. Some of their responses to the question of “how does technology allow you to manage your health?” are as follows:

“try to self-diagnose”, “use it for self diagnosis”, “can diagnose my own health problems”
“allow me to look up medications that i have questions about, use a lot at work, specialists (office numbers to set up referrals, I am a RN), patient education”
“find health care providers”
“search for health information on the web (google)”, “Look up health information on google”
“find things on the internet relating to problems, self-diagnosis, can print out things and talk with me to the doctor”
“helps me make better decisions about my health”

However, none of the participants had experienced any other type of interaction with their health care provider. Some people were open to the idea of scheduling doctor visits online, and many liked the idea of being able to access their health information online. Due to the positive attitudes towards technology, I feel that most of the residents that took part in this research would be open to exploring how mHealth can help in the management of their health.

Many residents criticized local health care providers. The rural residents in this study indicated that they do not go to the local doctors anymore because all they do is refer the patient to a healthcare provider that is at least twenty-five miles away. Existing research has shown that the use of mHealth creates happier and healthier patients (Moffatt & Eley, 2010). Residents in rural communities feel that they are healthy people, and they need to take care of their own health. These same people also feel a strong sense of community and connection between family and friends.

**Mobile Health for Equitable Healthcare Access for Rural Residents**

In order to determine if these results can be applied to the use of mobile applications to support equitable access to healthcare for rural residents, the second stage of this study carries out descriptive statistics analysis of rural residents’ interest in health or medical news (Q1f), ownership of mobile devices (INTMOB), types of mobile phones (SMART1), and level of trust from healthcare providers (Q6g). The number of respondents (N) was 1667.

For the question (Q1f), how interested are you in keeping up-to-date on the following topics? Health or medical news, the majority of respondents were very interested 45.2% and somewhat interested 38%. Of these respondents, 79.3% access the internet using a cellphone, tablet or other mobile device. 73.6% of the rural residents responded that they did use smartphones. When asked (Q6g), How much do you trust the information from health care providers when it comes to making decisions?, 36.9% responded with “A lot”, 45.9 with “Some”. Only 16.6% were not too keen to trust information from healthcare providers.

The next step of the analysis is to identify the potential relationship between the interest level of health or medical news and trust level of health care providers with the mobile phone ownership and types of mobile phone. Regression analysis was conducted to identify the relationship between interest level in health or medical news and ownership of mobile phones.

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Table 1. Coefficients of INTMOB with Q1f

Based on the analysis, there is a positive relationship between the usages of mobile device with the interest level of medical or health related news. The following figure identifies the relationship between the two variables.
Based on the analysis, we are 99.9% confident that there is a positive relationship between the Internet usage through mobile devices with the interest level in health or medical news. This implies that the public interest in healthcare related topics can be increased by the adoption of mobile devices. At this stage, no causal relationship can be determined. The positive relationship between the two variables can be interpreted in different ways. For example, mobile usage may imply a higher level of adoptions, which may further increase the interest level of health or medical related news. The analysis continues with regression analysis between the Internet Usage through Mobile Devices and level of trust from healthcare providers.

### Table 2. Coefficients of INTMOB with Q6g

Based on the analysis, we are 99.9% confident that there is a positive relationship between the Internet usage through mobile devices with the level of trust in healthcare providers. This is illustrated in the following figure 2:

**Figure 2. Regression Analysis of INTMOB with Q6g**

*** is significant at 0.001 level

This suggests that trust from healthcare providers will increase if there is Internet Usage through Mobile Devices. Similar to the previous regression analysis, while there are different explanations of the results, we do see that trust in healthcare providers can be further enhanced through the adoption of mHealth applications.

This is an important finding in that rural residents' use of mobile technology to access information relating to their healthcare needs is rising. Perrin (2017) estimates that mobile technology use among rural adults has also risen rapidly, with the share of those owning smartphones and tablets is increasing sharply. With this, it appears that rural residents are using the internet though their mobile devices it is rising as their trust in healthcare providers who will communicate with them in this manner.

In order to strengthen the findings of this research, the authors found two different case studies focused on rural residents. The studies included a survey based pilot study as well as a mHealth based application aimed at monitoring chronic disease management. First, a pilot study was conducted in rural Nebraska in two pharmacies to explore both access to mobile phones as well as willingness to receive health related services. The study was conducted through the use of surveys which were solicited by rural residents...
visiting the two pharmacies. This study found that the 95% of participants had access to a mobile phone. In addition, 75% of participants indicated that mobile phone based services were important (Sankaranarayanan & Sallach, 2014).

The second study was conducted within the Appalachia of West Virginia. This study utilized a new technology platform called mSMART. The goal of this study was to determine the feasibility and acceptability of the mHealth app for people living in rural areas. This application was used to monitor health conditions of rural patients who had at least one chronic condition. Each patient participated in the study for 12 weeks. The goal of the application was to provide self-monitoring of patients as well as access to patients and providers. The study participants were 18-64 years of age and had a diagnosis of a chronic illness. Using the mSMART application, the results indicate these individuals had an easier time managing their illness. In particular, when asked if they liked the system, the responses included:

"Easy to use",
"Being more aware of my overall health",
"Not having to go to the office",
"Knowing that health professionals are looking over your shoulder all the time gives a very reassuring feeling",
"That my Doctor could monitor everything and that I could talk to her."

In addition, the patients most likely to miss follow-up appointments lived father than 30 miles away from the clinic and have more than one chronic illness (Mallow, et al, 2016).

**Implications of mHealth Equitable Healthcare Access for Rural Residents**

There are a number of implications of these findings for equitable access to healthcare by rural residents. The above results suggest that if residents living in rural areas do not have internet access, they will have a bad experience. In addition, the results suggest the same for physical access to healthcare and experience. If people do not have suitable physical access, it is unlikely have will have a positive experience. These finding are important to the development of technology infrastructures for mHealth applications. To facilitate the adoption of mHealth in rural areas, it is essential that people have appropriate physical and internet access. In understanding how to deploy mHealth application in rural areas, residents in rural areas will be ready embrace new technologies if they have suitable internet and physical access.

With the right technologies, communities play an important role in the deployment technology infrastructures for mHealth. In order for residents in rural communities to embrace technology infrastructures, such as mHealth, residents experience will be heightened when internet access is proper and available. Peer pressure may play a role in getting people to adopt mHealth. This is drawn from the perception concept in which high factor loading was indicated in the health awareness factor. This means that rural residents are aware of their healthcare needs and are willing to use internet mobile technologies to access improved healthcare.

The results of this study indicate that equitable healthcare access for rural residents is possible through mHealth applications. In particular, in order to enable rural residents to be able to have equitable access to healthcare, mHealth applications will have to have offer the following functionalities: 1) Access to providers in the specialties needed by the rural residents, 2) Offer simple diagnostic tools for common symptoms, 3) Offer the ability to access care remotely, 4) Ability to access medical and health news and 5) Enable providers to communicate with rural residents through mobile applications – hence enabling trusting relationships. These findings are also supported in the literature (Boulos et al. 2011, Mallow et al. 2016, Mosa et al. 2012, Qureshi, 2016, Schiavo 2007, Sankaranarayanan & Sallach 2014, Tai-Seale & Chandler 2003).

In order to achieve equitable outcomes in healthcare for rural residents, mobile applications and internet access can transform healthcare by offering patients greater knowledge about their condition and the ability to actively participate in health-related decisions that affect them (Ventola 2014, Boulos et.al. 2011). Physicians and medical students are also increasing their usage to support their education and clinical practice (Payne et.al. 2012, Ventola 2014). The increased popularity of smartphones has led more
patients to proactively manage their care while on the go using specific mobile applications containing functionalities such as GPS tracker for Alzheimer’s patients, not available on desktop computers.

Location based mHealth applications can further assist the independent living of persons with disabilities and/or multiple chronic conditions and in epidemiology/public health surveillance, community data collection and remote monitoring of patients. (Boulos et. al., 2011, Mosa et.al. 2012). Disease diagnosis, drug reference, and medical calculator applications were reported as most useful by healthcare professionals and medical or nursing students (Mosa et. al., 2012). Their reliability for making clinical decisions, protection of patient data with respect to privacy; impact on the doctor–patient relationship; and proper integration into the workplace remains limited (Ventola 2014, Boulos et.al. 2011, Mosa et.al. 2012).

Summary Conclusion and Contributions

Given the need equitable access to healthcare by rural residents and the promise of mHealth, this paper investigated the research question investigated in this paper is: How can mHealth applications support equitable access to healthcare for rural residents? Following a review of the state of rural healthcare, access to healthcare by rural residents, their health information and awareness and mobile health for equitable healthcare provision, the analysis draws upon two sets of data. The results suggest that rural residents would like to use internet enabled mobile technology to access health information and their healthcare providers. We found a correlation between the use internet-enabled mobile technology by rural residents and their propensity to trust their healthcare providers. The implications of this research lie in the key functionalities needed in mHealth applications to be able to offer equitable healthcare provision to rural residents. The contribution of this research is in the concepts that help uncover the ways in which mHealth applications may be implemented to offer health equity.

There are several directions for future research. The survey dataset contains other demographic information like age, education, household income, and ethnicity may be factors to consider. Given the relatively larger sample size, it will be interesting to control some of the variables and conduct further analysis to further delve into the concepts.

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