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Telemedicine Services and patient Satisfaction

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MA, University of Baltimore, 2015

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Patient satisfaction associated with the use of telemedicine for patient care may be subjective as it may not reflect the patients' comfort and willingness to use telemedicine. Even though current perceptions of telemedicine may be positive, the challenge is knowing what constitutes the ingredients of patient satisfaction, particularly regarding age. This study examined two research questions concerning whether a patient's age (independent variable) affected their comfort and willingness (dependent variable) to use telemedicine for their care. The health belief model was the theoretical framework and related to an individual's perception of their health behaviors and their willingness to change their health behaviors based on perceived benefits, barriers, and self-efficiency of the health situation. The secondary data set, which reflected a nationwide survey of 4,345 respondents, was demographically balanced to represent the United States adult population. The Kruskal-Wallis H-Test was used to analyze the data. The results of the two research questions indicated that the null hypotheses were rejected because age was significantly related to the use of telemedicine services. Older patients (60+ years) were more comfortable and willing to use telemedicine than younger patients, with young adults (18-29 years) the least likely. Research recommendations included studies that explore ways to educate and facilitate willingness to use telemedicine in younger individuals and encourage the use of telemedicine in all age groups. Implications for positive social change involve the development of programs within healthcare organizations that highlight the benefits of telemedicine services to provide timely and convenient care across demographics.

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Dedication

To God and for Mum and Dad

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In the cause of this journey, I have traveled with several individuals. They have been kind to me and thus renewed my belief in the possibility of the human heart to generate unconditional love—Dr. Dimeji Soile, you never knew me, and we never had a chance to meet, but I could still hear your very soft benevolent voice, teaching me statistics and showing me how to navigate the process. This is a posthumous appreciation to you; thank you! I also want to thank my wife Adetutu; baby you came at the nick of time to save this sinking boat and my children—Toluwanimi, Ayomide, Omotayo, Oreoluwa, and Anuoluwapo. I also thank the following individuals for their help and prayers in birthing this effort: Elenalee Peddicord, Pastors Sesan, and Bimbo Kuforiji for your spiritual guidance. I am eternally grateful to Dr. Miriam Ross, my committee chair and member University Research Review Committee, URR, who rekindled my hope and tailored this paper to completion. Thank you, Dr. Melissa Green and Dr. Nicole Mcguire, for your patience and supervision. I could not have done this without your help. My appreciation to Dr. Kristin Wiginton for her guidance and to Dr. Robin Carlson, a member of the University Research Review Committee, who was meticulous in her reviews. Thank you, Brandon Welch, Jillian Harvey, Nathaniel O'Connell, and James McElligott for providing the dataset for this study. I am grateful to you all!

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Section 1: Foundation of the Study and Literature Review

The goal of any health care system, especially in the United States, is to promote a patient-centered delivery system that is accessible, affordable, and guarantees quality health outcomes. A health system that promotes patient satisfaction across the delivery of care is the desire of all stakeholders. Understanding the determinants of patient satisfaction with a country's health system has merit beyond its political and strategic value to stakeholders. Adequate responsiveness and accountability of health systems are widely considered standards of health systems performance, and patient satisfaction is an important measure of the extent to which systems meet them (Hero et al., 2016). The healthcare system has consistently been challenged to stimulate better quality care delivery, guaranteeing improved outcomes and encouraging quality patient experience. Telemedicine adoption is seen as one of the strategies that could fulfill these expectations.

This care delivery strategy has contributed immensely to creating a more effective, affordable, and accountable health system. The use of telemedicine has been shown to encourage long-term care management and patient satisfaction. It also facilitates a new avenue to locate health information, enhancing communication with practitioners, thereby increasing patient care opportunities and reducing potential travel for providers and patients (Alvandi, 2017). Telemedicine improves care access and allows providers and health facilities to expand their reach beyond their own offices. Similarly, given the shortage of healthcare personnel worldwide, telemedicine has a unique capacity to

increase services to millions of new patients in rural and urban areas (American Telemedicine Association, 2017).

Patient satisfaction is the extent to which patients' general health care needs are met to their expectations. Patient satisfaction, therefore, is a product of the experience patients have from the care they receive (Hero et al., 2016). However, there are hundreds of medical entities; there is no consistency in the methodologies used to evaluate patient satisfaction and the aspects of the satisfaction explored. Age plays a significant role in patients' comfort and willingness to use telemedicine and whether patients are comfortable or not with telemedicine is a product of their experience (Khemapech et al., 2019). The level of comfort and willingness with telemedicine adoption could vary from patient to patient because of individual preferences due to users' perceptions and age.

Problem Statement

Telemedicine care is intended to meet patients' specific needs and expectations irrespective of age, such as creating a window of opportunities to improve care delivery access, cost savings, and increase efficiency with better health outcomes (Balestra, 2017). However, while most health consumers are open to using telemedicine, the way they want to use it varies significantly by age. The challenge is knowing how comfortable and willing patients are ready to use telemedicine. Patient preferences and the use of telemedicine may yield different results in real situations, especially considering age, comfort, and willingness to use telemedicine (Powell et al., 2017). In a National poll conducted by the University of Michigan, older adults found the use of telemedicine comfortable and were willing to use telemedicine to interact with their providers

(University of Michigan, 2020). Therefore, age could significantly influence whether patients are comfortable and willing to use telemedicine to receive care (American Well, 2019). Also, young adults have internet and broadband usage rates that approach the general population. Once internet adoption occurs for this group, it often becomes an integral part of their daily lives. Adults use a greater breadth of technologies for multiple purposes, including communication, news, and community information domain (Greenwald et al., 2018).

Many studies have explored the benefits of using telemedicine, including stimulating innovative and quality care to patients to generate improved outcomes irrespective of age (Anthony, 2020). In addition, telemedicine has been used to provide a wide range of services to varied populations, including transitional care for people with heart failure and other severe chronic illnesses, palliative care, home-based primary care, behavioral and mental health services, and long-term services and supports (Quinn et al., 2018). This technology has been used to provide high-quality care, increase access to care and self-awareness, and encourage patients to manage their chronic conditions (Kruse et al., 2017). However, it is unclear whether the age of patients affects their comfort and willingness to use telemedicine for their care. The purpose of the study related to age, comfort, and willingness would further clarify these opportunities.

Purpose of the Study

This quantitative study aimed to determine whether the patients' age affects their comfort and willingness to use telemedicine services. Although telemedicine's current use as a means of consultation, treatments, and follow-up is often positive, satisfaction may

vary depending on age. Therefore, it may be too convenient to conclude that patients are generally satisfied with the telemedicine care delivered to them irrespective of age. The older population has intuitively understood some of the paradoxical virtues and power of technology in the form of a telemedicine encounter, namely, that the essence of care is the primary connectivity with another human being, the telling of one's narrative of what is ailing them, and the trust that the person across from them (on the monitor) is listening and observing carefully (Greenwald et al., 2018). The inability to reflect whether the patients' age affects the comfort and willingness to use telemedicine for their care and disentangle satisfaction from clinical outcomes may limit the opportunity to form an effective care plan (Langbecker et al., 2017).

Since telemedicine is an innovative strategy that facilitates better access to care, a well-defined process for measuring telemedicine usage across demographics may encourage more patients to be comfortable and willing to use it. Components such as age, comfortability, and willingness to use telemedicine are seldom examined collectively (Adelakun & Garcia, 2017). This gap was examined in this study by focusing on whether the patient's age affected their comfortability and willingness to use telemedicine. The independent variable for this study is age, and the dependent variables are comfortability and willingness to use telemedicine care.

Research Questions

Research Question 1: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), and the willingness to use telemedicine services?

$H_0 1$: There is no statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the willingness to use telemedicine services.

$H_a 1$: There is a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the willingness to use telemedicine services.

Research Question 2: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfortability to use telemedicine services?

$H_0 2$: There is no statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfortability to use telemedicine services.

$H_a 2$: There is a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfortability to use telemedicine services.

Theoretical Foundation for the Study

The Health Belief Model (HBM), developed in the 1950s by psychologists and updated in the 1980s, was the theoretical framework for this study (Boskey, 2020; Jones et al., 2016). This model is framed on individual perceptions relating to their health behaviors. The HBM is a tool scientists use to predict health behaviors. The model is based on the theory that a person's willingness to change their health behaviors is primarily due to their health perceptions. These perceptions could be measured from six

dimensions: perceived susceptibility, severity, benefits, barriers, cue-to-action, and self-efficacy (Boskey, 2020). The diagram below indicates the six contributing perceptions leading to patients' health behavior. Demographic factors and psychological characteristics were the starting foundation in determining if a patient will use health services such as telemedicine.

Figure 1

Diagram of the Health Belief Model
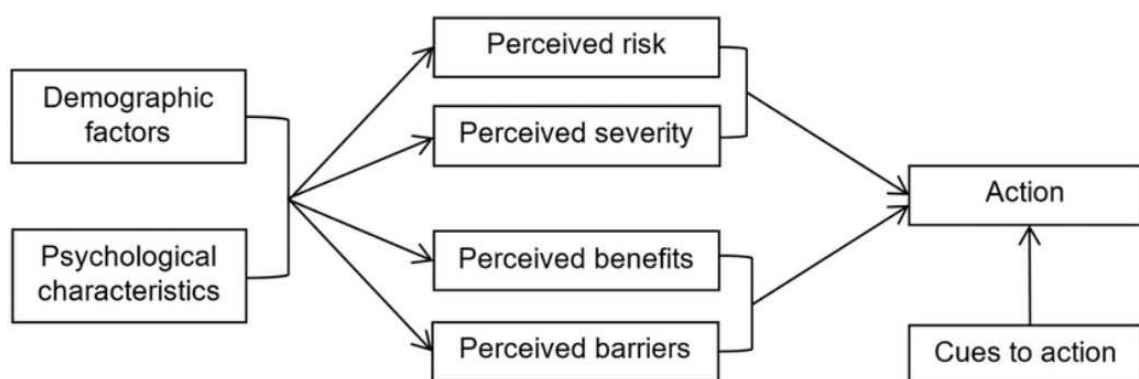
The Health Belief Model (Adapted from Becker., 1974)

The HBM posits that patients will take action to prevent illness if they regard themselves as susceptible to a condition (perceived susceptibility). Patients will also take action if they believe the existing health situation would have potentially serious consequences (perceived severity) and If they believe that a particular course of action available to them would reduce the susceptibility or severity or lead to other positive outcomes (perceived benefits).

Also, patients will take action if they perceive a few negative attributes related to the health action (barriers). Action will be taken if patients believe they can successfully

complete the behavior of interest despite considered barriers (self-efficacy) and believe that specific internal and external cues could spur them to take the necessary action to change their health behavior (Jones et al., 2016).

Nature of the Study

This study examined whether the patients' age affects their comfort and willingness to use telemedicine services. This quantitative study used a secondary data set. The secondary data reflects a nationwide survey of 4345 respondents demographically balanced to represent the United States adult population. The survey consisted of questions assessing the respondents' comfort and willingness to use telemedicine and the importance of providing care through telemedicine. SPSS was used to perform two statistical analyses for the research questions. For Research Question 1, the Kruskal-Wallis H test was used to determine if there is a statistically significant relationship between the independent variable—patient's age and the dependent variable—the willingness to use telemedicine. This test will show if the patient's age statistically affects their willingness to use telemedicine among the age groups of young adults (18-29 years), adults (30-44 years), and older adults (45-59 years), and elderly (60+ years).

Research question 2 was analyzed using the Kruskal-Wallis H test to determine if there is a statistically significant relationship between the independent variable—patient's age and the dependent variable—comfortability to use telemedicine. This analysis will also show if the patients' age statistically affects their comfort to use telemedicine among the age groups of young adults (18-29 years), adults (30-44 years), and older adults (45-59 years), and elderly (60+ years).

Significance

This study's significance determined whether the patients' age affects their comfort and willingness to use telemedicine services. Age is an important consideration when telemedicine adoption is being considered. The use of telemedicine is on the rise, especially during the 2020 pandemic. The Covid-19 pandemic has moved the health care system out of its comfort zone and has given a push to bring telemedicine to mainstream medicine (Faden et al., 2020). This opportunity makes this study relevant to current discussions on telemedicine, especially considering patients' age, comfort, and willingness to use telemedicine.

The study's contribution to professional practice showed that age is an important consideration to use telemedicine and the need for healthcare professionals to encourage patients to embrace telemedicine for their care. The research will further reveal to healthcare practitioners the importance of the patient's age when considering telemedicine as a care option.

Literature Search Strategy

The study used multiple search engines to locate relevant peer-review articles and other scholarly literature. Using various sites, including medical websites, organization websites, government websites, peer review articles, and dissertations, over 50 articles were identified. In addition, using these keywords, including telemedicine, patient satisfaction, telehealth, telemedicine technology, remote monitoring, videoconference, M- mobile, health literacy, teleconference, and Google scholar search, expanded the literature search strategy.

Literature Review Related to Key Variables and Concepts

This study examined whether the patients' age affects their comfort and willingness to use telemedicine services. The research also showed the use of telemedicine to provide the right healthcare services. This literature review reflects previous research on telemedicine's adoption and the challenges of its usage. The independent variable for this study was age, and the dependent variables were comfortability and willingness to use telemedicine services. Reviewing both the historical and current studies on telemedicine adoption further added to the relevance of this study.

Telemedicine Technology

The different perceptions of telemedicine were reflected in the many definitions of the technology. Khemmapech et al. (2018) defined telemedicine as the delivery of health care services by healthcare professionals, where distance is a critical factor, using information and communication technologies to exchange valid information for the diagnosis, treatment, and prevention of diseases and injuries. On the other hand, Hanna et al. (2016) observed that telemedicine uses medical information exchanged from one site to another via electronic communications to improve a patient's clinical health status. Such as using two-way video, email, smartphones, wireless tools, and other telecommunication technology forms.

Balestra (2017) concluded that telemedicine uses electronic information and telecommunications to support and promote long-distance clinical health care, patient and professional health-related education, public health, and health administration. Likewise, Karia (2016) described telemedicine as a necessity and a viable option in healthcare

delivery services (HCS). According to the author, telemedicine can enrich the nation's internet communication standards. Powell et al. (2017) expanded on the merits of telemedicine in their definition, revealing that telemedicine facilitates telecommunication platforms designed to enhance patient-centered health care. The authors indicated that telemedicine offers convenience, including increased care accessibility, decreased transportation barriers, and patient empowerment. In their definition, Young and Badowski emphasized the synchronous and asynchronous opportunities of using telemedicine for care. According to the authors, treating and safely storing patients' information are significant care delivery strategies. Skibinski (2017) defined telemedicine as an opportunity to deliver quality care when patients need it most. According to the author, by expanding practices to include telemedicine care, healthcare providers could provide more timely and convenient care for patients. The primary reason telemedicine is used to deliver care is the need to achieve genuine satisfaction and improve treatment outcomes.

Patient's Age and Telemedicine Usage

Telemedicine usage has never been more relevant due to the public health challenges caused by the Covid-19 pandemic. According to Anthony (2020), the virus has discouraged face-to-face hospital activities, including consultations, laboratory treatments, and many other hospital engagements. Covid-19 has caused significant strain on medical centers' resources. The concern about the spread and management of the virus is on the rise because there is a need to provide diagnosis, treatment monitoring, and follow-ups during the pandemic. As telemedicine is being introduced and re-introduced

to patients and health care practitioners, there is a need to consider users' age to facilitate appropriate telemedicine tools suitable for each age group (Anthony, 2020).

Choi et al. (2022) in their study on telehealth use among older adults pointed out that for older adults with underlying health problems telemedicine is a safe and viable option for obtaining care. According to these scholars, older adults and their health providers have reported high satisfaction with telemedicine as a means of accessing care while staying safe, especially those with limited mobility who were highly receptive to and satisfied with telemedicine for its in-person-like interactions and convenience (Choi et al., 2022). Indeed, the elderly have become one of the predominant demographics targeted for telemedicine care as telemedicine has the capability to connect the elderly with healthcare professionals, emergency services, and family members across long distances without the need for in-person, face-to-face interactions (Elbaz et al., 2021). Additionally, older adults showed comfort when using this technology and were willing to use telemedicine for their care if they recognized the benefits (Elbaz et al., 2021).

In a study on the barriers to telemedicine video visits for older adults in independent living facilities, Mao et al. (2022) found that once older adults have successfully completed a telemedicine visit, they are more willing to continue using telemedicine as part of their care. Mao et al.'s survey showed that 53% of the 249 participants surveyed were comfortable with telemedicine usage. Additionally, a national poll for healthy aging conducted by the University of Michigan (2020) revealed that older adults have experienced a rapid increase in telemedicine visits, with availability, use, and interest all increasing substantially over a year, along with personal use of and comfort

with telemedicine usage. For instance, the percentage of older adults participating in telemedicine visits rose sharply from 4% in May 2019 to 30% in June 2020 (University of Michigan, 2020). Similarly, the proportion of older adults who said they were comfortable using telemedicine rose from 53% in May 2019 to 64% in June 2020 (University of Michigan, 2020).

In a study on facilitating telehealth for older adults during the Covid-19 pandemic and beyond, Tan et al. (2020) found that a larger proportion of older adults have accepted telemedicine compared to younger adults seen by healthcare providers during the Covid-19 pandemic. This demonstrates the appetite for more widespread use of telemedicine services among older adults (Tan et al., 2020). While telemedicine services were developed and available before the Covid-19 pandemic, the fears and public health impact of the pandemic have led to the increased uptake of telemedicine services among older adults. Tan et al. concluded that older adults are likely to continue to benefit from telemedicine because of its convenience and the increased access to care it facilitates for those with limited mobility.

However, Frydman et al. (2021) cautioned that many older adults, including those with serious illnesses, will require support to navigate telemedicine technology due to visual, auditory, or cognitive impairments. Individualized approaches, including in-home technical assistance and easy-to-use video applications, may help overcome some of these barriers when using telemedicine. Similarly, Quinn et al. (2018) argued that telemedicine technology should be designed to be user-friendly, especially for older adults and the elderly.

Telemedicine and Patient Care

The adoption of telemedicine to provide consultations, treatments, and follow-up is not a replacement for the traditional care delivery method; rather, it should be a sign of growth, innovation, and development in the health sector. In addition, telemedicine usage is a response to the call for healthcare professionals to be more creative and proactive in delivering care so that healthcare consumers can enjoy better care outcomes. According to Dario et al. (2016), the adoption of telemedicine to provide care should not be seen as a replacement for face-to-face care but as a viable addition to regular care options. Alvandi (2017), in a study, that focused on the benefits of delivering care via telemedicine, indicated that the technology supports efforts to significantly improve healthcare quality by increasing accessibility and efficiency, providing clinical support, overcoming geographic barriers, offering various communication devices, and improving patient outcomes. Skibinski (2017) mentioned the opportunity for the timely care and flexibility of treatments telemedicine provides. In the study, which focused on the benefits of using telemedicine, the author revealed that telemedicine is built around delivering quality care in the most convenient, effective, and affordable way and offering better access and convenience to medical services.

Garcia et al. (2017) focused on the cost of telemedicine care. The scholars stated that the quality of care from telemedicine compares favorably with other care delivery methods. The study concluded that the comparison of the quality of care in this respect is the extent to which patients are satisfied with telemedicine in contrast with other forms of medical care, including face-to-face care. Langbecker et al. (2017) carried out a survey

about patient-level constructs used to assess patients' perspectives or experiences resulting from receiving care via telemedicine. The study showed that patient-level constructs might measure process outcomes, including how care was delivered and the outcome of care from using telemedicine. The authors suggested that when telemedicine and face-to-face consultations are used for an episode of care, the outcome may not be attributed to one form of consultation.

In their study centered on telemedicine usage, Duffy and Lee (2018) asked a question on the viability of telemedicine becoming the sole method of providing care to patients. The authors asked, "What if health care were designed so that in-person visits were the second, third, or even last option for meeting routine patient needs rather than the first?" According to the authors, face-to-face interactions will always have a central role in health care delivery, as many patients prefer to see their providers in person. Rosenberg (2017) also wrote on the benefits of telemedicine and the need to prioritize its three components— quality, cost, and outcome. The author stated that for many years, stakeholders in the US health care system desired that patients consistently receive quality care at an affordable cost. Kruse et al. (2017) had a similar study centered on telemedicine's patient experience and engagement. According to these scholars, telemedicine relies on patient satisfaction because patients are the only source of information that can report how they were treated and if the treatment received met their expectations. According to these authors, if patients are not happy with the care provided remotely, the service becomes redundant and expensive. Cruz et al. (2017) focused their study on the appropriate use of telemedicine technology for patients' care. They pointed

out that the challenge is knowing the method of telemedicine that is most suitable for patients' experience and appropriate for their care at any given time. According to their study, the broad reflection of telemedicine is to promote quality patient care and experience using the appropriate method of care delivery.

Videoconference, a significant part of telemedicine, offers users tremendous opportunities because of its audio-visual capabilities. In a study conducted to understand patients' perception of telemedicine, Powell et al. (2017) singled out videoconference, pointing out that patients reported treatment satisfaction with video visits. Many of the patients were interested in using video visits as an alternative to in-person visits. Patient satisfaction is an important measure of patient's willingness and comfort to use telemedicine across age groups (Serrano et al., 2018).

Waard et al. (2018) conducted a study like Serrano et al.'s (2018) findings on the importance of using video visits to stimulate patient satisfaction, especially considering the comfort and willingness of patients to use telemedicine for their care. The authors revealed that the audio-visual capacity of videoconference is an essential part of the patient's experience in using telemedicine for their care. Furthermore, the authors concluded that the patient-provider relationship could stimulate a more positive perception of telemedicine usage. The patient-provider relationship related to the comfort and willingness of patients to use telemedicine for their care is expounded below.

Patient-Provider Perspectives of Telemedicine

The successful use of telemedicine would depend, among other factors, on the patient-provider relationship. The patient-provider relationship can help create a more

positive use of telemedicine, encouraging the willingness to use the technology. (Ekeland et al., 2016). In their study, Garcia and Adelakun (2017) focused on stakeholders' perceptions of the use of telemedicine. According to these scholars, patients may view telemedicine favorably based on the care received. However, providers may have other concerns, such as the unavailability of internet facilities and patients' inability to navigate the technology. The importance of provider satisfaction with telemedicine is premised on the perception that telemedicine helps healthcare providers reduce costs while increasing care quality and patient outcomes (Hajar et al., 2018). If providers do not feel satisfied with the process, they are less comfortable using telemedicine to diagnose and treat their patients. Hence, provider satisfaction is an essential ingredient in the continuum of care via telemedicine (Rosenberg, 2017).

Researchers have also shown that patients' satisfaction with telemedicine may not reflect the overall patient experience and outcome in delivering care when considering patients' comfort and willingness to use telemedicine. In a qualitative study, Gibson et al. (2015) aimed to explore patient and provider views on the experiences of using a stroke telemedicine system to contribute to the development of reliable and acceptable telemedicine system and training for healthcare personnel. The researchers noted that although many participants accepted telemedicine usage, its use added a layer of complexity to the acute stroke consultation. They also found that using telemedicine was more challenging than face-to-face consultation due to navigating the remote assessor via a video link. Many patients were not familiar with this experience of receiving care. The authors further revealed their findings in a question and answer (Q/A) format using

specific questions about telemedicine operations to draw patient experiences. The

questions and answers are reflected below in Table 1.

Table 1

Patients' Understanding of Telemedicine

Patient Concerns	Questions	Answers
Staff presence	Can you remember how many and what staff were involved in the consultation?	The nurse with me, I think she was a little bit out of practice or something. So, she was a bit unsure.
Collective action	Can you remember who explained it to you and what they said?	No, I was wheeled to another bay, and there was this television with…probably a camera or something on the top, which looked like a big torpedo. They just wheeled it in front of me, and then they told me that they were doing a link with their (consultant). That was the end of that.
Technical and audio-visual issues	Were there any problems with the machine at the time, or did it all go smoothly?	The device wasn't working correctly—the video link wasn't coming on—it came up, but it was not properly working.
Reflexive monitoring	What do you think are the pros and cons of using a system like that?	All they could do was wait for the scan to be taken…he said, we have to wait for a porter, so it was a little bit frustrating.
Emotional reaction	Can you tell me about your experience with the telemedicine system?	It was slightly detached because you are not talking to somebody; it was unusual.
Impression of TM	Did you like having consultations this way? Would you use it again? Do you have any reservations about this way of working in health care?	I think face-to-face if there's any question must be easier. It'd be alright for mild stroke, but I don't know how you'd go on it if it were something serious.

Welch et al. (2017) reflected on the importance of the patient-provider relationship to a successful telemedicine experience. The scholars conducted a nationwide survey of 4,345 respondents demographically balanced to represent the United States adult population. The survey consisted of questions assessing respondents' comfortability and willingness to use videoconference and the importance of providers facilitating care via such a process. The study showed that relatively few patients knew whether their provider offered telemedicine, and twice as many respondents felt it was not essential for their care provider to offer telemedicine. Prabhu et al. (2017) conducted a satisfaction survey of patients discharged from the general surgery service at an academic university, showing that patient satisfaction requires more than care outcome. A total of 757 satisfaction surveys were completed and 91.5% of survey respondents rated satisfaction as all-encompassing care delivery from admission to the hospital to post discharge follow-up, while 95% said they would recommend the service method. The authors concluded that patient satisfaction scores had not been consistently correlated with the comfort and willingness to use the telemedicine technology. Serrano et al. (2018) had similar findings that patient satisfaction with telemedicine should reflect every aspect of patients' engagements before and after the treatments. They focused on a systematic review of the impact of medical informatics on telemedicine usage and found that although some studies reported improved telemedicine usage to facilitate patient satisfaction, results were inconsistent across the studies reviewed. They found that preusage expectation and willingness positively predicted patient satisfaction with telemedicine *(p ≤.001)*. Serrano et al. (2018) concluded that it is difficult to synthesize

findings across studies on patient satisfaction and build on existing research in this domain (Serrano et al., 2018).

Garcia et al. (2017) pointed out that there is often little consistency in the methods used to evaluate telemedicine satisfaction and the aspects of the satisfaction being explored. According to them, patient satisfaction may be high in some parts of care delivery and low in others. The type of telemedicine technology being used to deliver care may also impact whether patients will be comfortable and willing to use telemedicine for their care. Powell et al. (2017) conducted focused on patients' experiences using videoconference. The authors concluded that videoconference elicits positive reviews from patients. They reported that most participants had a positive experience with video visits, citing the convenience of not traveling or changing attire before consultations. One patient had this to say:

> You're sitting right in your room on your computer. How much more convenient can that be? And you don't even have to take a shower. I mean, you can get on the computer, talk to the doctor, go back to bed.

Several factors are to be considered when appraising patient satisfaction driven by the quality of care patients receive and the method of delivery. Patients' preferences and use of telemedicine may yield different results in real situations, especially considering age, comfort, and willingness to use telemedicine. ALDossary et al. (2017), in their study on the factors that drive patient satisfaction, revealed the factors that could measure patient satisfaction, including the age of the user, comfort of use, and the willingness to use telemedicine.

Waard et al. (2018) introduced a different perspective reflecting on the patient-provider relationship in their study. They pointed out that having a patient-provider relationship may not necessarily stimulate patient satisfaction without considering other important factors like the patient's age, comfort, and willingness to use telemedicine. They stated that patient satisfaction is relative to individual patient experience and may be difficult to measure. Quinn et al. (2018) had a similar conclusion in their study centered on telemedicine acceptance and adherence considering the users' age. The study revealed that technology had shown effectiveness in improving self-care skills, improving self-monitoring behaviors, and improving clinical outcomes among older adults with chronic conditions in different settings. According to the authors, the patient's age must be considered when using telemedicine technology. Hajar et al. (2018) had a related conclusion from their study to Quinn et al., concluding that rural providers are still not leveraging the gains from the technology. They suggested that telemedicine usage should be all-inclusive and that patients in rural locations should use the technology without inhibitions.

Even though there are benefits generated by telemedicine care, patients' willingness and comfort with telemedicine may vary because of underlined factors such as age (independent variable), comfort, and willingness to use (dependent variables). Eisenberg et al.'s (2018) study revealed the difficulty of synthesizing patient satisfaction across studies because only a few satisfaction surveys used standardized measures. There is no doubt that in years to come, the technology will keep evolving, and more patients

and providers will embrace the use of telemedicine to create better access to care and enhanced quality health outcomes.

Telemedicine During and Post Covid

This study was started shortly before the 2020 covid-19 pandemic, which has claimed over 6.2 million lives globally and over a million lives in the United States. The outbreak of the Covid-19 pandemic in early 2020 transformed telemedicine services into a necessary care delivery option to curb the spread of the virus. Telemedicine has become a primary care delivery option for the general population, healthcare providers, and patients with Covid-19, especially during the lockdown of people and businesses, providing care for people in real-time (Monaghesh & Hajizadeh, 2020). Even though telemedicine was on the rise before the Covid-19 outbreak, demand for its use was higher during the pandemic. According to Greiwe (2022), Prior to the Covid 19 pandemic, telemedicine access and utilization in the USA were on the rise. Since that time, however, the rise of telemedicine has undergone explosive growth, and investments are poised to change how healthcare is delivered now and, in the future (Greiwe, 2022).

Drake et al. (2022) view on the need to sustain telemedicine usage during the pandemic aligned with Griewe's (2022) position on the rise in the use of telemedicine. According to Drake et al., the growing demand for remote services and coverage was widely expanded with substantial changes in policy at both the state and federal levels. With improving reimbursements from insurers and the loosening of HIPAA requirements, telemedicine has gained mainstream acceptance in a very short time. In addition, the federal government eased many requirements for telemedicine usage in the

Medicare program allowing payees from any geographical location to access services from their homes. The writers further revealed that the efforts of the federal government to curb the spread of the Covid-19 pandemic were complemented by the state governments by expanding Medicaid access to telemedicine services while relaxing state-level restrictions around provider licensing, online prescribing, and written consent (Drake et al., 2022). Incentivizing telemedicine by the government, as reflected above, encouraged the use of telemedicine, and made the process attractive for patients. Qian et al. (2022) revealed that in response to the Covid-19 pandemic, the centers for Medicare and Medicaid Services (CMS) dramatically loosened regulations surrounding telemedicine use. In less than a year, the Covid-19 pandemic has made a lasting transformational mark on American healthcare systems, including the rapid expansion of telemedicine to deliver routine outpatient care (Qian et al., 2021).

During the outbreak of the Covid-19 pandemic, the need to facilitate access to care without the opportunity of spreading the virus was critically important to control the spread of the disease. To achieve this goal, telemedicine was rapidly expanded and incorporated into the day-to-day practice by primary care providers to allow for continued patient care access during this time. The quick adoption of telemedicine occurred because of the social distancing policy and the lockdown of people and businesses by the government (Vosburgh & Robinson, 2022). While the government was determined to control the spread of the Covid-19 virus by issuing different Covid-19 preventive guidelines, existing regulations that could hinder telemedicine use were either suspended or changed. According to Greiwe (2022), these changes enabled stakeholders

across the United States to rapidly implement telemedicine workflows. The use of telemedicine during the Covid-19 outbreak has clear advantages by reducing the risk of exposure to vulnerable patients and protecting the healthcare workforce (Qian et al., 2022).

Many people responded to the government's lockdown and other restrictions by embracing telemedicine usage for their care. Busso et al. (2022) recalled that telemedicine-related calls increased by 230% compared to the pre-Covid-19 pandemic outbreak. Also, the number of first-time callers grew by 198%. Resolved consultations increased by 235%, and calls referred to specialists increased by 190%. Telemedicine calls resulting in prescriptions more than tripled by 332%. These increases were primarily driven by older patients with pre-existing health conditions who used telemedicine for internal medicine consultations (Busso et al., 2022).

In a similar development, Wilhite et al. (2022) revealed that New York's public health system rapidly converted face-to-face hospital visits to telemedicine visits. According to the writers, the transition pushed the system from an average of 500 telemedicine visits in the month before Covid-19 to 57,000 telemedicine visits in the first three weeks of the state of emergency and ultimately to almost 1.3 million telemedicine visits. The situation was the same at the New York University Langone Health, with an 80% decrease in the number of in-person visits in the same period. Telemedicine urgent care rose from 82 to 1,336 visits during the same period (Wilhite et al., 2022).

Many of the patients and providers that adopted telemedicine to either receive or provide care during the Covid-19 outbreak expressed the willingness to continue to use

the telemedicine technology to receive care. Patients and providers reported high satisfaction with telemedicine visits in a primary care setting. Providers felt telemedicine visits usually take the same amount or less time as in-person visits. Both providers and patients reported a desire to see telemedicine visits continue after the pandemic (Visburg & Robinson, 2022). Busso et al. (2022) also revealed that patients who used telemedicine during the Covid-19 pandemic were overwhelmingly positive about their experience, reporting high quality of care and satisfaction (Busso et al. 2022). Wilhite et al. (2022) wrote that providers recognized the value of using telemedicine to deliver care during the Covid-19 pandemic "I really see the value of using telemedicine. I was able to care for the sick patients in the confines of their homes regularly" (Wilhite et al., 2022).

The post-Covid-19 pandemic era holds different opportunities for telemedicine technology. Even though the current use of telemedicine may not be at the level of usage during the Covid-19 outbreak, the demand for telemedicine did not decline sharply when restrictions were lifted (Busso et al., 2022). Qian et al. (2022) also revealed that the extent telemedicine would be used in the future will inherently depend on several factors, including federal and state health policy changes and the stability of reimbursement rates. Research prior to the Covid-19 outbreak demonstrated efficacy and safety with telemedicine across a range of specialties, and studies during the virus outbreak reflected the ability of telemedicine to deliver high-quality care (Qian et al., 2022). The post-Covid-19 use of telemedicine to receive care may not be at the level of usage during the pandemic but more people have certainly been exposed to telemedicine technology now than ever before the Covid-19 outbreak (Drake et al., 2022).

Literature Review Summary

The use of telemedicine technology to facilitate care delivery across the health care system is an innovative strategy. Telemedicine usage reflects growth and innovation in the healthcare sector and holds a great propensity to advance medical breakthroughs. There have been different motivations for adopting the technology before the current usage. The many definitions of telemedicine technology reflect the diversity of its users and the importance of this care delivery method. The adoption and acceptance of telemedicine demonstrate the user's age, especially considering their comfort and willingness to use the technology for their care. The significance of using telemedicine for care delivery is reflected in the reduced cost of care, faster access to care, the building of positive patient-physician relationships, and improved care outcomes.

Definition of Key Terms

The following key terms used in the study provide clarifications and context relating to the study:

*Age***:** This is an important variable in the study that shows the demographics of telemedicine users across age groups. Age is an important consideration in determining whether patients are comfortable and willing to use telemedicine for their care, as reflected in the study (American Well, 2019).

*Comfortability***:** This variable shows whether patients are comfortable using telemedicine, as reflected in the study (Welch et al., 2017).

*High patient satisfaction***:** The extent to which the patient's general health care needs are met to their expectations, especially using telemedicine (Sharma et al., 2014).

Patient satisfaction: Meeting expectations over the care patients receive from their providers as reflected in this study with the use of telemedicine (Dandachi et al., 2019). The study presents patient satisfaction relating to different age groups using telemedicine services.

Synchronous: Real-time communication between patient and provider, especially face-to-face consultation and treatments (Karia, 2016). The study presents different perspectives and preferences from the patients, especially knowing that telemedicine provides alternative care opportunities.

*Socioeconomic status***:** This is the social standing or class of an individual. The study shows that socioeconomic status is an essential factor to be considered when considering telemedicine usage because of the cost of the equipment associated with the use and the need for users to have a decent knowledge of the technology (Apa, 2019).

Telemedicine: The practice of medicine using electronic communications services to connect a clinician in one location with a patient in another area. Telemedicine provides patients with greater access to care and creates room for them to receive care wherever they may be, as reflected in this study (Whitten & Love, 2015).

Videoconference: facilitates communication over long distances while viewing and hearing each other. Patients generally want to see their care provider when they are engaged with telemedicine. The study shows that videoconference facilitates this opportunity (Hanna et al., 2016).

Willingness: State of readiness to take action or do something. This variable is reflected in the study to show how willing or otherwise patients want to use telemedicine for their care (Liu and Li, 2017).

Assumptions

Assumptions relate to statements and facts that are understood to be true but cannot be proven, and there were some assumptions associated with this study. The first assumption is that the secondary data that was used in this study is correct and that the participants understood the research questions. Another assumption concerned whether the participants were familiar with telemedicine technology and answered the questions accurately.

Scope and Delimitation

The scope of this study examined whether the patient's age, young adults (18- 29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), affect their comfort and willingness to use telemedicine services. The willingness and comfort to use telemedicine may vary due to the patient's age. However, the study did not consider whether patients under 18 years old would be comfortable and willing to use telemedicine for their care. The study identifies three variables that can measure patients' use of telemedicine, including independent variable— age and dependent variables, comfortability, and willingness to use telemedicine.

Summary

The adoption of telemedicine technology is an evolving care strategy. The quest for quality improvement in care delivery is a desirable goal. This study revealed a critical

part of the conversation on the importance of telemedicine technology for the delivery of care, especially considering the user's age. Every quality improvement strategy, especially in the health care system, is driven by the desire for optimal satisfaction. This desire for quality care delivery to patients was expressed in the comfort and willingness to use telemedicine across the patients' age. These variables, as shown in this study, reflected the gap in the literature whether the patient's age, young adults (18- 29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), affect their comfort and willingness to use telemedicine for their care. In section 2, the research design and description of the data analysis will expand on the purpose of this study to answer the research questions.

Section 2: Research Design and Data Collection

This section of the study presented the research design, data analysis, and methodology relating to the study. Attention was focused on the data set relating to patients' comfortability and willingness to use telemedicine by the different demographics. The HBM, which is framed on individual perceptions of their health behavior, was the theoretical framework of the study. The HBM emphasized that patients' comfort and willingness to change their health behavior were driven by their perception of the health situation. These perceptions can be measured from six dimensions: perceived susceptibility, severity, benefits, barriers, cue-to-action, and self-efficacy. These perceptions were used to determine the comfort and willingness to use telemedicine by the different age groups.

Telemedicine is a healthcare delivery strategy used to deliver healthcare services to patients wherever they are located, irrespective of age. The patients' age is an important consideration when using the HBM because the perception of susceptibility and seriousness of health conditions is sometimes related to a patient's age. A patient's perception of telemedicine is a key driver to whether a change in health behavior to embrace telemedicine will occur or not (Boskey, 2020). This study examined whether the patients' age, young adults (18- 29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), affect their comfort and willingness to use telemedicine for their care.

Research Design and Rationale

This study used the quantitative research design. The choice of this research

design was driven by the data set and the research questions, which were whether the age

of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years),

elderly (60+ years), affect the willingness to use telemedicine services and whether the

age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59

years), and elderly (60+ years) affect the comfort to use telemedicine services. As more

patients adopt telemedicine for their care, the comfort and willingness to use telemedicine

will continue to be important variables.

Secondary Data

The secondary data set that was used in this study was obtained directly from the

researchers who collected the dataset. This study used the raw data collected and related to

telemedicine. Email messages requesting the use of the data were sent to the researchers.

After assurances that the data set would only be used for academic purposes, the

researchers granted the request to use the data, and a link to the data was sent. However,

the researchers requested adequate credit for using the data, and their study was cited in

the literature review and references. The data reflected a nationwide survey of 4345

respondents demographically balanced to represent the United States adult population.

The original researchers recruited participants from SurveyMonkey Audience. Weighted

random sampling was conducted within the SurveyMonkey Audience participant pool so

that the sample would correlate to the general United States population in terms of

gender, race, and education. The survey consisted of questions assessing the respondents'

attributes and their comfortability and willingness to use telemedicine, as well as the importance of providing care through telemedicine (Welch et al., 2017).

Methodology

The study's methodology was based on a nationwide survey of 4,345 respondents demographically balanced to represent the United States adult population. The original researchers used weighted random sampling within the SurveyMonkey Audience participant pool so that the sample would correlate to the general United States population in terms of gender, race, and education. This quantitative study used the Kruskal-Wallis H test from the SPSS. The Kruskal-Wallis-H test, classified as a one-way ANOVA on ranks, was used for the statistical analysis. The Kruskal-Wallis-H test, a nonparametric test, is used when there is one independent variable with several levels. In addition, there were two research questions to analyze the data. For both research questions, the population was separated into age groups—young adults, adults, older adults, and the elderly to determine if the age of patients affects their willingness and comfortability to use telemedicine for their care. Also, two separate Kruskal-Wallis H tests were used to examine if the age of patients statistically affects the comfort and the willingness to use telemedicine services.

Population

The target population reflected a nationwide survey of 4,345 respondents' adults ages ≥ 18 years, demographically balanced to represent the United States adult population reflecting such age groups of young adults (18-29 years), adults (30-44 years), older adults (45- 59 years), and elderly (60+ years). The survey consisted of questions about whether

the respondents were comfortable and willing to use telemedicine and the importance of providing care via telemedicine (Welch et al., 2017).

Sampling and Sampling Procedure

The target population of the original study included adults in the United States who were members of the SurveyMonkey Audience participant pool. The original researchers recruited participants from SurveyMonkey Audience and used weighted random sampling within the SurveyMonkey Audience participant pool so that the sample would correlate to the general United States population in terms of gender, race, and education**.**

A power analysis was conducted using G*Power 3.1.9.7 (Faul et al., 2020) to determine the minimum number of participants needed to answer the research questions. The data analysis used was a Kruskal-Wallis-H test, a nonparametric alternative to a one-way analysis of variance (ANOVA). As G*Power did not directly calculate the Kruskal-Wallis-H test, the calculation was performed for a one-way ANOVA with four groups. A medium effect size ($f = 0.25$), an alpha level of .05, and a power level of .80 were selected based on Perugini et al.'s (2018) recommendations. This power analysis showed that the minimum number of participants needed for the ANOVA is 180. Statistics scholars have suggested that non-parametric tests generally should not require more than 15% additional participants than the corresponding parametric tests (Gilbert, 2019). The G*Power calculation was increased by 15% to account for using the nonparametric test. The minimum sample size needed after this adjustment was 207.

Instrumentation

Welch et al. (2017) developed the survey instrument used to collect the data that was used in this study. The original authors reported that the survey questions were developed from prior surveys used in health services research and consumer use of telemedicine. The questions were submitted to a panel of approximately ten telehealth and health policy experts who provided feedback on the questions' clarity, logic, and appropriateness. The questions asked about the willingness and comfortability of using telemedicine in each of the following scenarios: with their current primary care provider, with a different provider from the same healthcare organization as a primary care provider, and with a different provider from a different healthcare organization. Participants responded using a 5-point Likert scale ranging from very unwilling/uncomfortable to very willing/comfortable.

Operationalization of Constructs

Table 2 identified the operationalization of the variables and their measurements. Age as an independent variable with an ordinal level of measurement and was recorded as 1 for ages 18- 29 years, 2 for ages 30-44 years, 3 for ages 45-59 years, and 4 for ages 60+ years. Willingness was operationalized by the question that asked how willing participants would be to have an online video visit with their provider. Willingness is a dependent variable with an ordinal level of measurement and was recorded as 1 for "Very Unwilling," 2 for "Unwilling," 3 for "Neutral," 4 for "Willing," and 5 for "Very Willing." Comfortability was operationalized by the question that asked how comfortable participants would be with having an online video visit with their provider.

Comfortability as a dependent variable with an ordinal level of measurement was

recorded as 1 for "Very Uncomfortable," 2 for "Uncomfortable," 3 for "Neutral," 4 for

"Comfortable," and 5 for "Very Comfortable."

Table 2

Operationalization of Variables Using the Secondary Data Set

Variable	Operational definition	Level of measurement	Scoring
Willingness	If you were not feeling well (but it did not seem like an emergency) and had the option to meet with a provider using online video instead of traveling to a clinic, how WILLING would you be to have an online video visit with MY provider.	Ordinal/dependent variable	1-Very Unwilling 2-Unwilling 3-Neutral 4-Willing 5-Very Willing
Comfortability	If you were not feeling well (but it did not seem like an emergency) and had the option to meet with a provider using online video instead of traveling to a clinic, how COMFORTABLE would you be to have an online video visit with MY provider	Ordinal/dependent variable	1-Very Uncomfortable 2-Uncomfortable 3-Neutral 4-Comfortable 5-Very Comfortable
Age	Demographics of research Participants in groups: young adults 18-29 years, adults 30-44 years older adults 45-59 years elderly 60+ years.	Ordinal/ Independent variable	1- young adults 18-29 2- adults 30-44 3- older adults 45-59 4- elderly 60+

Data Analysis Plan

The data analysis plan included the SPSS version 28 for statistical analysis. Before the analysis, all survey responses were screened for missing data. Once all data were screened, the ordinal dependent and independent variables were assigned a point-scale value for the analysis in SPSS. The Kruskal-Wallis H test was selected because four age groups (18-29 years), (30-44 years), (45-59 years), and (60+ years) were compared on the ordinal dependent variables of willingness and comfortability. The statistical tests that were used to test the hypothesis were based on the type of variables that were being analyzed. The Kruskal-Wallis-H test, classified as a One-Way-ANOVA on ranks, was used for the statistical analysis.

The Kruskal-Wallis-H test, a non-parametric test, can be used to determine if there is a statistically significant relationship between two or more groups (18-29 years), (30-44 years), (45-59 years), and (60+ years) of an independent variable age, on an ordinal dependent variable. SPSS was used to perform the Kruskal-Willis H test for research question 1 to determine if there was a statistically significant relationship between the ordinal dependent variable patient's willingness to use telemedicine services, given that the independent ordinal variable was age groups. Also, SPSS was used to perform another Kruskal-Wallis H test for research question 2 to determine if there was a statistically significant relationship between the ordinal dependent variable patient's comfortability to use telemedicine services, given that the independent ordinal variable was age groups.

The assumptions that one dependent variable was measured at the ordinal or continuous level of measurements and that the independent variable should consist of two

or more categorical independent groups were met. These two assumptions were met because the dependent variables were ordinal, and the independent variable consists of four groups. An additional assumption was that all groups share the same distribution shape, which was tested by examining histograms.

Research Questions

Research Question 1: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), and the willingness to use telemedicine services?

$H_0 1$: There is no statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the willingness to use telemedicine services.

$H_a 1$: There is a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the willingness to use telemedicine services.

Research Question 2: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfort to use telemedicine services?

$H_0 2$: There is no statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfort to use telemedicine services.

$H_a 2$: There is a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly

(60+ years), and the comfort to use telemedicine services.

Threat to Validity

Threats to external validity that may affect the generalizability of this study include response bias and specificity of variables. Response bias may be a threat to the external validity of this study because the secondary data were collected from members of the SurveyMonkey Audience participant pool. There may be unmeasured differences between people who choose to participate in SurveyMonkey Audience and the general adult population of the United States that may affect the study results. However, to mitigate this threat, the original researchers used weighted random sampling within the SurveyMonkey Audience participant pool so that the sample would reflect the general United States population in terms of gender, race, and education. Another potential threat to external validity was the specificity of variables. The survey questions used to measure willingness and comfortability may not produce the same results as other instruments that could have been used to measure these variables. However, the survey questions were validated by a panel of telehealth and health policy experts who provided feedback on the questions' clarity, logic, and appropriateness.

Potential threats to the internal validity of this study include expectancy or social desirability biases in participants' responses. The participants may have answered the questions about willingness and comfortability to reflect the feelings they believe the researchers wanted them to express rather than their honest feelings on the subject. However, the anonymous nature of the survey may have increased the likelihood of participants providing honest responses.

Ethical Procedures

The raw data for this study were obtained with the authors' permission through written communication. The data was based on a study related to telemedicine, and the raw data was independently sorted for this study's purposes. The approvals for the data were shared with Walden's IRB. The authors provided and de-identified the data, which was used to analyze the variables after Walden's IRB committee approved this study. No further approval concerning the use of the data was needed from the authors who collected the data. The research topic of patient satisfaction related to telemedicine did not require patient identification for a successful analysis. The data set was downloaded and stored on my private computer with a password to be safeguarded. Once the proposal was approved, Forms A and B were completed and forwarded to Walden's IRB committee.

Summary

In this section, the overview of the quantitative research design and the methodology used were discussed. This quantitative study involved the analysis of a secondary dataset to determine if age has a significant relationship with the willingness and comfort to use telemedicine services. The secondary dataset included data from a sample of adults in the United States who were recruited using SurveyMonkey Audience and asked questions about their level of willingness and comfort in using telemedicine. The data was analyzed using Kruskal-Wallis-H tests to determine if there was a relationship between the age groups willing and comfortable to use telemedicine. In the introduction, the importance of telemedicine was highlighted. The significance of the patient's age concerning the use of telemedicine services was discussed in the literature

review. The ingredients that drive individual health behavior using the HBM as an

instrument in the perception of health behavior change relating to the study were

examined. The data analysis results are discussed in Section 3, consisting of the results and

findings.

Section 3: Presentation of the Results and Findings

This section contains the results of the statistical analyses conducted on the secondary dataset originally collected by Welch et al. (2017). Kruskal-Wallis H tests were performed to answer the research questions. Information about the data collection and characteristics of the sample are provided in this section. A summary and discussion of the results are also included in this section.

This quantitative study aims to determine whether the patient's age affects their comfort and willingness to use telemedicine services. The HBM, developed in the 1950s by psychologists and updated in the 1980s, serves as the theoretical framework for this study (Boskey, 2020; Jones et al., 2016). The dependent variables in this study were willingness and comfortability in using telemedicine services. The independent variable was age. The research questions and hypotheses tested in this study are as follows:

Research Question 1: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), and the willingness to use telemedicine services?

$H_0 1$: There is no statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the willingness to use telemedicine services.

$H_a 1$: There is a statistically significant relationship between the age of patients, youngadults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the willingness to use telemedicine services.

RQ 2: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfortability to use telemedicine services?

$H_0$2: There is no statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfortability to use telemedicine services.

*H*a2: There is a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years), and the comfortability to use telemedicine services.

Data Collection Process

The secondary data used in this study was originally collected by Welch et al. (2017) using SurveyMonkey Audience. The data consist of responses to a nationwide survey demographically balanced to represent the United States adult population. Email messages requesting the use of the secondary data were sent to the researchers. The researchers granted the request to use the data, and a link to the data was sent. The data was downloaded as an electronic spreadsheet file and imported into SPSS version 28. The dataset contained 4345 cases. Responses were screened for missing values on the variables of interest (i.e., willingness, comfortability, and age). Out of the total number of cases, 207 respondents had missing data for one or more of the variables; these cases were removed from the data, resulting in a final sample size of 4138 respondents.

Descriptive Data

The sample was approximately evenly distributed comprising of women ($n =$ 2170, 52%) and men ($n =$ 1968, 48%). Additionally, there was almost an even representation in the four age groups of the sample of interest. Young adults (18-29 years) made up 21.8% of the sample ($n =$ 901), adults (30-44 years) made up 25.6% of the sample ($n =$ 1060), older adults (45-59 years) made up 26.6% of the sample ($n =$ 1100), and elderly individuals (60+ years) made up the remaining 26.0% of the sample ($n =$ 1077).

Table 3 displays the frequencies of the responses to the questions about participants' willingness and comfortability to use telemedicine services with their current providers. Approximately 56% of the participants were either willing or very willing to use telemedicine services with their current providers, whereas 23% were either unwilling or very unwilling. Similarly, 58% of the participants were either comfortable or very comfortable with using telemedicine services with their current providers, whereas 22% were either uncomfortable or very uncomfortable.

Table 3

Frequencies and Percentages for Age and Willingness and Comfortability to Use Telemedicine Services (N = 4138)

Variable	Frequency	Percent
Age		
Young adults (18-29 years)	901	21.8
Adults (30-44 years)	1060	25.6
Older adults (45-59 years)	1100	26.6
Elderly (60+ years)	1077	26.0
Willingness		
Very Unwilling	490	11.8
Unwilling	475	11.5
Neutral	845	20.4
Willing	1304	31.5
Very Willing	1024	24.7
Comfortability		
Very Uncomfortable	475	11.5
Uncomfortable	439	10.6
Neutral	808	19.5
Comfortable	1360	32.9
Very Comfortable	1056	25.5

Assumptions and Statistical Analysis

Kruskal-Wallis H test

The Kruskal-Wallis H test was selected to answer the research questions. The dependent variables in this study are willingness and comfortability to use telemedicine services. Each dependent variable was measured using an ordinal 5-point Likert scale ranging from 1 (*very unwilling/uncomfortable*) to 5 (*very willing/comfortable*). The independent variable, age, was measured as an ordinal variable with four groups: (18-29 years), (30-44 years), (45-59 years), and (60+ years). The Kruskal-Wallis-H test is a non-parametric alternative to the one-way analysis of variance (ANOVA) that is appropriate

when comparing values of an ordinal dependent variable across two or more groups of an independent variable. A separate Kruskal-Wallis H test was performed for each research question. Each test was evaluated for statistical significance using an alpha level of .05.

The Kruskal-Wallis H test requires that the dependent variable be measured at the ordinal or continuous level of measurement. The independent variable consists of two or more categorical independent groups. These two assumptions were met because the dependent variables were ordinal, and the independent variable consisted of four groups. Another assumption of the Kruskal-Wallis H test is independence of observations. The assumption of independence of observations was met because each observation in the data came from a unique survey respondent.

Histograms Related to Research Question 1 - Willingness

An additional assumption is that all groups share the same distribution shape, which was tested by examining histograms. Histograms showing the distributions of willingness across age groups are displayed in Figures 2-5. The distributions of willingness were not the same across all age groups indicating the assumption was not met. The 18-29 age group showed less of a negative skew than the other age groups, meaning there were more observations near the center of the distribution for the 18-29 years age group. Because the assumption of similar distribution shapes was not met, differences in group medians were not interpreted. Instead, differences in mean ranks were interpreted, as the differences in mean ranks do not depend on the assumption of similar distribution shapes.

Figure 2

Histogram for Willingness to Use Telemedicine for Ages 18-29. The Most Frequent Response was 4 (willing), and the Second Most Frequent Response was 3 (neutral).
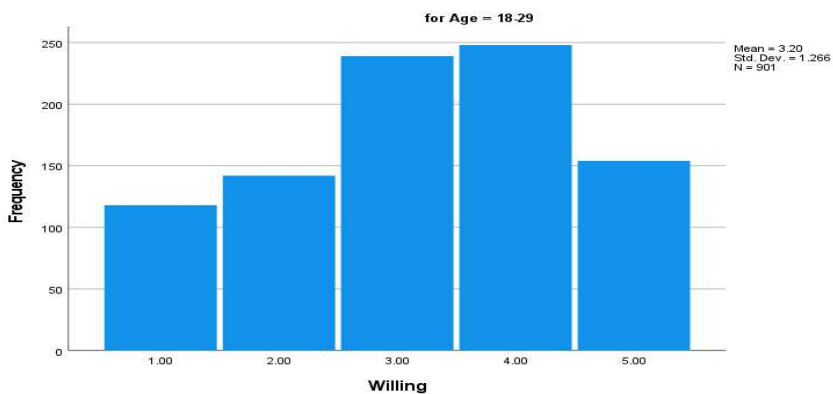
Figure 3

Histogram for Willingness to Use Telemedicine for Ages 30-44. The most Frequent Response was 4 (willing), While the Second Most Frequent Response was 5 (very willing).

Figure 4

Histogram for Willingness to Use Telemedicine for Ages 45-59. The most Frequent Response was 4 (willing), While the Second Most Frequent Response was 5 (very willing).
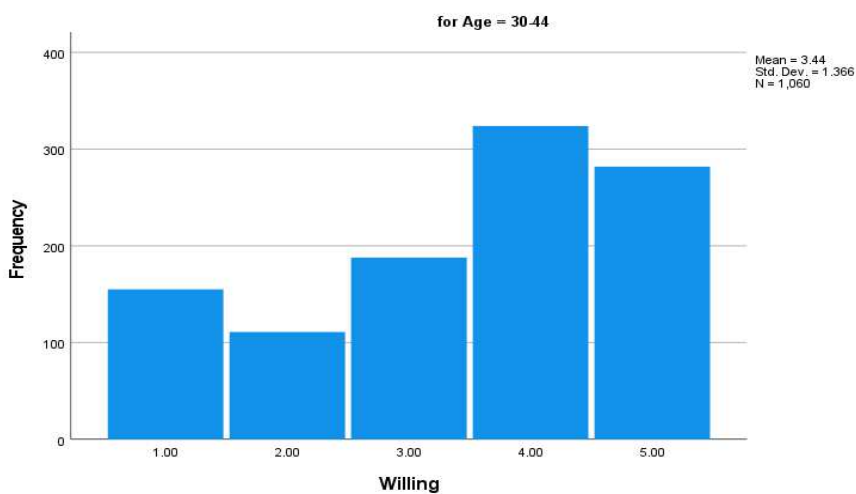

Figure 5

Histogram for Willingness to Use Telemedicine for Ages 60+. The most Frequent Response was 4 (willing), While the Second Most Frequent Response was 5 (very willing).
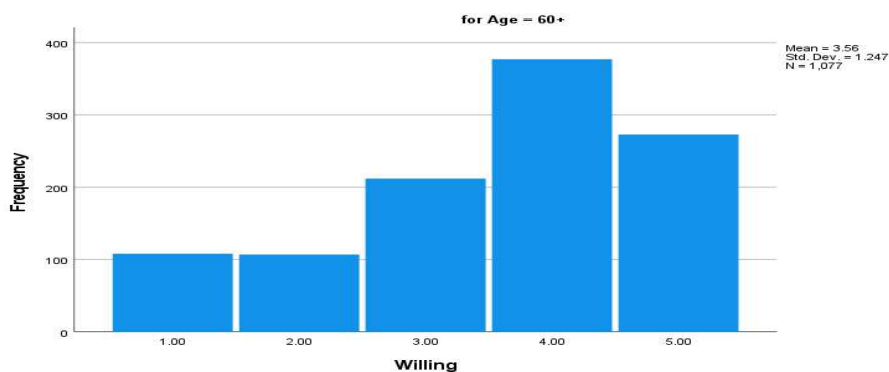
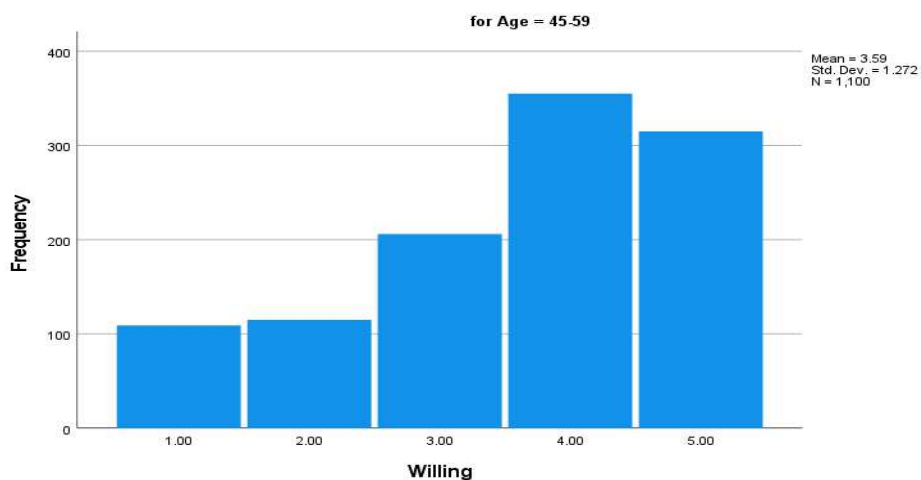

Histograms Related to Research Question 2 - Comfortability

Histograms showing the distributions of comfortability across age groups are displayed in figures 6-9. The distributions of comfortability were not the same across all

age groups indicating the assumption was not met. The 18-29 age group showed less of a negative skew than the other age groups, meaning there were more observations near the center of the distribution for the 18-29 age group. Because the assumption of similar distribution shapes was not met, differences in group medians were not interpreted. Instead, differences in mean ranks were interpreted, as the differences in mean ranks do not depend on the assumption of similar distribution shapes.

Figure 6

Histogram for Comfortability to Use Telemedicine for Ages 18-29. The Most Frequent Response was 4 (willing), the Second Most Frequent Response was 3 (neutral).

Figure 7

Histogram for Comfortability to Use Telemedicine for Ages 30-44. The most Frequent Response was 4 (willing); the Second Most Frequent Response was 5 (very willing).

Figure 8

Histogram for Comfortability to Use Telemedicine for Ages 45-59. The most Frequent Response was 4 (willing); the Second Most Frequent Response was 5 (very willing).
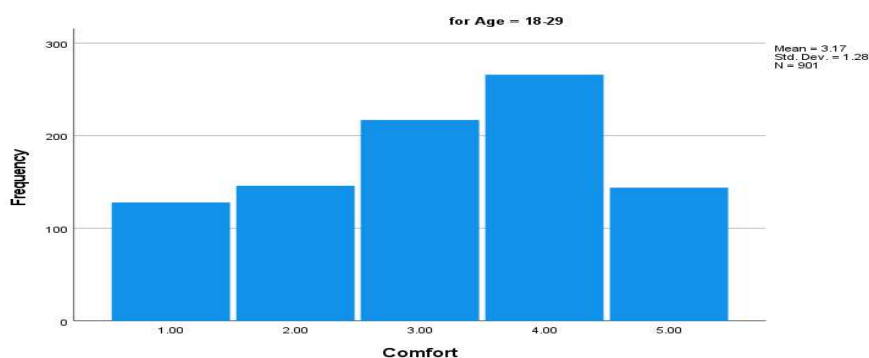

Figure 9

Histogram for Comfortability to Use Telemedicine for Ages 60+. The most Frequent Response was 4 (willing); the Second Most Frequent Response was 5 (very willing).
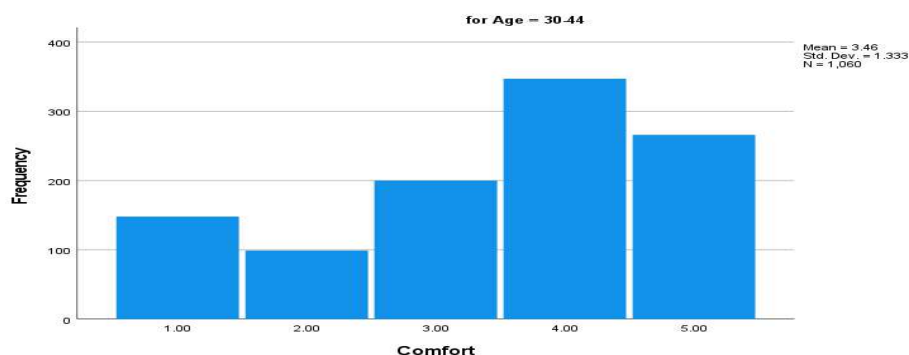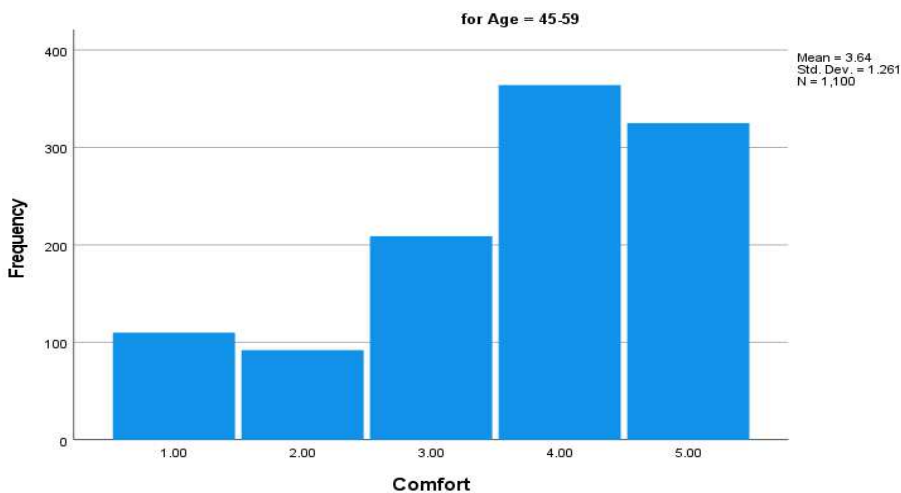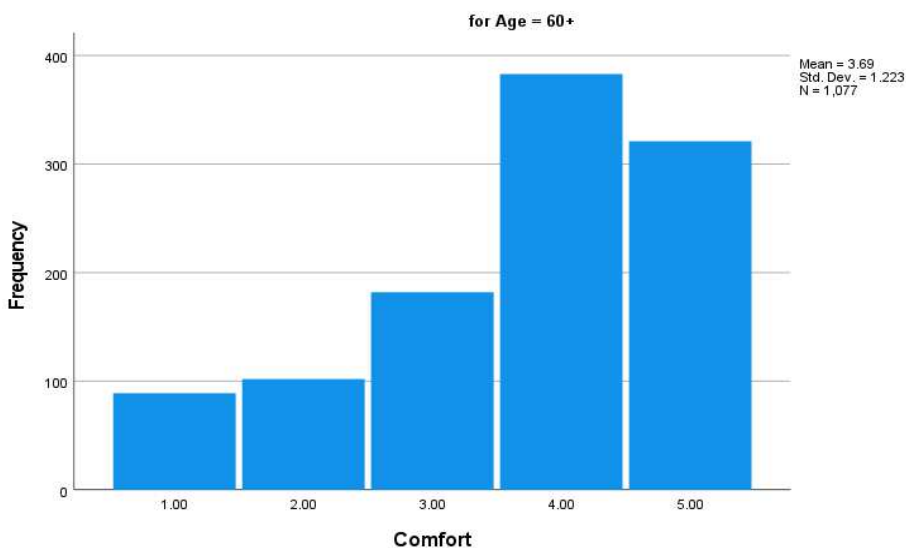
Study Results

Research Question 1

Research Question 1: Is there a statistically significant relationship between the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), and the willingness to use telemedicine services?

The results of the Kruskal-Wallis H test comparing willingness across age groups are displayed in Table 2. The test was significant ($p < .001$), indicating a significant relationship between age and willingness to use telemedicine services. The significance of the relationship indicated differences between age groups in the willingness to use telemedicine services. The null hypothesis ($H_0 1$) is rejected.

Table 4

Kruskal-Wallis H Test for Willingness

Test Statistic	df	P
62.20	3	< .001

Pairwise comparisons were computed and are displayed in Table 3. The pairwise comparisons revealed that the young adult (18-29 years) age group (Mean Rank = 1812.72) had statistically significantly lower willingness compared to the adult (30-44 years) (Mean Rank = 2075.78), older adult (45-59 years) (Mean Rank = 2193.58) and elderly (60+ years) (Mean Rank = 2151.40) age groups (all p values < .001). Additionally, the (30-44 years) age group had statistically significantly lower willingness than the (45-59 years) age group ($p = .018$). The significance of the relationships indicated that the young adults (18-29 years) age group were statistically significantly the

least willing to use telemedicine services compared to all others, and the older adults

(60+ years) age group was the most willing to use telemedicine services.

Table 5

Pairwise Comparisons for Willingness Across Age Groups

Age comparison	N1	N2	Test Statistic	Std. Error	Std. Test Statistic	Sig.
18-29 - 30-44	901	1060	-263.06	52.54	-5.01	<.001*
18-29 - 45-59	901	1100	-380.87	52.10	-7.31	<.001*
18-29 - 60+	901	1077	-338.69	52.35	-6.47	<.001*
30-44 - 45-59	1060	1100	-117.80	49.90	-2.36	.018*
30-44 - 60+	1060	1077	-75.62	50.16	-1.51	.132
60+ - 45-59	1100	1077	42.18	49.70	0.85	.396

$*p < .05$.

Summary of Results for Research Question 1

Research Question 1: Is there a statistically significant relationship between the

age of patients and their willingness to use telemedicine services? The results of the

Kruskal-Wallis H test showed that age is significantly related to the willingness to use

telemedicine services; therefore, the null hypothesis ($H_0 1$) is rejected. Pairwise

comparisons revealed that young adults (18-29 years) were statistically significantly less

willing to use telemedicine services than all of the other age groups, and that adults (30-

44 years) were less willing to use telemedicine services than older adults (45-59 years).

Older adults (60+ years) were the most willing to use telemedicine services, being

statistically significantly more willing than young adults (18-29 years).

Research Question 2

Research Question 2: Is there a statistically significant relationship between the

age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59

years), and elderly (60+ years), and the comfortability to use telemedicine services?

The results of the Kruskal-Wallis H test comparing comfortability across age groups are displayed in Table 4. The test was significant ($p < .001$), indicating a significant relationship between age and comfortability to use telemedicine services. The significance of the relationship indicated differences between age groups in the comfortability to use telemedicine services. The null hypothesis (H_02) is rejected.

Table 6

Kruskal-Wallis H Test for Comfortability

Test Statistic	df	P
105.14	3	< .001

Pairwise comparisons were computed and are displayed in Table 5. The pairwise comparisons revealed that the (18-29 years) age group (Mean Rank = 1750.31) had statistically significantly lower comfortability compared to the (30-44 years) (Mean Rank = 2039.42), 45-59 (Mean Rank = 2194.19) and (60+ years) (Mean Rank = 2238.78) age groups (all p-values < .001). Additionally, the (30-44 years) age group had statistically significantly lower comfortability than the (45-59 years) age group ($p = .002$) and the (60+ years) age group ($p < .001$). The significance of the relationships indicated that the young adults (18-29 years) age group were statistically significantly the least comfortable using telemedicine services compared to all others, and the elderly (60+ years) age group was the most comfortable to use telemedicine services, being statistically significantly more comfortable than young adults (18-29 years) and adults (30-44 years).

Table 7

Pairwise Comparisons for Comfortability Across Age Groups

Age comparison	N1	N2	Test Statistic	Std. Error	Std. Test Statistic	Sig.
18-29 - 30-44	901	1060	-289.12	52.42	-5.52	< .001*
18-29 - 45-59	901	1100	-443.88	51.98	-8.54	< .001*
18-29 - 60+	901	1077	-488.48	52.23	-9.35	< .001*
30-44 - 45-59	1060	1100	-154.77	49.79	-3.11	.002*
30-44 - 60+	1060	1077	-199.36	50.05	-3.98	< .001*
60+ - 45-59	1100	1077	-44.59	49.59	-0.90	.369

*$p < .05$.

Summary of Results for Research Question 2

Research Question 2: Is there a statistically significant relationship between the age of patients and the comfortability to use telemedicine services? The results of the Kruskal-Wallis H test showed that age was significantly related to the comfortability to use telemedicine services; therefore, the null hypothesis ($H_0 2$) is rejected. Pairwise comparisons revealed that young adults (18-29 years) were less comfortable using telemedicine services than all of the other age groups and that adults (30-44 years) were less comfortable using telemedicine services than older adults (45-59 years) and elderly individuals (60+ years). Elderly individuals (60+ years) were the most comfortable using telemedicine services.

Conclusion and Summary

Research Question 1 explored whether there is a statistically significant relationship between the age of patients and willingness to use telemedicine services. This question was answered by performing a Kruskal-Wallis H test which showed that age was significantly related to the willingness to use telemedicine services; therefore, the null hypothesis ($H_0 1$) was rejected. Young adults (18-29 years) were less willing to

use telemedicine services than all of the other age groups, and adults (30-44 years) were less willing to use telemedicine services than older adults (45-59 years). Elderly individuals (60+ years) were the most willing to use telemedicine services. Therefore the alternative hypothesis for RQ 1 was accepted indicating that the relationship between age and the willingness to use telemedicine is significant.

Research Question 2 explored whether there is a statistically significant relationship between the age of patients and the comfortability to use telemedicine services. This question was answered by performing a Kruskal-Wallis H test which showed that age is significantly related to comfortability to use telemedicine services; therefore, the null hypothesis (H_02) was rejected. Young adults (18-29 years) were less comfortable using telemedicine services than all of the other age groups, and adults (30-44 years) were less comfortable using telemedicine services than older adults (45-59 years) and elderly individuals (60+ years). The elderly individuals (60+ years) were the most comfortable using telemedicine services. Therefore the alternative hypothesis for RQ 2 was accepted indicating that the relationship between age and the comfort to use telemedicine is significant.

Section 3 contained the study results, including details about the data collection process, descriptive information about the sample, and the statistical method selected to answer the research questions. The results of the analysis for each research question were presented and summarized. In section 4, the study findings will be interpreted and discussed concerning the study's theoretical framework, Health Belief Model (HBM). Limitations of the study and recommendations for future research will also be presented.

Section 4: Application to Professional Practice and Implications for Social Change

This study used the quantitative research design and included the use of secondary data. The choice of this research design is driven by the data set and the research questions, which are whether the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), elderly (60+ years), affect the willingness to use telemedicine services and whether the age of patients, young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and elderly (60+ years) affect the comfort to use telemedicine services. Age has been shown to be a determining factor in consumer healthcare trends and telemedicine usage (American Well, 2019; Powell et al., 2017). It is important to know how comfortable and willing patients are to use telemedicine as it relates to age.

The theoretical framework for this study is the HBM, which recognized demographic factors and psychological characteristics as the starting foundation in determining if a patient will use health services such as telemedicine. The model can help to predict why a specific choice of care delivery option is made by different age groups or individual patients. In a survey conducted by Bechard et al. (2020) to collect sociodemographic, perceived health, and covid-19 health-related impacts, beliefs, and behaviors, the researchers found that different age groups have a distinct perception of the covid-19 virus and the need to use telemedicine care. Older adults and the elderly understood that telemedicine would help reduce their vulnerability to covid-19 through this process as opposed to an onsite visit (Bechard et al., 2020).

Summary of Key Findings

RQ1 showed the relationship between the age of patients and the willingness to use telemedicine services. Comparing willingness to use telemedicine services across age groups showed a significant ($p < .001$) relationship between age and willingness to use telemedicine services. The significance of the relationship showed differences between age groups in the willingness to use telemedicine services, and the null hypothesis (H_01) was rejected. The pairwise comparisons revealed that the young adult (18-29 years) age group had a significantly lower willingness to use telemedicine services compared to the adult (30-44 years), older adult (45-59 years), and elderly (60+ years) age groups (all p-values < .001). Additionally, the (30-44 years) age group had significantly lower willingness than the (45-59 years) age group ($p = .018$).

The significance of the relationships indicated that the young adults (18-29 years) age group were the least willing to use telemedicine services compared to all others, and the older adults (45-59 years) age group were more willing to use while the elderly 60+ years were most willing to use telemedicine services. Pairwise comparisons also revealed that young adults (18-29 years) were less willing to use telemedicine services than all the other age groups and that adults (30-44 years) were less willing to use telemedicine services than older adults (45-59 years). Older adults (60+ years) were the most willing to use telemedicine services.

RQ2: Comparing comfortability across age groups in RQ2 showed a significant relationship between age and the comfortability to use telemedicine services. The significance of the relationship indicated differences between age groups in the

comfortability to use telemedicine services, and the null hypothesis ($H_0 2$) was rejected.
The pairwise comparisons revealed that the (18-29 years) age group had significantly
lower comfortability compared to the (30-44 years), (45-59 years), and (60+ years) age
groups (all p values < .001). Additionally, the (30-44 years) age group had significantly
lower comfortability than the (45-59 years) age group (p = .002) and the (60+ years) age
group (p < .001). The significance of the relationships indicated that the young adults
(18-29 years) age group were the least comfortable to use telemedicine services
compared to all others, and the elderly (60+ years) age group was the most comfortable to
use telemedicine services.

Young adults (18-29 years) were less comfortable using telemedicine services
than all the other age groups, and adults (30-44 years) were less comfortable using
telemedicine services than older adults (45-59 years) and elderly individuals (60+ years).
Elderly individuals (60+ years) were the most comfortable using telemedicine

Interpretation of the Findings

Telemedicine usage has never been more relevant to patients' care than now,
especially during the recent Covid-19 pandemic. Due to the increased demand for
telemedicine use as a method of care to curtail and manage the spread of the Covid-19
virus, many providers, and patients, including older adults, were willing to use
telemedicine to receive and provide care (Choi et al., 2022).

In a 2020 national poll on "Healthy Aging" conducted by Michigan Medicine at
the University of Michigan, 30% of older adults with a telemedicine visit said that video
or phone visits were the only options available when scheduling their appointment.

Nearly half (46%) of the patients indicated that in-person visits were canceled or rescheduled to telemedicine visits by their care provider. The poll also revealed that the proportion of older adults who said they were comfortable with telemedicine rose from 53% in May 2019 to 64% in June 2020. Additionally, in June 2020, fewer people, 17%, reported that they have never used telemedicine compared to May 2019 at 28%. It is clear from this study that older adults are increasingly more comfortable with telemedicine and are willing to use the technology to interact with their health providers (Buis et al., 2020). The above national poll results align with this study's data analysis, which revealed that older and elderly adults were more comfortable and willing to use telemedicine services for their care. Now that the spread of the pandemic is under control, the use of telemedicine care may be reverting to the level prior to the outbreak of the virus. According to Portnoy et al. (2020), once the current pandemic is over, telemedicine can continue to be used to provide more convenient, cost-effective care to patients (Portnoy et al., 2020).

RQ1: Results of the study indicated that age is an important consideration to use telemedicine because the willingness to use telemedicine is driven by the age of the user or the demographic. The study also found that the older the user or demographic, the more willing they were to use telemedicine. This finding aligns with previous research. For instance, the proportion of older adults who said that they were comfortable with telemedicine technologies rose from 53% in May 2019 to 64% in June 2020 because of the Covid-19 pandemic (Michigan Medicine, 2020).

RQ2: The RQ2 analysis revealed a significant relationship between the age of the patients and the comfortability to use telemedicine services. The older the user, the more comfortable they were to use telemedicine for their care. The National Poll on Healthy Aging (2020) revealed that one of the most substantial shifts has been the rapid expansion of telemedicine services. These changes are likely to remain long after the Covid-19 pandemic subsides, especially with the comfort to use telemedicine by older adults. Telemedicine utilization is expected to continue to increase and become a standard part of healthcare services for older adults (University of Michigan, 2020).

Findings Related to the Theory

The HBM developed in the 1950s by psychologists and updated in the 1980s is the theoretical framework for this study (Boskey, 2020; Jones et al., 2016). This model is framed on individual perceptions relating to their health behaviors. The model is based on the theory that a person's willingness to change their health behaviors is primarily due to their health perceptions. These perceptions could be measured from six dimensions: perceived susceptibility, severity, benefits, barriers, cue-to-action, and self-efficacy (Boskey, 2020).

The perceived benefits, cues to action, and perceived susceptibility dimensions reflect a patient's choice of telemedicine services. These dimensions are relevant to the findings of this study. Elderly (60+) individuals were the most willing and comfortable using telemedicine services for their care, followed by older adults (45-59 years) and adults (30-44 years), respectively. According to Khorsandi et al. (2017), aging increases the odds of suffering from one or more chronic diseases, and most elderly patients suffer

from at least one chronic disease. Research shows that older adults and the elderly have increased perceived susceptibility to medical issues and are more likely to see the direct benefits of using telemedicine services than younger adults and adults (Khorsandi et al., 2017).

This study showed the relevance of the HBM to the four age groups used in the dataset in their comfort and willingness to use telemedicine for their care. Young adults (18-29 years) were less willing and comfortable to use telemedicine services than all the other age groups, and adults (30-44 years) were less willing and comfortable to use telemedicine services than older adults (45-59 years). Elderly patients (60+ years) were the most willing and comfortable to use telemedicine services. The findings from this study are consistent with the findings of other studies with a similar focus.

Limitations of the Study

The study identified some limitations related to the dataset used in this research. Welch et al. (2017), who developed the survey instrument used for the study, reported that the survey questions were developed from prior surveys used in health services and consumer use of telemedicine using online SurveyMonkey Audience participation. The data reflected a nationwide survey of 4345 respondents split into four age groups, 18-60+ years demographically balanced to represent the United States adult population. Also, since the online SurveyMonkey method was used for the sampling, there may be unmeasured differences between people who choose to participate in SurveyMonkey Audience and the general adult population of the United States, which may have limited the study results.

Another limitation of the present study was the age of the data. The data was collected in 2017 before the Covid-19 pandemic. Since the inception of Covid-19, to curtail and manage the spread of the virus, the willingness to use telemedicine to receive care and the necessity of using telemedicine has increased (Choi et al., 2022) Therefore, the data from the present study was not able to provide insight into the increased use of telemedicine because of Covid-19, in terms of comfort and willingness to use telemedicine, nor by age group.

Recommendations

It is recommended that future research include more demographic representation (13-17 years) to provide additional information related to the willingness to use and comfort in using telemedicine. Additionally, it is recommended that the study be replicated now after the first major surges of Covid-19 and the subsequent increase in the use of telemedicine to determine if and how these conditions have led to changes in the relationship between the willingness to use telemedicine, comfort in using telemedicine, and the age of the users. In-depth interview sampling is recommended for future research with a similar focus. More research is needed to better understand why elderly individuals are more comfortable and willing to use telemedicine than younger ones. Such research could also help identify new or different factors to examine after the initial surges of Covid-19, factors that may be related to using telemedicine, and age. Case studies with multiple data sources are also recommended to obtain a more comprehensive view and how adults of different age groups use telemedicine.

Implications for Professional Practice and Social Change

Professional Practice

Practical implications include healthcare administrators spearheading efforts and developing programs to reach out to and encourage younger individuals' willingness and comfort to use telemedicine services. Such efforts might include highlighting cues to action and perceived susceptibility in younger individuals. Highlighting cues to action and perceived susceptibility in younger individuals would include making them aware of medical issues that are specific to younger individuals and conditions to which they are susceptible that could encourage them to use telemedicine. Additional practical implications include healthcare administrators maintaining effective practices to sustain willingness and comfort in older individuals to use telemedicine. Encouraging willingness and comfort to use telemedicine may also have practical implications during future public health crises, like the Covid-19 pandemic, which may require intensive and prolonged use of telemedicine.

Positive Social Change

Significantly, the social change impact related to this study involves knowing that the age group most often in need of care, older individuals (Khorsandi et al., 2017), are willing to use and are comfortable using telemedicine services, thereby helping to provide timely and convenient care to these individuals. Positive social change is also achieved when those in rural areas and remote locations can receive the care they need in the comfort of their homes or designated telemedicine facilities without delay or additional cost. Telemedicine programs provide services to many patients in rural areas

who may not have access to care (ATA, 2016). Similarly, social change is achieved when the quality of health care delivery meets stakeholders' expectations, especially patients and providers. Telemedicine helps patients and providers reduce the cost of care without compromising the quality of care and outcome for patients (Hajar et al., 2018). Finally, implications for social change involve facilitating willingness to use and comfort using telemedicine services in younger groups, thereby helping to provide timely and convenient care to them.

Conclusion

This study examined if there is a relationship between the age of patients and their willingness and comfortability to use telemedicine. Kruskal-Wallis-H tests were used to examine whether there were relationships between age and willingness to use telemedicine services and between age and comfortability to use telemedicine services. Participants' ages included young adults (18-29 years), adults (30-44 years), older adults (45-59 years), and the elderly (60+ years).

The null hypotheses for both research questions were rejected because there was a significant relationship between the age of the patients and comfortability and willingness to use telemedicine for their care. Findings indicated that the older the patients, the more comfortable and willing they were to use telemedicine for their care. However, the study was not designed to provide information about the causality between variables. Therefore, more research is needed to better understand why elderly individuals are more comfortable and willing to use telemedicine than younger ones.

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