

Relationship of the Overall Perception of Middle-aged Patients from a Secondary Hospital in Tuguegarao, Cagayan and their Intention of Use towards Telemedicine during the COVID-19 pandemic

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Abstract: - As a result of the breakout of the novel coronavirus, people have turned to the use of Telemedicine. Specifically, middle-aged people are affected due to their chronic conditions and the need for their daily check-ups. However, the shift to Telemedicine has its advantages and disadvantages, especially in a developing country like the Philippines. Thus, the perceptions of patients may now vary towards the use and service of Telemedicine. This study aims to determine whether the overall perception of middle-aged patients affects their intention of use towards Telemedicine during the COVID-19 pandemic in the Philippines. A descriptive quantitative approach was utilized in this study. Seventy-six middle-aged patients from a Secondary Hospital in Tuguegarao, Cagayan, are to participate in the study. Patients should be at least 40-59 years of age and not necessarily engaged or have engaged in Telemedicine before. Respondents are asked to provide information, including name, age, and educational attainment. In addition, respondents are also asked to rank statements about efficiency, reliability, financial cost, interaction, perceived ease of use, and perceived usefulness as part of a holistic understanding of the respondents' overall perception. The data collection lasted for one month, from April 29 until May 29, through online and physical means. The statistical tools that were used to analyze the data gathered were Descriptive statistics and Pearson Correlation. Educational attainment was not a good indicator of the overall perception of the respondents. Respondents agreed that Telemedicine is efficient, reliable, cost-friendly, has a good doctor-patient relationship, is easy to use, and is useful, indicating that each of the predetermined variables influences the respondents' overall perception, which affects their intention of using Telemedicine. The overall perception is directly correlated with the intention of use as well. The intention of use of middle-aged patients on Telemedicine is greatly affected by the overall perception. These were found to be weakly related to the educational status of the patient. However, it should be noted that the overall perception of usage may differ once patients avail of telemedicine services as most research respondents have not yet experienced consultations through this method. Nevertheless, findings show that the respondents are open to adapt to this method of consultation. Thus, throughout the development of the pandemic and the continuous need for new ways for physicians to interact with their patients, Telemedicine could provide a useful method for consultation and help clinicians attend to the needs of their patients without risking possible exposure in light of social distancing measures.

Key Words: — *Overall Perception, Intention of Use, Middle-aged Patients, Telemedicine, COVID-19 pandemic.*

I. INTRODUCTION

In December 2019, a novel strain of coronavirus was first detected in Wuhan, China, after a pneumonia outbreak with no

apparent cause. Eventually, the said virus spread to over 200 countries. As a result, by March 11, 2020, the World Health Organization (WHO) declared a pandemic (Stewart et al., 2020). This pandemic has pushed many countries into a lockdown, including the Philippines, in a desperate attempt to contain the virus. This move forced the Philippine economy into a recession; it also wholly transformed Philippine healthcare. Furthermore, implementing stringent social

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distancing measures and hospitals full of highly infectious COVID-19 patients has forced other patients, especially patients who are most likely suffering from chronic diseases, to stay at home. As a solution, healthcare providers have turned to the use of Telemedicine. According to WHO, Telemedicine is the delivery of health care services by all healthcare providers through the use of information and communication technologies, providing valid information for the diagnosis, treatment, and prevention of disease and casualties, and ongoing education of healthcare providers. Its sole purpose is to aid in the management of the health of the people in need. Even so, Telemedicine is not a new concept; it can be traced back as far as 1905. Telemedicine started in 1905 in the field of cardiology when European physicians utilized long-distance transfer of electrocardiograms. It was followed in the 1920s by using radios for long-distance consultations from ships' passengers to medical centers in Norway, Italy, and France. The United States started with the transmission of radiographic images in the early 1950s (Ryu, 2010). Telemedicine in the Philippines had its debut when the University the Philippines (Manila) National Telehealth Center (UPM-NTHC) introduced their open-source telemedicine and mHealth projects that give way for the connection of remote patients with a specialist in Philippine General Hospital (PGH). From then on, innovations in Telemedicine arose in the country. One of the most notable of these innovations is the medical device called RxBox, which is equipped with the Community Health Information Tracking System (CHITS), which has been developed to help healthcare providers reach patients located in far-flung provinces. The latest update on Telemedicine in the Philippines is the healthnow.ph website, which was launched last May 26, 2020, by the Department of Health (DOH) through their Facebook Page. This website is an augmentation to the earlier released nationwide COVID-19 hotlines, which were also by DOH. It offers online consultation for Filipinos whether or not they have concerns related to COVID-19. Telemedicine has shifted from being practice-centric. Patients had to comply with the clinical schedule and location and be patient-centric. Patients can save time and travel costs (North, 2020). It has greatly assisted in mitigating the spread of the virus and preserving scarce personal protective equipment (PPE) (Calton et al., 2020). Furthermore, it can also be accessed by people directly from their homes. Thus, it may reduce the likelihood of viral transmission by limiting person-to-person contact while enabling people with the virus to be treated for viral symptoms and their normal medical conditions (Snoswell et al., 2020). Additionally, Perrone et al. (2020) found out that Telemedicine

is especially useful in managing chronic disorders such as diabetes, high blood pressure, and long-term chronic lung diseases. Thus, the convenience that Telemedicine provides at this time of pandemic is indisputable. However, the same can be said for the disadvantages of using Telemedicine in a developing country like the Philippines. The shift to Telemedicine requires the formation of a telemedicine unit. Consequently, the new equipment must be bought, and new staff must be hired. The current situation does not allow the Philippines to allocate a high budget for technology. Therefore, it is more crucial to divide the government funds between the COVID-19 response and financial support for the Filipinos who lost their jobs. Furthermore, if a telemedicine unit were successfully established, the applications needed to avail their services would require a stable and high-speed Internet bandwidth which, again, the Philippines does not have. The Philippines still lacks internet connectivity for transferring patients' files, records, pictures, and videos (Bali, 2018). Additionally, middle-aged adult patients are more susceptible to diseases and disabilities (World Health Organization, n.d.), thus requiring Telemedicine more than younger populations. Some of the said patients also do not have smartphones or computers, justifying their struggle with technology. Depending on their location, some will have poor or no connectivity at all. Therefore, the researchers would like to know whether the overall perception of middle-aged patients affects their intention of use towards Telemedicine during the COVID-19 pandemic in the Philippines.

The purpose of this research is to determine the relationship of the overall perception of middle-aged patients from a secondary hospital in Tuguegarao, Cagayan, to their intention of use towards Telemedicine during the COVID-19 pandemic in the Philippines. The researchers aim to: (1) Determine if there is a significant relationship between educational attainment and the overall perception of the respondents, (2) Determine if there is a significant relationship between the predetermined variables, namely efficiency, reliability, financial cost, interaction, perceived ease of use and perceived usefulness, and the respondents' overall perception, (3) Determine if there is a significant relationship between the overall perception and intention of use of the respondents.

The data collected in the study were exclusively limited to responses to survey questions from patients, ages 40 to 59 years old, which is under their overall perception of Telemedicine. Respondents were randomly selected, and survey forms were distributed and disseminated to the randomly selected

respondents through face-to-face visits and online platforms. Respondents included both male and female patients and were limited to those who are middle-aged only. Mental stability is a factor and is a requirement in choosing qualified respondents. The survey questions consisted of the personal information of the respondent. However, it was limited to their name, age, and educational attainment. Other than personal information, other parameters were considered in determining the overall perception of patients towards Telemedicine. Furthermore, the respondents are patients from a secondary hospital in Tuguegarao; therefore, the study cannot compare the perceptions between urban and rural groups or reflect the overall perception of the country. Based on the study of Lin (2017), who tackled the comparison of the overall perception of Telemedicine between frequent travelers and non-frequent travelers, seven (7) major criteria were considered. The said parameters are efficiency, financial cost, reliability, interaction, perceived ease of use, perceived usefulness, and intention. In addition, the study considered educational attainment as the only demographic to correlate with overall perception. Age was no longer considered for correlation since the study focused on the specified age group. Gender was also excluded for correlation due to the limited studies to support the findings of the study. The purpose of the study utilized simplified scenarios to describe Telemedicine in general and not specific since online consultation may differ from person to person.

This study was able to provide information about the different perceptions of middle-aged patients on Telemedicine. Furthermore, the study gave an insight into the correlation of overall perception and intention of use of middle-aged patients in the chosen settings. This study is beneficial to the following: To middle-aged patients with chronic conditions, the data gathered from this study shall serve as a tool to help in the better management of their conditions using Telemedicine. By identifying the relationship of their perception on their intention of use when it comes to Telemedicine, the administration of their check-ups and consultations using Telemedicine can be adjusted accordingly. Cimperman et al. (2013) stated that Telemedicine could offer better life quality, lesser financial burden, and more independent living. Nearly all efforts of telemedicine target the needs of middle-aged patients, which explains why the study is relevant to them. To the healthcare providers that monitor and treat patients through Telemedicine and to app developers, the data gathered from this study shall aid them by focusing on factors such as efficiency, financial cost, reliability, interaction, ease of use, and usefulness in the provision of an improved and more personalized service by

giving them insights on patient perception and intention of use with regards to Telemedicine. Considering that this concerns specific applications and varieties of modes of communication, ease of use will serve as one of the essential components. To future researchers, the data gathered from this study shall serve as their guide to a more comprehensive understanding of the correlation of patient perception on the intention of use when it comes to Telemedicine. Furthermore, the data from this study may lead them to innovations and novel ideas that will contribute to the betterment of the Philippine medical industry.

II. REVIEW OF LITERATURE

A. Educational Attainment

Statistical findings from a study conducted by the Australian Bureau of Statistics (2006) state that a considerable proportion of respondents with higher education showed poor health literacy. As a result, van der Heide et al. (2014) concluded that educational attainment is not correlated to health literacy. However, contrary to the previous studies, binary logistic regression analysis from a study by Wernhart et al. (2019) in Austria showed that educational attainment is significant, stating that most patients using Telemedicine obtained a university degree. Furthermore, most of the patients demonstrated that education and health literacy are directly proportional. Similarly, based on a study conducted by Mackert et al. (2016), patients with low levels of health literacy were less likely to use health information tools than those with higher levels of health literacy. Based on these studies, educational attainment is correlated with health literacy that affects their intention to use Telemedicine.

B. Efficiency

According to UNESCO, efficiency can result in the smallest quantity of resources possible, including effort and time. Telemedicine may be efficient since most people nowadays rely on the use of technology. Usage of Telemedicine had a higher success rate than the face-to-face setup. A survey showed that 85% of the patients were satisfied with their health concerns compared to 64% in face-to-face visits (American Well Survey, 2017). The majority of the patients' perspective towards Telemedicine is seen as a service that can save time and a beneficiary tool for patients with chronic conditions. The benefit of Telemedicine has also been emphasized by Caulfield (2015) in terms of efficiency and the reduction of travel times. A study conducted by Funderburk et al. (2019) found that though initially, postoperative patients were hesitant in

engaging in telemedicine services, 96% of the respondents were satisfied with the service provided. Instantaneous feedback between the clinician and patient while also providing decreased transport and waiting times were noted as major contributing factors to their satisfaction (Funderburk et al., 2019). George et al. (2009) have also recognized services of telemedicine offering reduced waiting times among African Americans and Latinos respondents residing in South Central Los Angeles. Likewise, in a study done by Wright and Diamond (2015), a web-based program was used to facilitate the supervision of glaucoma. It was found that the demand for face-to-face glaucoma appointments can be reduced through the program, allowing for scarce medical resources to be directed to patients most in need. Hersh et al. (2006) noted mixed results when evaluating the efficiency of Telemedicine in terms of diagnosis, wherein it was found that specialties that relied heavily on verbal interaction between the healthcare provider and the patient were found to have a more efficient and effective diagnosis such as in neurology, psychiatry and the management of chronic diseases among known patients. Jain et al. (2019) noted that Telemedicine streamlines the entire process of consultations, stating a more standardized, consistent, and efficient process; the presence of a comprehensive health questionnaire also avoids unnecessary interaction and increases physician efficiency.

C. Reliability

Reliability is defined as the capability of Telemedicine to accurately and dependably carry out all of the services that it claims to be able to perform (Lin, 2017). According to a study by Malliaras et al. (2021), because of the lack of physical examination, the use of Telemedicine can hinder medical professionals from making an accurate diagnosis and effective management when dealing with musculoskeletal conditions. In support of this, another study revealed poor compatibility of diagnosis made using Telemedicine and diagnosis made during face-to-face consultation due to the inaccuracy of a physical examination to assess tonsil size (Akhtar et al., 2018). However, Wood et al. (2016) argued that most of the patients were diagnosed accurately and given the appropriate treatment plan; in fact, it was found out that the use of Telemedicine improved the ability of doctors to provide care to their patients in the field of oral and maxillofacial surgery. Furthermore, Rajbhandari et al. (2019) found out that telephone telemedicine for epilepsy yielded a 93% diagnostic agreement between diagnosis made using telephone telemedicine and diagnosis made during face to face consultation and 0% misdiagnosis,

fostering an exceedingly positive patient satisfaction rate prompting the majority of the patients to agree that they would recommend the service to others. Additionally, because Telemedicine involves the use of the internet, aside from the accuracy and reliability of diagnosis, reliability is also concerned with the professionalism of the service provider, dependability of the information provided, security, privacy, and technology reliability (Lin, 2017). According to Lin (2017), one patient concern regarding the reliability of Telemedicine is the identity and qualification of online healthcare providers. The health care provider can build cognitive, interpersonal trust with the patient by presenting trusted evidence such as medical certificates to verify the health care provider's education and professional ability (Lee et al., 2019). One study stated that Chinese medical doctors establish their professional identities online using medical jargon, independent vocatives, and diagnostic questioning. On the other hand, they establish their authoritative identity by using collective vocatives to associate themselves as members of the medical community (Mao and Zhao, 2019). In contrast to this, a study by O'Regan et al. (2018) concluded that although social media has multiple benefits for medical professionals, it also has its downfalls, particularly the issue of unprofessional behavior because of the posting of personal pictures, updates, and comments, which was said to lead to the incorporation of their personal lives into their professional lives. Furthermore, many studies identify technological limitations as a significant barrier hampering telemedicine adoption in rural areas (Kruse et al., 2018; Lin et al., 2020; Moeckli et al., 2020). Bali (2018) stated a slow internet connection in rural areas, which led to the slow uptake of Telemedicine in the said setting. Another study explained that women in rural areas of India lack access to Telemedicine because of limited electricity and power supply (Dias and Vidya, 2021). Contrary to this, a study conducted in South Africa revealed that although the respondents lived in a rural area where there is limited electricity, most of them were still familiar with their national mHealth text support service and are looking forward to future HIV mHealth platforms (Mogoba et al., 2018). When it comes to reliability, if feasibility and effectiveness are met in the implementation of Telemedicine, improvement in patient mobility, autonomy, and health-related quality of life, in particular for those patients living alone or in rural areas, can be met. This is important particularly for those who live in rural areas and lack knowledge and understanding of diseases. When telemedicine reliability is met, it empowers patients and encourages them to manage their conditions (Hazenberget al., 2020).

D. Financial cost

In a developing country such as the Philippines, financial cost plays a significant role in developing patient perception whereby cheaper the cost leads to a positive patient perception. According to Kruse et al. (2018), the cost has always been one barrier to Telemedicine usage. Bali (2018) stated that the application of Telemedicine would incur huge costs as older technology must be replaced, and smooth operation of telemedicine systems would require a fast internet connection which also adds to the cost. Furthermore, Combi et al. (2016) found that telemedicine systems are far more expensive in developing countries than maintenance costs in developed countries because of their difference in hospital budgets and technological infrastructures. In contrast, according to a study by Helou et al. (2020), the adoption of Telemedicine can contribute to decreased healthcare costs. Buvik et al. (2019) concluded that Telemedicine for orthopedic consultations was €65 less for each patient than face-to-face consultations in the hospital without any significant difference in health outcomes. In addition to this, a study by Atmojo et al. (2020) has shown that telemedicine utilization in dermatology, radiology, pediatrics, and intensive care unit (ICU) rooms reduced health costs by 56% and patients' travel cost to health care by 94%. Furthermore, a study by Wang et al. (2016) stated that using Telemedicine is cost-effective in the long run. This is supported by a study conducted by Dullet et al. (2017). Telemedicine resulted in shorter travel distances with a total distance savings of 5,345,602 miles and less travel cost with a total cost savings of \$2,882,086 for the patients.

E. Interaction

Interaction refers to the doctor-patient relationship (DPR), which according to the study by Turabian (2019), is the "true core of clinical practice" as it, directly and indirectly, affects all health care activities. Similarly, Sadati et al. (2018) found out that DPR allows healthcare providers to enter the patients' private domain, enabling them to give the appropriate diagnosis and treatment. Telemedicine studies have shown both positive and negative patient feedback with regards to DPR. For example, a study by Acharya and Rai (2016) found out that 18% of their patient participants were not satisfied with the service of Telemedicine due to the absence of face-to-face contact with the doctor. On the other hand, a study by Elliott et al. (2020) concluded that 30% of the feedback given by delighted patients said that healthcare providers were still able to build rapport even through telemedicine consultations. Another study conducted by Antheunis et al. (2011) found that computer-

mediated communication having a similar setup with Telemedicine prompted more question asking, question/disclosure intimacy, and verbal statements of affection than face-to-face communication. Some studies also suggest that Telemedicine and face-to-face consultations are similar, having no significant difference in perceived information exchange and interpersonal relationship building (Tates, 2017). Experts also explained how Telemedicine achieves the interaction needed in the provision of medical services. As indicated in the Social Information Processing Theory of Walther (1992), the sender and the receiver of information in this study are the doctor and patient interchangeably. Both adapt with the media's limitations to achieve an outcome similar to the context of face-to-face there communication. Lastly, the DPR, based on a study by Chipidza et al. (2015), is anchored upon trust, knowledge, regard, and loyalty, which have been discovered to influence patient satisfaction; thus, it can be said that interaction plays a role in the perception of patients towards Telemedicine.

F. Perceived Ease of Use

Davis (1989) defines perceived ease of use (PEU) as the measure from which a person believes that a specific methodology would be free from effort. Ease of use refers to the ability to gain access to service and technology operations. A previous study by Brown (2002) set in Africa, a developing country like the Philippines, stated that PEU is influenced by the ease of finding, which involves ease of navigation to find needed information even for those with limited technological experience, and ease of understanding which involves understandable graphics, terms, language, and aesthetic visuals that appeal even to those with limited technological experience. In the study by Aljoza and Susanto (2015), they stated that the dimensions of perceived ease of use of online public service might relate to an individual's perception of web navigation and ability to use it anytime. The article written by Lighthall and Shokri (2020) stated that online telemedicine platforms are easy to use for both patients and health providers. For example, the study of Wildenbos et al. (2018) showed that many adult patients aged 56 to 75 years old activate patient portal accounts.

Additionally, in a study by Li et al. (2021), they found out that even though patients have different views on Telemedicine, they still had a positive outlook for its ease of use and usefulness. The study by He et al. (2018) explains the mechanism behind perception and intention of use (IU). According to the researchers, perceived ease of use is linked to an individual's self-efficacy; the easier it is for the individual to

operate the technology, the greater the belief of the individual in his/her ability to adapt the technology auspiciously, which in turn would improve their perception towards it. Furthermore, Portz et al. (2018) stated that older adult patients are already taking advantage of the features of the patient portals and that they were confident in their ability to make sense of the technology. Lin, Z (2017) stated that positive PEU had been correlated to overall perception, which is stipulated as a prerequisite to the positive intention of use (IU). In a study by Hamid et al. (2016), they found out that PEU predicted intentions of using the Malaysian E-government system and concluded that if the system were easy and practical, the PEU of the users would increase, consequently increasing their overall perception and intention of use. Another study by Klaassen et al. (2016) stated that usability studies should include objective measurement of effectiveness and efficiency and subjective measurement of satisfaction for users to accept Telemedicine. Furthermore, a study conducted by Li et al. (2019) was able to show that as perceived ease of use increases, so does user satisfaction; thus, it can be said that PEU has a direct effect on continued usage of mobile terminals.

G. Perceived Usefulness

According to Davis (1992), perceived usefulness is defined as a measure of how a person believes that a specific methodology would improve one's job performance. Applying this definition to the context of Telemedicine, usefulness refers to the degree to which the respondents believe that using Telemedicine for regular check-ups will improve their healthcare. The current healthcare dilemma worldwide is how quality services can be delivered for patients of all conditions. A recent study by Mattioli et al. (2020) discovered the usefulness of Telemedicine in the current pandemic is in its ability to use monitoring strategies to focus on selecting high-risk patients while using alternative remote mediums to accommodate non-COVID-19 patients. This is supported in the study conducted by Galiero (2020) evaluated the usefulness or efficacy of Telemedicine in different clinical subsetting. Teleophthalmology, particularly the management of diabetic retinopathy, has seen Telemedicine as beneficial in glaucoma diagnosis. The usefulness of Telemedicine in other clinical settings has also been reported.

Furthermore, in the management of high-risk chronic heart failure (CHF) older population, telemonitoring systems, based on the cooperation among different medical/nurse figures, seemed to reduce rehospitalizations. Emergency department accesses, reducing the expenditure for the follow-up of those patients (Burdese et al., 2018). From this, usefulness is evident

in the context of Telemedicine. In terms of patient satisfaction, the American Well Survey (2019) survey showed that most participants were satisfied with their health concerns compared to the face-to-face setup. The survey revealed that the participants view Telemedicine as a tool that conserves time and energy.

On the other hand, Amin et al. (2014) found that perceived usefulness is positively related to trust and mobile users' satisfaction. It was stated that DPR is linked to trust, knowledge, regard, and loyalty, which have been discovered to influence patient satisfaction (Chipidza et al., 2015). In the analysis of the current situation of Telemedicine, the study of Hincapié et al. (2020) claimed that the COVID-19 pandemic encouraged the utilization of Telemedicine. Additionally, Kichloo et al. (2020) concluded that developing Telemedicine offers quality healthcare while practicing physical distancing to prevent the spread of the virus. Developing policies, regulations, and further integration of the IT sector to healthcare will benefit Telemedicine in the current pandemic and future if a possible novel virus arises. From this, it can be drawn that perceived usefulness has a significant relationship to the perception of patients towards Telemedicine. Hence, the researchers reject the hypothesis that is no significant relationship between the overall perception and the intention of using the respondents towards Telemedicine.

H. Relationship of Overall Perception and Intention of use

As defined in the study of Ou (2017), perception is defined as procuring awareness or understanding sensory information. Perception consists of three stages: selection, organization, and interpretation. It involves selecting environment stimuli, organizing the information into meaningful patterns, and interpreting the selected stimuli by attaching meanings. A study conducted by Lin (2017) elucidated in the findings of his study where higher efficiency, reliability, perceived ease of use and usefulness, lower financial cost, and needs for interaction result in a higher overall perception of Telemedicine. According to (Cranen et al., 2011), patients with no prior experience with innovative services of Telemedicine, when allowed to explore and after brief use, will have an increased positive perception of Telemedicine. Patients who have previously used Telemedicine displayed higher acceptance through the development of accurate perceptions. Holtz's (2021) study that correlated the use of Telemedicine in the current pandemic stated that adoption of Telemedicine led to positive perceptions of this service. It was mentioned that despite the positive

correlations, there are still unresolved issues and questions. It was discussed that some of the new users did not choose the new mode and still prefer face-to-face consultations. In terms of the intention of use, the study of Teo (2011) used intention of use as a dependent variable as a close link to actual behavior. Behavioral intention is considered a factor since it can define how people are willing to perform a behavior (Ajzen, 1991; Teo, 2011). The study also stressed that measuring the intention of use is desirable compared to determining the actual use since there might be a breach of privacy. It concluded that measuring intention of use is more progressive and practical than actual use, which is also a dependent variable but is more static and retrospective. Several studies argued that perceived ease-of-use of Telemedicine contributes to the efficiency of healthcare processes in evaluating the intention of use technology (Davis, 1989; Saigi-Rubio et al., 2016). The successful integration of Telemedicine to healthcare is also attributed to its reliability which supports information exchange, communication, and collaboration in clinical practice. According to Davis (1989), the intention of use is influenced by attitude, determined by perceived usefulness and perceived ease of use. In terms of interaction Yip, et al. (2003) and Tates (2017) found that patients were satisfied with their encounters with Telemedicine due to the similarity of the experience with face-to-face consultations. This is further supported by Antheunis (2011), with similar findings in which computer-mediated interactions prompted more significant interaction between the respondents. A study conducted by Saigi-Rubió et al. (2016) demonstrated that two components of perceptions, perceived usefulness, and reduction of financial costs, had the most significant impact on the probability of using Telemedicine. Another component of perception, perceived ease-of-use of technology, has a two-fold effect on the users. A study done in Pakistan concluded with similar results that Perceived Ease of Use and Perceived Usefulness were among the major contributing factors that influenced the perception and, consequently, the overall acceptability of Telemedicine (Kamal et al., 2020). A study by Hossain et al. (2020) described the relationship and implications between the perception and attitudes towards the adaptation of new technological systems as significant. Their study revealed that a more positive perception towards the medium resulted in greater acceptability of novel systems. From this, it can be drawn that the overall perception has a significant relationship to the intention of use towards Telemedicine. Hence, the researchers would like to reject the hypothesis that there is no significant relationship among the

variables, including efficiency, financial cost, reliability, interaction, and perceived usefulness.

I. Theoretical Framework

This study utilized the Technology Acceptance Model (TAM). This model was proposed by Davis (1989) and has been used in numerous studies about end-user acceptance behavior of using technology and the factors affecting their decisions as to how they will accept and use the new technology, making it relevant in measuring patient perception and intention towards Telemedicine.

According to the Technology Acceptance Model, perceived usefulness and perceived ease of use are two constructs that determine a user's intention to use information technology. Perceived ease of use refers to how accessible the service and technology operation is. On the other hand, perceived usefulness refers to how useful the customer considers the technology system in improving their performance. Other noted variables include social influence, which determines the attitude of the user. The extended TAM model referred to as TAM2, is depicted in Figure 1, which explains perceived usefulness and usage intention in terms of social influence and cognitive instrumental processes while omitting the attitude towards the actual system used in the original TAM model.

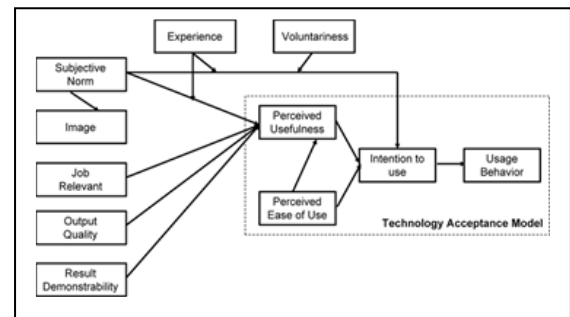


Fig. 1. Diagram of the Technology Acceptance Model

J. Conceptual Framework

This study evaluated the relationship between the overall perception and intention of using middle-aged patients towards Telemedicine during the COVID-19 pandemic in the Philippines. The evaluations were based on the demographics and predetermined variables that affect the overall perception of middle-aged patients, which in turn influences their intention of use (IU). The demographics, specifically educational attainment, and the predetermined variables, including efficiency, reliability, financial cost, interaction, perceived ease

of use, and perceived usefulness, differ for each patient. These unique variables allow the patients to conjure perceptions towards Telemedicine that are intrinsically theirs. Educational attainment is a perception of middle-aged patients, which in turn influences their intention of use (IU). The demographics, specifically educational attainment, and the predetermined variables, including efficiency, reliability, financial cost, interaction, perceived ease of use, and perceived usefulness, differ for each patient. These unique variables allow the patients to conjure perceptions towards Telemedicine that are intrinsically theirs. Educational attainment is a predictor of the subjective experience of the patients.

For instance, when it comes to educational attainment, those with a college degree and those with low literacy levels will have different experiences. The latter has a more challenging time using the technology; thus, they will deem the technology unusable and useless. Therefore, the researchers would like to reject the hypothesis that there is no significant relationship between the respondents' educational attainment and overall perception. Expounding on the predetermined variables, efficiency affects perception, particularly the service evaluation of the patients as it primarily determines the amount of time that the patients will spend when receiving the service of Telemedicine.

Reliability affects perception as it plays a role in service evaluation of the patients measuring the dependability and accuracy of the service. Financial cost affects perception, whereas it influences service evaluation of the patients determining whether they will access cost-effective healthcare through Telemedicine. Interaction affects patients' perception as the experience of the doctor-patient relationship (DPR) from each clinical check-up via Telemedicine may be harmful or positive, leading to additional feedback and perception. Perceived ease of use is considered a variable affecting perception as it determines how effortless it is to access Telemedicine. Perceived usefulness is considered a variable affecting overall perception.

It dictates how useful the patients find Telemedicine in improving their experience and outcomes. All of these variables contribute to the formation of overall perception. Thus, the researchers would like to reject the hypothesis that there is no significant relationship between the predetermined variables, namely, efficiency, reliability, financial cost, interaction, perceived ease of use, perceived usefulness, and overall perception of Telemedicine.

The overall perception then influences the intention to use middle-aged patients towards Telemedicine, whereby higher perception leads to higher intention. Hence, the researchers would like to reject the hypothesis that there is no significant relationship between the overall perception and the intention of using the respondents towards Telemedicine.

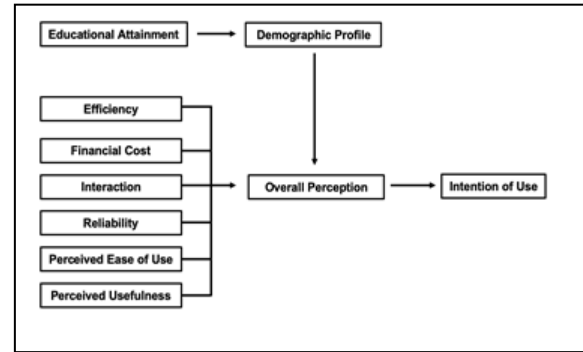


Fig.2. Modified Technology Acceptance Model

III. RESEARCH METHODS

A. Research Design

The study aims to provide a definitive and statistical description of the perception of Telemedicine from middle-aged patients during the COVID-19 pandemic.

This research utilized a descriptive quantitative approach by using survey questionnaires in collecting and interpreting data during the COVID-19 pandemic. The questionnaire used for this study is a modification of a study done by Lin, Z. (2017), modified to better suit the current context to obtain a more accurate and timely consensus among the research respondents. The questionnaire contains statements that aim to determine the perception of middle-aged patients Telemedicine in Tuguegarao City, Cagayan province, Philippines, during the COVID-19 pandemic. Respondents were asked to rank statements that pertain to predetermined variables such as efficiency, financial cost, reliability, interaction, perceived ease of use, and perceived usefulness, as part of a comprehensive understanding of the overall perception of Telemedicine among the respondents.

The questionnaire also included statements regarding the intention of using Telemedicine to evaluate the relationship between the overall perceptions of Telemedicine to the intention of use. The researchers used a modified version of the Technology Acceptance Model (Fig 2.) as the basis for this

research. With the data gathered from the respondents, the researchers were able to adequately assess the current state of perception towards Telemedicine and relate it to the intention of use and suggest changes to adapt and implement Telemedicine in the Philippines based on the results obtained.

B. Subjects and Study Site

The study focused on middle-aged patients in a secondary hospital in Tuguegarao City. The respondents were currently residing in the Philippines and have consented to the study. The researchers contacted the respondents via e-mail and employed a convenience sampling technique to help in gathering more respondents. The respondents were between the ages of 40 to 59 and were also literate in English or Tagalog.

The data collection lasted for one month, from April 29, 2021, until May 29, 2021, through online and physical means. A google form was sent directly to willing respondents who fit the criteria. The form contained both the confidentiality agreement as well as the questionnaire that was answered. Alternatively, a physical questionnaire was printed and distributed to the respondents in the hospital. The physical questionnaire also includes the same confidentiality agreement found in the google form.

The average patient count per month of the target hospital in which the respondents were computed using the most recent live count of 1061 patients, from January 2020 to December 2020; divided by 12 for each month of the year, obtaining an average patient count of 88. Using the live count, the researchers employed the Raosoft software to obtain the minimum number of respondents needed for this research.

The margin of error was set to 5% to offset the smaller sample size and increase the results' confidence levels. The margin of error was calculated using the formula:

$$\text{Margin of error} = 1.96 \pm \sqrt{\frac{p(1-p)}{n}}$$

1.96 is the critical value

p is the sample proportion

n is the sample size

On the other hand, the confidence level was set to 95%, the population size at 88%, and the response distribution was set to 50%.

The recommended sample size of the research is 72. The researchers have also consulted a statistician to confirm and validate the computations.

$$\text{Sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

Fig.3. Sample Size Computation

C. Data Measurement/Instrumentation

The study used a survey questionnaire that was produced to evaluate the perception of middle-aged adult individuals in a secondary hospital towards Telemedicine during the COVID-19 pandemic. The questionnaire that was disseminated is a modification of a questionnaire initially designed to compare the overall perception of Telemedicine among patients who frequently travel and those that do not frequently travel in the Chinese market. The researchers modified the questionnaire used by Lin, Z. (2017) to better suit this study's context.

The questionnaire contained 28 key statements, and the respondents were then asked to rank statements. The respondents were asked to follow the ranking scheme that categorizes the statements into 1 of 5 rankings marked with an "✓" if answered physically, and selected if digitally; 1 being strongly disagreed to 5 being strongly agreed."

The questionnaire was disseminated to willing respondents that fit the criteria. The criteria excluded respondents who have no affiliations in the second hospital in Tuguegarao, Cagayan, respondents that are not within 40-59 years of age and are unwilling to participate in the study or sign the informed consent. The researchers formulated different perceptions to obtain the necessary information to answer the questions, namely efficiency, financial cost, reliability, ease of use, usefulness, and interaction. Questions regarding the intention of use were also asked. The reliability of the questionnaire through Cronbach's Alpha was conducted to test the internal consistency and validity of the measurements. The data used to test the reliability of the questionnaire was taken from the pilot testing performed. The pilot testing was conducted among 20 middle-aged outpatients from a secondary hospital in Tuguegarao, Cagayan, as the primary respondents of the study. The hospital arranged the e-mails of each patient who is willing to participate in the study. The researchers then gathered the e-mails of each participant to identify each patient. The pilot test was conducted through a google form application. The respondents were informed about the nature of the study. They were asked for their consent before proceeding with the questionnaire portion. Special care was also given to mention

data privacy. The same questionnaire was distributed to the respondents. The result of the Cronbach's Alpha should be at 0.7 - 0.9, which indicates well the high reliability of the instrument. Items that fall below 0.7 that are deemed unreliable would be identified and removed in this process. Cronbach's alpha is a statistical tool used to measure the internal consistency of a test or scale. It is a tool that seeks to determine whether the items in a test are consistent and connected to the inter-relatedness with each other (Tavakol, 2011).

The first part of the questionnaire identifies the demographic data of the individuals. The items that were present include names of the respondent, age, and educational attainment.

The second portion of the questionnaire included questions that focus on the variables provided above to understand the perception of middle-aged adult patients towards Telemedicine. The first variable is used to identify how the patients perceive the efficiency of Telemedicine using questions that can determine whether Telemedicine is efficient; the same applies for the other variables such as financial cost, reliability, perceived ease of use, perceived usefulness, interaction, and intention of use.

D. Gathering Procedure

The researchers secured an ethical clearance from the Ethics Review Committee before conducting the study. Once the ethical clearance is secured, and permission from both the advisor and heads is given, the study begins. The researchers obtained respondents by convenience sampling. In coordination with the hospital, different communication platforms were used to collect the data, such as text messages, calls, or e-mails. Furthermore, the secondary hospital aided in the data collection. Prospective respondents were asked first to answer the consent form and whether they were willing to participate in the study. Before a patient can agree or disagree to participate in the survey, they were informed about the study protocol, benefits, risk, and significance of the study. Consent forms were also provided to the respondents before answering the surveys to inform them about the study. The researchers gathered a total of 76 middle-aged patients that fit the inclusion criteria. The patients were at least 40-59 years of age and not necessarily engaged in Telemedicine before. It was made that confidentiality was kept and that all the information gathered was only used for the study. The researchers began processing and analyzing the survey results using statistical means once all the necessary data had been gathered.

E. Ethical Considerations

The researchers seek the approval of the Ethics Review Committee before conducting the study. The researchers promise to uphold the autonomy of the respondents, and proper consent will first be asked before the respondents participate in the study. The selection of respondents will be treated equally without biased judgment based on the inclusion and exclusion of criteria. The researchers will ensure the anonymity and confidentiality of every information of the respondents. It will be regarded as optional when asking for the name of the respondent. The study will benefit the medical field in serving as an insight to every healthcare institution about Telemedicine. The study will not impose harm on the respondents.

The researchers will be held accountable and responsible for the results obtained from the data gathering. The researchers shall practice fidelity and veracity by being true to the results of the study. No monetary or stipend will be given to the respondents. The respondents will be allowed to withdraw from the study whenever they feel necessary.

F. Treatment of Data/Data Analysis

Analysis of the perception and intention of use of middle-aged patients towards Telemedicine during the COVID-19 pandemic in Tuguegarao City, Cagayan province, Philippines, was applied through the use of the following statistical techniques in order to assess the raw data from the questionnaire:

G. Percentage and Frequency

This is a statistical term used to determine the relative frequency of specific answers. This is also used to determine the fraction of the whole of a certain level of a factor. This will be used to analyze the demographic profiles specified above, such as educational attainment. This method will be able to identify the intention of use of the respondents on Telemedicine.

H. Weighted Mean

This is a mean or an average. Some data points or values contribute more "weight" than others instead of contributing equally to the final mean. The researchers will use this statistical treatment to determine the respondents' perception of Efficiency, Financial Cost, Interaction, Reliability, Perceived Ease of Use, Perceived Usefulness, and Intention of Use towards Telemedicine. The researchers will use the formula found below to calculate the weighted mean.

$$\bar{x}_w = \frac{\sum_{i=1}^n (w_i x_i)}{\sum_{i=1}^n (w_i)}$$

Fig.4. Formula for Weighted Mean

Table.3.1. Weighted Mean Interpretation

| Point Range Scaling | Interpretation |
|---------------------|-------------------|
| 1.00 -1.80 | Strongly Disagree |
| 1.81 - 2.61 | Disagree |
| 2.62 - 3.42 | Neutral |
| 3.43 - 4.23 | Agree |
| 4.24 - 5.00 | Strongly Disagree |

I. Pearson R Correlation

This is a statistical technique used to determine relationships between two quantitative and continuous variables. This is used to assess and measure the association between two variables and determine how strong or weak the relationship is. This method will determine the relationship of different factors to the respondents' perception of Telemedicine.

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{N}\right) \left(\sum Y^2 - \frac{(\sum Y)^2}{N}\right)}}$$

Decision (Pearson R Correlation):

If P-Value is greater than or equal to 0.05, the researcher does not reject the null hypothesis. This means that there is no significant relationship between the variables.

If P-Value is less than 0.05, the researcher rejects the null hypothesis. This means that there is a significant relationship between the variables.

Table 3.2. Pearson R Correlation

| Point Scale Range | Interpretation |
|-------------------|-----------------------------------|
| 1.00 - 0.80 | Very Strong Positive Relationship |
| 0.79 – 0.60 | Strong Positive Relationship |
| 0.59 – 0.40 | Moderate Positive Relationship |
| 0.39 – 0.20 | Weak Positive Relationship |
| 0.19 – -0.19 | Negligible / No Correlation |
| -0.20 – -0.39 | Weak Negative Relationship |
| -0.40 – -0.59 | Moderate Negative Relationship |
| -0.60 – -0.79 | Strong Negative Relationship |
| -0.80 – -1.00 | Very Strong Negative Relationship |

IV. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

The following chapter shows the data gathered from the study’s survey and discussion on the analysis of the Perception of Middle-aged Patients from a Secondary Hospital in Tuguegarao, Cagayan, towards Telemedicine during the COVID-19 pandemic in the Philippines. There were a total of 76 respondents after the survey was cond.

A. Educational Attainment Of The Respondents

The section explores the characteristics of the sample through descriptive statistics. Table 4.1.1 below shows that most of the respondents' highest educational attainment is Tertiary School, with 78.95%. Those with the highest educational attainment in Secondary School compose 13.16%. Lastly, those who finished Primary School and Vocational School equally compose 3.95%.

Table.4.1.1.Distribution of the Educational Attainment of the Respondents

| Educational Attainment | No. of Respondents | Percentage |
|------------------------|--------------------|------------|
| Primary School | 3 | 3.95% |
| Secondary School | 10 | 13.16% |
| Vocational School | 3 | 3.95% |

B. Perception of the Respondents towards Telemedicine

Table 4.2.1 below shows the average score of the respondents on their perception towards Telemedicine. In general, the respondents agree that Telemedicine is beneficial, with an average score of 3.62. The respondents agree that they think the diagnosis is reliable in Telemedicine, with the highest mean score of 3.91. Meanwhile, the respondents are neutral the least on not needing the assistance of medical service providers or technicians to use services of Telemedicine with the lowest mean score of 3.09. The table below also shows the respondents' perception on whether Telemedicine is beneficial to the following categories. The respondents agree that Telemedicine is beneficial in terms of efficiency, with a mean score of 3.68. The respondents agree that Telemedicine is beneficial in terms of reliability, with a mean score of 3.67. The respondents agree that Telemedicine is beneficial in terms of financial cost, with a mean score of 3.68. The respondents agree that Telemedicine is beneficial in terms of interaction, with a mean score of 3.57. The respondents are neutral that Telemedicine is beneficial in terms of perceived ease of use with a mean score of 3.40. Lastly, the respondents agree that Telemedicine is beneficial in terms of perceived usefulness, with a mean score of 3.81.

Table 4.2.1. Average Score of the Respondents on their Perception of Telemedicine.

| Categories | Variables | Mean Score | Overall Rank | Interpretation |
|------------|--|------------|--------------|----------------|
| Efficiency | I think Telemedicine saves time in traveling to hospitals and waiting for registration | 3.78 | 8 | Agree |
| | I think Telemedicine saves time of unnecessary physical examination; | 3.38 | 22 | Neutral |

| | | | | |
|--------------------|--|-------------|----|--------------|
| | therefore, it makes the diagnosis efficient | | | |
| | I think Telemedicine saves time in traveling to different departments within the hospital | 3.76 | 9 | Agree |
| | I think Telemedicine saves time in giving medical prescription | 3.80 | 7 | Agree |
| EFFICIENCY | | 3.68 | | AGREE |
| Reliability | I think the diagnosis is reliable in Telemedicine | 3.91 | 1 | Agree |
| | I think the healthcare provider who is in charge of the services of Telemedicine is professional | 3.88 | 2 | Agree |
| | Even without physical examination, the healthcare provider can learn about my health condition | 3.41 | 21 | Neutral |
| | The information (comments on healthcare providers, fees, etc.) provided is accurate and reliable | 3.87 | 5 | Agree |
| | The Telemedicine will not have technical problems | 3.29 | 23 | Neutral |
| RELIABILITY | | 3.67 | | AGREE |
| Financial Cost | I think Telemedicine saves money in traveling to and from the hospitals | 3.88 | 2 | Agree |
| | I think Telemedicine has a cheaper registration fee | 3.62 | 12 | Agree |
| | The service fee of | 3.54 | 16 | Agree |

| | | | | |
|------------------------------|--|-------------|----------------|---------|
| | Telemedicine is reasonable | | | |
| FINANCIAL COST | | 3.68 | AGREE | |
| Interaction | I can get more attention from medical service providers via Telemedicine | 3.68 | 11 | Agree |
| | I feel more comfortable communicating with medical service providers through Telemedicine | 3.51 | 18 | Agree |
| | Communication with medical service providers through Telemedicine is similar to face to face communication | 3.55 | 15 | Agree |
| | I can engage in communication with telemedicine service providers needed | 3.59 | 13 | Agree |
| | The communication frequency is reasonable in Telemedicine | 3.59 | 13 | Agree |
| INTERACTION | | 3.57 | AGREE | |
| Perceived Ease of Use | I think getting access to Telemedicine is easy, such as downloading and installing the application | 3.53 | 17 | Agree |
| | I think it is easy to understand the form and the service process of Telemedicine | 3.47 | 20 | Agree |
| | I think it is easy to use Telemedicine | 3.51 | 18 | Agree |
| | I do not need the assistance of medical service providers or technicians to use services of Telemedicine | 3.09 | 24 | Neutral |
| PERCEIVED EASE OF USE | | 3.40 | NEUTRAL | |

| | | | | |
|--|---|-------------|--------------|-------|
| Perceived Usefulness | I think Telemedicine can aid in the management of my condition | 3.71 | 10 | Agree |
| | I can understand my health condition and manage my health in time | 3.88 | 2 | Agree |
| | I think Telemedicine is useful | 3.84 | 6 | Agree |
| Perceived Usefulness | | 3.81 | Agree | |
| Perception Towards Telemedicine | | 3.62 | Agree | |

C. Intent of Usage of Telemedicine

Table 4.1.3 below shows the average score of the respondents on their intent of usage of Telemedicine. In general, the respondents agree to use Telemedicine with an average score of 3.48. The respondents agree that Telemedicine is acceptable, with the highest mean score of 3.62. Meanwhile, the respondents are neutral that they will always choose Telemedicine whenever they need medical services, with the lowest mean score of 3.41.

Table 4.3.1. Average Score of the Respondents on their Intent of usage of Telemedicine.

| Categories | Variables | Mean Score | Overall Rank | Interpretation |
|------------------------|--|-------------|------------------------------|----------------|
| Intention of Use | In general, I think Telemedicine is acceptable | 3.62 | 1 | Agree |
| | I will choose Telemedicine next time if needed | 3.45 | 3 | Agree |
| | I will always choose Telemedicine whenever I need medical services | 3.41 | 4 | Neutral |
| Intent Of Usage | | 3.48 | Agree Of Telemedicine | |

D. Relationship between Educational Attainment and the Perception of the Respondents towards Telemedicine

Table 4.4.1 below shows the relationship between educational attainment and the respondents' overall perception of Telemedicine. The researchers used Pearson Correlation to

assess Educational Attainment's relationship and their overall perception of Telemedicine. With a test statistic of $r=-0.21$ and a p-value of 0.07, which is greater than 0.05, there is no significant relationship between the respondents' educational attainment and their overall perception of Telemedicine.

Table 4.4.1. Pearson Correlation of the Educational Attainment to the Overall Perception towards Telemedicine

| Variables | Relationship to Overall Perception | P-Value | Interpretation |
|------------------------|------------------------------------|---------|--|
| Educational Attainment | -0.21 | 0.07 | There is no significant relationship between the variables |

E. Relationship between the Predetermined Variables and the Overall Perception of the Respondents towards Telemedicine

Table 4.5.1 below shows the relationship between the predetermined variables and the respondents' overall perception of Telemedicine. With a test statistic of $r=-0.21$ and a p-value of 0.07, which is greater than 0.05, there is no significant relationship between the respondents' educational attainment and their overall perception of Telemedicine. With a test-statistic of $r=0.77$ and a p-value of <0.001 , which is less than 0.05, there is a significant strong positive relationship between the efficiency of Telemedicine and the respondent's overall perception of Telemedicine. With a test-statistic of $r=0.79$ and a p-value of <0.001 , which is less than 0.05, there is a significant strong positive relationship between the reliability of Telemedicine and the respondent's overall perception of Telemedicine. With a test-statistic of $r=0.76$ and a p-value of <0.001 , which is less than 0.05, there is a significant strong positive relationship between the financial cost of Telemedicine and the respondent's overall perception of Telemedicine. With a test-statistic of $r=0.89$ and a p-value of <0.001 , which is less than 0.05, there is a significant very strong positive relationship between the interaction of Telemedicine and the respondent's overall perception of Telemedicine. With a test-statistic of $r=0.81$ and a p-value of <0.001 , which is less than 0.05, there is a significant very strong positive relationship between perceived ease of use of Telemedicine and the respondent's overall perception of Telemedicine. With a test-statistic of

$r=0.85$ and a p-value of <0.001 , which is less than 0.05, there is a significant very strong positive relationship between the perceived usefulness of Telemedicine and the respondent's overall perception of Telemedicine.

Table 4.5.1. Pearson Correlation of the Predetermined Variables to the Overall Perception towards Telemedicine

| Variables | Relationship to Overall Perception | P-Value | Interpretation |
|-----------------------|------------------------------------|----------|--|
| Efficiency | 0.77 | <0.001 | There is a strong positive relationship between the variables |
| Reliability | 0.79 | <0.001 | There is a strong positive relationship between the variables |
| Financial Cost | 0.76 | <0.001 | There is a strong positive relationship between the variables |
| Interaction | 0.89 | <0.001 | There is a very strong positive relationship between the variables |
| Perceived Ease of Use | 0.81 | <0.001 | There is a very strong positive relationship between the variables |
| Perceived Usefulness | 0.85 | <0.001 | There is a very strong positive relationship between the variables |

*Note: Significant at p-value = 0.05

F. Relationship between the Overall Perception and Intention of Use of the Respondents

Table 4.6.1 below shows the Pearson Correlation of the relationship between the overall perception and intention of using the respondents towards Telemedicine. With a test-

statistic of $r=0.54$ and a p-value of <0.001 , which is less than 0.05, there is a significant moderate positive relationship between perceived ease of use of Telemedicine and the respondent's intention to use Telemedicine. With a test-statistic of $r=0.70$ and a p-value of <0.001 , which is less than 0.05, there is a significant strong positive relationship between the perceived usefulness of Telemedicine and the respondent's intention of use of Telemedicine. Finally, with a test-statistic of $r=0.83$ and a p-value of <0.001 , which is less than 0.05, there is a significant very strong positive relationship between the overall perception of Telemedicine and the respondent's intention of use of Telemedicine.

Table.4.6.1. Pearson Correlation of the Overall Perception and the Intention of Use towards Telemedicine

| Categories | Relationship to Intentions | P-Value | Interpretation |
|-----------------------|----------------------------|----------|---|
| Efficiency | 0.28 | 0.01 | There is a weak positive relationship between the variables |
| Reliability | 0.53 | <0.001 | There is a moderate positive relationship between the variables |
| Financial Cost | 0.62 | <0.001 | There is a strong positive relationship between the variables |
| Interaction | 0.72 | <0.001 | There is a strong positive relationship between the variables |
| Perceived Ease of Use | 0.54 | <0.001 | There is a moderate positive relationship between the variables |
| Perceived Usefulness | 0.70 | <0.001 | There is a strong positive relationship |

| | | | |
|--------------------------------------|------|----------|--|
| | | | between the variables |
| Overall Perception | 0.83 | <0.001 | There is a very strong positive relationship between the variables |
| *Note: Significant at p-value = 0.05 | | | |

G. Discussion

This study was designed to identify the relationship between the perception and intention of use of middle-aged patients to their intention of using Telemedicine during the COVID-19 pandemic in the Philippines. It was found that, in general, the respondents' overall perception of Telemedicine and the respondents' intention of use of Telemedicine have a very strong positive relationship. From this, it was inferred that the respondents' general impression of Telemedicine greatly affects their intention of using Telemedicine. The respondents' overall perception is influenced by educational attainment and predetermined variables, including efficiency, reliability, financial cost, interaction, perceived ease of use, perceived usefulness, and intention of use. A study by Lin (2017) conformed to this theory with the findings of their study wherein higher efficiency, reliability, perceived ease of use and usefulness, lower financial cost, and needs for interaction resulted in a higher overall perception of Telemedicine. On the other hand, Intention of use, according to Davis (1989), is influenced by attitude, which is determined by perceived usefulness and perceived ease of use. Furthermore, the correlation of each category will be further discussed below.

The data showed that educational attainment does not correlate with patients' overall perception of Telemedicine. Hence, the researchers do not reject the hypothesis that there is no significant relationship between educational attainment and the respondents' overall perception. These findings contradict the several studies conducted wherein education and health literacy are directly proportional (Mackert et al., 2016; Wernhart et al., 2019). According to van der Heide et al. (2014), despite strong correlations, educational attainment is not equivalent to a person's health literacy. A finding supports this by the Australian Bureau of Statistics (2006), which states that a considerable proportion of respondents with higher education showed poor health literacy. This explains why there is no significant relationship between the educational attainment and perception of respondents towards respondents.

The results of this study show that there is a strong positive relationship between the efficiency of Telemedicine and the respondent's overall perception of Telemedicine. Based on the results obtained from the survey, respondents agreed that Telemedicine saves time in traveling to hospitals and waiting for registration. Hence, Telemedicine has a greater satisfaction rating among patients, attributed to the shorter waiting times experienced using Telemedicine services (American Well Survey, 2017). In addition, due to the nature of telemedicine services, most patients have access to clinicians in the safety of their homes (Gillman-Wells et al., 2021; Hong et al., 2020). This, in turn, decreases the need to physically travel to and from the hospital, thus improving efficiency (Caulfield, 2015; George et al., 2009).

Similarly, respondents agree that telemedicine services save time in traveling to different departments within the hospital. Telemedicine facilitates direct digital contact with the clinician. It provides instantaneous feedback and real-time engagements between clinicians and patients (Funkerbuk et al., 2019). The respondents were neutral regarding telemedicine saving time from unnecessary physical examination, making diagnosis more efficient. The perception of efficiency of diagnosis varies within different specialties of medicine. Specialties that rely on verbal communication between patients and healthcare providers avoid unnecessary physical examinations making diagnosis more efficient (Hersh et al., 2006). Respondents also agreed that Telemedicine saves time in giving medical prescriptions. As previously mentioned, Telemedicine provides a linear experience for patient consultations, decreasing wait times. Access to patient records would avoid unnecessary interaction between the clinician and the patient, subsequently increasing healthcare provider efficiency (Jain et al., 2019).

The researchers found out that there is a strong positive relationship between reliability and the respondents' overall perception of Telemedicine. Indicating that the respondents agree that Telemedicine is reliable. Respondents who have a positive perception towards Telemedicine perceive the same level of reliability when compared to face-to-face consultations (Wood et al., 2015). Furthermore, diagnosis made through Telemedicine is accurate, leading to positive patient satisfaction rates (Rajbhandari et al., 2019). Consequently, the respondents agree that healthcare providers who are in charge of Telemedicine services are professionals and the information provided by the healthcare providers is accurate and reliable. Despite Telemedicine being dependent on the use of the internet, the respondents deemed the healthcare providers

professionals, qualified and dependable with the information they provided, which concerns their privacy, thereby contributing to its reliability (Lin, 2017). In addition, healthcare providers can build cognitive, interpersonal trust with patients through presenting medical certificates, which serve as evidence to verify the healthcare provider's education and professional ability (Lee et al., 2019). Finally, the respondents expressed a neutral stance that even without physical examination, the healthcare provider can learn about their health condition.

Moreover, the lack of physical examination affects Telemedicine in impeding accurate diagnosis and effective management in managing musculoskeletal conditions (Malliaras et al., 2021). Meanwhile, Wood et al. (2015) refuted the idea that the reliability of Telemedicine is questionable without physical examination, through the basis that most of the patients were given proper diagnosis and treatment plan by the usage of Telemedicine. Based on these studies, contrasting perceptions regarding this statement explain why the respondents expressed a neutral stand on this statement. Additionally, the respondents demonstrated a neutral stand on the statement that Telemedicine will not have technical problems. A study revealed that despite having technical problems, especially with limited electricity, the respondents are still familiar with telemedicine platforms such as HIV and text supports (Magoba et al., 2018). Improvement in patient mobility, autonomy, and health-related quality of life is achieved when feasibility and effectiveness are met in the implementation of Telemedicine, especially in respondents located in rural areas (Hazenberg et al., 2020).

In contrast, Bali (2018) revealed that slow internet connection led to the slow uptake of Telemedicine. Furthermore, a study conducted in India reported that limited electricity and power supply hinders the access of patients to Telemedicine which results in poor diagnosis (Dias and Vidya, 2021). Based on these studies, this explains why the respondents exhibited neutrality on this statement due to different perceptions.

In terms of expenses, the results show a strong positive relationship between financial cost and the respondents' overall perception of Telemedicine as data listed from respondents state that Telemedicine reduces financial costs for patients compared to regular consultations. This can entice more patients and consultants to integrate a telemedicine platform as continuous consultations conducted through Telemedicine are cost-effective in the long run for patients (Wang et al., 2016). Telemedicine's inherently lower price than face-to-face check-

ups can be ascribed to miscellaneous fees that can indirectly affect a patient's ability to acquire healthcare, such as transportation (Dullet et al., 2017). Telemedicine also allows for a cheaper treatment protocol without reduced efficacy in areas of medicine such as in dermatology, radiology, pediatrics, and intensive care unit (ICU) rooms (Atmojo et al., 2020), as well as in orthopedic consultations (Buvik et al., 2019). The costs of the methods for telemedicine protocols need to be thoroughly examined in order to maximize the benefit of Telemedicine's efficacy while maintaining low costs. As the pandemic continues to hinder face-to-face consultation, the telemedicine approach in the Philippines is a viable alternative for providing healthcare given the Philippines' status as a developing country.

The interaction was found to have a very strong positive relationship with the overall perception of Telemedicine. First, a consensus was established among middle-aged patients that they could get more attention from medical service providers via Telemedicine. A study with a similar finding likewise concluded that healthcare providers were still able to build rapport considering Telemedicine was the mode of consultations (Elliott, 2020). Second, it was established that DPR is considered as the gateway in providing appropriate diagnosis and treatment (Sadati, 2018). It is apparent from the results obtained from the survey that the respondents are satisfied with the attention they received. After all, the "true core of clinical practice" is to bring forth a good doctor-patient relationship, for it is significant across all healthcare activities (Turabian, 2019). Next, the respondents agreed that they feel comfortable when communicating with medical service providers through Telemedicine. DPR starts when communication begins, and as indicated in studies, it is anchored upon trust, knowledge, regard, and loyalty (Chipidza, 2015).

Furthermore, the number of interactions between the healthcare provider and the patient shows how good the established communication is. Results indicated that the respondents felt comfortable communicating through Telemedicine. This finding is comparable with the long-standing research suggesting the idea that computer-mediated communication results in equally if not greater interactions (question asking, question/disclosure intimacy, and verbal statements of affection) over face-to-face communication (Antheunis, 2011). The respondents also agreed that communication with healthcare providers through Telemedicine is similar to face-to-face communication. A similar study also found that doctor-

patient communication in web-based consultations did not differ from face-to-face consultations (Tates et al., 2017). The respondents concluded this because the healthcare provider and the patient must have provided efforts to compensate for the absence of nonverbal cues that should infer each other's attitude in a face-to-face context (Walther, 2015). The respondents were satisfied with their interaction with medical service providers through Telemedicine. They agreed they could communicate with Telemedicine when needed and the communication frequency is reasonable. Therefore, Telemedicine is deemed to be an interactive approach in providing health care.

The study results show a very strong positive relationship between perceived ease of use of Telemedicine and overall perception of Telemedicine. Perceived ease of use is defined as the measure from which a person believes that a certain methodology would be free from effort (Davis, 1989). From the responses on PEU, it can be seen that the respondents agreed that getting access to Telemedicine is easy, such as downloading and installing the application. Furthermore, Middle-aged patients do not experience any difficulties accessing Telemedicine (Wildenbos et al., 2018). The respondents also agreed that it is easy to understand the form and the service process of Telemedicine.

Additionally, Navigating and understanding the service process of Telemedicine does not pose a problem with this age group (Portz et al., 2018). In terms of usage, the respondents also agreed that Telemedicine is easy to use. This is supported by a study conducted in Hershey, Pennsylvania, USA, that telemedicine platforms are easy to use for patients and health providers alike (Shokri and Lighthall, 2020).

On the other hand, the respondents expressed a neutral stance regarding needing the assistance of providers or technicians to use telemedicine services. In developing countries such as the Philippines, PEU is influenced by the ease of finding information and web navigation, even for those with limited technological experience (Aljoza and Susanto, 2015; Brown, 2002). In terms of PEU, the respondents find Telemedicine to be effective, efficient and satisfied, which results in a positive outlook (Hamid et al., 2016; Klaassen et al., 2016; Li et al., 2021).

In line with the results, there is a very strong positive correlation between perceived usefulness and the overall perception towards Telemedicine. Perceived usefulness is the measure of how a person believes that a certain methodology would improve one's job performance (Davis, 1989). The respondents agreed that Telemedicine could manage their condition.

Reassuringly, a study conducted by Mattioli et al. (2020) revealed that healthcare providers utilize alternative remote media to accommodate non-COVID-19 patients to focus on high-risk patients, which may guarantee the respondents' perception, as revealed in the study. This is supported by Galiero's (2020) studies, which explored the usefulness of teleophthalmology, and Burdese et al. (2018), which highlighted the use of telemonitoring systems in managing high-risk chronic heart failure. The respondents also agreed that Telemedicine conserves time in scheduling an appointment and energy, which contributed more to the perceived usefulness of this mode (American Well Survey, 2019). It can also be drawn from the results that the respondents trust and are satisfied with Telemedicine as Amin et al. (2014) and Chipidza et al. (2015) suggest that perceived usefulness is related to trust and satisfaction. Furthermore, the outcomes of this study in terms of perceived usefulness can also be justified with the current situation with the pandemic as Telemedicine being the preferred means of the patient for their healthcare as they deem it to be useful because of the risk of going to hospitals (Kichloo et al., 2020).

Furthermore, all of these variables showed a positive correlation towards the overall perception of the respondents; hence, the researchers reject the hypothesis that there is no significant relationship between the predetermined variables, namely, efficiency, reliability, financial cost, interaction, perceived ease of use and perceived usefulness, and the overall perception of the respondents towards Telemedicine.

When examining the results obtained comprehensively, it showed a very strong positive relationship between overall perception and intention of use. Implying that respondents displayed a very positive impression towards Telemedicine and would be willing to engage in the service. Hence, the study rejects the hypothesis that there is no significant relationship between the perception and the intention of using the respondents towards Telemedicine. Perception is defined as the process of procuring awareness or understanding of sensory information (Ou, 2017). On the other hand, the intention of use is a close link to actual behavior (Teo, 2011).

Behavioral intention is a factor that determines the willingness to perform a behavior (Ajzen, 1991). According to Cranen et al. (2011), a high overall perception contributes to the acceptance of using Telemedicine as an alternative for a face-to-face consultation.

Moreover, their study also showed that patients who have prior use of Telemedicine developed more accurate perceptions than

those who have not used it before. All predetermined variables: Educational Attainment, Efficiency, Reliability, Financial Cost, and Interaction, and Perceived Ease of Use and Perceived Usefulness were all taken into account with regards to Overall Perception (Lin, 2017). In this study, there is a moderate positive relationship between reliability and intention to use Telemedicine. A study done in Spain claimed that reliability is said to be involved with information exchange, communication, and collaboration in clinical practice, which affects the usage of Telemedicine (Saigi-Rubió et al., 2016). A strong positive relationship between interaction and intention of use was presented in the data. Respondents agreed that the interaction they get from Telemedicine is similar or even greater with computer-mediated consultations when compared to face-to-face consultations (Antheunis, 2011; Yip, 2003). There is a strong positive relationship between financial costs and perceived usefulness between the intention of use. These two are said to have the biggest impact on the probability of using Telemedicine (Saigi-Rubió et al., 2016). Perceived Ease of Use is said to increase when respondents find Telemedicine is effective and easy to operate and adapt, which improves their intention to use (Hamid et al., 2016; He et al., 2018). On the other hand, there is a moderately positive relationship with perceived ease-of-use and a weak positive relationship with efficiency correlated with Telemedicine's intention as the perceived ease of use of technology influences navigation efficiency (Saigi-Rubió et al. (2016).

Furthermore, perceived usefulness and perceived ease-of-use are two contributing factors that influence perception leading to the actual usage (Kamal et al., 2020). The positive overall perception towards telemedicine results in the greater acceptance and adaptation of the new system (Hossain et al., 2020). The current pandemic contributed to the positive overall perception of the respondents as this offers a contactless alternative compared to the face-to-face clinical check-up, thus increasing its acceptance and probability of usage of Telemedicine (Holtz, 2021).

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. Summary

The conduction of face-to-face consultation has always been the gold standard and status quo for healthcare providers and patients alike. However, the enforcement of stringent social distancing guidelines by the Inter-Agency Task Force on Emerging Infectious Diseases (IATF-EID) to mitigate the

spread of the COVID-19 virus has forced many among the general population into staying at home. This paradigm shift has forced healthcare workers into looking into different methods of providing effective healthcare while adhering to strict guidelines. Despite the emergence of Telemedicine as an alternate form of service to patients, it has yet to be fully implemented in several healthcare settings in the Philippines. The overall perception among middle-aged patients towards Telemedicine and its implications on its intention of use provide insight into the implementation of Telemedicine in the Philippines.

This study has provided an overview of the current trends of the overall perception of middle-aged patients towards Telemedicine in terms of the predetermined values, which include: efficiency, reliability, financial cost, interaction, perceived ease of use, and perceived usefulness. The overall perception of these respondents to Telemedicine was then analyzed against the intention of use. Furthermore, the respondents' educational attainment was also correlated to the overall perception of the respondents toward Telemedicine. Therefore, the Department of Health (DOH) or individual hospitals and private institutions can use the data collected to implement Telemedicine in the healthcare system. In addition, this study can give rise to intervention programs to implement appropriate adjustments, modifications, and improvements in providing service.

As for the method used, the researchers conducted a descriptive quantitative approach by using both physical and online survey questionnaires on randomly selected middle-aged patients from Tuguegarao, Cagayan. The study used descriptive statistics to measure the educational attainment of the respondents. The data gathered from the questionnaire were analyzed using Pearson Correlation to assess the relationship between the variables in the study. Moreover, based on the data gathered from the survey, the researchers found out that the highest educational attainment of most of the respondents is tertiary school at 78.95%, next is secondary schooling at 13.16%, lastly primary school and vocational school at 3.95%. Furthermore, the researchers were also able to conclude that the respondents agree that Telemedicine is beneficial in terms of efficiency, yielding a mean score of 3.68. Likewise, the respondents also agree that Telemedicine is beneficial when it comes to the financial cost, yielding a similar mean score of 3.68.

Regarding the reliability of Telemedicine, the respondents also agree that it is beneficial, with a mean score of 3.67. Regarding perceived ease of use of Telemedicine, the respondents are

neutral, giving a mean score of 3.40. Finally, when considering the perceived usefulness of Telemedicine, the respondents agree that it is beneficial, resulting in a mean score of 3.81.

Moreover, concerning interaction, the respondents agree that Telemedicine is beneficial, yielding a mean score of 3.57. In sum, the researchers conclude that the respondents' overall perception of Telemedicine is positive, with a mean score of 3.62. Additionally, the researchers determined that the respondents' intent of usage of Telemedicine is positive, with a mean score of 3.48. Moreover, the researchers also found out that 72.37%, more than half of the respondents, have no experience using Telemedicine.

When assessing the relationship between the predetermined variables to the overall perception towards Telemedicine, it was found that there is a strong positive relationship between efficiency and the overall perception of Telemedicine, yielding a test statistic of 0.77. At the same time, financial cost and reliability concluded with similar results of 0.76 and 0.79, respectively, both having a strong positive relationship between the variable and overall perception. On the other hand, perceived ease of use yielded a test statistic of 0.81, with a very strong positive relationship of the variable to the overall perception of Telemedicine. Furthermore, there is a very strong positive relationship between perceived usefulness and overall perception, which has also yielded similar results with a test statistic of 0.85. Lastly, there is also a very strong positive relationship between interaction and Telemedicine's overall perception with a test statistic of 0.89.

Using descriptive statistics to analyze the data for educational attainment, the researchers discovered that there is no significant relationship between the educational attainment of the respondents and their overall perception of Telemedicine as test statistic yielded -0.21. On the other hand, using the different responses of the respondents to the predetermined variables, the researchers were able to determine whether there is a significant relationship between the predetermined variables and intention of use of Telemedicine. Between efficiency and intention of use, there is a weak positive relationship as test statistics yielded 0.28. Furthermore, the researchers gathered that both reliability and perceived ease of use have a moderate positive relationship with the intention of use as test statistics yielded 0.53 and 0.54, respectively. As for financial cost, perceived usefulness, and interaction, the researchers deemed these three variables to have a strong positive relationship to the intention of use as test statistics yielded 0.62, 0.70, and 0.72, respectively. All in all, the researchers conclude that there is a

very strong positive relationship between the variables and the respondents' intention of use of Telemedicine based on the test statistic of 0.83.

B. Conclusions

The following conclusions are presented based on the results from this study:

- There is no significant relationship between the educational attainment of the respondents and their overall perception of Telemedicine.
- There is a strong positive relationship between the predetermined variables: efficiency, reliability, and financial cost, and the overall perception of respondents towards Telemedicine. At the same time, there is a very strong positive relationship between the predetermined variables: interaction, perceived ease of use and perceived usefulness, and respondents' overall perception towards Telemedicine.
- There is a very strong positive relationship between the overall perception and the respondents' intention towards Telemedicine.

The overall perception of middle-aged patients is not affected by the educational attainment of the patient. This means that education is not a necessity for patients to have before choosing to partake in Telemedicine. Telemedicine, therefore, can be successful even in a place where there is poor literacy, a common scenario in rural areas. The contrasting result in regards to other studies may be attributed to geographical differences and the increased need for a telemedicine because of the pandemic. On the other hand, overall perception of middle-aged patients is strongly affected by the predetermined variables which are efficiency, reliability, interaction, perceived ease of use, and perceived usefulness. This suggests that the patients must first find the predetermined variables to be adequate before deciding to participate in Telemedicine. Furthermore, efficiency, reliability, and financial cost showed a positive relationship with overall perception while interaction, perceived ease of use, and perceived usefulness showed a very positive relationship with overall perception. Current perception of the respondents therefore implies that they find the current Telemedicine system to be satisfactory. From this, the researchers can say that the current Telemedicine system is already adequate yet improvements can still be done to further increase patient satisfaction. The study also revealed that there is a very strong positive relationship between overall perception and intention of use towards telemedicine. This

means that even middle-aged patients, who are not well-versed with advanced technology, are willing to adjust to a Telemedicine infrastructure when there is no option for face-to-face consultations. Therefore, Telemedicine is considered as an alternative platform that can be used even during the post-pandemic period. Moreover, there is still a continuous need for healthcare providers to innovate in the way they interact with their patients. The circumstances in which the pandemic has hindered healthcare provision are unfavorable, particularly for indigent people. Telemedicine provides a convenient method for consultation, increases accessibility for all people in acquiring for their healthcare needs, and helps clinicians attend to the needs of their patients without risking possible exposure in light of social distancing measures.

C. Recommendations

The following are recommendations for future research:

- Allow a broader range of representation among patients by including respondents from different demographics, including age, geographic location, specific health conditions, different types of hospitals and larger sample size.
- Conduct a different research with healthcare providers as respondents to improve their practice of telemedicine.
- Provide the population with video-based information of telemedicine services.
- Improve the modified TAM model by including other variables that can influence respondent's perception, as well as adding usage behavior as a determining factor to actual usage for further research.

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