SUPPORTING CHRONIC DISEASE MANAGEMENT WITH TELEMEDICINE: AN EXAMINATION THROUGH TECHNOLOGY ACCEPTANCE MODEL

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Abstract - This research was conducted to explore how telemedicine can assist people with chronic illnesses by examining the relationship between healthcare needs, social influence, and healthcare access by employing the Technology Acceptance Model (TAM). The study was conducted across 144 participants with varying healthcare needs and social backgrounds. The findings revealed that healthcare needs had a significant and positive impact on the perceived usefulness of telemedicine. Social influence was identified as a key factor that positively affected both the perceived usefulness and ease of use of telemedicine. Moreover, the overall acceptance of telemedicine among people with chronic illnesses was positively influenced by perceived usefulness and ease of use. The healthcare access that would influence the acceptance of telemedicine did not have a significant moderating effect on the acceptance of telemedicine as initially hypothesized. The study's conclusions provide useful information for healthcare professionals, policymakers, and health tech businesses. This helps to enhance telemedicine adoption and develop effective implementation strategies among those who manage chronic diseases.

Keywords: Chronic Diseases; Healthcare Access; Healthcare Needs; Technology Acceptance; Technology Acceptance Model; Telemedicine

1. INTRODUCTION

1.1. Background

Telemedicine is largely described as using technological devices for human health, from health promotion to patient education (Guitton, 2021). When most of the health cases handled through Telemedicine are acute diseases, a lesson learned after COVID-19 has become endemic is that managing chronic illness through Telemedicine has become a key factor in improving patient adherence and healthcare literacy (Corbett et al., 2020). Chronic diseases, as defined by the Centers for Disease Control and Prevention's About Chronic Disease (2022), encompass conditions that require continuous medical attention or impose limitations on daily activities, lasting for a year or longer.

Hypertension, arthritis, stroke, oral health problems, chronic pulmonary diseases, and diabetes are the diseases that are commonly reported among elderly people in Indonesia. Elderly Indonesians are most commonly killed by stroke, ischemic heart disease, and diabetes, according to a recent report by the World Health Organization (WHO). It is crucial to note that a 2019 report by Statistics Indonesia revealed Indonesia's aging population will reach 17.3 million citizens aged 65 and above. Indonesia is projected to experience a 40% increase in elderly citizens by 2025, making it one of the fastest-aging countries in Asia. This demographic shift will have a significant impact on the healthcare industry.

Meanwhile, around 44% of the senior millennial generation that was born between 1981 and 1988 are diagnosed with at least one chronic disease. This generation has symptoms of migraine, depression, asthma, hypertension, and diabetes (mostly diabetic type 2) (Hasibuan, 2022). These individuals rely heavily on regular medical consultations, specialized treatments, and timely interventions to manage their conditions and enhance their quality of life.

Previous research mostly focused on people using telemedicine during pandemics. However, Swidan et.al, 2022 found 67.7% of people with chronic diseases as the most used telemedicine during the pandemic disease but this study does not focus on how telemedicine can help chronic disease people. Studies have shown that patients with chronic diseases are generally interested in using telemedicine, regardless of their health status and age (Reicher & Toren, 2021). Studies have found that a majority of participants had a positive attitude toward telemedicine, considering it a useful tool during the pandemic. Participants believed that telemedicine saves time, labor, and costs and is an effective tool for treating patients at a safe distance (Alajwari et al., 2021). Furthermore, the utilization of telemedicine in managing chronic diseases has been well established, and it has been shown to provide constant monitoring, improved access to healthcare providers, and reduced waiting time (Sim & Lee, 2021). On the other hand, in Jakarta, the findings of Halodoc's 2022 report reveal a remarkable statistic: a mere 6% of patients classified under the chronic disease category engaged in healthcare transactions through telemedicine platforms. This study aims to fill in the gap by focusing on why patients with chronic diseases in Jakarta use telemedicine to alleviate their situation.

Telemedicine is now deemed an essential tool to ensure uninterrupted care for patients with multiple chronic ailments, particularly those who are more susceptible to the virus. (Omboni et al., 2022). Chronic disease patients need frequent monitoring and specialized care. Furthermore, a study by Chu et al. (2021) found that the utilization of telemedicine has increased among patients with chronic diseases, including diabetes and congestive heart failure.

A report by BPJS shows an 18.6% surge in cases during 2022 compared to 2021 cases, totaling 23.3 million instances of chronic diseases (Katadata.co.id, 2023). This statistic is the impetus for this study due to how it signifies a significant untapped potential within

telemedicine, presenting a unique and promising opportunity for business expansion. The low utilization of telemedicine by chronic disease patients underscores the potential for growth in this arena, where virtual consultations and remote healthcare services could bridge gaps in accessibility, affordability, and convenience. Telemedicine offers solutions to these challenges by providing remote access to consult with doctors, facilitating self-management, and reducing the burden of visiting hospitals in person (Arlinta, 2021).

This study explores factors influencing chronic patients' acceptance of telemedicine services, such as healthcare needs, social influence, and healthcare access as moderating variables. The Technology Acceptance Model (TAM) is used to analyze key factors in telemedicine adoption by conducting questionnaires from participants with chronic diseases in DKI Jakarta. Following this, we present the results and discuss their implications for the adoption of telemedicine. Finally, we conclude with recommendations for healthcare stakeholders and outline potential avenues for future research in this field. Each section aims to bridge the gap between theoretical models and practical applications in telemedicine, providing actionable insights for improving healthcare delivery.

1.2. Literature Review

Technology acceptance refers to an individual voluntarily embracing new technology. The willingness of users to adopt technology plays a pivotal role in its successful implementation and utilization (Holden, 2009). In recent years, various models have been developed by researchers to understand the factors that influence the acceptance of technology by users. These models have been validated multiple times to determine their effectiveness in different applications of information technology. Yet, the Technology Acceptance Model (TAM) introduced by Davis (1989) remains the most well-established and substantial framework for understanding technology acceptance. Emerging from sociology and psychology, TAM is widely utilized across diverse research endeavors. Its primary objective is to predict users' adoption of new technology and identify potential design issues within an information system before it becomes widely adopted. TAM comprises two core concepts: perceived ease of usefulness and perceived ease of use, which find application in various technological contexts.

However, several studies have raised concerns regarding the adequacy of TAM's original constructs in explaining user intentions toward health information technologies. In cases like the adoption of telemedicine services, respondents' intentions can only be adequately explained partially through a limited set of variables. The adoption of telemedicine services depends on a multitude of social and behavioral factors not accounted for in the TAM model. The research underscores the intertwined influence of diverse social influence, which can significantly reshape user behavior toward embracing new technology on end-users' intention to use e-services and, consequently, e-service acceptance (Taherdoost, 2018).

In today's healthcare landscape, access to healthcare providers holds paramount significance for patients battling chronic diseases (Chudasama et al., 2020 & Song et al., 2019) Chronic diseases are a broad range of conditions that require ongoing medical attention or limit daily activities, lasting for a year or more, as defined by the Centers for Disease Control and Prevention in their publication "About Chronic Disease" for the year 2022. These individuals rely heavily on regular medical consultations, specialized treatments, and timely interventions to manage their conditions and enhance their quality of life.

The literature above (Taherdoost, 2018; Chudasama et al., 2020 & Song et al., 2019) suggests that access to healthcare, healthcare needs, and social influence impact people's

acceptance of telemedicine. Exploring these variables is essential to understanding how ready people with chronic diseases are to use telemedicine in their healthcare routines. It is crucial to understand how these variables interact to ensure the success of telemedicine initiatives.

1.2.1 Healthcare Needs

Healthcare Needs refer to the specific requirements and demands for healthcare services and interventions that individuals or populations with chronic diseases or other health conditions require. It encompasses the range of medical, psychological, social, and supportive care necessary to address the health needs of individuals (Endeshaw, 2020). It emphasizes the multidimensional nature of healthcare quality and the importance of incorporating the perspectives of various healthcare stakeholders. The healthcare needs associated with chronic diseases, such as frequent monitoring, medication management, or lifestyle modifications, might be more open to telemedicine interventions. Telemedicine has been found to be of interest to patients with chronic diseases, regardless of their age or health status (Reicher & Toren, 2021). The study highlights that telemedicine interventions can provide remote monitoring, medication management, and lifestyle modification support, which is crucial for addressing the healthcare needs of patients with chronic diseases (Sim & Lee, 2021).

Hypothesis 1a (H1a): Healthcare needs positively influence the perceived usefulness of telemedicine services among the population with chronic diseases in DKI Jakarta.

Hypothesis 1b (H1b): Healthcare needs positively influence the perceived ease of use of telemedicine services among the population with chronic diseases in DKI Jakarta.

1.2.2. Social Influence

Social influence is the degree or the extent to which a person believes that others, especially his/her acquaintances and friends, believe that he/she should use a new system (Venkatesh, 2003). Social influence encompasses the impact of peers, family, healthcare professionals, and society on individuals' technology acceptance decisions. Studies have shown that individuals are more likely to adopt telemedicine if their peers or friends have positive experiences (Khan, N. M., & Bhatti, R., 2018). Positive peer experiences contribute to the perceived social norm of using telemedicine, encouraging adoption among potential users. Healthcare professionals play a pivotal role in shaping patients' attitudes toward telemedicine. Physicians' recommendations and endorsements can significantly impact patients' perceptions of telemedicine's effectiveness and trustworthiness (Chatterjee, S., & Kar, A. K., 2018). Familial support and encouragement also affect individuals' decisions to adopt telemedicine. Families' beliefs in the benefits of telemedicine can influence the perceived usefulness of the technology (Keesara, S., Jonas, A., & Schulman, K., 2018). In developing countries, joint families rely on each other for support. Telemedicine's acceptance among the family and community, including those with chronic diseases and their caretakers, can be impacted. Therefore, it is imperative to thoroughly investigate the social influence on the adoption of telemedicine and evaluate whether it encourages or discourages its usage.

Hypothesis 2a (H2a): Social influence positively influences the perceived usefulness of telemedicine among the population with chronic diseases in DKI Jakarta.

Hypothesis 2b (H2b): Social influence positively influences the perceived ease of use of telemedicine among the population with chronic diseases in DKI Jakarta.

1.2.3. Perceived usefulness

Perceived usefulness is central to TAM, defined as the extent to which individuals believe technology will enhance their performance (Davis, 1989). It is closely related to users' attitudes, behavioral intentions, and actual adoption decisions. In the context of telemedicine, perceived usefulness reflects patients' beliefs about how telemedicine can improve healthcare access, convenience, and overall outcomes. Studies reveal that patients perceive telemedicine as a tool for better health management, enabling regular monitoring, timely interventions, and improved health outcomes (Patel and Patel, 2019). Exploring how participants perceive the alignment of telemedicine with their healthcare requirements for chronic disease patients and how it enhances their overall healthcare encounter is imperative for comprehending their acceptance of telemedicine.

Hypothesis 3 (H3): Perceived usefulness positively mediates the acceptance of telemedicine services among the population with chronic diseases in DKI Jakarta.

1.2.4 Perceived ease of use

Perceived ease of use as a central component of the TAM framework, Davis (1989) suggests that perceived ease of use is an essential factor in user acceptance of information technology. It is defined as the degree to which users believe that using a particular technology will be free of effort and straightforward. Within the TAM framework, perceived ease of use is closely linked to user satisfaction, adoption intention, and technology use. Patients' perception of the ease of use of telemedicine platforms, including their user-friendliness and navigability, can positively or negatively impact their willingness to adopt and utilize telemedicine. Studies found that intuitive and aesthetically pleasing interfaces enhance perceived ease of use, improving user satisfaction and adoption (Smith et al., 2020).

Hypothesis 4 (H4): Perceived ease of use positively mediates the acceptance of telemedicine services among the population with chronic diseases in DKI Jakarta.

1.2.5 Healthcare Access

Healthcare Access is the ability of individuals or populations to obtain and utilize healthcare services, including medical care, preventive services, and health promotion activities (Geethanath & Vaughan, 2019). It encompasses various dimensions, such as geographical, temporal, financial, cultural, and digital aspects, that influence an individual's ability to seek and receive appropriate healthcare (Geethanath & Vaughan, 2019). This study focuses on the first dimension, which is spatial in nature. Geographical, also known as accessibility, refers to the location of health care delivery and the patient's residence, which includes concepts such as commuting time and distance (Hoseini-Esfidarjani, et al., 2021). The study emphasized the benefits of telemedicine in providing access to specialized care, particularly for those with chronic illnesses who require frequent treatment, thereby reducing the need for travel.

Hypothesis 5 (H5): Healthcare access positively moderates the acceptance of telemedicine services.

1.2.6 Acceptance of Telemedicine

Measuring the chronic disease patients' acceptance of telemedicine as an alternative to healthcare services, indicated by their intention to use telemedicine and their willingness to recommend it to others, is essential in understanding the overall acceptance of telemedicine. Davis (1989) highlights that user acceptance is influenced by factors such as perceived

usefulness, perceived ease of use, and social influence. Chronic disease patients' intention to use telemedicine and their willingness to recommend it to others reflect their acceptance of telemedicine as a viable alternative to traditional healthcare services.

Hypothesis 6 (H6a): The relationship between people with chronic diseases in DKI Jakarta and the acceptance of telemedicine is positively mediated by healthcare access & perceived usefulness.

Hypothesis 6 (H6b): The relationship between people with chronic diseases in DKI Jakarta and the acceptance of telemedicine is positively mediated by healthcare access & perceived ease of use.

1.3. Research Framework

The six hypotheses mentioned above were summarized in the research framework, shown in Figure 1.

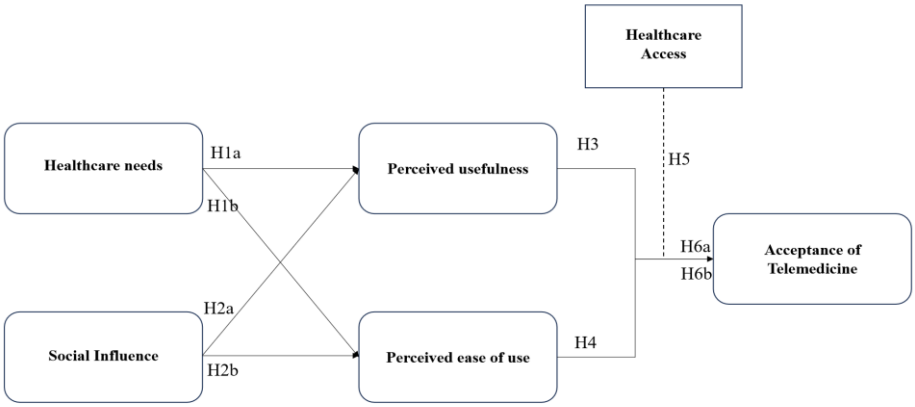

Figure 1. Research Framework

2. DATA AND METHOD

2.1. Research Philosophy and Sampling Approach

This research adopted a pragmatic philosophy, focusing on the practical implications of the findings. The researchers used a survey approach to collect data from a sample population of about 145 respondents from the chronically ill demographic within the DKI Jakarta region. This allowed us to explore the acceptance level of telemedicine services in the real world. As the availability of respondents is niche, this study employed the help of the researchers' cohort and connections to refer people with chronic diseases to answer the questionnaire. This approach guarantees a valid respondent, as the researcher asked the respondent with chronic disease to refer to other patients with chronic disease that they know of.

2.2. Research Design

The study executed a Cross-Sectional Survey Design with the purpose of examining the adoption of telemedicine services within the population of individuals living with chronic ailments. Through this approach, this study assessed the degree of acceptance across various groups of chronic disease patients, all at a specific moment in time.

2.3. Research Strategy

This research employed a comparative research strategy to compare the acceptance levels of various groups of chronic disease patients. Data was collected using Google Forms

questionnaires to the chronic disease patients in DKI Jakarta. Ethical considerations will be prioritized throughout the research process.

2.4. Data Collection

The research aims to target all Indonesians with chronic diseases, but this study focuses on individuals with chronic ailments who reside in DKI Jakarta. As Telemedicine requires verification through ID Card, only participants at least 17 years old will be considered for this study. The questionnaire also collected the demographic data of each participant, such as gender, age, education, self-insured status, type of chronic condition, and monthly health expenses. For representative data 50% of females and 50% male are targeting as participants in this study.

Quantitative data on the level of acceptance is collected using a Likert scale ranging from 1 to 4, with 1 being strongly disagree and 4 being strongly agree. The result was analyzed using descriptive statistics and inferential analysis. The operational definition of each variable and indicator became a questionnaire designed to answer the hypotheses above.

Table 1. Operational Definition, Indicator, and Sources

Variables	Operational Definition	Code	Indicators	Source
Heathcare Needs	The specific requirements and demands for healthcare services and interventions that individuals or populations with chronic diseases or other health conditions require	HN1	I need intensive health care every month related to my health.	Endeshaw, 2020
		HN2	I require Intensive medical attention or consultation regarding my health condition.	
		HN3	It is critical for me to manage my health condition for my overall well-being.	
Social Influence	The degree or the extent to which a person believes that others, especially his/her acquaintances and friends, believe that he/she should use a new system	SI1	Recommendations from my friends and family influence my decisions regarding health care services, including telemedicine services	Venkatesh, 2003
		SI2	I am affected by societal attitudes towards telemedicine when deciding to use it for my health condition	
		SI3	I am willing to try telemedicine based on positive feedback from others who have used it.	
Healthcare Access	The ability of individuals or populations to obtain and utilize healthcare services, including medical care, preventive services, and health promotion activities	HA1	My residence is close to a health care provider (clinic, hospital, etc.).	Geethanath & Vaughan, 2019
		HA2	I can reach healthcare providers whenever I need it	
		HA3	I have to prepare a certain budget to support my health every month.	
		HA4	The internet access I use support me to easily access to telemedicine application	
Perceived Usefulness	The extent to which individuals believe that using technology will	PU1	Using Telemedicine enables me to manage my health	Davis, 1989
		PU2	Using Telemedicine provides a solution for my healthcare needs.	

Variables	Operational Definition	Code	Indicators	Source
	enhance their performance	PU3	Using Telemedicine helps me address specific health concerns related to my health condition	
		PU4	I consider telemedicine as an important tool for managing my health.	
Perceived Ease of Use	The degree to which users believe that using a particular technology will be free of effort and straightforward	PEU1	Learning to use telemedicine for my health is easy for me	Davis, 1989
		PEU1	Using telemedicine for my health is clear and understandable	
		PEU3	I am confident in my ability to navigate and use telemedicine effectively.	
		PEU4	I am comfortable with the idea of using technology for health-related purposes	
Acceptance of Telemedicine	The intention to use telemedicine and their willingness to recommend it to others	AT1	I am likely to recommend telemedicine to others with similar health conditions	Davis, 1989
		AT2	I am happy if telemedicine services effectively meet my healthcare needs	
		AT3	I trust telemedicine as a reliable method for managing my health	
		AT4	I am confident that telemedicine can provide me with timely health care support	

2.5. Validity and Reliability

We ascertain the internal reliability and validity of the study by evaluating the Cronbach alpha coefficient and the Heterotrait-monotrait ratio (HTMT) of the results. A high alpha value indicates the study's internal consistency, demonstrating that the items used in the research reliably measure the same underlying construct. a low HTMT indicates a high discriminant validity. This meticulous approach guarantees the data's accuracy and consistency, contributing to this study's overall quality and reliability.

2.6. Timeframe

Data collection took place over 1 month, from 9 October 2023 to 12 November 2023.

2.7. Software and Tools

The data collected has been analyzed using the SmartPLS Application and subjected to quantitative analysis to address the research objectives. The research employs a quantitative approach to provide a comprehensive understanding of the research.

3. RESULT

3.1. Demographic Profile of Respondents

The study encompassed 145 participants, but one was excluded as they did not have a chronic disease, leaving a total of 144 valid participants. The result revealed a diverse demographic with a majority age group of 41-52 (62%), followed by individuals over 52 (19%). The gender distribution was fairly balanced, with females at 58% and males at 42%. Educational backgrounds were predominantly undergraduate (85%), with a smaller proportion

holding master's or doctoral degrees (14%). Monthly expenses for health conditions primarily fell below 2.5 million (76%), with the remaining participants distributed across higher expenditure brackets. Chronic respiratory diseases, including asthma, were the most common condition (50%), followed by Chronic Allergic (25%). The representativeness of the study well represents the population of DKI Jakarta that is in the middle age group with chronic disease, as most of the respondents are in the 41-52 age bracket with fair balance within gender.

Table 2. *Demographic Profile of Respondents*

Demographic	Frequency	Percentage
Number of Participants	144	100%
Gender		
Female	84	58%
Male	60	42%
Age		
17-28	23	16%
29-40	5	3%
41-52	89	62%
52+	27	19%
Education		
Highschool Graduate	3	2%
Diploma	8	6%
Undergraduate	123	85%
Master Degree or Doctoral Degree	20	14%
Monthly Expense for their health conditions		
<2,5 Million	110	76%
2,6 - 5 Million	21	15%
5,1 - 7,5 Million	8	6%
>7,5 Million	5	3%
Type of chronic disease		
Chronic Respiratory Diseases (incl. asthma)	72	50%
Chronic Allergies	36	25%
Type 1 or 2 Diabetes	14	9%
Cancer	12	8%
Cardiovascular disease	8	6%
Psoriasis	1	1%
Kidney Stones	1	1%

3.2. Reliability and Validity

Utilizing SmartPLS version 4.0.9.6, some indicators (HA1 0.137, HA2 0.081, HA3 0.028) were removed due to low loadings with a threshold below 0.7, are presented in Table 3. The revised

loadings that meet the acceptable criteria are the measurement models that we use for further analysis.

Table 3. Outer Loadings

	AT	HA	HN	PEU	PU	SI	HA x PU	HA x PEU
AT1	0,874							
AT2	0,828							
AT3	0,839							
AT4	0,841							
HA1		0,137						
HA2		0,081						
HA3		0,028						
HA4		1,000						
HN1			0,751					
HN2			0,792					
HN3			0,853					
PEU1				0,879				
PEU2				0,947				
PEU3				0,829				
PEU4				0,886				
PU1					0,873			
PU2					0,945			
PU3					0,917			
PU4					0,846			
SI1						0,886		
SI2						0,906		
SI3						0,875		
HA x PU							1,000	
HA x PEU								1,000

The internal consistency was confirmed, with all constructs showing Cronbach's alpha well above the 0.70 threshold in Table 4, ensuring reliability. Composite reliability (rho_a and rho_c) similarly validated this reliability. All constructs' Average Variance Extracted (AVE) exceeded the 0.50 standard, suggesting adequate convergent validity. The data demonstrate that the measurement model is robust and the constructs are well-defined and reliable.

Table 4. Reliability of the Construct

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AT	0.867	0.871	0.909	0.715
HN	0.738	0.813	0.842	0.640
PEU	0.912	0.99	0.936	0.786
PU	0.918	0.921	0.942	0.803
SI	0.868	0.875	0.919	0.791

An examination of the Heterotrait-Monotrait ratio (HTMT), as presented in Table 5, is instrumental in assessing the research model's discriminant validity. Discriminant validity tests whether concepts or measurements that are not supposed to be related are unrelated.

The HTMT values fall well below the threshold of 0.90, which is recommended for establishing discriminant validity. The interaction terms HA × PU and HA × PEU exhibit HTMT values of 0.899, respectively. The value for HA × PEU approaches the threshold, indicating that while still distinct, there might be a higher correlation between these constructs compared to others. This could suggest a closer relationship in how HA, through the lens of PEU is associated with other variables in the model.

Table 5. Heterotrait-monotrait ratio (HTMT)

	AT	HA	HN	PEU	PU	SI	HA x PU	HA x PEU
AT								
HA	0,515							
HN	0,281	0,458						
PEU	0,571	0,482	0,379					
PU	0,752	0,61	0,327	0,537				
SI	0,53	0,53	0,442	0,289	0,551			
HA X PU	0,546	0,676	0,274	0,446	0,474	0,321		
HA x PEU	0,442	0,57	0,151	0,424	0,418	0,312	0,899	

3.3. Path Coefficients

The structural model analysis indicated that all variables had significant path coefficients impacting the AT. HN showed a positive path coefficient, while HA showed a negative influence. PU and PEU had the strongest path coefficients, highlighting their critical role in AT. HA higher moderated PEU compared to PU in relation to AT, underscoring the importance of accessibility in the adoption process.

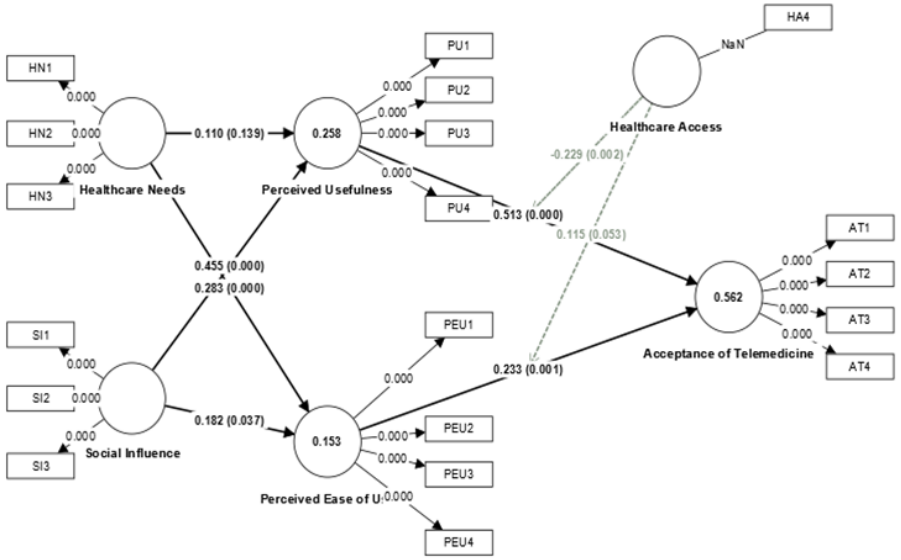

Figure 2. Path Coefficients and p Values.

3.4. Hypothesis Testing

Hypothesis tests revealed nuanced relationships between variables. HN significantly predicted PEU but not PU. SI significantly affected both PU and PEU. Notably, the interaction effects of HA with PU on AT are significantly affected, but the interaction effect of HA with PEU on AT is not significant. HA itself does not significantly moderate AT. However, PU and PEU significantly affect AT.

Table 6. Hypotheses Result

Variable to Variable	Hypothesis	P values	Hypothesis Result
HA → AT	H5	0,158	Rejected
HN → PEU	H1b	0	Accepted
HN → PU	H1a	0,139	Rejected
PEU → AT	H3	0,001	Accepted
PU → AT	H4	0	Accepted
SI → PEU	H2b	0,037	Accepted
SI → PU	H2a	0	Accepted
HA x PU → AT	H6a	0,002	Accepted
HA x PEU → AT	H6b	0,053	Rejected

4. DISCUSSION

The objective of this research is to investigate the extent to which individuals with chronic illnesses in DKI Jakarta accept telemedicine services. The findings present a detailed comprehension of the connection between healthcare needs (HN), social influence (SI), and healthcare access (HA) in shaping the acceptance of telemedicine, as stated in the hypotheses.

Despite the positive impact of healthcare needs (HN) on the perceived ease of use of telemedicine (H1b), it is intriguing to note that these needs did not significantly affect perceived usefulness (H1a). This divergence from expectations might suggest that while chronic disease patients in Jakarta find telemedicine accessible, the services provided may not fully meet their expectations or requirements for usefulness, an aspect highlighted by Reicher & Toren (2021).

Social influence (SI) has emerged as a significant factor impacting the perceived usefulness but not the perceived ease of use of telemedicine (H2a and H2b), aligning with the findings of Khan & Bhatti (2018). The influence of social norms and professional recommendations plays a crucial role in shaping the perception of telemedicine's benefits among DKI Jakarta's population with chronic diseases. This result suggests that the decision to adopt telemedicine is not made in isolation but is influenced by the experiences and recommendations of peers and healthcare professionals, leading to an acceptance of the service as beneficial for managing their health conditions.

In line with Patel and Patel (2019), both perceived usefulness (PU) and ease of use (PEU) were significant mediators in the acceptance of telemedicine (H3 and H4). The path coefficients revealed that perceived usefulness holds a stronger relationship with acceptance, indicating that the practical benefits of telemedicine are a compelling factor for its adoption among chronic disease patients. This implies that patients will likely embrace telemedicine not merely as a novel technology but as a pragmatic solution that addresses their healthcare needs, enhancing their quality of life.

The impact of healthcare access (HA) on telemedicine acceptance was multifaceted. While it negatively moderated the acceptance of telemedicine, suggesting other factors at play, for example, the study shows that people with easy access to healthcare providers do not need telemedicine as much as people with limited access to healthcare providers. Its positive moderation of the relationship between perceived usefulness and acceptance (H6a) highlights the importance of telemedicine's benefits being perceived by the patients. This duality reflects

the complexity of healthcare adoption behaviors and the critical role that accessibility plays in the adoption of telemedicine services.

In summary, this research has shown the multifaceted relationships between healthcare needs, social influence, healthcare access, and the acceptance of telemedicine among chronic disease patients in DKI Jakarta. The findings indicate that variables that affect perceived usefulness are social influence and healthcare access whereas a variable that affects perceived ease of use is healthcare needs.

Finally, this study supports the hypothesis that telemedicine acceptance is positively mediated by perceived usefulness and ease of use, consistent with Davis's (1989) TAM. This study uses the TAM model as a mediating factor instead of an independent variable.

4.1. Potential Reasons Behind the Findings

The strong influence of healthcare needs on telemedicine acceptance might be attributed to participants' heightened awareness of telemedicine's benefits, fostering an appreciation for its role in their healthcare. The findings indicate that while healthcare needs significantly influence telemedicine's perceived ease of use, they do not necessarily translate to perceived usefulness, suggesting a gap between service availability and patient expectations of utility. Social influence strongly impacts the perceived usefulness of telemedicine, underscoring the importance of community and professional support in the adoption process. The unexpected findings regarding healthcare access, especially the geographical dimension, have not significantly affected the acceptance of telemedicine.

4.2. Managerial Implications

Following these research findings, businesses should prioritize pragmatic design, focusing on the specific healthcare requirements of chronic disease patients to enhance perceived usefulness and ease of use. Leveraging social influence through peer endorsements and professional referrals could enhance user adoption and market penetration.

4.3. Limitations of the Study

This study's geographic restriction to DKI Jakarta may limit its generalizability, particularly to areas with different technology adoption rates and healthcare access. The cross-sectional nature of this study limits the ability to observe changes over time, which could be addressed through longitudinal studies. We did not explore all possible variables influencing telemedicine acceptance, such as personal health beliefs and previous technology experiences.

4.3. Direction for Future Study

Future research could greatly benefit from expanding its investigative scope in several key areas. By broadening the geographic range of the study beyond DKI Jakarta to potentially other Indonesian regions or different countries, researchers could assess how variations in cultural, economic, and healthcare environments impact telemedicine acceptance. Implementing longitudinal studies would also be advantageous, as they would allow for the monitoring of changes in telemedicine perceptions and acceptance over time, reflecting shifts in societal norms and technological advancements. Additionally, exploring variables not covered in the initial study, for example, personal health beliefs, prior technology usage, and specific barriers like digital literacy and privacy concerns, could deepen the understanding of what influences telemedicine adoption. Further analysis into the dynamics of social influence, particularly comparing the impact of recommendations from family members versus healthcare

professionals, could show varying effects on different demographic groups, enhancing our comprehension of the complex factors driving telemedicine acceptance.

4.5. Conclusion

In conclusion, this study's findings affirm that healthcare needs and social influence are significant factors in telemedicine acceptance regardless of healthcare access. Businesses can leverage these insights to enhance service reach and efficacy. Policymakers and healthcare providers should consider these relationships when promoting telemedicine. This study lays the groundwork for future research to understand telemedicine acceptance further and drive healthcare innovation.

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