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RESEARCH ARTICLE

Effect of Internet Self-Efficacy on the Adherence of Middle Adulthood M-Health Users with Online Trust Behavior

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Abstract

Adherence to treatment regimens is a significant challenge faced by patients with chronic illnesses and healthy individuals, including through m-Health—a new model of remote health delivery via mobile phones. Middle-aged adults often need more internet skills, especially concerning internet self-efficacy and online trust behavior in health services. This study aims to elucidate the relationship between internet self-efficacy and adherence to medical advice among middle-aged m-Health users, mediated by online trust behavior. A cross-sectional study was conducted from 4 July to 4 September 2022, involving 214 respondents selected through convenient sampling from various cities and regencies in Indonesia. Data were collected using online forms distributed to the participants. The statistical analysis employed a structural equation model (SEM) with the LISREL version 8.7. The results showed a chi-square value of 438.61, df=187, p=0.00000, RMSEA=0.079, NFI=0.93, NNFI=0.95, CFI=0.95, and IFI=0.95. These findings indicate that online trust behavior successfully mediates the relationship between internet self-efficacy and adherence. However, internet self-efficacy does not directly affect adherence. This means that adherence will increase when trust in health services.

Keywords: Adherence, internet self-efficacy, m-Health, online trust behavior

Introduction

The utilization of m-Health technology holds the potential to enhance access to better and more affordable healthcare, even for patients residing in remote areas or those with low socioeconomic status. Recognizing the significance of health, there is an increasing need to seek health information through the internet. With the rapid proliferation of mobile phones, the use of long-distance health information delivery via cell phones, such as m-Health, is becoming increasingly prevalent.[1–5]

In Indonesia, digital health services have experienced significant growth, particularly in the last two years, with a notable increase in users. According to a survey conducted by Deloitte Indonesia, approximately 84.4% of digital health service users expressed satisfaction with the provided services. The satisfaction reported encompassed practicality, convenience, affordability, and the availability of a wide range of features for users to choose from.[6] As the number of users of digital health services continues to rise, it can be observed that health application users are increasingly being recognized within the community.

Research on adopting the Western m-Health application has shown its popularity and usage across different age groups. A study examined m-Health users in middle age in China.[7] The findings indicated increased adoption of m-Health usage, which decreased physiological conditions. However, the study also identified a lack of hospital service support, positively influencing the intention to use m-Health.

In Indonesia, the use of m-Health, particularly among individuals above the age of 45, shows lower rates compared to younger age groups.[8]

Trust in health application services becomes crucial as online health services continue growing. Trust plays a significant role in helping individuals overcome perceptions of uncertainty and risk.[9] When individuals trust online health information and find it high quality, they are more inclined to seek online health information again in the future.

The utilization of m-Health among individuals in middle adulthood is less prevalent than in the younger age group. This is attributed to declining physical condition, affecting internet usage skills and lowering internet self-efficacy.[10,11] With the

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advancement of technology that provides online health services, self-efficacy has become a crucial factor in technology and information system usage.[12]

Internet self-efficacy is a construct developed by Eastin and LaRose,[13] rooted in Bandura et al.'s[14] self-efficacy theory. Internet self-efficacy refers to an individual's belief in their ability to manage and utilize the internet to achieve desired outcomes effectively. The correlation between internet experience, expectations, internet use, and internet self-efficacy ratings was significant.[13]

In this study, researchers employed the self-determination theory to explain adherence to medical advice. This theory elucidates the role of intrinsic motivation in guiding individuals toward activities that can enhance their well-being.[15] This study aims to elucidate the relationship between internet self-efficacy and adherence to medical advice among middle-aged m-Health users, mediated by online trust behavior.

Methods

A cross-sectional study was conducted from 4 July to 4 September 2022 by distributing questionnaires via Google Forms. The respondents who were willing to complete the research questionnaire and met the research criteria totaled 214 respondents from 39 cities/districts in Indonesia. They consisted of 121 women and 93 men, with the majority having an undergraduate level of education. This research has been approved by the Research Ethics Committee of Konsorsium Psikologi Ilmiah Nusantara, number 047/2022.

All the questionnaires utilized in this research are reflective, and three scales were employed. The Health Care Climate Questionnaire (HCCQ) was used to measure adherence.[16] It comprises 15 items that assess three dimensions: autonomy, competence, and relatedness. The scale uses a Likert scale format for self-reporting. The reliability test on this scale yielded a coefficient of 0.890, indicating high reliability.

To assess the ability to navigate the internet, the researchers utilized the internet self-efficacy scale developed by Eastin and LaRose[13] and adapted it for this study. This unidimensional scale consists of eight items. The reliability test on this scale yielded a coefficient of 0.754, indicating good reliability.

The researchers employed the online trust behavior scale adapted from McKnight and Chervany[17] to measure trust in online health services.This scale encompasses three components: integrity (four indicators), benevolence (two indicators), and competence (three indicators). After conducting a reliability test using Pearson's correlation, it was determined that five items out of the initial 44 were invalid, resulting in a final set of 39 items. The proposed model was tested using structural equation model (SEM) analysis, utilizing the LISREL version 8.7.[18]

Data collection for this study involved conducting surveys among middle-aged adults residing in various regions of Indonesia who use health applications (m-Health). The health applications available for access in Indonesia include Alodokter, Halodoc, GrabHealth, SehatQ, Alomedika, Konsuldok, Go-dok, KlikDokter, YourDoctors, MySiloam, and YesDok.[8]

In this study, a non-probability sampling technique was used.[19] The inclusion criteria for the research subjects in this study were as follows: (1) 45 to 60 years old who actively use m-Health applications; (2) Minimum of high school level; (3) Have downloaded an m-Health application for the purpose of consulting with doctors regarding their health conditions; (4) Are general patients who are not currently undergoing long-term treatment and do not have comorbidities.

Before data collection, the ethical principles of research were communicated to the participants, starting with the provision of an informed consent form. The participants were provided with clear and easily understandable information about the nature and purpose of the research. The participants were also assured that their personal and demographic information would be treated confidentially, maintaining their privacy and anonymity throughout the study.

Results

Table 1 shows that most respondents using m-Health based on gender are female (56.54%), the application is Halodoc (72.9%), and the reasons are convenience and practicality (61.21%). Respondents revealed that transactions through health applications (m-Health) were safe (91.12%). Meanwhile, the adherence level of middle-aged users is moderate (72.9%).

The results of a confirmatory factor analysis (CFA) test and the loading factor for each variable are shown in Table 2. Results show the t count value exceeds the t table value. This indicates that

Table 1 Frequency Distribution of Respondent Characteristics

Characteristics	n=214 (%)
Gender	
Male	93 (43.46)
Female	121 (56.54)
m-Health used	
Halodoc	156 (72.90)
Alodok	17 (7.94)
Mobile JKN	13 (6.07)
Telemedicine	12 (5.61)
BNI-Life	2 (0.93)
Garda medika	1 (0.47)
Grab-health	1 (0.47)
Klikdokter	6 (2.80)
Mi-health	1 (0.47)
RS Avisena	1 (0.47)
Samsung health	2 (0.93)
Yakes mobile	1 (0.47)
We+	1 (0.47)
Reasons for using health service	
Convenience and practicality	131 (61.21)
Other people's → recommendations	36 (16.82)
Reliability	8 (3.74)
Completeness of features	9 (4.21)
Health information	30 (14.02)
Transactions through health applications (m-Health)	
Safe	195 (91.12)
Unsafe	19 (8.88)
Adherence level of middle-aged users	
High	30 (14.02)
Moderate	156 (72.90)
Low	28 (13.08)

online trust behavior has a significant effect on adherence behavior, and internet self-efficacy has a significant influence on online trust behavior. In contrast, internet self-efficacy has an insignificant effect on adherence behavior.

The LISREL section 8.7 statistical test shows the following values: chi-square=438.61, df=187, p=0.000, and the root mean square error of approximation (RMSEA)=0.079. The calculated value of the model fit index is obtained (Table 3).

Table 4 shows that online trust behavior significantly mediates the effect of internet self-efficacy on adherence behavior.

Discussion

The theoretical model of adherence behavior in middle-aged m-Health users in this study aligns with the empirical data. Both internet self-efficacy and online trust behavior, acting as mediator variables, were predictors of adherence behavior. The purpose of testing this theoretical model in the study was to explain the mechanism of the relationship between the independent variable (internet self-efficacy and online trust behavior) and the dependent variable (adherence behavior).

Based on the study results, it was discovered that the adherence components of middle-aged m-Health users fell into the moderate category. This indicates that most m-Health users exhibited moderate compliance with medical advice. Despite being in the moderate category, this finding suggests that these m-Health users were willing to modify their behavior and adhere to medical advice. Furthermore, the study revealed that the users internalized the care environment, serving as a support to fulfill their psychological needs. These psychological needs include autonomy, competence, and relatedness.[20]

The study results demonstrate that the adherence behavior model aligns with the empirical data. This model explains that adherence is a behavior that can be predicted to either increase or not increase, both directly and indirectly, while individuals are within and after

Table 2 Direct Effect of the Independent Variable on the Dependent Variable

Direct Effect	Coefficient Score	Standard Error	t Count × t Table	R^2	Results
Internet self-efficacy → adherence	0.043	0.067	0.65<1.97	0.48	Insignificant
Online trust behaviour → adherence	0.61	0.069	8.88>1.97	0.48	Significant
Internet self-efficacy → online trust behavior	0.37	0.070	5.24>1.97	0.15	Significant

Table 3 Model Fit Index

Fit Index	Fit Value	Criteria	Conclusion
RMSEA	0.079	<0.08	Fit
Normal fit index (NFI)	0.91	>0.90	Fit
Non-normal fit index (NNFI)	0.93	>0.90	Fit
Comparative fit index (CFI)	0.95	>0.90	Fit
Incremental fit index (IFI)	0.95	>0.90	Fit

Table 4 Indirect Influence

Indirect Effect	Coefficient Score	z Sobel × t Table	p	Results
Internet self-efficacy → online trust behavior → adherence	0.37×0.61=0.226	4.54>1.96	0.000	Significant

leaving the online healthcare environment.

The direct relationships with adherence behavior were tested through multiple pathways: (1) Internet self-efficacy was found to have a direct effect on adherence behavior; (2) Online trust behavior was found to have a direct effect on adherence behavior; (3) Internet self-efficacy was found to have a direct effect on online trust behavior; (4) Internet self-efficacy was found to have an indirect effect on adherence behavior, which was mediated by online trust behavior.[21]

This research integrates self-determination theory with health behavior and supports consistent findings. It suggests that when individuals, in this case, patients, have psychological needs for autonomy, competence, and relatedness supported in the healthcare process, they are more likely to actively engage in their treatment and achieve better outcomes over time.[20]

This study also investigates the role of trust in online health services in influencing patients or users to utilize medical applications, emphasizing the significance of trust for patients. Patients who do not trust online health services may be reluctant to use them, even if these services are beneficial. Therefore, trust is a crucial factor that needs to be fostered and supported to ensure the continued utilization of online health services.[22,23]

From the study results, it is evident that online trust behavior serves as a mediator variable between internet self-efficacy and adherence behavior. The findings also emphasize the importance of trust in online health services, particularly when seeking online health information. This indicates a positive relationship between patient/user trust and the website. Trust plays a crucial role in online health services in the context of the intention to use health applications. The study reveals a positive relationship between benevolence and trust in the competence of the website.[24]

Expanding on previous research, this study provides insights into how user trust influences intrinsic motivation and the intention to continue using online health services. Competency beliefs, which reflect the users' perception of the website's ability to provide relevant information and assist in solving health-related problems, play a significant role in this relationship. These findings are consistent with the perspective put forth by McKnight and Chervany,[17] suggesting that online health service providers, or websites, should prioritize user beliefs regarding the competence of the website.

Conclusions

This study concluded that middle-aged m-Health users with a higher belief in their abilities and skills to use the internet tend to be more diligent in searching for the health information they require. The study also indicates that individuals who have had negative or unpleasant experiences with digital technology may display less willingness to actively involve themselves and take responsibility for their health.

Conflict of Interest

There is no conflict of interest in this study.

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