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Original Research

Patient-Centric Telehealth Pharmacy: An Investigation on Satisfaction, Trust, Loyalty, and Adherence

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Abstract

Background: The objective of this study was to assess the impact of telehealth pharmacy services on patient satisfaction, trust, and adherence in individuals with degenerative health diseases. **Methods:** This quantitative study, conducted from November 2022 to April 2023, involved the participation of 302 respondents who provided responses through a Likert scale-based questionnaire. To evaluate the impact of telehealth services, data were collected three months before and after the implementation of telehealth at Pharmacy X. Two sequential regression models were employed for analysis, and the statistical processing was conducted using R (version 2023.03.0). **Results:** In exploring patient loyalty factors, two sequential regression models were utilized. The first model assessed the impact of Quality Service on Adherence, Satisfaction, Trust, and Adherence itself, revealing a significant influence on Adherence ($p < 0.05$). However, its impact on Satisfaction, Trust, and Adherence lacked statistical significance. The second model examined the collective impact of Adherence, Satisfaction, Trust, and Adherence on patient loyalty. Trust emerged as a consistent and significant driver, while Adherence significantly influenced loyalty ($p < 0.05$). In contrast, Satisfaction did not significantly impact patient loyalty in this subset. It is noteworthy that Telehealth Pharmacy has significantly enhanced the impact of Quality Service on Adherence, Satisfaction, Trust, and Adherence ($p<0.05$). **Conclusion:** The sequential regression analysis unveiled critical insights into the factors. Trust emerged as a consistent and significant driver, while Adherence played a crucial role in fostering loyalty. These findings emphasize the nuanced dynamics that contribute to sustained commitment in this evolving healthcare landscape.

Keywords: telehealth pharmacy; patient satisfaction; adherence; degenerative health diseases; loyalty

INTRODUCTION

In the wake of the COVID-19 pandemic, the landscape of healthcare has undergone significant transformations, giving rise to new paradigms such as Patient-Centric Telehealth Pharmacy.[1] The pandemic has accelerated the adoption of telehealth services, and this shift has not only changed the way healthcare is delivered but has also influenced patient behaviors and expectations.[2] One notable change is the increased reliance on telehealth solutions for pharmaceutical services. Telehealth pharmacy, by offering remote consultations and digital prescription services, aligns perfectly with these safety-conscious preferences.[3] Additionally, the limitations imposed by movement restrictions during the pandemic have underscored the importance of convenient and accessible healthcare services.[4] Telehealth pharmacy, with its capacity for virtual consultations and prescription arrangements from the comfort of one's home, meets these requirements effectively.[5]

Telehealth, driven by advancements in technology, has redefined the healthcare delivery model, offering patients unprecedented access to pharmaceutical services from the comfort of their homes.[6] The advancements in technology and the increasing acceptance of digital solutions have empowered patients to actively engage in managing their own healthcare. Health apps, online consultation platforms, and digital prescriptions provide patients with greater control and flexibility over their health-related decisions.[7] Additionally, positive experiences with telehealth services during the pandemic, such as streamlined communication with healthcare professionals and the convenience of digital prescriptions, have elevated patient expectations for more efficient and innovative healthcare solutions.[8]

The focus on patient-centricity in telehealth pharmacy not only underscores a commitment to personalized care but also raises critical questions about the factors influencing patient satisfaction, the establishment of trust in remote healthcare interactions, and the subsequent impact on treatment adherence.[9] Further, the reasons behind this shift in patient expectations are multifaceted. The heightened awareness of safety concerns during the pandemic has propelled patients to prioritize healthcare solutions that minimize physical interactions. Furthermore, our initial study has identified several critical factors influencing the pharmacist-patient relationship, namely quality service, patient trust, patient loyalty, and patient satisfaction. In this context, this investigation aims to shed light on the unique interplay between patients

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and telehealth pharmacy services, unraveling the dimensions of satisfaction and trust that underpin the patient experience. Additionally, the study explores the implications of these factors on treatment adherence, recognizing its pivotal role in achieving positive health outcomes. By probing into these intricacies, we aspire to contribute valuable insights that inform the ongoing evolution of Patient-Centric Telehealth Pharmacy, fostering a deeper understanding of its role in cultivating patient satisfaction, building trust, and promoting adherence to prescribed healthcare regimens.

METHOD

Research design and data collection

This study employs an explanatory research design, focusing on Patient-Centric Telehealth Pharmacy to investigate satisfaction, trust, loyalty, and adherence among degenerative patients. The research, conducted in Medan city, spans from November 2022 to April 2023 and involves randomly selected pharmacies. The intervention group consists of 202 respondents, while the non-intervention group comprises 100 respondents, all users of the Telehealth Pharmacy application. The sampling technique utilized in this study was purposive sampling, focusing on the selection of participants based on their degenerative conditions.

Data Collection

The primary data collection method involves distributing questionnaires to degenerative patients who use the Telehealth Pharmacy application. The questionnaire, specifically designed for each theme, comprises 13 questions for Quality Service, 5 for Satisfaction, 7 for Trust, 6 for Loyalty, and 5 for Adherence. These questions aim to gather detailed information on patient satisfaction, trust in the telehealth service, loyalty to the platform, and adherence to prescribed medications. Cluster sampling is employed to select specific groups of patients based on their degenerative conditions. It's worth noting that the Telehealth Pharmacy application under examination can be accessed through the following link: https://klinikapoteker.com/. This web-based platform serves as a comprehensive hub for patients seeking telehealth services, enhancing accessibility and convenience in managing their healthcare needs.

Measurement Variables

In evaluating the impact of telehealth services within the Telehealth Pharmacy application, various measurement variables were considered. The dependent variables played a pivotal role in assessing the effectiveness of these services. Patient satisfaction, as a crucial metric, was evaluated through the collection of patient feedback, providing valuable insights into their overall experience with the application. Trust, another key factor, was measured by assessing the level of confidence patients had in the accuracy and reliability of the telehealth services. Loyalty, indicative of sustained engagement, was determined by evaluating the likelihood of patients continuing to use the Telehealth Pharmacy application. Additionally, the study delved into medication adherence, examining self-reported data both before and after the implementation of telehealth services to understand any changes in patients' commitment to prescribed treatment plans.[10,11]

The independent variable in this study was Telehealth Usage, categorized into pre-telehealth and post-telehealth phases. This categorization facilitated a comprehensive analysis of changes in patient behavior and perceptions as they transitioned from conventional healthcare approaches to the integration of telehealth services. To ensure a robust analysis, control variables, specifically the Quality of Service, were incorporated.[12] The quality of service was assessed through patient feedback on the effectiveness, accessibility, and responsiveness of the telehealth services. This additional dimension allowed for a more nuanced understanding of how the quality of service might influence the relationships between telehealth usage and the dependent variables.

Ethical Considerations

This research adheres to ethical guidelines, ensuring the confidentiality and privacy of participants. Informed consent will be obtained from all participants before their involvement in the study. This study strictly adheres to the principles outlined in the Declaration of Helsinki, and the ethical approval for this research has been granted under the protocol number 207/KEPK/USU/2023.

Limitations

Potential limitations of this study include the reliance on self-reported data, the generalizability of findings, and the impact of external factors on patient experiences.[13]

RESULTS

User interface of Telehealth Pharmacy

In the context of this study, Figure 1 serves as a visual representation of the user interface employed in the Telehealth Pharmacy application. The graphical representation encapsulates the visual elements and features that constitute the user experience within the application, providing a comprehensive snapshot for analysis and evaluation.

Respondent Characteristics

Based on the established inclusion criteria, a total of 302 respondents suffering from degenerative diseases willingly participated in the study until its completion. The characteristics of the respondents are detailed in Table 1, providing a comprehensive overview of the demographic and health-related information gathered during the research.

Questionnaire Validation

In establishing the integrity of our data collection process, a meticulous validation procedure was implemented, incorporating the examination of questionnaire validity. Prior to distribution, the questionnaire underwent scrutiny for each question relationships using Pearson correlation analysis. Figure 2 visually represents the outcome of this validation process, indicating that among the questionnaire items

within the designated theme used as a measurement tool, no significant correlations were observed. This absence of notable correlations affirms the independence of these items, signifying that each question captures distinct information. The inclusion of Pearson correlation analysis adds a quantitative layer to the validation, providing statistical assurance that the questionnaire items are not unduly influenced by one another.

In addition to the aforementioned validation steps, further scrutiny was applied through Alpha Cronbach analysis to assess the internal consistency of the questionnaire items. This analysis aids in gauging the reliability of the measurement instrument by examining the degree of correlation between items within the same theme. The results of the Alpha Cronbach analysis demonstrated a high level of internal consistency, reinforcing the reliability of the questionnaire (Table 2).

The Alpha Cronbach analysis was performed to assess the internal consistency of the key scales within the study, namely Quality Service, Satisfaction, Trust, Loyalty, and Adherence. The results revealed a high level of reliability across all scales, with raw alpha coefficients consistently around 0.7616 and standardized alpha coefficients at 0.7617. The average inter-item correlation (r) for each scale was approximately 0.1973, indicative of a substantial positive relationship among the items. The analysis, with an average number of items (N) around 3.20, showcased a robust internal consistency, supported by mean inter-item correlations ranging at 3.61. The median inter-item correlation (r) consistently stood at 0.1672, further affirming the reliability of the scales. These results underscore the strong internal consistency among the questionnaire items within each scale, enhancing the credibility and reliability of the measurement instrument utilized in the study.

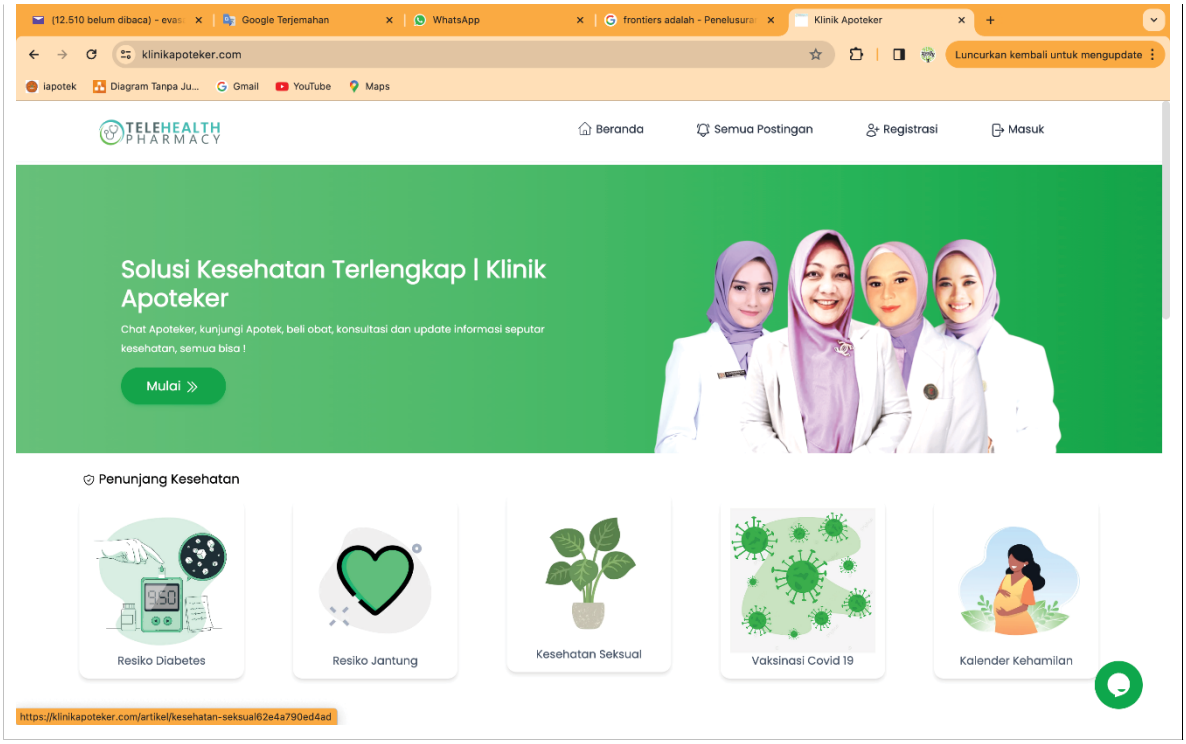

Figure 1. A graphical representation of the application is accessible through the web interface

Table 1. Respondents general characteristic

	Frequency	%	p-value				
			Service quality	Satisfaction	Trust	Loyalty	Adherence
Gender			0.063	0.444	0.368	0.072	0.162
Male	113	37,40					
Female	189	62,60					
Age (year)			0,124	0.583	0.585	0.313	<0.000
25-44	112	37,10					
45-60	156	51,70					
61-75	34	11,30					

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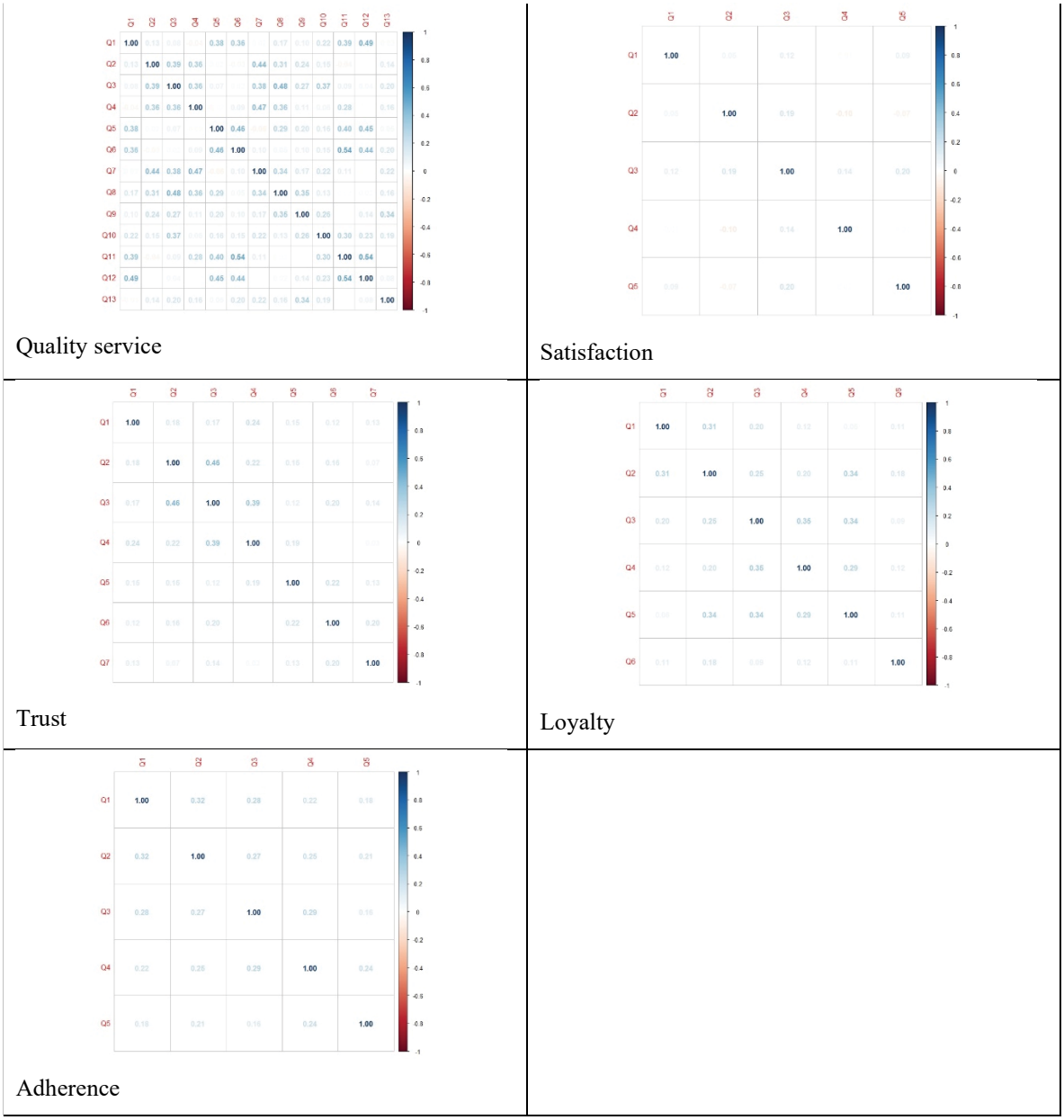

Figure 2. Person correlation among questions in each themes

Table 2. Alpha Cronbach analysis

Scale	Alpha_Cronbach. raw_alpha	Alpha_Cronbach. std.alpha	Alpha_Cronbach. average_r	Alpha_ Cronbach.S.N	Alpha_Cronbach. mean	Alpha_Cronbach. median_r
Quality service scale	0.761555579	0.761679398	0.197334079	3.196028337	3.606469689	0.167160931
Satisfaction scale	0.761555579	0.761679398	0.197334079	3.196028337	3.606469689	0.167160931
Trust scale	0.761555579	0.761679398	0.197334079	3.196028337	3.606469689	0.167160931
Loyalty scale	0.761555579	0.761679398	0.197334079	3.196028337	3.606469689	0.167160931
Adherence scale	0.761555579	0.761679398	0.197334079	3.196028337	3.606469689	0.167160931

Pre and post Telehealth Intervention

The average outcomes of quality of service, satisfaction, trust, loyalty, and adherence between the intervention group using the Telehealth Pharmacy application and the non-intervention group are presented in Table 3. This table provides a comparative view of the mean scores across these key metrics, allowing for an assessment of the potential impact of the telehealth intervention on patient experiences. The results aim to unveil any discernible differences or trends between the two groups, shedding light on the effectiveness of the Telehealth Pharmacy application in influencing the perceived quality of service, overall satisfaction, trust levels, loyalty to the platform, and adherence to prescribed medications.

Table 3 presents the Mann-Whitney assessment of pre and post-telehealth pharmacy intervention scores for each theme. The pre-telehealth pharmacy scores for Quality of Service, Satisfaction, Trust, Loyalty, and Adherence were 50.50, 60.35, 52.82, 51.02, and 135.65, respectively. Following the telehealth pharmacy intervention, the post-telehealth pharmacy scores showed significant improvements, measuring 251.50 for Quality of Service, 248.24 for Satisfaction, 250.73 for Trust, 251.33 for Loyalty, and 223.31 for Adherence. The p-values for all themes were found to be less than 0.00, indicating a statistically significant difference before and after the telehealth pharmacy intervention across all assessed categories. These results underscore the positive impact of the telehealth intervention on enhancing perceived quality of service, overall satisfaction, trust levels, loyalty, and medication adherence among the participants.

For a more detailed understanding of these differences, refer to the Violin Diagram - Mann-Whitney test pre-post (Figure 3). This graphical representation visually depicts the distribution of scores and highlights the notable shifts following the telehealth intervention. The Violin Diagram provides a comprehensive view of the data distribution and further reinforces the substantial impact of the telehealth pharmacy intervention on improving the perceived quality of service, overall satisfaction, trust levels, loyalty, and medication adherence among the participants.

Sequential Regression Analysis Model

To streamline analysis and simplify interactions among the themes—Quality Service, Satisfaction, Trust, Loyalty, and Adherence—we utilized the model depicted in Figure 4. This model serves as a visual representation to enhance clarity and facilitate a comprehensive understanding of the relationships and dynamics between these key themes. By employing this model, we aimed to provide a structured framework that simplifies the interpretation of interdependencies and allows for a more nuanced examination of how each theme contributes to the overall patient experience. In exploring patient loyalty factors, two sequential regression models were utilized. The first model assessed Quality Service's impact on Adherence, Satisfaction, Trust, and Adherence. The second model examined Adherence, Satisfaction, Trust, and Adherence's collective impact on patient loyalty. Figure 4 encapsulates the synthesized connections between the assessed themes, offering a valuable tool for researchers and stakeholders to glean insights into the intricacies of patient perceptions within the context of the Telehealth Pharmacy intervention.

Quality service serves as a pivotal factor influencing patient experiences within the healthcare framework. The delivery of high-quality service not only directly impacts patient satisfaction but also plays a crucial role in establishing trust. As patients consistently receive exemplary service, it fosters a positive perception, leading to increased satisfaction levels. This heightened satisfaction, in turn, becomes a cornerstone for building trust in the healthcare provider or system. Trust, once established, becomes a driving force behind patient loyalty, as individuals are more inclined to remain committed to a healthcare service they trust and are satisfied with. Therefore, the interplay between quality service, patient satisfaction, and trust forms a cyclical relationship that ultimately contributes to the enhancement of patient loyalty, underscoring the importance of a patient-centered approach in healthcare services.

The correlation among Quality Service, Satisfaction, Trust, and Adherence

The justification for conducting Pearson correlation analysis among Quality Service, Satisfaction, Trust, and Adherence lies in the pursuit of comprehending the intricate relationships between these key variables within the healthcare context. This statistical examination is vital for uncovering the degree and nature of associations between the quality of service provided to patients, their resultant satisfaction levels, the establishment of trust in healthcare services, and the subsequent adherence to prescribed treatments. By employing Pearson correlation analysis, we aim to quantify and qualify the interdependencies among these crucial aspects of patient experience. The findings, as depicted in Figure 5, will offer a visual representation of the correlations, providing valuable insights into how enhancements in one variable may influence

Table 3. Mann-Whitney assessment pre and post telehealth pharmacy for each themes

Themes	Pre-telehealth pharmacy	Post-telehealth pharmacy	P-value
Quality service	50.50	251.50	<0,00
Satisfaction	60.35	248.24	<0,00
Trust	52.82	250.73	<0,00
Loyalty	51.02	251.33	<0,00
Adherence	135.65	223.31	<0,00

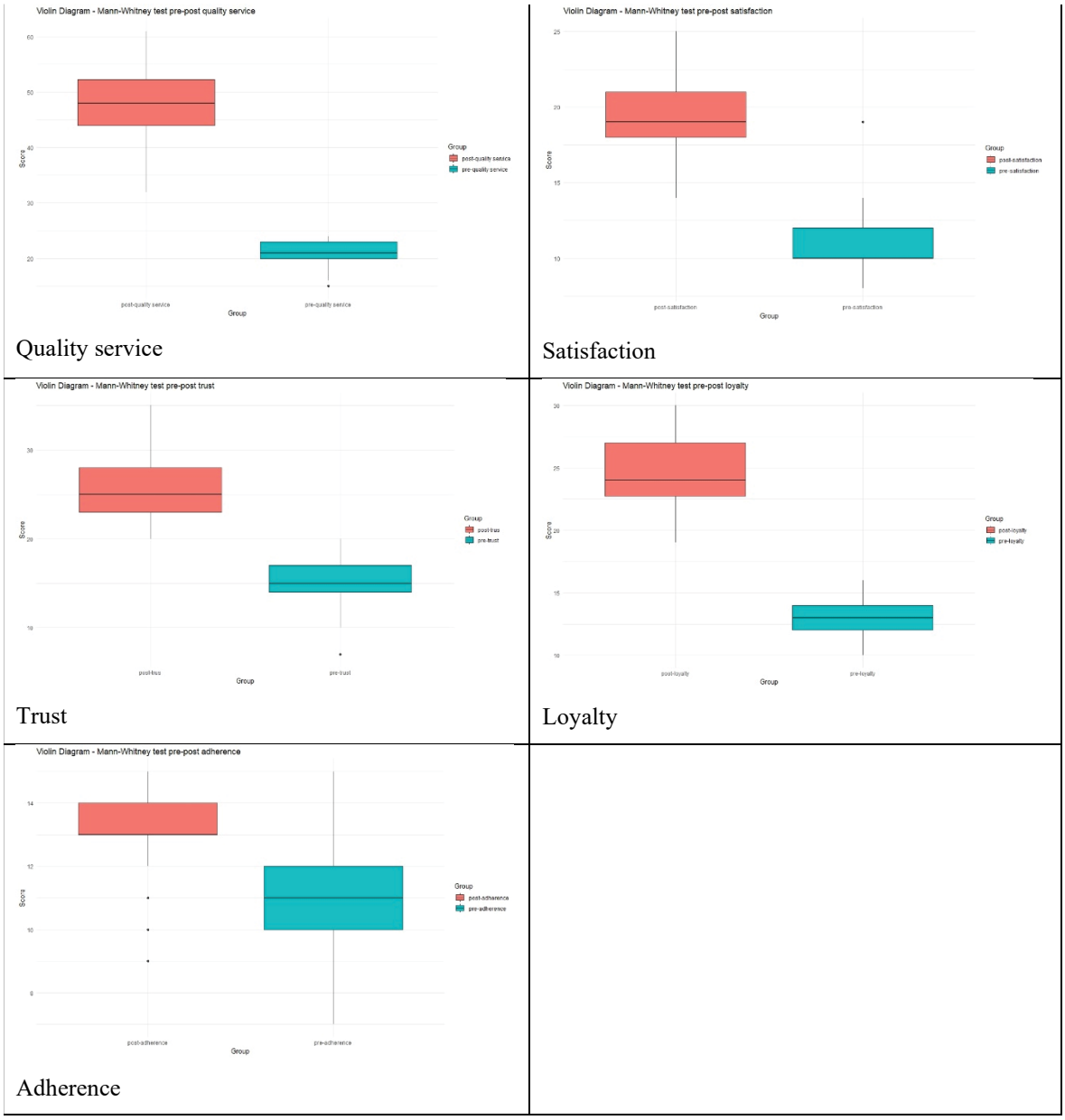

Figure 3. Violin Diagram - Mann-Whitney test pre-post

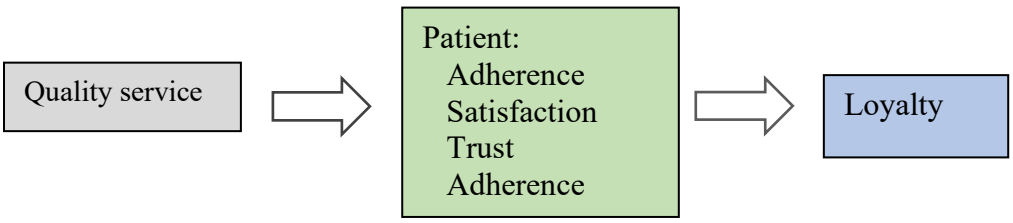

Figure 4. The correlation model used in this study aims to establish connections among the variables Quality service, Satisfaction, Trust, Loyalty, and Adherence

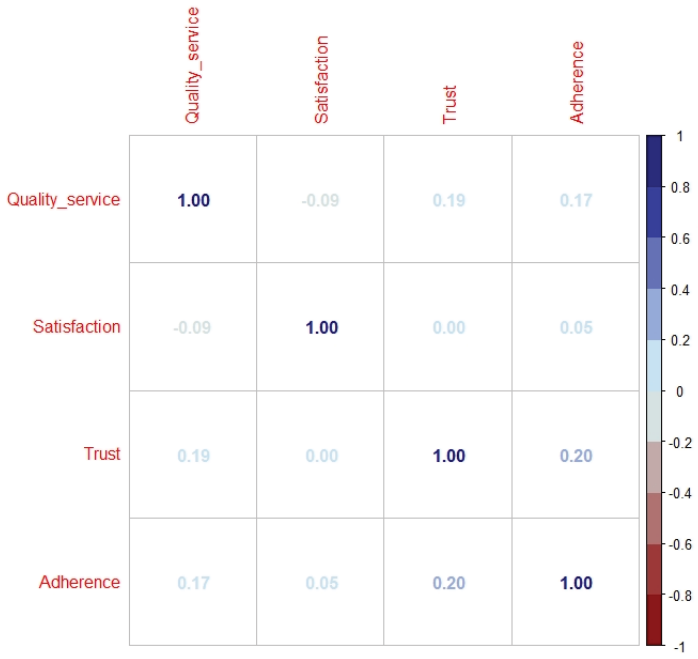

Figure 5. Pearson correlation for Quality service, Satisfaction, Trust, and Adherence

or be influenced by others. This analytical approach contributes to a more nuanced understanding of the dynamics shaping patient perceptions and behaviors, ultimately informing strategies to optimize the delivery of patient-centric healthcare services.

Satisfaction and trust influence loyalty

The analysis of factors influencing loyalty, as depicted in Table 4, illuminates key insights into the relationship dynamics among Satisfaction, Trust, Adherence, and their impact on loyalty. The regression model provides a nuanced understanding of these variables' contributions.

Moreover**,** Figure 6 illustrates the relative independent variable weights against loyalty, providing a visual representation of the quantitative impact of each variable in influencing patient loyalty. The chart displays the comparative magnitudes of Satisfaction, Trust, and Adherence in contributing to the overall loyalty outcome. The varying lengths of the bars in the figure indicate the respective weights of each independent variable, offering a clear depiction of their relative importance in shaping patient loyalty. This visual insight aids in discerning the dominant factors influencing loyalty within the studied context, providing a comprehensive overview that enhances our understanding of the intricate dynamics governing patient behaviors and preferences.

DISCUSSION

Table 1 reveals significant findings regarding the respondent characteristics, indicating that the number of female respondents is nearly twice that of male respondents, accounting for 62.60% of the total. This observation suggests that women exhibit a heightened concern for their health and that of their families, encompassing medications and other health-related information.[14] Women's heightened health consciousness is particularly pronounced when a family member is unwell, as they are more prone to diseases and are psychologically more affected by illnesses, prompting more frequent consultations with healthcare professionals compared to men.[14,15] The inclination to seek healthcare services is also more prevalent among women, aligning with research conducted on healthcare services such as community health centers, which states that women tend to visit healthcare facilities more frequently than men.[16]

The age distribution of respondents is based on the World Health Organization (WHO) guidelines, categorizing ages

Table 4. Regression analysis result

Variabel	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	17.217	2.910	5.916	5.08e-08
Satisfaction	-0.063	0.134	-0.472	0.638
Trust	0.456	0.069	6.558	2.74e-09
Adherence	-0.269	0.169	-1.592	0.115

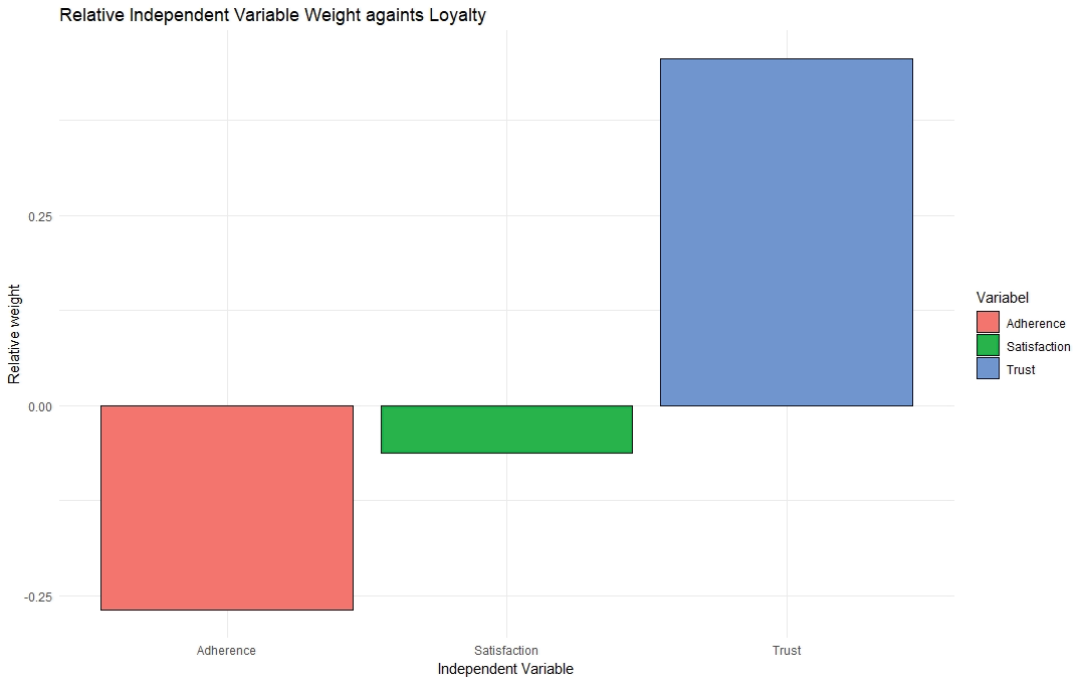

Figure 6. Relative Independent Variable Weight against Loyalty

into young, middle-aged, and elderly based on the approach of healthy aging by the WHO.[17] Respondents sampled in this research are aged over 30 years, aligning with the Basic Health Research, which indicates that degenerative diseases typically begin to manifest in patients aged 30 and above.[18] Approaching middle age, individuals are generally more susceptible to various health conditions, making this age range a critical juncture between youth and old age. At this stage, individuals are still adaptable to current technological advancements as the aging process has not yet significantly impacted organ functionality.[19,20] Interestingly, over half of the sampled respondents (51.70%) utilizing telehealth pharmacy services fall within the middle-aged bracket (45-60 years). This finding contrasts with a study in Bosnia, which suggested that users of health application services were predominantly above 60 years old.[20]

Additionally, Table 1 highlights that degenerative diseases are increasingly prevalent among relatively young age groups. Modern lifestyle changes, including altered dietary patterns and elevated stress levels, contribute to degenerative diseases affecting individuals at a relatively young age. Shifts in lifestyle behaviors, such as irregular eating, lack of exercise, excessive working hours, and the consumption of fast food, have become common practices that potentially lead to degenerative diseases.[21,22] Younger age groups are more accustomed to digital devices for accessing healthcare services, as evidenced by their second-highest percentage at 37.10%.[23] Statistical reports note that social media and digital platform users in Indonesia, as of 2020, are primarily aged between 25-34 years, with 20.6% being male and 14.8% female. Users aged 65 and above represent the smallest demographic in social media usage.[24]

The presented analysis offers a deeper understanding of the factors influencing patient loyalty within the examined model. The intercept value of 17.217, accompanied by a highly significant p-value of 5.08e-08, serves as a crucial indicator of the overall model's strength and positive association with loyalty. This robust intercept suggests that, on average, loyalty is significantly influenced by the combined effect of the predictor variables in the model. Upon closer examination of individual variables, distinct patterns emerge, shedding light on their respective impacts on loyalty. Satisfaction, represented by an estimate of -0.063 and a non-significant p-value of 0.638, fails to exhibit a statistically significant influence on loyalty. This implies that variations in satisfaction levels, within the observed range, do not significantly contribute to changes in patient loyalty. The findings of this study align with the research conducted by Yi-Ting, who asserted that positive emotions, rather than satisfaction, serve as the best predictor for both overall loyalty and the most reliable dimension of loyalty—positive word of mouth.[25] This correlation underscores the notion that cultivating positive emotional experiences in healthcare interactions plays a pivotal role in shaping patient loyalty. The emphasis on emotions as a key determinant reflects a broader understanding that patient loyalty goes beyond mere satisfaction, emphasizing the emotional resonance that contributes significantly to positive word of mouth and overall commitment to healthcare services.[26]

Conversely, Trust stands out as a substantial driver of loyalty, with an estimate of 0.456 and an exceptionally low p-value of 2.74e-09, signaling a highly significant positive association. This suggests that increases in trust levels are strongly linked

to heightened patient loyalty. Notably, these findings are consistent with the research conducted by Mari Jansen van Rensburg, further affirming the robust connection between trust and patient loyalty observed in both studies.[27] The convergence of results across different investigations reinforces the significance of trust as a key determinant in fostering and sustaining patient loyalty within the healthcare context. Trust, therefore, emerges as a critical factor in shaping patients' sustained commitment to healthcare services.[28,29]

Furthermore, the analysis indicates that Adherence, represented by an estimate of -0.269 and a p-value of 0.115, does not wield a statistically significant impact on loyalty. While Adherence contributes to the overall model, the observed variations in adherence levels within the sample do not lead to significant changes in patient loyalty. This observation resonates with several studies in the field. For instance, research by Agudo *et al*. (2012) and AlOmari *et al*. (2022) similarly found that, although medication adherence is crucial for positive health outcomes, it may not be a predominant factor in determining patient loyalty to healthcare services.[30,31] These consistent findings across different studies underscore the nuanced relationship between adherence and loyalty, suggesting that other factors, such as trust and positive emotions, may play more pivotal roles in shaping and sustaining patient loyalty.

In light of the regression analysis, the derived equation, Loyalty = 17.217 + (-0.063) * Satisfaction + 0.456 * Trust + (-0.269) * Adherence, encapsulates the combined effects of these variables on loyalty. At the forefront of these influences is Trust, emerging as the most influential factor that positively contributes to patient loyalty. This outcome resonates with the foundational role of trust in healthcare relationships, highlighting its significance in shaping and fortifying patient loyalty. However, it's important to note that the lesser impact of Satisfaction and the lack of statistical significance in Adherence underscore the intricate dynamics at play within this model. This nuanced understanding reinforces the notion that patient loyalty is a multifaceted construct influenced by various factors, with trust standing out as a particularly robust determinant in this analysis.

CONCLUSIONS

In summation, these findings provide valuable insights into the nuanced relationships among Satisfaction, Trust, Adherence, and patient loyalty. Trust emerges as a pivotal factor, highlighting its significance in fostering sustained loyalty. While Satisfaction and Adherence contribute to the overall understanding, their individual impacts may be relatively less pronounced within the context of this specific analysis. This nuanced exploration enhances our comprehension of the multifaceted nature of patient loyalty, contributing to the broader discourse on patient-centered healthcare services.

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Author contribution

Conceptualization: ESD. and UH. Methodology: ESD. Software: ESD. Validation: UH., WW. and KK. Formal analysis: ESD. Investigation: ESD. Resources: ESD. Data curation: ESD. Writing—original draft preparation: ESD. Writing—review and editing: UH., WW., and KK. Visualization: ESD. Supervision: UH., WW., and KK. Project administration: UH. All authors have read and agreed to the published version of the manuscript.

ETHICS APPROVAL

This research adheres to ethical guidelines in accordance with the Declaration of Helsinki. Approval for the study was granted by the Ethics Committee under protocol number 207/KEPK/USU/2023, ensuring the protection of participants' confidentiality and privacy throughout the research process.

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CONFLICT OF INTEREST

The authors declare no conflict of interest

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