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Original Article

Patient experience, satisfaction, and adherence: Mediating roles of communication and outcome quality among geriatrics

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Abstract

Treatment adherence among geriatric population remains a challenge due to multimorbidity, polypharmacy, and communication barriers. Although patient experience and satisfaction are major predictors of treatment adherence, the mediating pathways involving communication and perceived outcome quality, patients' perceptions of the effectiveness of treatment, including symptom relief, functional improvement, and overall quality of life, have not been explored, particularly in healthcare systems of developing countries. This study aimed to examine the effects of patient experience and satisfaction on treatment adherence, with service communication and perceived outcome quality serving as mediating variables. A cross-sectional study was conducted at the Geriatric Outpatient Clinic of RSUPN Dr. Cipto Mangunkusumo Hospital between June and September 2025. A total of 221 geriatric patients aged ≥60 years completed validated questionnaires on five constructs using six-point Likert scales. Data were analyzed using Partial Least Squares Structural Equation Modeling, with model validity and reliability confirmed through average variance extracted, composite reliability, and variance inflation factor indicators. Patient experience (β=0.260, p<0.001) and satisfaction (β=0.158, p<0.001) significantly improved adherence. Service communication (β=0.352, p<0.001) and outcome quality (β=0.249, p<0.001) partially mediated these effects, explaining 74% of adherence variance (R^2=0.740). Communication showed stronger mediation, underscoring the importance of empathy, clarity, responsiveness, and shared decision-making in fostering adherence. Enhancing patient experience and satisfaction through effective communication, collaborative care, and perceived positive outcomes may strengthen adherence and optimize service quality in geriatrics, particularly in resource-limited health systems.

Keywords: Patient experience, patient satisfaction, perceived outcome, service communication, treatment adherence

Introduction

The provision of healthcare services has undergone a paradigm shift in recent decades, increasingly adopting a patient-centered approach that positions service quality and patient trust as critical performance indicators [1]. This evolution reflects the need to align service encounters with patient needs, particularly as population aging becomes a global phenomenon requiring integrated, life-course-oriented care for individuals with chronic conditions and multimorbidity

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[2]. In Indonesia, adults aged ≥60 years accounted for 12% of the population in 2024 and are projected to reach nearly 20% by 2045 [3], placing pressure on tertiary hospitals where geriatric patients commonly present with multiple comorbidities and greater dependence on multidisciplinary, long-term care [4].

Treatment adherence represents a major challenge in geriatric healthcare [5]. Non-adherence in chronic disease management is associated with poor disease control, accelerated progression, increased morbidity and mortality, and preventable healthcare costs due to avoidable hospitalizations [6]. Patient experience and satisfaction have been increasingly recognized as essential determinants of adherence, alongside safety and clinical effectiveness [7]. Positive experiences, characterized by empathetic communication, mutual respect, and shared decision-making, foster trust, and engagement, while satisfaction reflects how well care aligns with expectations and is consistently correlated with improved adherence behaviors [8].

Outcome quality refers to patients' perceptions of the effectiveness of care, including symptom relief, functional improvement, and enhanced quality of life. Research has shown that patients who perceive tangible improvements in health are more motivated to maintain adherence [9]. Limited patient cooperation and engagement during treatment are frequently associated with suboptimal clinical outcomes [10]. These challenges include inadequate comprehension of medical instructions, reduced recall of clinical information, and poor adherence to prescribed therapies. Effective physician–patient communication plays a pivotal role in addressing these barriers. High-quality communication promotes patient self-management, addresses emotional and psychosocial needs, strengthens the therapeutic alliance, and facilitates shared decision-making [10]. From the patient perspective, meaningful communication extends beyond receiving medical information to encompass feeling heard, respected, and actively involved as partners in their care. This collaborative relationship fosters trust, which in turn enhances treatment adherence and overall clinical effectiveness [10]. Patient feedback and experience-based assessments are increasingly viewed as key indicators in evaluating healthcare performance and quality improvement initiatives [11].

Despite growing global evidence, empirical research in Indonesia examining how patient experience and satisfaction influence adherence through outcome quality and communication remains limited. Therefore, this study aims to analyze these relationships among geriatric outpatients at a national referral hospital, focusing on the dual mediating roles of service communication quality and perceived outcome quality. We hypothesize that service communication and outcome quality mediate the relationship between patient experience and patient satisfaction on treatment adherence. To our knowledge, this is the first study in Indonesia to investigate dual mediating pathways in ambulatory geriatric care. By integrating relational, informational, and perceptual dimensions into a single predictive model, this study advances adherence theory beyond traditional clinical determinants, offering a more nuanced understanding relevant to health systems facing demographic aging.

Methods

Study design and setting

This quantitative, cross-sectional study investigated the correlations among patient experience, patient satisfaction, outcome quality, service communication, and treatment adherence in geriatric outpatients. The research adhered to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) criteria for reporting cross-sectional studies. Data collection occurred from June to September 2025 at the Geriatric Outpatient Clinic at RSUPN Dr. Cipto Mangunkusumo Hospital, which offers interdisciplinary care for geriatric patients with intricate medical requirements.

Study participants and criteria

The study population comprised patients aged 60 years and older or their caretakers. The inclusion criteria were: (a) patients aged 60 years or older attending the geriatric clinic; (b) having received at least one consultation from a physician; (c) possessing sufficient cognitive ability to complete the questionnaire or receiving assistance from a caregiver if needed; and (d)

demonstrating willingness to participate and provide informed consent. The exclusion criteria comprised: (a) significant cognitive impairment lacking caregiver assistance; (b) terminal illness or acute medical instability; and (c) patients participating in quick medication-refill appointments devoid of a consultation element.

Sample size and sampling method

A power study conducted with GPower 3.1 established a minimal sample size of 138 participants, predicated on a medium effect size (f^2=0.15), α=0.05, statistical power of 0.95, and five predictor variables. Participants were recruited using sequential sampling, where individuals were selected in a predetermined order from those attending routine outpatient appointments until the required sample size was reached.

Measurements and instruments

All variables (constructs) were measured using validated instruments grounded in established theories. Patient experience (PE) was assessed using the Generic Short Patient Experience Questionnaire (GS-PEQ), reflecting the patient's overall care process and communication with healthcare providers, which influences treatment adherence [12]. Patient satisfaction (PS) was measured using adapted items from Amporfro *et al.* [13], focusing on whether healthcare services met patient expectations, as guided by the expectancy disconfirmation theory. Service communication (SC), measured using Kwame and Petrucka [14], evaluates how well healthcare providers communicate with patients, playing a key mediating role in adherence through trust and clarity. Outcome quality (OQ), based on Kim *et al.* [15], reflects patients' perceptions of the effectiveness of care, reinforcing their adherence behaviors as mediated by perceived clinical improvement. Treatment adherence (TA) was measured using a modified version of the Medication Adherence Report Scale (MARS-5), specifically tailored to reflect desirable adherence behaviors in geriatric patients [16-18]. All variables were measured using a six-point Likert scale, ranging from 1 ("strongly disagree") to 6 ("strongly agree"), with higher scores indicating more favorable perceptions. This scale was applied to all constructs, including patient experience, satisfaction, service communication, outcome quality, and treatment adherence [19].

The constructs were chosen based on their theoretical relevance in predicting treatment adherence, with service communication and outcome quality acting as mediators, influencing how patient experience and patient satisfaction translate into adherence. This model reflects the critical role of communication and perceived care quality in sustaining adherence behaviors, particularly in geriatric healthcare.

Participant characteristics and sociodemographic, clinical, and healthcare utilization variables

In addition, this study assessed sociodemographic, clinical, and healthcare utilization characteristics. Sociodemographic variables included gender, age, educational attainment, occupation, monthly income, and living arrangement. Clinical variables included the presence of comorbidities, such as hypertension, diabetes mellitus, rheumatologic diseases, sarcopenia, and other chronic conditions. Healthcare utilization was assessed based on the frequency of outpatient visits within the preceding year.

Data collection procedures

Questionnaires were administered in paper-based format under the supervision of trained research assistants following standardized instructions to ensure consistent administration and comprehension among geriatric participants. Caregivers were allowed to assist when needed to ensure accurate responses. The research team verified completeness and clarified any ambiguities on-site to minimize missing data and improve response quality.

Information on sociodemographic characteristics, living arrangements, income, and healthcare utilization in the previous year was obtained directly from participants. Clinical information, including comorbidities, was collected from medical records and patient self-reports during routine outpatient appointments.

Statistical analysis

Data analysis was conducted with SmartPLS 4.0 (SmartPLS GmbH, Germany) employing Partial Least Squares Structural Equation Modeling (PLS-SEM), chosen for its efficacy in managing intricate latent constructs and moderate sample sizes. The analysis was conducted in two phases. Initially, the measurement model was assessed to determine reliability and validity through composite reliability, Cronbach's alpha, average variance extracted (AVE), and discriminant validity. All constructs exhibited AVE values of 0.50, signifying sufficient convergent validity. Secondly, the structural model was evaluated by analyzing path coefficients, R^2 values, and the importance of correlations among latent variables. This thorough assessment validated that the model was statistically sound, theoretically coherent, and suitable for fulfilling the research aims in geriatric healthcare.

In addition to PLS-SEM, Importance-Performance Map Analysis (IPMA) was used to evaluate the relative importance and performance of each construct in explaining treatment adherence. IPMA combines both the results of the structural model and performance measures, allowing the identification of constructs with the highest impact on adherence and highlighting areas where improvements may be needed. This approach provides a comprehensive view of the model, offering insights into the effectiveness of each construct in a more visually interpretable way.

Results

Participant characteristics

A total of 221 geriatric outpatients participated in this study at the Geriatric Outpatient Clinic of RSUPN Dr. Cipto Mangunkusumo Hospital from June to September 2025. Detailed baseline characteristics are presented in **Table 1**. The participants had a mean age of 73.2±7.0 years, with women comprising 65.6% of the sample. Most had at least a secondary education and lived with spouses or family members. Nearly half reported monthly incomes below 1 million Indonesian Rupiah, and 44% had visited the clinic 12 times or more in the past year. Hypertension, rheumatologic disease, and diabetes mellitus were the most prevalent comorbidities, while sarcopenia was found in a small proportion.

Table 1. Characteristics of geriatric outpatients included in this study (n=221)

Characteristics	Frequency (%)
Sex	
Male	76 (34.4)
Female	145 (65.6)
Age (years), mean±SD	73.16±7.02
Education level	
No formal education	2 (0.9)
Elementary school graduate	19 (8.6)
Junior high school graduate	16 (7.2)
Senior high school graduate	88 (39.8)
Associate graduate	30 (13.6)
Bachelor's degree	41 (18.6)
Master's degree	21 (9.5)
Doctoral degree	4 (1.8)
Occupation	
Self-employed	25 (11.3)
Private employed	37 (16.7)
Civil servant	23 (10.4)
Housewife	64 (29.1)
Pension	54 (24.4)
Others	18 (8.1)
Residing with	
Spouse	124 (56.1)
Sibling(s)	5 (2.1)
Relative(s)	62 (28.1)
Child(ren)	2 (0.9)
Grandchild(ren)	1 (0.5)
Caregiver	3 (1.4)
Living alone	23 (10.4)

Characteristics	Frequency (%)
Others	1 (0.5)
Commorbidities	
Sarcopenia	6 (2.6)
Rheumatology disease	42 (19.0)
Hypertension	63 (28.5)
Coronary heart disease	2 (0.9)
Diabetes mellitus	36 (16.3)
Chronic obstructive pulmonary disease	4 (1.7)
Gastrointestinal disease	16 (7.1)
Liver disease	4 (1.7)
Hypercholesterolemia	20 (9.0)
Hyperuricemia	12 (5.4)
Cerebrovascular disease	6 (2.6)
Glaucoma	2 (0.9)
Vertigo	4 (1.7)
Hernia nucleus pulposus	4 (1.7)
Cancer	2 (0.9)
Income (Indonesian Rupiah)	
<1 million/ month	96 (43.3)
1–5 million/ month	54 (24.4)
5–10 million/ month	40 (18.1)
10–15 million/ month	27 (12.2)
>15 million/ month	4 (1.8)
Visit in last year	
1 visit	8 (3.6)
2–4 visits	14 (6.3)
5–7 visits	38 (17.2)
8–11 visits	63 (28.5)
>12 visits	98 (44.4)

Measurement model evaluation

The outer model was assessed to ensure the validity and reliability of the latent constructs, including patient experience, patient satisfaction, service communication, outcome quality, and treatment adherence. All indicator loadings exceeded 0.70, confirming item reliability (**Table 2**). Composite reliability (CR) and Cronbach's alpha values were above 0.70, and AVE values were greater than 0.50, indicating adequate convergent validity. Discriminant validity was demonstrated using the HTMT, with all values below 0.90 (**Table 3**). Collinearity assessment showed VIF values below 5, indicating no multicollinearity issues. Overall, the measurement model met all statistical criteria, confirming internal consistency and conceptual distinctiveness.

Table 2. Results of measurement model evaluations of patient experience, satisfaction, service communication, outcome quality, and treatment adherence among geriatrics

Composites	Outer loadings	Variance inflation factor (VIF)	Average variance extracted (AVE)	Composite reliability (CR)	Cronbach's alpha
Patient experience (PE)			0.680	0.955	0.845
PE1	0.798	2.357			
PE2	0.814	2.698			
PE3	0.903	4.454			
PE4	0.767	2.133			
PE5	0.799	2.334			
PE6	0.864	3.480			
PE7	0.823	2.798			
PE8	0.807	2.363			
PE9	0.833	2.731			
PE10	0.834	2.915			
Patient satisfaction (PS)			0.753	0.938	0.918
PS1	0.912	3.655			
PS2	0.871	2.724			
PS3	0.863	2.571			
PS4	0.862	2.690			
PS5	0.828	2.243			
Service communication (SC)			0.764	0.942	0.922
SC1	0.859	2.522			
SC2	0.903	3.462			

Composites	Outer loadings	Variance inflation factor (VIF)	Average variance extracted (AVE)	Composite reliability (CR)	Cronbach's alpha
SC3	0.852	2.484			
SC4	0.888	3.156			
SC5	0.865	2.650			
Outcome quality (OQ)			0.763	0.906	0.845
OQ1	0.853	1.971			
OQ2	0.895	2.289			
OQ3	0.873	1.934			
Treatment adherence (TA)			0.731	0.931	0.908
TA1	0.878	2.772			
TA2	0.887	3.010			
TA3	0.766	1.830			
TA4	0.873	2.742			
TA5	0.866	2.591			

Table 3. Heterotrait–monotrait ratio (HTMT) for evaluating the measurement model of patient experience, satisfaction, service communication, outcome quality, and treatment adherence among geriatrics

Variables	OQ	PE	PS	SC	TA
Outcome quality (OQ)					
Patient experience (PE)	0.658				
Patient satisfaction (PS)	0.737	0.595			
Service communication (SC)	0.614	0.709	0.735		
Treatment adherence (TA)	0.792	0.780	0.765	0.836	

Structural model analysis

The inner model was assessed to examine the hypothesized relationships among the constructs. The coefficient of determination (R^2) for service communication, outcome quality, and treatment adherence was 0.573, 0.495, and 0.740, respectively. These results indicate that the model demonstrates good explanatory power, with approximately 74% of the variance in treatment adherence explained by patient experience, patient satisfaction, service communication, and outcome quality. The effect size (f^2) analysis indicated that patient experience had a medium effect on service communication (f^2=0.284) and a small effect on treatment adherence (f^2=0.128) and outcome quality (f^2=0.111) (**Table 4**). Patient satisfaction demonstrated a large effect on service communication (f^2=0.323), a medium effect on outcome quality (f^2=0.225), and a small effect on treatment adherence (f^2=0.042). Furthermore, service communication exhibited a medium effect on treatment adherence (f^2=0.205), while outcome quality showed a small effect on treatment adherence (f^2=0.121). Conversely, the path from service communication to outcome quality showed no significant effect (f^2=0.000) (**Table 4**).

Table 4. Effect size (f^2) for the structural model assessing the relationships between patient experience and satisfaction, and treatment adherence, with service communication and perceived outcome quality as mediating variables among geriatrics

Category	f^2	Effect size
Patient experience → Treatment adherence	0.128	Small effect size
Patient satisfaction → Treatment adherence	0.042	Small effect size
Patient experience → Service communication	0.284	Medium effect size
Patient experience → Outcome quality	0.111	Small effect size
Patient satisfaction → Service communication	0.323	Large effect size
Patient satisfaction → Outcome quality	0.225	Medium effect size
Service communication → Treatment adherence	0.205	Medium effect size
Outcome quality → Treatment adherence	0.121	Small effect size
Service communication → Outcome quality	0.000	No significant effect

The structural model illustrates the relationships between constructs, with path coefficients indicating the strength of those relationships, as presented in **Figure 1**. The R^2 values inside the circles indicate the variance explained by each construct, providing insights into how well each construct accounts for the variance in the model. For example, treatment adherence has a high R^2 value of 0.740, indicating a strong explanation of the variance in treatment adherence.

Additionally, the outer loadings represent the strength of each indicator's relationship with its respective construct, such as patient satisfaction (PS1=0.912), patient experience (PE3=0.903), service communication (SC2=0.903). The *p*-values in parentheses ($p<0.05$) indicate that all relationships in the model are statistically significant, except for the path from service communication to outcome quality, which is not significant ($p=0.827$). These findings confirm the strong relationships between the constructs and their indicators, with one exception.

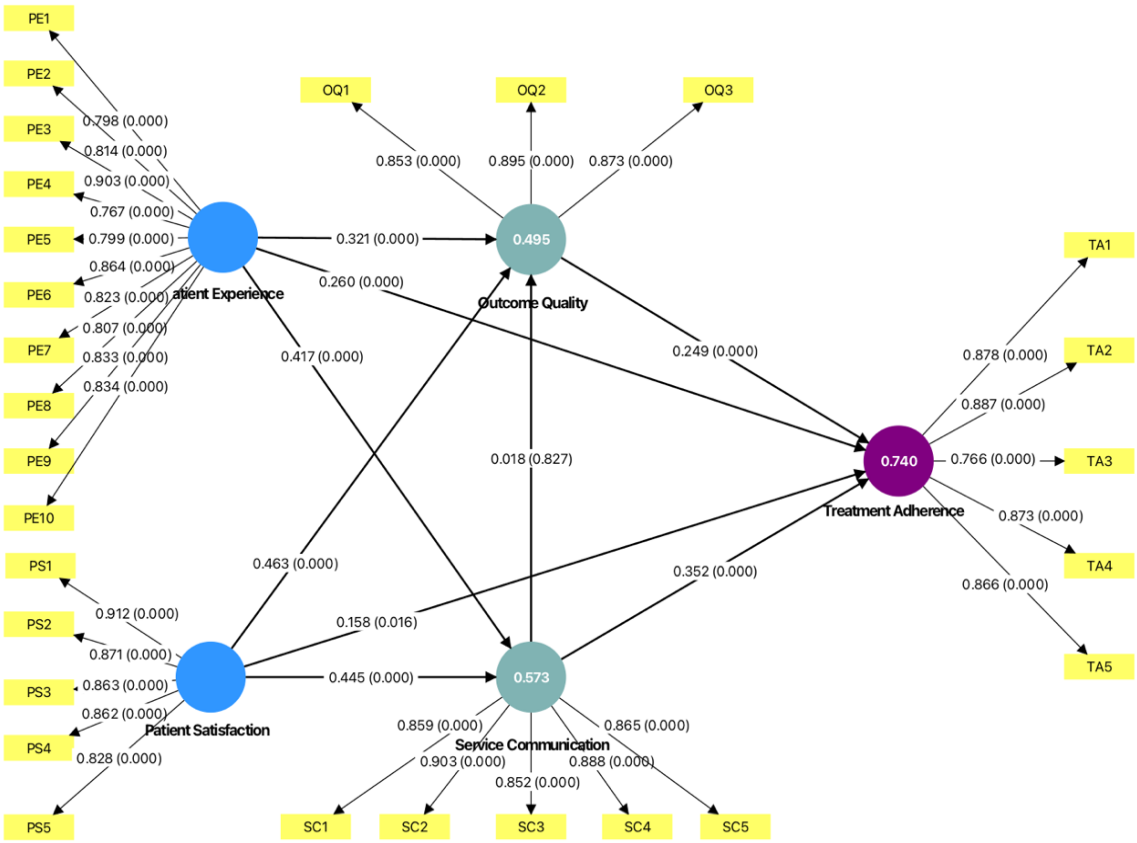

Figure 1. Structural model showing the relationships between constructs. Numbers in the circles represent R^2 values, indicating the variance explained by each construct. Path coefficients show the strength of relationships between constructs, and outer loadings indicate the strength of each indicator's relationship with its construct, with *p*-values in parentheses denoting statistical significance ($p<0.005$). OQ: outcome quality; PE: patient experience; PS: patient satisfaction; SC: service communication; TA: treatment adherence.

Path coefficients and hypothesis testing

All hypothesized relationships were evaluated using a bootstrapping procedure with 5,000 subsamples. The results revealed that nearly all hypothesized paths were statistically significant ($p<0.05$) as presented in **Table 5**. Patient experience had significant positive effects on treatment adherence (β=0.260, $p<0.001$), service communication (β=0.417, $p<0.001$), and outcome quality (β=0.321, $p<0.001$). Similarly, patient satisfaction significantly influenced treatment adherence (β=0.158, $p<0.001$), service communication (β=0.445, $p<0.001$), and outcome quality (β=0.463, $p<0.001$). Furthermore, both service communication (β=0.352, $p<0.001$) and outcome quality (β=0.249, $p<0.001$) demonstrated significant positive contributions to treatment adherence.

The mediation analyses supported that patient experience and patient satisfaction indirectly enhanced treatment adherence through both service communication and outcome quality, with all indirect paths being significant ($p<0.05$). In contrast, the path from service communication to outcome quality was not significant (β=0.018, $p=0.827$). These findings indicate that patient experience and satisfaction exert strong direct effects on service communication and outcome quality, while also improving treatment adherence indirectly through these mediating constructs.

Table 5. Path coefficient, t-values, and *p*-values for the structural model assessing the relationships between patient experience and satisfaction, and treatment adherence, with service communication and perceived outcome quality as mediating variables among geriatrics

Category	Path coefficient (β)	t-value	*p*-value	Result
H1. PE → TA	0.260	4.929	<0.001*	Supported
H2. PS → TA	0.158	2.418	<0.001*	Supported
H3. PE → SC	0.417	7.736	<0.001*	Supported
H4. PE → OQ	0.321	4.756	<0.001*	Supported
H5. PS → SC	0.445	8.376	<0.001*	Supported
H6. PS → OQ	0.463	6.378	<0.001*	Supported
H7. SC → TA	0.352	6.668	<0.001*	Supported
H8. OQ → TA	0.249	5.103	<0.001*	Supported
H9. SC → OQ	0.018	0.219	0.827	Unsupported
H10. PE → SC → TA	0.147	4.806	<0.001*	Supported
H11. PE → OQ→ TA	0.080	3.157	<0.002*	Supported
H12. PS → SC → TA	0.157	5.196	<0.001*	Supported
H13. PS → OQ → TA	0.115	3.967	<0.001*	Supported
H14. PE → SC → OQ	0.007	0.216	0.829	Unsupported
H15. PS → SC → OQ	0.008	0.216	0.829	Unsupported
H16. SC → OQ → TA	0.004	0.218	0.827	Unsupported
H17. PE → SC → OQ → TA	0.002	0.218	0.827	Unsupported
H18. PS → SC → OQ → TA	0.002	0.213	0.831	Unsupported

OQ: outcome quality; PE: patient experience; PS: patient satisfaction; SC: service communication; TA: treatment adherence
*Statistically significant at $p<0.05$

Mediation effects

Mediation analyses confirmed that service communication and outcome quality partially mediated the effects of patient experience and patient satisfaction on treatment adherence (**Table 5**). The indirect path patient experience → service communication → treatment adherence was significant (β=0.147, $p<0.001$), underscoring the role of effective communication in translating positive experiences into adherence behaviors. Similarly, patient experience → outcome quality → treatment adherence (β=0.080, $p=0.002$) indicated that perceived clinical improvement reinforced adherence. For patient satisfaction, both indirect effects through service communication (β=0.157, $p<0.001$) and outcome quality (β=0.115, $p<0.001$) were significant, confirming that satisfaction enhances adherence through improved communication and perceived care outcomes.

Importance-Performance Map Analysis (IPMA)

The IPMA provides valuable insights by illustrating both the relative importance (total effects) and performance of each construct in explaining treatment adherence. All constructs show similarly high-performance levels (around 50.045), indicating consistently positive patient perceptions (**Figure 2A**). The primary variation is observed in the importance values (ranging from 0.053 to 0.107). At the construct level, patient experience shows the highest importance (0.488), followed by patient satisfaction (0.432), service communication (0.357), and outcome quality (0.249), despite the performance scores being consistent across all constructs (**Table 6**).

At the indicator level (**Figure 2B** and **Table 6**), patient satisfaction (PS1–PS5: 0.094–0.107) and outcome quality (OQ1–OQ3: 0.087–0.101) have the highest importance, reflecting a stronger influence on adherence behavior. In contrast, the patient experience (PE1–PE10: 0.053–0.067) and service communication (SC1–SC5: 0.079–0.085) indicators exhibit slightly lower importance values.

These findings suggest that while the performance across service attributes is well-balanced with no critical weaknesses, patient experience exerts the strongest influence at the construct level. Clinically, strategies to enhance treatment adherence should focus on maintaining high-quality interactions, strengthening patient satisfaction, and improving communication clarity.

Table 6. Importance-Performance Map Analysis (IPMA) results: performance and importance values

Level	Construct/indicator	Performance	Importance
Construct level	Patient experience	50.045	0.488
	Patient satisfaction	50.045	0.432
	Service communication	50.045	0.357
	Outcome quality	50.045	0.249
Indicator level	Patient experience (PE1-PE10)	50.045	0.094–0.107
	Patient satisfaction (PS1-PS5)	50.045	0.087–0.101
	Service communication (SC1-SC5)	50.045	0.053–0.067
	Outcome quality (OQ1-OQ3)	50.045	0.079–0.085

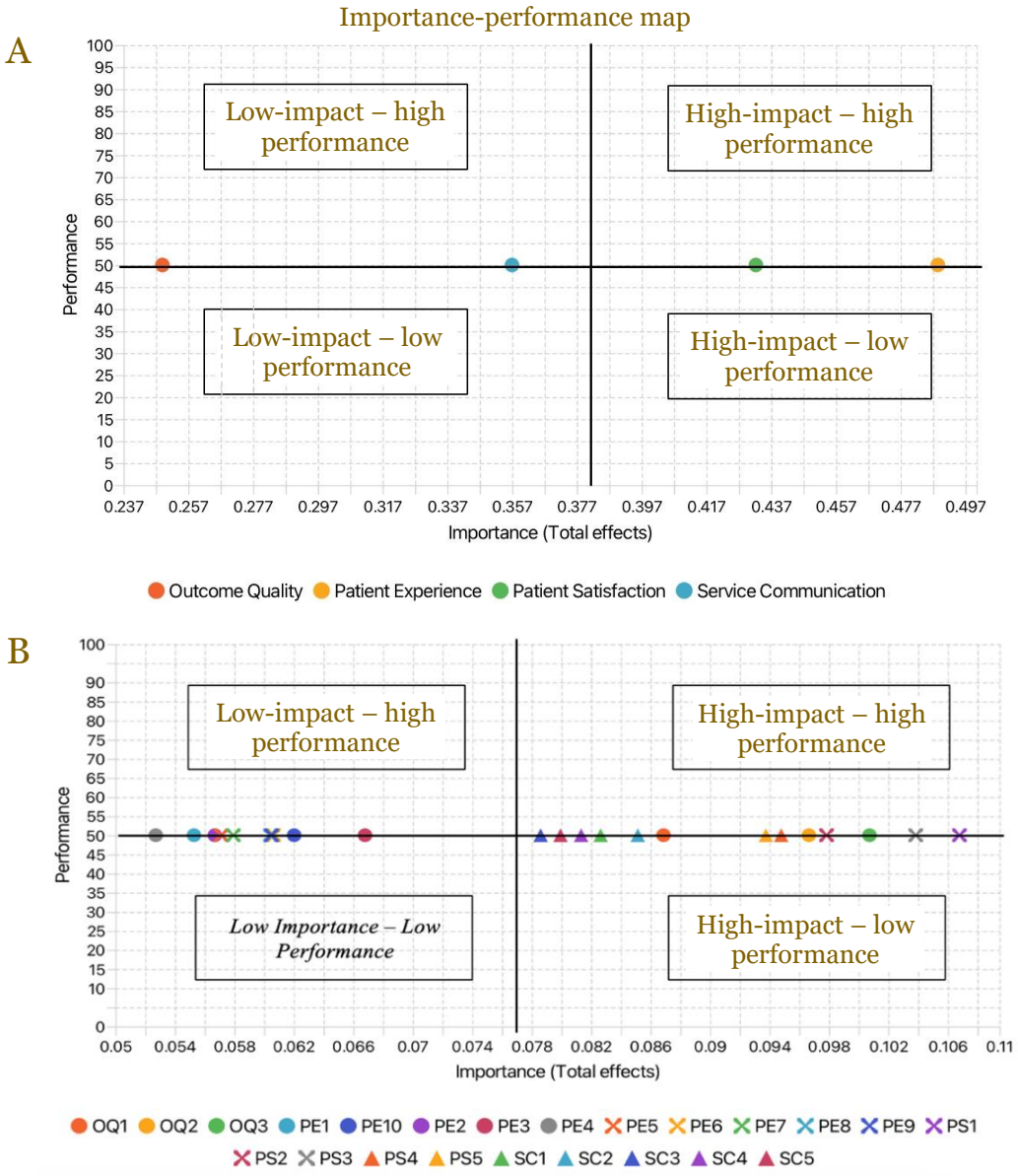

Figure 2. Importance-Performance Map Analysis (IPMA), showing the importance and performance values of (A) constructs and (B) indicators for each construct. The quadrants in this figure are divided based on the average importance and performance values for each construct. The right side of the figure represents high importance, while the left side represents low importance. The upper half reflects high performance, and the lower half indicates low performance. Constructs in the high importance and high-performance quadrant are critical for treatment adherence, while those in the low importance and low performance quadrant have minimal impact. Indicators in the top-right quadrant (high importance, high performance) are the most influential on treatment adherence. In contrast, those in the bottom-left quadrant (low importance, low performance) have the least impact. OQ: outcome quality; PE: patient experience; PS: patient satisfaction; SC: service communication; TA: treatment adherence.

Discussion

This study found that patient experience and patient satisfaction significantly influenced treatment adherence among the geriatric outpatient population at a tertiary referral hospital, both directly and indirectly through service communication and perceived outcome quality. These findings demonstrate the multifactorial and psychosocial nature of adherence behavior in geriatric patients receiving ambulatory care.

The analysis revealed that patient experience had a strong positive effect on treatment adherence (β=0.260, p<0.001) and showed the highest overall importance in the IPMA (importance=0.488). This study emphasizes the experiential dimension of care, including empathy, responsiveness, and psychological support, as central mechanisms that influence behavioral engagement in geriatrics managing multiple chronic conditions [20,21]. The mechanism linking therapeutic experience to adherence operates through various complementary pathways. Trust in the physician correlates with patients' perceived effectiveness of care, their openness to new medications, and their intention to follow clinical recommendations. Healthcare providers who demonstrate empathy and responsiveness create interpersonal conditions that facilitate patients' readiness to engage with treatment regimens [22]. For geriatrics navigating the complexity of polypharmacy and multimorbidity, such supportive interactions mitigate treatment-related burdens, enhance intrinsic motivation to adhere, and reduce psychological barriers, such as distrust, fear of medication dependence, and skepticism about the necessity of treatment [23].

Continuity of provider relationships represents an essential structural component that allows positive patient experience to result in improved adherence outcomes. Ongoing therapeutic relationships foster a deeper understanding of each patient's health status, enable more effective shared decision-making regarding care goals, and build the interpersonal foundation for communication about treatment concerns. When geriatrics perceive that their healthcare providers understand their circumstances and involve them as active partners in treatment planning, they report greater adherence to medications and follow-up schedules [24,25]. Patient satisfaction also emerged as a significant predictor of adherence (β=0.158, p<0.001), exerting both direct and mediated effects through service communication and outcome quality. Although its direct influence was weaker than that of patient experience, satisfaction demonstrated strong indicator reliability (PS1–PS5), suggesting that positive evaluations of care substantially reinforce adherence.

Patient satisfaction emerged as a statistically significant determinant of treatment adherence, demonstrating both direct and indirect pathways through service communication quality and care outcomes. Although patient satisfaction demonstrated a weaker direct effect on treatment adherence compared to patient experience, its high measurement reliability indicates that satisfaction was consistently and validly captured. This suggests that positive evaluations of healthcare services function as a stable psychological foundation that reinforces patients' commitment to adherence, primarily through improved communication and perceived treatment outcomes [26]. Patient satisfaction is a multidimensional construct that encompasses both cognitive and affective components. In geriatric healthcare contexts, specifically, satisfaction with healthcare provider communication, information clarity, and perceived equitable treatment have been empirically associated with improved medication compliance and active participation in chronic disease management. In geriatric patients, satisfaction correlates with health complexity, age, and clinical parameters [27]. Consequently, efforts to improve patient satisfaction should extend beyond clinical efficiency metrics to encompass relational and emotional aspects of care delivery, recognizing that compassionate communication and patient-centered engagement are crucial for enhancing therapeutic adherence and long-term health outcomes [28,29].

Service communication emerged as a critical mediating mechanism, linking both positive patient experiences (β=0.417, p<0.001) and patient satisfaction (β=0.445, p<0.001) to adherence behaviors (β=0.352, p<0.001). These findings presented a compelling framework in which high-quality healthcare communication serves as an operational channel, transforming favorable patient perceptions into tangible adherence-related behaviors. This mediation pathway demonstrates that communication excellence is not merely a relational tool but a fundamental mechanism that operationalizes positive patient cognitions into consistent health management

practices [30]. The geriatric care context amplifies the importance of strategic communication design. Geriatrics navigating complex medication regimens face multifaceted barriers, including polypharmacy, sensory impairments, and age-related cognitive decline, all of which hinder therapeutic comprehension [27,31]. In these vulnerable populations, health professionals must implement simplified and emotionally supportive communication strategies that reinforce information retention and ensure that medication instructions are clearly understood and remembered [29].

Outcome quality also demonstrated a significant positive effect on adherence (β=0.249, p<0.001), mediating the relationships between patient experience and satisfaction with adherence. For geriatric populations, the perception of meaningful health improvements carries psychological significance. This perception helps buffer against treatment fatigue, which results from the cumulative emotional and physical exhaustion associated with prolonged medication regimens and chronic disease management. Positive perceptions of outcomes alleviate treatment burden and reinforce confidence in the healthcare system, motivating continued engagement despite the complexities of polypharmacy and age-related functional limitations. Research on recovery trajectories in geriatric populations shows that those who perceive favorable health outcomes and experience fewer medications show greater treatment resilience and adherence sustainability [32]. These findings align with earlier studies identifying perceived outcome quality as a fundamental determinant of healthcare value perception and interpersonal trust. However, the effect size analysis revealed that the influence of outcome quality (f^2=0.121) was notably smaller than that of service communication (f^2=0.205), highlighting the theoretical distinction in which communication is the stronger driver of behavioral compliance.

This study advances adherence theory by demonstrating that behavioral compliance is shaped by relational quality and communication processes, not solely clinical outcomes. Service communication exerted a stronger mediating effect than outcome quality, underscoring the importance of interpersonal influences in geriatric care. Conducted in a national referral hospital in a low- and middle-income context, this study expands the applicability of existing adherence models beyond high-income settings. Clinicians should apply structured counseling, teach-back techniques, and simplified instructions to improve comprehension and reduce uncertainty. Healthcare managers can integrate patient experience metrics into dashboards, evaluations, and training. Optimizing continuity of care strengthens trust and adherence.

This cross-sectional design constrains causal inference. Self-reported data may be subject to recall and social desirability biases. The single-center setting limits the generalizability of findings to other hospital types, such as regional or private institutions. The assistance of caregivers may have influenced participants' interpretations. Lastly, subjective outcomes were used instead of objective clinical measurements. Longitudinal designs are needed to clarify causal pathways, and multi-center studies should examine broader generalizability. Objective metrics, such as hospitalization frequency, medication reconciliation accuracy, and functional mobility, should complement perceived outcomes. Mixed-methods approaches may uncover emotional and cognitive mechanisms influencing adherence.

Conclusion

This study underscores the importance of improving communication strategies and patient-centered care to boost treatment adherence and overall quality of life in geriatrics. By exploring how patient experience and satisfaction influence adherence, the research adds to existing knowledge, particularly in resource-limited settings. It highlights that strengthening communication and improving the perceived quality of care can help create better outcomes, particularly for the aging population. These findings offer practical insights for healthcare systems aiming to enhance care for geriatrics, emphasizing the role of effective communication and patient involvement.

Ethics approval

The study was conducted in accordance with the Declaration of Helsinki and approved by the Research Ethics Committee of the Faculty of Medicine, Universitas of Indonesia – RSUPN Dr. Cipto Mangunkusumo Hospital (Protocol No. 24101617; approval date: 6 January 2025). All

respondents were informed about the study's objectives and procedures prior to participation, and both verbal and written informed consent were obtained from all participants or their caregivers before data collection.

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Competing interests

The authors declare that there are no significant competing financial, professional, or personal interests that might have affected the performance.

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Underlying data

Derived data supporting the findings of this study are available from the corresponding author on request.

Declaration of artificial intelligence use

We hereby confirm that no artificial intelligence (AI) tools or methodologies were utilized at any stage of this study, including during data collection, analysis, visualization, or manuscript preparation. All work presented in this study was conducted manually by the authors without the assistance of AI-based tools or systems.

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