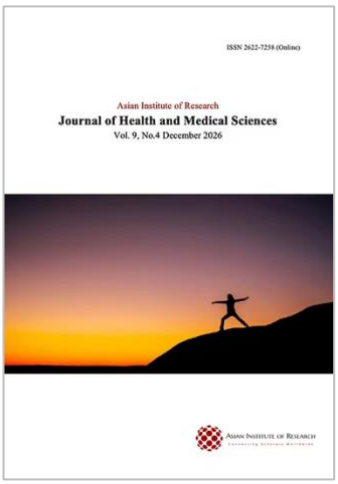


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Physician Communication Skills and Treatment Adherence: A Dual-Trust Mediation Model

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Abstract
Purpose: Drawing on Trust Theory and Social Exchange Theory, this study examines the relationships among perceived physician communication, cognitive trust, emotional trust, and treatment adherence within the Omani healthcare setting. Design/methodology/approach: A cross-sectional survey design was employed, and data were collected from 423 patients who had received hospital services in Oman during the last six months. Partial least squares structural equation modelling was used for data analysis. Findings: The findings indicate that perceived physician communication has a positive relationship with treatment adherence as well as with cognitive and emotional trust. Emotional trust shows a significant positive relationship with treatment adherence, whereas cognitive trust shows no direct association. Mediation analysis reveals that emotional trust mediates the relationship between physician communication and treatment adherence, whereas cognitive trust has no mediating association. These results suggest that affective aspects of trust are more behaviourally relevant to adherence than rational evaluations of physician competence. Theoretical implications: The study advances the literature by disaggregating trust into cognitive and emotional dimensions and demonstrating their distinct roles in the communication adherence relationship. The findings reveal the importance of empathic, patient-centred communication for strengthening emotional trust and supporting adherence behaviours. Practical implications: Practical implications support communication training initiatives that emphasise empathy, relational engagement, and cultural sensitivity within multicultural healthcare systems such as Oman. Originality/value: This study disaggregates trust into cognitive and emotional dimensions and tests their distinct mediating roles in the relationship between physician communication and treatment adherence in Oman.

Keywords: physician-patient communication, cognitive trust, emotional trust, treatment adherence, healthcare services

1. Introduction

As healthcare systems shift toward patient-centred models of care, greater attention has been placed on the quality of the physician-patient interaction (Park *et al*., 2022). Global health policy frameworks advanced by the World Health Organization (WHO) reinforce this shift, identifying effective communication, respect for patient preferences, and strengthened provider-patient relationships as core components of healthcare quality and responsiveness (WHO, 2016). These priorities reveal the importance of relational and perceptual factors in healthcare delivery. Beyond establishing accurate diagnoses, physicians must communicate effectively to serve patients' needs; while medical expertise influences clinical decisions, communication skills determine how those decisions are received and acted upon (Ranjan, 2015). When effective, such communication builds a therapeutic

alliance that enhances patient understanding, generates trust, and promotes adherence to treatment plans (Sharkiya, 2023; Kitakata *et al*., 2021).

One important outcome of effective physician-patient communication is the development of trust (Nuhu *et al*., 2025). Patient trust in physicians is understood to comprise two distinct dimensions: cognitive trust (COT) and emotional trust (EMT). COT reflects a patient's rational belief in the physician's competence and ability to diagnose and treat illness accurately, built when patients perceive their provider as reliable and professionally skilled (Krot and Rudawska, 2021). EMT is affective in nature, centred on the patient's perception of the physician's empathy, care, and concern for their well-being, and is shaped by warm and attentive interactions (Šimić *et al*., 2021). Although conceptually distinct, these dimensions often co-occur and reinforce one another (Nwosu *et al*., 2025).

Research across various healthcare settings has shown that trust influences patients' beliefs in the efficacy and necessity of their prescribed treatment plans, thereby strengthening their commitment to following medical recommendations (Nwosu *et al*., 2023a; Birkhäuer *et al*., 2017). In Oman, these considerations take on particular significance given the country's rapidly evolving healthcare landscape. The healthcare system has undergone substantial reforms aimed at expanding access and improving quality, particularly within primary healthcare services (Al-Jabri *et al*., 2021). However, the diversity of the healthcare workforce, alongside sociocultural and linguistic differences, creates notable communication challenges (Al-Kindi *et al*., 2019). While patients in Oman generally report positive experiences, interpersonal communication, continuity of care, and shared decision-making have been identified as areas requiring improvement (Abdulhadi *et al*., 2006; Al-Jabri *et al*., 2021).

Treatment adherence is a central factor in the management of chronic non-communicable diseases (NCDs) such as diabetes and hypertension. These conditions require sustained long-term care and account for a substantial proportion of global morbidity and mortality. Improving adherence is therefore essential for achieving effective disease control, reducing complications, and lowering premature mortality. The WHO's Global Action Plan for the Prevention and Control of NCDs 2013–2030 identifies improved treatment adherence as a major strategy for addressing the global burden of chronic diseases and directly supports Sustainable Development Goal 3 (SDG 3), which aims to ensure healthy lives and promote well-being for all (WHO, 2013; United Nations, 2015). Within this policy context, physician communication and patient trust are essential determinants of sustained patient engagement and long-term adherence.

Despite the recognised importance of trust in healthcare, no study in Oman has examined how physician communication influences COT and EMT separately, or how each trust dimension independently affects adherence. Most existing research in Oman has focused on general patient satisfaction or access barriers, with limited attention to the psychological processes through which communication quality shapes patient behaviour (Alhenaidi *et al*., 2023; Al Harrasi *et al*., 2021). Although the broader international literature has repeatedly demonstrated that trust mediates the relationship between communication and adherence (Nwosu *et al*., 2023b; Birkhäuer *et al*., 2017; Ozawa and Sripad, 2013; Panahi *et al*., 2022), this body of work predominantly treats trust as a unidimensional construct, overlooking the conceptually important distinction between its cognitive and emotional components. Trust Theory (McAllister, 1995) posits that COT and EMT develop through different processes and may therefore influence adherence through distinct paths. Addressing this theoretical and contextual gap, the present study examines the direct relationship between perceived physician communication (PCM) and treatment adherence (TAD) and tests the mediating role of COT and EMT in the relationship.

This study contributes to the literature by disaggregating trust into its cognitive and emotional dimensions and demonstrating their distinct roles in the proposed relationship. The findings provide theoretical insights into how different facets of trust operate as mechanisms between communication quality and patient behaviour, and offer practical implications for physician communication training in Oman and other multicultural healthcare settings where empathic, patient-centred practice is essential for supporting treatment adherence.

2. Literature Review

Patient-centred care is widely recognised as a foundational principle for improving healthcare quality and outcomes. The WHO has consistently emphasised this approach across major policy frameworks, including the

Ljubljana Charter on Reforming Health Care (WHO 1996), the World Health Report 2000, the World Health Report on Primary Health Care (WHO 2008), the Global Strategy on People Centred and Integrated Health Services (WHO 2015), and the Framework on Integrated People Centred Health Services (WHO 2016). Collectively, these documents position effective communication, respect for patient preferences, dignity, and shared decision-making as core components of health system performance rather than supplementary features. They also highlight trust as a central element in provider-patient interactions that influences health outcomes. In particular, cognitive trust, based on perceived provider competence, and emotional trust, grounded in empathy and relational care, are associated with patient engagement and treatment adherence. Building on these policy foundations, the present study examines how perceived physician communication relates to cognitive and emotional trust and how these trust dimensions influence treatment adherence in the multicultural healthcare context of Oman.

2.1 Theoretical Framework

This study is based on two complementary theoretical perspectives, namely Trust Theory and Social Exchange Theory (SET). Trust Theory conceptualizes trust as a multidimensional construct composed of cognitive and emotional components. Cognitive trust refers to the rational judgment that another party is competent, reliable, and capable of fulfilling obligations (Stedham and Skaar, 2019). Emotional trust is an affective bond characterized by feelings of care, concern, and security in the relationship (Legood *et al*., 2022). Cognitive trust grows from evidence of reliability and competence, whereas emotional trust is rooted in relational bonds and interpersonal care (McAllister, 1995). In other words, cognitive trust reflects a patient's belief that the physician is competent, while emotional trust reflects the perception that the physician genuinely cares about the patient's well-being. The quality of physician-patient communication is the primary way through which both forms of trust are established. Providing clear explanations, offering detailed responses to patient questions, and involving patients in decision-making processes strengthen COT by showcasing competence and transparency (Zhao and Mao, 2021). Nonverbal cues such as active listening, maintaining eye contact, and expressing compassion nurture EMT by showing that the physician genuinely cares about the patient's well-being (Liu *et al*., 2021).

Social Exchange Theory (SET), originally articulated by Blau (1964)It offers a complementary perspective by framing interpersonal interactions as exchanges of valued resources. The physician offers both informational resources (expert medical advice) and socio-emotional resources (support and empathy). Patients, in turn, evaluate these exchanges in terms of perceived benefits relative to costs. A valuable perception of the physician's communication results in positive reciprocity. Reciprocity can take the form of heightened trust and more consistent adherence to treatment regimens (Nuhu *et al*., 2025). SET thus helps explain the motivational basis for why patients who feel they have benefited from high-quality physician communication tend to engage in behaviours that sustain the relationship.

The integration of these two theories explains the proposed relationships in this study. Trust Theory explains the psychological process by which physician communication generates cognitive and emotional trust. SET complements this by explaining why trust leads to adherence. Trust signals to the patient that the exchange is beneficial and that the physician has provided value, prompting the patient to reciprocate by maintaining the relationship and cooperating with treatment plans.

Treatment adherence has long been explained using established health behaviour theories. For example, the Health Belief Model (Rosenstock, 1974) suggests that adherence is influenced by patients' perceptions of illness severity, treatment benefits, barriers, and self-efficacy. Similarly, the Theory of Planned Behaviour (Ajzen, 1991) highlights the importance of attitudes, subjective norms, and behavioural intentions, while Self-Determination Theory (Deci and Ryan, 2000) emphasises the role of autonomous motivation in sustaining health behaviours. Collectively, these perspectives indicate that adherence is shaped by multiple cognitive, motivational, and social factors rather than by trust or communication alone. Building on this broader literature, the present study focuses on physician communication and cognitive and emotional trust as relational mechanisms that may influence patients' adherence behaviours. Rather than replacing established health behaviour theories, this study complements them by providing a more detailed understanding of the interpersonal processes through which adherence may be strengthened.

2.2 Hypotheses Development

2.2.1 Perceived Physician Communication and Treatment Adherence

High-quality physician-patient communication is expected to improve adherence to treatment regimens. A comprehensive meta-analysis of 106 correlational and 21 experimental studies found that patients whose physicians communicate poorly have a 19% higher risk of non-adherence, and that physicians who received communication-skills training had patients with 1.62 times higher odds of adhering to treatment (Haskard Zolnierek and DiMatteo, 2009). Further empirical research shows that patient-centred communication substantially enhances treatment adherence. Studies indicate that patient-centred communication improves patients' understanding of their conditions and increases their willingness to follow medical guidance (Nwosu *et al*., 2023a; Sharkiya, 2023). Świątoniowska-Lonc *et al*. (2020) examined the association between satisfaction with physician-patient communication and adherence to treatment or self-care in patients with hypertension undergoing chronic treatment. The result obtained was positive and significant. Evidence from systematic reviews and meta-analyses further supports the relationship between physician communication and treatment adherence. DiMatteo's (2004) meta-analysis showed that supportive patient-provider relationships were associated with better adherence, while Zolnierek and DiMatteo (2009) found that effective physician communication significantly improved patients' adherence to treatment recommendations. Likewise, reviews such as Epstein and Street (2011) reported that patient-centred communication and shared decision-making contribute to better adherence by encouraging patient involvement in treatment decisions. Although the strength of these relationships varies across healthcare settings and patient populations, the overall evidence indicates that effective communication is an important factor in promoting adherence.

Based on this evidence, the following hypothesis is proposed:

H1: Perceived physician communication is associated with treatment adherence

2.2.2 Perceived Physician Communication and Patient Trust

Effective physician-patient communication is widely recognized as a central element in building and sustaining patient trust (Chandra *et al*., 2018). A consistent body of research highlights that clear, empathetic communication establishes trust between providers and patients and can directly enhance confidence in the clinician (Street *et al*., 2009; Pellegrini, 2017). To cultivate emotional trust, physicians must go beyond the mere exchange of medical facts. This involves listening attentively, addressing patient concerns without dismissal, and conveying genuine empathy and emotional awareness (Derksen *et al*., 2013). Nonverbal cues such as maintaining steady eye contact, using facial expressions that convey warmth and concern, and, where culturally and contextually appropriate, offering supportive touch can deepen the emotional bond between patient and physician (D'Agostino and Bylund, 2014). Nwosu *et al*. (2025) found that patients' perceptions of communication quality strongly influence EMT. Similarly, Mohd Salim *et al*. (2023) observed that physicians exhibiting compassion, warmth, and sensitivity instil a sense of safety in patients, thereby enhancing trust. Validating patient concerns and showing understanding also increases their readiness to follow medical advice and sustain ongoing relationships with healthcare providers (Wu *et al*., 2022).

The development of COT is also important, which is grounded in a patient's belief in a physician's competence and expertise (Stalnikowicz and Brezis, 2020). Studies indicate that patients tend to perceive physicians as knowledgeable and reliable when evidence-based guidance, comprehensive explanations, and well-organized responses to their questions are received (Feng *et al*., 2022; Kennedy *et al*., 2017). Sharing medical knowledge and educating patients reduces uncertainty, improves comprehension of their conditions and reinforces COT (Montori *et al*., 2023). Transparency in outlining treatment options and involving patients in shared decision-making processes further strengthens COT. Moreover, breaking down complex medical terms and offering clear, structured direction increases patients' confidence in a physician's expertise (Fukami, 2024; Légaré *et al*., 2018; Berman and Chutka, 2016). Effective communication skills thus help patients interpret information effectively, deepening their trust in the physician's professional judgment.

Based on this evidence, we hypothesize that PCM will lead to higher patient trust. Specifically:

H2: Patients' perception of effective physician communication is associated with their COT in the physician

H3: Patients' perception of effective physician communication is associated with their EMT in the physician

2.2.3 Cognitive Trust and Treatment Adherence

In healthcare settings, patients often base their evaluation of a provider's trustworthiness on observable indicators such as medical expertise, accurate diagnoses, clear explanations, and the consistency of treatment recommendations (Wang *et al*., 2023). A patient's perception of their physician as knowledgeable and capable tends to create a belief that the care will be effective. This perception can strengthen their sense of security in clinical decisions and promote a positive care experience (Molina-Mula and Gallo-Estrada, 2020; Lu *et al*., 2024). Cognitive trust is linked with treatment adherence. Confidence in the accuracy of a provider's diagnosis and the appropriateness of the prescribed treatment plan increases the likelihood that patients will follow medical advice and sustain treatment regimens over time (Religioni *et al*., 2025). Adherence requires not only motivation but also conviction that the recommended actions will produce beneficial health outcomes (Jimmy and Jose, 2011). A strong belief in the provider's competence reduces doubts, minimises perceived risks, and promotes behavioural compliance with medical guidance (Vandecasteele *et al*., 2024). Existing research supports a positive association between COT and adherence. Birkhäuer *et al*. (2017) found that trust in a physician's competence was a significant predictor of patient-reported adherence across multiple healthcare contexts. Similarly, Hall *et al*. (2002) observed that COT enhances a collaborative patient-provider relationship, which strengthens the patient's commitment to agreed-upon treatment plans. Although trust has been recognised as an important factor associated with treatment adherence, the evidence is not entirely consistent across healthcare settings and patient populations. Ozawa and Sripad (2013) noted that the relationship between trust and health outcomes varies according to the healthcare context, patient characteristics, and methods used to measure trust. In addition, treatment adherence is influenced by several other factors, including patients' beliefs, self-efficacy, and barriers to accessing healthcare (Kvarnström *et al*., 2018), suggesting that trust alone may not fully explain adherence behaviour. Evidence also indicates that different dimensions of trust may have different effects. For example, Feng *et al*. (2022) found that trust in physicians' ability was not significantly associated with medication adherence and was negatively associated with some non-pharmacological adherence behaviours. Collectively, these findings suggest that the relationship between cognitive trust and treatment adherence is more complex than previously assumed. These mixed findings indicate that the role of cognitive trust in treatment adherence remains uncertain and warrants further investigation. Accordingly, the following hypothesis is proposed: **H4:** COT in the healthcare provider is associated with treatment adherence.

2.2.4 Emotional Trust and Treatment Adherence

In healthcare relationships, trust extends beyond perceptions of a provider's technical competence to encompass an emotional dimension rooted in feelings of care, empathy, and genuine concern (Nwosu *et al*., 2025). Emotional trust a patient's belief that their healthcare provider acts in their best interest and values them (Liu *et al*., 2021). This trust develops when warmth, compassion, and understanding in the provider's communication and actions are perceived (Arakelyan *et al*., 2021). Emotional trust can be seen as an affective determinant that influences positive attitudes toward adherence and strengthens the patient's intention to follow prescribed regimens. It increases the likelihood of perceiving treatment as personalised, interactions as supportive, and evaluating care more favourably (Wu *et al*., 2022; Religioni *et al*., 2025). An emotional connection to the provider increases the inclination to internalise treatment goals, persist with lifestyle adjustments, and comply with medication or follow-up schedules, even if these involve significant effort or discomfort (Pizga *et al*., 2022; Kvarnström *et al*., 2018).

Given this evidence, it is proposed that:

H5: Patients' EMT in their physician is associated with their treatment adherence.

2.2.5 Mediating Role of Trust in the Relationship between Communication and Adherence

Trust Theory and SET offer a strong theoretical foundation for explaining how perceived physician communication influences treatment adherence. SET suggests that interpersonal exchanges are governed by

reciprocity and mutual obligation, with trust serving as a major factor that sustains cooperative behaviour. Effective communication builds trust by reflecting respect, competence, and commitment. This encourages patients to respond with adherence to medical recommendations (Wu *et al*., 2022). Within this framework, trust is understood as a relational resource that emerges from effective communication and is maintained through continued reciprocal interaction.

Trust Theory similarly emphasises that confidence in a physician's competence and benevolent intentions increases patients' willingness to accept and follow medical advice. Nwosu *et al*. (2023b) demonstrate that patient trust fully mediates the relationship between PCM and TAD. Related studies consistently report positive associations between patient trust and adherence behaviours (Aliafsari Mamaghani *et al*., 2025; Wu *et al*., 2022; Konlan *et al*., 2023). Based on the proposed relationship, much of the existing literature conceptualizes trust as a unidimensional construct, thereby overlooking its distinct cognitive and emotional components. Addressing this gap, the present study disaggregates trust into cognitive and emotional trust and examines their mediating roles in the relationship between PCM and TAD.

Trust is conceptualized as a multidimensional construct comprising cognitive and emotional components that operate through complementary channels. These dimensions indicate that PCM influences TAD by influencing both patients' rational evaluations of medical advice and their affective relationship with the physician. Addressing this theoretical gap, the present study disaggregates trust into cognitive and emotional trust and examines their mediating roles in the relationship between PCM and TAD. Thus, the following hypotheses are proposed:

H6: EMT mediates the association of PCM and patient TAD.

H7: COT mediates the association of PCM and patient TAD.

Figure 1 below shows the proposed relationships among the variables of interest.

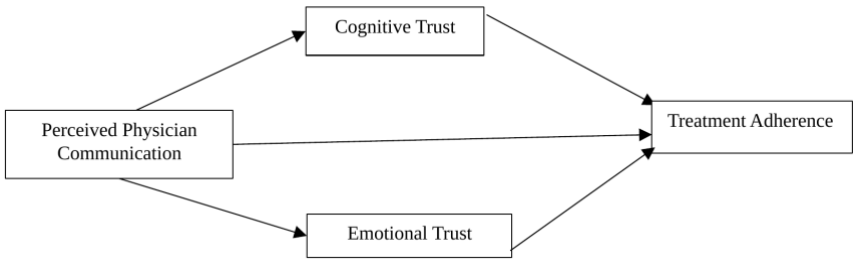


Figure 1: Conceptual Framework

3. Method

3.1 Research Design and Sample Selection

Participants were recruited using a convenience sampling approach with purposive eligibility criteria. The survey link was distributed broadly through social media platforms, and participation was voluntary. However, to ensure that respondents constituted a theoretically relevant sample, strict inclusion criteria were applied. Eligibility was restricted to adult patients aged 18 years and above who had received hospital-based healthcare services in Oman within the preceding six months. Respondents were required to confirm this eligibility before proceeding with the survey, and those who did not meet the criteria were excluded from analysis. This approach combines the accessibility of convenience sampling with the targeting precision of purposive criteria. This recall window was selected to ensure that participants could provide accurate accounts of their clinical experiences. Patients under 18 years of age and individuals unable to complete the survey independently due to cognitive constraints were excluded from the study.

Data was collected via an online structured questionnaire developed using Google Forms. While online data collection offers broad reach and logistical efficiency, it may inadvertently exclude patient profiles with limited

digital access. Of the 450 responses received, 423 met the eligibility criteria and were retained for analysis, yielding a usable response rate of 94%. Although convenience sampling with purposive eligibility criteria and online recruitment may reduce the representativeness of the sample, these methods were deemed appropriate given the study's focus on individuals with recent hospital care experience. The approach facilitated efficient access to eligible respondents with relevant experience and is consistent with the objectives of the study.

Sample size adequacy was assessed using two complementary approaches. Following Cochran (1973), a minimum of 384 responses is considered sufficient for reliable estimation in studies with unknown population sizes. Additionally, Hair *et al*. (2020) recommend that PLS-SEM models include at least ten observations per structural path; with a maximum of 23 directed arrows in the present model, this criterion requires a minimum of 230 cases. The obtained sample of 423 participants satisfies both thresholds and is therefore considered adequate for the proposed analysis. Tabachnick and Fidell (2007) also revealed that a sample size of 300 or more is suitable for a study using the SEM framework. Thus, the data is adequate for this study.

3.2 Measurement

All constructs were measured using a five-point Likert scale. Perceived physician communication (PCM) was assessed using eight items adapted from Chandra *et al*. (2021). Cognitive trust (COT) and emotional trust (EMT) were each measured using five items adapted from Feng *et al*. (2022) and Chen *et al*. (2020), respectively. Treatment adherence scale was adopted from Koppen *et al*. (2018).

3.3 Data Analysis

Hypotheses were tested using partial least squares structural equation modelling (PLS-SEM) via SmartPLS 4 (Cheah *et al*., 2023). PLS-SEM is well-suited to the present study given its capacity to handle complex models with multiple latent variables and its robustness to non-normal data distributions, which are common in social science survey research (Hair *et al*., 2020). The analysis proceeded in two stages: first, a measurement model was assessed to establish reliability and validity; second, the structural model was evaluated to test the proposed hypotheses. Mediation effects were tested using a bootstrapping procedure with 5,000 resamples to generate bias-corrected confidence intervals. PLS-SEM was selected because it is well suited to the objectives and characteristics of the present study. While CB-SEM is generally recommended for confirmatory research with well-established theories, PLS-SEM is more appropriate for prediction-oriented studies, theory extension, and the analysis of complex models with latent constructs (Hair et al., 2022). The present study examines a mediation model in the context of Omani healthcare, where empirical evidence remains limited, and the data showed departures from normality. In addition, the study focuses on explaining relationships among constructs and the variance explained in treatment adherence rather than evaluating overall model fit. Following current recommendations, confirmatory composite analysis (CCA) was conducted to assess the measurement model before evaluating the structural model.

3.4 Common Method Bias

Since all study variables were measured using data obtained from the same participants during a single survey administration, the possibility of common method bias (CMB) was carefully evaluated. Common method bias arises when observed relationships among constructs are influenced by the data collection method rather than reflecting the true associations between the constructs themselves (Podsakoff *et al*., 2012). To reduce this potential source of error, several procedural safeguards were incorporated into the survey process. Participants were assured that their responses would remain anonymous and confidential, and they were encouraged to provide honest answers without concern for evaluation, thereby minimising response-related biases. To further examine the presence of common method bias, the full collinearity assessment approach was employed. Variance inflation factor (VIF) values were calculated for all latent constructs, and the results showed that each value remained below the recommended threshold of 5.0. These findings indicate the absence of problematic collinearity and suggest that common method bias is unlikely to have materially affected the study results (Hair *et al*., 2021).

3.5 Ethical Review

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the university's institutional review board before data collection. Participation was entirely voluntary, and all participants were informed that they could withdraw at any time without consequence. A consent form accompanying the survey explained that responses would be used solely for scientific purposes, kept strictly confidential, and reported only in aggregated form with no identifying information disclosed. Completion and submission of the questionnaire were taken as confirmation of informed consent.

4. Result

4.1 Demographic Profile

Table 1 presents the demographic characteristics of the respondents. Gender distribution was approximately equal, with 50.4% female and 49.6% male participants. The largest age group was 40-49 years (40%), followed by 30-39 years (26%) and 50 years and above (16.8%), while smaller proportions were aged 20-29 (15.8%) or under 20 (1.4%). In terms of educational attainment, the largest group held undergraduate degrees (39.5%), and the smallest held junior high school qualifications (6.6%). Regarding health status, 44.2% of respondents reported having a chronic condition requiring regular physician visits. The most frequently reported conditions were hypertension, diabetes, elevated cholesterol, and respiratory disease, while 56.5% reported no chronic illness. Among those with a diagnosis, most had lived with their condition for one year or more, including those diagnosed for 1-5 years (13.9%) and 10 or more years (14.9%).

Table 1: Demographic Profile

		Frequency	**Percent**
Gender	Female	213	50.4
	Male	210	49.6
Age	less than 20	6	1.4
	20-29	67	15.8
	30-39	110	26.0
	40-49	169	40.0
	50 and above	71	16.8
Educational Level	Elementary school and below	37	8.7
	Junior high school	28	6.6
	Senior high school	137	32.4
	Undergraduate	167	39.5
	Postgraduate	54	12.8
Have you been managing any chronic disease that requires you to see the doctor on a regular basis?	No	236	55.8
	Yes	187	44.2
If yes, what is your chronic disease(s)	Blood Disorders (Anemia and Iron Deficiency)	12	2.8
	Cholesterol	17	4.0

		Frequency	Percent
	Diabetes	31	7.3
	Heart Diseases	8	1.9
	High Blood Pressure	33	7.8
	Joint and Spine Issues	16	3.8
	No Chronic Disease	239	56.5
	Other Various Diseases	31	7.3
	Respiratory Diseases (e.g., Asthma)	23	5.4
	Thyroid Disorders	13	3.1
How long have you been diagnosed with this disease?	Less than 1 year	30	7.1
	1 to less than 5 years	59	13.9
	5 to less than 10 years	55	13.0
	10 years or more / Since childhood	63	14.9
	Not diagnosed or no illness	216	51.1

4.2 Reliability and Validity

Table 2 presents the reliability and convergent validity indicators for the measurement model. Factor loadings ranged from 0.600 to 0.851, with most items exceeding the recommended threshold of 0.70. The few items falling below this threshold remained acceptable given adequate composite reliability values (Kante and Michel, 2023). Cronbach's alpha values ranged from 0.807 to 0.869, all surpassing the minimum acceptable level of 0.70, confirming strong internal consistency across constructs. Convergent validity was established through AVE values ranging from 0.564 to 0.642, all exceeding the recommended cut-off of 0.50 (dos Santos and Cirillo, 2023), indicating that each construct accounts for more than half the variance in its indicators. VIF values ranged from 1.332 to 2.393, remaining well below the critical threshold of 3.3, which indicates that multicollinearity is not problematic in the model (Tessema *et al*., 2025; Nwosu and Yesilada, 2026). These indicators confirm that the constructs are both reliable and valid, providing a sound basis for structural model analysis.

Table 2: Reliability and Validity

	Loading	α	CR	AVE	VIF
COT1	0.740	0.860	0.899	0.642	1.579
COT2	0.796				1.853
COT3	0.778				1.784
COT4	0.851				2.393
COT5	0.835				2.294
EMT1	0.778	0.819	0.874	0.581	1.631
EMT2	0.684				1.402
EMT3	0.777				1.728
EMT4	0.739				1.568
EMT5	0.826				1.874
PCM2	0.600	0.869	0.900	0.564	1.332
PCM3	0.764				1.901

	Loading	α	CR	AVE	VIF
PCM4	0.770				1.980
PCM5	0.800				2.011
PCM6	0.693				1.584
PCM7	0.796				2.143
PCM8	0.810				2.283
TAD2	0.774	0.807	0.873	0.633	1.520
TAD3	0.741				1.563
TAD4	0.818				1.716
TAD5	0.844				1.834

4.3 Discriminant Validity

Table 3 presents discriminant validity results assessed using the Fornell-Larcker criterion and the Heterotrait–Monotrait Ratio (HTMT). Under the Fornell-Larcker criterion, discriminant validity is supported when the square root of each construct's AVE exceeds its correlations with all other constructs (Fornell and Larcker, 1981). As shown in Table 3, all diagonal values exceed the corresponding inter-construct correlations, satisfying this condition. HTMT values offer a more conservative test and were all below the recommended threshold of 0.95 (Calahorra-Candao and Martín-de Hoyos, 2024), providing additional evidence that the constructs are empirically distinct. Although the HTMT value between COT and EMT (0.903) exceeds the conservative threshold of 0.85 proposed by Henseler et al. (2015), it remains well below the 0.95 threshold. This is consistent with Trust Theory (McAllister, 1995), which posits that cognitive and emotional trust are theoretically related dimensions of the same principal construct and are expected to share considerable variance.

Table 3: Fornell and Larker Criterion and Heterotrait-monotrait Ratio

Fornell and Larker Criteria					Heterotrait-monotrait Ratio			
	COT	EMT	PCM	TAD	COT	EMT	PCM	TAD
COT	0.801							
EMT	0.761	0.762			0.903			
PCM	0.522	0.494	0.751		0.598	0.575		
TAD	0.193	0.259	0.274	0.795	0.227	0.320	0.324	

4.4 R2, Q2, and f2

Table 4 presents the structural model's predictive accuracy (R^2), out-of-sample predictive relevance (Q^2), and effect sizes (f^2). Following Ahmed *et al*. (2025), R^2 values below 0.19 indicate weak explanatory power, values between 0.20 and 0.49 indicate moderate explanatory power, and values of 0.50 or above indicate strong explanatory power. Cognitive trust (COT: $R^2 = 0.272$) and emotional trust (EMT: $R^2 = 0.244$) demonstrated moderate explanatory power. Treatment adherence (TAD: $R^2 = 0.098$) showed weak explanatory power, which warrants attention: the model accounts for less than 10% of variance in adherence, suggesting that other factors not captured in the model may contribute substantially to adherence behaviour. Q^2 predict values were positive for all constructs (COT = 0.265, EMT = 0.235, TAD = 0.069), confirming adequate out-of-sample predictive relevance (Stone, 1974). Effect size results (f^2) revealed that physician communication (PCM) exerted strong effects on both COT ($f^2 = 0.374$) and EMT ($f^2 = 0.323$), based on Cohen's (2013) thresholds of 0.02 (small), 0.15 (medium), and 0.35 (large). In contrast, COT had a negligible effect on TAD ($f^2 = 0.003$), while EMT ($f^2 = 0.022$) and PCM ($f^2 = 0.034$) show weak effects on TAD. These findings indicate that while PCM is a strong predictor of both dimensions of trust, the model's direct and indirect effects on adherence are modest.

Table 4: R2, Q2, and f2

	R-square	Q²predict	f-square
COT	0.272	0.265	
EMT	0.244	0.235	
TAD	0.098	0.069	
COT→TAD			0.003
EMT→TAD			0.022
PCM→COT			0.374
PCM→EMT			0.323
PCM→TAD			0.034

4.5 Path Coefficients

Table 5 presents the structural model results, including standardized path coefficients (β), t-statistics, and p-values. PCM had a positive association with TAD (β = 0.208, t = 3.474, p = 0.001), supporting H1. PCM also had positive association with COT (β = 0.522, t = 12.178, p < 0.001) and EMT (β = 0.494, t = 11.457, p < 0.001), supporting H2 and H3, respectively. The path from COT to TAD was not statistically significant (β = −0.082, t = 1.110, p = 0.267), indicating that cognitive trust was not associated with adherence in this sample. H4 is therefore not supported. In contrast, EMT was positively linked with TAD (β = 0.219, t = 3.032, p = 0.002), supporting H5. Mediation analyses revealed that the indirect association of PCM and TAD via EMT was statistically significant (β = 0.108, t = 2.893, p = 0.004), supporting H6. The indirect relationship via COT was not significant (β = −0.043, t = 1.086, p = 0.278). This result does not support H7. The total effect of PCM on TAD was significant (β = 0.274, t = 5.893, p < 0.001), reflecting an overall positive association when direct and indirect paths are considered jointly.

Table 5: Path Coefficients

Hypothesis		β	Mean	SD	T statistics	P values	Decision
H1	PCM→TAD	0.208	0.211	0.060	3.474	0.001	Supported
H2	PCM→COT	0.522	0.524	0.043	12.178	0.000	Supported
H3	PCM→EMT	0.494	0.497	0.043	11.457	0.000	Supported
H4	COT→TAD	-0.082	-0.082	0.074	1.110	0.267	Unsupported
H5	EMT→TAD	0.219	0.220	0.072	3.032	0.002	Supported
Mediation Effect							
H6	PCM→EMT→TAD	0.108	0.109	0.037	2.893	0.004	Supported
H7	PCM→COT→TAD	-0.043	-0.043	0.039	1.086	0.278	Unsupported
Total Effect							
	PCM→TAD	0.274	0.278	0.046	5.893	0.000	

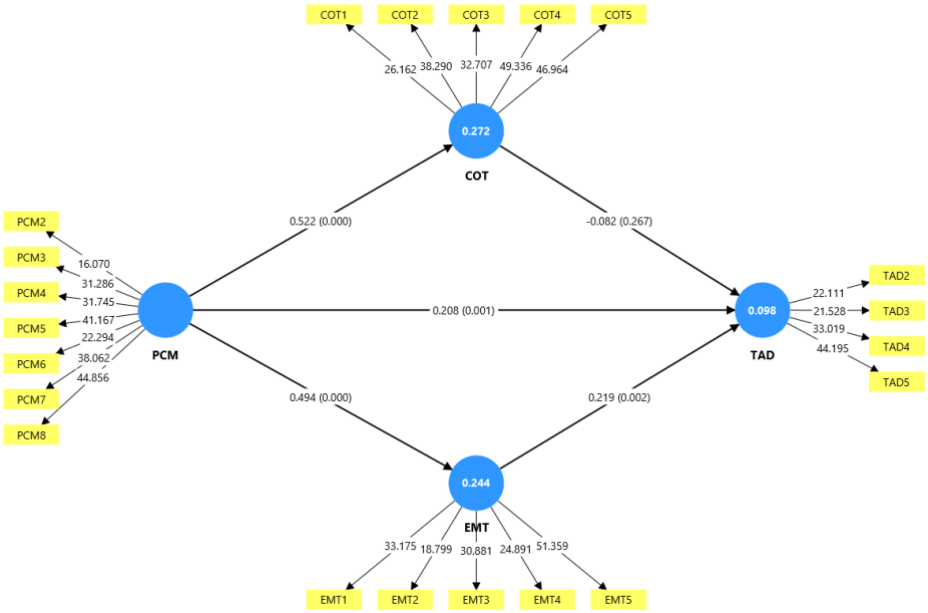


Figure 2: Structural Model

5. Discussion

5.1 Interpretation of Findings

The present findings indicate that perceived PCM is positively associated with TAD, consistent with H1 and with a substantial body of prior research demonstrating that clear, patient-centred communication is linked to greater adherence (Haskard Zolnierek and DiMatteo, 2009; Nwosu *et al*., 2023a; Sharkiya, 2023; Świątoniowska-Lonc *et al*., 2020). The strength and direction of this association are consistent with the proposition that communication quality is a meaningful correlate of patient behaviour.

PCM was also positively associated with both COT and EMT, supporting H2 and H3. Patients who reported clearer and more effective communication tended to report higher levels of both rational confidence in their physician's expertise and emotional connection with their physician. These patterns align with prior studies associating communicative behaviours with trust formation in healthcare settings (Mohd Salim *et al*., 2023; Tan *et al*., 2023; Wu *et al*., 2022; Feng *et al*., 2022; Lee, 2021; Du *et al*., 2020; Wang *et al*., 2022; He *et al*., 2022).

A notable pattern concerns the differential associations of the two trust dimensions with adherence. COT was not significantly associated with TAD (H4 not supported; $\beta = -0.082$, $p = 0.267$), while EMT was (H5 supported; $\beta = 0.219$, $p = 0.002$). This differential finding is in line with Feng *et al*. (2022) but contradicts prior studies that found cognitive trust to predict adherence (Birkhäuer *et al*., 2017; Hall *et al*., 2002). This suggests that rational confidence in a physician's competence may be insufficient, on its own, to motivate behavioural commitment to a treatment regimen. One plausible interpretation is that patients who trust their physician's technical skill but do not feel personally supported or emotionally engaged may nonetheless hesitate to follow complex or burdensome treatment plans. Espinosa and Kadić-Maglajlić (2019) observed that low perceived emotional support weakened the association between trust and adherence, and Bai *et al*. (2025) noted that physician empathy is associated with reduced patient anxiety and stronger therapeutic alliance. These findings suggest that the affective dimension of the patient-physician relationship may have a particularly important role in influencing adherence-related behaviour (Wu *et al*., 2022; Religioni *et al*., 2025; Pizga *et al*., 2022; Kvarnström *et al*., 2018)

The mediation analysis further clarifies these relationships. The indirect relationship between PCM and TAD via EMT was statistically significant (H6 supported; $\beta = 0.108$, $p = 0.004$), whereas the indirect link via COT was not (H7 not supported; $\beta = -0.043$, $p = 0.278$). This pattern suggests that effective communication may be linked to adherence, at least in part, through the emotional trust it generates, rather than through rational confidence alone.

This is consistent with evidence from adjacent healthcare contexts where affective trust has been associated with care utilisation and revisit intentions (Xiao *et al*., 2025; Nwosu *et al*., 2025).

5.2 Practical and Policy Implications

These findings have implications for clinical practice, health policy, and system design, though the cross-sectional nature of the data means that the following recommendations should be understood as evidence-informed proposals rather than conclusions drawn from causal evidence. At the clinical level, the association between PCM and both trust dimensions is consistent with the view that communication quality may be an important factor associated with patient trust and adherence. Training programmes focused on clear explanation, active listening, and patient-centred dialogue may be beneficial. Given the comparatively stronger association of EMT with adherence, such programmes could usefully emphasise empathy-building and the relational dimensions of consultation, in addition to informational clarity. In Oman's multicultural healthcare context, where providers interact with both local and expatriate patients, adaptability to cultural norms around family involvement and communication style may be particularly relevant. However, these contextual recommendations extend beyond the study's data and should be evaluated through targeted research.

At the policy level, these findings suggest that cultural competence and relational care quality could merit greater attention within health system quality frameworks. Potential policy responses include strengthening cultural competence among healthcare professionals and incorporating patient-reported communication and trust indicators into healthcare quality assessment frameworks. Such measures are broadly consistent with the priorities of Oman Vision 2040, though the specific operational and fiscal implications of these proposals would require further evaluation.

Beyond clinical and policy considerations, the findings carry broader organisational and economic relevance. Non-adherence in chronic disease management contributes to avoidable hospitalisations and increased healthcare expenditure, suggesting that the communication training investments recommended above may also generate downstream cost savings for healthcare systems, though this relationship warrants direct examination in future health economics research. More broadly, the findings position the quality of the physician-patient relationship as a public health concern with implications for how healthcare systems are designed, how physicians are trained, and how care quality is evaluated and reported.

5.3 Limitations and Future Research

Several limitations should be considered when interpreting these findings. First and most fundamentally, the cross-sectional design precludes causal inference. While PCM, COT, EMT, and TAD are associated in the expected directions, the analysis cannot establish that communication causes changes in trust or adherence. Longitudinal or experimental designs are needed to clarify directionality.

Second, all study variables were measured through patient self-report, which introduces two related sources of potential bias. Social desirability bias may lead patients to over-report adherence. Recall bias may affect the accuracy of retrospective assessments of communication quality and medication-taking behaviour. Although procedural safeguards were employed to reduce these tendencies, their effectiveness cannot be guaranteed. Future studies would benefit from supplementing self-reported adherence with objective clinical indicators in line with WHO recommendations for evaluating healthcare (dos Santos and Cirillo, 2023).

Third, patient heterogeneity with respect to education level, language proficiency, nationality, and socioeconomic status was not accounted for in the analyses. These factors may moderate the relationships between communication, trust, and adherence, and their exclusion means that the findings may not apply equally across all patient subgroups. Future research could incorporate moderation analyses to examine how demographic and social factors influence these paths.

Fourth, the study does not distinguish between patients with chronic NCDs and those receiving acute or short-term care. Given that adherence is particularly critical in chronic disease management and that communication and trust dynamics may differ substantially between chronic and acute care contexts, future research focusing on chronic

disease populations such as patients with diabetes or hypertension would provide more targeted and clinically actionable insights.

Fifth, the model focuses on individual-level psychological factors and does not capture structural or organizational determinants of care quality. The WHO framework on Integrated People-Centred Health Services highlights the importance of consultation time, care coordination, continuity of care, and access to services. Even highly effective physician communication may be constrained by system-level barriers such as long waiting times, fragmented referrals, or financial obstacles to treatment access. Future research incorporating structural indicators alongside patient-reported measures would provide a more comprehensive account of the determinants of adherence.

Lastly, while the model demonstrates adequate predictive relevance ($Q^2 > 0$ for all constructs), the weak explanatory power for TAD ($R^2 = 0.098$) indicates that the constructs examined account for a small proportion of adherence variance. Future models should consider additional predictors which may account for a larger share of the variance and would contribute to a robust theoretical account of adherence behaviour.

6. Conclusion

The study provides comprehensive evidence that physician communication and trust are associated with treatment adherence. Effective treatment goes beyond prescribing the right medicine; it requires building a trusting relationship. In culturally diverse settings like Oman, this means tailoring communication to patients' backgrounds and emphasising empathy. Healthcare systems can improve adherence and outcomes by training physicians to communicate clearly and kindly. This study bridges communication theory and trust research in the context of health, highlighting that patient adherence is not simply a technical issue but fundamentally a relational one. The results suggest that improving the human side of medicine through better communication and genuine caring can have a measurable influence on patients' health behaviours and well-being.

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