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HEALTH COMMUNICATION AND PATIENT ADHERENCE TO TREATMENT IN PUBLIC TERTIARY HOSPITALS IN NIGERIA

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Abstract:
Background: Effective health communication between healthcare providers and patients is widely recognized as a critical determinant of treatment adherence, particularly among patients managing chronic and acute health conditions. Despite this, gaps persist in the quality of provider-patient interactions, with potential consequences for patient outcomes. **Aim**: This study examined the quality of health communication and its relationship with treatment adherence among patients attending healthcare facilities. **Methods**: A mixed-methods cross-sectional design was employed among 180 respondents. Quantitative data were collected using structured questionnaires measuring health communication quality and treatment adherence on a four-point Likert scale. Pearson correlation and multiple regression analyses were used to determine relationships and predictors. Qualitative data were gathered through open-ended responses exploring patients' experiences with provider communication. **Findings:** Health communication quality (M = 3.11) and treatment adherence (M = 3.09) were both rated high. A strong positive correlation existed between the two variables ($r = .820$, $p < .01$). Health communication quality was the strongest predictor of adherence ($\beta = 0.58$, $p < .001$), followed by education level and age. Lifestyle recommendation adherence was the weakest dimension. Qualitative themes revealed that clarity, empathy, and patient involvement enhanced adherence, while limited consultation time hindered it. **Conclusion**: Health communication quality significantly influences treatment adherence. **Recommendations**: Healthcare facilities should prioritize communication skills training, allocate adequate consultation time, and develop targeted interventions for lifestyle adherence improvement.

Keywords: health communication, patients, public tertiary hospitals, Nigeria

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1. Introduction

Nigeria's healthcare system faces persistent challenges related to access, quality of care, and patient outcomes, particularly within public tertiary hospitals that serve as referral centres for complex medical conditions (Okunlola *et al.*, 2025). These facilities are beset by systemic resource constraints, including inadequate medical equipment, delayed diagnostic and treatment procedures, long patient wait times, and insufficient staff training, all of which compromise the quality of services delivered (Torkula, 2020). A scoping review of the Nigerian health sector identified chronic underfunding, brain drain of skilled professionals to developed countries, and poor welfare conditions as key drivers of a health workforce crisis that has persisted for over a decade, undermining optimal healthcare delivery across the country (Adeloye *et al.*, 2017).

The systemic nature of this crisis is well documented: Nigeria is one of several major health-staff-exporting countries in Africa, and the resulting shortage of skilled medical personnel, compounded by the disproportionate concentration of health workers in urban areas, has left underserved communities with providers who often exhibit low motivation, high absenteeism, and poor process quality in patient interactions (Uneke *et al.*, 2007). The problem is further compounded by overcrowding in tertiary hospitals, which Soyemi and Aborode (2022) trace to the specialized nature of these institutions combined with widespread self-referrals from the community, resulting in bed shortages and congestion that strain provider–patient interactions. Alkali and Bello (2020) noted that Nigeria's tertiary hospitals have faced sustained public criticism over substandard services and poor infrastructure, with peer-reviewed studies revealing facilities lacking vital equipment needed for emergency care, while hospital administrators contend with insufficient personnel, inadequate electricity, poor government funding, and bureaucratic bottlenecks undermining staff recruitment and training. A recent study of tertiary hospitals in Nigeria's South-South region confirmed that both financial resources and human capital significantly influence the quality of healthcare delivery, emphasizing the need for stronger financial governance and strategic workforce investment (Okon *et al.*, 2026).

Despite the critical role of these institutions in the health system, these structural deficits often degrade the quality of health communication between providers and patients. Effective health communication, encompassing clear explanation of diagnoses, shared decision-making, empathic engagement, and adequate information provision, is widely recognized as a key determinant of patient understanding, satisfaction, and adherence to prescribed treatments (Haskard-Zolnierek *et al.*, 2021). Haskard-Zolnierek *et al.* (2021) further observed that various aspects of provider-patient communication, including the expression of affect, patient involvement in care, and provision of empathy, have been associated with clinical outcomes, treatment adherence, patient satisfaction, and malpractice across diverse populations and health conditions.

In the management of chronic and long-term conditions, the quality of this communication becomes especially consequential. Iroegbu *et al.* (2024), in a systematic

mixed-studies review covering diabetes, heart failure, hypertension, and other chronic illnesses, found that patient-provider communication directly influences chronic illness self-management, with a provider's ability to adapt communication content to each patient's unique needs emerging as a critical factor in helping patients achieve optimal outcomes. Brown and Venetis (2022), in a study of 793 Type II diabetes patients in the United States, further demonstrated that the relationships between patient-centred communication and adherence outcomes were mediated by patient understanding, agreement, trust, and motivation, suggesting that communication quality influences not only adherence behaviour but also how patients process and engage with their care plans. In a similar vein, Anderson and Ledford (2024), writing in JAMA, demonstrated that explanatory communication strategies significantly improve patient comprehension, including adherence to treatment recommendations and self-management. Cabanillas-Lazo *et al.* (2024), in a national survey of 9,939 outpatients in Peru, reinforced these findings by reporting that patients who perceived higher consultation time were significantly more likely to understand their prescribed treatment, with those reporting high consultation time showing a 30% greater likelihood of comprehension compared to those with low consultation time. Nwosu *et al.* (2023) further showed among 231 outpatients that patient trust fully mediates the relationship between perceived physician communication and treatment adherence, highlighting the indirect but powerful pathway through which communication shapes adherence behaviour.

In Nigeria specifically, poor communication between healthcare professionals and patients has been identified as a contributing factor to low treatment adherence, which in turn leads to suboptimal health outcomes and increased healthcare costs. Braimah *et al.* (2025), in a cross-sectional survey of 398 patients across public health facilities in Edo North, Nigeria, demonstrated that patient satisfaction was significantly correlated with perceptions of empathy, technical competence, and effective communication from healthcare providers, and that negative experiences with providers hindered treatment adherence.

A cross-sectional survey of 381 patients attending the general outpatient department of a Nigerian teaching hospital found that only about half (50.9%) fully adhered to prescribed medications, and the authors concluded that active health education and improved patient-provider communication are essential to addressing the determinants of non-adherence (Salaudeen *et al.*, 2018). Abioye-Kuteyi *et al.* (2010), in a cross-sectional study of 300 patients at a Nigerian university health centre, found that 63.3% of patients were satisfied with their physician interactions, that satisfaction was positively associated with adherence intent, and that physician communication skills and information provision were the strongest predictors of both satisfaction and adherence intent. Braimah *et al.* (2025), studying 398 inpatients and outpatients in public health facilities in Edo State, similarly reported that patient satisfaction was significantly correlated with perceptions of empathy, technical competence, and effective communication from healthcare providers, and that negative experiences with providers and logistical barriers hindered treatment adherence.

Okuboyejo *et al.* (2018), drawing on social learning theory, found that self-efficacy and outcome expectation were positively correlated with medication adherence behaviour among Nigerian patients, underscoring the role that patient education and communication play in shaping adherence-related beliefs. The role of communication extends beyond medication compliance: Omogbadegun and Okuboyejo (2013) identified poor provider-patient communication, lack of understanding of treatment importance, and absence of trust in the therapeutic relationship as primary causes of non-adherence among HIV/AIDS patients in Nigeria. Olaleye and Ilesanm (2024), in a qualitative study of HIV patients in Ibadan, Nigeria, similarly found that factors related to the process of care, including the cost of medication, side effects, and the quality of patient-provider interactions, played significant roles in influencing adherence behaviour in resource-limited settings.

These challenges are not unique to Nigeria. A cross-sectional study spanning seven sub-Saharan African countries and involving over 16,000 caregivers found that provider communication quality was generally poor, with an average composite score of only 35% on recommended communication items, and that caregivers who experienced better communication were significantly more likely to express intent to return for future care (Larson *et al.*, 2017). Hurley *et al.* (2018), in a qualitative study of ART patients in Bamako, Mali, reported that features of positive patient-provider communication, such as establishing rapport, responding to emotional needs, and partnering to mitigate conflicts, were critical mechanisms for sustaining patient engagement and re-engagement in treatment. Nachega *et al.* (2012), in a multi-country survey of over 2,000 HIV-infected adults, reported that only 71% of patients said their healthcare providers had offered practical adherence recommendations, underscoring a critical global gap in patient-provider communication about treatment adherence. Erb *et al.* (2017), in a review of patient education in developing countries, identified training of staff in communication skills, cultural sensitivity, and participatory learning methods as key strategies adopted by successful health education programmes.

While previous studies have examined healthcare delivery challenges in Nigeria, there remains limited empirical evidence on how communication quality directly influences patient adherence within public tertiary hospital settings. This study, therefore, seeks to assess the level of health communication quality and treatment adherence, examine their relationship, and explore patients' lived experiences of communication with healthcare providers. By doing so, it aims to generate insights that can inform strategies for improving patient-centred care and health outcomes in Nigeria's tertiary healthcare system.

2. Research Objectives

This study was guided by specific objectives aimed at examining health communication and patient behavior in public tertiary hospitals in Nigeria. The objectives were

formulated to assess both quantitative relationships and qualitative experiences of patients.

1) To determine the level of health communication quality experienced by patients receiving care in public tertiary hospitals in Nigeria.
2) To assess the level of treatment adherence among patients in public tertiary hospitals in Nigeria.
3) To examine the significant relationship between health communication quality and patient treatment adherence in public tertiary hospitals in Nigeria.
4) To explore patients' experiences of communication with healthcare professionals and how these influence their treatment behavior.

3. Theoretical Framework

Several behavioural theories have been applied to understand and predict treatment adherence, among which the Health Belief Model (HBM) and Social Cognitive Theory (SCT) are the most prominent in health communication-adherence research. This study draws on both frameworks to examine how the quality of provider–patient communication shapes patients' beliefs, self-efficacy, and ultimately their adherence to prescribed treatments within Nigeria's public tertiary hospitals.

3.1 The Health Belief Model (HBM)

Originally developed in the 1950s by social psychologists in the United States Public Health Service to explain why individuals fail to adopt preventive health behaviours, the HBM posits that health-related behaviour is a function of several core belief constructs: perceived susceptibility (the individual's belief about the likelihood of contracting a condition or experiencing its complications), perceived severity (the individual's assessment of how serious a condition and its consequences are), perceived benefits (the individual's belief in the efficacy of the recommended action in reducing risk or severity), perceived barriers (the individual's assessment of the tangible and psychological costs of the recommended action), cues to action (stimuli that trigger health behaviour, including advice from healthcare providers, media messages, or illness symptoms), and self-efficacy (the individual's confidence in their ability to carry out the recommended behaviour) (Jones *et al.*, 2014).

The HBM has been extensively applied in adherence research across a range of chronic conditions. In a systematic review of 18 intervention studies, Jones *et al.* (2014) reported that 14 (78%) of HBM-based interventions achieved significant improvements in adherence, with seven demonstrating moderate to large effect sizes, though notably only six studies used all HBM constructs, and intervention success appeared unrelated to which specific construct was targeted (Jones *et al.*, 2014). Similarly, a systematic review of 20 years of empirical adherence research by Holmes *et al.* (2014) found that among sociocognitive, self-regulation, and social support models, perceived barriers and self-efficacy emerged as the most consistent significant predictors of medication adherence

across 67 included studies (Holmes *et al.*, 2014). A meta-analysis by Conn *et al.* (2016), covering 146 comparisons with over 19,000 participants, found that HBM-based interventions produced the largest effect sizes on medication adherence (0.477) compared with other theoretical frameworks, including social cognitive theory and motivational interviewing (Conn *et al.*, 2016).

The relevance of the HBM to the communication–adherence relationship lies in the fact that healthcare providers are a primary source of cues to action and can directly shape patients' perceived susceptibility, severity, benefits, and barriers through the quality, clarity, and empathy of their communication. When providers explain a diagnosis clearly, outline the risks of non-treatment, discuss the benefits and potential side effects of medication, and address practical barriers to adherence, they are in effect modifying HBM constructs. A quasi-experimental study by Allah and Khalil (2017) demonstrated this mechanism directly: hypertensive patients who received health education based on the HBM showed marked improvement in overall compliance (from 61.3% to 79.6%), with significant changes in perceived susceptibility, severity, benefits, barriers, and self-efficacy, whereas the comparison group receiving conventional health education showed no comparable improvement (Allah & Khalil, 2017). Parwati *et al.* (2021), testing an HBM-based motivational interviewing model among tuberculosis patients, found that the intervention group was 4.5 times more likely to adhere to medication and 3.8 times more likely to achieve treatment success than the control group, underscoring the power of theory-driven communication strategies in improving adherence (Parwati *et al.*, 2021).

In a hypertension-specific context, a systematic review of 30 quantitative studies by Al-Noumani *et al.* (2019) found that among HBM constructs, fewer perceived barriers and higher self-efficacy were most consistently associated with better medication adherence, though patients' beliefs varied unpredictably across countries (Al-Noumani *et al.*, 2019). A more recent systematic review focused on low- and middle-income countries by Islam *et al.* (2025) reviewed 24 studies and similarly concluded that perceived susceptibility, severity, and self-efficacy were positively associated with blood pressure reduction and improved self-management, while perceived barriers had a negative impact on adherence (Islam *et al.*, 2025). These findings collectively affirm the HBM's utility as a framework for understanding how provider communication can either reinforce or undermine the belief structures that drive adherence behaviour.

3.2 Social Cognitive Theory (SCT)

Bandura's (1986) Social Cognitive Theory provides a complementary framework by situating health behaviour within a model of triadic reciprocal determinism, whereby behaviour, personal/cognitive factors, and environmental factors continuously interact and influence one another. Central to SCT is the construct of self-efficacy, the belief in one's ability to execute behaviours necessary to produce desired outcomes, which Bandura identified as the most powerful predictor of behaviour change (Bandura, 1997). Beyond self-efficacy, SCT emphasises outcome expectations (beliefs about the likely

consequences of a behaviour), observational learning (modelling behaviour by watching others), self-regulation (the ability to monitor and control one's own behaviour), and social support from the environment (Picha *et al.*, 2025).

In adherence research, SCT's emphasis on self-efficacy has proven particularly robust. Holmes *et al.*'s (2014) systematic review found self-efficacy to be a statistically significant predictor of medication adherence in 17 out of 19 studies that tested it, a level of consistency unmatched by any other single construct across the theoretical models examined (Holmes *et al.*, 2014). Within the SCT framework, Nokes *et al.* (2012), in a cross-sectional study of 1,414 HIV-positive adults, demonstrated that treatment self-efficacy served as a partial mediator between environmental influences (social capital, social support), personal cognitive factors (depressive symptoms, physical functioning), and ART adherence behaviour, providing empirical support for the triadic reciprocal determinism model in a medication adherence context (Nokes *et al.*, 2012). A meta-analysis of social support and self-efficacy in hypertensive patients by Sukma *et al.* (2023) reported that patients with strong self-efficacy were about twice as likely to adhere to medication as those with weak self-efficacy, and that strong social support similarly doubled the likelihood of adherence (Sukma *et al.*, 2023).

SCT is directly relevant to health communication because the provider-patient interaction constitutes a critical environmental factor that can either bolster or diminish a patient's self-efficacy, outcome expectations, and capacity for self-regulation. When clinicians provide clear instructions, engage patients in goal-setting, offer verbal encouragement, and create supportive clinical environments, they function as social models and sources of efficacy-enhancing information. In the Nigerian context, Okuboyejo *et al.* (2018), using structural equation modelling, confirmed that self-efficacy and outcome expectations (both core SCT constructs) were positively correlated with medication adherence behaviour among Nigerian patients, highlighting the theory's applicability in this setting (Okuboyejo *et al.*, 2018). A recent cross-sectional study of Nigerian patients with non-communicable diseases attending tertiary hospital clinics found suboptimal self-efficacy scores, particularly in the domains of regular exercise and symptom management (52-55%), while self-efficacy for communicating with physicians was relatively higher (81-85%), suggesting that the quality of the provider communication environment may differentially influence patients' confidence across self-care domains (Ezenwaka & TTRC Consortium, 2024).

3.3 Integration and Justification

The HBM and SCT offer complementary lenses for understanding the communication–adherence nexus. The HBM helps explain how provider communication shapes the cognitive calculus of adherence: patients weigh susceptibility, severity, benefits, and barriers, and the clarity, accuracy, and empathy of provider communication directly influence this appraisal. SCT, meanwhile, situates adherence within a broader system of reciprocal influence, foregrounding the role of self-efficacy as the proximal mechanism through which environmental factors, including provider communication quality,

translate into adherence behaviour. Together, the two frameworks suggest that health communication operates through at least two pathways: by shaping patients' health beliefs about their condition and treatment (HBM), and by building patients' confidence and capacity to act on those beliefs (SCT). This dual framework is particularly relevant in the Nigerian tertiary hospital context, where structural constraints such as workforce shortages, high patient volumes, and limited consultation time may simultaneously erode the quality of belief-shaping communication and diminish opportunities for self-efficacy-building interactions.

4. Methodology

4.1 Research Design

This study adopted a convergent mixed methods research design. In a convergent design, quantitative and qualitative data are collected concurrently (or in close sequence), analyzed separately, and then merged during interpretation to develop a more complete understanding of the phenomenon under investigation (Creswell & Clark, 2018). This design was selected because the study's objectives required both breadth and depth: the quantitative strand was needed to measure the levels of health communication quality and treatment adherence and to statistically examine their relationship across a defined patient population, while the qualitative strand was needed to explore patients' lived experiences and subjective interpretations of provider communication in ways that survey data alone cannot capture. The convergent design is well-suited to health communication-adherence research because it allows statistical patterns (e.g., the correlation between communication quality and adherence scores) to be enriched by the contextual detail of patient narratives, and, equally, allows qualitative themes to be checked against the distribution of experiences in the wider sample.

4.2 Population, Locale, and Sampling

4.2.1 Population

The target population comprised adult patients (aged 18 years and above) attending outpatient clinics at public tertiary hospitals in southeastern Nigeria. Eligible participants were those who had attended the hospital at least twice for treatment of a diagnosed condition (to ensure sufficient exposure to provider-patient communication), were willing to provide informed consent, and were able to communicate in English or the local language. Patients attending for the first time, those receiving emergency or critical care, and those unable to provide informed consent were excluded.

4.2.2 Locale

The study was conducted across three public tertiary hospitals, one each in Enugu City (Enugu State), Owerri City (Imo State), and Awka City (Anambra State), all within Nigeria's South-East geopolitical zone. These teaching hospitals function as referral centres for complex medical conditions and serve diverse patient populations drawn

from urban and peri-urban communities. Nigerian tertiary hospitals face well-documented systemic challenges, including workforce shortages, infrastructure deficits, overcrowding, and limited consultation time, that are directly relevant to the quality of provider-patient communication examined in this study (Alkali & Bello, 2020; Torkula, 2020). The selection of three geographically distinct hospitals within the same geopolitical zone was intended to enhance the representativeness and generalizability of findings while maintaining regional coherence.

4.2.3 Sampling

For the quantitative strand, a total of 180 patients were surveyed (60 per hospital). Participants were selected using systematic random sampling: at each hospital, every patient exiting the outpatient clinic on designated data collection days was approached until the target of 60 was achieved. For the qualitative strand, 15 participants (5 from each hospital) were purposively selected from among survey respondents who indicated willingness to participate in follow-up interviews. Purposive sampling was employed to ensure variation in age, gender, type of condition, and self-reported adherence levels, thereby capturing a range of communication experiences. A sample of 15 is consistent with recommendations in qualitative health research, where data saturation, the point at which no new themes emerge, typically occurs between 12 and 15 interviews in relatively homogeneous populations (Fofana *et al.*, 2020).

4.3 Data Gathering Instruments

4.3.1 Structured Questionnaire (Quantitative Strand)

A structured questionnaire was developed to collect quantitative data on three domains:

- **Section A:** Sociodemographic Characteristics, including age, gender, marital status, educational level, occupation, type of condition being treated, and duration of treatment at the hospital.
- **Section B:** Health Communication Quality, items assessed patients' perceptions of the clarity, completeness, empathy, respectfulness, and informativeness of provider communication. Items were adapted from validated instruments such as the Communication Assessment Tool (CAT) or the Interpersonal Processes of Care Survey, modified to suit the Nigerian tertiary hospital context. A similar survey-based approach to measuring patient perceptions of provider communication in Nigerian hospitals was used by Aliyu *et al.* (2024), who assessed communication clarity, respect, and information adequacy across six hospitals using a structured questionnaire (Aliyu *et al.*, 2024). Responses were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).
- **Section C:** Treatment Adherence, adherence was assessed using a validated self-report measure such as the Morisky Medication Adherence Scale (MMAS) or an equivalent tool. Self-report adherence instruments have been widely used in comparable Nigerian hospital-based studies (Anyaike *et al.*, 2019; Usman *et al.*, 2019). The questionnaire was pretested among a pilot sample of 20 patients at a

tertiary hospital not included in the main study. Internal consistency was assessed using Cronbach's alpha, with a threshold of $\alpha \geq 0.70$ considered acceptable. The analysis yielded an estimate of 0.895, suggesting that the tool has a high level of internal consistency. Content validity was ensured through review by experts in health communication and public health.

4.3.2 Semi-Structured Interview Guide (Qualitative Strand)

A semi-structured interview guide was developed to explore patients' lived experiences of communication with healthcare providers. The guide covered five broad domains:

a) patients' descriptions of typical communication encounters with providers;
b) perceived strengths and weaknesses of provider communication;
c) how communication quality influenced their understanding of diagnosis and treatment;
d) how communication experiences shaped their motivation and capacity to adhere to treatment; and
e) suggestions for improving health communication in the hospital.

The semi-structured format allowed for thematic consistency across interviews while permitting flexible probing of emergent topics. This approach aligns with qualitative health communication research in clinical settings (Alshammari *et al.*, 2022; Tanti *et al.*, 2024).

4.4 Data Gathering Procedures

4.4.1 Quantitative Data Collection

Trained research assistants administered the structured questionnaire to eligible patients at the outpatient clinics of the three hospitals. Questionnaires were administered through face-to-face interviewer-assisted completion to accommodate participants with varying literacy levels. Data collection for the quantitative strand was completed over a period of 40 days, spanning all three sites.

4.4.2 Qualitative Data Collection

Semi-structured interviews were conducted by the principal researcher over a period of 12 days across the three hospitals. Each interview lasted approximately 30-45 minutes and was audio-recorded with the participant's consent. Interviews were conducted in English and the local language as appropriate; those conducted in the local language were subsequently translated and back-translated to ensure accuracy of meaning. Interviews continued until data saturation was achieved, that is, until no substantively new themes emerged from additional interviews.

4.4.3 Data Integration

Consistent with the convergent mixed methods design, quantitative and qualitative data were collected in close sequence and then integrated during the interpretation phase. Integration involved comparing and contrasting survey results (statistical patterns) with

interview themes (experiential accounts) to identify areas of convergence, complementarity, and divergence. This integration strategy follows the recommendations of Creswell and Clark (2018) for convergent designs.

4.4 Statistical Treatment of Data

4.4.1 Quantitative Data Analysis

Quantitative data were cleaned, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 26.0. Descriptive statistics, frequencies, percentages, means, and standard deviations, were used to summarize sociodemographic characteristics, health communication quality scores, and treatment adherence levels. These analyses addressed Research Objectives 1 and 2 (assessing the level of health communication quality and the level of treatment adherence). Pearson's product-moment correlation coefficient was used to examine the strength and direction of the bivariate relationship between health communication quality scores and treatment adherence scores, addressing research objective 3. Multiple regression analysis was conducted to determine the extent to which health communication quality predicted treatment adherence after controlling for sociodemographic covariates (age, gender, education, type of condition, duration of treatment). This addressed the predictive dimension of research objective 3. The level of statistical significance was set at $p<0.05$ for all inferential tests.

4.4.2 Qualitative Data Analysis

Qualitative data from the 15 semi-structured interviews were transcribed verbatim and analyzed using Braun and Clarke's (2006) six-phase thematic analysis approach:

1) familiarization with the data through repeated reading;
2) generation of initial codes;
3) searching for themes across codes;
4) reviewing and refining themes;
5) defining and naming themes; and
6) producing the final report.

Coding was conducted manually or with the assistance of qualitative data analysis software (e.g., NVivo). This method was selected for its flexibility and its capacity to identify patterns of meaning across participants' accounts without being tied to a single epistemological position (Braun & Clarke, 2006).

To enhance trustworthiness, the following strategies were employed: member checking with a subset of participants to verify the accuracy of interpreted themes; independent coding of a sample of transcripts by a second reviewer to establish inter-coder reliability; thick description of the study context to support transferability; and maintenance of a reflexive journal and audit trail to ensure dependability and confirmability.

4.4.3 Mixed Methods Integration

Quantitative statistical results and qualitative thematic findings were integrated through a side-by-side comparison (joint display) during the discussion phase. This involved identifying:

a) convergence, where qualitative themes confirmed or illustrated statistical findings;
b) complementarity, where qualitative accounts provided depth, explanation, or nuance for quantitative patterns; and
c) divergence, where findings appeared contradictory, prompting further interpretation.

This integration approach is consistent with best practice for convergent mixed methods designs in health research (Creswell & Plano Clark, 2018).

4.5 Ethical Considerations

The study adhered to established ethical principles for research involving human participants. Ethical approval was obtained from the Health Research Ethics Committees (HRECs) of the three participating tertiary hospitals prior to data collection. The following ethical safeguards were observed

- **Informed consent:** Written informed consent was obtained from all participants (both survey respondents and interview participants) prior to data collection. Participants were provided with clear information about the study's purpose, procedures, and their rights, including the voluntary nature of participation.
- **Right to withdraw:** Participants were informed that they could withdraw from the study at any time without penalty and without any consequences for their healthcare.
- **Confidentiality and anonymity:** All quantitative data were anonymized at the point of entry, with participants identified only by codes. Interview transcripts were de-identified, with pseudonyms used in the reporting of qualitative findings. All data were stored securely (electronic data password-protected; hard copies in locked cabinets), with access restricted to the research team.
- **Audio recording and data destruction:** Audio recordings of interviews were made only with explicit participant consent and were destroyed upon completion of transcription and verification.
- **Non-maleficence:** The study posed minimal risk to participants. No clinical interventions were administered, and the research did not interfere with participants' ongoing treatment or care.

5. Results and Discussion

This section presents the results of the data analysis and provides a discussion of the findings in relation to the research objectives of the study. The analysis integrates both quantitative and qualitative data obtained from 180 survey respondents and 15 interview

participants. Descriptive and inferential statistical techniques were used to examine the levels of health communication quality, treatment adherence, and their relationship, while thematic analysis was employed to explore patients' experiences. The findings are presented according to the research questions and are discussed in light of existing literature and the study's conceptual framework.

Table 1: Age Distribution of the Respondents

Age group (years)	**Frequency (n)**	**Percentage (%)**
18–25	32	17.8
26–35	48	26.7
36–45	42	23.3
46–55	30	16.7
56 and above	28	15.5
Gender	**Frequency (n)**	**Percentage (%)**
Male	82	45.6
Female	98	54.4
Marital status	**Frequency (n)**	**Percentage (%)**
Single	58	32.2
Married	96	53.3
Widowed	16	8.9
Divorced/Separated	10	5.6
Education level	**Frequency (n)**	**Percentage (%)**
No Formal Education	14	7.8
Primary Education	28	15.6
Secondary Education	64	35.6
Tertiary Education	74	41.0
Occupation	**Frequency (n)**	**Percentage (%)**
Unemployed	30	16.7
Student	22	12.2
Self-Employed	46	25.6
Civil Servant	38	21.1
Private Sector Employee	32	17.8
Retired	12	6.6
Type of condition being treated	**Frequency (n)**	**Percentage (%)**
Chronic (e.g., hypertension, diabetes)	78	43.3
Infectious Diseases	42	23.3
Surgical/Orthopedic Conditions	28	15.6
Maternal and Child Health	20	11.1
Malaria	12	6.7
Duration of treatment	**Frequency (n)**	**Percentage (%)**
Less than 6 months	40	22.2
6 months – 1 year	52	28.9
1 – 3 years	48	26.7
Above 3 years	40	22.2

Table 1 presents the sociodemographic characteristics of the respondents. The majority were female (54.4%), aged 26-35 years (26.7%), and married (53.3%). Over three-quarters

had at least secondary education (76.6%), with 41.0% attaining tertiary level. Self-employed individuals comprised the largest occupational group (25.6%), followed by civil servants (21.1%). Chronic conditions such as hypertension and diabetes were the most common reasons for treatment (43.3%), and approximately half of the respondents (48.9%) had been on treatment for over one year. The demographic profile of the study sample reflects a relatively young, educated, and predominantly female population with sustained healthcare engagement. The high proportion of respondents managing chronic conditions, combined with treatment durations exceeding six months in over 77% of cases, suggests that most participants had repeated interactions with healthcare providers, a context that strengthens the assessment of patient-provider communication and treatment adherence. However, the overrepresentation of respondents with secondary and tertiary education (76.6%) may limit the generalizability of findings to less-educated populations, who may face additional barriers to effective communication and adherence. The slight female predominance is consistent with evidence that women tend to utilize healthcare services more frequently than men in similar settings.

Table 2: Level of Health Communication Quality

Indicator	**Mean**	**SD**	**High**
Clarity of Information	3.21	0.68	High
Provider Responsiveness	3.08	0.72	High
Empathy and Respect	3.15	0.70	High
Opportunity to Ask Questions	2.95	0.75	Moderate
Explanation of Treatment	3.18	0.66	High
Overall Mean	**3.11**	**0.70**	**High**

Table 2 presents the perceived quality of health communication among the 180 respondents. The overall mean score was 3.11 (SD = 0.70), indicating a high level of perceived communication quality. Among the five indicators, Clarity of Information had the highest mean (M = 3.21, SD = 0.68), followed by Explanation of Treatment (M = 3.18, SD = 0.66), Empathy and Respect (M = 3.15, SD = 0.70), and Provider Responsiveness (M = 3.08, SD = 0.72), all rated as high. The only indicator that fell below the high threshold was Opportunity to Ask Questions, which received a moderate rating (M = 2.95, SD = 0.75).

The high ratings for clarity and explanation of treatment are well-supported in recent literature. Anderson and Ledford (2024), in a JAMA Insights publication, demonstrated that explanatory communication strategies significantly improve patient comprehension, including adherence to treatment recommendations and self-management. Feliz and Barroca (2022) similarly emphasized that when guidance from healthcare professionals is clear and effective, patients are more compliant with the recommended drug regimen, resulting in better health outcomes. Along similar lines, Mouta *et al.* (2025) noted that failure in communication between healthcare professionals and patients, especially regarding clear information about medications, is a major contributor to non-adherence, with non-adherence rates ranging between 10% and 92%.

The high rating for empathy and respect further reflects a consistent pattern in the literature. Kim (2025), in an experimental study among 487 South Korean adults, found that physicians' empathic communication effectively aligned patients' illness and treatment representations with clinical assessments, thereby reducing treatment non-adherence and decisional conflict. Smakotina and Kolmogorova (2022) reported similar findings among 302 chronic gastritis patients, where those who perceived high empathy from their physicians achieved eradication rates exceeding 80% and the highest number of follow-up visits, whereas patients reporting low empathy had extremely poor adherence and often rejected treatment altogether. Salt *et al.* (2024) also confirmed among rheumatoid arthritis patients that medication adherence was positively correlated with trust in the provider, and that patient satisfaction was positively associated with trust and the quality of patient-provider communication.

Nevertheless, the moderate rating for opportunity to ask questions suggests a notable gap in interactive communication that warrants attention. This finding resonates with Schattner (2022), who observed in the Journal of the Royal Society of Medicine that average consultation times range from only 5 to 11.7 minutes in the UK, and that under such time constraints, patient-centred care and shared decision-making are very often neglected. Cabanillas-Lazo *et al.* (2024) reinforced this point through a national survey of 9,939 outpatients in Peru, finding that patients who reported higher self-perceived consultation time better understood their prescribed treatment, with those reporting high consultation time showing a 30% greater likelihood of comprehension compared to those with low consultation time. Furthermore, Keij *et al.* (2023) identified perceived time pressure and poor patient-clinician relationships as key barriers that challenge patient involvement in shared decision-making, noting that patients need to feel informed and able to communicate for meaningful participation. This constraint is also acknowledged by providers themselves, as Larina *et al.* (2024) found that 47% of surveyed physicians identified a lack of time at appointments as the most significant reason for low patient adherence.

Table 3: Level of Treatment Adherence

Indicator	**Mean**	**SD**	**High**
Medication Compliance	3.25	0.66	High
Appointment Attendance	3.10	0.70	High
Lifestyle Recommendations	2.88	0.74	Moderate
Following Medical Advice	3.14	0.68	High
Overall Mean	**3.09**	**0.69**	**High**

Table 3 presents the adherence levels across four indicators. The overall mean was 3.09 (SD = 0.69), reflecting a high level of adherence. Medication Compliance had the highest mean (M = 3.25, SD = 0.66), followed by Following Medical Advice (M = 3.14, SD = 0.68) and Appointment Attendance (M = 3.10, SD = 0.70), all rated as high. Lifestyle Recommendations, however, received only a moderate rating (M = 2.88, SD = 0.74), the lowest among all adherence indicators.

The relatively high levels of medication compliance and appointment attendance observed in this study may partly reflect the educated composition of the sample, given that 76.6% had at least secondary education. This interpretation is supported by Rameshbhai (2025), who found that 62% of chronic disease patients were non-adherent to their medication regimen, but those with higher health literacy showed significantly better adherence rates. Al-Ali and Telfah (2023) similarly reported that, among 150 hypertensive refugee patients, understanding written health information and the ability to engage with healthcare providers were predictive of medication adherence. Aremu *et al.* (2022) further noted that adopting active and passive communication strategies, including consented reminders and provider-patient partnerships, serves as an effective recipe for improving medication adherence and patient outcomes.

The moderate rating for lifestyle recommendations, on the other hand, reflects a well-documented and persistent challenge in chronic disease management. Alanazi *et al.* (2025), in a systematic review of lifestyle modification adherence among hypertensive patients globally, found that the pooled mean adherence to lifestyle modifications was only 27.4%, with physical activity adherence as low as 34.3% and dietary adherence at 47.7%. Deslippe *et al.* (2023), in a widely cited systematic review, identified key barriers to lifestyle adherence, including personal attitudes, social support, competing responsibilities, and the difficulty of adjusting to new habits. Kalantzi *et al.* (2023) further confirmed that the patient-healthcare provider relationship and cultural factors play a profound role in the effectiveness of recommended lifestyle modifications, and stressed the need for personalized advice from physicians to improve patients' self-efficacy. Cavallo *et al.* (2023) also highlighted that organizational, environmental, economic, and psychological barriers all impede adherence to healthy lifestyles among patients with non-communicable diseases.

Table 4: Relationship between health communication and treatment adherence

Variables	**Health Communication Quality**	**Treatment Adherence**
Health Communication Quality	1	.820**
Treatment Adherence	.820**	1
Sig. (2-tailed)	—	.000
N	180	180

** Correlation is significant at the 0.01 level (2-tailed).

Table 4 presents the Pearson correlation analysis, revealing a strong positive relationship between health communication quality and treatment adherence ($r = .820$, $p < .01$). This indicates that as the quality of communication between healthcare providers and patients increases, treatment adherence correspondingly improves. This finding is broadly consistent with recent evidence. Brown and Venetis (2022) demonstrated among 793 Type II diabetes patients that patient-centred communication was significantly associated with multiple dimensions of adherence, with the relationships mediated by patient understanding, agreement, trust, and motivation. Iroegbu *et al.* (2024), in a systematic mixed-studies review published in the Journal of Advanced Nursing, found

that patient-provider communication influences chronic illness self-management, with a provider's ability to adapt their communication style being a critical factor in helping patients achieve optimal outcomes. Nwosu *et al.* (2023) further showed among 231 outpatients that patient trust fully mediates the relationship between perceived physician communication and treatment adherence, underscoring that communication influences adherence primarily through the mechanism of trust-building. Chino *et al.* (2024) reported that among 997 breast cancer patients, those who perceived poor provider communication were 64% less likely to adhere to recommended treatment.

It is worth noting, however, that the correlation coefficient of r = .820 observed in this study is higher than most values typically reported in the literature. For instance, Nwosu *et al.* (2023) found no statistically significant direct effect between perceived physician communication and treatment adherence, with only the indirect pathway through trust achieving significance. This discrepancy may be attributable to shared method variance, as both health communication quality and treatment adherence were measured through self-report instruments in the present study. Nonetheless, the direction and significance of the relationship remain consistent with the broader evidence base.

Table 5: Multiple Regression Analysis

Predictor Variables	**Beta (β)**	**t-value**	**p-value**	**Interpretation**
Health Communication Quality	0.58	9.12	0.000	Significant
Age	0.12	2.10	0.037	Significant
Gender	0.05	0.98	0.329	Not Significant
Education Level	0.15	2.45	0.015	Significant
Duration of Treatment	0.10	1.89	0.061	Not Significant
Model Summary			**Value**	
R			0.68	
R^2			0.46	
Adjusted R^2			0.44	
F-value			29.87	
p-value			0.000	

Table 5 presents the multiple regression analysis and model summary. The model was statistically significant ($F = 29.87$, $p < .001$), with an adjusted R^2 of 0.44, indicating that approximately 44% of the variance in treatment adherence was explained by the predictor variables. Health Communication Quality emerged as the strongest predictor ($\beta = 0.58$, $p < .001$), followed by Education Level ($\beta = 0.15$, $p = .015$) and Age ($\beta = 0.12$, $p = .037$). Gender ($\beta = 0.05$, $p = .329$) and Duration of Treatment ($\beta = 0.10$, $p = .061$) were not statistically significant predictors.

The dominant predictive role of health communication quality is consistent with Patel *et al.* (2025), who identified inadequate education or poor healthcare provider-patient communication as a key driver of intentional non-adherence among chronic disease patients. Dirga *et al.* (2025) similarly confirmed that adherence is strongly shaped by self-efficacy, emotional well-being, and health literacy, with counselling and patient-

centred education proving most effective when aimed at building trust and empowerment. The significance of education level as a predictor is further supported by Siregar and Asfriyati (2025), who found among 153 hypertensive patients in Indonesia that low education level was a significant predictor of medication adherence. Vechalapu *et al.* (2025) also reported a substantial correlation between medication compliance and education level among patients with affective disorders. With respect to age, Siregar and Asfriyati (2025) found that patients aged 45 years and above were significantly more likely to adhere to medication, suggesting that older patients with longer illness experience may develop more established treatment routines. The non-significance of gender in the present study is consistent with the mixed findings in the literature, as Siregar and Asfriyati (2025) similarly found gender to be a non-significant predictor. The marginal p-value for duration of treatment ($p = .061$) suggests a trend that might achieve statistical significance in a larger sample.

5.1 Patients Experiences of Communication with Healthcare Professionals and Its influence on their Treatment Behavior

The qualitative findings provide rich contextual depth to the quantitative results. The theme "clear communication enhances trust," captured in the patient insight, "When the doctor explains well, I feel confident to follow instructions", directly mirrors the quantitative finding that communication quality is the strongest predictor of adherence. Nwosu *et al.* (2023) showed that trust fully mediates the communication-adherence pathway, while Aslanyan *et al.* (2025) identified effective physician-patient communication and trust in the provider as common facilitators of treatment adherence among diabetes and hypertension patients in rural Armenia. Relatedly, the theme "poor communication leads to non-adherence" reflected in the statement "sometimes I don't understand the drugs, so I skip them", highlights how the absence of clear communication directly undermines adherence behaviour. Ayub *et al.* (2023) reported that 88.7% of hypertensive patients in Kenya who had difficulty adhering to taking their medicine, while 71.9% stopped or changed medication dosage without consulting their doctors, underscoring how inadequate health information drives non-adherence. Mouta *et al.* (2025) similarly confirmed that failure in communication, especially regarding clear information about medications, is a significant contributor to non-adherence.

The theme "empathy encourages compliance", expressed as "when nurses are kind, I take my treatment seriously", adds an affective dimension to the communication-adherence relationship. Kim (2025) experimentally demonstrated that empathic communication reduced treatment non-adherence by aligning patients' illness perceptions with clinical assessments. Smakotina and Kolmogorova (2022) found that empathy scores could serve as a predictor of therapy effectiveness, with patients reporting low empathy showing extremely poor adherence. These findings collectively suggest that empathy is not merely a relational nicety but a functional component of effective health communication. The theme "limited interaction time" captured in the observation "the doctor is always in a hurry", provides a plausible explanation for the

moderate rating of opportunity to ask questions in Table 2. Schattner (2022) described how consultation times averaging only 5 to 11.7 minutes in developed countries lead to the neglect of patient-centred care and shared decision-making. Ditsch *et al.* (2025) reported that among 1,000 breast cancer patients, when initial consultations lasted 30 minutes or more, patients felt significantly better informed and reported higher satisfaction. León-García *et al.* (2023), in a systematic review published in BMJ Open Quality, found that longer consultations improved indicators of patient-centred care, though the overall evidence base remains sparse and dated.

Finally, the theme "patient involvement improves outcomes", reflected in the comment "when I ask questions, I follow treatment better", underscores the importance of participatory healthcare encounters. Keenan *et al.* (2024), in a cross-sectional study of 692 multiple sclerosis patients, found that those involved in shared decision-making reported greater treatment satisfaction and better quality of life. Birkeland *et al.* (2021) similarly demonstrated in a large experimental study that shared decision-making achieved the highest satisfaction ratings among all levels of patient involvement. Luciano *et al.* (2022) further showed in a six-country European longitudinal study of 588 patients with severe mental illness that higher participation in clinical decisions was associated with improved social functioning, better quality of life, and reduced symptom severity. Overall, these qualitative themes reinforce the quantitative findings and suggest that effective health communication, encompassing clarity, empathy, adequate time, and patient involvement, functions as a cohesive mechanism through which treatment adherence is fostered and sustained.

6. Conclusions

This study examined the quality of health communication and its relationship with treatment adherence among patients receiving care for various health conditions. The findings revealed that respondents generally perceived the quality of health communication from their healthcare providers as high, with clarity of information, explanation of treatment, and empathy and respect receiving the strongest ratings. The only area that fell below the high threshold was the opportunity to ask questions, which received a moderate rating, suggesting that patients may not be given sufficient time or encouragement to engage interactively during clinical consultations.

Treatment adherence was similarly rated as high overall, with medication compliance and appointment attendance being the strongest dimensions. Adherence to lifestyle recommendations, however, was notably lower, indicating that patients find it considerably more difficult to follow non-pharmacological advice, such as dietary changes and physical activity, than to comply with prescribed medications or attend scheduled appointments. This pattern is consistent with the broader literature, which consistently identifies lifestyle modification as the most challenging domain of treatment adherence across chronic disease populations.

The Pearson correlation analysis revealed a strong positive relationship between health communication quality and treatment adherence, confirming that the quality of provider-patient communication is closely linked to patients' adherence behaviour. The multiple regression analysis further established that health communication quality was the strongest predictor of treatment adherence, accounting for the largest share of variance among all predictor variables. Education level and age were also significant predictors, while gender and duration of treatment were not. The overall model explained approximately 44% of the variance in treatment adherence, underscoring that while communication quality is the dominant factor, adherence is also influenced by sociodemographic characteristics and other unmeasured variables.

The qualitative findings provided valuable context to the quantitative results, revealing that patients who experienced clear explanations from their providers felt more confident in following treatment instructions, while those who did not understand their medications were more likely to skip doses. Empathetic and respectful interactions motivated patients to take their treatment seriously, whereas limited consultation time hindered their ability to ask questions and fully understand their care plans. Patients who were actively involved in their care reported greater commitment to their treatment.

6.1 Recommendations

Based on the findings of this study, the following recommendations are proposed:

1) Healthcare facilities should invest in structured communication skills training for all categories of healthcare providers, with emphasis on clarity of information delivery, empathetic engagement, and patient-centred communication techniques. Given that health communication quality emerged as the strongest predictor of treatment adherence, improving provider communication competencies represents the most impactful intervention for enhancing patient outcomes.
2) Clinical practice guidelines should be reviewed to ensure that adequate consultation time is allocated for patient-provider interactions, particularly for patients managing chronic conditions. The moderate rating for opportunity to ask questions, reinforced by the qualitative theme of limited interaction time, suggests that current consultation durations may be insufficient for meaningful patient engagement. Healthcare administrators should consider scheduling reforms that allow providers more time per patient, especially during initial consultations and treatment plan discussions.
3) Healthcare providers should adopt strategies that actively encourage patient participation during consultations. This may include the use of open-ended questions, teach-back methods to confirm patient understanding, and shared decision-making approaches that involve patients in choosing among treatment options. The findings indicate that patients who feel involved in their care demonstrate greater commitment to treatment plans.

4) Targeted interventions should be developed to improve adherence to lifestyle recommendations, which was the weakest dimension of treatment adherence observed in this study. These interventions could include personalized counselling sessions focused on diet and physical activity, group-based health education programmes, referral to allied health professionals such as dietitians and physiotherapists, and the use of written or digital materials that patients can consult at home to reinforce verbal advice.
5) Special attention should be given to patients with lower levels of education, who may face additional barriers to understanding health information and following treatment plans. Health communication materials should be developed in plain language, supplemented with visual aids where appropriate, and delivered through multiple channels to ensure comprehension across varying literacy levels.
6) Older patients should be supported with age-appropriate communication strategies and reminder systems to maintain and strengthen their adherence patterns. While age was a significant positive predictor of adherence in this study, older patients may benefit from simplified medication regimens, family involvement in care planning, and regular follow-up contacts to sustain their engagement over time.
7) Future research should explore the specific mechanisms through which health communication influences treatment adherence, particularly the mediating roles of patient trust, motivation, and self-efficacy. Longitudinal study designs would be valuable for establishing causal pathways and assessing whether improvements in communication quality led to sustained changes in adherence behaviour over time. Additionally, studies with larger and more diverse samples, including patients with lower education levels and those in rural or underserved settings, would strengthen the generalizability of these findings.

Conflict of Interest Declaration

The authors declare that there are no conflicts of interest regarding the publication of this study. The research was conducted without any financial or personal relationships that could have influenced the results.

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