

Medication Adherence and Health-Seeking Behaviour in Typhoid Fever Treatment: Insights from Kaduna Metropolis, Nigeria

¹Sani A. Mohammed, ²Yusuf Akande, ³Mohammed N. Danjuma, ⁴Aishatu Yusha'u Armiya'u, ⁵Sherifat B. Anafi

¹Department of Clinical Pharmacology and Therapeutics, Kaduna State University, Kaduna, Nigeria.

²Grants and Collaborations Office, Federal Neuropsychiatric Hospital, Kaduna, Nigeria.

³Department of Pharmacology and Therapeutics, Ahmadu Bello University Zaria, Nigeria.

⁴Department of Clinical Services, Federal Neuropsychiatric Hospital, Kaduna, Nigeria.

⁵Department of Pharmacology and Therapeutics, Ahmadu Bello University Zaria, Nigeria.

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ABSTRACT

Medication nonadherence and inconsistent health-seeking behaviors significantly hinder the effective treatment of typhoid fever, particularly in low- and middle-income countries (LMICs) like Nigeria. A cross-sectional survey of 175 respondents revealed significant medication nonadherence, with 88% reporting missed doses, primarily due to forgetfulness and financial constraints. Chemists were the most utilized source of medication (60%), surpassing pharmacies and healthcare centers, while 30% of respondents relied on herbal remedies either exclusively or alongside orthodox medicine. Adherence improved post-hospital visits, with 65.7% reporting no missed doses. These findings underscore the need for targeted interventions, including patient education, regulation of informal healthcare providers, and technology-driven adherence support to enhance treatment outcomes and mitigate antimicrobial resistance.

Keywords – *Medication adherence; health-seeking behavior; typhoid fever; antimicrobial resistance; informal healthcare providers; orthodox medicine; Kaduna Metropolis*

INTRODUCTION

Typhoid fever, caused by *Salmonella enterica* serovar Typhi, continues to be a pressing public health issue. In LMICs, typhoid fever accounts for over 17 million cases annually, with Africa bearing the highest burden [1], [2]. In Nigeria, limited access to clean water and sanitation exacerbates this issue, particularly in urban centers such as Kaduna Metropolis, where rapid population growth and inadequate infrastructure heighten the risks [3].

Successful management of typhoid fever requires timely diagnosis and strict adherence to antimicrobial regimens. However, medication nonadherence is a prevalent challenge, leading to prolonged illness, complications, and the emergence of antimicrobial resistance (AMR) [4], [5]. Addressing the drivers of nonadherence is critical to improving treatment outcomes and mitigating the public health impact of AMR [6].

In urban settings like Kaduna Metropolis, where healthcare access ranges from formal institutions (e.g., hospitals, pharmacies) to informal providers (e.g., chemists, herbal medicine vendors), health-seeking behaviors are shaped by socioeconomic and cultural factors [7]. Previous studies highlight a high reliance on informal providers due to accessibility and affordability [7], [8]. Additionally, the use of herbal and traditional remedies alongside orthodox treatments reflects a pluralistic approach to healthcare in this region [8].

This study investigates medication adherence and health-seeking behaviors among patients with typhoid fever in Kaduna Metropolis. Specifically, it aims to analyze the demographic and socioeconomic factors influencing

healthcare access, assess the extent and reasons for medication nonadherence, and explore the reliance on various sources of treatment, including chemists, pharmacies, and traditional medicine vendors. The findings will inform targeted interventions to improve adherence, optimize healthcare access, and combat the rising threat of AMR.

METHODOLOGY

Study Design and Setting: A cross-sectional study was conducted in Kaduna Metropolis, Nigeria, covering four local government areas: Kaduna South, Kaduna North, Chikun, and Igabi. The study targeted patients diagnosed with typhoid fever attending selected healthcare facilities within these areas, reflecting a diverse urban population with varied socioeconomic and cultural backgrounds.

Study Population and Sampling: A total of 200 patients aged 1 year and above, diagnosed with typhoid fever, were recruited using stratified random sampling to ensure proportional representation across the four study areas.

Inclusion and Exclusion Criteria: The inclusion criteria was patients diagnosed with typhoid fever based on clinical and/or laboratory confirmation, individuals aged 1 year and above, and willingness to participate with informed consent (or assent for minors with guardian consent). Exclusion criteria includes patients with coexisting chronic illnesses that could interfere with medication adherence (e.g., diabetes, hypertension), and individuals enrolled in other intervention programs related to medication adherence.

Data Collection Instrument: Data were collected using a structured, interviewer-administered questionnaire, designed to capture comprehensive information on:

1. Demographics: Age, gender, education, marital status, and socioeconomic background.
2. Health-Seeking Behavior: Preferred healthcare sources (e.g., hospitals, chemists, herbal medicine vendors) and reasons for their selection.
3. Medication Adherence: Self-reported adherence rates, reasons for noncompliance (e.g., forgetfulness, financial constraints), and adherence patterns after hospital visits.
4. Sources of Medication: Type and reliability of sources, including formal providers (pharmacies, hospitals) and informal providers (chemists, medicine vendors, herbalists).

The questionnaire was pretested in a similar population to ensure clarity, reliability, and cultural relevance. Necessary adjustments were made before the main data collection. Ethical approval was obtained from the Health Research Ethics Committee of Ahmadu Bello University Teaching Hospital, Kaduna. Informed consent (or assent for minors) was secured from participants, and confidentiality was maintained.

Data Analysis: Descriptive statistics were used to summarize the data, including frequencies, percentages, and cross-tabulations. Results were presented in tables and charts for clear visualization of demographic characteristics, medication adherence patterns, and sources of medication. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 25. No inferential statistics were applied as the study primarily focused on descriptive insights..

RESULTS

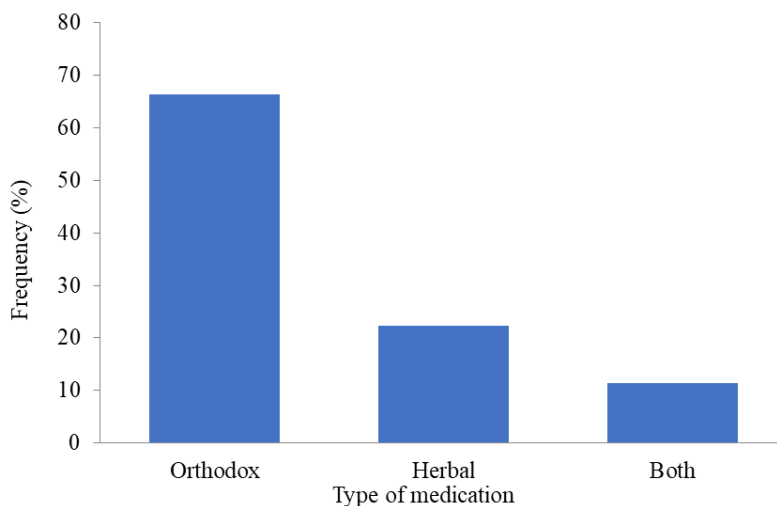
The study included 175 respondents, with a majority being male (70.3%) compared to females (29.7%) as shown in Table 1. The respondents' ages were predominantly within the 1–9 years category (45.7%), followed by 20–29 years (17.1%) and 10–19 years (13.1%). Older age groups were less represented, with 8.6% in the 40–49 years range and only 4.0% aged 50–59 years. Participants were nearly evenly distributed across the selected health facilities. Kaduna South accounted for the highest proportion (25.7%), followed closely by Igabi (25.1%), while Kaduna North and Chikun each contributed 24.6%. This distribution reflects the stratified sampling approach used to ensure representation from key areas of Kaduna Metropolis.

Table 1 Demographic Characteristics of Respondents

Characteristics	Frequency (N = 175)	Percent (%)
Gender		
Male	123	70.3
Female	52	29.7
Total	175	100
Age		
1 – 9	80	45.7
10 – 19	23	13.1
20 – 29	30	17.1
30 – 39	20	11.4
40 – 49	15	8.6
50 – 59	7	4
Total	175	100
Health Facility		
Kaduna South	45	25.7
Igabi	44	25.1
Kaduna North	43	24.6
Chikun	43	24.6
Total	175	100

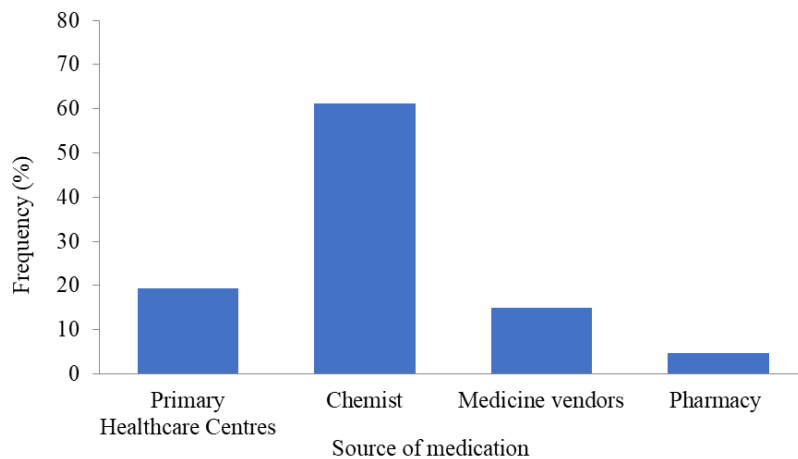
As illustrated in Figure 1, the majority of respondents (approximately 70%) relied exclusively on orthodox medicines for the treatment of typhoid fever. A smaller but significant proportion (about 20%) reported the use of herbal remedies alone, reflecting a continued reliance on traditional medicine. Additionally, around 10% of participants indicated combining both orthodox and herbal medications, demonstrating a pluralistic approach to healthcare practices in the region.

Figure 1 Types of Medications Taken by Respondents



The primary sources of medications are depicted in Figure 2. Chemists emerged as the most frequently used source, accounting for approximately 60% of respondents. Primary healthcare centers were utilized by about 20%, while 15% relied on medicine vendors. Pharmacies, on the other hand, were the least utilized source, representing less than 10% of responses. These findings reflect the significant role of informal providers in medication access and highlight areas for potential healthcare system improvements.

Figure 2 Primary Sources of Medications Among Respondents



As shown in Table 2, only 12% of respondents reported not missing any medication doses in the last week, indicating high levels of nonadherence. The most common duration of missed medication was 3–5 weeks, reported by 25.7% of respondents, followed closely by 1–2 weeks (24.6%) and 6–10 weeks (22.3%). Additionally, 15.4% missed their medication for more than 10 weeks. These findings suggest significant short- and long-term medication adherence challenges.

Table 2 Missed Medication in Last Week

Time medication was missed (in weeks)	Number of respondents (N = 175)
Never	21 (12.0)
1 – 2	43 (24.6)
3 – 5	45 (25.7)
6 – 10	39 (22.3)
More than 10	27 (15.4)

*Percentage in parenthesis

Improved adherence was observed after the last hospital visit, as detailed in Table 2. A majority (65.7%) of respondents reported no missed doses since their last visit. However, 31.4% missed their medication 1–2 times, and a small proportion (2.9%) missed it 3–5 times. These results indicate that adherence tends to improve with regular follow-up and healthcare provider engagement.

Table 3 Missed Medication After Hospital Visit

Number of times medication was missed	Frequency (percent)
Never	115 (65.7)
1 – 2	55 (31.4)
3 – 5	5 (2.9)

*Percentage in parenthesis

DISCUSSION

The study revealed a predominance of male respondents (70.3%) and a high proportion of children aged 1–9 years (45.7%) seeking care for typhoid fever. These demographic trends align with healthcare-seeking patterns observed in Nigeria due to socio-cultural priorities, where men often access healthcare more frequently due to their role as financial providers, while young children receive prioritized care from caregivers [9]. However, the lower proportion of female respondents indicates persistent gender-based barriers, including financial dependence, cultural norms, and limited autonomy in healthcare decisions, as highlighted in other studies on healthcare access disparities in sub-Saharan Africa [10].

Most respondents (70%) relied on orthodox medicine, but 20% used herbal remedies exclusively, and 10% combined both. These findings echo those of previous studies, where urban populations demonstrated openness to integrating herbal remedies with conventional treatments due to cultural beliefs, cost considerations, or perceptions of natural efficacy [11]. A WHO report emphasizes the need for the regulation of herbal medicine and its integration into primary healthcare to enhance safety and efficacy [11]. Such integration would help mitigate risks associated with herb-drug interactions, particularly for diseases requiring consistent antimicrobial therapy..

Chemists were the most frequently used source of medications (60%), outpacing pharmacies and primary healthcare centers. This reflects findings in LMICs, where informal providers are preferred due to accessibility and affordability [12]. However, the risks of unregulated practices, such as dispensing substandard or counterfeit drugs, contribute significantly to antimicrobial resistance (AMR) [13]. Policymakers must focus on regulating chemists and informal providers while ensuring that essential medications are accessible through formal healthcare channels [12].

A significant factor influencing health-seeking behavior and medication adherence in this study was financial constraints [14]. The high utilization of chemists and the integration of herbal remedies indicate economic considerations, as chemists and herbalists are perceived as more affordable compared to formal healthcare facilities and pharmacies [15]. Additionally, the out-of-pocket expenditure required for diagnosis and treatment further exacerbates financial barriers, leading to incomplete medication courses and increased risk of AMR [16]. Addressing these financial constraints requires a multi-faceted approach, including subsidy programs, community health insurance schemes, and public health education to promote the value of complete medication adherence.

The study identified high rates of medication nonadherence, with only 12% of respondents reporting no missed doses in the last week. Forgetfulness was the most frequently cited reason, consistent with previous studies on adherence challenges in Nigeria [17], [18]. Interestingly, adherence improved after hospital visits, with 65.7% reporting no missed doses. This suggests that follow-up appointments and healthcare provider engagement positively influence adherence. Similar trends were observed in studies that highlighted the role of patient education and healthcare support in improving adherence rates [19], [20], [21].

The findings punctuate the need for targeted interventions to improve adherence and address reliance on informal providers. Educational campaigns tailored to young and male populations could tackle forgetfulness, while the integration of technology-based reminders (e.g., SMS alerts) may enhance adherence. The preference for chemists also highlights gaps in formal healthcare access, suggesting the need for regulation and capacity-building initiatives for informal providers [22].

CONCLUSIONS

This study highlights significant gaps in medication adherence and health-seeking behaviors among typhoid fever patients in Kaduna Metropolis, Nigeria. The high reliance on chemists over formal healthcare facilities, coupled with the substantial use of herbal remedies, pinpoints the need for improved regulation and public health interventions. While adherence improved after hospital visits, overall noncompliance remains a challenge, driven by forgetfulness and financial constraints. Addressing these issues requires targeted educational campaigns, integration of technology-driven adherence support, and policy efforts to regulate informal medication sources.

Strengthening healthcare accessibility and patient engagement is crucial to improving treatment outcomes and mitigating the growing threat of antimicrobial resistance.

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