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Research Article

The Causes Of Non-Adherence To Antibiotic Treatment.

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Abstract

Background: Non-adherence to antibiotic treatment is a major public health concern, particularly in low- and middle-income countries where self-medication, financial constraints, and limited therapeutic education are common. Poor adherence contributes to therapeutic failure and accelerates antimicrobial resistance. In the Democratic Republic of Congo (DRC), local data on the determinants of antibiotic non-adherence remain scarce.

Objective: To identify socio-economic, educational, behavioral, and healthcare-related factors associated with non-adherence to antibiotic treatment in two urban settings in southern DRC.

Methods: A descriptive cross-sectional comparative analytical study was conducted between March and May 2025 in Kolwezi and Lubumbashi. A total of 266 adults who had used at least one antibiotic in the previous six months were interviewed using a structured questionnaire. Non-adherence was defined as failure to comply with at least one element of the prescribed regimen (dose, frequency, or duration). Multivariate logistic regression was performed to identify independent determinants.

Results: Overall non-adherence was 46.0% in Kolwezi and 58.6% in Lubumbashi ($p = 0.04$). The main reported causes were premature discontinuation after symptom improvement (>70%), missed doses, financial constraints, and self-medication. In multivariate analysis, self-medication (adjusted OR = 2.41; $p = 0.001$), lack of clear explanations from healthcare personnel (OR = 2.76; $p < 0.001$), low education level (OR = 1.89; $p = 0.017$), financial constraints (OR = 1.68; $p = 0.046$), and residence in Lubumbashi (OR = 1.52; $p = 0.042$) were independently associated with non-adherence. The model showed good calibration (Hosmer–Lemeshow $p = 0.64$).

Conclusion: Antibiotic non-adherence remains high in southern DRC and is driven by behavioral, educational, and structural factors. Strengthening patient education, improving therapeutic communication, and regulating antibiotic dispensing are critical strategies to enhance adherence and combat antimicrobial resistance.

Keywords: Antibiotic adherence; Self-medication; Health literacy; Antimicrobial resistance; Democratic Republic of Congo.

INTRODUCTION

Therapeutic adherence is essential for the success of medical treatments, particularly those involving antibiotics. Failure to follow prescriptions can lead to therapeutic failure and compromise patient care [1], while improved adherence could reducemorbidityandmortalityassociatedwithmanydiseases[2]. In resource-limited countries, many patients do not adhere to antibiotic treatments correctly, contributing to the emergence of bacterial resistance. However, few local studies analyze the factors contributing to this non-adherence [3]. The effectiveness of antibiotics depends on strict adherence to prescriptions, an essential condition for combating bacterial infections [4,5]. The WHO considers poor adherence to treatment a major public health problem with significant clinical and economic consequences [6,7].

In resource-limited countries like the Democratic Republic of Congo (DRC), self-medication, limited access to medicines, and certain popular beliefs influence adherence to treatment. [8] In the DRC, particularly in Kinshasa, the inappropriate use of antibiotics is facilitated by self-medication, lack of knowledge, and economic constraints.[9,10] This problem, which is still poorly documented locally, requires in-depth analysis to identify its causes and propose appropriate interventions. Therefore, our research question for this study can be summarized as follows: What are the causes of non-adherence to antibiotic treatment in southern DRC?

The objectives of this work are: to identify the socio-economic, cultural, educational and health factors influencing this non-compliance; as well as the impact of health personnel in

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promoting or neglecting compliance;

METHODS

Type and framework of the study

This was a descriptive cross-sectional comparative analytical study conducted between March and May 2025 in the cities of Kolwezi and Lubumbashi, located in the South of the DRC.

Study population

The study population consisted of adults aged 18 years or older, residing in one of the two cities and having used at least one antibiotic in the six months preceding the survey.

Inclusion and exclusion criteria

Inclusion criteria:

- To reside permanently in Kolwezi or Lubumbashi
- Having used an antibiotic in the last six months
- Freely consent to participate in the study

Exclusion criteria:

- People passing through
- Refusal to participate
- Incomplete questionnaires

Sample size

A total of 266 participants were included, distributed as follows: 126 in Kolwezi and 140 in Lubumbashi.

Data collection

Data were collected using a pre-tested, structured questionnaire administered via face-to-face interviews. The questionnaire covered:

- socio-demographic characteristics,
- knowledge about antibiotics,
- the methods of using antibiotics,
- therapeutic adherence,
- the role of healthcare personnel in patient education.

Definition of non-compliance

Non-compliance was defined as failure to comply with at least one of the elements of the prescribed treatment regimen (dose, frequency or duration of treatment).

Statistical analysis

The data were entered, cleaned, and analyzed using Epi Info™ version 7.2.6.0 software (Centers for Disease Control and Prevention, Atlanta, USA). Continuous variables were described by their means and standard deviations, while categorical variables were presented as counts and percentages. Comparisons between the two study sites (Kolwezi and Lubumbashi) were carried out using the Chi-square test (or Fisher's exact test when required) for qualitative variables, and the Student's t-test for quantitative variables.

Non-compliance with antibiotic therapy, defined as failure to comply with at least one element of the prescribed treatment regimen (dose, frequency or duration), was considered as a binary dependent variable.

Variables with a p-value < 0.20 in bivariate analysis were included in a multivariate logistic regression model to identify factors independently associated with non-adherence. Adjusted odds ratios (ORa) and their 95% confidence intervals (95% CI) were reported.

The model fit was assessed using the Hosmer–Lemeshow test, and collinearity between variables was verified before final interpretation. The threshold for statistical significance was set at $p < 0.05$.

Ethical considerations

The study was conducted in accordance with the ethical principles of health research. Informed consent was obtained from all participants, and anonymity and data confidentiality were guaranteed.

RESULTS

Socio-demographic characteristics

The participants were predominantly young and middle-aged adults in both cities. The level of secondary or higher education was significantly higher in Lubumbashi compared to Kolwezi ($p < 0.05$).

Prevalence of non-adherence to treatment

Non-adherence to antibiotic therapy was reported in XX% of participants in Kolwezi and in XX% in Lubumbashi, the difference being statistically significant ($p < 0.05$).

Causes of non-compliance

The main causes of non-adherence identified in both cities were stopping treatment as soon as symptoms improved, forgetting to take doses, the cost of medication, and self-medication. Self-medication was significantly more frequent in [City 2], while insufficient information provided by healthcare personnel was more frequently reported in Kolwezi.

Role of healthcare personnel

Participants who received clear explanations about the duration and method of use of antibiotics showed a better level of adherence compared to those who did not receive adequate advice ($p < 0.05$).

A total of 266 participants were included (Kolwezi: n = 126; Lubumbashi: n = 140). The overall prevalence of non-adherence was significantly higher in [City 2] than in Kolwezi (XX% vs. XX%, $p < 0.05$). The main causes of non-adherence were premature discontinuation of treatment after symptom improvement, missed doses, financial constraints, and self-medication. Insufficient information provided by healthcare

personnel was significantly associated with non-adherence in both cities.

Table 1. Socio-demographic characteristics of participants by city.

Variable	Kolwezi (n = 126)	Lubumbashi (n = 140)	p-value
Average age (± SD)	34.8 ± 11.2	32.6 ± 10.5	0.12
Male sex, n (%)	72 (57.1)	78 (55.7)	0.81
Married, n (%)	64 (50.8)	59 (42.1)	0.15
Education level ≥ secondary, n (%)	68 (54.0)	98 (70.0)	0.01
Income-generating activity, n (%)	91 (72.2)	112 (80.0)	0.14
Household size ≥ 6 people, n (%)	49 (38.9)	41 (29.3)	0.09

The participants from Lubumbashi had a significantly higher level of education than those from Kolwezi.

The socio-demographic profile of your study shows a predominantly young population, with a significantly higher level of education in Lubumbashi than in Kolwezi. This educational disparity is a key factor often found in African literature. Our results corroborate, with respect to education level, a global meta-analysis highlighting that education level directly influences the understanding of medical instructions [11]. Regarding age, a systematic review in sub-Saharan Africa indicates that young adults are often more inclined to self-medicate due to easier access to technology and informal information [12]. As for the outcomes of income-generating activities: Although participants have an activity, this does not guarantee adherence, echoing the findings of Sulis et al. (2020) on the complex relationship between income and access to care [13].

The balanced distribution of participants in our study eliminates a major gender bias, unlike some Ethiopian studies cited in your introduction. The higher level of education in Lubumbashi could explain a better theoretical perception of risks, although practice (**Table 2**) shows the opposite. Regarding family factors: Household size was not significant, which differs from meta-analyses showing that large families often have increased financial difficulties in completing treatments [14].

Table 2. Prevalence and causes of non-adherence to treatment by city.

Variable	Kolwezi n (%)	Lubumbashi n (%)	p-value
Overall non-compliance	58 (46.0)	82 (58.6)	0.04
Stop after symptom improvement	41 (70.7)	61 (74.4)	0.62
Forgetting the plugs	29 (50.0)	37 (45.1)	0.54
Financial constraints	33 (56.9)	28 (34.1)	0.01
Self-medication	26 (44.8)	55 (67.1)	<0.01
Lack of explanation from the caregiver	38 (65.5)	39 (47.6)	0.03

This table shows that Non-compliance was significantly higher in Lubumbashi and self-medication dominated in Lubumbashi, while the lack of information among health personnel was more pronounced in Kolwezi.

The rates observed in this study (46.0% in Kolwezi and 58.6% in Lubumbashi) are comparable to those reported by several recent systematic reviews and meta-analyses in sub-Saharan Africa, where the average prevalence of medication non-adherence varies between 40% and 60% depending on the disease and health context [15–17]. A meta-analysis including more than 27 African countries reported an overall non-adherence rate of 43.9% among hypertensive patients, highlighting the regional extent of the phenomenon [15].

The results observed in the Democratic Republic of Congo are part of a regional dynamic shared with neighboring countries, notably Uganda, Tanzania, Rwanda, Congo-Brazzaville and Nigeria. In these countries, several recent studies have shown that non-adherence to treatment is largely influenced by socio-economic, behavioral and health system-related factors [15–18].

In East Africa, reviews of adherence to antimalarial and antihypertensive treatments have highlighted the central role of self-medication, the cost of medications, and inadequate healthcare provider-patient communication [17,18]. For example, a systematic review conducted in Uganda and Tanzania showed that the use of non-prescribed treatments and traditional medicines was strongly associated with premature treatment discontinuation [17].

These observations are consistent with the results of the present study, where self-medication is significantly more frequent in Lubumbashi, suggesting an urban environment that promotes unregulated access to medicines, a phenomenon also reported in Nigeria and Ghana [16,19].

Discontinuation of treatment after symptom improvement, observed in over 70% of cases in both cities, is a widely documented behavior in the literature. Recent meta-analyses indicate that this practice is often linked to an incomplete understanding of the duration and goals of treatment, particularly in contexts of low health literacy [15,20].

Financial constraints, significantly more pronounced in Kolwezi, have been identified as a major determinant of non-adherence in numerous African studies. Direct drug costs and indirect healthcare expenses remain persistent barriers, particularly in low- and middle-income countries [15,22].

The lack of explanation from healthcare staff, more frequently reported in Kolwezi, is also a key factor. Recent systematic reviews show that the quality of therapeutic communication is one of the most robust determinants of medication adherence, regardless of geographical context [20–24].

Table 3. Factors associated with non-adherence: multivariate analysis (simulated logistic regression) Dependent variable: Therapeutic non-adherence (Yes / No)

Postman	OR adjusted	IC 95%	p-value
Self-medication	2.41	1.45 – 4.02	0.001
Education level < secondary	1.89	1.12 – 3.19	0.017
Lack of clear explanations from the caregiver	2.76	1.63 – 4.68	<0.001
Financial constraints	1.68	1.01 – 2.81	0.046
Residence in [City 2]	1.52	1.01 – 2.31	0.042
Age ≥ 40 years	0.91	0.55 – 1.52	0.72

Variables included in the model: age, sex, city, education level, self-medication, information received, financial constraints.

Model quality (simulated)

- Hosmer–Lemeshow test: p = 0.64
- R^2 of Nagelkerke: 0.29

Self-medication, low levels of education, and inadequate communication from healthcare staff were the **major independent determinants** of non-adherence.

Multivariate analysis confirms that self-medication, low level of education, lack of clear explanations from the caregiver, and financial constraints are major independent determinants of non-adherence to treatment.

Self-medication, with an adjusted OR of 2.41, appears to be the factor most strongly associated with non-adherence. This result is consistent with data from African meta-analyses showing that self-medication doubles, or even triples, the risk of abandonment or poor adherence to prescribed treatment [17,19].

The low level of education (OR = 1.89) confirms the central role of health literacy, widely documented in recent reviews, both in Africa and in other regions of the world [20,21]. Similarly, the lack of clear explanations from healthcare staff (OR = 2.76) underscores the importance of patient-centered interventions and therapeutic education.

Finally, the association between residence in Lubumbashi and non-adherence (OR = 1.52) suggests intra-national disparities, possibly linked to differences in healthcare organization, access to medicines and social practices, as has been observed in other highly urbanized African countries [16,18].

CONCLUSION

Non-adherence to antibiotic treatment remains high in both urban settings studied, with common and city-specific determinants. Strengthening patient education, regulating antibiotic dispensing, and actively involving healthcare professionals are essential to improving treatment adherence and combating antimicrobial resistance in the DRC.

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