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# Antibiotic Use in the Community for Uncomplicated Urinary Tract Infection

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## ABSTRACT

***Introduction:*** *The consumption of antibiotics by the population is one of the elements of antimicrobial resistance (AMR) which constitutes a global public health crisis.*

***Methods:*** *This cross-sectional study was conducted with 10,890 participants between January 2025 and March 2025. Data were analyzed using Stata 13.0. Multivariate regression techniques were used to determine factors influencing antibiotic use.*

***Results:*** *Among the 10,890 participants, 98.02% of whom admitted to having purchased antibiotics in the last six months with a prescription, 31.43% of them benefited from the pharmacist's advice, 83.74% had purchased a complete course, but only 69.11% consumed the entire course. These antibiotics were prescribed in the majority without any biological basis and to a lesser extent on the basis of a blood count; Amoxicillin was the most prescribed in 92.81% of cases and consumed for 10 days by 51% and only 32% of cases claimed to feel very well after treatment while 94.12% of cases did not carry out control examinations.*

***Conclusions:*** *This study revealed that the misuse of antibiotics in the community contributes to the occurrence of antimicrobial resistance. This requires urgent intervention in terms of community engagement in the fight against AMR and adherence to treatment guidelines. Thus, intensification of community awareness campaigns and educational activities on the appropriate use of antibiotics is an absolute necessity.*

## Keywords
Urinary Tract Infection, Antimicrobial resistance, Antibiotics.

## Introduction
Antibiotics have become the most frequently prescribed drugs worldwide, and their use continues to increase [1]. This rapid escalation in antibiotic use has been observed mainly in low- and middle-income countries [2]. While in low- and middle-income countries, the burden of infection is highest and health systems lack the capacity to respond to the problems of antimicrobial resistance [3]. Which poses a global threat to public health. Many factors contribute to this problem [4], human consumption of antibiotics being one of them [5]. Indeed, the intensive use of antibiotics in a population can contribute to the development of antibiotic resistance [6]. This situation is, especially in developing countries, the basis for the occurrence of many opportunities for the development of antimicrobial resistance in bacteria with far-reaching consequences, including much higher morbidity and mortality [7]. And yet, the WHO in its "People-centred approach to addressing antimicrobial resistance in human health", believes that a practical set of interventions, based on the need for a strong people-centred response in the human health sector, will greatly contribute to One Health actions under the umbrella of multi-sectoral national action plans on AMR [8]. This situation requires us in one way or another to carry out an inventory before undertaking any intervention; this is the main object of this study, which aims

to establish an inventory of the consumption of antibiotics in the community of the South of the DR Congo and mainly in the towns of Lubumbashi, Kolwezi and Likasi.

## Methods

This cross-sectional study was conducted in southern DR Congo in the cities of Lubumbashi, Likasi, and Kolwezi. This was a population-based survey and allowed for data collection from participants during the same period to avoid discrepancies in results. These cities were chosen because they are the most developed and best represented in terms of population of different ethnicities and communities of different socioeconomic backgrounds and constitute an excellent attraction factor for any commercial activity. In addition, many pharmacies in these cities provide health services to the communities.

### Data Collection

Data collection was carried out using a structured questionnaire (google form Online). The questionnaire was reviewed for its content and face validity by experts from the School of Health of the University of Lubumbashi and this after a pre-test by a pilot study on a sample of 272 participants. The results of this pre-test were not part of the results of the main study. In the main study, the interviewers oriented according to the health areas administered the questionnaire to randomly selected households. The questionnaire was designed in French and focused on the consumption of antibiotics in the community by addressing three axes: access to antibiotics, mode of use of antibiotics. The maximum duration of the interview was approximately 10 to 15 minutes.

### Data Management and Analysis

The data collected from Google Forms were imported into a Microsoft Excel 365 spreadsheet for data cleaning. After cleaning the database, we collected 10,890 valid responses, which were analyzed after being transferred to SPSS Version 3 for descriptive and statistical analysis.

### Ethics

Ethical approval for this study was requested from the Ethics Committee of the University of Lubumbashi, approval reference UNILU/CE/008/2025.

## Results and Discussion

Figure 1 shows that 98.02% of people in this study bought antibiotics recently and with a prescription and that when buying in a pharmacy, they only benefited from the pharmacist's advice in 31.43% and 83.74% bought a complete course and only 69.11% took a complete course. 80.56% of people found the price of antibiotics affordable and within their budget. Indeed, Klein in his study noted a rapid escalation in the use of antibiotics was mainly observed in low- and middle-income countries [2]. This surge in antibiotic consumption is due to the availability of more affordable generic antibiotics and the absence of regulatory measures [1]. This situation is the result of the ready availability of antimicrobials without a prescription in developing countries increasing the emergence of resistant pathogens due to the overuse and misuse of these drugs [9,10].

Most of our patients, despite having purchased a full course of treatment, did not complete their antibiotic treatment to the end, which allows certain bacteria responsible for the infection to survive and acquire resistance through natural or acquired selection, hence the appearance of a higher than normal resistance of the patient's bacterial population to this antibiotic [11]. And the reproduction of the surviving bacteria makes the infection impossible to treat with the same antibiotic [12]. If the infection is transmitted to another

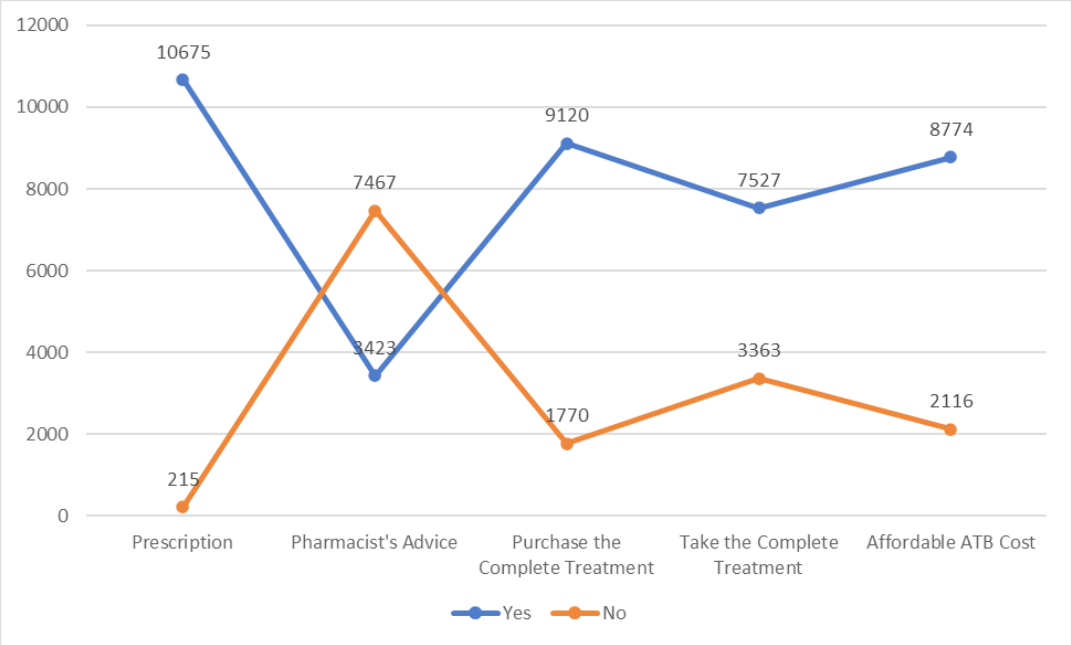


**Figure 1:** State of antibiotic consumption.

person, they will also be resistant to the antibiotic [13]. Also, it is often said that stopping antibiotics prematurely could promote the development of bacterial resistance. However, this myth has proven false, as more and more evidence confirms the opposite.

In reality, it is prolonged exposure to antibiotics that exerts the selective pressure favoring antimicrobial resistance; therefore, longer courses of treatment are more likely to lead to the emergence of resistant bacteria [14]. In addition, long-term courses of treatment expose patients to an increased risk of adverse effects [15].

**Table 1:** Prescription basis for antibiotics and treatment prognosis.

| Prescription Base | Pre-Prescription Review | % | Post-Prescription Review | % |
|---|---|---|---|---|
| **Blood count** | 4855 | 44.58 | 989 | 9.08 |
| **C-reactive protein** | 1795 | 16.48 | 219 | 2.01 |
| **Procalcitonin** | 657 | 6.03 | 109 | 1.00 |
| **Culture and ATB** | 2803 | 25.74 | 312 | 2.87 |
| **None** | 5635 | 51.74 | 10250 | 94.12 |

The clinical manifestations of urinary tract infections are summarized by symptoms such as dysuria, frequency and urgency of urination [16]. And its diagnosis is based on clinical symptoms associated with the results of laboratory tests including urine culture [17] and sometimes in some settings, other unconventional tests are used including the detection of bacteria in urine by nitrite strips and semi-quantitative assessment of white blood cell count in urine [18]. Thus, suboptimal diagnostic procedures can lead to over- or under-treatment which in turn can lead to serious and potentially fatal complications [19]. Apart from these analyses, some authors note abnormalities in blood tests in patients with urinary tract infections, including variations in the acceleration of the erythrocyte sedimentation rate, and elevation of C-reactive protein mainly [20] and the use of three index tests (CRP, PCT or ESR) as a complementary test to the clinical diagnosis of urinary tract infections in the elderly [21]. The value of the blood count, as an indirect test for the diagnosis of urinary tract infection, can only be demonstrated in the presence of specific signs and symptoms [22].

**Table 2:** Antibiotics consumed in the community.

| Antibiotics consumed | Tablets | Ampoules or vials | Suspension |
|---|---|---|---|
| Amoxicillin | 10108 | 0 | 219 |
| Ampicillin | 67 | 0 | 21 |
| Penicillin | 79 | 32 | 0 |
| Ceftriaxone | 0 | 67 | 0 |
| cefotaxime | 0 | 32 | 0 |
| Cefixime | 0 | 15 | 0 |
| Erythromycin | 201 | 0 | 49 |
| **Total** | | **146** | **289** |

Figure 2 shows that 51% of patients took antibiotics for 10 days and 12% took them for more than 10 days. Clinicians routinely prescribe a fixed duration of antibiotic therapy for common community-acquired bacterial infections, without regard to the patient's clinical response [23]. Yet research data on treatment duration tell us that short courses of antibiotics are generally as effective in terms of clinical cure and relapse as longer courses for most uncomplicated community-acquired infections [24]. And recent clinical trials have challenged the dogma that antibiotic therapy cannot be stopped early [25-30]. At the very least, prolonged exposure to antibiotics may exert selective pressure favoring antimicrobial resistance and therefore longer courses are more likely to result in the emergence of resistant bacteria [31].

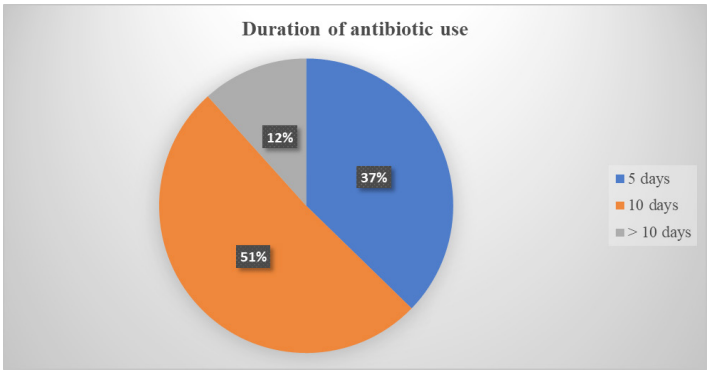


**Figure 2:** Duration of antibiotic consumption.

Patients taking antibiotics feel very well with 32% improvement in all signs and complaints, 42% feel well with at least half improvement in signs and complaints, and 26% feel quite well with less than half improvement in clinical signs. Researchers have shown that patients overestimate the benefits and underestimate the risks of many diagnostic tests and treatments [32]. Other studies have shown that patients believe that the disappearance of their symptoms after taking antibiotics is synonymous with their improvement, even though studies have shown that antibiotics do not accelerate the resolution of symptoms in such cases [33].

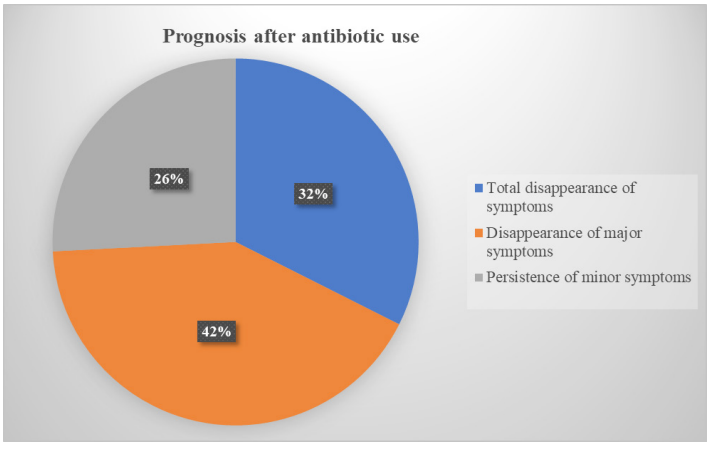


**Figure 3:** Prognosis after consumption of Antibiotics.

From the observation and analysis of our results, it is noted that the use of non-prescription antimicrobials contributes to the development and spread of bacterial resistance to antimicrobials [34-36]. According to studies, the use of non-prescription antimicrobials occurs when patients use drugs without a doctor's

prescription and without medical supervision and most often during common infections such as respiratory tract infections, urinary tract infections and typhoid fever [37] and Nepal et al., estimates that amoxicillin, macrolides, fluoroquinolones, cephalosporins and metronidazole are the antibiotics most affected by community use [38]. Antibiotics characterized by the emergence of resistance due to the genetic alteration of the penicillin-binding protein in β-lactams, the most used family in our studies (Table 2); Alterations in ribosomal target sites and efflux pump activity for macrolides and accumulation of mutations, enhancement of efflux mechanisms and acquisition of plasmid genes for fluoroquinolones [39-41]. And This use of antibiotics in the community without prescription plays an important role in the selection and maintenance of these high levels of antimicrobial resistance in the community [37] and the consumption of antibiotics in the community seems to emerge from existing health inequalities and inadequacies of the health system, the difficulty of access to quality care as well as the marginalization of rural communities [42].

## Conclusion

Antibiotic resistance is increasing in low-income countries and threatens to significantly increase morbidity and mortality in already vulnerable populations. In low-income countries, controlling antibiotic use is necessary to combat the development of resistance. Balancing access to antibiotics for those who need them and limiting their excessive use is crucial and requires a comprehensive approach, the basis of well-functioning health systems. Hence the crucial role of community health workers in the appropriate use of antibiotics because they are the only point of access to medical information or treatment for infectious diseases, especially when health infrastructure is insufficient. There is no single solution to this problem; the approach will likely need to be multidisciplinary and tailored to national and regional contexts, and ensure sustainable access to antibiotics. National action is therefore imperative to reduce the use of over-the-counter antibiotics. Interventions must be multifaceted and complementary.

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