



The Basics of Prescribing Antibiotics, a Key Indicator in the Prevention of Antibiotic Resistance

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ABSTRACT

Antimicrobial agents are among the most widely used, and often misused, therapeutic drugs worldwide. This study set itself the objective of evaluating the bases of antibiotic prescription in order to identify bad practices likely to be the basis of the occurrence of antibiotic resistance in community germs. Through a cross-sectional descriptive study, carried out by third year students of the Faculty of Medicine of Lubumbashi during the student's personal work, a questionnaire on Google form was administered to prescribers in an exhaustive manner and we received 1578 responses. From our results it appears that most antibiotics are prescribed by general practitioners; The most likely bacterial etiology (67%), previous experiences of successful prescription (20%) were the prescription references in most cases. the microbiologist's opinion or laboratory results were used in a proportion of 8% of cases; In the experience of prescribers, the probable bacterial strain in question and the spectrum of action of the antibiotics would be the two parameters used for prescribing antibiotics; The most commonly used route of administration of antibiotics was the intravenous route.

It should be noted that the prescriptions of antibiotics in Lubumbashi are not based on obvious facts, in particular, the results of the culture and antibiogram, and the intravenous route of administration on an outpatient basis is known to lead to contamination by flora local skin. A DU on the General Principles of Antimicrobial Therapy would be urgent.

Introduction

Antibiotics are currently the most commonly prescribed drugs in hospitals worldwide[1,2]. However, inappropriate use of antibiotics contributes to the development of bacterial resistance, which accelerates the emergence, spread of resistant microorganisms, and has a significant impact on treatment outcomes[3].

The Centers for Disease Control and Prevention (CDC) recommends that health care professionals work to improve antibiotic prescribing and use practices in human health care and emphasizes the establishment of a program of antibiotic management [4]. Because inappropriate use and misprescription of antibiotics increase the incidence of antibiotic resistance [5]. who, today; constitutes one of the greatest challenges to global

public health and the problem is getting worse[2].

A systematic review of antibiotic use in Africa demonstrates that use was highest in Nigeria, with a prevalence of 97.6%.[6] , in Ethiopia a recent study among outpatients reported high antibiotic prescription, around 46.7% [7], in Tanzania, the overall use antibiotics varies between hospitals, ranging from 38% to 63% [8]; in Kenya, 46.7% of hospitalized patients were taking antimicrobials, of which 94% were prescribed antibiotics[9]. It should be noted with these few African countries that the prescriptions of antibiotics which are the consumption of antibiotics are much higher in Africa and require a quality approach which must define, after an assessment of the situation, the bases of a good prescription of antibiotics.

This study aims to change prescribing behavior in order to guarantee the rational use of antibiotics and prevent the occurrence of antibiotic resistance, which already constitutes a serious public health problem worldwide.

Methods

Design of the decor and study. This was a single-center observational study carried out in the city of Lubumbashi. A one-off cross-sectional prevalence survey was conducted from January to April 2024 as fieldwork for students from the Faculty of Medicine at the University of Lubumbashi.

This study approached all doctors prescribing antibiotics according to their sectors of activity using a pre-established and pre-tested questionnaire. Survey data was included using Google Form, imported using Microsoft Excel 365, and analyzed using IBM SPSS Statistics 28.0.1.0 (142).

A descriptive analysis was carried out for each parameter. Applicability expressed the percentage of assessed prescribers who had the information necessary to calculate adherence. Adherence was defined as the percentage of prescribers who met the standard. The margin for improvement for prescriptions was calculated as 100% minus the adherence score, and it was used to identify areas for improvement regarding antibiotic prescriptions in the city of Lubumbashi.

Results

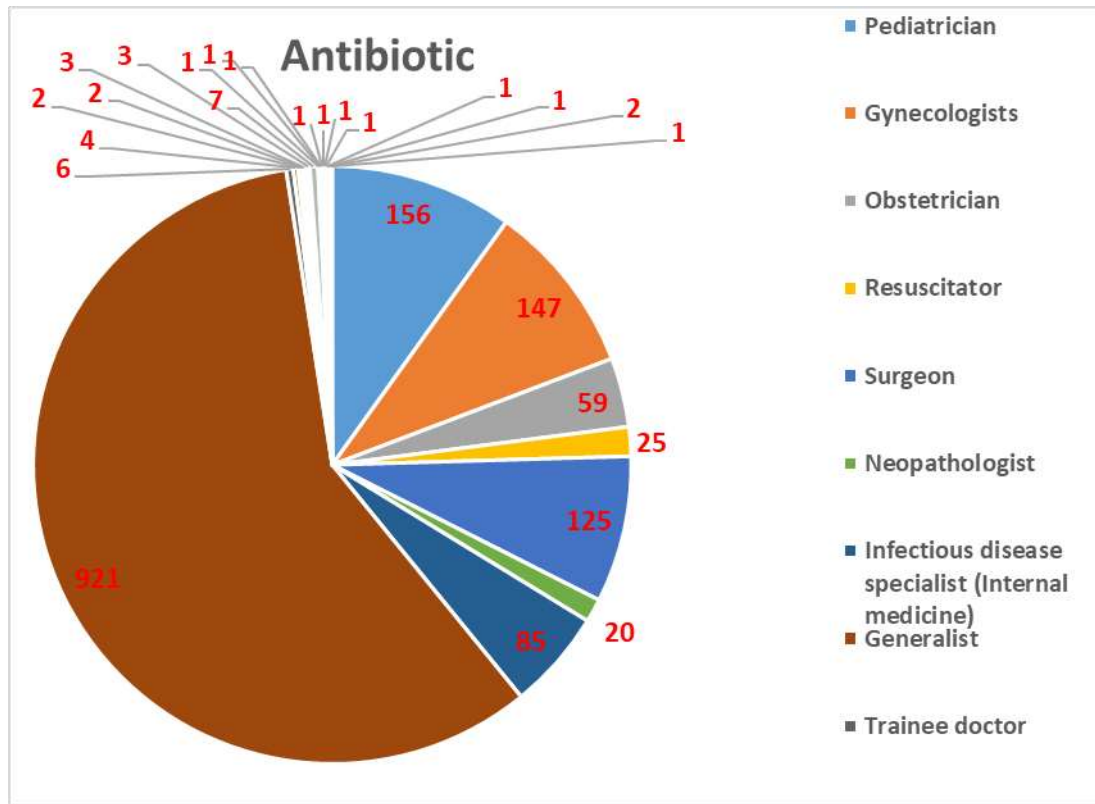


Figure 1

This figure 1 shows that antibiotics are more prescribed by general practitioners, i.e., 921 cases for a total of 1578 health personnel interviewed or 58.36% of cases.

The prescriber plays a significant role in the quality of the prescription, because of inappropriate prescribing by prescribers and poor use of antibiotics by patients [10]. Inappropriate antibiotic prescribing is positively correlated with inappropriate antibiotic use [11]. In Ghana, prescribers' knowledge, perceptions and practices regarding antibiotic use and resistance were conducted to identify gaps to guide policy recommendations aimed at reducing the appearance of resistant strains [12]. Hence, the crucial role of prescribers in controlling the occurrence of resistance. Anyone prescribing antibiotics must consider their clinical and public health responsibilities. The goal should be to provide optimal patient care while seeking to minimize the selective pressure that can lead to the emergence and spread of antibiotic resistance.

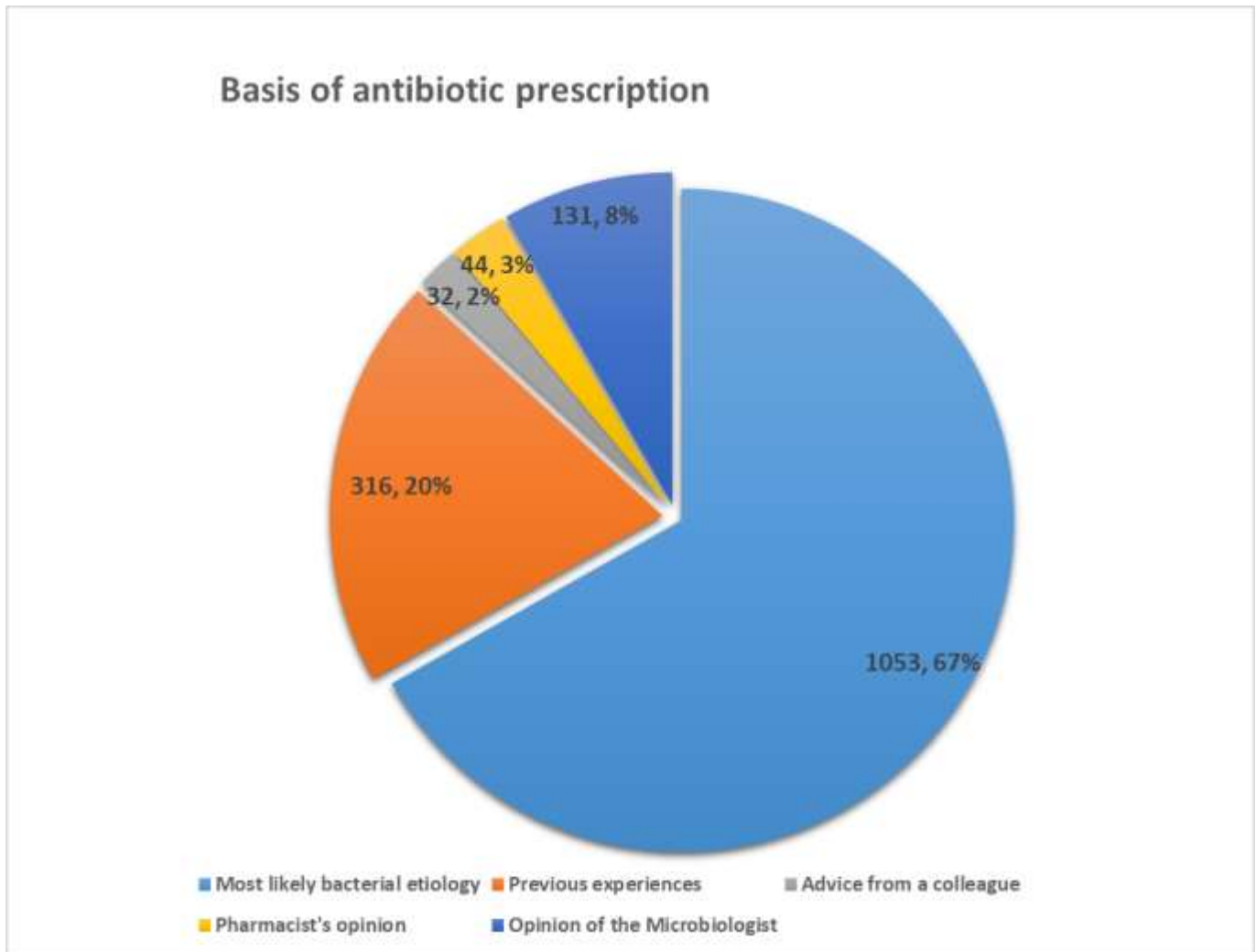


Figure 2

The most likely bacterial etiology (67%), previous experiences of successful prescription (20%) were the prescription references in most cases. the opinion of the microbiologist or laboratory results were used in a proportion of 8% of cases

These results are consistent with that of Smith who found in his study that clinicians rely heavily on their previous experience when making decisions regarding antibiotic treatment[13].

The basic message for prudent antibiotic prescribing is simple: when prescribing antibiotics, “Start smart, then focus;” use the right medicine at the right time, at the right dose and for the right duration. [14]. This implies that the quality of the initial decision to prescribe an antibiotic (including informed choice of drug and empirical dose), must be deliberately combined with a second emphasis on the critical importance of formally reviewing antibiotic therapy after 48 hours , depending on the patient's clinical response and the

availability of microbiological test results. simple steps to optimize [15]. This therefore requires knowledge of the etiological agent, its sensitivity to antimicrobials, an adequate dosage, and collaboration between clinician, microbiologist and pharmacist. [16-18]

	patient age	weight if pediatric	liver and kidney function	Comorbidity or chronic diseases	pregnancy and breast feeding	action spectrum ATB	Bactrian strain in question	Route of administration	Cost of ATB	Socio level patient economic
Yes	616	366	365	51	178	1349	1407	1093	654	611
No	314	270	327	464	201	227	169	483	922	965
Total Compliance %	930	636	692	515	379	1576	1576	1576	1576	1576
	66.24	57.55	52.75	9.90	46.97	85.60	89.28	69.35	41.50	38.77

Table 1

In the experience of prescribers, the probable bacterial strain in question and the spectrum of action of the antibiotics would be the two parameters of recourse for the prescription of antibiotics, respectively in 89.28% and 85.60% of cases; followed by the route of administration (69.35%) and the age of the patient (66.24%). for pediatric cases, weight is only considered in 52.7% of cases; the renal and hepatic assessment in 52.75% and to the least extent, the prescriptions consider the state of pregnancy or breastfeeding as well as the cost of the antibiotic and the socio-economic level. Amenities and chronic diseases are the least observed.

The study of Jegatha Krishnakumar and Rosy Tsopra clearly illustrate the elements of choice for a good dosage of antimicrobials; in fact, in this study, they affirm that general practitioners take into account different factors in the choice of antibiotics: factors linked to microbiology (bacterial resistance), to pharmacology (adverse effects, effectiveness, practicality of the protocol of administration, class of antibiotics, cost of the drug), clinical conditions (patient profile and comorbidities, symptoms, evolution). infection, history of antibiotic treatment, preference) and personal factors (experience, knowledge, emotion, GP preference).[19]

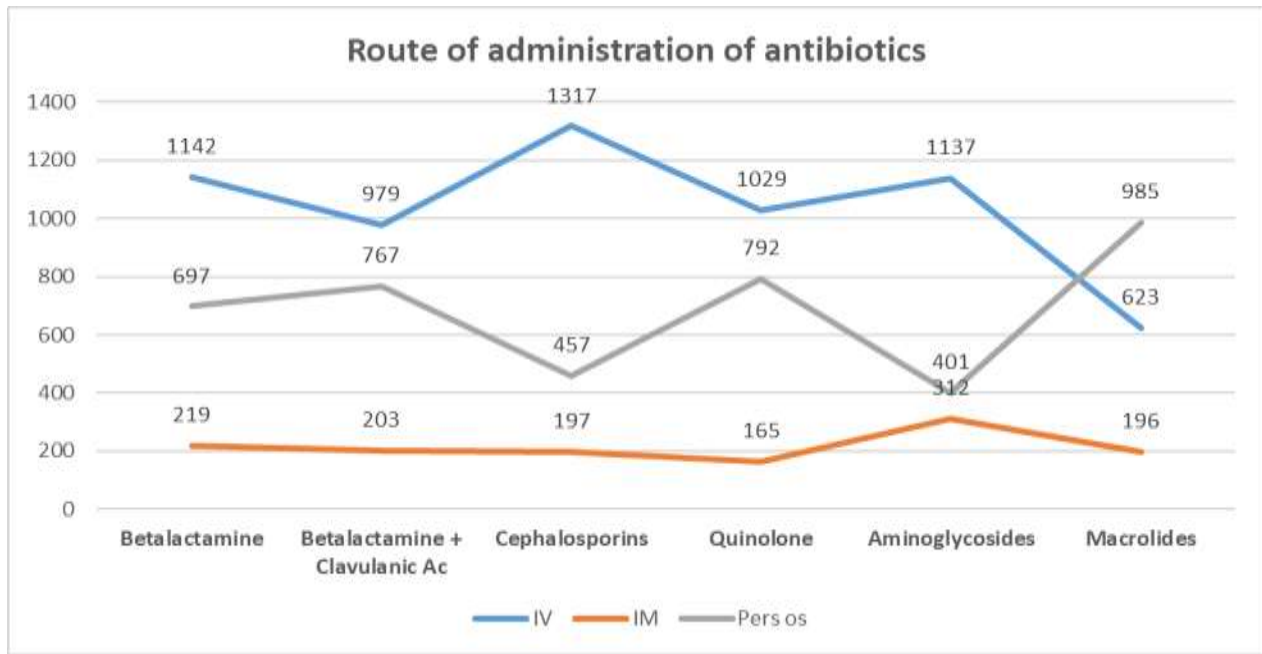


Figure 3

The most used route of administration of antibiotics was the intravenous route followed by oral administration for all antibiotic families, with the exception of macrolides for which the most used route was oral administration.

A key aspect of antimicrobial stewardship is the route of administration. And choosing the most appropriate route of administration is part of quality use of medicines. It is common for critically ill patients to receive empiric intravenous antibiotic therapy upon admission due to rapid administration, high bioavailability, and uncertainty surrounding potential infection. Later in treatment, once the patient is stabilized and the infection is understood, their antibiotics are often switched to an oral route of administration.[20]

As observed in Lubumbashi, poor practice of near intravenous administration of antibiotics will need to shift to oral administration as soon as possible and use more oral medications when appropriate, given that they are often equally effective and can reduce side effects during prolonged exposure[21,22]. Reducing the unnecessary use of indwelling intravenous devices is a well-established priority in patient safety and infection prevention to minimize the risk of nosocomial infections[23].

For many patients with bacterial infections requiring treatment with antibiotics, an oral formulation is the most appropriate choice. However, hospitalized patients often receive antibiotics intravenously. Although there are clinical circumstances in which parenteral administration is indicated, for some infections oral

treatment may be equally effective.[24]

The main advantages of the oral route over the intravenous route are no cannula-related infections or thrombophlebitis, lower medication costs, and reduced hidden costs such as the need for a healthcare professional. and equipment to administer antibiotics intravenously. Oral therapy has the potential to enable early discharge from hospital [25-27] and is cheaper and more cost-effective [28].

The bioavailability of antibiotics remains a key factor in the choice of route of administration, and yet, there is a distinct lack of knowledge regarding the bioavailability of administered antibiotics[29]

Despite considerable evidence, the use of early oral treatment remains low [30]. The reasons for the underutilization of oral administration are uncertain. Some clinicians and parents may be under the impression that intravenous antibiotics are more effective⁷ or than insurance; companies mandate intravenous therapy for reimbursement for hospitalizations[31]. The desire to maximize the use of oral therapies and, alongside their limited adoption is encouraged[32,33]

Selection of the optimal route is an important aspect of antibiotic therapy. The two main dosage forms of antibiotics are oral and injectable. Depending on the specific condition of the patient, the doctor will consider whether to use the appropriate antibiotic route[34]. It is important to clarify here that if the transfer of antibiotics from the parenteral route to the oral route A patient should switch from parenteral antibiotics to oral antibiotics when his condition improves significantly, that is to say the patient does not present serious, life-threatening infections[35]. The opposite assumes that the infection does not improve, the concentration of bacteria in the blood is high and is difficult to control with oral antibiotics and requires transfer from the oral to the parenteral route [36]. .

This is a different route of use. Change therapy: change antibiotics in the same class, with the same antibacterial spectrum but different active ingredients and routes of administration. Progressive therapy: the change of antibiotics can be of the same or different classes. The dose, frequency, and antibacterial spectrum of the previous parenteral antibiotic and the oral antibiotic of choice may not be the same[37].

Conclusion

The successful treatment of bacterial infections depends on many factors, including the choice of antibiotics and the appropriate route of antibiotic administration. Flexible switching of antibiotics from parenteral to

oral administration and vice versa helps ensure safety, treatment effectiveness and economy, and helps reduce antibiotic resistance during treatment.

For many infections, oral antibiotics can be as effective as intravenous medications. Shorter durations of intravenous antibiotic therapy and switching to oral therapy should be important considerations in patient management. They have the potential to improve patient outcomes by avoiding adverse effects of intravenous medications and may facilitate early discharge from hospital.

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