Original Article

Analysis of Antibiotic Prescription Patterns at Community Pharmacy Outlets; A Multi-Centered Study

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Abstract

This study aimed to analyse the types of prescribed antibiotics, frequency of usage, and age-based prescription patterns in a selected population. This study was granted ethical clearance and data were collected from Kottawa, Kalubowila, and Mawanella. Prescriptions were collected from patients after obtaining informed consent. Results showed that 41% antibiotic prescriptions prescribed with penicillin, 23% with macrolides, 20% with cephalosporin, 9% with quinolones, 4% with nitroimidazoles, and 3% with tetracycline. Clavamox, clarithromycin, and cefuroxime were the most prescribed drugs in the penicillin, macrolide, and cephalosporin categories respectively. We further found that the 21-40 age group was the highest receivers of antibiotics (46%). Considering the dosage frequency of penicillin category drug amoxicillin in different brand names including Clavamox, ranoxly, and novaclav was prescribed three times per day. Macrolide category drugs including clarithromycin and cephalosporin category drug including cefuroxime were prescribed two times per day. Results revealed that penicillin category drugs were the most prescribed antibiotics at a young age (21- 40) and brand clavamox (amoxicillin + clavulanic acid) was the highly used antibiotic with a dosage frequency of three times per day.

Keywords: Antibiotics, Frequency, Penicillin, Prescription pattern.

Introduction

Antibiotics are one of the most important discoveries in the field of medical science [1]. They are widely used against infectious diseases and essential for treating bacterial Infections, which include bactericidal and bacteriostatic effects [2].

Infectious diseases are common causes of morbidity and mortality in most developing countries of the world. The problem of overuse of antibiotics is a global phenomenon that develops antibiotic resistance worldwide. Antibiotic resistance makes an antibiotic ineffective/less effective against bacterial infections [8]. The antibiotic resistance crisis has been attributed to the overuse and misuse of these medications. In addition, the lack of new drug development, reduced economic incentives, and challenging regulatory requirements have increased the usage of antibiotics [11]. The causes of antibiotic resistance are identified as overuse of antibiotics, inappropriate prescription, extensive use on livestock, etc. [11]. In India, the prevalence of antibiotic usage ranges from, 24% - 67% [2]. According to a recent study, 75% of antibiotic prescriptions were found each year in Sri Lanka and it is the most frequent reason for seeking medical attention due to the development of antibiotic-resistant strains [3].

Various antibiotics containing prescription problems have been identified in the health sector, especially in developing countries. These problems include polypharmacy and high usage of drugs with unproven efficacy [2]. Further,

irrational antibiotic usage can lead to increased healthcare utilization, morbidity, adverse drug events, and drug resistance [4]. Therefore, a serious reduction in the use of antibiotics could help to decrease the spread of antibiotic resistance [5].

The prescription patterns of antibiotics will reflect the physician's understanding of the disease, and the health history [3]. In developing countries, antibiotics are the highly consumed medicines, and irrational use of antibiotics has become a common practice [1]. Therefore, it is an essential component in pharmacy services to study and analyze the frequency of prescribing antibiotics, usage, and age-based prescription pattern in a selected population. The present study was focused on, evaluating the prescription patterns of antibiotics in pharmacies in Kottawa, Kalubowila, and Mawanella areas.

Methodology

A Series of observational studies were conducted by obtaining ethical approval from the Ethics Review Committee, Faculty of Health Sciences, CINEC Campus, Malabe. The research was carried out in pharmacies in Kottawa, Kalubowila, and Mawanella areas by analyzing each prescription. A total of 100 prescriptions were analyzed that contained antibiotics. Antibiotics were then categorized according to their name and type. Then the usage of antibiotics was analyzed by considering four different age categories. All data were statistically analyzed by using SPSS software.
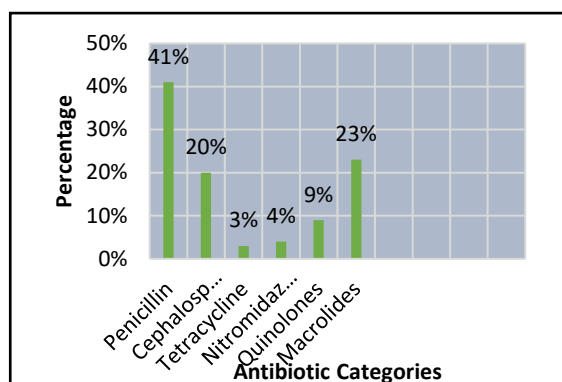
Results & discussion

Fig. 1: percentage of prescribed antibiotic categories.

Fig. 1 This graph shows the percentage of prescribed antibiotic categories. The highest prescribed antibiotics category was penicillins (41%), whereas the least prescribed antibiotics category was tetracycline (3%).
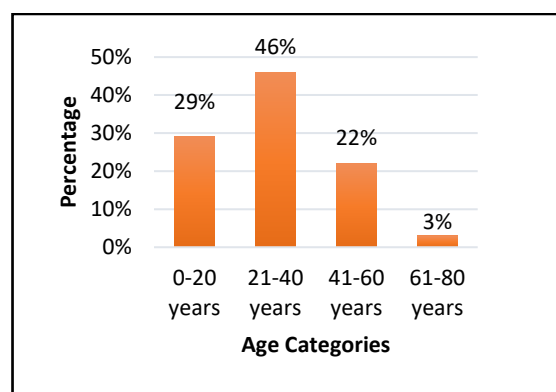

Fig. 2 percentage of dispensed antibiotics according to four age categories.

Fig. 2 This graph shows the percentage of dispensed antibiotics according to four age categories. The age category ranging from 21-40 years shows the highest consumption of antibiotics, whereas the age category ranging from 61-80 years shows the least consumption of antibiotics.
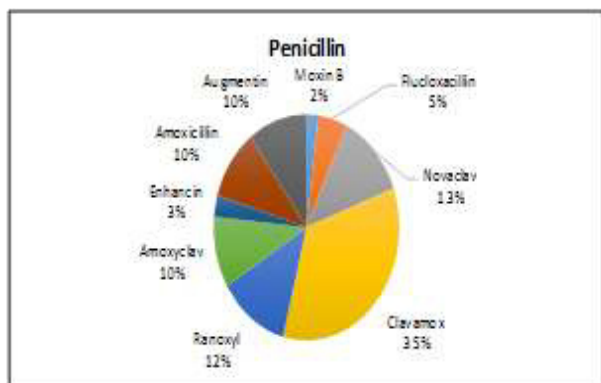
Fig. 3: percentage of prescribed penicillin category antibiotics.

Fig. 3 This graph shows the percentage of prescribed penicillin category antibiotics. The highest prescribed penicillin category antibiotic was clavamox (amoxicillin + clavulanic acid) (35%), whereas the least prescribed drug was moxin (moxifloxacin) (2%).
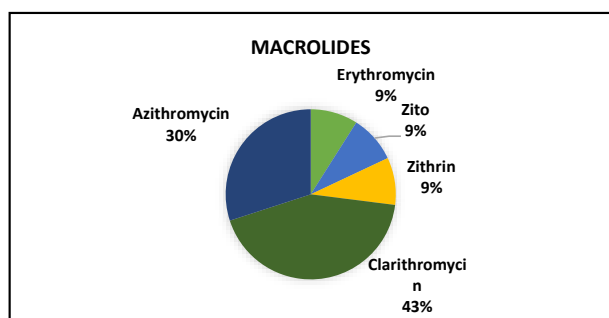

Fig. 4: percentage of prescribed macrolide category antibiotics.

Fig. 4 this graph shows the percentage of prescribed macrolide category antibiotics. The highest prescribed macrolide antibiotics category was clarithromycin (43%), whereas the least prescribed drugs were erythromycin (9%), Zithrin, and Zito (azithromycin) (9%).
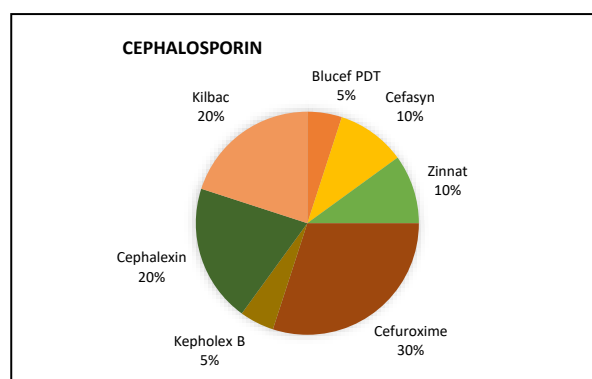

Fig. 5: percentage of prescribed cephalosporin category antibiotics.

Fig. 5 this graph shows the percentage of prescribed cephalosporin category antibiotics. The highest prescribed cephalosporin antibiotics category was cefuroxime (30%), whereas the least prescribed drugs were kepholex B and blucef PDT (cephalexin) (5%).

The usage of antibiotics by a selected population was examined according to the type of antibiotics prescribed among four different age categories. In addition, the frequency of antibiotic usage was observed.

A total of 100 prescriptions were screened. Among them, 100 antibiotics were observed. As a percentage, it was 24.15%. Since the sample size taken for the study was very small, it may affect the validity of the conclusions drawn about antibiotic resistance. According to the obtained results, the majority of antibiotics were prescribed for patients in the age category of 21-40 (46%). The age category belonging to 61-80 years showed the least consumption of antibiotics (3%).

Considering the percentages of most prescribed antibiotics, penicillins appeared to be prescribed in 41% followed by macrolides in 23%, and cephalosporins in 20%. The least prescribed antibiotic category was identified as tetracyclines (3%). Other categories including quinolones (9%) and nitroimidazoles (4%) showed an intermediate prescription pattern.

Considering the dosage frequency of each antibiotic category, which was highly prescribed, the penicillin category drug amoxicillin in different brand names including Clavamox, ranoxly, and novaclav was prescribed three times

per day. Macrolide category drugs including clarithromycin and cephalosporin category drug including cefuroxime were prescribed two times a day.

Further, the present study emphasizes that nearly half of the participants (41%) was prescribed antibiotic penicillin from 100 antibiotics observed from 100 prescriptions in the study population. It is mainly amoxicillin in different brand names. Thus, penicillin antibiotics can be predicted to use with high frequency than other antibiotic categories, where developing resistance against penicillin category antibiotics will be more pronounced. In addition, the present study results revealed that most of the early adults (21-40 years age category) are using antibiotics whereby the chance of occurring antibiotic resistance is high in this population which can be a serious threat to Sri Lankan economy.

In a recent study, it was concluded that a vast majority of physicians (97%) believed that widespread and inappropriate use of antimicrobials is an important cause of antibiotic resistance [9]. However, only 60% favored restricting the use of broad-spectrum antibiotics [9]. The dispensing of antibiotics without any prescription has been announced cautious by the World Health Organization as a measure to control the arising of antibiotic-resistant strains [6]. Considering these facts, it is essential to further develop this study, to find out the dose and the common conditions for prescribing these antibiotics to prevent antibiotic misuse in Sri Lanka.

Since antibiotics are the most prescribed drugs at hospitals in developing countries like Sri Lanka, understanding of drug utilization process is very important [10]. Therefore, necessary steps should be taken to minimize the usage of antibiotics to prevent future complications of antibiotic-resistant strains.

Conclusion

Penicillin category antibiotics following the brand Clavamox, 35% (amoxicillin + clavulanic acid) was the most prescribed antibiotic with a dosing

frequency of three times per day. Further, the 21-40 age group was the highest receivers of antibiotics (46%). It is recommended to develop this study further to provide new facts considering the dose and the common conditions of antibiotics use in the Sri Lankan population to develop new policies by relevant government authorities and thereby ensure the safe use of antibiotics at the correct dose with correct dosing frequencies for correct disease for an adequate period.

Acknowledgment

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