



The Prescribing Trends of Metronidazole in The Outpatient Setting

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Aim: The aim of this study is to characterize the trends of metronidazole prescribing in outpatient setting in Alkharj.

Methodology: This is a retrospective study includes evaluating outpatient antibiotic prescriptions from 01-01-2018 till 31-12-2018 in a public hospital Alkharj. The data were collected and analyzed using excel software and the descriptive data were represented by frequencies and percentages.

Results: The majority of the metronidazole prescriptions were regular and only few prescriptions were urgent. The physicians who prescribed metronidazole were mainly residents who don't have sufficient experience that may results in more inappropriate antibiotic prescribing patterns.

Conclusion: The excessive use of metronidazole in addition to its prescribing by resident may results in inappropriate prescribing pattern that may lead to increase the adverse effect which may lead to increase the rate of bacterial resistance. More efforts are needed, especially by applying antimicrobial stewardship program, to ensure that metronidazole is prescribed correctly.

Keywords: Prescribing; trends; patterns; metronidazole; antibiotic; outpatient.

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1. INTRODUCTION

Antibiotics are medications that show an excellent efficacy when they are developed. Soon after their discovery, however, it became obvious that microbes could become resistant to them [1].

Antimicrobial Resistance (AMR) has become a global health problem and is related to increased mortality and morbidity; with nearly 700,000 deaths yearly associated with it worldwide [2,3]. If appropriate steps aren't taken, this mortality could increase to about 10 million deaths per year globally by 2050, which would lead to more mortality rate than cancer [3]. AMR affects costs on the healthcare system by increasing patient visits and causing hospitalization for prolonged period [4]. Moreover, it is estimated that by 2050, global health care costs attributed to AMR will increase to one trillion dollars yearly [3]. One of the main contributors to AMR is the unsuitable and unnecessary usage of antibiotics [5].

Monitoring of antibiotic prescribing data in the outpatient setting is frequently conducted to analyze national and state antibiotic prescribing data and this leads to better understanding of the trends in outpatient antibiotic prescribing, to identify whether any interventions are needed or no and to measure progress [6].

In the United States community pharmacies in 2014, approximately 266.1 million courses of antibiotics are dispensed to outpatient settings. This means that in United States more than 5 prescriptions written yearly for every 6 people [7].

At least 30% of antibiotics prescribed in the outpatient setting are unnecessary, meaning that antibiotic was given to patients who didn't need it [8]. Other studies reported that total unsuitable antibiotic use including inappropriate selection, unnecessary use, inappropriate dosing and duration may approach 50% of all outpatient antibiotic use [9-13].

Despite the guidelines and the efforts by government agencies and professional medical societies to decrease the inappropriate antibiotic prescribing, [14,15] the patterns of prescribing have changed little, [16-18] and in high income countries antibiotic use remains steady. [19] Furthermore, data on antibiotic prescribing trends which can guide stewardship efforts remain scarce, particularly for vulnerable populations [20].

Metronidazole is an antiprotozoal and antibacterial agent. It is approved by FDA for the treatment of several anaerobic bacterial infections [21]. Metronidazole may be administered orally, intravenously, or topically. The main side effects of it include peripheral neuropathy, nausea, metallic taste, vomiting, confusion and diarrhea. Metronidazole resistance is common in various Gram-positive anaerobic rods (*Actinomyces* spp., *Propionibacterium* spp., *Lactobacillus* spp.), while the prevalence of resistant Gram-positive cocci and Gram-negatives is usually very low (<1%) [22,23].

To reduce the adverse effects and to reduce the development of drug-resistant bacteria of metronidazole, it should be used only when needed to avoid excess use and as a result to decrease the rate of bacterial resistance. Therefore, it is necessary to know the prescribing trends associated with this drug [24]. The aim of this study is to characterize the trends of metronidazole prescribing in outpatient setting in Alkharj.

2. METHODOLOGY

This is a retrospective study includes evaluating outpatient antibiotic prescriptions from 01-01-2018 till 31-12-2018 in a public hospital in Alkharj, Al Kharj is a city in Al Kharj Governorate in central Saudi Arabia. Al Kharj is 77 km south of Riyadh and include about 425,300 person.

The inclusion criteria include the prescriptions in 2018 that included metronidazole and the exclusion criteria include the prescriptions before or after 2018 and the prescriptions that didn't include metronidazole.

The data include personal information, type of prescription, the prescribing departments and the level of prescribers.

The data were collected and analyzed using excel software and the descriptive data were represented by frequencies and percentages.

This study was approved by the Institutional Review Board Log No. 18-474E.

3. RESULTS

This study includes reviewing 500 metronidazole prescriptions during 2018 to find the trends of metronidazole prescribing in the outpatient settings. About 50.8% of the patients were female and 49.2% were male. Personal Data are shown in Table 1.

Most of the prescriptions contain metronidazole tablet, followed by solutions. The dosage forms of metronidazole prescribed by outpatient settings are presented in Fig. 1.

The majority of the metronidazole prescriptions were regular and only few prescriptions included only metronidazole to be given when required. Fig. 2 shows the type of metronidazole prescriptions.

Table 1. Personal data

Variables	Number	Percentage
1. Gender		
a. Male	246	49.2%
b. Female	254	50.8%
2. Nationality		
a. Saudi	461	92.2%
b. Non- Saudi	39	7.8%

The majority of the metronidazole prescriptions were from emergency department (83.60%). Table 2 represents the departments that prescribed metronidazole in 2018.

Table 2. The departments that prescribed metronidazole in 2018

Departments	Number	Percentage
Dental	1	0.20
E.N.T	3	0.60
Emergency	418	83.60
Gastroenterology	5	1.00
General Surgery	31	6.20
Infection Control	1	0.20
Internal Medicine	1	0.20
Nephrology	10	2.00
Obstetrics & Gynecology	27	5.4
Pediatric Surgery	3	0.60

The prescribed physicians were mainly residents (92.00%). The level of the prescribed physicians is shown in Table 3.

Table 3. The level of the prescribed physicians

The level of the physicians	Number	Percentage
Consultant	22	4.40
Resident	460	92.00
Specialist	18	3.60

4. DISCUSSION

This study includes reviewing 500 metronidazole prescriptions. The study was conducted in

Alkharj, Al Kharj is a city in Al Kharj Governorate in central Saudi Arabia. Al Kharj is 77 km south of Riyadh and include about 425,300 person. The patients were equally distributed, approximately 50% of the respondents' male and 50% female. The most common dosage form of metronidazole prescriptions included solid dosage form, which means the majority of the patients were adults. For some of the prescriptions, the antibiotic prescribed when needed, on the other hand, the majority of the patients were used it regularly.

About 83.60% of the prescriptions were prescribed by emergency department followed by surgery department (6.2%). These results are rational because commonly the majority of the outpatient antibiotics were prescribed by emergency department. Moreover, metronidazole is prescribed commonly by surgery department because it is commonly used for surgical prophylaxis if anaerobic organism was suspected such as in the case of colon surgeries, brain abscess and in dental cases. [25] Dar-Odeh N.S reported that 39.4 % of the antibiotic prescriptions that were prescribed by dentists include metronidazole. Where as in this study only 1 out of 500 prescriptions containing metronidazole was prescribed by dental department [26].

The majority of the prescribers were resident physicians, this means that the majority of the physicians don't have enough experience and this may increase the inappropriate prescribing of metronidazole and as a result may lead to bacterial resistance. D C Saltman et al reported that the resident need the consultant to be always supportive to him [27].

Metronidazole is one of the most common antibiotics that were prescribed in the outpatient setting in Alkharj in 2018 and this is similar to the study of Freeman CD et al. who reported that metronidazole is prescribed frequently and that many clinicians still consider metronidazole to be the 'gold standard' antibiotic to treat many infections caused by anaerobic organism [28]. Moreover, Yimenu DK et al reported that metronidazole is the third most common prescribed antibiotic in the outpatient setting, similar to our data which show that metronidazole was the most commonly prescribed after amoxicillin and amoxicillin/clavulanic acid [29].

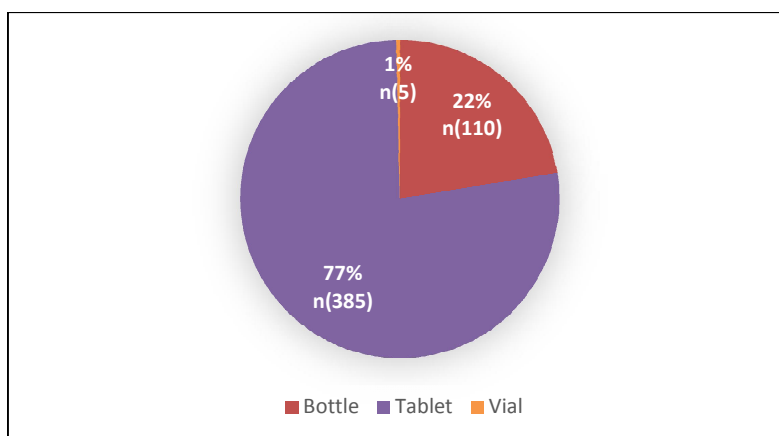


Fig. 1. The dosage forms of metronidazole prescribed by outpatient settings

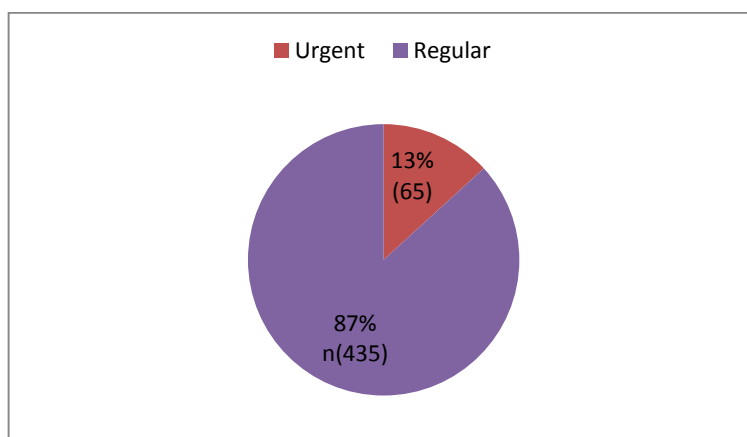


Fig. 2. Type of metronidazole prescriptions

5. CONCLUSION

Metronidazole is one of the most commonly prescribed antibiotics. Among the 500 outpatient antibiotic prescriptions, the majority of the prescription prescribed in the emergency departments especially from resident physicians. The excessive use of metronidazole in addition to its prescribing by resident may results in inappropriate prescribing pattern that may lead to increase in adverse effects and increase in rate of bacterial resistance. More efforts are needed, especially by applying antimicrobial stewardship program, to ensure that metronidazole is prescribed only when needed for the correct patient and in the appropriate time, duration, dose and route of administration. Moreover, it is important to check the drug - drug interactions of it with other drugs and to avoid the duplication by avoiding the dispensing of it with other antibiotic that cover anaerobic bugs.

6. LIMITATION

In the present study we didnt check the adverse effects and the drug-drug interaction.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the author.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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