

RESEARCH ARTICLE

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A Study on Antibiotics Prescribing Pattern at Outpatient Department in Four Hospitals in Aden-Yemen

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Abstract

Objective: The study was to investigate antibiotic prescription patterns at outpatient departments (OPDs) at four hospitals in Aden-Yemen. **Settings and Design:** A cross sectional descriptive study was conducted in the four hospitals in different areas of Aden city, the commercial capital of Yemen, from November 2015 through December 2015. WHO indicators were chosen. The study sampled the prescriptions conveniently. The data collection form used include Core Indicators and Complimentary Indicators of WHO such as average number of medicines per encounter, percentage of medicines prescribed by generic name, percentage of medicines prescribed from the EML and percentage of prescriptions in accordance with treatment guidelines. Data was analysed descriptively. **Results:** Out of the 400 prescriptions received from the outpatient clinics in the four hospitals during the study period, 337 antibiotic prescriptions were counted for. The percentage of prescriptions involving antibiotics was 84.2%. The average number of drugs per prescription was 3.2. Out of the surveyed antibiotic prescriptions, 65% contain one antibiotic and more than one-third were in the cephalosporin group (38.8%). Generally, 41% of the prescriptions were generic, furthermore, 44.8% of the prescribed medicines across all hospitals were from the EML. **Conclusion:** Important number of the prescribing indicators showed deviation from the standard values recommended by WHO. This deviation indicated an obvious degree of irrational/inappropriate prescribing in the hospitals, particularly poly pharmacy, underuse of international nonproprietary names (generic names), and over prescription of antibiotics. The study recommended to more adherence to WHO antibiotic prescribing guidelines and improving knowledge of proper and good prescribing procedure among health system prescribers.

Key words: Antibiotics, Hospital, Prescribing pattern, WHO indicators, Yemen.

INTRODUCTION

Antibiotics are among the highly consumed medicines and the most important thing is their rational use. Inappropriate and irrational use of antibiotics is common in practice mainly in countries that lack strict regulation on the use of antibiotics. Another factors



for misuse and abuse of antibiotics are illiteracy, ignorance and poverty among the people of resource poor countries.^[1-3] Development of antibiotic resistance is an alarming issue due to inappropriate use of antibiotics and it is a serious challenge to the healthcare professionals.^[4] At healthcare professional level, the most common problems with antibiotic therapy are their proper selection, dose and duration.^[5] Lack of experience also contribute to inappropriate antibiotics prescribing.^[6,7]

There are three broad reasons for investigating usage of medicines, i.e. to describe current patterns of medicine use, to correct specific medicine use problems, and to monitor medicine use over time. Investigation of use of medicines in a specific context can be accomplished through a number of activities: (1) starting with assessing current patterns of medicine use; (2) defining standards of appropriate practice and identifying the specific problems and their causes; (3) designing and implementing interventions to tackle the identified problems; and (4) evaluating patterns following implementation of interventions.^[8] In Yemen, only few studies have been conducted on the behavior of medical practitioner's use of antibiotics.^[9] This study was designed and carried out to determine the prescribing pattern of antibiotics among the physicians at private and public hospitals in Aden city, Yemen.

MATERIALS AND METHODS

A cross sectional descriptive study was conducted in four hospitals in different areas of Aden city, Yemen, from November to December 2015. Sample selection was convenient, focusing on four hospitals. Such a targeted selection of hospitals was made because the subsequent planning, design, and implementation of interventions to address problems or constraints identified by the study would be easier. We considered that selecting these hospitals would make it more convenient and practical data collection. All of the patients who visited the medical OPDs of the four hospitals and who were prescribed antibiotics were enrolled in the study.

Seven medicine use indicators—three core, one patient, and three complimentary indicators—from the WHO Drug Use Indicators (Outpatient Facilities) list were assessed.^[8] These indicators assessed performance of district-level health care facilities. Core Indicators: Average number of medicines per encounter, percentage of medicines prescribed by generic name, and percentage of medicines prescribed from the EML or formulary. Complimentary Indicators: Average medicine cost per encounter, percentage of prescriptions in accordance with treatment guidelines.

Quantitative data was collected, counted numerically, and used to identify the prescribing pattern within the four hospitals. The qualitative data was used to determine prescribing pattern and to provide answers relating to the reasons behind the identified prescribing pattern. The patients' information was taken from their medical records when they presented to the hospital pharmacy to collect their medications. Information about their presenting medical conditions and antibiotics prescribed were recorded in data collection sheets.

The antibiotics prescribed were checked for appropriateness and whether they had been prescribed according to the Standard Treatment Guidelines (STGs). Similarly, the patients' specimens sent for laboratory investigations were also recorded. Similarly, the availability of STGs in the consulting rooms and the rate of reference and adherence to these guidelines by the prescribing physicians in the medical OPDs were also assessed.

The collected data from the respondents was analysed using the SPSS® version 18.0. The data from the data collection sheet were evaluated for various parameters. Descriptive statistics such as frequencies, percentages and means were used in the analysis of the data.

The study was approved by the Ethics Research Committee of the Faculty of Medicine and Health Sciences, Aden University. Written consent was obtained from all of the subjects who agreed to participate in the study after explaining the objectives, importance and benefits of the research and that the participation is voluntary. They were assured that all the collected data will be handled with full confidentiality, and will be used only for the research purpose and it will not affect their treatment.

RESULTS

Four hundred patients were included in the study and their prescriptions containing at least one antibiotic were analysed. About 56% of the patients were females followed by males (44%). (Table 1) provides demographic details of the patients to whom antibiotics were prescribed. The maximum antibiotics was prescribed in patients aged below 12 years (37%) whereas, the least antibiotics were prescribed in patients over 60 years of age (4%). Indications for which antibiotics were prescribed are given in the (Table 2). Respiratory tract infections were the most common clinical conditions in hospitals for which antibiotics were prescribed in high percentage, i.e. 38%. A high number of prescriptions which the diagnosis either was not written or not clear.

Out of the 400 prescriptions received from the outpatient clinics in the four hospitals over the study period, 337 antibiotic prescriptions were counted for. The percentage of prescriptions involving antibiotics was 84% as shown in (Table 3). The average number of drugs per prescription was 3.2. Out of the surveyed antibiotic prescriptions, 65% contained one antibiotic, 17% contained two antibiotics, and 2.5% comprised of three antibiotics.

(Table 4) Indicated the prescribing indicators used. On average, 41% of the prescriptions contained medicines prescribed in generic while 46.5% of the prescribed medicines across all hospitals were from the EML. In addition, the results show that 33% of medicines were injectables. About half (51%) of the cases, specimens were sent to laboratory for microbial testing. Adherence to the STGs was found low. The study also assessed the type of antibiotics prescribed. The widely used antibiotics were amoxicillin (22%), followed by ceftriaxone (20%). The most highly prescribed group of antibiotics was cephalosporin (39%) (Table 5).

DISCUSSION

Antibiotics are among the most commonly prescribed drugs in hospitals. Majority of the patients in hospitals obtain the prescription of antibiotics without bacteriological tests. Prescribing antibiotics haphazardly can lead to increased antibiotic resistance and the scenario is more common in developing nations. This study was carried out with the purpose to determine the prescribing pattern of antibiotics among the physicians of both private and public hospitals of Aden City, Yemen.

Pediatric patients were found more (37%) prescribed with antibiotics, and the common complications for which antibiotics were prescribed are respiratory and gastrointestinal infections. The finding of the study conducted in Nepal by Thapaliya *et al* in 2015 also go along with this.^[10] This indicates that respiratory and gastrointestinal complications are more common among pediatric populations, and are more vulnerable to the complications due to inappropriate use of antibiotics.^[11] Thus, children need more control on antibiotics use.^[12] In contrast, elderly patients get less prescribed with antibiotics but more with non-antibiotics like analgesics for backache and other painful conditions as bones and muscles become weaker with the advancement in age.^[13]

Most (65%) of the prescriptions contained single antibiotic which is good indication of prescribing pattern of antibiotics in terms of number of antibiotic per prescription.^[14]

Our study showed that the average number of drugs per encounter is about 3 which is slightly higher than the recommended limit (2) by the WHO.^[15,16] However, the finding is similar to that of previous studies reported by investigators from Kingdom of Saudi Arabia, Sudan, Nigeria and Nepal which range from 1.3 to 3.8 and less than that obtained by Otoom *et al*, in Jordan (2.3) and Al-Niemat *et al*, in Jordan (2.4).^[17-20] In developed countries, around 30% of the hospitalized patients are treated with antibiotics with the numbers much higher in developing countries. Previous studies in developing countries shows that 35 to 60% of clinical encounters were prescribed with antibiotics while appropriate prescribing were reported in less than 20%.

On average, 41% of the prescriptions contained medicines prescribed in generic which is similar to another study conducted in Yemen.^[21] Over 46% of the prescribed medicines across all hospitals were from the EML. This indicates the clinician's preference over specific brand of the medicines without bothering whether the medicine is in the EML. There can be various factors behind this such as influence from the manufacturers to promote a specific brand.^[22,23] In addition, the results show that 33% of medicines were injectable. As most the patients were pediatrics, injectable are the preferred dosage form to be prescribed. In about one half of the cases, specimens were not sent to laboratory for microbial sensitivity testing and the finding is in accordance with study by Ansari *et al* in Nepal.^[14]

Al-shami *et al* investigate the prescribing of antibiotics in Yemen and provide a baseline picture of prescribing habits in four public quaternary health care facilities in Sana'a, Yemen. Results showed that the total number of brand name antibiotics prescribed was 76.8%, and 27.5% of the antibiotics were not on the Yemen Essential Drug List (YEDL).^[24]

The average number of antibiotics per each patient received was 1.2 ± 0.4 (median=1) and the percentage of antibiotics prescribed as injections was 27.8%. They concluded that there were various potential problems in antibiotic usage in the government quaternary hospitals in Yemen. Advocacy education and awareness initiatives are required to alleviate these problems. Our study showed that the percentage of prescriptions involving antibiotics was 84.2%. However, the finding is higher to the study obtained by Bashrahil which was 66.2%.^[21] Injectable drugs accounted for 33% of total drugs prescribed. However, the finding is higher to the study obtained by Bashrahil which was 24.6%.^[21]

It has been demonstrated that penicillins (e.g. amoxicillin, 21%), cephalosporins (e.g. ceftriaxone, 20%), and

Table 1: Demographic characteristics of the patients taking antibiotics (n=400)

Demographic factors	Categories	All hospitals N (%)	Saber hospital N (%)	Alnaqeeb hospital N (%)	Alwaly hospital N (%)	Alsadaqa hospital N (%)
Age in years	< 12	148 (37)	10 (17.2)	25 (53.1)	15 (21.4)	98 (43.5)
	12-30	107 (26.7)	25 (43.1)	11 (23.4)	22 (31.4)	49 (21.7)
	31-60	128 (32)	19 (32.7)	9 (19.1)	19 (27.1)	66 (29.3)
	>60	17 (4.25)	4 (6.8)	2 (4.25)	14 (20)	12 (5.3)
Gender	Male	177 (44.3)	30 (51.7)	24 (51.1)	33 (47.1)	90 (40)
	Female	223 (55.8)	28 (48.2)	23 (48.9)	37 (52.9)	135 (60)

Table 2: Antibiotic prescribing patterns across diagnostic conditions

Conditions	All hospitals N (%)	Antibiotics prescribed			
		Saber hospital N (%)	Alnaqeeb hospital N (%)	Alwaly hospital N (%)	Alsadaqa hospital N (%)
Upper RTI	151 (37.8)	19 (32.8)	26 (55.3)	15 (21.4)	91 (40.4)
UTI	28 (7.0)	5 (8.6)	7 (14.9)	5 (7.1)	11 (4.9)
Gastroenteritis	63 (15.8)	5 (8.6)	4 (8.5)	17 (24.3)	37 (16.4)
Diagnosis not mentioned	68 (17)	22 (37.9)	5 (10.6)	20 (28.6)	21 (9.3)
Unclear	90 (22.5)	7 (12.1)	5 (10.6)	13 (18.6)	65 (28.9)

Table 3: Indicators of drug use

Variables	All hospitals N (%)	Saber hospital N (%)	Alnaqeeb hospital N (%)	Alwaly hospital N (%)	Alsadaqa hospital N (%)
Average number of drugs per encounter (n=400)	3.17	3.2	2.7	4.0	2.9
1 antibiotic	260 (65)	38 (65.5)	40 (85)	43 (61.4)	139 (61.7)
2 antibiotics	67 (16.7)	13 (22.4)	4 (8.5)	18 (25.7)	32 (14.2)
3 antibiotics	10 (2.5)	0 (0)	1 (2.1)	2 (2.8)	7 (3.1)
Percentage of encounter with a prescribed antibiotic	337 (84.2)	51 (87.9)	45 (95.7)	63 (90)	178 (79.1)

Table 4: Different prescribing parameters

Hospitals	Medicines on EDL N (%)	Encounter sent to the laboratory N (%)	HPTC N (%)	STGs N (%)	Prescribed generic name N (%)	Antibiotics need to improve N (%)
All hospitals (n=400)	179 (44.8)	206 (51.5)	0	186 (46.5)	164 (41)	368 (92)
Alsadaqa hospital (n=225)	89 (39.6)	121 (53.8)	0	58 (25.8)	80 (35.6)	209 (92.9)
Alnaqeeb hospital (n=47)	30 (63.8)	7 (14.9)	0	27 (57.4)	17 (36.2)	47 (100)
Saber hospital (n=58)	32 (55.2)	24 (41.4)	0	53 (91.4)	23 (39.7)	58 (100)

Table 5: Percentage share of prescribed antibiotics

Antibiotic name	N (%)
Amoxicillin	86 (21.5)
Ceftriaxone	79 (19.8)
Metronidazole	41 (10.3)
Cefotaxime	29 (7.3)
Cefixime	24 (6)
Ciprofloxacin	23 (5.8)
Azithromycin	21 (5.3)
Gentamycin	13 (3.3)
Penicillin	13 (3.3)
Co-trimoxazole	09 (2.3)

metronidazole (10%) were the most frequently used antibiotics in all of the four hospitals. Broad-spectrum antibiotics accounted for approximately 58% of the total prescribed antibiotics. UTI was the favored complication in which broad-spectrum antibiotics (38%) were prescribed. Similarly, amoxicillin and ceftriaxone were the antibiotics of choice for respiratory tract infections. Previous studies conducted in Jordan showed that prescribing antibiotics for upper respiratory tract infection was more in children than in adults.^[25]

Various indicators of antibiotics prescribing reveals that inappropriate prescribing of antibiotics is prevalent in Yemen regardless of public or private hospitals. No pharmacy and therapeutic committee to oversee the use and prescribing practices of antibiotics, and lack of practice of sensitivity testing before prescribing antibiotics contribute to inappropriate prescribing of antibiotics. Furthermore, pediatric population are more vulnerable to the consequences due to irrational use of antibiotics.

Limitations and constraints of the study

The main limitation of our study is the sampling procedures, where the target group was chosen conveniently rather than randomly which may be quite unrepresentative of the study population. Another limitation of the study is that the findings were restricted to only health care professionals working only in one city. The outcome would have been more significant and could be applied to the whole country, if the study was conducted in different geographical areas of the country.

CONCLUSION

Important number of the prescribing indicators showed deviation from the standard values recommended by WHO. This deviation indicated an obvious degree of irrational/

inappropriate prescribing in the hospitals, particularly poly pharmacy, underuse of international nonproprietary names (generic names), and over prescription of antibiotics. The study recommended to more adherence for WHO antibiotic prescribing guidelines and improving knowledge of proper and good prescribing procedure by performing several activities among health system prescribers.

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CONFLICT OF INTEREST

None to declare.

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