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Drug Utilization Patterns in the Emergency Department of Najran University Hospital, Najran

Saad Ahmed Alkahtani*

Department Clinical Pharmacy, College of Pharmacy, Najran University, Najran, SAUDI ARABIA.

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***Correspondence to:**

Dr. Saad Ahmed Alkahtani,

PhD, Assistant Professor, Department Clinical Pharmacy, College of Pharmacy, Najran University, Najran, SAUDI ARABIA.

Email: saad.rkh@gmail.com

Abstract

Background: Study on the drug utilization pattern in emergency department (ED) is important not only for the general physician but also for the emergency physicians. It provides the means of evaluating drug prescribing trends, cost-effectiveness and efficiency of hospital formularies. **Objective:** The objective of this study was to evaluate the drug utilization pattern in Najran university hospital to assess drug prescribing trends, average number of drug per prescription, the WHO core indicators for drug utilization and prescription cost during patients visit at the ED. **Methods:** It was a retrospective cross-sectional study of all the adult patients who attended the ED at Najran university hospital. **Results:** The average age of the patients was 38±16 years. The average no drugs per prescription, was 2.39 ± 0.55, with a significant number of patients in this study (31%) receiving at least two drugs per episode. The majority of drugs were administrated by the oral route (68%) followed by the parenteral route (23%) and then other routes (7%). **Conclusion:** Anti-infective drugs cost was the highest among all the drug classes prescribed. Anti-infective were the most frequent class of drug administrated to the patients. Highest no of drugs were prescribed for respiratory tract infection followed by renal and gastrointestinal disease.

Key words: Drug utilization, Emergency department, WHO core indicator, Prescribing trend, Antibiotic.

INTRODUCTION

Drug utilization research was defined by WHO in 1977 as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences.[1] The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. Pattern of drug utilization is studied to estimate the incidence and prevalence of drug use, to analyze that the recommended guidelines for prescription are being followed or not.[2,3,4] For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price. Without knowledge of how drugs are being prescribed and used, it is difficult to initiate a discussion on rational use of drug or to suggest measures to improve prescribing habits.[5] Throughout last few years, plentiful research studies have been conducted globally to determine the safe and effective drug utilization specifying that inappropriate drug use is a universal phenomenon.[6] Research on drug utilization pattern conducted in the inpatient backgrounds are operative tools that help in assessing the drug prescribing trends, efficiency, and cost-effectiveness of hospital.[7] The development of twin concepts of therapeutic formularies and essential drug lists are the major reason for studying drug utilization.[8]

Drug utilization pattern varies from countries to countries and even among hospital within the same country and sometime within the same hospital at different point of time possibly because of changing disease trends over a period of time.[7,9] Pattern of drug utilization is studied to estimate the incidence and prevalence of drug use, to analyze that the recommended guidelines for prescription are being followed or not.[2] To compare, analyze and present statistical data of drug utilization research, the anatomical and therapeutic chemical (ATC) classification systems is accepted worldwide and recommended by WHO.[2,10,11] WHO has specified prescribing indicators, patient care indicators, facility indicators and complementary indicators for planning and conducting drug utilization studies.[2,12] Rational prescribing of drugs is a skill, for which proper knowledge about drugs, pharmacoeconomics, pharmacovigilance and experience is mandatory.[2,3,4] If the drugs are overused, they increase occurrence of toxic reactions, if underused, there will be therapeutic failure and Chances of development of resistant strain to antibiotics, if misused will lead to unnecessary adverse drug effects and drug interactions.[3,4] An optimal pharmacotherapy is achieved when the right drug in the correct dosage and quality reaches the right patient at the right time point.[13] Glitches concomitant with drug prescriptions are not rare world−wide. As literature revealed, worldwide, more than 50 % of all medicines are prescribed, dispensed or sold inappropriately while 50 % of the patients fail to take them correctly.[14] These include mainly medications errors and adverse drug events are frequent and are associated with increased costs for treatment.[13,15] Numerous issue are involved in the drug prescription error such as polypharmacy, lack of sufficient pharmacological knowledge, errors in patients' charts or documentation by nurses, inadequate pharmacy service, being a female, age >65 years, renal excretion of drugs, drugs with narrow therapeutic index and the use of anticoagulants or diuretics.[13,15]

Patients come to the emergency department (ED) for evaluation of emergent or urgent conditions for after−h medical care, or by referral from their primary physician.[13] In the ED, physicians face crucial and sever cases that need to be treated quickly with high quality.[15] This creates a challenge for doctors to initiate and select appropriate drugs for the patient.[15] Moreover, the unique operating characteristics of ED make it vulnerable to medical errors including medication errors and adverse drug.[15] The emergency department signifies a vital platform for conducting drug utilization studies as patients present with a wide range of diseases in acute form and the drug use is quite extensive. Therefore, evaluating the drug prescribing behavior and usage patterns in the ED has the potential of determining the rationality of drug therapy.[7] Keeping this in view, we conducted a drug utilization study in our Najran University hospital to assess drug prescribing trends, average number of drug per prescription, the WHO core indicators for drug utilization and prescription cost during patients visit at the ED.

MATERIALS AND METHODS

Study design

This study was conducted at the ED of Najran university hospital, Najran, Kingdom of Saudi Arabia. Approximately 25000 patients visit the ED annually. It was a retrospective cross-sectional study of all the adult patients (n= 7743) who attended the ED at Najran university hospital. The subjects include both Saudi and non-Saudi from all sex groups of adult patients. The hospital information system used to extract relevant patient's information.

The WHO prescribing indicators measured retrospectively from the hospital's medical record. No information collected about the sign and symptoms of disease, as this is not a requirement as per the WHO guideline.[15,16]

Statistical analysis

Descriptive statistics were used to describe the data. For categorical variables, frequencies and percentage were reported. For continuous variables, means and standard deviation were reported.

Ethical approval

Ethical approval for the study was obtained through the Medical research and Ethics Committee at the Najran University Hospital**.**

RESULT

Among the recruited patients, 4741 (61.23%) were males and 3002 (38.77%) were females. The average age of the patients was 38±16 years. Only 3591 (46.377%) were referred to other department for further management. The characteristics of the patients are shown in Table 1.

Cost of individual drug classes varied widely as shown in Table 2. The average cost per prescription was 205.65 ± 41.71 US$. Augmentin (Amoxicillin + Clavulanate Potassium) had high cost (45862 US$), followed by Cefixime 27000 US$ (Table 3)

The total number of prescription for the 7743 patients over six months was 10380. Majority of the patients presented with diseases of respiratory tract system (23%), followed by urinary tract system (16%), the rest of the cases were related to other systems as given in Table 3. The total average number of drug prescribed per patient was 2.39±0.55 as shown in Table 3. The majority of drugs were administrated by the oral route (68%) followed by the parenteral route (23%) and then other routes (n=7%). 1.32% of the total prescribed drugs were given as fixed dose combinations the commonly prescribed fixed dose combinations were amoxicillin-clavulanic acid (1.23%), trimethoprim-sulfaamethoxazole (0.08%). Among the injectable preparations, paracetamol (39%) were the most commonly prescribed agents followed by Metronidazole (17%) as shown in Figure 1. Further it was found that among different age groups, older patients (55-60 years) consumed more drug (31%) as shown in Figure 2. Analysis of prescriptions using WHO core indicators are shown in Table 4.

DISCUSSION

The methods for surveying drug endorsing pattern, efficiency of drug treatment and cost analysis of hospital formularies gives a mean of drug prescribing usage design in the ED. This is the primary study in Najran University Hospital to study drug utilization pattern in the ED. The average patient's age was 38 ± 16 years. The recruited patients, 4741 (61.23%) were males and 3002 (38.77%) were females. The average drug per prescription, which is an imperative list of the standard of endorsing, was 2.39 ± 0.55 (Table 3).

Table 1: Summary of the total census of the total patients in the ED at Najran university hospital.

Total no of patients	Age, Mean ±SD) (years)	Sex		Weight, Mean ±SD (kg)	Duration of stay at ED, Means ±SD (h)	Number of drugs prescribed per patients (Mean ±SD)	Patients out come	
		Male (%)	Female (%)				Discharged	Refereed to other department
7743	38±16	4741 (61.229)	3002 (38.771)	65±3	2±0.5	2.39±0.55	4152	3591

Table 2: The top 10 drugs prescribed to patients at ED.		
Name of the drug	**Percentage**	**Cost of Drug in US$**
Augmentin (Amoxicillin + Clavulanate Potassium)	23	45862
Paracetamol	16	15800
Loratidine	13	10500
Diclofenac sodium	12	9865
Azithromycin	7	16500
Expectorant	6	12600
Metronidazole	4	8000
Omeprazole	5	18900
Buscopan	5	7000
Ciprofloxacin	5	18000
Cefixime	4	27000
Total	100	190027

Table 3: Drug indication, prescribing trends and prescription cost.				
Indication	**n**	**Percentage**	**Average no of drugs/ prescription (mean ±SD)**	**Average cost/per patients (US$)**
Respiratory	1782	23%	2.69±1.50	62.71 ± 12.2
Renal	1239	16%	2.72±0.98	32.92 ± 6.30
Muscoskeletal	1161	15%	2.88±1.00	22.10 ± 3.90
CVS	1161	15%	1.88±0.90	13.84 ± 2.17
Gastrointestinal	852	11%	2.47±1.06	39.78 ± 7.34
Infection	697	9%	2.57±1.50	18.76 ± 5.25
Trauma	619	8%	2.69±0.75	10.76 ± 3.23
CNS	232	3%	1.25±0.80	4.78 ± 1.320
Total	7743	100	2.39±0.55	205.65 ± 41.71

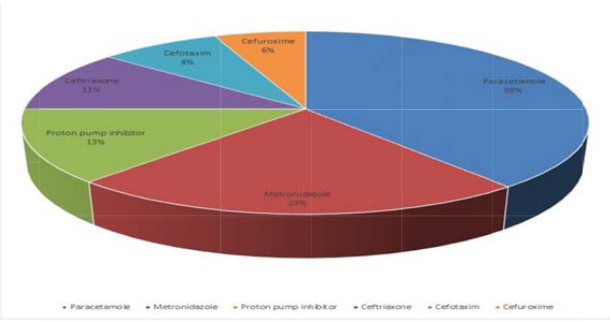

Figure 1: Percentage of drug used as an Injectable preparation.

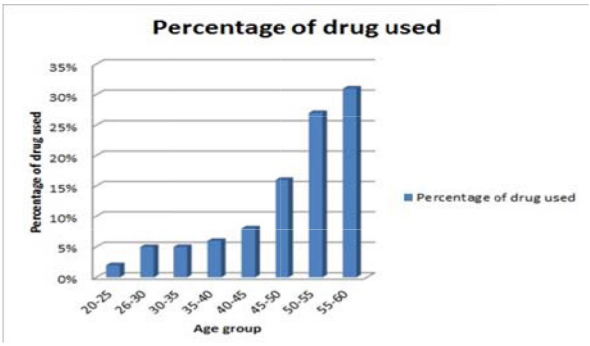

Figure 2: Consumption of drug by different age group.

Table 4: WHO core prescribing indicator.	
Indicator	**value**
Average no of drug per prescription	2.39±0.55
Percentage of prescription with antibiotic	23%
Percentage of prescription with injection	33%
Percentage of drug prescribed from essential drug list	65%

The respiratory tract system diseases followed by urinary tract system diseases had the most average drugs per prescription. This study exhibited a high utilization of Paracetamol (39%) in the ED and this could be clarified by the substantial therapeutic range as shown in Table 3, followed by Metronidazole (17%), Amoxicillin-clavulanic acid (1.23%) and Trimethoprim-sulfamethoxazole (0.08%). A study directed in Sultanate of Oman, the highest average number of drugs per prescription was for cardiovascular disease (3.70 ± 1.49). WHO recommended an average number of drugs per prescription of 2.0.[17] A study in ED in the USA on elderly patients (n = 124) displayed to be found a normal number for each drug of 8.6 (range 021). Two investigations directed in India (n = 200 and n = 259) demonstrated an average of number drugs per prescription of 4.2 and 3.3, respectively,[18,19] in these two studies, cardiovascular system diseases and liver cirrhosis disease had the highest average number of drugs per prescription (5.4 and 3.9, individually).[20] One explanation behind the higher average number of drugs per prescription in the USA contrasted and the WHO standard is that doctors have a tendency to oversee poly-pharmacy amid the underlying contact with the patient while the conclusion is not

yet affirmed and sitting tight for laboratory comes about. In spite of this, keeping the mean average of drugs per prescription to as low as conceivable is constantly desirable over diminish the danger of drugdrug collaborations, advancement of drugs resistance and unfavorable drug occasions.

In our study, the highest average number of drugs per prescription was for respiratory system diseases (23%) followed by urinary tract system diseases (16%) and remain of the cases related to other systems (Table 3). In the Indian study, the average of drug per prescription was most in the cardiovascular diseases, followed by the focal nervous system and renal disease.[19]

Our study demonstrated that there was a big relationship between the prescribing trends, cost and age. More elderly patients had higher medication cost on the grounds that as a male gets the more established male/female are more inclined to have variations of infections and in addition with their confusions that require facilitating medicine administration. Besides, the term of remain in the ED had a significant relationship with the hospital cost. As the hospital stay expands so too was the cost on the grounds that long remains mean further examinations and administration that are required for the patient for a big relationship between the hospital cost and ED type.

CONCLUSION

A baseline data of drug utilization pattern in ED of Najran university hospital is created by this study. Prescription by generic name and from essential list, preference of oral routes is encouraging finding. Paracetamol was the highest drug per prescription administered in the ED either through the oral route or parenteral route. Antibiotics cost was the average of the normal prescription in the ED. The significance of these methodologies ought to be underlined in medicinal educational module and proceeding with the restorative instruction of well-being experts. The consequences of this sort of studies highlight the significance of techniques that must be actualized to improve drug use at the ED. These incorporate guaranteeing that all people required in the solution procedure have great pharmacological information, computerization of the whole medicine process and engagement of clinical drug specialists in such process.

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CONFLICT OF INTEREST

The Author state no conflict of interest.

ABBREVIATIONS USED

ED: Emergency Department; **WHO:** World health organization; **ATC:** Anatomical and therapeutic chemical.

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