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Evaluation of Antibiotics Prescribing Patterns in the Pediatric Emergency Clinic of Prince Zaid Bin Al Hussein Hospital in Jordan a Retrospective Study

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Abstract**—** *The rise in numbers of infections due to antibiotic resistant has a direct and significant impact on the disease it self, on death rates and on significant increase in healthcare expenses. The influence of antibiotic resistance is considered higher in poor countries compared to developed countries which can be related to several factors among them are the random prescribing habits and the lack of awareness of the significance of antibiotic resistance on the patients and on the disease . The purpose of the study is to illustrate the patterns of prescribing antibiotics to children who visit the emergency department in prince Zaid bin Al-Hussein hospital (PZH).* ***Methods****: Data was obtained from the emergency department at (PZH), during the period of 1st Nov to 30th of Dec 2019, a total of (3082) prescriptions were collected and sorted according to patients age then the pediatric prescriptions will be sorted and recorded according to patient age, diagnosis and antibiotics prescribed. WHO investigating indicators were followed and calculated as 1) The frequency of drugs prescribed for each patient, 2) The frequency of the number of prescribed antibiotics (number of antibiotics in each prescription), 3) The frequency of antibiotics prescribed as a generic name, and 4) The frequency of prescribed antibiotics from the drug's list of the hospital.* ***Results****: Four hundred sixty two (462) prescriptions were involved in this study. The patient`s mean age was 6.45 years. 54.87 % (no. =254) patients male. A 2.96 was an average of drugs prescribed for each patient (WHO standard is 2.0). More than one antibiotic was prescribed 77.49 % (no. =358) for all patients (WHO standard is 30 %). 100 % of the antibiotics prescribed were written by the list of essential drugs from the hospital and 97.83 % of prescribed antibiotics written as a generic name. Of all antibiotics prescribed, 81.2 % were broad-spectrum. Amoxicillin was the prevalent choice (58.1 %).The verified diagnoses were (upper and lower) respiratory tract infections (42.63 %), bronchial asthma (30.19 %), gastrointestinal infections (20.45 %) and injuries (6.7 %).* ***Conclusions****: Our study presented high rates of prescribing antibiotics in the emergency department in the pediatric section, a high rate of drugs prescribed for each patient, which indicates an irrational use of medications and not following the WHO standards. Using antibiotics for bronchial asthma or viral infections reflects the misuse or abuse of prescribing antibiotics to pediatric patients. Amoxicillin was the first choice in the emergency department in our study.*
For these reasons more monitoring and directing prescribers in ED to decrease the misuse and abuse of antibiotics should be taken into consideration.

Keywords**—** *Emergency clinic, Antibiotics resistance, Pediatrics*.

I. INTRODUCTION

Antibiotics usually prescribed for patients with illnesses for which they offer no value, including viral respiratory infections. Broad-spectrum antibiotic use is growing, which adds excessive cost and promotes the development of antibiotic resistance.[1, 2] The rise in antibiotic-resistant infections has directed to significant disease, death, and an increase in healthcare expenses.[3] The influence of antibiotic resistance is considered higher in poor countries compared to developed countries which can be related to several factors among them are the random prescribing habits and the lack of awareness of the significance of antibiotic resistance on the patients and on the disease.[3] Good practice of prescribing antibiotics will help the healthcare system to reduce the coast of purchasing medicines and controlling overuse of antibiotics and misuse.[4] Document of the concept of this practice has been measured, with less than half of many countries having any guidelines endorsing good antibiotic supervision.[4]

Emergency Department shows an important part in providing health facilities. Until now excess of usage of antibiotics at (ED) is a great worry in clinical practice.[5] Practically two-thirds of ED visits need antibiotic prescriptions,[6] most of this practice is not compatible with evidence-based guidelines[7] or observer an over treatment of broad-spectrum antibiotics.[8] In addition, frequent ED visits lead to adverse reactions related to the use of antibiotics.[9]

Data collected from studies were antibiotics prescribed to children improperly reveals that this habit is strongly dangerous and this inappropriate use reflected the challenge that faces the whole world.

Due to the nature and circumstances of a child living such as in nursery and at schools, they are more susceptible to infections and more drug resistance due to high bacterial infection relapse.[10] adding to that, children, officially not be encountered in any clinical trials, therefore no data about side effect is collected .in addition, lack of compliance may be due to difficult dose calculations or ploy pharmacy drugs is an important concern to children.[10,11].

The WHO has proposed indicators to perceive obstacles in order to achieve good antimicrobial supervision [12, 13]. These indicators ensure the presentation of drug prescribers properly in the primary health-care services and are used regularly in drug deployment studies.[12] There has been

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some earlier published drug consumption studies evaluating the indicators used in a pediatric setting in Jordan.

In Jordan, antibiotics account for the most important market proportion of the consumption of drugs (23% by JD) and, only a few antibiotics utilization studies conducted in Jordan which showed one of a kind patterns and irrelevant antibiotic prescriptions.[14, 15] From these viewpoints, it is essential to perform research on the modern-day utilization styles of antibiotics in Jordan as records from those research might be expected to provide useful statistics in an area where in such facts .and this study revealed a proper feedback about using antibiotics in emergency department at pediatric military hospital and a high misuse of antibiotics[16]. For these reasons more monitoring and directing prescriber in ED to decrease the misuse and abuse of antibiotics should be taken into consideration.

II. METHOD

The study was conducted at the emergency department of Prince Zaid Bin Al Hussein Hospital which is located in Tafila, south of Jordan. The hospital consists of (124) beds, (16) beds located at ED, a pediatric clinic perform its job 24 hours, Data were obtained from the pharmacy of the emergency department during the period of 1st Nov to 30th of Dec 2019, a total of (3082) prescriptions were collected and classified to adult and pediatric prescriptions, patient age, diagnosis and antibiotics prescribed were documented. Prescriptions classified according to the age written and subdivided into four groups of age, patient sex is recorded. Intravenous antibiotics were excluded from this study because it is given as a single dose at ED and an oral antibiotic written to the patient. The verified diagnoses were upper and lower respiratory tract infections, bronchial asthma, gastrointestinal infections, injuries, and others. WHO investigating indicators were followed and calculated as

1) The frequency percentage of drugs prescribed for each patient,
2) The frequency of the number of prescribed antibiotics,
3) The frequency of antibiotics prescribed as a generic name, and
4) The frequency of prescribed antibiotics from the drug's list of the hospital.

III. RESULTS

Four hundred sixty two prescriptions were involved in this study. The patient's mean age was 6.45 years. A 54.87 % (no.= 254) patients male, the high percentage of mean age was to the group of 3-6 years (41.99%)followed by the group of 7-10 years (29.22 %) Table (1). A (2.96) was an average of drugs prescribed for each patient (WHO standard is 2.0). More than one antibiotic was prescribed 77.49 % (no. = 358) for all patients (WHO standard is 30 %). 80.36% of the patient received one antibiotic, while 16.5 % prescribed two antibiotics and 2.78 % prescribed three antibiotics, Table (2). 98 % of the antibiotics prescribed were written by the list of essential drugs from the hospital and 97.83 % of prescribed antibiotics written as generic names, Table (3). Of all antibiotics prescribed, (81.2 %) were broad-spectrum.

TABLE 1. Demographic characteristic of the sample

Characteristic	Frequency	
	No.	%
Sex:		
Male	254	54.97
Female	208	45.03
Age:		
1 month – 2years	59	12.77
3- 6 years	194	41.99
7-10 years	135	29.22
11-13 years	74	16.01

TABLE 2. antibiotics prescribed per patient (*N*=382)

Antibiotic indicator	Frequency % (*N*=)
Single antibiotic	80.36 % (*N*=307)
Two antibiotics	16.75 % (*N*=64)
Three antibiotics	2.87 % (*N*=11)

TABLE 3. WHO Prescribing Indicator obtained from 462 prescriptions.

WHO Prescribing Indicator	Frequency
Average number of drugs per prescription (*No.*= 462)	2.96
Percentage of prescriptions with one or more antibiotic (*No.*= 462)	77.49
Percentage of antibiotics prescribed by generic name (*No*= 462)	97.83
Percentage of antibiotics from essential drug list (*No*= 462)	98

Amoxicillin was the most antibiotic prescribed for the patients visited the emergency department (58.1 %), cephalosporin encountered for (21.46%), Metronidazole was (13.71%) and Azithromycin was the least antibiotic chosen (7.30%) Table (4).

TABLE 4. Who Prescribing Indicator Obtained From 462 Prescriptions.

Antibiotic used	% of Antibiotics Prescribed (No= 452)
Amoxicillin	262 (58.1%)
Cephalosporin	97 (21.46%)
Metronidazole	62 (13.71%)
Azithromycin	33 (7.30%)

The documented diagnoses were upper and lower respiratory tract infections (42.63 %), bronchial asthma (30.19 %), gastrointestinal infections (20.45 %) and injuries (6.7 %) respectively Table (5).

TABLE 5. Diagnoses seen in the pediatric emergency department

Diagnosis	Frequency
Upper and lower respiratory tract infections	42.63 %
Bronchial asthma	30.19 %
Gastrointestinal infections	20.45 %
Injuries	6.7 %

IV. DISCUSSION

World Health Organization standards showed that the average prescribed number of medication for a prescription is 2.0 [13], this study showed a rate higher than the standard (2.96). Using more than one antipyretic, cough preparations and topical medications was the main reason for this increased rate.

World Health Organization standards Reveal that the average prescribed number of antibiotics for a prescription is 30%, this study showed a rate higher than the standard (77.49%), which indicates a misuse or abuse of antibiotics due to poly-pharmacy practice, in this case, many side effects and

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bacterial resistance will be expected.[13] This value is the same when compared to other studies conducted in Jordan (85%) and many countries such as Sudan (81.3%) and India (81.1%)[16-18].

Percentage of antibiotics prescribed by generic name is high in the study (97.83%), this is due to the list of drugs delivered to the physician and the availability of antibiotic provided by a medical main house that received medications purchased by tenders yearly, a little choice to write brand drugs if the antibiotic prescribed is not available at that time in the emergency pharmacy.

A high percentage of selection antibiotics from EDL was documented (98 %) in this study, this can augment the prescriber to choose the best antibiotic from the list provided by the pharmacy department according to the resistance of drugs and taking into consideration the cost-effectiveness of the choices available of antibiotics.

As mentioned in table 3, (77.49 %) of prescription contains at least one antibiotic and the major antibiotic used as amoxicillin (58.1%) which is broad spectrum followed by cephalosporin –cephalexin (21.46%), followed by narrow-spectrum as metronidazole (13.71%) and azithromycin (7.30%).

The main diagnosis documented in the study was upper and lower respiratory tract infection in general (42.63%), followed by bronchial asthma (30.19%), which is predictable at that time of the study due to the winter season. While gastrointestinal infections were (20.45%) and injuries reported as (6.7%).

V. CONCLUSIONS

Our study presented high rates of prescribing antibiotics in the emergency department in the pediatric section, a high rate of drugs prescribed for each patient, which indicates an irrational use of medications and not following the WHO standards. Using antibiotics for bronchial asthma or viral infections reflects the misuse or abuse of prescribing antibiotics to pediatric patients. Amoxicillin was the first choice in the ED in our study. A short time of duration for collecting data limited the study (two months), Adherence to the treatments available at the emergency pharmacy had an effect on the results observed. The basic information available on the application of optimal use of antibiotics is the first stage in improving the control of drug writing and improving patient care. Educating parents about the wrong and repeated use of antibiotics and their impact on the health of their children is an important issue that should be taken into consideration.

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