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THE MOST FREQUENT PRESCRIBED ANTIMICROBIAL IN HOSPITALS OF NINEVEH, IRAQ – 2019

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ABSTRACT

Context: Antimicrobials are one of the most successful forms of chemotherapy in the history of medicine. It saves many lives and significantly contributes to the control of infectious diseases. **Aim:** The current study is aiming for determining the most frequent prescribed antibiotics in hospitals in Nineveh governorate at the north of Iraq. **Method and Subjects:** A cross-sectional study design was adopted to analyze data that were collected from statistics which were referred formally from hospitals to the Department of Pharmacy in Nineveh Health Directorate during the period from January 1st to the end of December 31st, 2019. **Results:** The current study had found that penicillin group was the most frequent antibiotic that was prescribed to hospitalized patients (66.42%); followed by Cephalosporin Group (13.32%) and Quinolones Group. **Conclusion:** Antibiotic that are belong to penicillin, cephalosporin and quinolones groups are the most frequently prescribed to hospitalized patients in Nineveh Governorate. **Recommendation:** The use of all antibiotics in general, and penicillin group in particular is recommended to be balanced.

KEYWORDS: Antibiotics, consumption, cross-section, Nineveh, hospitals.

INTRODUCTION

Antimicrobials are now considered one of the most successful forms of chemotherapy in the history of medicine. It is not necessary to reiterate here how many lives they have saved and how significantly they have contributed to the control of infectious diseases that were the leading causes of human morbidity and mortality for most of human existence.

The discovery of first three antimicrobials, Salvarsan, Prontosil, and penicillin, was exemplary, as those studies set up the paradigms for future drug discovery research. The paths, followed by other researchers, resulted in a number of new antibiotics, some of which made their way up to the patient's bedside. The period between the 1950s and 1970s was indeed the golden era of discovery of novel antibiotics classes, with no new classes discovered since then. Therefore, with the decline of the discovery rate, the mainstream approach for the development of new drugs to combat emerging and re-emerging resistance of pathogens to antibiotics has been the modification of existing antibiotics.[1]

It is important to know that the routine measurement and display of consumption information to prescribers and policy-makers are a first step in increasing the awareness and importance of careful antibiotic use. It is then possible to attempt to define levels of optimal use. Comparative information can help to define those levels by evaluating individual consumption and proportions in the context of recognized leaders in the area. Conformity to local practice guidelines can be evaluated, and expected levels of consumption can be estimated by defining the incidence of disease requiring antimicrobial therapy. Feedback to prescribers is one potential form of intervention.[2]

The current study is aiming for determining the most frequent antibiotics that were prescribed for hospitalized patients in Nineveh at the north of Iraq.

METHOD AND SUBJECTS

Nineveh Governorate contains 18 hospitals, half of them are locating in the center of the Province (Mosul). All hospitals are included in the study.

A cross-sectional study design was adopted in order to achieve aim of the current study. The required data were collected from the formal statistics that were regularly referred from the hospitals to the Department of Pharmacy in Nineveh Health Directorate during the period from January 1st to the end of December 31st, 2019.

After tabulation of the collected data, frequency of the antibiotics that were prescribed to the hospitalized patient during time of data collection was estimated. However, different units are used to express the prescribed antibiotics (tablets or capsules, syrup, vial, ampule).

RESULTS

The current study had found that penicillin group was the most frequent antibiotic that was prescribed to hospitalized patients (66.42%); followed by Cephalosporin Group (13.32%) and Quinolones Group. Table (1).

Table (1): Frequency distribution of antimicrobials according to pharmacological classification.

Antimicrobials	Frequency	
	No.	%
Penicillin Group	1742278	66.42
Cephalosporin Group	349509	13.32
Quinolones Group: Ciprofloxacin	187290	7.14
Nitroimidazole Group: Metronidazole	135302	5.15
Aminoglycoside Group	77382	2.95
Sulfonamide Group: Metheprim Tablet (480mg)	35631	1.35
Macrolides Group	30385	1.15
Carbapenem Group: Meropenem Vial	17137	0.65
Tetracycline Group: Doxycyclin Capsule (100mg)	16300	0.62
Antiviral Group: Acyclovir	14545	0.55
Glycopeptide Group: Vancomycin Vial	10148	0.38
Imidazole Group: Miconazole Nitrate	6760	0.25
Benzimidazole Group: Albendazole Suspension (400mg/20ml)	162	0.006
Total	**2622829**	

Among penicillin group, Amoxicillin/Clavulanic acid tablet 625 mg was the most frequent (56.12%) as shown by table 2. While amoxicillin capsule 500 mg represented almost the third (32.99%).

Table (2): Frequency distribution of the penicillin antimicrobial drugs.

Penicillin group		Frequency	
		No.	%
Amoxicillin/Clavulanic acid	Tablet 625mg	977900	56.12
	Suspension 312.5mg/5ml	30918	1.77
	Total	**1008818**	**57.89**
Amoxicillin	Capsule 500mg	574856	32.99
	Vial 500mg	121509	6.97
	Suspension 250mg/5ml	29054	1.66
	Total	**725419**	**41.62**
Ampicillin	Vial	2831	0.16
Pipracillin	Vial	4210	0.24
procaine penicillin	Vial	1000	0.05
Total		1742278	

Table 3 displays frequency of antibiotics that belong to the cephalosporin group. First generation cephalosporin represented more than half (55.28%) of the group particularly cephalexen capsule 500 mg (53.58%).

Table (3): Frequency distribution of the Cephalosporin antimicrobial drugs.

Cephalosporin Group		Frequency	
		No.	**%**
1st G	**Cephalexen Capsule 500mg**	187290	53.58
	Cephalexen Suspension 250mg/5ml	5840	1.67
	Cefazolin vial (1g)	100	0.028
	Total	**1878840**	**55.28%**
3rd G	**Ceftrixon vial (1g)**	70515	20.17
	Cefotaxim	66898	19.14
	Ceftazidim vial (1g)	18060	5.16
	Cefixim Capsule 400mg	760	0.22
	Suspension 100mg	46	0.01
	Total	**156279**	**44.72%**
Total		**349509**	

DISCUSSION

Despite preventive efforts, infections will always occur, and we will always need safe and effective therapy for them. The collapse of the antibiotic research-and-development pipeline is the result of both economic and regulatory barriers. The solution is better alignment of economic and regulatory approaches to antibiotic development. For example, public–private partnerships could align the research-and-development focus of industry with unmet medical needs. Also, a new regulatory approach, such as the Limited Population Antibiotic Drug (LPAD) proposal from the Infectious Diseases Society of America, could allow drugs to be approved on the basis of small, relatively inexpensive clinical superiority trials focused on lethal infections caused by highly resistant pathogens.[3]

Now, antimicrobial resistance (AMR) compromises the effective treatment of bacterial infections and represents a global threat to public health. Antibiotic consumption is a key driver of the development and spread of AMR, and prudent antibiotic prescribing has been identified as an important strategy to curb this problem. Prudent prescribing includes avoiding unnecessary prescriptions, delaying prescriptions when possible, favoring narrow-spectrum over broad-spectrum antibiotics and optimizing treatment duration.[4]

Because of the important role of antibiotics in disease management, a study of prevalent diseases and their management practices will aid in informing practical interventions that will aim at reducing the development and spread of antibiotic resistance as a result of antibiotic use in disease management.[5]

The development of resistance to antibiotics by reducing in the affinities of their enzymatic targets occurs most rapidly for antibiotics that inactivate a single target and that are not analogs of substrate.[6]

Antibiotic resistance can be reduced by using antibiotics rationally based on guidelines of antimicrobial stewardship programs (ASPs) and various data such as pharmacokinetic (PK) and pharmacodynamics (PD) properties of antibiotics, diagnostic testing, antimicrobial susceptibility testing (AST), clinical response, and effects on the microbiota, as well as by new antibiotic developments. The controlled use of antibiotics in food animals is another cornerstone among efforts to reduce antibiotic resistance. All major resistance-control strategies recommend education for patients, children (e.g., through schools and day care), the public, and relevant healthcare professionals (e.g., primary-care physicians, pharmacists, and medical students) regarding unique features of bacterial infections and antibiotics, prudent antibiotic prescribing as a positive construct, and personal hygiene (e.g., handwashing). The problem of antibiotic resistance can be minimized only by concerted efforts of all members of society for ensuring the continued efficiency of antibiotics.[7]

The current study concluded that Penicillin pharmacological group was the most frequent antibiotic that was prescribed to hospitalized patients in Nineveh Governorate; followed by cephalosporin group and quinolones Group.

The current study recommends to balance the use of all antibiotics in general, and penicillin group in particular; otherwise problems of developing resistance as well as antibiotics wastage might emerge.

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