

## ANTIBIOTICS CONSUMPTION IN IBN AL-ATHEER PEDIATRIC TEACHING HOSPITAL IN NINEVEH, IRAQ

Shaymaa H. Saeed<sup>1</sup>, Mahmood A. Khattab<sup>2</sup>, Wail M. Mohammed<sup>3</sup>, Haimn A. Tawfiq<sup>4</sup>, Bushra M. Yaseen<sup>5</sup> and Dr. Hajir H. Al-Ridhwany\*<sup>6</sup>

<sup>1,2</sup>Specialist Pharmacist, Pharmacy Department, Nineveh Health Directorate, Iraq.

<sup>3</sup>Specialist Pharmacist, Nineveh Health Directorate, Iraq.

<sup>4</sup>Specialist Pharmacist, Pharmacy Department, Nineveh Health Directorate, Iraq.

<sup>5</sup>Pharmacist, College of Pharmacy, University of Mosul, Iraq.

<sup>6</sup>Senior Doctor in Public Health and Preventive Medicine, Ph.D. Community Medicine, Nineveh Health Directorate, Iraq.

Received date: 06 November 2020

Revised date: 26 November 2020

Accepted date: 16 December 2020

\*Corresponding Author: Dr. Hajir H. Al-Ridhwany

Senior Doctor in Public Health and Preventive Medicine, Ph.D. Community Medicine, Nineveh Health Directorate, Iraq.

### ABSTRACT

**Context:** Antibiotics are among the most commonly prescribed drugs in pediatrics. They are mostly started on an empirical basis, without proof of a bacterial infection. **Aim:** The current study is aiming for enumerating antibiotics that are frequently consumed by Ibn-Alatheer pediatric teaching hospital in Mosul, Iraq. **Method and Subjects:** A cross-sectional study design was adopted. Data was collected from the formal statistics of Ibn-Alatheer Pediatric Teaching Hospital over the last year from January 1<sup>st</sup> to the December 31<sup>st</sup>, 2019. **Results:** It was found that the most frequent consumed antibiotics (56.6%) were grouped as penicillin, cephalosporin (17.1%) and aminoglycoside (10.1%). **Conclusion:** It is concluded that penicillin is the most frequent prescribed antibiotics in Ibn-Alatheer Pediatrics Teaching Hospital. **Recommendation:** The current study suggests that antibiotics are needed to be prescribed carefully for pediatrics.

**KEYWORDS:** Antibiotics, Penicillin, Nineveh, Iraq.

### INTRODUCTION

Despite the fact that a significant percentage of the population is unable to swallow tablets and capsules, these dosage forms continue to be the default standard. These oral formulations fail many patients, especially children, because of large tablet or capsule size, poor palatability, and lack of correct dosage strength. The clinical result is often lack of adherence and therapeutic failure. The American Association of Pharmaceutical Scientists formed a Pediatric Formulations Task Force, consisting of members with different areas of expertise including pediatrics, formulation development, clinical pharmacology, and regulatory science, in order to identify pediatric, manufacturing, and regulatory issues and areas of needed research and regulatory guidance. Dosage form and palatability standards for all pediatric ages, relative bioavailability requirements, and small batch manufacturing capabilities and creation of a viable economic model were identified as particular needs. This assessment is considered an important first step for a task force seeking creative approaches to providing more

appropriate oral formulations for children.<sup>[1]</sup>

Antibiotics are among the most commonly prescribed drugs in pediatrics. In most cases, antibiotics are started on an empirical basis, without proof of a bacterial infection, either before the beginning of therapy or afterwards.<sup>[2]</sup>

Epidemiological data from developed countries indicate that over a year, half of the pediatric population is prescribed medications, from a wide range of therapeutic agents, and mainly in younger children (Clavenna 2009a; Clavenna 2009b; Zhang 2013). Anti-infective drugs, especially antibiotics, remain the most frequently prescribed medication. Other commonly used medications are respiratory drugs, analgesics, psychoanaleptics, antiepileptics, or corticoids (corticosteroids). Low- and middle-income countries (LMIC) provide very limited data; the most widely used medications in children are antimalarial drugs, antibiotics and analgesics/antipyretics (Clavenna 2009a).

Health authorities and organizations now recognize that medication use in children is a worldwide burden that cannot be addressed with the available medications that are primarily designed for use in adults (WHO 2008; WHO 2012; EMA 2013; FDA 2016). Thus, there is an urgent need for the development and assessment of effective and safe medications for children (Standing 2005; Ivanovska 2014; Salunke 2016). In parallel, selecting and developing age-appropriate pediatric formulations that ensure success and safety of administration and adequate adherence is a critical objective for health authorities and pediatric researchers (Nunn 2005; EMA 2006; WHO 2008; Cram 2009; Rieder 2010; WHO 2012; EMA 2013; Batchelor 2015; Venables 2015).<sup>[3,4]</sup>

The current study is aiming for enumerating antibiotics that are frequently consumed by Ibn-Alatheer pediatric teaching hospital in Mosul, Iraq.

## METHOD AND SUBJECTS

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 of Ibn-Alatheer Pediatric Teaching Hospital during the last year from January 1<sup>st</sup> to the December 31<sup>st</sup>, 2019. All statistics were referred to the Department of Pharmacy in Nineveh Health Directorate.

The reported antibiotics were listed according to their frequency. The studied items were expressed by different units (tablets or capsules, syrup, vial, ampule).

## RESULTS

Table 1 shows list of antibiotics that are commonly consumed in Ibn-Alatheer teaching Hospital for Pediatrics. More than half of them (56.6%) were grouped as penicillin. Almost a quarter represented by cephalosporin (17.1%) and aminoglycoside (10.1%). Antiviral agent was the least frequent at the bottom of the list (2.8%).

**Table (1): List of consumed antibiotics in Ibn-Alatheer teaching Hospital for Pediatrics.**

Antimicrobials	Frequency	
	No.	%
<b>Penicillin Group</b>	52156	56.6
<b>Cephalosporin Group</b>	15754	17.1
<b>Aminoglycoside Group</b>	9300	10.1
<b>Nitroimidazole Group</b>	4731	5.1
<b>Sulfonamide Group</b>	4580	5.0
<b>Glycopeptide Group</b>	2979	3.2
<b>Acyclovir</b>	2590	2.8
<b>Total</b>	<b>92090</b>	<b>100%</b>

Regarding penicillin group, amoxicillin was the most frequent antibiotic (82.5%). While injectable cefotrioxon represented almost half of the consumed antibiotics (49.4%). Amikacin ampule comprised 63.4% of aminoglycoside group. Table 1, 2 and 3.

**Table (2): Details of penicillin group.**

Penicillin group		Frequency	
Name	Drug Form	No.	%
Amoxicillin	Capsule 250 mg	12000	23.0
	Vial 500 mg	18900	36.2
	Capsule 500 mg	10000	19.2
	Suspension 250 mg	2136	4.1
Co-Amoxiclave	Capsule 625 mg	6000	11.5
	Suspension 312 mg/ 5 ml	3120	6.0
<b>Total</b>		<b>52156</b>	<b>100%</b>

**Table (3): Details of Cephalosporin group.**

Cephalosporin group		Frequency	
Name	Drug Form	No.	%
Cefotrioxon	Vial 1 g	7788	49.4
Ceftazidim	Vial 1 g	2400	15.3
Cefotaxim	Vial 1 g	1816	11.5
Cephalexin	Capsule 250 mg	3000	19.4
	Suspension 250 mg	750	4.6
<b>Total</b>		<b>15754</b>	<b>100%</b>

**Table (4): Details of Aminoglycoside group.**

Aminoglycoside group		Frequency	
		No.	%
Amikacin	Ampoule 100 mg	5800	62.4
	Ampoule 500 mg	100	1.0
Gentamicin	Ampoule 80 mg	3400	36.6
<b>Total</b>		<b>9300</b>	<b>100%</b>

## DISCUSSION

The present study had performed to detect the percentage of antibiotics utilized in Ibn-Alatheer pediatric teaching hospital.

Despite preventive efforts, infections will always happen, 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. In addition, 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.<sup>[5]</sup>

Society plays an important role in use and abuse of antibiotics as well as the spread of uncritical tendencies. Due to higher number of infectious diseases in developing countries like Iraq, the use of antibiotics is widespread. However, because of the relaxed laws in Iraq and other developing countries, it is not difficult to obtain antibiotics without prescription (over the counter drugs) and hence, antibiotics abuse by public is common.<sup>[6]</sup>

Unnecessary antibiotic use, which have evaluated as a type of inappropriate antibiotic use, had defined as the presence of at least one of following conditions.<sup>[7]</sup>

- Use of antibiotic in conditions where no infectious disease has found, or a viral infection has found when clinical findings, laboratory variables (white blood cell count, neutrophil count, CRP and procalcitonin value), lung imaging, and culture results have evaluated.
- Use of prophylactic antibiotic even though no indication is present.
- Use of antibiotics for longer than necessary.

The present study concluded that more than half of consumed antibiotics in Ibn-Alatheer Pediatrics Teaching Hospital for are one of penicillins; followed by cephalosporin and aminoglycosides.

The current study suggests that antibiotics are needed to be prescribed carefully for pediatrics.

## REFERENCES

1. A Zajicek, M J Fossler, J S Barrett, J H Worthington, R Ternik, G Charkoftaki, et al. A Report from the Pediatric Formulations Task Force: Perspectives on the State of Child-Friendly Oral Dosage Forms. *AAPS J.*, 2013 Oct; 15(4): 1072–1081. doi: 10.1208/s12248-013-9511-5.
2. Hasime Qorraaj Bytyqi,\* Rexhep Hoxha, Elton Bahtiri, Valon Krasniqi, and Shaip Krasniqi. Antibiotic Utilization in Pediatric Hospitalized Patients – A Single Center Study. *Open Access Maced J Med Sci.*, 2017 Apr 15; 5(2): 256–260. doi: 10.3889/oamjms.2017.045.
3. Audrey Lajoinie, corresponding author Perrine Janiaud, Emilie Henin, Jean-Cédric Gleize, Clémentine Berlion, Kim An Nguyen, et al. Assessing the effects of solid versus liquid dosage forms of oral medications on adherence and acceptability in children. *Cochrane Database Syst Rev*, 2017 Sep; 2017(9): CD012783. doi: 10.1002/14651858.CD012783.
4. Maria Matuz,1,\* Ria Benko,1 Monique Elseviers,2 Edit Hajdu,3 Peter Doro,1 Reka Viola, et al. Dosage Form Data Used for Estimating Pediatric Antibiotic Use. *Sci Pharm*, 2015 Jul-Sep; 83(3): 511–518. doi: 10.3797/scipharm.1511-05.
5. Brad Spellberg, M.D., John G. Bartlett, M.D., and David N. Gilbert, M.D. The Future of Antibiotics and Resistance. *N Engl J Med*, 2013; 368: 299-302. DOI: 10.1056/NEJMp1215093.
6. Shreya Agarwal, Corresponding author1 Vijay N Yewale, 2 and Dhanya Dharmapalan3. Antibiotics Use and Misuse in Children: A Knowledge, Attitude and Practice Survey of Parents in India. *J Clin Diagn Res*, 2015 Nov; 9(11): SC21–SC24. doi: 10.7860/JCDR/2015/14933.6819.
7. Ayşe Betül Ergül, corresponding author1 İkbâl Gökçek,1 Taylan Çelik,2 and Yasemin Altuner Torun3. Assessment of inappropriate antibiotic use in pediatric patients: Point-prevalence study. *Turk Pediatri Ars.* 2018 Mar; 53(1): 17–23. doi: 10.5152/TurkPediatriArs.2018.5644.