



## THE EFFECTS OF VARIOUS TREATMENTS ON ENTEROBACTER STRAINS

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### ABSTRACT

**Objective:** This study aimed to determine Enterobacter antibiotic resistance to different antibiotics. **Materials and methods:** This is a retrospective study at Alhomsy Laboratory between 1/2/2018 and 30/6/2019 including all samples of urinary infections with Enterobacter during the studied period. **Results:** We found 155 samples with **urinary infection with** Enterobacter. The highest resistance was against Ceftazidime and norfloxacin (79% for each), while the highest sensitivity against Enterobacter was by Meropenem and Nitrofurantoin (70% for each). **Conclusion:** Rapidly emerging resistant bacteria threaten the extraordinary health benefits that have been achieved with

antibiotics. This crisis is global, reflecting the worldwide overuse of these drugs and the lack of development of new antibiotic agents by pharmaceutical companies to address the challenge. Antibiotic-resistant infections place a substantial health and economic burden on the health care system and population.

### INTRODUCTION

Antibiotics has changed medicine and saved millions of lives for decades now. However, bacterial resistance is becoming a major problem by causing adverse effects on morbidity and mortality rates.<sup>[1,6]</sup> The antibiotic resistance crisis has been related to the lack of awareness about these medications, the misuse and overuse of them.<sup>[2,5]</sup> According to the Centers for

Disease Control and Prevention in the U.S, some of the bacteria due to its very high resistance are becoming an urgent and serious concern. Moreover, this issue could be causing a burden clinically and financially on the healthcare systems worldwide.<sup>[1,5,7,8]</sup>

**MATERIALS AND METHODS**

This study was a retrospective study of all the urine cultures with Enterobacter infection of the patients who reviewed Alhomsi laboratory between 1/2/2018 to 30/6/2019. This study included 155 cases. Only the authors to ensure the privacy collected all the data and all the names and personal information were blinded. Informed consent was taken from all the patients to be included in this study. Statistical analysis was done using SPSS 25.0.

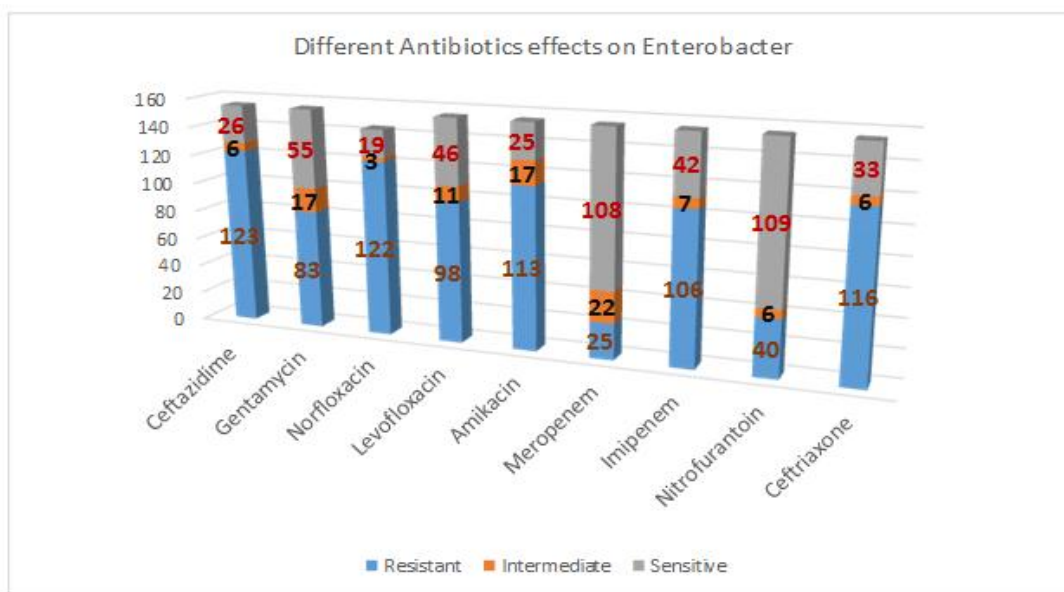
**RESULTS**

**Table No 1: Gender Distribution of Our Study.**

Gender	N	%
Male	100	64.5
Female	55	35.5
Total	155	100

**Table No 2: Source of samples in our study.**

Source of sample	N	%
Urine	155	100



**Figure: Frequency of cases that are (Resistant, Sensitive, and Intermediate) to different antibiotic therapies.**

## DISCUSSION

This study was done to determine the resistance of Enterobacter to commonly used antibiotics. Our study included 155 cases of urinary infection with Enterobacter. We found a higher incidence in males 100 cases (64.5%) and 55 females (35.5%). Table 1.

A similar study (9) showed that Enterobacter resistance to Cephalosporins was (14.3%), which was the highest, while Enterobacter resistance to Carbapenems was (1.3%).

In our study, Enterobacter was resistant to Cephalosporins with a statistical significant ( $p < 0.05$ ). 75% for Ceftriaxone and 79% for Ceftazidime. Enterobacter resistance to Fluoroquinolones (norfloxacin, levofloxacin) was (79%, 63%), respectively. Furthermore, 53% and 73% of Enterobacter cases had resistance against gentamycin and amikacin, respectively. (Both Aminoglycosides). Regarding Carbapenems (Imipenem specifically) 69% of Enterobacter strains was resistant to it, while 70% of Enterobacter species were sensitive to meropenem. (Figure).

Another antibiotic in our study which was sensitive for the treatment of Enterobacter Nitrofurantoin (Sulfonamides) with a 70% of Enterobacter species being sensitive to it. (Figure).

It should be noted that the resistance of the Enterobacter in our study to different antibiotics was much higher than the resistance percentages of similar studies (9) and that shows the obvious misuse, overuse and lack of knowledge about their effects among general population.

### Compliance with Ethical Standards

**Funding:** This study was not funded by any institution.

**Conflict of Interest:** The authors of this study have no conflict of interests regarding the publication of this article.

**Ethical approval:** The names and personal details of the participants were blinded to ensure privacy.

**REFERENCES**

1. Golkar Z, Bagazra O, Pace DG. Bacteriophage therapy: a potential solution for the antibiotic resistance crisis. *J Infect Dev Ctries*, 2014; 8(2): 129–136. 13. [PubMed]
2. Gould IM, Bal AM. New antibiotic agents in the pipeline and how they can overcome microbial resistance. *Virulence*, 2013; 4(2): 185–191. [PMC free article] [PubMed]
3. Wright GD. Something new: revisiting natural products in antibiotic drug discovery. *Can J Microbiol*. 2014; 60(3): 147–154. [PubMed]
4. Sengupta S, Chattopadhyay MK, Grossart HP. The multifaceted roles of antibiotics and antibiotic resistance in nature. *Front Microbiol*. 2013; 4: 47. [PMC free article] [PubMed]
5. Centers for Disease Control and Prevention, Office of Infectious Disease Antibiotic resistance threats in the United States, 2013. Apr, 2013. Available at: <http://www.cdc.gov/drugresistance/threat-report-2013>. Accessed January 28, 2015.
6. Congressional Research Service Report Life expectancy in the United States. Mar, 2005. Available at: <http://www.cnire.org/nle/crsreports/05mar/RL32792.pdf>. Accessed January 5, 2015.
7. Lushniak BD. Antibiotic resistance: a public health crisis. *Public Health Rep*, 2014; 129(4): 314–316. [PMC free article] [PubMed]
8. Rossolini GM, Arena F, Pecile P, Pollini S. Update on the antibiotic resistance crisis. *Clin Opin Pharmacol*. 2014; 18: 56–60. [PubMed]
9. Edelsberg, J., et al., *Prevalence of antibiotic resistance in US hospitals*. *Diagnostic microbiology and infectious disease*, 2014; 78(3): 255-262.