



## Antibiotic Resistance Trends in the Kingdom of Bahrain

Ali Bin Thani\*

Department of Biology, College of Science, University of Bahrain, Bahrain

\*Corresponding author: Ali Bin Thani, Department of Biology, College of Science University of Bahrain, Bahrain, Phone: +973 17437419; Fax: +973 17449158; E-mail: abinthani@uob.edu.bh

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### Abstract

Antibiotic resistance is threatening the health sectors in different developing countries. The first report on antibiotic resistance in the Kingdom of Bahrain was in 2003. The work was comparing the number of *Shigella* isolates for the years 1984-1988 and 1994-2001. In 2009 another study investigated 11,886 isolates and 22.6% were ESBLs. Two more studies had covered the prevalence of ESBLs in 2011 and 2014. This time the trend of ESBLs had showed an increase in CTX-M with respective detection percentages of 98% and 93.8%. Even though that there is an increase in the number of ESBLs with a predominance for CTX-M type of ESBLs still no carbapenem resistant isolates were noted as yet.

**Keywords:** Antibiotic resistance; ESBLs; CTX-M; *Escherichia coli*; *Shigella* spp.

### Introduction

Antibiotic resistance (AR) is threatening the health sectors in different developing countries. AR reduces the number of available treatment regimes. Continues monitoring of different trends in antibiotic resistance become a basic routine in certain medical settings. The first report on antibiotic resistance in the Kingdom of Bahrain was by Jamsheer et al. [1]. The work was comparing the number of *Shigella* isolates for the years 1984-1988 and 1994-2001. The data showed that *S. sonnei* and *S. flexneri* were resistant to co-trimoxazole while all isolates examined in the study were sensitive to ciprofloxacin and ceftriaxone. According to the study by Jamsheer et al. [1] there were no concerns in Bahrain for the appearance of extended spectrum beta-lactamases (ESBLs) as no isolates of *Shigella* with plasmid encoded resistance genes to cefotaxime and ceftriaxone were observed. While the study reports no incidences for quinolone resistance it pinpoints the importance for the alarming increase in TEM-1 plasmid-mediated resistance to cefuroxime by *S. dysenteriae*. The work on TEM-1 resistance was continued in the years to come, where more isolates were examined [2]. In this work the study investigated the prevalence of ESBLs in Enterobacteriaceae. Main finding of the study was that no carbapenem resistant isolates were observed. However, the trend and spread of ESBLs were noted and reported in this study. 11,886 isolates were studied and 22.6% were ESBLs. Two more studies had covered the prevalence of ESBLs [3,4]. This time the trend of ESBLs had showed an increase in CTX-M with a respective detection percentages of 98% and 93.8% [3,4].

### Discussion

Trends in antibiotic resistance have dramatically changed over the past 30 years. The current trend is showing an increase in the percentage of CTX-M. However, certain factors are important when covering the prevalence and distribution of ESBLs. Most reported cases are nosocomial with percentage reaches 88% [2]. However, there are

some concerns in terms of antibiotic prescription and misuse during treatment. With such practice there are some concerns that in the coming year's outpatients with antibiotic resistance might increase in the near future. Other issues were related to type of bacterial species isolated with ESBL patterns. The predominant ESBL in Bahrain was *Escherichia coli* [2-4]. According to Bindayna et al. reports showed that *E. coli* with CTX-M type ESBLs might favor selection for carbapenem resistance. Such evolutionary pathway might introduce resistance for the final resort of possible antibiotics (imipenem and meropenem) still in medical use. According to Shahid et al. the CTX-M identified in Bahrain belongs to the CTX-M-15 genotype and to a lesser instance to CTX-M-55. They indicated that CTX-M-15 is the most predominant genotype in the region, while for CTX-M-55 it might express a local evolutionary divergence.

### Conclusion

From the data presented above we conclude that after 2000 there was an increase in the number of ESBLs and more recent results show predominance for CTX-M type of ESBLs. Noteworthy, that such trend was almost controllable if restrictions to the number of antibiotic prescriptions were applied.

### References

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