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Antibiotic consumption in non-teaching Lebanese hospitals: A cross-sectional study

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Summary The rising threat of antibiotic resistance is linked to patterns of antibiotic use in hospital settings where global efforts are undertaken to encourage reporting and benchmarking antibiotic consumption in an attempt to improve prescription regimens. In Lebanon, where data concerning the level of antibiotic consumption in hospitals is scarce, the aim of our paper is to track the intensity of antibiotic consumption in order to identify potential evidence of antibiotic misuse or abuse. The study is conducted in 2012 for a period of 12-month using data from pharmacy records in 27 non-teaching Lebanese hospitals according to the Anatomical, Therapeutic and chemical classification system and Defined Daily Dose (ATC/DDD) recommended by the World Health Organization and compiling data on ABC Calc software version 3.1. Results show that the average antibiotic consumption excluding pediatric cases is 72.56 Defined Daily Dose per 100 Bed-Days (DDD/100BD). Total broad spectrum antibiotic consumption is 12.14 DDD/100BD with no significant difference found between public and private hospitals ($p > 0.05$ for all). The most commonly used antibiotics were Amoxycillin/Clavulanic acid, Ceftriaxone, Amoxycillin and Cefuroxime for parenteral use. Consumption of beta-lactams, Cephalosporins, Carbapenems, Monobactams and quinolones did not vary significantly by region, occupancy rate, number of beds including the number of intensive

Abbreviations: ATC/DDD, Anatomical, Therapeutic and chemical classification system/Defined Daily Dose; DDD/100BD, Defined Daily Dose per 100 Bed-Days; WHO, World Health Organization.

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care unit beds. Our data findings provides baseline information on patterns of antibiotic consumption in Lebanon and the issue calls for concerted efforts to encourage data reporting on national basis and to correlate future findings with results of antibiotic susceptibility testing which can provide insights and tools needed to assess the public health consequences of antimicrobial misuse and to evaluate the impact of antibiotic resistance containment interventions.

Introduction

Antibiotic resistance is a growing global health threat of broad concern where increased antibiotic consumption is driving resistance [1]. Consequently, antibiotics are becoming less effective or even ineffective, resulting in an accelerating health security emergency that is rapidly outpacing available treatment options [2]. Surveillance of antimicrobial resistance tracks changes in microorganisms and allows the early detection of resistant strains of public health importance, while surveillance of antibiotic consumption allows the quantification of the selection pressure on microbial populations and serves as an outcome measure of antibiotic stewardship programs. According to the World Health Organization (WHO), linking the surveillance findings to patterns of antibiotic consumption has proven to be a crucial factor driving political commitment to successful resistance containment campaigns. In this context, hospitals represent 'hot spots' for selective pressure on micro-organisms [3] where the lack of control of antimicrobial use will inevitably lead to overuse, poor outcomes and higher healthcare costs [4]. Numerous initiatives in recent years have encouraged hospitals to conduct surveillance of antimicrobial consumption in order to identify possible overuse and misuse [5]. In fact, in high income countries, networks such as European Surveillance on Antibiotics Consumption Network database (maintained by European Centre for Disease Control for European Union (EU) countries) [6] and resistance map in the United States of America have enabled greater understanding of antibiotic use; however, there are still gaps in data worldwide, especially in resource limited settings [7] Few published descriptions [5,8] or comparisons of antibiotic consumption are available [9,10,34,35] particularly in the Mediterranean region, identified as an area of hyper-endemicity for multiresistant hospital pathogens [11]. In Lebanon, there is a lack of information concerning the level of antibiotic consumption in the hospitals. The objective of the study is to address this issue and focus on the intensity of antibiotic use in participating hospitals and benchmark with published data expressed in daily divided dose per 100-bed-days (DDD/100BD) in neighboring Mediterranean in particular and other available data worldwide in general. Our aim is to give an insight of antibiotic prescribing patterns and provide a baseline data for future benchmark and correlation with changes in antibiotic susceptibility testing and trends of antimicrobial resistance in the hospital settings.

Material and methods

Study design

This is an observational cross-sectional study conducted for a period of 12-month in 2012 using data from pharmacy records aggregated at hospital level.

Data collection

Following the approval of the Institutional Review Board, fifty two hospitals were asked to fill out an anonymous questionnaire. Administrative data consisted of the hospital number of beds and the occupancy rate for a period of 12 month during the year 2012 allowing the determination of the number of Bed-days, a standardized figure that provides a degree of comparison among different institutions. Other requested data included, the hospital status, number of intensive care unit (ICU) beds and the availability of a transplantation and/or oncology unit, considered primary areas of focus due to