

Misuse of antibiotic: A systemic review of Saudi published studies.

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Abstract

Background: The misuse of Antibiotics has become a major public health issue all over the globe. In Saudi Arabia precisely, drug selling without a medical physician prescription and other factors may influence this practice of antibiotic misuse.

Objective: Our focal point is to review the published Saudi literatures on the antibiotic misuse in Saudi Arabia. To assess the factors contributing to this problem, its effects and the intervention strategies used in the reduction of this problem.

Methods: Saudi literatures in English language about antibiotic misuse from January 2002 to end of December 2015 were explored via a web-based medical database. Articles concerned with the prevalence of antibiotic misuse, factors contributing to this problem among Saudi population, its impacts, and intervention strategies used in reducing this problem were reviewed.

Results: The literature demonstrated a high prevalence of antibiotic misuse among Saudi population ranging from 41%-92%, especially among the children. The reasons of this high prevalence are complex, and several contributing factors including cultural factors, behavioral characteristics, socio-economic status, and level of education.

Conclusion: This review concentrates on the magnitude of this major health problems in Saudi health system. Which lead to more nosocomial infection, high cost and antibiotics resistance. Many intervention strategies need to apply in order to reduce this issue.

Keywords: Antibiotics, Impacts, Misuse, Saudi Arabia.

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Introduction

Antimicrobial agents have been the groundwork of clinical medicine and have saved a huge number of people from life-threatening bacterial infections, ever since the second half of the 20th Century was recorded [1]. However, the last decade of the 20th century and the first decade of the 21th century have witnessed the emergence and spread of antibiotic resistance of different types of pathogenic bacteria around the World. The consequent failure of antibiotic therapy was associated with higher mortality and morbidity and prolonged hospital stay [1,2].

During the past 2 decades, the prevalence of multidrug-resistant bacterial infections had increased significantly in

children. This problem was observed in community-onset and health care-associated infections (HAIs) [3].

Antimicrobial drugs are usually sold to patients outside the hospital without a medical prescription, all over the world (Figure 1) [2].

In Saudi Arabia, as in many Middle East countries, antibiotics and other drugs obtainability are easy over the counter. And till now, there are no legislation or restrictions on their use of such antibiotics in Saudi Arabia [3,4].

Patients can bypass the health care system, and purchase some antibiotics in private pharmacies without prescription [4]. This article is focused on reviewing the prevalence and factors associated with antibiotic misuse in Saudi

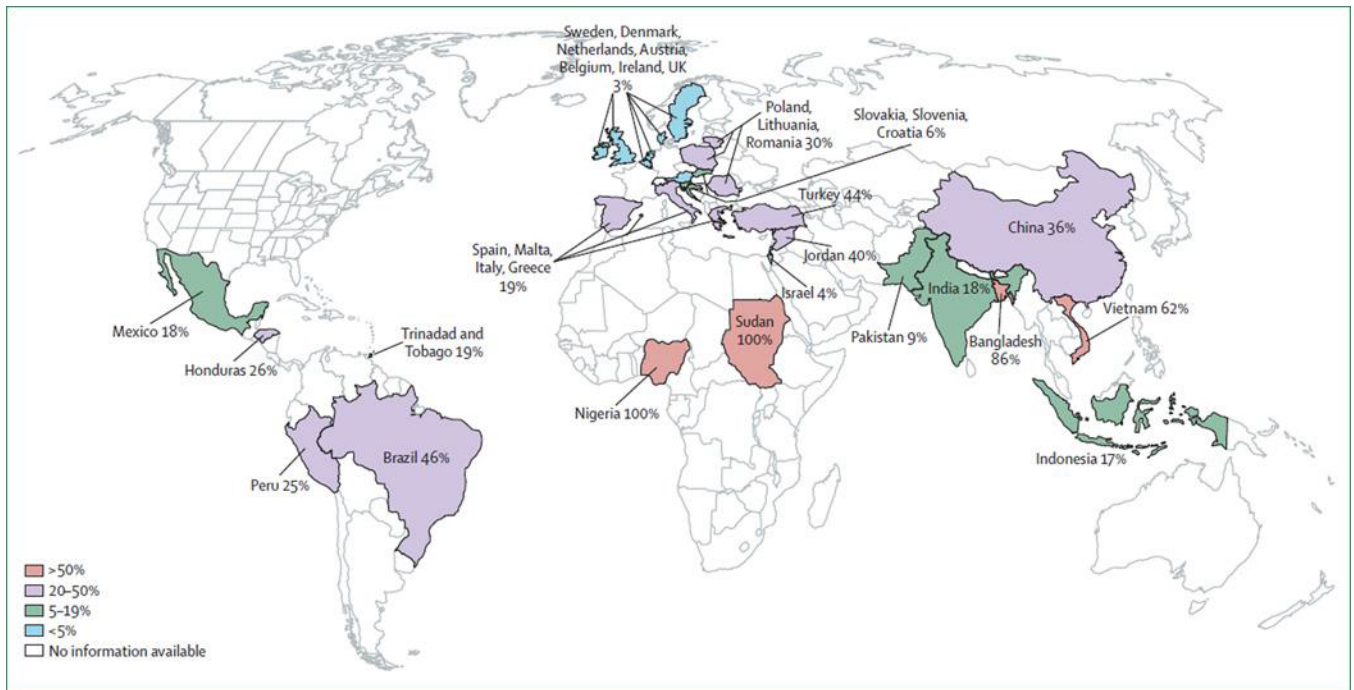


Figure 1. Frequency of non-prescription use of antimicrobials in the general population worldwide [3]

population, and the impact of the public health problem as well as the intervention strategies used in reducing this issue.

Literatures Review

We searched all Medline medical Data base for all Studies about antibiotic misuse in Saudi Arabia from January 2002-December 2015. We reviewed 7 articles published in English language from Saudi Arabia and concerned with the prevalence of antibiotic misuse, factors contributing to this problem among all Saudi population (children and adult), its impacts, and intervention strategies used in the reduction of this problem were reviewed. The heading terms used in searching were "Antimicrobial abuse, misuse and overuse", "Bacterial resistance", "Antimicrobial resistance" "impacts" and "intervention". The word "Saudi" and "KSA" has been added to all terms used in the researching process and reference lists of relevant articles, and reports were checked.

Results

Prevalence of Antibiotic Misuse in Saudi

A cross sectional survey was conducted in pediatrics emergency care at National Guard hospital, in Riyadh, Saudi Arabia. This identified the prevalence of non-prescribe antibiotic among the Saudi children. The study rated 43.6% of participants that had given antibiotics without prescription to their child [5]. In most recent cross section study conducted 2015 at King Abdullah international medical research center in adult and pediatric emergency. Alanazi et al. found the prevalence of antibiotic misused in were 38.7% and 57.8% in adult and oediatric respectively with total of 46.2% [6]. This percentage increase among the health system employees, Khalil et al. [4] reported in

AlKharj city, that self-prescribed antibiotic were used by employed patients (82%) more than unemployed patients (79%) but this was not statistically significant. Patients who were healthy showed more prevalence for the use of self-prescribed antibiotics (87%) than unhealthy patients (75%). The main source of self-prescribed antibiotic was private pharmacies accounting for about 94%. The main reason behind taking self-medication was an advice from a friend (80%) [5].

Another feasibility study carried out Al-Ghamdi et al. [7] to find the incidence of nosocomial infection and the prevalence of antibiotic misuse in a 174-bed community hospital in Saudi Arabia over a six-month period, concluded that a high rate of nosocomial infection compounded by a widespread misuse of antibiotics should raise serious concern to local health authorities.

An analysis was done by Al-Mohamadi et al. [8] to assess the practice, and attitude of pharmacists in retail pharmacy toward dispensing non-over the counter drugs. The analysis included sixty pharmacies randomly selected in Jeddah-KSA and found that 97.9% of the analyzed pharmacists pass on the drugs either by recommending or simply following the want of the patient. The rationality of many pharmacist, is that there was no country's policy of proscribe providing these drugs without prescription [8].

A cross sectional study by Abdulhak et al. [9] has included a 327 pharmacies in different region of Riyadh, and the study was aimed at determining the percentage of pharmacies that sells antibiotics without medical prescriptions. Examining the potential associated risks of such practice in Riyadh, Saudi Arabia. They discover that antibiotics could be easily obtained without a prescription or medical indication [9]. Elberry has also conducted

Table 1. Studies of the prevalence of misuse of antibiotics in Saudi Arabia

References	Study time	Place	Institute and (No)	Prevalence %
Al Anazi, et al. [5]	2015	Riyadh	Cross section(5752)	46%
Elberry, et al. [9]	2014	Jeddah	Community based (313)	41%
Al- Mohamadi, et al. [8]	2013	Jeddah	Pharmacies (60)	97%
Khalil, et al. [4]	2013	AlKharj	Dental clinics	82%
Alanazi, et al. [6]	2013	Riyadh	Pediatric emergency Parents (433)	43%
Abdulhak, et al. [9]	2010	Riyadh	Pharmacies (327)	77.6%
Al-Ghamdi, et al. [7]	2002	Abha	Community hospitals (2445 pts)	72%

a study to determine the prevalence of non-prescribed antibiotic use. The study included 313 participants and revealed that 41.7% of participants sought non-prescribed antibiotics, while 58.3% of participants preferred the idea of prescribed antibiotics [10]. Most of these studies were stressed on the antibiotic misuse among Saudi children in different medical and pediatric facilities. Some details about these studies are arranged by its year of publication and presented in Table 1.

Discussion

A comparison of antibiotic misuse with another country valued a 405 community of pharmacists in Jordan, 381 (94%) believed that drugs were distributed without a prescription by their staff. Typically antibiotics, cough or cold preparations and benzodiazepines [11,12]. In a study conducted on 171 general practitioners and the data collected on 16,899 consultations to demonstrate that potentially inappropriate prescribing is occurring in primary care and the high rate of broad-spectrum antimicrobial agents is a major concern.

In this study, an antibiotic was prescribed at 20.16% of these consultations and majority also were prescribed for symptoms or diagnoses associated with the respiratory system. 11 A cross-sectional study of antibiotic dispensing done by Sabry et al. [13] to describe the pattern of antibiotics dispensing belong the Egyptian pharmacies and they discovered that more than 63% of the recorded antibiotics were dispensed on official prescriptions, 23.3% upon pharmacist's recommendation and 13% upon patient request.

In the USA, a thorough study was carried out to determine changes in antibiotic-dispensing rates among children in 3 health plans located in New England [A], the Mountain West [B], and the Midwest [C] regions of the States. Pharmacy and outpatient taken from 2000 to 2010 were used to evaluate the rate of antibiotic dispensing per person yearly for 3 months aged children to 18 years. According to health plan (A: 2.27, B: 1.40, C: 2.23 antibiotics per person-year; P, 0.001), antibiotics used for 3-24 months age group varied at baselines.

In the 3-24month age group, the study revealed 5.0%, 9.3% and 7.2% annual decline early in the decade in the 3 plans, respectively and these rates were dropped to 2.4%, 2.1% and 0.5% by the end of the decade [14].

Factors Influencing Antibiotics Misuse

The reasons of antibiotic misuse are complex, and several contributing factors are evidently associated with the overuse of antibiotics in both the patient's (or parents of children) level and doctor's level. These factors include cultural factors, behavioral characteristics, socio-economic status, and level of education [15]. Furthermore, doctors usually relate their pattern of over prescribing to patients'/parents' pressure [16]. Also, lack of health education is one of the major contributing factors in the overuse of antibiotics [17]. Self-medication is a very important behavioral aspect that contributes to the misuse of antibiotics. 17 Socio-demographic characteristics such as age, gender education, income levels, and geographical locations have also been associated with antibiotic misuse. 18 Younger age groups have been associated with antibiotic misuse more than older age groups; younger males have been invariably related to misuse practices whereas younger females have been associated with storing of antibiotics. In both low and high education, the low, middle and high income levels are reported to be associated with antibiotic misuse [18].

A survey from the central region of Saudi Arabia carried out, included 610 parents to investigate knowledge, beliefs, and practices associated with parental antibiotic misuse. They discover that 50% of the study parents responded that antibiotics are required in children with flu like illness presented with runny nose, cough, sore throat and fever; however, 57.7% used the antibiotic to reduce symptom severity and duration, and these are: Parents with low income, more than 2 children, lack of knowledge, inappropriate beliefs and practices are vulnerable for misusing antibiotics in children [19,20].

Impacts of Antibiotic Misuse

Antibiotics are essential treatment worldwide, especially in developing countries, where infectious diseases are the commonest cause of death, but their overuse will lead to the emerging of multiple resistant organisms [21]. The data from SMART studies showed that the level of antimicrobial resistance of antibiotics overuse to vary by geographic region and is highest in Asia-Pacific countries [22]. Each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotic and 23,000 (approximately) people dying each year as a direct result of this infection [23]. Antimicrobial-

drug resistance has recently become a concern for its economic impact.

The Institute of Medicine estimates the annual cost of infections caused by antibiotic-resistant bacteria to be US \$4 to \$5 billion, and the misuse of antibiotics increases antibiotic resistance, and this cost the US health care system over \$20 billion each year [24]. Most studies on economic costs focused on duration of stay in hospitals and its related costs. These aspects, however, appeared to be objective and easy to be analyzed rather than other complicated related aspects of impact. Recently, impact related studies have also included other parameters estimating increased hospital stay, specific treatments, and diagnostic tools needed to diagnose patients with resistant organisms in comparison with those infected with other similar susceptible organisms. These studies, however, have not included other costs of medical services provided to such patients with antibiotic resistant organisms such as laboratory tests, radiologic studies, bronchoscopies, and other diagnostic procedures.

Surveillance and Intervention of Antibiotic Misuse

Most published studies have emphasized on a thorough planning of surveillance and intervention protocols to reduce antibiotic misuse and its impacts [24-30]. The investigation of these intervention strategies globally cannot be overrated as well as looking for the appropriate protocol to be used in countries like Saudi Arabia, according to the contributing factors to this overuse of antibiotics.

All the above mentioned studies have suggested intervention strategies to reduce antibiotic misuse. These strategies included health education campaigns where increasing awareness of both health care givers and population is found to play an essential role in reducing antibiotic misuse, particularly in children. Also, doctor-patients communication and interactions, is very important where the patients could share the protocol of their treatment, with the best intervention protocol will relay on discussing misuse factors with the patient [28]. According to the Infectious Diseases Society of America (IDSA), the definition of antimicrobial stewardship includes: optimizing the indication, selection, dosing, and route of administration and duration of antimicrobial therapy, to maximize clinical cure or prevention of infection [21]. Antimicrobial Stewardship (AS) programs are effective in improving clinical outcomes associated with antimicrobial therapies while improving patient safety by reducing adverse events and development of bacterial resistance. The primary aim of stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity, the selection of pathogenic organisms, and the emergence of resistance [3].

In Saudi Arabia, the studies about this issue were rare and emphasis on the knowledge and attitude of the studied

subjects about the guidelines of antimicrobial prescription and resistance. A recent study conducted in Riyadh city to assess knowledge, perceptions and attitude towards antimicrobial prescription among practicing physicians. This study has concluded that there are considerable unmet training and education need for physicians in the area of antimicrobial prescription. Local antimicrobial guidelines need revision to ensure that they are more relevant and helpful for medical practitioners [30]. Much more recently, another cross-sectional study, including 447 physicians from universities, private and public hospitals of Jeddah city, Saudi Arabia was conducted to study their knowledge, attitude, and practice of towards antimicrobial resistance through self-administered questionnaire. Although the clear concepts of antimicrobial resistance among all the studied physicians, there have been lack in their attitudes and the use of effective educational resources. The study has also revealed the lack of dedication to follow the guidelines for antimicrobial use among several physicians. This finding highlights the need to use antimicrobial resistance stewardship in all health care facilities [31].

Conclusion and Recommendation

In conclusion, misuse of antibiotic is a serious concern in public health problem worldwide. Most Saudi literature emphasized on prevalence studies and revealed a considerable high prevalence of antibiotic misuse among Saudi population, particularly among children. On the other hand, there is a great lack of study regarding other epidemiologic aspects of antibiotic misuse. The future researchers have to address this aspect as well as increasing awareness of the public, about the impacts of misuse of antibiotics.

Finally, it is recommended to study the global intervention strategies and policies in common use and to find out the suitable protocol to be used in our country, Saudi Arabia. According to the influencing factors to this problem.

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