



## Original article

## Self-medication with antibiotics in Saudi Arabia

Sultan Alghadeer<sup>a</sup>, Khalid Aljuaydi<sup>b,\*</sup>, Salmeen Babelghaith<sup>a</sup>, Abdullah Alhammad<sup>a</sup>,  
Mohammed N. Alarifi<sup>a</sup>

<sup>a</sup> Department of Clinical Pharmacy, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia

<sup>b</sup> College of Medicine, King Saud University, Riyadh, Saudi Arabia

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## ABSTRACT

**Introduction:** Despite of the global dilemma of antibiotics resistance, this issue is more worsen in developing countries or places where the antibiotics can be dispensed or purchased without prescription such as in Saudi Arabia. Most health awareness campaigns and published studies regarding the self-medication with antibiotics in Saudi Arabia are conducted within hospitals. The prevalence and reasons of self-medication with antibiotics were not well studied from community perspective in Saudi Arabia. This study was conducted to investigate the prevalence of self-medication with antibiotics in Saudi Arabia.

**Methodology:** A cross-sectional study using online survey and snowball technique was conducted during the period from January 2017 to May 2017 targeting people who are living in Saudi Arabia.

**Results:** A total of 1264 respondent completed the questionnaire and included in the study. About 34% of respondents have used antibiotic without a prescription, and 81.3% of them knew that it might be harmful to health. The most antibiotic used for self-medication was Amoxicillin/clavulanic acid (45.1%) followed by amoxicillin (39.9%). The most common illness and reasons for seeking antibiotic without prescription were tonsillitis (76.7%) and the previous experience of using a particular antibiotic (52.1%) respectively. The major source of self-medication with antibiotic was previous doctor's prescription (36.6%).

**Conclusion:** The relative high prevalence of self-medication with antibiotics necessitates taking serious steps by health authorities to implement the law of forbidding the sale of antibiotics without prescription.

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## 1. Introduction

Due to the accelerated growth of microbial resistance towards the most effective antimicrobial agents, WHO established a program named "WHO Global Strategy for Containment of Antimicrobial Resistance" to confront this challenge (World Health Organization, 2001). The aim of this strategy was to reduce the spread of antimicrobial resistance by implementing several action plans including the reduction of inappropriate use of antimicrobials. Despite of WHO efforts in halting the overuse of antimicrobials, antimicrobial purchase is considered one of the most

common buying medications globally (Col and O'Connor, 1987). The purchase of antimicrobial drugs without prescription is estimated to be 58% in Asia, 47% in southern Europe, 30% in eastern Europe, 25% in South America, 39% in Middle East (Morgan et al., 2011). The use of non-prescribed antimicrobial agents may lead to dangerous impact on the public health. The continuous emergence of antimicrobial resistance, the reported incidence of adverse effects, and the unavoidable costs of buying non-prescribed antimicrobials are consequences of acquisition antimicrobials without prescription.

Of the most common used antimicrobial agents are antibiotics. The major problem of utilizing antibiotics without prescription is the emergence of antibiotics resistance (General Background: Antibiotic Resistance, 2017). Kingdom of Saudi Arabia showed the highest prevalence of resistant pathogens in clinical isolates among all Gulf Corporation Council (GCC) countries (Aly and Balkhy, 2012). Also, using the antibiotics inappropriately can lead to unnecessary adverse effects or may cause diseases like Clostridium difficile colitis which happens due to disturbance in the normal bacterial flora in the colon because of using antibiotics (Morgan et al., 2011;

\* Corresponding author at: P.O. Box 2454, Riyadh 11451, Saudi Arabia.

E-mail address: [432100569@student.ksu.edu.sa](mailto:432100569@student.ksu.edu.sa) (K. Aljuaydi).

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**General Background: Antibiotic Resistance, 2017).** The incidence of toxigenic *Clostridium difficile* colitis in Saudi Arabia is reported to be 15% (Alasmari et al., 2014). The economic burden of antibiotic-resistance is an essential concern. No data estimated the economic burden of antibiotic resistance in Saudi Arabia; however, in the United States, approximately a range from \$18,588 to \$29,069 is the medical cost of a patient with antibiotic resistance infection (Golkar et al., 2014; Bartlett et al., 2013).

Despite of the global dilemma of antibiotics resistance, this issue is more worsen in countries or places where the antibiotics can be dispensed or purchased without prescription (Morgan et al., 2011). In Saudi Arabia, a study showed that 77.6% of the pharmacies are dispensing antibiotics without prescription, and almost 95% of which dispensed the antibiotics even without the patient request (Bin Abdulhak et al., 2011). On the other hand, antibiotics can be purchased without prescription in Saudi Arabia. According to a recent hospital-based cross sectional study conducted in Riyadh, It is estimated that around 79% of the participants purchased at least one antibiotic without a prescription (AlRasheed et al., 2016). Although of health awareness campaigns and published studies regarding the self-medication with antibiotics in Saudi Arabia, most of these campaigns and researches are conducted in hospitals. The prevalence and reasons of self-medication with antibiotics were not well studied from community perspective in Saudi Arabia. Therefore, this study was conducted to investigate the prevalence of self-medication with antibiotics in Saudi Arabia.

## 2. Methods

A cross-sectional study using online survey was conducted during the period from January 2017 to May 2017 targeting people who are living in Saudi Arabia.

The survey contained questions about: (1) demographic data such as age, gender, occupation, education level, and insurance status, (2) frequency and name of antibiotic used if any, (3) illness and reasons of self-medication with antibiotics, (4) knowledge of substantial impact of using or recommending antibiotic without prescription, (5) the availability of antibiotics at home, and (6) source of information for selecting particular antibiotic. The common generic names of antibiotics in Saudi Arabia were taken from the latest edition of "Saudi National Formulary (SNF); 4th edition". Participants were recruited through social media websites and applications using snowball technique where any person recruited to do the survey provides multiple referrals. Any participant who lives outside Saudi Arabia will be exempt from the survey.

A well-structured questionnaire was developed from extensive literature review that conducted studies in this regard. Since most of those studies were published in English language, the questions used in those studies were first collected, organized, modified and then translated to Arabic language by an independent professional translator.

Eight experts in the field were asked to comment independently on appropriateness of the questions to assess the validity of the questionnaire. After the validation and comments consideration, a pilot face-to-face study of 10 randomly selected persons was conducted to ensure the linguistic and conceptual understanding of the questions. Reliability of the questionnaire was assessed with the Cronbach's alpha coefficient that scored 0.9.

The data were analyzed and processed by using SPSS version 15.

## 3. Results

In this surveyed study, a total of 1264 of respondents filled the questionnaire. Majority of respondents (72.7%) were female. The

most of respondents were aged from 34 to 51 years. Just over two-third of respondents had university education and further information on characteristics of respondents are given in Table 1.

In this study, more than one third (43.4%) of respondents reported that they sometimes using self-medication with antibiotics, while almost half of respondents (51.6%) claimed that they never used antibiotic without prescription. Only 5% of participants stated that they always use antibiotics without prescription.

The findings of this study reported that the most vital reasons for practicing self-medication with antibiotics were the previous experience of using particular antibiotic (52.10%), followed by the low severity or seriousness of diseases (36%), lack of time (22.30%), financial constraints (13.0%) and lack of a trustful medical doctor (10.10%) as shown in Fig. 1.

The antibiotics most usually used for self-medication were amoxicillin and potassium clavulanate (45.1%), followed by amoxicillin (39.9%), azithromycin (16.8%), cefuroxime (9.7%) and cephalixin (5.7%). Antibiotic included sulfamethoxazole and trimethoprim, levofloxacin and doxycycline were rarely used in self-medication. The percentage of use of each antibiotic is showed in Fig. 2.

Common reported illness in which self-medication with antibiotics were seeking include tonsillitis and pharyngitis (76.7%), fever (29.3%), toothache (26.5%), and respiratory symptoms (24.4%) such as cough and phlegm Table 2). The vast majority of respondents (84.1%) selected their antibiotics as self-medication based on its effectiveness. It was interesting that majority (81.3%) of the respondents knew that antibiotics cause adverse effects. More than two-third of the respondents had medications store at their home, and amoxicillin and amoxicillin/potassium clavulanate were the most frequent antibiotic are available (Table 2).

The major source of self-medication with antibiotic was previous doctor's prescription (36.6%), followed by advertisements from websites, social media, TV, or reading (26.5%), and pharmacist advice (19.7%). See Table 3.

**Table 1**  
Distribution of demographic information of respondents (N = 1264).

Variables		Frequency	Percentage
Age (in years)	Less than 18	45	3.6%
	18–24	301	23.8%
	24–33	296	23.4%
	34–51	495	39.2%
	52–64	123	9.7%
	65 and older	4	0.3%
Gender	Male	345	27.3%
	Female	919	72.7%
Occupation	Employee	601	47.5%
	Non-Employee	343	27.1%
	Student	320	25.3%
Are you a health practitioner? (Doctor, pharmacist, nurse, etc.)	Yes	283	22.4%
	No	981	77.6%
Level of education	Illiterate	3	0.2%
	Primary school	47	3.7%
	Secondary school	235	18.6%
	University	852	67.4%
	Postgraduate	127	10.0%
Health insurance	None	525	41.5%
	General (governmental) insurance	456	36.1%
	Private insurance	283	22.4%

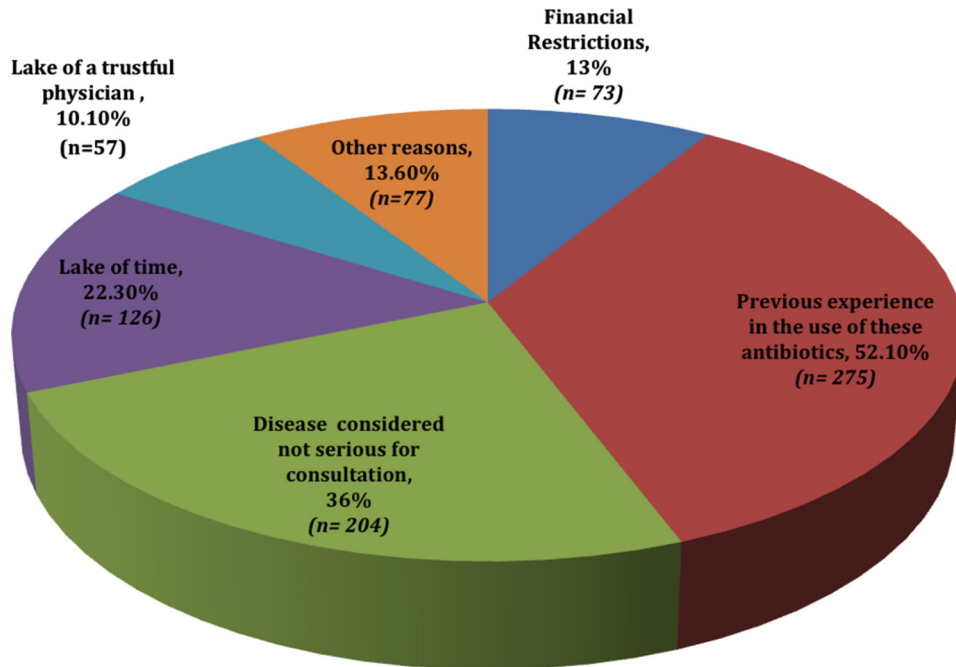


Fig. 1. Reasons for self-medication with Antibiotics.

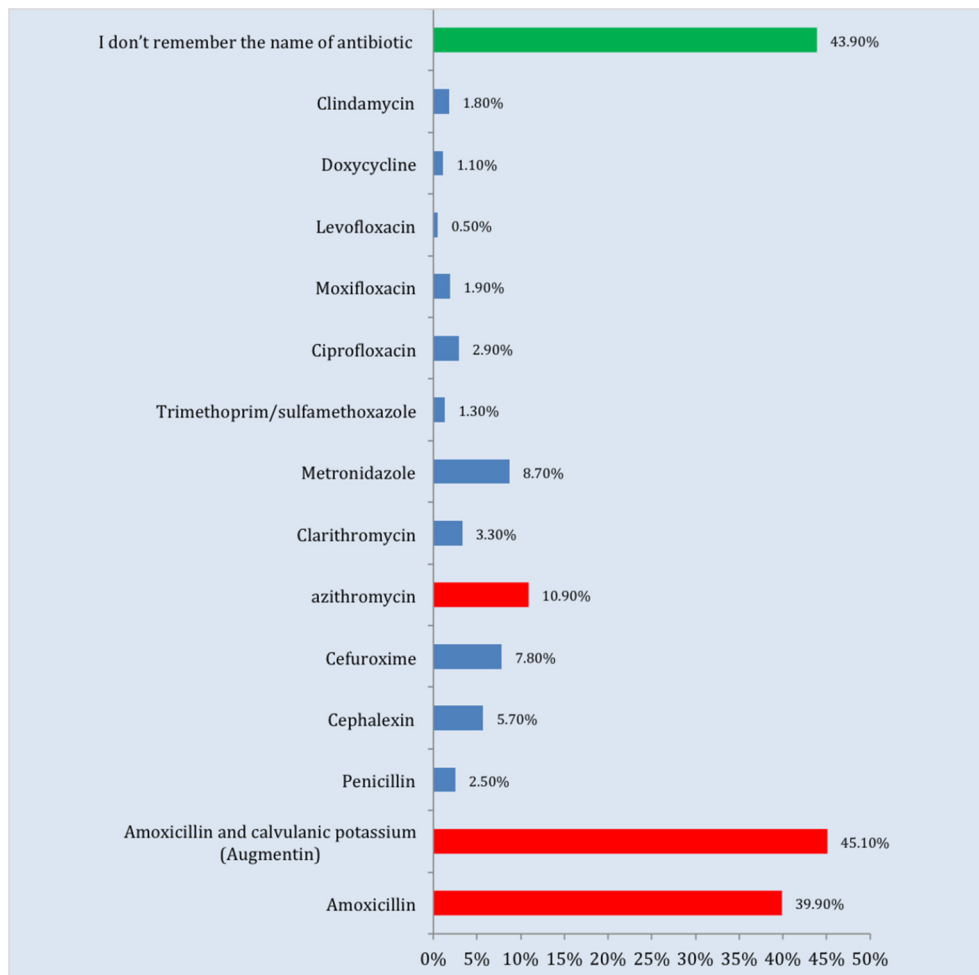


Fig. 2. Parentage of antibiotics used in self-medication.

**Table 2**  
Reasons and conditions for self-medication with antibiotics.

Variables		Frequency	Percentage
Conditions for self-medication with antibiotics	Tonsillitis and pharyngitis	434	76.7%
	Fever	166	29.3%
	Abdominal pain	50	8.8%
	Toothache	150	26.5%
	Cough and phlegm	138	24.4%
	Dermatitis	24	4.2%
	Diarrhea	36	6.4%
	Other symptoms	78	13.8%
Method of selection of antibiotic	Shape and color	20	3.5%
	Its price	55	9.7%
	Its name	141	24.9%
	Its glass or its outer box	18	3.2%
	Effectiveness	476	84.1%
Do you have an idea of the possible harmful effects of using antibiotics?	Yes	981	81.3%
	No	226	18.7%
Do you recommend any antibiotic you used for others?	Yes	324	26.8%
	No	883	73.2%
Do you have a pharmacy at home or do you keep some of old medicines at home?	Yes	814	67.4%
	No	393	32.6%
What are the most important antibiotics they contain?	Amoxicillin	278	35.1%
	Amoxicillin and potassium clavulanate	284	35.9%
	Penicillin	23	2.9%
	Cefpodoxime	18	2.3%
	Cephalexin	33	4.2%
	Cefuroxime	62	7.8%
	Azithromycin	86	10.9%
	Clarithromycin	26	3.3%
	Metronidazole	69	8.7%
	Sulfamethoxazole and trimethoprim	10	1.3%
	Ciprofloxacin	23	2.9%
	Moxifloxacin	15	1.9%
	Levofloxacin	4	0.5%
	Doxycycline	9	1.1%
Clindamycin	14	1.8%	
I do not remember	347	43.9%	

**Table 3**  
Source of information of self-medication with antibiotics.

Variables	Frequency	Percent
Friends and family	113	9.6%
Pharmacist advice	19.7	19.7%
Previous doctor's prescription	432	36.6%
Advertisements	313	26.5%
Others	90	7.6%

#### 4. Discussion

Approximately 48.5% of subjects in our study are using antibiotics without prescription which seems consistent with two local studies that targeted hospital-visited participants and actual residents (AlRasheed et al., 2016; El Zowalaty et al., 2016). Among 681 hospital visitors, 78.7% reported utilizing antibiotic without prescription, and among random sample of 1310 Saudi residents, 63.3% admitted purchasing antibiotics without prescription. This tremendous usage of non-prescribed antibiotics raises the concern of emergence of antimicrobial resistance. Of all the Gulf Corporation Council (GCC) countries, which include Saudi Arabia, Kuwait, Qatar, Bahrain, Oman, and Emirates, Saudi Arabia has the highest prevalence of Gram negative resistant pathogens (Aly and Balkhy, 2012). Saudi and Kuwait were associated with the highest prevalence of Gram positive resistant pathogens. In addition to the emergence of antimicrobial resistance, the proper usage of antibiotics among these users is being questioned and in turn may

impact their health negatively. According to a study conducted in Greece where the use of non-prescribed antibiotics is evident, they found that adults who self-medicate themselves with antibiotics are more prone to discontinue therapy earlier, not follow the correct dosage instructions, and store the remaining antibiotics for future usage (Mitsi et al., 2005). In Saudi Arabia, a study found that more than 70% of people who self-medicate themselves with antibiotics then stopped the antibiotics before completing the course as they felt better (AlRasheed et al., 2016).

Amoxicillin/potassium clavulanate and amoxicillin are the two common utilized or dispensed antibiotics without prescription in our study or countries where the sale regulation of antibiotics without prescription is lacking or not implementing. Amoxicillin was the most used antibiotic as self-medication in Jordan (53.6%), Yemen (52.3%), Emirates (46.3%), Indonesia (46%), Greece (27.7%), and Sudan (23.1%) (Al-Azzam et al., 2007; Afadly et al., 2017; Abasaheed et al., 2009; Hadi et al., 2008; Mitsi et al., 2005; Awad et al., 2005). Also, Amoxicillin was the most dispensed antibiotics without prescription in Brazil (74%) while amoxicillin/potassium clavulanate was the most dispensed antibiotic without prescription in Syria (50.5%) (Volpato et al., 2005; Al-Faham et al., 2011). In Spain, simulated clients visited 69 pharmacies seeking for antibiotic recommendation were given amoxicillin for sore throat in 87% of cases from 21 pharmacies and for acute bronchitis in 100% of cases from only 10 pharmacies (Llor and Cots, 2009). Amoxicillin and amoxicillin/potassium clavulanate are considered as effective and safest first line antimicrobial agent for upper respiratory tract infection, otitis media, and dental infections. (Shulman et al. (2012), Lieberthal et al. (2013), Bahl et al. (2014)) They have

been used frequently as self-medication for managing these conditions in our study and worldwide (Al-Azzam et al., 2007; Afadly et al., 2017; Abasaheed et al., 2009; Hadi et al., 2008; Mitsi et al., 2005; Awad et al., 2005; Vaananen et al., 2006). Uncontrolled use threatens the availability of these agents as effective and safe medication in the future. No well-structured epidemiological surveillance of antibiotic resistance was conducted in Saudi Arabia; however, the global ongoing surveillance study titled “The Survey of Antibiotic Resistance (SOAR)” that is aiming in study the susceptibility of community-acquired respiratory tract isolates was conducted in adjacent countries in Bahrain, Lebanon, Oman and the United Arab Emirates (UAE) throughout different time periods (Jamsheer et al., 2016). They found that susceptibility to amoxicillin (with or without clavulanate) reduced significantly from >98% in 2004 to 89.9% in 2013.

Several reasons for self-medication have been identified in the literature. The most common reason for self-medication is mild illness, followed by the cost of a physician’s visit, the previous experience of using a particular medication, the long waiting time to visit a physician, and the lack of time and health insurance (Shaghghi et al., 2014). In our study, the top three reasons for practicing self-medication with antibiotics were the previous experience of using a particular antibiotic (52.10%), followed by the low severity or seriousness of diseases (36%), and lack of time (22.30%). The financial constraints might not be a vital reason for self-medication with antibiotics in Saudi Arabia since most governmental hospitals are providing free medications and medical consultations (Bin Abdulhak et al., 2011). Friends, relatives, and family, previous prescription by physician, and a pharmacist recommendation are the most frequent source of self-medication worldwide (Shaghghi et al., 2014). Relatively similar results are shown in our study. The top three sources of information regarding the self-medication with antibiotics that were reported by our subjects are the previous doctor’s prescription (36.6%), advertisements from websites, social media, TV, or reading (26.5%), and pharmacist advice (19.7%). Although pharmacists should be the gatekeepers for restricting antibiotics overprescribing, they may participate in this phenomenon. According to a study was done in Riyadh, Saudi Arabia on 327 pharmacies that have had two visits by two investigators who simulated having a relative with a specific clinical illness. They found that 77.6% of the pharmacies gave the antibiotics without prescriptions, 95% of them recommended antibiotics even without the patient request, no one of the pharmacists asked about history of antibiotics allergies or drug interactions, and only 23% of pharmacists asked about pregnancy status before giving the antibiotics (Bartlett et al., 2013).

Although our study is an online-based survey that some elderly or technology illiterates may be not approachable, it is still a convenient method since the most of antibiotics users without prescription were commonly reported from adult population in previous studies. In addition, the adult literacy rate is relatively high in Saudi Arabia (Strategy and at Glance: Saudi Arabia, 2017). This study is considered a community-based survey that is different from other previous studies where data were collected from population visiting healthcare services or pharmacies. In addition, it was not restricted to one area. It aimed to investigate the prevalence of self-medication with antibiotics in the whole Saudi Arabia.

## 5. Conclusion

Study results revealed that the prevalence of self-medication with antibiotics in Saudi community is relatively high. The majority of illness for which people are seeking self-medication with antibiotics could be probably of viral origin and unnecessary use of antibiotics promote the emergence of new-strains of resistant

pathogens and the incidence of unwanted adverse effects. Therefore, health authorities should take serious steps to implement the approved law by ministry of health in 1978 that abandons antibiotics sales without prescription. They also should stimulate the development of national evidence-based guidelines controlling the use and prescription patterns of antibiotics. In addition, health awareness campaigns to prevent antibiotic misuse should be conducted to pharmacists, prescribers and general public to halt the global and local growth resistance of utilized antibiotics. These campaigns should be not restricted to health care facilities, and should be conducted in public areas such as malls and shopping areas.

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