

Brief Original Article

Self-medication with antibiotics and awareness of antibiotic resistance among population in Arar city, Saudi Arabia

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Abstract

Introduction: Self-medication with pharmaceutical products can be defined as the use of these products without a medical prescription, and the production, distribution, and sale of these products are the client's responsibility, while they think it is within rational usage. Among these products, antibiotics remain the most serious problem leading to the spread of antibiotic resistance, with consequences of increased morbidity, mortality, and extended hospital stays.

Methodology: This is a cross-sectional study aimed to estimate the prevalence of self-medication with antibiotics among Arar city population and assessing their awareness of antibiotic resistance. Data had been collected through a self-administered validated online questionnaire. Data entry and analysis were performed using a statistical package for the social science program (SPSS) version 20.

Results: The overall number of respondents to our survey was 462, with 56.7% female and 43.3% male participants. The prevalence of self-medication with antibiotics was (77.5%). The main reasons for self-medication with antibiotics were ease of use (54.6%) and cost-saving (24.8%). When asked about what they think about self-medication with antibiotics for self-care, 20.1% of our participants thought that it is a good practice and 41.6% thought that it is an acceptable practice. 81.4 % of respondents thought that antibiotic resistance occurs when your body becomes resistant to antibiotics and no longer works well

Conclusions: In the Northern region, despite the open and rapid access to medical care services, it appears that a high proportion of young adult population prefers custom antibiotics without a medical prescription.

Key words: Self-medication; antibiotics; antibiotic resistance.

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Introduction

Self-medication with pharmaceutical products can be defined as the use of these products without medical prescription, and the production, distribution, and sale of these products are the client's responsibility, while they think it is within the rational usage [1]. Among these products, antibiotics remain the most serious problem. The source of the antibiotics is often the remaining doses of the previous treatment course and can be donated by a family member or a close friend [2]. In Saudi Arabia, the reasons behind self-medication need more studies, because it is not studied well from the community viewpoint [3]. An accurate estimation of the prevalence and the reasons for this problem can provide policymakers with ideal solutions. With self-medication with antibiotics emerges the problem of resistance. Antibiotic resistance occurs when bacteria can beat the drugs used to kill them. One of the most urgent clinical issues globally is the antibiotic

resistance dissemination [4]. In the U.S., about 2.8 million people are infected annually with antibiotic-resistant bacteria or fungi, with more than 35,000 mortalities [5].

Globally, the prevalence of self-medication with antibiotics was found to be greater in Southern European countries ranging from Greece at 76% to Portugal at around 19%, with middle rates in East Europe countries specifically in Romania and Poland, at 41.1%. In the Middle East, Saudi Arabia accounted for the highest rate with about 80%, while the lowest rate reported from Jordan with 40.7%. Studies performed in central African countries reported almost equal rates of self-medication with antibiotics around 80% in Nigeria and 79% in Guatemala [6]. 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 [3]. From the Jordanian survey

40.4% reported having used an antibiotic without a prescription [7]. Among Cairo university students about 77.7% of the students used antibiotics without prescriptions with no statistical differences by age, sex, residence, or type of universities [8]. Interestingly the use of self-medication antibiotics was “observed to be more frequent in younger aged individuals belonging to low- or middle-income groups”, and the “prevalence rate was reported to be high among the South Asian lay public and may be a major contributor to antibiotic resistance” [6].

Methodology

Our current study is a cross-sectional study aimed to estimate the prevalence of self-medication with antibiotics among Arar city population and assess their awareness of antibiotic resistance as a consequence of the irrational use of antibiotics. Arar city is the capital of the Northern Border Region of Saudi Arabia with an estimated population of 148,540 as the last census indicates.

The sample size (n) was computed using a valid formula for determining the sample size for cross-sectional study.

$$n = z^2 p(1 - p)/d^2$$

where n represents the sample size, p represents the percentage, picking a choice was 32.6%, Z represents

1.96 for a confidence level 95%, and d represents 0.05 for confidence interval and acceptable margin error of 5% [9].

Depending on this formula, the minimum sample size was found to be 338, and the least sample size was 372 after adding a 10% non-response rate.

A self-administered validated online disseminated questionnaire [2] was used to collect the participant data after elaboration of the study objective and taking along with the consent to participate in the study. The questionnaire was converted to Arabic and converted back to English by a language expert to ensure consistency and face validity. The questionnaire was prepared in three sections: the first section contained the sociodemographic characteristics of respondents; the second section handles questions about the behavior of self-medication with antibiotics; the third section contained questions on awareness about antibiotic resistance. Thereafter, the questionnaire was prepared as an online form and a simple random technique was used for data collection, and the data were collected during January and February 2021. Adults aged between 20 and 65 years were included in the study, illiterates, and those under 20 and over 65 were excluded from the study.

Data entry and analysis was performed using the statistical package for the social science program (SPSS) version 20. Data were presented in tables and graphs according to the study objectives. Descriptive statistics was used to analyze the responses and the results were presented as percentages and frequencies. The Chi-squared test was used to estimate the association between sociodemographic variables and self-medication practice and all *p* values < 0.05 was considered statistically significant.

Results

The overall respondent to our survey was 462, their sociodemographic data was shown in Table 1, females constitute (56.7%), while males were 43.3%.

Table 2 represents the practice of self-medication with antibiotics. A majority (77.5%) of participants were self-medicated with antibiotics. The main reasons for self-medication with antibiotics were convenience 54.6%, and cost saving 24.8%.

Table 3 showed the attitude of participants towards self-medication with antibiotics. When the participants were asked about what they think about self-medication with antibiotics for self-care, 20.1% thought that it is a good practice, 41.6% thought that it is an acceptable practice, and 21.4% thought that one can successfully

Table 1. Sociodemographic characteristics of participants (n = 462).

Parameter	N (%)
Gender	
Male	258 (43.3)
Female	338 (56.7)
Age	
Less than 20	59 (9.9)
20- 30	170 (28.5)
31 - 40	184 (30.9)
41 - 50	157 (26.3)
51 - 60	25 (4.2)
More than 60	1 (0.2)
Education level	
Primary	6 (1.0)
Secondary	152 (25.5)
University graduate	409 (68.6)
Postgraduate graduate	29 (4.9)
Occupation	
government sector	319 (53.5)
private sector	38 (6.4)
self employed	3 (5.0)
Student	128 (21.5)
unemployed	108 (18.1)
Income level	
less than 3000	185 (31.0)
7000-3000	116 (19.5)
15000-8000	227 (38.1)
more than 15,000	68 (11.4)

treat common infectious diseases with antibiotics on their own.

The main complaint(s) for using antibiotics, the basis of antibiotics selection, and the causes of stopping antibiotics were represented in Figures 1, 2, and 3 respectively. Still, sore throat constitutes about 32 % of all other complaints. More than 250 participants reported that they utilize a previous doctor’s prescription as a basis for the new encounter of self-medication with antibiotics. The result also showed that the advertisement is not a crucial element in the basis of antibiotics selection for self-medication, which indicates some rational governmental policies which rule the medicines advertisement nationally. More than 30% of participants stop their self-medication course of antibiotics directly after symptoms disappear, which is the leading cause of resistance emergence among the population.

Table 4 represents the awareness of the respondents about antibiotic resistance (AR), 81.4 % thought that antibiotic resistance occurs when your body becomes resistant to antibiotics and no longer works well, and 76.4% thought that many types of infections are becoming increasingly resistant to antibiotic treatment.

Figure 1. Reasons for using antibiotics.

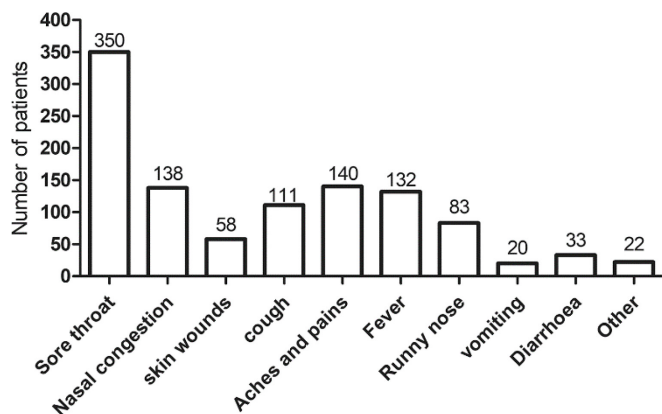
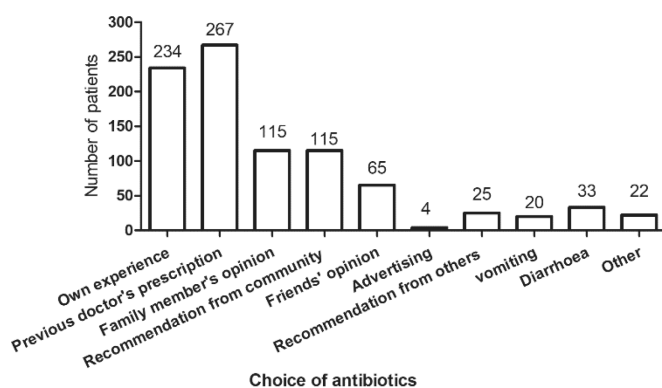


Figure 2. Basis of antibiotics selection.



66.7% thought that when bacteria are resistant to antibiotics, it may be difficult or impossible to treat the infection they cause, 74.5% reported that antibiotic resistance is an issue that can affect me or my family,

Table 2. The practice of self-administration of antibiotics (n = 462).

Parameter	N (%)
Self-administration of antibiotics	
Yes	462 (77.5)
No	134 (22.5)
Choice of antibiotics depend on	
Type of antibiotic	339 (50.3)
Indications for use (reasons)	116 (17.2)
The side effects	94 (13.9)
Trade mark	60 (8.9)
Price of antibiotics	52 (7.7)
Other (specify below)	13 (1.9)
Place to get antibiotics for self-medication	
Community pharmacies	310 (49.7)
health practitioners	100 (16.0)
Remnants of a previous prescription	170 (27.2)
Online shopping/e-pharmacy	30 (4.8)
other (select)	14 (2.2)

Table 3. The attitude of participants towards self-administration of antibiotics (n = 462).

Parameter	N (%)
Think about self-medication with antibiotics for self-care	
Good practice	93 (20.1)
Bad practice	177 (38.3)
Acceptable practice	192 (41.6)
Think you can successfully treat common infectious diseases with antibiotics on your own	
Yes	99 (21.4)
No	133 (28.8)
I'm not sure	230 (49.8)

Figure 3. Causes of stopping the use of antibiotics.

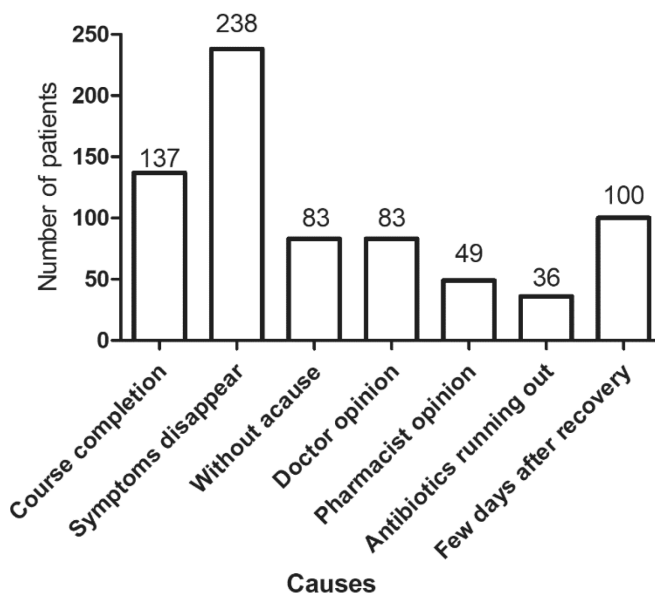


Table 4. Awareness of subjects regarding usage of antibiotics (n = 462).

	Correct	False
Antibiotic resistance is a phenomenon in which drug potency and efficacy is declined and diminished	376 (81.4%)	86 (18.6%)
The treatment against various plethora is infections is proving to be inefficient day by day	353 (76.4%)	109 (23.6%)
The resistance of bacteria will render antibiotics ineffective and it will become impossible to treat variant infections	308 (66.7%)	154 (33.3%)
I or my family could be a victim of antibiotic resistance	344 (74.5%)	118 (25.5%)
This region is devoid of the resistance rendered by antibiotics	215 (46.5%)	247 (53.5%)
Regular intake is thought to be associated with AR	266 (57.6%)	196 (42.4%)
Intra-individual spread of this AR phenomena	300 (64.9%)	162 (35.1%)
Infections originated from AR could enhance risks especially during surgeries or treatments of malignancies	366 (79.2%)	96 (20.8%)

46.5% thought that antibiotic resistance is a problem in other countries but not here, 57.6% reported that antibiotic resistance is only a problem for people who take antibiotics regularly, 64.9% regarded that antibiotic-resistant bacteria can be passed from person to person, 79.2% thought that antibiotic-resistant infections can make medical procedures such as surgery, organ transplants, and cancer treatment riskier, there is no significant correlation between self-administration of antibiotics and gender but there is a significant correlation between self-administration of antibiotics and age, occupation, education level, and income (Table 5).

Discussion

According to our study, most of the participants (77.5%) were self-medicated with antibiotics, the reasons for self-medication with antibiotics were convenience of use and cost saving with percent of 54.6%, and 24.8% respectively. This was higher than reported by El Zowalaty *et al.* [10], as 63.6% of participants reported using antibiotics without a prescription from pharmacies. Similar to our results, a study by Jorgji *et al.* [11] reported that 78.14% of the participants had received antibiotics without a medical prescription. Compared to the prevalence of self-medication with antibiotics among health care provider, a current Ethiopian study had reported it in a one-month recall period to be (22.7%), and they stated that the

Table 5. The relationship between self-administration of antibiotics and sociodemographic characteristics of participants.

	Self-administration of antibiotics		Total (N = 462)	p value
	Yes	No		
Gender				
Male	192	66	258	0.113
Female	270	68	338	
Age (in years)				
< 20	0	59	59	0.001
20 to 30	132	38	170	
31 to 40	160	24	184	
Between 40 and 50	150	7	157	
51 – 65	20	5	25	
> 65	0	1	1	
Literacy level				
Primary	5	1	6	0.001
Secondary	83	69	152	
University graduate	351	58	409	
Postgraduate graduate	23	6	29	
Employment				
Governmental	285	34	319	0.001
Private sector	29	9	38	
Self-employment	3	0	3	
Student	53	75	128	
Unemployed	92	16	108	
Income level				
less than 3000	117	68	185	0.001
3000-7000	93	23	116	
8000-15000	197	30	227	
more than 15,000	55	13	68	

main reason “given for this practice was being familiar with the treatment options” [12].

The current study found that 18.9% stopped the antibiotics upon completion of the course (treatment course), while 32.8% stopped the antibiotics after symptoms disappear, 13.8% after a few days of recovery, while El Zowalaty *et al.* reported that 71.1 % did not finish the antibiotic course as they felt better [10]. Jorgji *et al.* [11] found that earlier discontinuation of antibiotics (29.05%) was reported when symptoms disappeared, 18.9% stopped the antibiotics upon completion of the course (treatment course), and 32.8% stopped the antibiotics after symptoms disappear. Pechere [13] noted that patients frequently report discontinuing antibiotic therapy when they begin to feel better which might be the very reason why they would have leftover antibiotics.

In this study the reasons for self-medication were sore throat, nasal congestion, skin wound, cough, aches and pains, fever, runny nose, vomiting, and diarrhea, Jorgji *et al.* study [11] stated that the most common reasons for self-administration of antibiotics were fever in 172 patients (29.05%), sore throat in 172 (29.05%), cough in 87 (14.70%) and runny nose in 42 (7.09%).

The fight against antibiotic resistance (AR) is nowadays a world priority. Antibiotic resistance is largely associated with the overuse of antibiotics and a lack of awareness of the problem. Regarding awareness in terms of AR, a large proportion (81.4%) of our study participants had the opinion that AR can be declared when the body becomes resistant to antibiotics and no longer works well. A previous study reported similar results as (70.7%) of participants falsely believe that antibiotic resistance occurs when their body becomes resistant to antibiotics [14]. Emelda *et al.* [15] reported that (50.3%) agreed that their prescribing behavior could promote antimicrobial resistance. The outcomes of enhanced antimicrobial resistance are pretty detrimental in terms of increased stay in tertiary care setups as well as the enhanced rate of mortality and complicated infections as well [16].

In our study, there is no significant correlation between self-medication with antibiotics and gender, yet there is a significant correlation between self-medication with antibiotics and age, occupation, education level, and income level. Previous surveys worldwide reported that age, education, and gender were significant predictors of awareness of antibiotic use [17–20]. Specifically, lower age, lower education, and females were less likely to be aware of prescription medicine, antibiotics use, and AR. A study in Poland found that people who were young and had lower

education were more likely to believe that antibiotics could protect against viral infections [20].

Conclusions

In the Northern region, despite the open and rapid access to chief care services, it appears that a high proportion of young adult population prefers to custom antibiotics without medical prescription. Therefore, the restriction of sale of drugs with potentially harmful effects should be executed effectively with monitoring arrangements between the physicians and pharmacists, this depicts the need for creating public awareness that antibiotics should only be used with a valid prescription and demands appropriate counselling on finishing the course as prescribed to ensure that the effectiveness of antibiotics is preserved, and also to conduct an educational campaigns that focus on how antibiotic resistance develops, how resistant bacteria are spread, as well as the role of each one in mitigating resistance. Therefore, there is an ongoing need for multinational periodical studies based on standardized methodologies, to get a comprehensive understanding of the international practices and prevalence of self-medication with antibiotic. In addition to this, future research is needed to sort out the influences of factors associated with self-medication with antibiotics at different levels of healthcare system utilization, in order to design effective interventions in these settings.

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