



FACTORS INFLUENCING MISUSE OF ANTIBIOTIC THERAPY IN AL-QASSIM REGION, SAUDI ARABIA

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ABSTRACT

Globally, about 66% of oral antibiotics are taken without prescription with an aim to treat diseases which are mostly viral or protozoal in origin such as malaria, flu and pneumonia. In the developing countries, recent developments in healthcare and improvement in income have increased the use of antibiotics. This study is aimed to assess the pattern of antibiotic misuse in Al-Qassim region and factors associated with this misuse. This is a cross sectional community-based study. About 596 study participants selected and recruited randomly from localities of Al-Qassim region in Saudi Arabia. After obtaining written consents, the data were gathered using questionnaires which consisted of two parts namely Part1 for demographic variables and part B for data about behaviors in antibiotic use. The descriptive statistics were obtained for the distribution and patterns of antibiotic misuse. To adjust for confounding effect, a multiple logistic regression was performed. Thus, demographic variables were introduced to the model as predictors and the use of prescribed antibiotics as a dependent variable. Approximately one third of the respondents used antibiotics without doctors' prescriptions, while pharmacists were consulted in the 11% of the respondents. About 19% of the respondents practiced self-medication. Age, income and the PhD level of education were found to be significantly predicting the possibility of taking antibiotics with prescriptions. Those who aged 30 years old or more were 1.76. They were more likely to use antibiotics with doctor's prescription than those who aged <30 years old. The respondent with low income were more likely to take antibiotics based on the medical prescriptions. We concluded that a prevalence of antibiotics misuse is high in Al-Qassim region but the compliance with drug instructions are generally good.

KEYWORDS: *Antibiotic, Misuse, Self-medication, Prescription, Behavior*



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INTRODUCTION

Misuse of antibiotics is an emerging health problem. It leads to the appearance of a serious challenge of bacterial resistance to antimicrobial agents. Other consequences of antibiotic misuse include increased costs of healthcare, unsuccessful treatment, increased duration of hospitalization.¹ Misuse of antibiotics includes self-medication, poor compliance with antibiotic treatment, insufficient quality control of antibiotics available in the market, and inadequate monitoring and surveillance of the health authorities.² Globally, about 66% of oral antibiotics are taken without prescription with the aim to treat diseases which are mostly viral or protozoal in origin such as malaria, flu and pneumonia.³ In the developing countries, recent development in healthcare and improvement in income have increased the use of antibiotics. However, in developed countries, antibiotics accessibility is restricted due to the prescribed antibiotics. Thus, the majority of studies about antibiotics misuse have been conducted in the countries of Middle East, African and Central Asian countries.⁴⁻⁹ In Saudi Arabia, recently patients visited community pharmacies to obtain the antibiotics without medical prescription. In 2013, a cross sectional study in pharmacists was conducted to assess their responses to self-medication.⁵ The findings showed that about 98% of the pharmacists sold the requested antibiotics without prescriptions. The cause reported by the pharmacists was "if we did not dispense the antibiotics, other pharmacists would do. Another study conducted in Makka indicated that all the surveyed community pharmacies dispensed antibiotics without prescriptions.¹⁰ This study was aimed to assess the pattern of antibiotic misuse in Al-Qassim region and to assess factors associated with this misuse.

METHODS

This is a cross sectional community-based study where 534 study participants were selected randomly from localities of Al-Qassim region in Saudi Arabia. Four area from which the participants were selected in approximately equivalent numbers of participants. In Alras, Braidah, and Aldwadami areas, the concept of path-finder sampling was followed in each area. Thus, one sampling site was selected from the capital town in the area and then two sampling sites from other important towns, then four sampling sites from north, south, west and

west parts of the selected area. The gender distribution was biased towards the majority of males, therefore we included female students and staff from the Faculty of Dentistry (girls' sector). After obtaining written consents, the data were gathered using questionnaires consisted of two parts namely part 1 for demographic variables and part B for data about behaviors in antibiotic use. Ethical clearance was obtained from ethical committee in Saudi Commission of Health Specialties.

STATISTICAL ANALYSIS

The data were analyzed using Statistical Package of Social Sciences (SPSS), version 22. The descriptive statistics were obtained for the distribution and patterns of antibiotic misuse. To adjust for confounding effect, a multiple logistic regression was performed. Thus, demographic variables were introduced to the model as predictors and the use of prescribed antibiotics as a dependent variable and the level of significance was set at 0.05.

RESULTS

Out of 596 randomly selected participants, 56.4% were females and 43.5% were males. The majority of the respondents were 30 years old or younger, while only 3.9% were over 50 years old. About 69% of the respondents had some college or had finished bachelor degree and approximately 5% had completed postgraduate degree. Less than half of the respondents had a monthly income of <2000 SAR and only 15% earn > 10000 SAR per month. About a third of the respondents were health staff, and they were selected from the faculty of Dentistry, Alras, Braidah, and Aldwadami, localities of Al-Qassim region (Table 1). The answers for questions investigating antibiotic misuse indicated that 29% of the respondents took the antibiotics in the last month, while 51.4% used antibiotics more than three months ago. Approximately, one third of the respondents used antibiotics without doctors' prescriptions, while pharmacists were consulted in the 11% of the respondents. About 19% of the respondents practiced self-medications. Most of the respondents who took antibiotics without prescriptions had non-economic causes of this choice. Approximately, 90% of the respondents followed the instructions about timing of the antibiotics and 86% followed the instructions regarding dosing of the medications. The pharmacy was indicted by 88% of the participants as the

source of antibiotics they took. The antibiotics were taken mostly for complaints such as flu, toothache and sore throat (Table 2). As shown in table 3, the logistic regression modeling was done to identify important factors influencing taking the antibiotics without medical prescriptions. Age, income and the PhD level of education found to be significantly predicting the possibility of taking antibiotics with prescriptions. Those who aged 30 years old or more

were 1.76. They were more likely to use antibiotics with doctor's prescription than those who aged <30 years old. The respondent with low income were more likely to take antibiotics based on the medical prescriptions. Education level was not a significant predictor in this model except for PhD level holder who were about 13 times more likely to use antibiotics without medical prescriptions than those who had primary level of education.

Table 1
Demographic characteristics of the respondents

Variables	Frequency	Percent (%)
Gender: (n= 596)		
Male	259	43.5
Female	337	56.4
Age: (n=567)		
18-30 years old	404	71.3
31-40 years old	94	16.6
41-50 years old	47	8.3
51-60 years old	16	2.8
>60 years old	6	1.1
Education: (n=589)		
Primary	12	2.0
Intermediate	32	5.4
Secondary	109	18.5
University level	406	68.9
Postgraduate	29	4.9
Income per month: (n=558)		
< 2000 SAR*	250	44.8
2000-6000 SAR	132	23.7
6001-10000 SAR	93	16.7
> 10000 SAR	83	14.9
Health staff: (n= 581)		
Yes	202	34.8
No	379	65.2
Sampling area: (n=596)		
Alras	163	27.3
Braidah	110	18.5
Dentistry Faculty (Girls)	128	21.5
Aldwadmi	120	20.1

*Saudi Arabia Riyals

Table 2
The misuse of antibiotics in Al-Qassim region, Saudi Arabia

Variables	Frequency	Percent (%)
When did the last time you take antibiotics (n=589)		
Last month	146	24.8
Two months ago	80	13.6
Three months ago	60	10.2
More than three months ago	303	51.4
You took the antibiotics based on (n= 577)		

Doctor (prescriptions)	383	66.4
Nurse	4	0.7
Pharmacist	65	11.3
Friends or relatives	12	2.1
My opinion	109	18.9
Others	4	0.7
Reasons of taking unprescribed antibiotics (n=194)		
Economic causes	37	19%
Other causes	157	81%
Did you follow the instructions about timing of the antibiotic (n=568)		
Yes	452	79.6
No	116	20.4
Did you follow the instructions about dose of the antibiotic (n=565)		
Yes	485	85.8
No	80	14.2
Source of the antibiotic (n=544)		
Pharmacy	479	88.1
Friends or relatives	48	8.8
Already available in the home	17	3.1
Complaint to which antibiotic was taken (n=581)		
Flue	224	38.6
Toothache	112	18.8
Sore throat	109	18.3
Others	136	24.3

Table 3

Logistic regression for modeling the associations between demographic characteristics and taking the antibiotics without medical prescriptions

Variables	Reference group	P value	OR	95% CI for OR	
				Lower	Upper
Age	<30 years old	0.42	1.76	1.022	3.015
Income	>10000 SAR per month	0.041*			
less than 2000		0.005*	3.015	1.397	6.509
2000-6000		0.022*	2.379	1.132	4.999
6001-10000		0.121	1.837	.852	3.960
Education	Primary level of education	0.086			
Intermediate level		0.233	4.715	.368	60.324
Secondary level		0.712	1.375	.253	7.464
Some university		0.770	1.260	.268	5.931
Bachelor education		0.695	1.360	.292	6.340
Master		0.181	2.784	.620	12.499
PhD		0.044*	12.970	1.076	156.404

OR= Odds Ratio, CI= Confidence Interval, SAR= Saudi Arabia Riyals, *Significant differences

DISCUSSION

The prohibition of purchasing antibiotics without medical prescriptions in Saudi Arabia was not yet enforced when this study was carried out. However, the health authorities in Saudi Arabia conducted strict successful campaigns to monitor the enforcement of this policy in the recent previous

months. This study investigated the misuse of antibiotics when they were available as over-the-counter (OTC) medication in the pharmacies. The characteristics of the included participants showed that the majority was educated persons selected from shopping centers, colleges and hospitals in Al-Qassim region. The findings of our study revealed that approximately two thirds of the respondents used prescribed antibiotics. The reasons for taking

non-prescribed antibiotics were not financial as 81% of the respondents stated. As the hospitals provided free medical services for Saudi people. Everyone was supposed to see the doctor first to diagnose the diseases and then prescribe free antibiotics. Thus, low economic status was not the cause for taking non-prescribed antibiotics. Furthermore, regression findings of the study showed that high-income respondents were more likely to use non-prescribed antibiotics. In other words, those who have more money were more likely to purchase the antibiotic from community pharmacies. The present study found 19% prevalence of antibiotic by self-prescription which was higher than that found by Mossa et al.¹¹ in Ethiopia and Widayati et al.¹² in Indonesia who reported a prevalence of 6.7% and 7.3% respectively. Whereas, it was less than a prevalence reported by other studies conducted in Sudan¹³, UAE¹⁴, Egypt¹⁵, and other region in Saudi Arabia⁴.⁹ These differences can be explained by different characteristics of populations and health systems. In our study, respondents took antibiotics for complaints such as flu and sore throat which are usually viral in adults with no indications for antibiotic use. Other studies conducted with different populations reported similar findings.^{9,16-17} About 10% of the respondents of the present study said that they did not follow the instructions concerning timing of the antibiotics and 14% did not follow the instructions regarding the dosage of the medications. These are important indicators of antibiotic misuse because these might exacerbate the emerging problem of bacterial resistance.¹⁸ In the present study, the results of logistic regression revealed that gender, occupation (being a health staff or not) and region were not significant predictors for taking prescribed antibiotics. These results are consistent with the previous study conducted in Riyadh region.^{9,19} However they disagree with the findings of other studies.¹³⁻¹⁵ However, age, income and the PhD level of education were found to be significantly predicting the possibility of taking prescribed antibiotics. Those who aged 30 years old or more were 1.76. They were more likely to use antibiotics with

doctor's prescription than those who aged <30 years old. This can be attributed to the fact that older age individuals are more familiar with doctors and healthcare. In the absence of economic determinant of health seeking behavior as in Saudi Arabia, young adults are less likely to go to the hospital or consult doctors than older patients.²⁰ This can be supported by the regression results where respondents with low income were found more likely to take antibiotics based on the medical prescriptions. Thus, low income people are more likely to use free medical services represented by prescribed antibiotics. This study had limitations regarding the selected sample. The majority of the respondents were highly educated persons which reflected special characteristic of the respondents. No attempt was made to identify the characteristics of non-respondents and to compare them with the respondents' characteristics.

CONCLUSION

We concluded that a prevalence of self-prescription of antibiotics is higher in Al-Qassim region but the compliance with drug instructions are generally good. Age, income and the PhD level of education were found to be significantly predicting the possibility of taking antibiotics without prescriptions.

AUTHORS CONTRIBUTION STATEMENT

Otaibi and Almutairi plan to the study and built the conceptual framework of the presented idea. Otaibi and Almutairi developed the theory and performed the computations. Al-Namshan and Al Dhohayan verified the analytical methods. Rakan Alotibi contribute to the writing of the manuscript. All authors discussed the results and contributed to the final manuscript.

CONFLICT OF INTEREST

Conflict of interest declared none.

REFERENCES

1. Sclar D, Tartaglione T FM. Overview of issues related to medical compliance with implications for the outpatient management of infectious diseases. *Infect agents Dis.* 1994;3(5):266–73. Available from: <https://europepmc.org/abstract/med/7866659>
2. Okeke IN, Laxminarayan R, Bhutta ZA, Duse AG, Jenkins P, O'Brien TF, et al. Antimicrobial resistance in developing countries. Part I: recent trends and current status. *Lancet Infect Dis.* 2005;5(8):481–93. DOI:10.1016/s1473-3099(05)70189-4

3. Zelikow P. The Global Infectious Disease Threat and Its Implications for the United States. *Foreign Aff.* 2000;79(4):154. DOI:10.2307/20049847
4. Elberry A, Shaikha A, Al-Marzoukia A FR. Evaluation of non prescribed antibiotic use among children with upper respiratory tract infection. *Int Res J Pharm Pharmacol.* 2012;2(6):147–52.
5. Al-Mohamadi A, Badr A, Bin Mahfouz L, Samargandi D, Al Ahdal A. Dispensing medications without prescription at Saudi community pharmacy: Extent and perception. *Saudi Pharm J.* 2013;21(1):13–8. DOI:10.1016/j.jsps.2011.11.003
6. Khalil H, Abdullah W, Khawaja N, AlSalem A, AlHarbi S SH. Self-prescribed antibiotics by Saudi patients as a routine self-management of dental problems. *Life Sci J.* 2013;10(4):1939–42. Available from: http://www.lifesciencesite.com/ljsj/life1004/257_21724life1004_1939_1942.pdf
7. Bin Abdulhak AA, Al Tannir MA, Almansor MA, Almohaya MS, Onazi AS, Marei MA, et al. Non prescribed sale of antibiotics in Riyadh, Saudi Arabia: A Cross Sectional Study. *BMC Public Health.* 2011;11(1). DOI:10.1186/1471-2458-11-538
8. Salam M, Al Anazi M, Al-Jeraisy M. Prevalence and predictors of antibiotic prescription errors in an emergency department, Central Saudi Arabia. *Drug Healthc Patient Saf.* 2015;103. DOI:10.2147/dhps.s83770
9. Alotaibi NN, Almutairi MD, Al-Namshan YZ. Misuse of Antibiotics Therapy in General Population of Saudi Arabia. *Egypt J Hosp Med.* 2018;70(6):1056–61. DOI:10.12816/0044362
10. AlQasimi MS MM. Medications without Prescription at Saudi community: extent and Perception. *Br J Med Heal Res.* 2016;3(4):83–91. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3745069/>
11. Wabe N, Ahmed D, Angamo M. Self-Medication with Antibiotics and Antimalarials in the Community of Silte Zone, South Ethiopia. *TAF Prev Med Bull.* 2012;11(5):529. DOI: 10.5455/pmb.1-1314892446
12. Widayati A, Suryawati S, de Crespigny C, Hiller JE. Self medication with antibiotics in Yogyakarta City Indonesia: a cross sectional population-based survey. *BMC Res Notes.* 2011;4(1):491. DOI:10.1186/1756-0500-4-491
13. Awad A, Eltayeb I, Matowe L TL. Self-medication with antibiotics and antimalarials in the community of Khartoum State, Sudan. *J Pharm Pharm Sci.* 2005;8(2):326–31.
14. Dameh M, Green J, Norris P. Over-the-counter sales of antibiotics from community pharmacies in Abu Dhabi. *Pharm World Sci.* 2010;32(5):643–50. DOI:10.1007/s11096-010-9418-5
15. El-Nimr NA, Wahdan IMH, Wahdan AMH, Kotb RE. 256 Self-medication with drugs and complementary and alternative medicines in Alexandria, Egypt: prevalence, patterns and determinants. *East Mediterr Heal J.* 2015;21(4):256–65. DOI:10.26719/2015.21.4.256
16. Richman PB, Garra G, Eskin B, Nashed AH, Cody R. Oral antibiotic use without consulting a physician: A survey of ED patients. *Am J Emerg Med.* 2001;19(1):57-60. DOI:10.1053/ajem.2001.20035
17. Belkina T, Al Warafi A, Hussein Eltom E, Tadjieva N, Kubena A, Vlcek J. Antibiotic use and knowledge in the community of Yemen, Saudi Arabia, and Uzbekistan. *J Infect Dev Ctries.* 2014;8(04). DOI:10.3855/jidc.3866
18. Austin DJ, Kristinsson KG, Anderson RM. The relationship between the volume of antimicrobial consumption in human communities and the frequency of resistance. *Proc Natl Acad Sci.* 1999;96(3):1152–6. DOI:10.1073/pnas.96.3.1152
19. Abasaeed A, Vlcek J, Abuelkhair M, Kubena A. Self-medication with antibiotics by the community of Abu Dhabi Emirate, United Arab Emirates. *J Infect Dev Ctries.* 2009;3(07). DOI:10.3855/jidc.466
20. Ahmed SM, Tomson G, Petzold M KZ. Socioeconomic status overrides age and gender in determining health-seeking behaviour in rural Bangladesh. *Bull World Health Organ.* 2005;83:109–17. Available from: https://www.scielo.org/scielo.php?pid=S0042-96862005000200011&script=sci_abstract&tlng=fr