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The impact of waiting time in primary care clinics on self-medication with antibiotics: A hospital based study in Saudi Arabia.

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Abstract

The aim of this study was to determine the waiting times in a primary care clinic in the military hospital in the capital city of Saudi Arabia and their impact on self-medication by patients. We performed this nested case-control study from a cross-sectional study involving self-medication with antibiotics at a primary care clinic in the Riyadh Military Hospital. From the cross-sectional study, 289 returned questionnaires were selected to implement the nested study. Both the perceived and the actual waiting times showed significant independent association with the practice of antibiotic self-medication (SMA) with OR 3.64 (CI 2.20-6.00) and 2.44 (CI 1.49-3.99), respectively. Community pharmacies were found to be by far the most common source of antibiotics (85%). The most common ailments for which participants self-medicated were the common cold (67.9%), sore throat (65.5 %) and chest infection (31.5%). The most frequent reason for practicing self-medication with antibiotics was the long waiting time to see a doctor. Prior experience of antibiotic use resulted in SMA in 40.7% of cases and considering the illness not serious enough for consultation with a doctor resulted in SMA in 38.9% of cases. Knowledge about the ineffectiveness of antibiotics for viral infections was significantly higher among patients who were not practicing SMA (p=0.018). However, there was no significant difference in awareness about antibiotic resistance between patients who were practicing self-medication and those who were not. Interventions aimed at preventing self-medication should include reducing both the actual and the perceived waiting time in primary care clinics (PCC). The high prevalence of self- medication with antibiotics at Riyadh Military Hospital PCC indicates that appropriate interventions are required to decrease improper antibiotic use, which may also help in the prevention of antibiotic resistance.

Keywords: Waiting time, Perceived waiting time, Actual waiting time, Self-medication, Antibiotics, Saudi Arabia.

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Introduction

Self-medication is the use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of a prescribed drug for a chronic or recurrent disease or set of symptoms [1]. Self-medication with antibiotics (SMA) is defined as antibiotic usage by humans to treat symptoms or diseases without medical prescription [2]. The consumption of unsupervised medicine, or medicine not prescribed by a physician, can also be known as "over the counter" (OTC) drugs [3]. The side effects of self-medication frequently affect the patient, but side effects such as inappropriate dosages, drug interactions and masked diagnoses also negatively affect the community by increasing drug resistance [4]. Adverse drug events (ADE) are defined as injury or harm resulting from the use of a drug. ADE is a common consequence of SMA but is rarely reported due to the difficulty of follow-up and the need for critical evaluation of evidence [5]. Antibiotic resistance is a problem that is growing globally and which constitutes a real threat to public health, and to health costs, as it can result in the failure of antibiotics to treat and prevent infectious diseases. Inadequate knowledge about antibiotics has been widely described as the major reason for their inappropriate use, and this includes failure to complete treatment, skipping of doses, the re-use of leftover medicines, and a general overuse of antibiotics [6]. The prevalence of antibiotic resistance is directly proportional to the number of antibiotic prescriptions used by patients at a national level, and the prevalence of SMA will contribute to increased use of antibiotics by patients, which will contribute to the increasing antibiotic resistance [7,8]. The prevalence of SMA has been found to be on the increase in Europe, the United States, Pakistan, Jordan, and the United Arab Emirates [9-11]. Saudi Arabia has not yet been documented in relation to the prevalence of its SMA risk. As yet, no studies have been implemented on SMA, and this could be the first such study. The major aim of this study was to determine the waiting time spent in the primary care clinic in the military hospital in the capital city of Saudi Arabia and its impact on self-medication by patients.

Methods

Ethical considerations

Riyadh military hospital gave ethical approval for the study. Verbal consent was obtained from all participants, and they were assured of the confidentiality of the data.

Study design and setting

This study was carried out at Al-Wazarat family medicine center in the military hospital in Riyadh. This center provides complete primary care facilities for all age groups and both genders. We conducted a nested case-control study between September 2012 and July 2013 on the hospital premises. A cross-sectional survey was first conducted with a well-designed questionnaire to select both the cases and the control subjects. Of 300 questionnaires distributed, 289 were completed and returned and these were subdivided into 162 cases and 127 controls. The inclusion criteria for the cases were self-medication with antibiotics within the family (this could include the participant, the spouse or the children). The exclusion criterion was no practice of self-medication with antibiotics in the family during the past year, and those excluded served as control subjects for the study. Only adult Saudi patients were selected, and Illiterate patients were excluded.

Waiting time assessment

In order to identify both an acceptable as well as an accurate length of waiting time for patients before their consultation, 100 participants were piloted in the Al-Wazarat family medicine center using a questionnaire that was developed to estimate the length of waiting time. This questionnaire included questions about the patient's own estimation of whether they had waited for a very long, a long, an acceptable or a short time before their consultation. Based on the results of this pilot study, the mean waiting time for each group (very long, long, acceptable and short waiting times) was calculated. Ninety minutes was the cut-off point that differentiated between the long (including both long and very long) waiting time and the not long (including short and acceptable) waiting time. Thus, the actual waiting time was considered long if the respondents estimated their usual waiting time to be more than 90 minutes, and it was considered not long if it was 90 minutes or less.

Instrument

A self-administered questionnaire was developed by two family physicians to assess the respondents' self-medication with antibiotics and whether it was affected by the patients' length of waiting time (as obtained from the pilot study). To ensure the content and face validity of the questionnaire, two expert researchers in instrument development assessed the validity content of the questionnaire. Slight modifications were made and the translation and back translation method was used. The questionnaire included four sections. The first section included demographic data such as age, gender, occupation, educational level, and marital status. The next section contained assessment questions regarding their perceived and actual waiting time before their consultation, the number of community pharmacists who refused to dispense antibiotics without prescription, and whether antibiotics had been used by the patients, their spouse, or children in the last year. The third section included questions asking whether the respondents practiced self-medication with antibiotics and if so how they obtained these antibiotics (buying them from a pharmacy, using left-over medication, or both), the frequency of self- medication, and a list of ailments that participants would self-treat. Infections such as the common cold, a sore throat, chest infection, ear infection, urinary tract infection, gastroenteritis were included. The respondents were also asked to indicate their reasons for obtaining antibiotics without prescriptions. These reasons included: the long waiting time to see a physician, prior experience of using an antibiotic for the same ailment, financial constraints, the nonchalant attitude of the clinic staff, the illness not being serious enough to require a consultation, trusting the pharmacist's ability in diagnosis and treatment. The last section of the questionnaire assessed the respondents' knowledge of antibiotics and the indications for their application, such as whether an antibiotic is needed for a viral infection of the upper respiratory tract, whether the respondents had heard about antibiotic resistance, and their ability to understand the relationship between using antibiotics without prescription and antibiotic resistance.

A second pilot test was needed to assess the clarity of the questionnaire items, thereby contributing to the face validity of the questionnaire. This pilot test was performed on thirty patients at the Al-Wazarat family medicine center using the Arabic self-administered questionnaire. The final sample size was calculated on the basis of the results of this pilot study. We needed 260 participants based on a power of 80% and a confidence interval of 95%. Taking into account the non-response rate of 4% that occurred with the pilot study, the questionnaire was distributed to 300 participants.

Data analysis

Data were presented and statistically analysed using the SPSS statistical package for Windows, version 21, and differences were considered significant at $p<0.05$. Descriptive results were expressed as frequencies and percentages. Some of the questions had several options to choose from; hence the sum total for the percentage was not always 100%. A Chi square was used to measure if there was a significant difference. The Spearman rank correlation was used to analyse associations between the perceived and actual waiting times.

Results

Out of 300 questionnaires distributed, 289 individuals responded to the survey. The response rate was thus 96.3%. Male respondents made up 47.8% and females 52.2%. Table 1 presents the demographic features of the participants. The mean age of the males and females was 32.7 ± 12.04 and 33.3 ± 10.32, respectively ($p=0.07$). In this study, 162 subjects reported antibiotic self-usage and 127 subjects reported non-self-usage of antibiotics. Equal numbers of each gender were involved in the antibiotic self-usage, whereas, of those not self-using antibiotics, 55.1% were males and 44.9% were females ($p=0.03$). Among the antibiotic self-usage subjects, 54.3% were working, 37% were not working, and 8.7% were students. Of the antibiotic non-self-usage subjects, 47.2% were working,

39.4% were not working, and 13.4% were students (p=0.43 and p=0.14). The majority of subjects from both groups had high school educational qualifications, i.e., 57.4% and 48.8% respectively (p=0.04). In the antibiotic self-usage group, 33.2% had post-graduate qualifications and 9.2% a primary school education. In the antibiotic non-self-usage group, 34.7% were post-graduates and 16.5% had primary school education (p=0.16). The majority of subjects in both groups were married (p=0.05). Of the antibiotic self-usage patients, 90.1% were human resource network (HRN), and 83.5% of the antibiotic non-self-usage patients were HRN (p=0.09).

Table 1. *Demographic features of selected participants.*

S. no	Demographic features	Antibiotic self-usage (n=162)	Antibiotic self-non-usage (n=127)	OR (95% CI)	P-value
1	Age (Years)	32.7 ± 12.04	33.3 ± 10.32	0.428*	0.07
2	Gender (Male: Female)	81 (50%): 81 (50%)	70 (55.1%): 57 (44.9%)	0.81 (0.50-1.33)	0.03
3	**Working status**				
	Working	88 (54.3%)	60 (47.2%)	Reference	-
	Not-working	60 (37.0%)	50 (39.4%)	0.82 (0.48-1.39)	0.43
	Student	14 (8.7%)	17 (13.4%)	0.56 (0.24-1.31)	0.14
4	**Educational qualification**				
	Illiterate/primary	15 (9.2%)	21 (16.5%)	Reference	-
	Intermediate/high school	93 (57.4%)	62 (48.8%)	2.10 (0.95-4.68)	0.04
	University/ Post-graduate	54 (33.4%)	44 (34.7%)	1.72 (0.74-4.00)	0.16
5	**Marital status**				
	Married: Unmarried	135 (83.3%): 27 (16.7%)	94 (74%): 33 (26%)	1.76 (0.95-3.24)	0.05
6	**Patients with MRN**				
	Yes: No	146 (90.1%): 16 (9.9%)	106 (83.5%): 21 (16.5%)	0.55 (0.26-1.17)	0.09

Table 2 confirms that there was a significant but independent association between patients practicing SMA and actual and perceived waiting periods. However, the perceived length of waiting time was more strongly associated with the practice of using SMA than the actual length of waiting time [OR 3.64 (CI 2.20-6.00) and 2.44 (CI 1.49-3.99) respectively. Our analysis with the Spearman rank association showed a positive correlation between perceived and actual length of waiting time (p=0.002 and p=0.03).

Table 2. *Waiting time for receiving self-medication antibiotics.*

S. no		Waiting time (n=162)	Non-waiting time (n=127)	P value
1	Short time (<90 min)	82 (50.6%)	90 (70.9%)	0.002
	Long time (>90 min)	80 (49.4%)	37 (29.1%)	
2	Does not suffer from long time after perceived	39 (24.1%)	68 (53.5%)	0.03
	Suffering from long time after perceived	123 (75.9%)	59 (46.4%)	

Approximately 21% of SMA subjects used antibiotics three times per annum, and 61.7% and 17.3% of SMA subjects had used antibiotics for 1-2 and 2-3 years, respectively (Table 3). The most common ailments for which subjects self-medicated were the common cold (67.9%) and sore throat (65.5 %), followed by chest infections (31.5%). Ear infections and gastroenteritis were reported by 14.2% and 13%, respectively. Treating for urinary tract infection and "other" causes were both equal with 11.7%, (Table 3). The majority (85.1%) of SMA subjects reported that their source of antibiotics for self-medication was the pharmacy; 4.3% of antibiotics used were left-over ones, and 9.3% of people using SMA obtained their antibiotics from both the pharmacy and left-over medication.

Table 3. *List of SMA per annum and usage of antibiotics for common alignments.*

SMA	(n=162)
SMA for 3 times per Year	34 (21.0%)
SMA for 1-2 Years	100 (61.7%)

SMA for 2-3 Years	28 (17.3%)
Common cold	110 (67.9%)
Sore throat	106 (65.4%)
Chest infection	51 (31.5%)
Ear infection	23 (14.2%)
Gastroenteritis	21 (13%)
Urinary tract infection	19 (11.7%)
Others	19 (11.7%)
Sources of antibiotics from pharmacy	137 (84.5%)
Used left-over	07 (4.3%)
Both	15 (9.3%)
Others	03 (1.9%)

A little over half of the respondents who self-medicate (52.5%) do so because of the long waiting time to see a doctor. Among others who self-medicate, prior experience of the use of antibiotics was reported by 40.7%, and considering their illness not sufficiently serious for a consultation with a doctor was reported by 38.9% of respondents. Interestingly, financial constraints, trusting the pharmacist's ability to diagnose and treat, and other causes were reported equally with 9.9% for each. Only 4.3% of participants reported that they practice self-medication because of the nonchalant attitude of clinic staff (Table 4).

Table 5 reports knowledge about the relevance of antibiotics in treating viral infections and awareness of antibiotic resistance. A comparison between those respondents who do not practice antibiotic self-medication and those who do, showed a statistically significant difference in their knowledge about using antibiotics to treat a viral illness with 36% and 23%, respectively (p=0.018). However, there was no statistically significant difference between these two groups in their awareness of antibiotic resistance or in their knowledge about the relationship between antibiotic self-medication and antibiotic resistance. Logistic regression did not show any significant results (Table 5).

Table 4. *Factors influencing self-medication antibiotics factor.*

Factors	**N=162**
Long waiting time	85 (52.5%)
Prior experience of use	66 (40.7%)
Financial constrains	16 (9.9%)
Non-chalant attitude of PCC staff	07 (4.3%)
Illness considered not serious enough for consultation	63 (38.9%)
Trusting the pharmacists' ability in diagnosis and treatment	16 (9.9%)
Other causes	16 (9.9%)

Table 5. *Participants' knowledge and awareness about antibiotic resistance.*

Knowledge	**Antibiotics with prescription (n=127)**	**Antibiotics without prescription (n=162)**	**P-value**
Yes	39 (30.7%)	81 (50%)	<0.05
No	46 (36.2%)	38 (23.5%)	<0.05
Don't know	42 (33.1%)	43 (26.5%)	>0.05
Awareness	**Not-practicing SMA (n=127)**	**Practicing SMA (n=162)**	
Patient awareness about antibiotic resistance	47 (37.0%)	46 (28.4%)	>0.05
Relation between ABX self-usage and resistance	09 (7.1%)	08 (4.9%)	<0.05
Self-usage can reduce the antibiotic resistance	20 (15.7%)	21 (13.0%)	>0.05
Self-usage can increase the antibiotic resistance	18 (14.2%)	27 (16.7%)	>0.05
Don't know	79 (62.2%)	106 (65.4%)	>0.05

Discussion

The aim of the current study was to determine waiting times in the primary care clinic in the military hospital in the capital city of Saudi Arabia and the impact of waiting on patients' self-medication. The literature indicates that this is the first study to be implemented in Saudi Arabia as a nested case-control study of the relationship between waiting time and SMA. This initial study consisted of the analysis and determinants of the causes and prevalence of SMA in Saudi Arabia. Our results confirm that perceived waiting and actual waiting time are directly correlated with SMA. However, perceived waiting time is more directly correlated with SMA than actual waiting time. No prior studies have been implemented against which to compare our current study.

In our study, the prevalence of SMA was 56%, which is more than in countries such as Bangladesh (22.5%), India (18%), Jordan (23%), Viet Nam (12%), and Turkey (19.1%) [1]. In European countries, the SMA rate is less than 10%, which is

five times lower than in Saudi Arabia [1]. The prevalence of SMA in the kingdom was found to be very high, even though the drug regulation policy restricts antibiotic dispensing to patients with prescriptions. Our results, indicating a 56% prevalence of SMA, are in accord with the results of the United Arab Emirates (56%) and Jordan (40.7%) [10,12]. However, our results differ from those in European countries: In Denmark the prevalence of SMA is 3%, in Greece it is 44.6% and in the US it is 17% [13-15]. In our study, the major source for obtaining SMA without a prescription was the community pharmacy which accounted for 85% of SMA. To the best of our knowledge, our results indicate that Saudi Arabia and the United Arab Emirates have the highest national rates for obtaining SMAs without a prescription, followed by Greece with 44.6% [15]. Enforcing restrictions on the sale of antibiotics would be one of the most important interventional strategies in reducing the rate of SMA in the kingdom and thereby, decreasing drug resistance in the community. Reducing the long waiting time to consult with doctors in PCCs could prove to be another important strategy. Another possible intervention would be to reduce the number of pharmacies, and minimize the competition for the sale of antibiotics without prescription. Previous studies have shown that patients' past experience of treatment using antibiotics for upper respiratory tract infections (URTIs) will affect their future expectations of antibiotic use for URTI treatment [16,17]. Similar results were found in our study as 40% of participants who practiced SMA considered previous antibiotic use for the same condition as a reason for not consulting physicians. However, in Jordan, general practitioners were found to be prescribing antibiotics inappropriately for URTI [18].

No significant associations were displayed between any of the socio-demographic factors, like age, gender, marital status, education, and working status and the use of self-medication, and our study was found to be in accordance with the reports from other studies [19]. However, a few studies have confirmed a positive association between certain socio-demographic factors and SMA [12,20]. This could be due to differences in culture, sample size and different recall periods. The proportion of SMA users appeared similar in all groups despite differences in monthly income and educational level. One comparative study in Brazil documented a higher prevalence of SMA in the higher socio-economic classes than in the lower socio-economic classes: here the higher socio-economic patients paid out of their pockets for their medication, and the lower socio-economic patients had free access to medication [21]. In our study, none of the subjects, regardless of social class, paid for their own medication.

In this study, many participants who practice SMA considered their illness to be insufficiently serious to take to a doctor, and they had acquired their knowledge about the effectiveness of antibiotics from previous use. Few participants knew that viral infections do not require antibiotics. A European study confirms that a low awareness of antibiotic resistance is associated with a high prevalence of SMA [22,23]. These findings highlight the need to modify patients' health seeking behavior at a community level. Furthermore, there is a need for general practitioners to advise and educate patients about antibiotic resistance and its impact on the community's overall health.

The current study has some limitations due to the self-reported nature of its data: the survey has the potential for either over-reporting or under-reporting and also a recall bias. Earlier reports were unable to confirm SMA for more than a year. We decided to enquire about SMA practice during the last one year, in order not to miss any patients who had used SMA for URTIs, which many studies consider to be the main reason for the use of SMAs. Another limitation is that our population sample may not be representative of the general population in Saudi Arabia. There were limitations in the way we measured perceived waiting time as it depended on previous visits; and this may have led to a recall bias. We avoided assessing perceived waiting time from patients immediately after they had finished their consultation with a doctor because the patients who agreed to participate, would probably be only those patients who were satisfied with the service received. This group was likely to have perceived a shorter waiting time.

Conclusion

Antibiotic resistance is a global problem that requires urgent action. SMA is one of the causes of this global problem. The impact of perceived and actual waiting time on patient behaviour has rarely been studied in the medical field. Our findings of a more direct correlation between perceived waiting time and SMA than between actual waiting time and SMA, highlights the importance of interventions to minimize perceived waiting time. The high prevalence of SMA in our study indicates the importance of interventions to reduce the inappropriate use of antibiotics. The community pharmacies in our study were the main source of SMAs. This finding highlights the importance of interventions that target this major source of excessive and unnecessary use of antibiotics. Future research with a larger sample size and in varied primary and secondary care settings around the country are necessary to determine perceived and actual waiting time and their relationship with SMA. Additionally, further studies are also recommended regarding the prevalence, determinants and causes of SMA in Saudi Arabia. Our study recommends that patients should be educated about the use of antibiotics in URTIs and the risks of antibiotic resistance.

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Conflict of Interest

The author has no conflict of interest

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