

ORIGINAL REPORT

## Self-medication with antibiotics: questionnaire survey among primary care center attendants<sup>†</sup>

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### SUMMARY

**Purpose** The aim of this study was to determine the frequency and reasons for self-medication with antibiotics within the last 12 months among primary healthcare center attendants aged 18 or over, in Ankara.

**Methods** A questionnaire was applied by face to face interview technique to 2696 subjects attending at five primary healthcare centers. Information on demographic characteristics, intention to self-medication with antibiotics and self-medication within last 12 months were collected.

**Results** It was found that 28% of the subjects were storing antibiotics at home. The percentage of self-administering antibiotics was 19.1% in the last 12 months. The most common reasons for self-administration of antibiotics were sore throat (59.6%), fever (46.2%), and cough (40.0%). Other reasons were dental infection, rheumatism, and fatigue. According to age groups, the most common self-medicating group was those aged 40–49 with 23% while the least self-usage was in the 60–69 age groups with 11.8%. Male sex, being single, educational level of secondary school or higher, being employed and not having social security increased self-administration of antibiotics ( $p < 0.05$ ).

**Conclusions** The study indicated the need for legal regulations regarding the sale of antibiotics without prescription and, health education is required for the community to decrease the inappropriate use of antibiotics and self-medication. Copyright © 2009 John Wiley & Sons, Ltd.

KEY WORDS — self-medication; antibiotics; Turkey

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### INTRODUCTION

The World Health Organization reports that rational use of medicines occurs when patients receive adequate medication for their clinical needs, at doses corresponding to individual requirements, and at the lowest possible cost for the patient and the community.<sup>1</sup> Taking this definition into account, an effective drug treatment requires patient compliance and consultation with a medical professional together with close follow-up, conditions rarely attained. Irrational drug use and especially self-medication with antibiotics is common throughout the world.<sup>2,3</sup>

The use of antibiotics should follow specific criteria: the right patient, at the right dose, with the right route and at the right time, but, the ability of antibiotics to cure bacterial infections with little short-term harm to the host has helped to create the image of antibiotics as “miracle drugs.”<sup>4</sup> Antibiotics are therefore the most common drugs to be used inappropriately and unreasonably.<sup>5</sup>

The inappropriate use of antibiotics for the treatment of infections is a worldwide problem that has implications for the cost of treatment and the development of resistant strains of bacteria.<sup>2,5–9</sup> The antibiotics are on top of the list of self-administered drugs in countries that do not control their commercialization. It is reported that easiness of obtaining drugs without a prescription can especially increase the inappropriate use of antibiotics.<sup>5,10–13</sup>

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Although antibiotic abuse is a global problem, its most severe economic and ecologic effects are seen in underdeveloped countries.<sup>2,5-9</sup> Total medication expenditure makes up 24–66% of the total healthcare budget in developing countries and 7–30% in developed countries.<sup>14</sup> As well, national expenditure for medication now makes up 7–66% of total healthcare expenditure in the world.<sup>15</sup> One of the main reasons for medication expenditure constituting such a large portion of the healthcare budget is extensive antibiotic usage.<sup>15</sup> Medication expenditure has made up more than half of the healthcare budget in Turkey in the last 5 years<sup>16</sup> and antibiotics are the biggest item within the medication expenditure segment. The irrational and excessive use of antibiotics is an important problem for our country<sup>10,11,17-19</sup> and antibiotics take first place among all drugs used in Turkey with 22%.<sup>17</sup>

In Turkey, there are no legal restrictions or obligations regarding the sale and prescribing of antibiotics. The patients can buy any antibiotic from the pharmacy without a prescription. But, if a physician prescribes the antibiotic, the social security institutions provide complete reimbursement, or 80% of the fee depending on the brand name of the antibiotic; and the patients has not to pay anything for the antibiotics medicines, or have to pay only 20% of the fee. Physicians may have a tendency not to refuse such demands and insistence of the patient fearing that the patient–physician relationship may deteriorate. Patient demand increases unnecessary prescribing<sup>6,20</sup> and this both increases the drug expenditure of the employers and also facilitates and increases self-medication with antibiotics.

As described above, self-medication with antibiotics is a common procedure in many developing countries, as well as in Turkey,<sup>21</sup> but little is known about the influencing factors. The aim of this study was to determine the frequency and reasons for self-medication with antibiotics within the last year among a group of primary healthcare center attendants aged 18 or over, in Ankara.

## METHODS

### *Study population*

The study was conducted in February 2006 at the five primary healthcare centers located in Ankara, the capital of Turkey where training and research activities of Gazi University School of Medicine Department of Public Health are carried out. The service capability and the demographic characteristics of the population served were similar for the five centers.

A total of 2696 subjects aged 18 or over presenting at the abovementioned healthcare centers between 30 January 2006 and 9 February 2006 and accepting to participate in the study were included in the study.

### *Procedure*

A structured questionnaire was applied to participants. Preliminary test of the questionnaire was conducted on 50 individuals attending another primary care center close to one of the study centers. The questionnaire was applied to the subjects using face to face interview technique by 8 public health research assistants. Before the application of the questionnaire, information on the research subject and aims of the study were provided to the participants and verbal consent was obtained.

The use of antibiotics without consulting any one, after demanding a pharmacist to give any antibiotic, and after being insistent in that the physician prescribe an antibiotic (although the physician did not consider necessary), were considered to be “self-administration of antibiotics.” The latter was considered as self-administration because: as expressed in introduction, in Turkey the prescription prevents the patient from out of pocket expenditure, if the antibiotic is prescribed the social security institution provides reimbursement (complete or 80% of the fee); “being insistent in that the physician prescribes an antibiotic” aims to use some antibiotic although the physician does not recommend and avoid the out of pocket expenditure for it.

Presence of a disease lasting 3 months or more was considered as a “present chronic disease.” The perceived health status of the subjects was determined by the question “how do you rate your health status,” the answer was scaled on five points (very bad, bad, neither bad nor good, good, and very good).

### *The survey form*

The questionnaire used for data collection consisted of three sections with a total of 31 questions. The first section included questions on the person’s descriptive characteristics (age, sex, marital status, educational level, monthly income, and presence of health insurance) and their perceived health status. The second section included questions on “first choice in case of a health problem” (visiting a doctor/trying conservative traditional remedies/self-medication/doing nothing, etc.) whether the respondent stores medicines at home (if yes, the source of medicines stored at home, the description of them-analgesics/antibiotics/topical agents, etc.), intention to self-

medication with antibiotics and self-medication with antibiotics within the last 12 months. The intention to self-medication with antibiotics was determined with yes or no questions: “In general, would you use antibiotics without consulting a physician?” “In general, would you be insistent in prescribing some antibiotics to your physician although he/she did not consider it necessary for the moment?” and “In general, would you use antibiotics consulting a pharmacist?” In the third section same questions were asked for the last 12 months to determine self-medication with antibiotics within this period. Questions about antibiotic usage within the last 12 months, the reason and source of the used antibiotic within the last 12 months (prescribed by physician, left-over stored at home, pharmacist consultation, etc.). The completion time of the survey form was about 10 minutes.

### Statistical analysis

The software SPSS version 10.0 (SPSS, Chicago, IL, USA) was used to analyze the data and statistically significance was set as  $p$  values  $<0.05$ . The relevance of self-administration of antibiotics was reported as a percentage with 95% confidence intervals computed using Epi Info version 6.0 (Centers for Disease Control and Prevention, Atlanta, GA). In addition to the descriptive statistics, the Chi-Square test and multivariable logistic regression analysis were performed to determine the factors influencing self-administration of antibiotics. The model fitness was evaluated with the Hosmer and Lemeshow test. Multivariable logistic regression analysis allowed us to examine how self-medication with antibiotics is influenced by certain factors such as age, sex, educational level employment status, social insurance, household number, and monthly income.

## RESULTS

The total number of persons 18 or over attending the five primary healthcare centers was 3230 within the study period, 2696 of them participated the study (study participation rate was 83.5%). The questionnaire was administered just a single time if the same person presented more than once during this period. The mean age of the participants was  $39.5 \pm 15.2$ . A chronic disease was present in 28.6% of study participants. The self-evaluation of health status was good in 62.3% and very bad in 0.4% of study participants (Table 2). The percentage answering “I would go to a physician” to the question “what would

you do first when you have a health problem” was 60.5%.

The percentage of those storing medicines other than those required continually to treat chronic diseases at home was 74.4%. The medications stored at home were analgesic/anti-inflammatory drugs in 92.7%, cold medication in 45.7% and antibiotics in 28% (Figure 1).

Among those storing medicines at home, 68.4% had asked for these drugs to be prescribed when they visited the physician for any reason and 52% of the drugs kept at home were left over from previous treatments.

The frequency of having the intention of self-medication with antibiotics was 54.1% ( $n = 1459$ ) and 35.2% ( $n = 514$ ) of them stated that they self-medicated with antibiotics in the last 12 months. The percentage of self-medication with antibiotics in the last 12 months was 19.1% (Table 1). The percentage of those using antibiotics within the last 12 months was much higher in those who had the intention of self-medication compared to those who had not (28.7% vs. 9.2%) ( $p < 0.05$ ). The most common reasons for self-medication with antibiotics in the last 12 months were sore throat (59.6%), fever (46.2%), and cough (40.0%). Other reasons were dental infection, rheumatism and fatigue (Figure 2).

Table 2 shows the univariate analysis results and Table 3 shows the logistic regression analysis of factors influencing self-medication with antibiotics. There was a statistically significant difference between the age

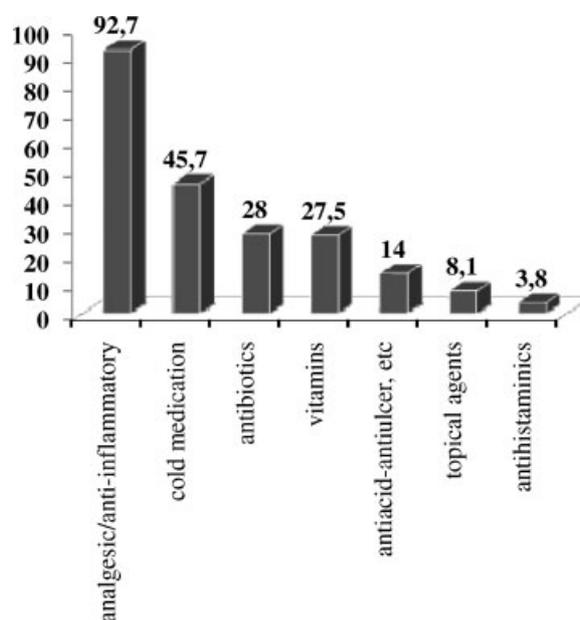


Figure 1. Distribution of medicines stored at home (% based on those who store medication at home).

Table 1. Patterns of self-medication with antibiotics

	Self-medication intention ( <i>n</i> = 1459)		Self-medication in the last 12 months ( <i>n</i> = 514)	
	% <sup>a</sup>	% <sup>b</sup>	% <sup>a</sup>	% <sup>b</sup>
Antibiotic use without consulting a physician	33.4	61.7	15.3	79.5
Antibiotic use consulting a pharmacist	13.2	24.5	2.1	11.1
Being insistent with the physician to prescribe an antibiotic	24.1	44.6	3.5	18.4
Presence of at least one pattern	54.1		19.1%	

<sup>a</sup>Percentage based on all respondents.

<sup>b</sup>Percentage based on the group.

groups at univariate analysis ( $p < 0.05$ ). The most common self-medicating group was the 40–49 age groups with 23% while the least usage was in the 60–69 age group with 11.8%. Male sex, being single, educational status of secondary school or higher, being employed and not having social security increased self-administration of antibiotics ( $p < 0.05$ ). Males were self-administering antibiotics 1.24 times higher than females; those educated to secondary school level or higher had 1.43 times than those less educated; those without social security were self-administering antibiotics 1.45 times than those having social security. However, the logistic regression analysis showed that the factors influencing self-administration of antibiotics were an educational status of secondary school or higher (OR = 1.31; 95%CI = 1.01–1.69) and absence of social security (OR = 1.56; 95%CI = 1.10–2.25).

Figure 3 presents the distribution of the conditions for using antibiotics within the last 12 month. As the reason of self-medication with antibiotics within the last 12 months, 28% of the subjects stated that they did not have time to visit a physician, 11% did not want to pay for the physician and tests, and 61% had just used the antibiotic that was prescribed by the physician for a similar condition previously and had not seen a need to visit the physician.

## DISCUSSION

This is a descriptive study determining the self-antibiotic usage percentage among primary health care center attendants. The study is conducted in primary healthcare centers, but most of those people who self-medicate with antibiotics may not visit primary healthcare center at all. They buy antibiotics directly from the pharmacy, use leftovers or receive them from their friends, relatives, etc. The results of the study cannot be generalized as long as the sample has been taken in healthcare centers, but, could contribute the literature on self-medication with antibiotics to better

describe the phenomenon and its correlates. The prevalence of actual with antibiotics has been reported as 13.0–74.6% in population-based studies.<sup>3,6–8,22,23</sup> In European countries, the prevalence of actual self-medication with antibiotics varies from 1 to 210 per 1000 in the population (1 in Netherlands, 4 in Sweden, 56 in Malta, 198 in Romania, and 210 in Lithuania).<sup>24</sup> In a study conducted among public health care facility attendants in Indonesia, the percentage of self-antibiotic users is reported as 17%.<sup>25</sup> It is reported that younger age, higher educational level, and presence of a chronic disease were significantly associated with self-medication with antibiotics and sex had no significant relevance.<sup>24–26</sup> In a Jordanian study, higher income was an additional related factor.<sup>26</sup> In Turkey, data exists about health expenditure, antibiotic consumption and the proportion of antibiotics within medication expenditures in Turkey,<sup>17–19</sup> but there are not available nation wide data on self-medication with antibiotics. The percentage of self-medication with antibiotics was 19.1% in our study; taking into account that the study population consisted of primary healthcare centers attendants, persons able to reach and demand healthcare services, this ratio is considered high, and it is estimated that self-medication with antibiotics could actually be much higher in the general population compared to the study population and to the other countries population based data.<sup>3,6–8,22–26</sup>

In our study, male sex, being at age 30–59, higher educational level, unemployment, absence of social security, increased monthly income increased the self-medication with antibiotics.

Subjects with an educational level of secondary school or above were more self-medicating with antibiotics compared those with a lower educational level. This may be explained with the increased confidence in their own knowledge as the educational level increases. They may be using “lack of time” as an excuse and thinking that reading the insert of a

Table 2. Factors Influencing Self-medication with Antibiotics

	<i>n</i>	Self-medication with antibiotics	
		Yes (%) (95%CI)	OR (95%CI)
Age group			
18–29	925	17.9 (15.6–20.7)	1
30–39	614	21.8 (18.7–25.3)	1.28 (0.98–1.66)
40–49	430	23.0 (19.1–27.3)	1.32 (1.02–1.83)
50–59	372	18.8 (15.0–23.2)	1.37 (1.02–1.83)
60–69	245	11.8 (8.1–16.6)	0.61 (0.39–0.95)
≥70	110	15.5 (9.6–23.6)	0.84 (0.47–1.48)
		$\chi^2 = 17.358, p < 0.05$	
Gender			
Female	1652	17.8 (15.9–19.7)	1
Male	1044	21.2 (18.7–23.8)	1.24 (1.02–1.51)
		$\chi^2 = 4.71, p < 0.05$	
Marital status			
Single	468	25.4 (21.5–29.6)	1
Married	1970	8.2 (6.5–19.9)	0.65 (0.51–0.83)
Widow/divorced	243	15.2 (10.9–20.4)	0.53 (0.34–0.81)
		$\chi^2 = 15.528, p < 0.05$	
Educational status			
Primary school or lower	906	15.6 (13.3–18.1)	1
Secondary school or higher	1787	20.9 (19.0–22.9)	1.43 (1.15–1.78)
		$\chi^2 = 10.98, p < 0.05$	
Employment status			
Employed	1260	16.5 (14.5–18.7)	1
Unemployed	1436	21.4 (19.3–24.6)	1.38 (1.13–1.68)
		$\chi^2 = 10.30, p < 0.05$	
Social security			
Present	2499	18.7 (17.2–20.3)	1
Absent	192	25.0 (19.0–31.9)	1.45 (1.02–2.07)
		$\chi^2 = 4.65, p < 0.05$	
Presence of chronic disease			
No	1925	18.8 (17.1–20.6)	1
Yes	771	19.8 (17.1–22.9)	0.94 (0.75–1.16)
		$\chi^2 = 0.38, p > 0.05$	
Perceived health status			
Very bad	10	20.0 (2.5–55.6)	1
Bad	139	20.1 (13.8–27.8)	1.01 (0.19–10.27)
Neither good or bad	643	19.6 (16.6–22.8)	0.97 (0.19–9.53)
Good	1677	18.4 (16.5–20.3)	0.90 (0.18–8.74)
Very good	224	22.8 (17.4–28.8)	13.57 (2.56–133.23)
		$\chi^2 = 2.737, p > 0.05$	
Number of persons in household			
≤5	2376	18.5 (16.9–20.1)	1
>5	318	23.3 (18.7–28.3)	1.33 (1.00–1.78)
		$\chi^2 = 4.10, p > 0.05$	
Monthly income level (YTL)			
<500	272	16.9 (12.7–21.9)	1
500–999	1148	16.4 (14.3–18.6)	0.96 (0.67–1.39)
1000–1499	505	21.2 (17.7–25.0)	1.32 (0.89–1.97)
1500–1999	265	23.0 (18.1–28.6)	1.73 (1.11–2.70)
≥2000	350	24.0 (19.6–28.8)	1.55 (1.02–2.36)
		$\chi^2 = 15.828, p < 0.05$	

1 YTL ≈ 1,342 USD.

*n*: number of persons in the group; %: percentage of those who self-medicate in the group.

medicine is enough before using it and they have more intention to self-medication.

Patients without social security have high rates of self-medication with antibiotics perhaps due to not having enough money to visit a physician; they can only afford the medication or if they cannot pay for this

either just take the drugs present at relatives or friend or the samples found at pharmacies. Unemployment also was determined as a risk factor for self-medication with antibiotics probably with the same reasons of those without social security, in addition, most probably; unemployment carries with the lack of

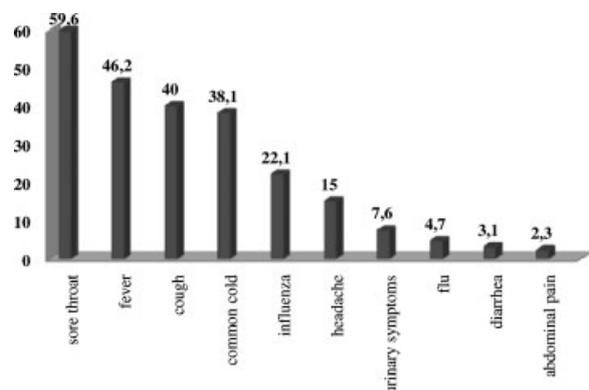


Figure 2. Percentage of conditions for which antibiotics are self-administered (% based on those who have the intention of self-medication with antibiotics).

social insurance. Logistic regression analysis showed the lack of social security is the main factor influencing self-medication with antibiotics and unemployment is the second and last one.

The percentage of those using antibiotics within the last month was much higher in those who have the intention; this indicates that patients who self-medicate with antibiotics make a habit of this and they self-medicate often. When the reason for self-medicating was presented to those who had self-medicated within the last month, 28% stated they did not have time to see a physician, 11% that they did not want to pay a

physician and 61% that they had used similar treatment before. These rates were 17, 17, and 22%, respectively in a study from Malta.<sup>6</sup> Self-medicating to avoid the fee is a problem in developing countries. The high cost of healthcare services and financial worries, the inadequate healthcare services and the patient's desire to determine his/her own destiny when confronted with high-technology medicine leads to self-administration and patients start to take medicine themselves or according to someone else's suggestion without consulting a physician.

Many other studies<sup>6,25–29</sup> have stated that the most common causes of self-administration of antibiotics and using antibiotics within the last month are upper respiratory tract infection, cough, the flu and having a cold, similar to our study. This indicates that self-administered antibiotics are unnecessary and used without a proper indication. Prescribing antibiotics for conditions such as upper respiratory tract infection would be irrational drug usage and the reason is probably the concern over spoiling the patient–physician relationship but this inappropriate use will lead to many negative results including the development of resistance to antibiotics.

Finally, we found that those self-administering antibiotics stopped the antibiotic regime quicker than those using it on the advice of a physician and this will also contribute to the development of resistance and disease recurrence.

Table 3. Logistic regression analysis of self-medication with antibiotics

Variables	Coefficient ( $\beta$ )	OR	95%CI	<i>p</i>
Age				
>40		1		
≤40	0.017	1.017	0.823–1.257	>0.05
Sex				
Female		1		
Male	0.168	1.183	0.956–1.465	>0.05
Educational level				
Primary school or lower		1		
Secondary school or higher	0.267	1.306	1.011–1.687	<0.05
Employment				
Unemployed		1		
Employed	0.027	1.028	0.775–1.363	>0.05
Social security				
Present		1		
Absent	0.453	1.572	1.101–2.246	<0.05
Number of persons in household				
≤5		1		
>5	0.177	1.194	0.964–1.480	>0.05
Monthly income level (YTL)				
<500		1		
500–999	–0.103	0.902	0.628–1.295	>0.05
1000–1499	0.173	1.189	0.795–1.778	>0.05
1500–1999	0.273	1.314	0.836–2.065	>0.05
≥2000	0.322	1.380	0.896–2.215	>0.05

1 YTL ≈ 1,342 USD.

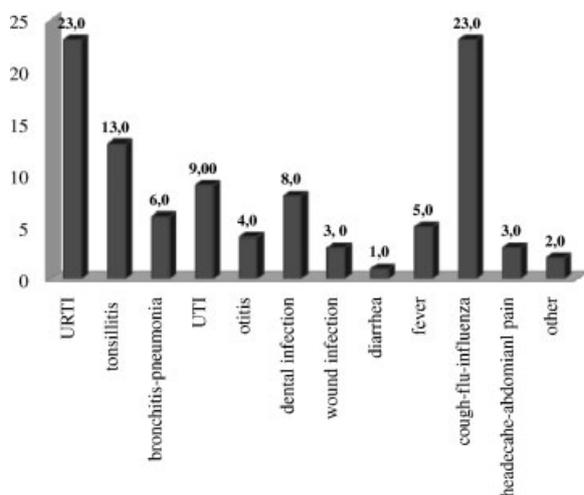


Figure 3. Percentage the reason for using antibiotics within the last 12 months

## CONCLUSION

This study has been performed on a population that has access to primary healthcare services and a physician, but 19.1% were still self-administering antibiotics. Antibiotic resistance due to inappropriate antibiotic usage is a global problem and efforts to prevent it should target the matter of self-medication and physicians, pharmacists and the general population. The study indicated the need for legal regulations regarding the sale of antibiotics without prescription and, health education is required for the community to decrease the inappropriate use of antibiotics and self-medication. Antibiotics should be available on prescription only and patients should be educated to not to store the medicines left over and not to use any antibiotics without the recommendation and prescription of a physician.

### KEY POINTS

- Antibiotics are the biggest item within the medication expenditure segment in Turkey.
- In Turkey there is no obligation of physician prescription to obtain antibiotics from the pharmacies.
- Self-medication with antibiotics is a common procedure in many developing countries but little is known about the situation in Turkey and the influencing factors.
- According to the study, the frequency of self-medication with antibiotics is high even among those able to reach health care service.
- In Turkey there is a need legal regulations regarding the sale of antibiotics without prescription.

## ACKNOWLEDGEMENTS

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