

Patient Attitudes and Patterns of Self-Medication with Antibiotics – A Cross-Sectional Study in Bulgaria

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Abstract

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Key words: self-medication; resistance; general practitioner; over-the-counter sales of antibiotics.

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BACKGROUND: Self-medication with antibiotics is a major concern worldwide because of the high risks of antimicrobial resistance which may result in complicated courses of treatment, increased risk of death and excess costs to the healthcare systems.

AIM: The aim was to study the attitudes and self-medication patterns as related to the use of antibiotics among the general Bulgarian population and their determinants.

MATERIALS AND METHODS: A questionnaire-based survey was performed among the patients in two randomly selected municipalities. The questionnaire was mailed to 50 randomly selected adult patients by each of the 33 responding GPs thus addressing a total of 1650 participants.

RESULTS: A total of 1050 patients completed and returned the questionnaire. The observed self-medication rate was 43%. The women and the younger employees and students tended to have a higher self-medication rate. Fever (22%), sore throat and cough (12.7%) and discomfort when urinating (8.2%) were the most frequent patterns related to the practice of self-medication.

CONCLUSION: This analysis reported an extensive use of self-medication with antibiotics in the study population before the changes in the Bulgarian legislation. Younger age and social status (students, employed) were the most important socio-demographic patterns that had probably led towards self-medication with antibiotics.

Introduction

Self-medication with antibiotics is a major concern worldwide and a real problem with public health importance [1]. Most of the recent studies have revealed high prevalence of self-medication in some countries and reported positive correlation of excessive drug use with antimicrobial resistance [2-6]. When antibiotics are used without medical prescription, the increased risk of resistance is associated with the insufficient dosage or incorrect type of drugs [2, 4, 7-9]. Self-medication has been observed most frequently in the countries of economic transition and healthcare system reforms where the prescription legislation is not well enforced and the drugs are freely available over the counter [10, 11].

Cultural, socioeconomic factors and patient individual patterns have been reported to influence

self-medication practices. Beyond this, most important specific determinants were found to be such factors as antibiotic reimbursement policies, access to health care, marketing campaigns of pharmaceutical companies and the ways by which the antibiotics are dispensed (e.g., without prescription), among others. Of note, all these patterns have been observed most frequently in the Eastern European countries regardless of any legislation restrictions [12-14].

In particular, new legislation measures have been introduced in Bulgaria in 2009 to regulate the access to antibiotics and other drugs and to enforce the restrictions of over-the-counter sales. Recent data have indicated that the consumption of antibacterial drugs for systemic use (ATC group J01) has decreased during years 2008-2010 from 20.6 defined daily doses (DDD) per 1000 population to 18.22 DDD [15]. However, only few studies have addressed the patterns of self-treatment with antibiotics in Bulgaria

and there are not sufficient data yet that may allow a more correct evaluation of the effectiveness of the new legislation [16].

The aim of this study was to explore the attitudes and self-medication patterns as related to the use of antibiotics among the general Bulgarian population and their determinants.

Methods and Materials

Study design

This was an observational cross-sectional study to analyse the patient opinions and attitudes on self-medication with antibiotics. A questionnaire survey was performed between July and December 2008 among GP patients of two municipalities in the Plovdiv region, Bulgaria.

The minimum sample size (1000 insured individuals) for inclusion in the analysis was determined on the basis of the health insurance status of the adult population (aged 18+) in the region. Assuming a response rate below 50%, a total of 1600 patients had to be recruited (i.e., inflation by a minimum of 60%).

Ethical

The study was approved by the Ethics Committee of the Medical University of Plovdiv and performed in accordance to the Helsinki Declaration.

Study population

A parallel multi-stage sampling procedure was applied to randomly select the patients from two municipalities (Figure 1). All random selections were made by the lottery method.

First, all municipalities of the Plovdiv region were divided in two sub-groups: urban and rural. Then, one rural municipality and one urban municipality were selected at random from the two sub-groups. The municipalities of Plovdiv and Maritsa were chosen. Assuming the total number of adult residents (aged ≥ 18), gender ratios in Maritsa (30724 people, male:female = 0.50:0.50) and Plovdiv (379220 people, 0.47:0.53) municipalities as well as the rural:urban ratio (0.10:0.90), a minimum of 160 rural and 1440 urban residents ($n=1600$) had to be approached initially.

Second, 6 GPs and 40 GPs were randomly selected from the two municipalities, respectively, from which only 4 and 29 GP agreed to participate.

At the third stage, each of the 33 GPs

selected from their lists 50 adult patients at random and mailed 50 questionnaires to a total of 1650 (200 rural and 1450 urban) patients, initially. Two weeks later, due to the low response rate, we asked the GPs to mail an additional set of 830 questionnaires, according to the same scheme, as above. Finally, out of the 2480 approached patients, 1050 patients returned the completed questionnaire and were included in the analysis (42.3% response rate).

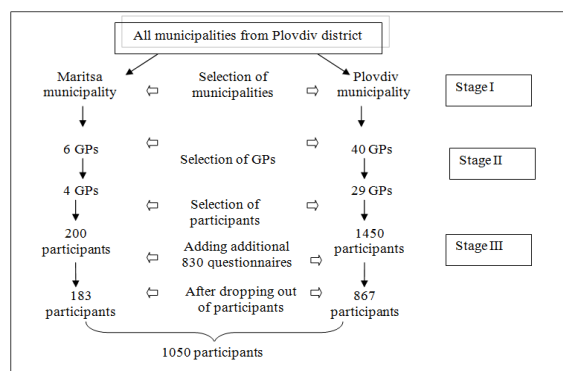


Figure 1: Multi-stage sampling of participants.

Questionnaire and validation

We were not able to find a questionnaire on self-medication with antibiotics that had been created and/or validated in Bulgarian language. Due to specific national socio-cultural and organizational characteristics, an original 28-item self-administered questionnaire was designed. An evaluation of the questionnaire's validity was performed in a conducted pilot survey [17].

The questionnaire included structured (e.g., multiple-choice) questions in several panels. The first panel included demographics (gender, age, level of education, social status, residence) and the presence of chronic diseases i.e. explanatory phenomena (EP); The second - observed outcomes (OO): knowledge about the role of antibiotics against infectious diseases and side effects; attitude and awareness about the risk of self-medication with antibiotics; prevalence and reasons for self-medication. Some of the questions allowed free-text answers which were later submitted for further elaboration, contextual analysis and grouping and then entered in the study database for statistical analyses.

Observed outcomes (OO)

1. Attitudes OO (1) – approval of the frequent use of antibiotics at home;
2. Awareness OO (2) – awareness of the side effects of antibiotics;
3. Behaviour OO(3) - actual self-medication with antibiotics;

Questionnaire survey

A kick-off meeting was organised with all GPs that agreed to participate. The GPs were informed about objectives of the survey and provided informed consent. GPs were given instructions how to distribute and collect questionnaires in the way that no bias was introduced. Each GP agreed to mail questionnaires and written patient informed consent forms to at least 50 adult patients.

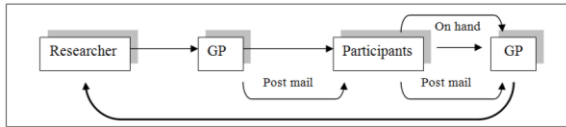


Figure 2: Flowchart of the distribution of questionnaires.

All questionnaires were mailed in one and the same time. The participants received a pre-stamped self-addressed envelope and were asked to complete the questionnaire and mail it or hand it back within two weeks. Labelled locked boxes were provided in the GP waiting rooms for the return of questionnaires in person. If a questionnaire was not received back within that period, another patient, as selected at random from the GP list, was invited to participate. A total of 830 additional questionnaires were mailed but if some of those were not returned within two weeks, no further substitutions were made. The opening of the questionnaire and verification of responses were made only after all of the 1050 questionnaires were received.

Statistical analysis

Data were presented as mean \pm SD or frequency (percent), as appropriate. Descriptive statistics and frequency distribution analysis were used. The chi-square test was applied to test the associations between categorical variables. Binary multiple logistic regression was used to evaluate combined factors' effect. The most reasonable model was chosen by the backward selection, and a level of statistical significance was established at a value of $p < 0.05$. Differences were assessed by odds ratio (OR) with 95% CI and a value of $p < 0.05$ estimated by the chi-square and Wald statistics. For the purposes of binary multiple regression scales for evaluation of some observed outcomes were reduced from the five-point scale into a binary scale.

Results

Sample description

A total of 2480 patients were approached to

participate in the survey from which 1050 patients completed and returned questionnaires (42.3% response rate). Out of these 1050 questionnaires, 6 questionnaires were not complete and were excluded while the remaining 1044 questionnaires were entered anonymously in the database and analysed. To note, the male-to-female ratio of the participants from the two communities was similar to that of the general population ($P = 0.068$).

The mean age was 42.2 (± 17.1) years (range 18-80). The gender distribution was almost equal ($n = 562$ females, 53.8%) while urban population was prevalent with 861 patients (82.5%). The relationships between the socio-demographic factors and self-medication are presented on Table 1.

Table 1: Socio-demographic characteristics and self-medication (n=1044 respondents).

	Self-medication		χ^2	P value
	yes n (%)	no n (%)		
Gender				
Male	194 (41.9)	269 (58.1)	4.13	0.042
Female	259 (48.3)	277 (51.7)		
Level of education				
High school	166 (41.1)	238 (58.9)	4.99	0.083
College	88 (48.9)	92 (51.1)		
University	198 (47.9)	215 (52.1)		
Social status				
High school student	42 (77.8)	12 (22.2)	66.82	<0.001
University student	50 (43.1)	66 (56.9)		
Employed	32 (49.5)	328 (50.5)		
Retired	40 (22.5)	138 (77.8)		
Unemployed	-	2 (100)		
Residence				
Town	376 (46.1)	440 (53.9)	0.97	>0.326
Village	77 (42.1)	106 (57.9)		
Age group (years)				
Up to 20	42 (56.0)	33 (44.0)	154.24	<0.001
21-30	60 (34.1)	116 (65.9)		
31-40	85 (35.9)	152 (64.1)		
41-50	160 (78.4)	44 (21.6)		
51-60	66 (50.8)	64 (49.2)		
61-70	27 (30.7)	61 (69.3)		
71 and above	13 (14.6)	76 (85.4)		

Attitude, awareness and knowledge about antibiotics

Half of the respondents ($n = 592$, 56.7%) reported to have used antibiotics during the last year. Out of them, 378 patients (36.2%) used antibiotics once while 268 patients (25.7%) - more than once. Most respondents ($n = 792$, 75.9%) did not approve the frequent use of antibiotics even when those had been prescribed by a physician and they also considered the self-medication as an inappropriate behaviour. Similar proportion of the participants did not approve the self-medication, either. However, at least half of younger respondents (aged < 20 , $P < 0.001$) and more than one-fifth of male patients ($P < 0.001$) did approve the frequent use of antibiotics. Approval of the frequent use of antibiotics is more common among young people up to 20 years (OR: 6.104; 95% CI: 3.445-10.816; $P < 0.001$), among men (OR: 3.988; 95% CI: 2.524-6.301; $P < 0.001$) and

among those with lowest degree of education (high school) (OR: 1.852; 95% CI: 1.095-3.131; $P = 0.021$). The model with 3 variables (gender, attained degree of education and chronic disease) accounts for 17 % approval of frequent use of antibiotics.

More than half of the patients acknowledged the antibiotic resistance while the remaining patients ($n = 418$, 40.0%) had never considered its importance. The women and urban patients were better informed ($P < 0.001$) and showed a greater awareness of the antimicrobial resistance. The statistical analysis revealed that higher education grade might have positively influenced the awareness of antimicrobial resistance. Of note, the university graduates were best informed about the importance of the resistance ($P < 0.001$) and side effects ($P < 0.001$) as related to the use of antibiotics.

On the other hand, half of the participants felt that they needed more information about the side effects and risks of excessive or improper use of antibiotics. The women, students and workers ($P < 0.001$) reported to be familiar and very well informed about the side effects of the use of antibiotics. Awareness on the side effects of antibiotics is insufficient in men (OR: 2.887; 95% CI: 1.863-4.472; $P < 0.001$), in those below 20 years (OR: 3.847; 95% CI: 2.071-7.145; $P < 0.001$) and in people with lower degree of education (OR: 2.002; 95%CI: 1.155-3.470; $P = 0.013$). The model with 3 variables (gender, age and chronic disease) accounts for 18 % awareness on side effects.

Last but not least, about 18% of patients ($n = 184$) did approve the use of antibiotics and they would have taken antibiotics even if they had considered their health problem as a minor one, i.e., "...just to be on the safe side". The majority of patients (77%) rather disapproved of the use of antibiotics for minor illnesses and the remaining 5.4% (56) could not answer. This opinion was found to coincide with the knowledge that antibiotics were effective on bacteria ($n = 533$, 51.0%), fungi ($n = 220$, 21%), viruses ($n = 171$, 16.4%) and other microorganisms such as mycoplasma and chlamydia ($n = 190$, 18.2%).

Prevalence of self-medication with antibiotics and health behavior

About half of the respondents ($n = 449$, 43.4%) reported an antibiotic use without prescription in the last year (42% male, 48% female). Out of those, 278 patients (62.0%) reported a self-medication at least once while 140 patients (31.3%) reported such use more than once and the remaining 31 patients (6.7%) did neither remember nor answer the question.

About 24.2% of the patients ($n = 232$) had started taking antibiotics for high temperature or fever, 159 patients (24%) – for sore throat and cough, and only 113 patients (17%) took drugs without medical

advice in cases of discomfort or burning when urinating. Also, the students were more likely to report a self-treatment as compared to the other social status subgroups. In particular, 31% of all patients reported that, as parents, they had treated at least once their children deliberately with antibiotics without prescription.

It was interesting to reveal that the chronically ill patients were less likely to apply self-medication with antibiotics ($P < 0.001$). Of note, 622 patients (60%) had deliberately kept drug leftovers for personal use in the future or had offered these to a friend or relative. The remaining 40% of patients reported they had no any left or had thrown out such leftovers.

The risk for self-medication with antibiotics was higher with women (OR: 1.390; 95% CI: 1.040-1.858; $P = 0.026$), workers (OR: 1.638; 95% CI: 1.209-2.218; $P = 0.001$), young people up to 20 years (OR: 2.307; 95% CI: 1.342-3.965; $P = 0.002$) and those without a chronic illness (OR: 1.944; 95% CI: 1.315-2.874; $P = 0.001$). The model with 4 variables (gender, social status, age and chronic disease) accounts for 13% self-medication in adults.

Means of conveying information and reasons for self-medication

Advice and information before treatment with antibiotics was sought most often from GPs ($n = 486$, 46.6% or another medical professional ($n = 258$, 24.7%). A small proportion of the patients reported that their usual source of information was a pharmacist ($n = 61$, 5.8%) or a relative ($n = 97$, 9.3%) while the remaining patients had not consulted anyone when there were taking antibiotics. In particular, the male patients did consult most often with a pharmacist or a relative ($P < 0.001$) regarding self-treatment while the school and university students – with a relative ($P < 0.001$).

In summary, the main reasons for self-medication as reported by the patients may be enlisted as follows: previous experience with known antibiotics, lack of timely access to GP (despite the open access to primary care), and lack of time to see a doctor or because of recommendation by a pharmacist.

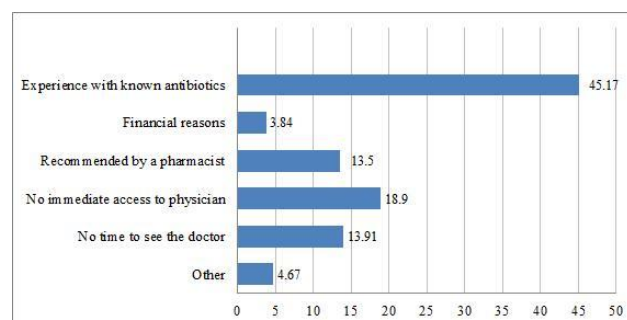


Figure 3: Reasons for self-medication with antibiotics.

Discussion

The fact that 75.9% percent of the people criticizing self-medication with antibiotics was higher than the actual self-medication 43%, according to us, may be explained, on the one hand, with the presence of a certain percent socially desirable answers and on the other, with the actual behavior which is due to financial, time and other restrictions related to the access to healthcare system in some population subgroups as students, unemployed and retired. The self-medication with antibiotics was associated mainly with age, gender and social status, but with neither residence nor educational level. In particular, the self-medication with antibiotics was the most prevalent among the patients aged 31-50.

The other main patterns that we revealed were that female patients as well as those from the urban areas were informed at most about possible issues with antimicrobial resistance and the side effects of the use of antibiotics. However, irrespectively of available information on the antibiotics, more than half of the patients reported to be keeping drug leftovers at home for a future use.

In the same time, an important finding of our survey was the high proportion of parents who were treating their children with antibiotics without prescription ($P < 0.001$). Of note, this confirmed that the practice of self-medication of children was not an infrequent finding in other countries around the world, as well [11, 12, 18].

It is necessary to underline that the proportion of patients who practiced self-medication with antibiotics in our survey (43.4%) was considerably higher than the findings for Spain (15.2%), Malta (19%), Romania (19.8%), Lithuania (22%) and Czech Republic (31.1%) but close to that of Jordan (39.5%) [8, 11, 19-21]. Other studies reported higher prevalence rate of self-medication than that found in our study, in particular, for United Arab Emirates (44%) and Greece (rural, 44.6%; urban, 74.6%) [18, 22, 23]. However, despite the potentially high prevalence of self-medication, the available data did not show high rates of antimicrobial resistance in Bulgaria [15].

Self-medication, as a pattern, is a risky behaviour of multifactorial aetiology. Our findings confirmed the associations of socio-demographic factors, cultural and personal characteristics with the self-medication and tendency for self-medication as established previously in other studies [8, 13, 18, 20, 24]. For instance, similar to Lithuania [11], we found that women tended to use more antibiotics than men. In the same time, we found that fever or common cold and cough were the major symptoms for self-medication with antibiotics which was found also in other studies [11, 21-23, 25].

Our study revealed also that the patients relied mainly on previous experience with antibiotics, similar to the findings from a survey in Jordan [21]. To note, in this sense, the proportion of our patients who kept leftovers was relatively high (60%) thus confirming previous studies from Greece (49.2%) or European Union surveys which reported that the main source of antibiotics supply was the leftovers from a previous course of treatment [5, 22]. In particular, the proportion of patients in our study who were using leftovers was higher than that in studies for Malta (35%) and United Arab Emirates (28%) [18, 20].

The higher percent of people keeping leftovers in Bulgaria, as compared to Western European and other countries, most probably may be associated with low socio-economic status, some national culture characteristics such as thriftiness, specific cultural models of the population in our country and lack of sufficient awareness on the risks [8, 20-22]. Also, note that it is important the intended self-medication and storage of antibiotics at home were predictors of actual self-medication [8].

It was interesting to further reveal which are the patients at the highest risk of self-medication with antibiotics. Our results are comparable to those reported by the Eurobarometer's study [5] which found that the younger people (aged 15-24) were more likely to use antibiotics without prescription and later, with age, they preferred to obtain the antibiotics from a medical practitioner, with a prescription. On the other hand, our study also found that the patients with chronic conditions were less likely to practice self-medication with antibiotics. This behaviour may be explained by the positive influence of their more frequent contacts with the GPs or other healthcare professionals.

Providing the correct and timely information about antibiotics might be one of the effective ways against self-medication. Both the Eurobarometer surveys and our study found that the majority of respondents felt they needed more information about the side effects and risks of the use of antibiotics. About half of the European respondents (47%) believed that the antibiotics were effective against cold and flu, while 16.4% of our patients in Bulgaria believed that the antibiotics killed viruses and 35% agreed that the antibiotics could be also used to treat fever. In this sense, it was a common finding that the GPs were considered the most important source of advice and information before a treatment with antibiotics [5]. For instance, Scliros et al. emphasized the key role of GPs in Greece on advising patients about the correct use of antibiotics [22].

Strengths and limitations of the study

This is the first study in Bulgaria which successfully performed a survey of self-medication with antibiotics and obtained a response rate of >42%.

However a selection bias should not be ruled out. Therefore, the sample might not be representative of all society classes. To the best of our knowledge, there was no any other validated tool in a Bulgarian language that could be used. Another limitation might be that we assessed only the subjectively reported attitudes and behaviours by the patients but were not able to refer directly to the actual purchase practice of antibiotics over the counter. However, if standardised and translated, our questionnaire could be freely used and validated in other similar countries, as well, and we believe that our unique findings might be also relevant to the former socialist countries and the other countries in the Balkan region.

Also, since the questionnaires were returned together with the informed consent form to the GP (but not directly to the researchers), some patients might have not responded honestly to all questions having been afraid of compromised anonymity. However, this was highly unlikely, because participants were aware that their GPs would not open and read the questionnaires. Also since all 1055 returned envelopes were opened together (only when all were received) and these were opened by the researchers themselves, but not by the GPs or in the presence of the latter. The low rate of missing data in the completed and returned questionnaires confirmed this assumption.

Important actions and efforts of the health authorities will have to be taken to promote public educational campaigns on proper antibiotic use in outpatients, involving primary care doctors, and enforce further measures to reduce the over-the-counter sale of antibiotics.

In conclusion, our study reported a relatively high prevalence of self-medication with antibiotics in the Plovdiv region of Bulgaria prior to the changes in the prescription legislation. This risky behaviour was most likely influenced by socio-demographic factors. Among the most common reasons for self-medication were the previous "experience" with antibiotics and lack of timely access to a physician. Based on our initial findings, future studies may be needed to further follow and analyse the attitudes, awareness and behavioural patterns of Bulgarian patients regarding the self-medication, especially after the introduction of the new legislation and rules for the prescription and sale of antibiotics.

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