

## Antibiotic Self-Medication Among Young Adults in Kosovo

Zana Shabani

Thematic Specialist in Health and Nutrition Save the Children Pristina, Kosovo

Kerry J. Redican\*

Department of Population Health Sciences College of Veterinary Medicine Virginia Tech Blacksburg, VA, Virginia

### Abstract

A survey was developed and distributed to adult pharmacy customers in Pristina, Kosovo to explore the extent and reasons for self-medication and knowledge regarding antibiotic use. The survey was distributed via-email to a convenience sample of pharmacy customers (n=693). Four hundred and nineteen (n=419, 63.2% response rate) completed surveys were returned. Most respondents (56%, n=235) were between 25-45 years old, almost 80% (79.62%, n=332) held a university degree, 59.43% were females, and 12.05% (n=50) were unemployed. Sore throats (44.47%, n=185) were the most common reason for self-medicating with antibiotics followed by other – unspecified (28.61%, n=119), cough (7.21%, n=30) and pain (6.49%, n=27). Amoxicillin was the most frequently self-administered antibiotic (41.1%, n=175). It was concluded that self-medication with antibiotics in this sample is a problem and controlling antibiotic use is an important public health effort.

**Keywords:** Self-Medication; Antibiotic behavior; Antibiotic controlled use; Antibiotic use in kosovo.



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### 1. Introduction

Antibiotic use has been the cornerstone of treating bacterial infectious diseases since their introduction in the 1940s. Unfortunately, the overprescribing and inappropriate use of antibiotics has led to antibiotic microbial resistance (AMR) and can be related to severe infections, complications, longer hospital stays and increased mortality [1, 2].

In addition to overprescribing and inappropriate use, self-medication is an important factor of antimicrobial overuse [3]. Self-medication is defined as “*the use of drugs to treat self-diagnosed disorders or symptoms without prescription, or the intermittent or continued use of a prescribed drug for chronic or recurrent disease or symptoms or sharing medicines with relatives or members of one's social circle or using leftover medicines stored at home*” [4-6]. The highest prevalence of self-medication, is in developing countries. For example, Southern and Eastern European countries report both high levels of both antibiotic use and antibiotic resistance, with self-medication as the most important driver of the antibiotic abuse [7, 8]. Up to 50% of prescribed antibiotics are not necessary to treat the diagnosed condition [9].

Self-medication in developing countries is high due to loose regulatory systems, poor supervision of antibiotic prescription and dispensing, availability of antibiotics as over the counter drugs and lack of healthcare system. The prevalence ranges from 24% to 73.9% in Africa, 36.1% to 45.8% in the Middle East, 29% in South America and up to 75% in Asia [10]. The prevalence of self-medication with antibiotics (SMA) is lower, with 3% in Northern Europe, and 6% in Central Europe [10]. There is a wide variation in the extent of prevalence of self-medication with antibiotics among European countries [10]. For example, 3% antibiotic self-medication was reported in Denmark [11], 19 % in Malta [12], 22% in Lithuania [13], 77% in Greece [3] and 78% in Albania [14]. Other interesting European self-medication and home storage of antibiotics in Spain, where the prevalence ranges from 18% to 41% [15, 16] and 18.7% in Italy [17]. The variation among countries in the prevalence of self-medication with antibiotics suggests that there is a set of complex factors that play a significant role in the difference among countries such as: socioeconomic factors, disparities in healthcare system, reimbursement policies, access to healthcare, drug prescription and dispensing policies [3].

#### 1.1. Determinants of Self-Medication

Education level and knowledge are important determinants of self-medication. When people lack the knowledge of the adverse effects of self-medication they are less likely to use caution when self-medicating. The high prevalence of self-medication with antibiotics requires urgent attention not only for the major risk of developing antibiotic resistance but also for the additional harmful effects such as: dangerous drug interactions, severe adverse drug reaction such as anaphylactic shock, kidney or liver toxicity [18].

The major determinants that affect self-medication in low middle income countries (LMIC) include severity of illness, socio-economic status, past successful experience with the drug and education level [19]. Populations from LMICS do not visit the health professional prior to initiating treatment due to associated costs such as time, travel expenses and consultation charges [20]. For example, in Albania limited restrictions on the purchase of antibiotics are associated with lack of interest on the part of health care providers and pharmacists result in self-medication with

antibiotics [14]. Another factor that adds to the burden of antibiotic resistance is the use of more than one antibiotic during an illness episode, which is indicative for the uncertainty of the cause of illness [19].

While much is known about antibiotic use and misuse in Central and Northern Europe, little is known about use and misuse in Southern Europe in countries like Kosovo.

## 1.2. Antibiotic Use in Kosovo

Kosovo is a small country landlocked in the Balkan Peninsula, claimed independent from Serbia in 2008. The 2015 National Statistics Agency stated the population of Kosovo as 1.9 Million. Moreover, 67.2% of the entire population is under the age of 64 years old and therefore Kosovo is considered as a country with a young population. It is a post-war country in transition with many public health challenges. Resistance to antibiotics in Kosovo is a major public health problem and related to the practice, particularly among young adults, of using antibiotics without a prescription.

The wide spread practice of purchasing antibiotics over the counter is a very common problem in Kosovo. Antibiotic self-medication is influenced by a set of combined factors such as poverty, lack of sustainable healthcare system, lack of reimbursing system, low health literacy, easy access of drugs over the counter, underestimation of medical conditions and view of self-medication as a common practice. Even though antibiotics are categorized as drugs that require a prescription from a physician according to the law for medicinal products and medical devices in Kosovo (LIGJI Nr. 03/L-188 PËR PRODUKTE DHE PAJISJE MEDICINALE, today this law continues to not be followed by the pharmaceutical setting, medical facilities, and the general population itself [21]. Furthermore, Kosovo does not have a sustainable health care system nor a reimbursement system, which enables the purchase of antibiotics only as out of pocket payments and facilitates the accessibility to drugs for self-medication. Out of pocket payments for medicines presents a major problem in due to low socioeconomic status and poverty which makes it difficult to access the healthcare.

Additionally in Kosovo sale of antibiotics is loosely regulated and supervised, making self-medication perceived as common practice, effective, safe and cost-effective [22]. Furthermore, the practice of self-medication itself may encourage people to underestimate their medical condition and believe in their independence in treating themselves [23]. Another major problem, is the inappropriate prescribing by physicians, who tend to prescribe antibiotic very often. This in combination with inadequate instructions on how to use the antibiotics and for how long either by the physician or the pharmacy, leads to inappropriate use and poor treatment of the medical condition. A study conducted by the World Health Organization [24] in developing and transitional countries found that 40% of the antibiotics were prescribed in under dosage by all health care providers, while the percentage of inappropriate antibiotic prescription was the highest when the prescriber was a medical doctor [25].

No studies have been conducted in Kosovo exploring self-medication with antibiotics. This contribution is significant, since it is the first study that collects such data and investigates the extent of self-medication practice and knowledge regarding self-medication.

This study will help in the development and designing of interventions with the potential of improving antibiotic use and reduction of self-practice, whether through awareness campaigns, effective policy restrictions, or combined interventions. Through a full assessment of the reasons and factors of self-medication over antibiotics, we can gain important data and knowledge on how to potentially improve and reduce self-practice. The significance of undertaking such studies that contribute to the understanding of the extent of self-medication and the development of strategies to reduce or prevent self-medication. Horton and Stewart [22] suggested that self-medication with antibiotics would decrease if the general population was provided with sufficient information on the importance of using medicines properly and the consequences of self-medication.

## 1.3. Purpose

This purpose of this study was to explore the extent and reasons for self-medication and knowledge regarding antibiotics among adults in Kosovo.

## 3. Methods

This study was cross sectional and designed to assess prevalence, association of variables related to self-medication with antibiotics. Though it was not possible to establish causal relationships, it was able to capture the required data necessary for analysis based on the outlined objectives of the study.

### 3.1. Sampling Technique

A convenience sampling was used to acquire study participants in Kosovo. This sampling technique involved procuring customer emails from a large pharmacy in Kosovo. E-mails were sent to customers (n=693) asking them to answer a questionnaire regarding SMA.

### 3.2. Survey Instrument and Data Collection

Based on the antibiotic use literature review and conversations with medical doctors. A three part questionnaire on self-medication with antibiotics was developed [3, 26-28]. The 39 item survey method was performed using the 39-item questionnaire had a readability level of 7<sup>th</sup> grade. The questionnaire was reviewed by three medical doctors and a pharmacist and determined to have face validity. The final questionnaire consisted of sections on demographic characteristics, self-medication with antibiotics, respondent's knowledge on antibiotics and questions about patterns

of SMA included the symptoms for which antibiotics were being used; the types of antibiotic; the duration of use; the reasons for self-medication; the sources of antibiotics; and the knowledge regarding antibiotics. Socio-demographic characteristics involved gender, age, marital status, education level, professional status. Surveys were administered through a web link and were distributed and advertised through social media.

The questionnaire was pilot tested with five people, who were representative of the study population, to determine the clarity of the language used and questionnaire structure. Some questions were changed based on responses.

### 3.3. Confidentiality

Participants were assured about confidentiality of the information obtained in the course of the study in that: no personal identifiers were used and the data was analyzed in aggregates. All potential respondents were sent the study questionnaire along with a brief written introduction to survey, having a web-link to the study questionnaire. Answering the questionnaire was considered to be consent to take part in the study and informed consent was not asked separately. No monetary incentive was provided to the respondents.

### 3.4. Data Analysis

Data were entered, analyzed, and stored with the assistance of statistical package for social science R version 3.3.3, as well as Microsoft Excel. Descriptive statistics were used to describe socio-demographic characteristics of the respondents, the prevalence, and the patterns of self-medication with antibiotics.

## 3. Results

### 3.1. Socio-Demographic Characteristics of the Study Population

At total of four hundred and nineteen (n=419) of six hundred and sixty three (n=663) were returned completed, giving a response rate of 63.2%. The study includes data from four hundred and nineteen participants (249 women/170 men). The participants whose age ranged from 18-25 were 34.13% (n=143), 25-45 years were 56.09% (n=235), 45-60 years were 8.83% (n=37) and >60 years were 0.95% (n=4). Most of the respondents had a university degree or college education 79.62 (n=332), 13.91% (n=58) has a high school education, 6% (n=25) had professional/technical education and 0.48% (n=2) had only elementary school education. Regarding employment status, 46.51% (193) reported to be employed, 12.05% (n=50) were unemployed, 30.60% (n=127) reported to have student status and 10.84% (n=45) were students and employed (Table 1).

**Table-1.** Socio-demographic characteristics of the respondents from Kosovo (n=419)

Characteristic	Categories of Characteristics	Frequency	Percent
<b>Age</b>	18-25	143	34.13
	25-45	235	56.09
	45-60	37	8.83
	> 60	4	0.95
<b>Sex</b>	Female	249	59.43
	Male	171	40.57
<b>Education</b>	Elementary	2	0.48
	High school	58	13.91
	Professional/Technical	25	6.00
	University Degree	332	79.62
<b>Employment Status</b>	Unemployed	50	12.05
	Employed	193	46.51
	Student	127	30.60
	Student/Employed	45	10.84

Out of 419 participants, 58.65% (n=244) have reported that they have used antibiotics without medical prescription.

The major source of self-medication was the pharmacy without prescription 91.69% (n=342), followed by the left-over antibiotics 8.31% (n=31). The most common reasons for self-medication with antibiotics were sore throat in 185 respondents (44.47%), nasal congestion in 12 respondents (2.99%), diarrhea in 5 respondents (1.24%), pain in 27 respondents (6.72%), cough in 30 respondents (7.46%), skin wounds in 13 respondents (3.23%), runny nose in 5 respondents (1.74%), fever in 18 respondents (4.48%), vomiting in 4 respondents (1%) and other concerns not specified in 103 respondents (25.62%) (See Table 2)

**Table-2.** Reasons for self-medication with antibiotics

Reasons for antibiotic self-administration	Frequency	Percentage (%)
Nasal congestion	11	2.64
Sore throat	185	44.47
Cough	30	7.21
Runny nose	5	1.20
Fever	18	4.33
Pain	27	6.49
Vomiting	4	0.96
Diarrhea	5	1.20
Skin wounds	12	2.88
Others(unspecified)	119	28.61

Table 3 shows that the most frequently self-administered antibiotics were amoxicillin (41.53%), amoxicillin/clavulanic acid (amoxiclav) (23.77%), ampicillin (13.11%), ciprofloxacin (5.74%), clarithromycin (0.55%) and other not specified (15.30%)

**Table-3.** Most frequently self-administered antibiotics

Most frequently self-administered antibiotics	Frequency	Percentage (%)
Amoxicillin	175	41.1
Amoxicillin/ Clavulanic Acid	107	25.1
Ampicillin	51	12.1
Ciprofloxacin	24	5.7
Clarithromycin	2	0.5
Other	66	15.5

When respondents were asked if they could successfully treat common infectious diseases with antibiotics by themselves, 54.41% answered “No I cannot”, 39.29% were not sure and 6.30% answered “Yes I can”. Earlier discontinuation of antibiotics (28.03%) was reported when symptoms disappeared. A little over 37% (37.09%) of the respondents reported to have changed the type of the antibiotic during the same treatment, and 35.9% reported to have

changed the dose of the antibiotic when self-treated. Our study showed that 33.16% of the respondents took the same antibiotic under different brand names for the same treatment. The study showed that most of the respondents had knowledge that antibiotics are used against bacterial infections, with 41.23% agreeing and 31.11% totally agreeing.

## 4. Discussion

The study was aimed at determining the prevalence of self-medication and knowledge regarding antibiotics among young Kosovar adults. Our results show that the prevalence of self-medication among young adults in Kosovo is high. Our results are comparable to those of the Albanian and Greek population, where studies showed that 78% and 77% respectively of respondents reported self-medication with antimicrobials. Substantial variation in the prevalence rates of antibiotic self-medication among European countries suggest that the socioeconomic factors play a role, as do disparities in healthcare systems such as reimbursement policies, access to healthcare and drug dispensing policies. [3, 14]. Another important factor is the acquisition of antibiotics from pharmacies without prescription, which occurred most frequently in eastern and southern European countries.

Self-medication is facilitated via: legal availability of antibiotics over the counter; left-over antibiotics; unnecessary prescription from physicians and dispensing from pharmacists. Factors like traditional, social, and cultural beliefs may also influence the practice of self-medication. Approximately 60% of the participants had an experience of self-medication with antibiotics. In the present study the major source of self-medication was the pharmacy. It was also seen that the majority of respondents consider self-medication not as a good practice, but ironically most of them have self-medicated at some point in their life. The results indicate the most common reasons for self-medication where to save time, previous successful experience and was less expensive.

These findings are not surprising considering the fact the most of the health care expenditure in our country is out-of-pocket and the healthcare facilities cannot satisfy the needs of the general population. Among the list of antibiotics most widely used for self-medication were amoxicillin, amoxicillin/clavulanic acid, and ampicillin. In our study, sore throat, cough, and other unspecified are the most common concerns for which antibiotics were used. This finding matches the common reasons for self-medication found in previous studies [14, 29].

Assessing knowledge about antibiotics it was found that the vast majority of the participants knew what antibiotics are and that they are used against bacterial infections rather than virus infections. When taking antibiotics whether prescribed or non-prescribed it is the responsibility of the patient to read the instructions inside. Our study revealed that more than 60% of the participants in our study read the instructions that come with the antibiotic package.

However in terms of changing the dose and switching the type of antibiotics, it was concerning that around 35% of the participants changed the dosage or switched to another antibiotic during the same treatment. In our study we

also assessed various factors that could be associated with the use of self-prescribed antibiotics amongst the study population. No association could be established between the demographic factors such as education, gender, age, professional status, and self-medication with antibiotics. These findings are consistent with previous studies which found no association between self-medication in general and socio-demographic factors [28].

Our study data also revealed that as soon as the symptoms disappeared, the patients stopped taking antibiotics without the completion of the full treatment regimen. This practice could trigger serious consequences because symptoms are underlying cause of the disease and killing the symptoms may not necessarily heal you from the actual cause. Furthermore, incomplete course of treatment may result in provocation of resistance and emergence of superbugs. Antibiotic resistance is a major problem worldwide, with a higher prevalence in developing countries [30]. It is widely believed that human inadequate practices such as inadequate dosing, incomplete regimen of treatment and inadequate drug use are major factors that drive to the emergence and spread of antimicrobial resistance [28].

#### 4.1. Limitations

In our study we obtained a high response rate (63.2%) which helps to defuse concerns regarding response bias. Knowledge of antibiotics and self-medication with antibiotics among the Kosovar population has only been studied to a limited extent. In spite of the large sample size and high response rate, several limitations of this study should be noted. As the study was based on a self-administered questionnaire, the data were represented from the respondent's memory, and thus, in some cases it was subjective. We used convenience sampling instead of systematic randomized approach. In our study data were collected online, so it is hard to generalize the data beyond this population, because we did not include participants who do not use social media.

### 5. Conclusion

Controlling the use of antibiotics is of paramount importance in both developing and developed countries. The first step to overcome this is by identifying the prescribing, dispensing and consuming of antibiotics used in the community [31]. Therefore, we believe that in order to combat this, we need to enhance the awareness of patients and healthcare community, perform continuous surveillance, and enforce the rules and regulation on antibiotic prescribing and dispensing.

#### 5.1. Recommendations

Like rest of the developing world, self-medication with antibiotics among Kosovar adults is an issue of public health concern. Reduction in self-medication and consequently antibiotic resistance through rational use of antibiotics is among major public health challenges. This particular study has assessed antibiotic self-medication practices among Kosovar adults. This study has also offered recommendations to plan strategies to address this issue.

In Kosovo, antibiotic self-medication and health risks associated with it are not well known to the public, due to illiteracy, lack of knowledge, poor recognition from the government and availability of the antibiotics due to poor restrictions. Therefore there is a need to address this issue by increasing awareness among the public and healthcare providers through education and enforcement of laws and policies.

#### 5.2. Antimicrobial Stewardship Programs, Campaigns and Audits

Informational and educational activities and campaigns aimed at improving the public's and healthcare professional knowledge and behavior about antimicrobials play the leading role in reducing imprudent use of antibiotics. Such interventions should include special educational leaflets, websites, and consumer information offices, messages included on TV, radio, and mass media. Other activities would be publication of guidelines, educational sessions on appropriate prescribing of antibiotics, educational sessions on the diagnosis and management of infectious diseases and consultation by pharmacists.

Multi-faceted interventions such as combined strategies or targeting patients, physicians and pharmacists simultaneously are more likely to result in behavior change than single interventions [31, 32]. Television is the most effective medium for communicating messages [31, 32]. An Australian national program aimed at reducing antibiotic use for URTIs addressed patients attitudes and beliefs and provided them with the knowledge and skills to manage cold and flu without using antibiotics. The evaluation of the program showed a significant decrease in self-reported use of antibiotics for cough, cold, and flu [33].

Interventions targeting doctors and patients in primary care with active participation of general practitioners in audits with discussions of results obtained have been found to be effective in achieving a reduction in antibiotics prescribed [34]. A 2009 rationing antibiotic use campaign in France was effective [35].

#### 5.3. Enforcement of Governmental Laws Prohibiting Over-The-Counter Sale of Antibiotics

Enforcement of existing laws regulating the sale of antibiotics could reduce self-medication. This strategy has been effective in Chile where after strict enforcement of existing laws, that restricted the purchase of antibiotics without prescription, the sale of antibiotics decreased by 43% [36]. Another issue in Kosovo, which need to be further investigated is the increasing number of pharmacies per inhabitant, and how it influences competition between pharmacies and possibly triggers the OTC sale of antibiotics.

## 5.4. Other Potential Determinants and Measures of Reducing Self-Medication

Prescribed antibiotics should not be dispensed according to the package size. Dispensing the exact number of antibiotics in pharmacies as implemented in USA and some other European countries is a technique that could be promoted in Kosovo and contribute to the reduction of self-medication. This way, the number of left-over antibiotics could be reduced, together with the possibility of self-medicating.

## 6. Conclusions

In Kosovo, despite the open and rapid access to primary care services, it appears that a high proportion of young adult population prefers to use antibiotics without prescription. Results show that socio-demographic factors such as age, gender, education, and professional status did not have any association with antibiotic self-medication. However, there was an association between gender and change of dose, and gender and knowledge regarding antibiotic use. This study has opened horizons for further research on this subject, besides showing that it's a real problem and should be addressed. This study only touches upon and briefly explores antibiotic self-medication issue, the relation between self-medication and antibiotic resistance could be a useful subject for future studies. A comprehensive public health approach must be taken to prevent this problem from further escalating, which would involve: awareness regarding the implications of self-medication with antibiotics through health education; strategies to prevent the supply of medicines without prescription; enforcing regulations regarding antibiotic sale, dispensing, and advertising.

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