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# KNOWLEDGE AND BEHAVIORS REGARDING THE USE OF ANTIBIOTICS: A DESCRIPTIVE CROSS-SECTIONAL SURVEY IN ROMANIA

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## INTRODUCTION

World Health Organization draws attention upon antibiotic resistance becoming one of the biggest threats to global health, food security, and development today [1]. Moreover, it is recognized that the overuse of antibiotics among patients is one of the main causes of the emergence of resistant bacteria [2]. European Centre for Disease Prevention and Control draws attention that the levels of antimicrobial resistance in Romania in key indicator bacteria from humans are very high and/or rising in comparison to most other EU/EEA countries [3]. For example, in 2015, Romania was ranked the 6th in the world for the consumption of daily doses of antibiotics per inhabitant [4]. More recently, data from the European Surveillance of Antimicrobial Consumption Network (ESAC-Net) show that Romania had a total consumption in the community and the hospital sector of 33.3 defined daily doses per thousand inhabitants and per day, the second highest in Europe [5]. As a response to this issue, countries have initiated educational campaigns to stimulate the public in reducing unnecessary use of antibiotics [6]. However, the majority of measures initiated in Romania regarding the rational use of antibiotics were discontinued in 2017 [7].

The aim of this study was to inspect the knowledge regarding the use of antibiotics among general public in Romania. This is considered a first step in raising awareness campaigns about the excessive use which poses a serious threat to public health [8].

## MATERIALS AND METHODS

### *Sources of data*

Data were collected at the end of 2018 using a face-to-face questionnaire by students from the University of Agricultural Sciences and Veterinary Medicine, who were also involved throughout the project. Before the field research they were given explicit instructions about the sampling procedure and filling in the data. Data were analyzed using the SPSS version 18 for Microsoft Windows. Response frequencies for the survey questions were determined and displayed in graph and tabular formats.

### *Sample profile*

The total sample reached 500 respondents from 4 Romanian counties in the West region (Arad, Timiș, Caraș-Severin and Hunedoara). There were more male respondents in the sample (58.1% compared to 41.9%). Two thirds of them were living in urban areas (68.5%). Half of the respondents were in the age group 35–54, and one third had university studies

### *Measurements*

The study used the instrument proposed by WHO [9]. The translated version of questionnaire included 30 questions grouped in three dimensions: use of antibiotics, knowledge about antibiotics, and knowledge about antibiotics resistance. Additional information was gathered on gender (male/female), residency (urban/rural), age (16-24, 25-34, 45-54, 55-64, 65+), and education (basic, highschool, higher).

## RESULTS

### *Usage of antibiotics*

#### *How people obtained antibiotics*

One third of respondents surveyed report having taken antibiotics within the past six months (37.6%) and 20.1% during the last year. The administration of medicine appears as a quite responsible behavior, because respondents who reported were having taken antibiotics, when asked how they obtained it, the vast majority (79.1%) report that they got their antibiotics through a prescription. There are little variations around how respondents reported getting their antibiotics. Females respondents are slightly more likely than males to have a prescription (80.1% compared to 77.9%), urban respondents (80.1%) are also slightly more likely than those in rural areas (77.9%) to report having gotten antibiotics through a prescription, and more educated a respondent is, more likely is to adopt a prescription-driven behavior.

### Where people obtained the antibiotics

Almost all surveyed respondents report having obtained the antibiotics they last took from a pharmacy (88.9%) out of which 8.9% without a prescription. Respondents aged 65 and older are more likely to obtain the antibiotics from a pharmacy using a prescription (87.8%) compared with 74.1% of those aged 16–24, 81.5% of those aged 25–34, and 78.5 of those aged 35–54. Similarly, respondents who are more educated are more likely to procure antibiotics from a pharmacy (84.6%), compared to 77% of those with basic education or a highschool degree. Male respondents and those residing in urban areas are slightly more likely to report having received antibiotics from the internet.

## *Knowledge about antibiotics*

### How and when to take antibiotics

Respondents were first asked whether they thought the following statement was true or false: *It's okay to use antibiotics that were given to a friend or family member, as long as they were used to treat the same illness*. Overall, 12% of the survey respondents think this is true, whereas it is in fact a false statement, showing that the majority of them had the correct information. Slightly more male respondents (13.3%) think this statement is true compared to females (10.6%), respondents from rural areas are more likely than those in urban areas to think that this incorrect statement is true, at 14.8% and 10.7% respectively. Also, the more educated a respondent is, the less likely they are to agree with the incorrect statement (8.9% for those with higher education, 10.9 for those with a highschool degree and 22.1% those with basic education).

However, when asked if *It's okay to buy the same antibiotics, or request these from a doctor, if you're sick and they helped you get better when you had the same symptoms before*, more than one quarter (27.2%) thought this statement is true, whereas it is also in fact a false statement. Females are also more likely to correctly indentify this statement as false (58.2%) compared to their male counterparts (48.8%). There is a slight towards older respondents being more likely to correctly identify that the statement is false for the interval 16–54, but after 55 years old, respondents follow a downward trend whereas only 41.2% of the respondents older than 65 correctly indentifying the statement.

### When to stop taking antibiotics

Asked when they think they should stop taking antibiotics once they had begun administration, the majority of respondents answered the entire dosage should be continued as prescribed (65.9%). Even if WHO recommends to follow the health worker's advice when using antibiotics [10], one quarter (27.6%) think it is better to stop administration once the symptoms have ameliorated. There are some notable differences by socio-demographics: younger adults (16–24) and older adults (over 65) are more likely to believe that they should stop administration once they feel better (37.1% and 34.2% respectively) compared to other age groups. The age group 35–54 appeared as the most informed group because 69.7% of them considered continuing the treatment as prescribed. Females are slightly more likely to continue administration of antibiotics as directed (68.7%) compared to males (64.7%). Additionally, respondents in rural areas are slightly more likely than respondents in urban and urban areas to think that they should stop taking antibiotics when they feel better, at 29.5%, compared to 26.8%. There is a clear upward trend in terms of education, thus respondents who are more educated are more likely to continue the treatment as directed. So, 37.3% of respondents with at least compulsory education say that they should stop taking antibiotics when they feel better compared to 32.1% and 16.8% of respondents a highschool degree or higher education respectively.

### Which conditions should antibiotics be used to treat

Asked from a list of medical conditions to say which can be treated with antibiotics, the majority of respondents correctly identified bladder/urinary tract infection (81.9%) and skin/wound infections (61.2%). In contrast, only 32.3% of respondents correctly identified gonorrhea as a condition treatable by antibiotics. Also, more than half of respondents mistakenly thought that viral conditions which do not respond to the use of antibiotics can, nonetheless, be treated with these medicines: 67.7% agree that the use of antibiotics is useful for sore throats while 57.4% agree that the use of these medicines is appropriate for cold/flu (Fig. 1).

We can notice some insteresting differences between the socio-demographic groups' responses to the bladder infection/UTIs, the condition for which the highest rate of accurate identification was obtained. Women are more likely to responde correctly, with 86.6% compared to 78.4% males. Respondents aged 35 and older are more likely to give the correct answer, with 88.3% of respondents over 35 answering that UTIs can be treated with antibiotics, compared with 69.4% of those aged 16–24 and 66.7% of those aged 25–34. Urban respondents are more likely to respond correctly, with 85.4% thinking that UTIs can be treated with antibiotics compared to 73.7% of those in rural areas.

## CONCLUSIONS

The cross-sectional design prevents us from drawing conclusions regarding causal relationships. However, several important conclusions emerged. There are still some misconceptions about the efficacy of antibiotics for different medical conditions. Healthcare professionals have the first responsibility towards responsible antibiotic use by informing the public about the appropriate use of antibiotics for common infections [11]. Access to antibiotics without a prescription is a contributing factor for irrational and excessive use of antibiotics. Even if the majority of our respondents used a prescription from a doctor and a pharmacy to buy them, the procurement via the internet is considered to be a growing problem [12]. Changing habits and increasing awareness [13, 14, 15, 16] of public about antibiotic use is considered as a fundamental early planning to maintain antibiotic potency in the time of growing bacterial resistance [17].

### *Declaration of conflicting interests*

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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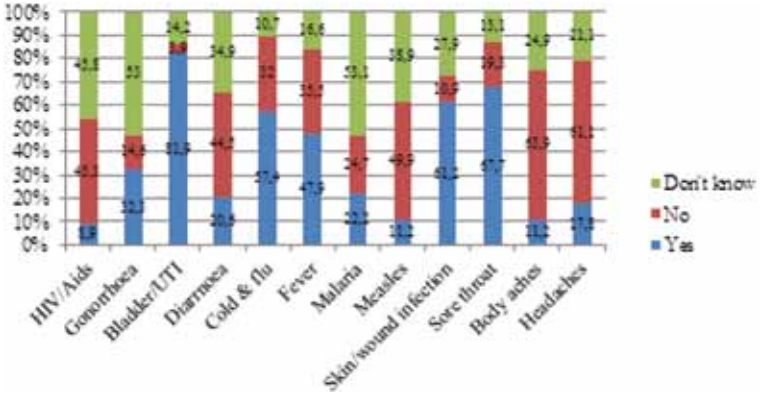


***Fig. 1.*** *Percentage of responses from all respondents to "Do you think these conditions can be treated with antibiotics?"*

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