

Self-medication with Antibiotics in Health Science and non-Health Science University Students

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Abstract: Self-medication is a very common practice in the Spanish university cohort due to the easy access to medicine both with and without a medical prescription, which can cause numerous health problems due to irresponsible use of pharmaceutical drugs and the masking of symptoms that could be indicative of major diseases. The therapeutic breach or the abuse of antibiotics in this group can produce bacterial resistance and generate a great cost to health services. This descriptive study utilizes 135 students from the University of Extremadura (Spain) divided by Health Science and non-Health Science programs for which a survey was provided online to gather information on the population and the most common habits of self-medication in order to determine the need for programs on health education and to determine the information that students possess on the rational use of these medicines. The results showed high percentages of self-medication with antibiotics in students who lived in their family's home and took courses in non-Health Science studies due to disinformation concerning basic pharmacology. In addition, antibiotic treatment was abandoned in 89% of cases when symptoms disappeared. In conclusion, non-health sciences students demonstrate misperceptions and limited knowledge about the correct use of medicines. Students who self-medicate with antibiotics are more likely to live in their family home and have non-health sciences areas of study. They are also more likely to stop antibiotic treatment early once the symptoms for which they took the medication resolve. This could be related to the lack of information about the correct use of medicines. Programs in health education in schools and a greater presence of nursing in the education of children could cause a shift in behavior in future generations.

Keywords: Self-medication, Antibiotics, University students, Medicine

1. Introduction

Self-medication is defined by the World Self-Medication Industry (WSMI) and the International Pharmaceutical Federation (IPF) as "the use of medicines without medical prescription at the person's own initiative." [1] Self-medication is a common practice in Spain due to social, economic and cultural factors. The World Health Organization (WHO) created the concept of "Responsible self-medication" aimed to increase the rational use of medicines and the treatment of symptoms and health problems that do not require medical assistance [2].

Self-medication is not the same as self-care, which is defined as the set of health-related activities engaged by the patient, without consulting with health care professionals. Self-care includes preventing health problems by eating an appropriate diet, engaging in physical exercise, consuming alcohol in moderation, and avoiding the use of tobacco and the abuse of drugs. When these preventive measures are not sufficient, the patient generally decides to use non-prescription medicines.

In Spain, patients take non-prescription medications with similar frequency as prescription medications. This can cause the improper use of medications due to the ease of access of over-the-counter

medicines, which can in turn lead to medication misuse and overall worsening of the symptoms they are intended to treat.[3]

University students are very susceptible to self-medication due to easy access to medicine, the knowledge that health-science students have about pharmacology and physiology and the change of residence. This means fewer visits to the doctor due to lack of time and misinformation about the location of health services at their new residence. In addition, the consumption of alcohol and caffeine in this population is elevated and can be a severe problem if these substances are mixed with medicine.

One important problem with self-medication is the masking of symptoms that may be indicative of secondary diseases and could cause numerous visits to Urgent Health Services and hospitalization, in addition to a great cost for health services and damage to the health of the individual. With the consumption of antibiotics, the most severe problem is the acquired bacterial resistance, which renders many antibiotics ineffective. In Spain, it was shown that 25% of the 80 million packages of antibiotics sold annually is consumed without medical prescription.[4]

According to the Spanish Health Ministry, in the Campaign for the Rational Use of Medicines in 2006-2007: Spain is among the European countries' major consumers of antibiotics, and as a consequence, it bears a major percentage of resistant bacterial strains. To illustrate, 1/3 of the strains of *Streptococcus pneumoniae*, a main cause of pneumonias, are resistant to penicillin, 30% of the strains of Staphylococci is resistant to oxycline, and 60% of the invasive strains of *Escherichia coli*, the bacterium responsible for many urinary infections, is resistant to ampicillin. The high consumption of antibiotics alone does not explain the high prevalence of resistant infections in our country in comparison to other countries in the region, but they are also used for treating viral infections, which are not responsive to nor indicated for treatment with antibiotics. More than 85% of the consumption of antibiotics is outpatient, and of this number, a great percentage is for the treatment of respiratory infections in children and adults who, in most cases, do not need antibiotic treatment due to the illness being a viral infection.[...] Is needed to promote the rational use of medicines due to the high levels of self-medication in Spanish population. Is the doctor who may to diagnose any disease and prescribe the best treatment to the patient, working in the awareness of the patient on the damages to the health of the self-medication.”[5]

Collaboration with doctors and pharmacists is important for preventing and promoting responsible self-medication by means of health education programs in schools, which promotes a change of conduct and provides more information about the risks of irresponsible self-medication and the subsequent costs for public health services.

Learning about the consumption habits of medicine is important in determining health policies and educational programs in each population and reducing unnecessary costs for public health services.

The main purpose of this study is to summarize the effects of self-medication in students of the University of Extremadura. Secondary goals include determining the risk factors and related effects, determining the level of information that the students possess on the correct use of the medicines and assessing the positive and negative aspects of the practice of self-medication in these students.

2. Materials and Methods

The sample was 135 pupils (men and women) from the University of Extremadura; 77 were enrolled in Health Science studies (Nursing, Medicine, Occupational Therapy, Sports Sciences, Physiotherapy, Biology and Veterinary Sciences), and 58 were enrolled in non-Health Science studies (Economics, Education and Teaching, Geography, Forest Engineering and Law Studies) in order to have an epidemiologic, descriptive, prospective and transversal study.

Data collection was done using an online survey in Google Forms consisting of 24 mandatory questions about personal information, studies, self-medication habits and actual residence (Appendix A). The survey was sent by an instant messaging app on the student's smartphones by students outside of the study between 01/25/2016 and 02/16/2016, coinciding with the winter evaluations season exclusions or lost values in the sample. All of pupils who sent back the survey were admitted in the study.

Data was tabulated by sex (male or female) and studies (health science and non-health science). Outcomes were compared looking for statistically significant differences among the habits of consumption of antibiotics between health-science students and non-health-science students and residency in the family home or outside the family home.

Risk was estimated by looking for possible risk factors and protective factors related to self-medication with antibiotics. The data analysis was done using SPSS Statistics 20. Comparisons were made using contingency tables and the Phi and Cramer's V test. Statistically significant differences between subgroups were considered at the $p < 0.05$ level. Statistical power was fixed *a priori* at 80% (0.8). Sample size was calculated using a statistical calculator.

3. Results

Of the total sample, 62.2% were women and 37.8% were men (Figure 1).

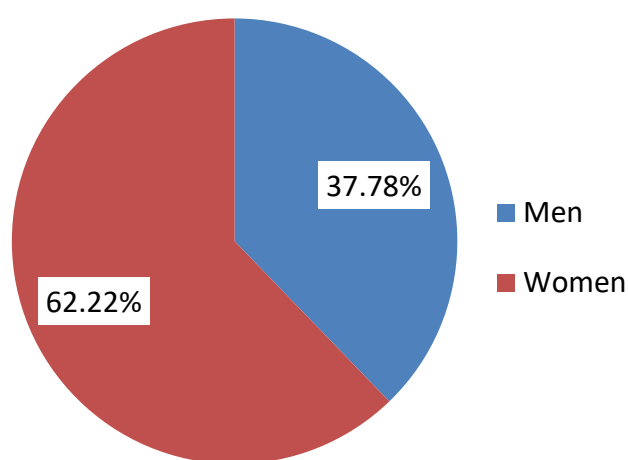


Figure 1. Sex of the participant.

The primary age range was 17 – 21 years (49.6%) (Figure 2).

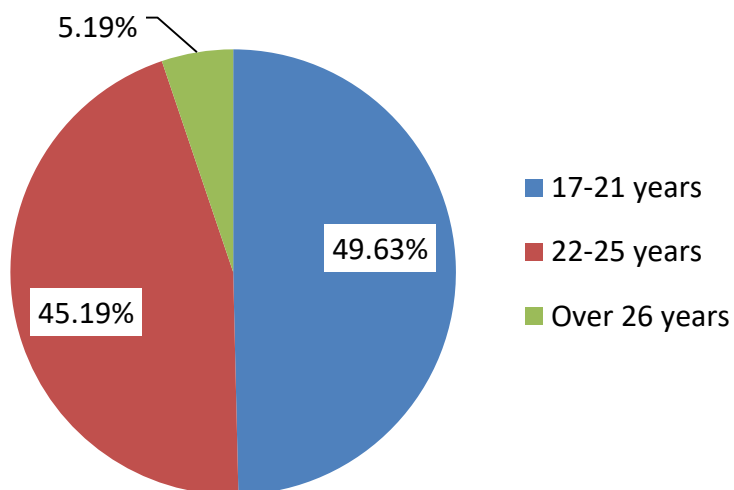


Figure 2. Age range of the participant.

Sanitary studies were most common (57%) (Figure 3).

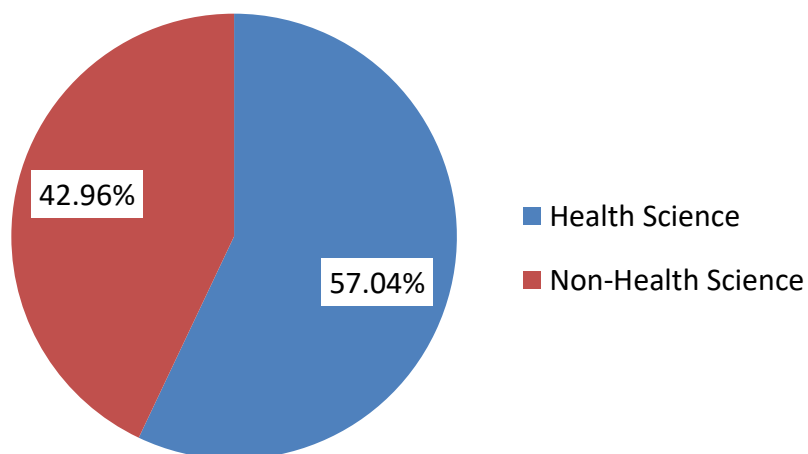


Figure 3. Percentage of pupils in Health Science and Non-Health Science studies.

The 91.9% of individuals admitted to having self-medicated at least once in their lifetime (Figure 4).

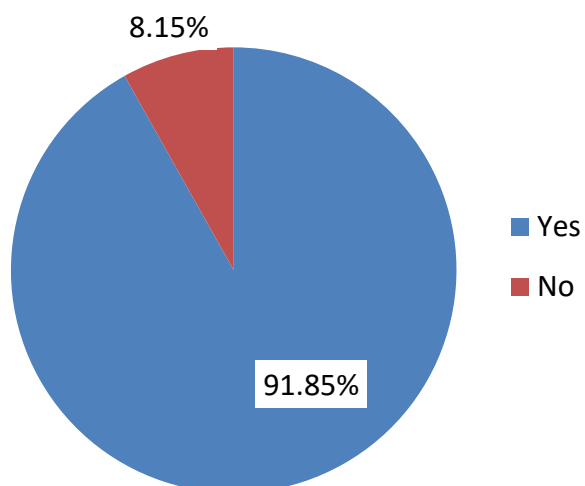


Figure 4. Practiced self-medication at least once.

In total, 66.7% of pupils were living outside the family's home (Figure 5).

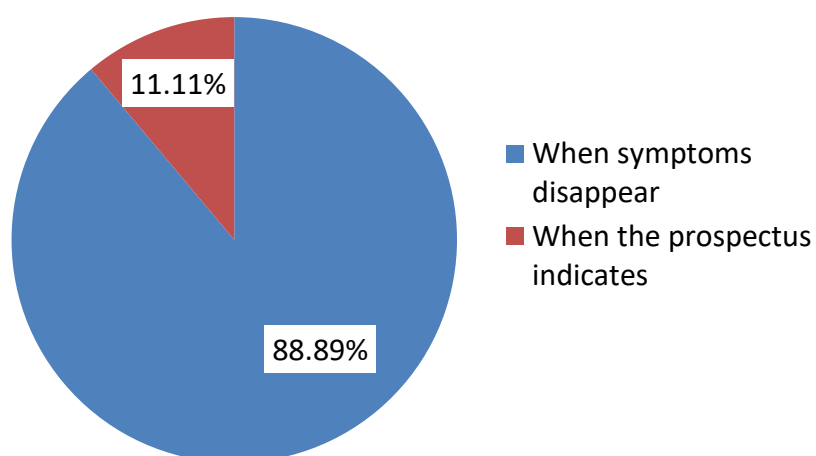


Figure 5. Domicile of the participant during the course of treatment.

At least 9 pupils in the sample marked "antibiotics" as their most consumed medicine. Of those pupils, 88.9% were enrolled in non-Health Science studies. The most common consumers of antibiotics were from non-Health Sciences studies (88.9%) (Figure 6) and live in the family home (55.56%) (Figure 7).

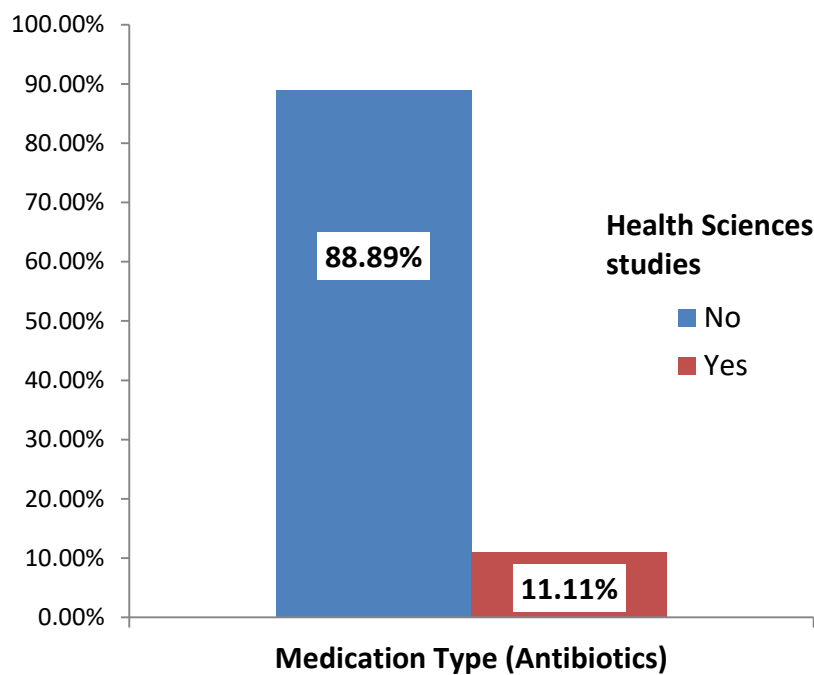


Figure 6. Self-medication with antibiotics by area of study.

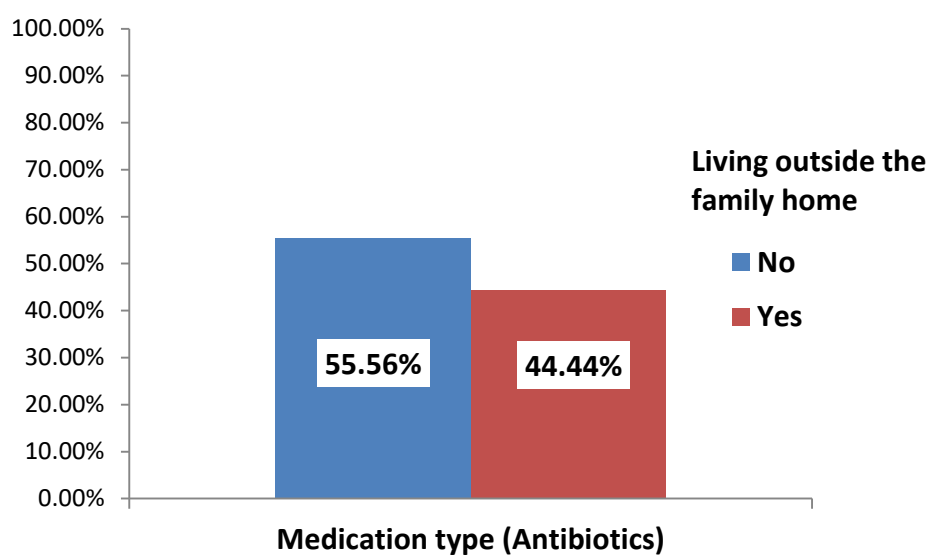


Figure 7. Self-medication with antibiotics by domicile during treatment course.

The 88.9% of the antibiotic consumers abandoned the treatment when symptoms disappeared, and only 11% followed the instructions on the medicine packaging (Figure 8).

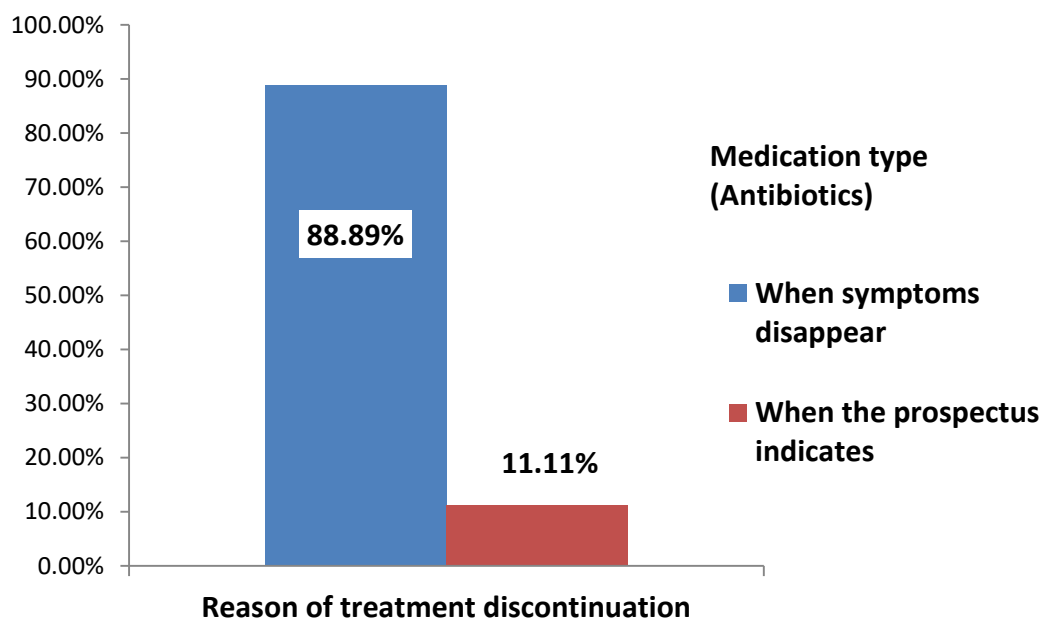


Figure 8. Reason for discontinuing antibiotic treatment.

4. Discussion

Self-medication is a risky practice common in university students who are enrolled in non-Health Science studies due to disinformation about pharmacology. Pupils that live in the family home consume more antibiotics, possibly due to the greater availability of these drugs at home from other previous treatments as compared to a student apartment or residence flat. Although women consume the majority of medicines, they demonstrate more responsible habits of self-medication than do men. Comparing the results with recent studies on the topic, we find similarities with studies conducted in Spain [6,7], Latin America [8-10] and the Middle East [11-14]. A study conducted by the University of Valencia (Spain) shows a frequency of self-medication of 90%, a consumption of analgesics / anti-inflammatories of 73% and a major consumption of antibiotics in males. The individuals who use more antibiotics are, in turn, those who possess less information about these medicines.[7]

The reasons for antibiotic treatment abandonment is a lack of knowledge about the use of antibiotics and not consulting the instructions. This indicates that students who are enrolled in non-Health Science studies and live in their family home are a population at risk for irresponsible self-medication. In a study on drug use among nursing students in Pakistan 52.7% of students reported self-medicating with antibiotics, with a higher prevalence in men (69%). [12]

This study has been designed as a pilot study with the main objective of gathering information on the habits of self-medication in students of the University of Extremadura and the future development of studies about the habits of similar populations, and the prevalence of antibiotic resistance due to excessive or unjustified use of prescription and non-prescription antibiotics.

In addition to decreasing the future prevalence of resistant bacterial infections, programs in disease prevention and health education on the proper use of medications might reduce costs related to public health services and decrease the number of urgent care visits due to adverse effects of medications taken without a prescription.

Due to the shortage of literature about self-medication with antibiotics and other medicines in Spain and other European countries, this study has limitations relating to the consumption habits in these regions and relative to others.

The most abundant literature comes from countries of the Middle East and Latin America, which do not possess a level of accessibility to these medicines to the same degree as Spain or European countries, which might give rise to incorrect implications. The answers gathered in the questionnaires might not be generalizable to the polled regions due to mistakes in the compilation of the questions and other associated factors.

Because the information-gathering was carried out in winter, the consumption of anti-flu medications and antibiotics might be higher than during other seasons.

More studies are necessary during the rest of the seasons for further comparison with the gathered information. A larger sample is needed to avoid bias and errors in the results.

This study is a fragment of a larger study that also includes other types of drugs.

5. Conclusions

Risk factors related to inappropriate self-medication with antibiotics were living in the family home and having a non-health sciences field of study. Positive factors related with responsible self-medication with antibiotics were the reading of the package insert and consulting with health care professionals.

The level of understanding of non-health sciences students about the correct use of medicines is limited. Health sciences students demonstrate a higher level of knowledge about this topic.

Factors that contribute positively are the consultation of the package insert and consultation with health care professionals before taking a medicine. Negative features are the high consumption of antibiotics with or without medical prescription in the younger population, the premature discontinuation of antibiotic treatment (mostly when symptoms disappear), which can cause a high prevalence of bacterial resistance and a larger cost to public health services by the prescription of more potent and higher-cost antibiotics. In addition, the consumption of energy drinks and alcoholic beverages can cause unwanted side effects and reduce the effectiveness of the antibiotics.

Most students believe that self-medication is a risky practice but only a few engage in or follow the principles of proper self-medication.

Health education programs about the correct use of medicines in schools and clinics are needed. Greater involvement of nursing on the education of children and adolescents would mean a major shift in the behaviors of future generations.

Conflicts of Interest: None

Appendix A

Survey provided to students.

Choose one of the answers. You must answer all the questions:

1. Genre: Men/Women
2. Age range: 17-21 years/22-25 years/ Over 26 years
3. Do you live outside the family home?: Yes/No
4. Are you pursuing a Health sciences degree?: Yes/No
5. Do you follow any treatment regimen for a chronic disease?: Yes/No
6. Is your mother or father a Health professional?: Yes/No
7. Have you ever practiced self-medication?: Yes/No
8. Frequency of self-medication practice: Habitual/ Seldom/ Never
9. Why would you take a medication without a prescription?: No time for a medical consultation/ The symptoms are mild/ I know what drug I have to take.
10. What drug do you consume most often?: Analgesics/ Anti-flu/ Antibiotics/ Antacid/ Anxiolytics/ Other drugs.
11. Which drug information source is most influential on you?: Doctor/ Pharmacist/ Family and friends/ Publicity.
12. After consume a drug without prescription, how many times did you get the desired effect?: Always/ Sometimes/ Seldom/ Never
13. When do you stop taking a medicine without a prescription?: When the prospectus indicates/ When symptoms disappear/ When symptoms don't disappear after a while.
14. If the symptoms persist after taking a non-prescription medication, what would you do?: Visit the doctor/ Increase the dose/ Change medication.
15. Do you think publicity helps you to decide which drug you should take?: Yes/No
16. When you go to the pharmacy, you prefer: A generic drug/ A branded drug
17. Do you consult with the pharmacist when you buy non-prescription medicines?: Yes/No
18. Do you read the prospectus of the medicines you buy?: Yes/No
19. Do you recommend medicines that have been effective for you to other people?: Yes/No
20. Do you consume energy drinks frequently (cola, coffee, drinks with taurine...)?: Yes/No
21. Have you ever consumed energy drinks with medicines?: Yes/No
22. Have you ever consumed alcoholic drinks with medicines?: Yes/No
23. Do you have a Social Security medical card?: Yes/No
24. Do you think self-medication is a risky practice?: Yes/No

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