MEDICINA UNIVERSITARIA

www.elsevier.es/rmuanl

ORIGINAL ARTICLE

Antibiotic self-medication in university students from Trujillo, Peru

M. Núñez [a], M. Tresierra-Ayala [b], F. Gil-Olivares [c,*]

[a] School of Medicine at the Antenor Orrego Private University, Trujillo, Peru
[b] Post-graduate School at the Antenor Orrego Private University, Trujillo, Peru
[c] Quality Management Unit at Hospital de Emergencias Villa El Salvador, Lima, Peru

Abstract
Introduction: Antibiotic self-medication is a kind of indiscriminate use of antibiotics. This practice has been growing worldwide, and has been identified as a risk factor for bacterial resistance (according to the WHO, it is one of the most difficult public health problems to combat in the XXI century). This activity has also been observed in the university population, and there is some literature reporting factors among young people that could increase it.
Objectives: To describe risk factors associated with antibiotic self-medication among university students from Trujillo, Peru.
Materials and methods: An observational, analytical, retrospective study was performed using a questionnaire. It was applied to 1000 college students selected by proportional allocation from three universities in Trujillo.
Results: Seventy percent self-medicated two or more times during the last year. The drug most often used for self-medication was amoxicillin, by 133 students (20.33%). An association was found between antibiotic self-medication and the female gender. No association was found between antibiotic self-medication and age ($p = 0.46$), economic monthly income ($p = 0.83$), knowledge level ($p = 0.23$), health sciences programs ($p = 0.14$) and college year ($p = 0.15$).
Conclusions: A high use of antibiotic self-medication was reported and a probable link to females. However, we could not establish an association between antibiotic self-medication and age, income, prior knowledge about antibiotics, school programs or college years.
© 2017 Universidad Autónoma de Nuevo León. Published by Masson Doyma México S.A. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Antibiotics are one of the most commonly purchased drugs worldwide, especially in developing countries, where the prevalence of infectious diseases increases their use.[1] They represent a large impact due to the costs they generate,

* Corresponding author at: Urb. Los Sauces Mzna. E lote 37, Distrito de Victor Larco, Departamento de La Libertad, Peru. Tel.: +51 999 141011.
 E-mail address: fgilo1@upao.edu.pe (F. Gil-Olivares).

the damage to health (adverse reactions and therapeutic failure), and poor therapeutic practices, such as long-term self-medication. These present a global public health problem.[2,3]

Self-medication is the use of medications to treat common health problems without being prescribed by a doctor.[4] However, self-medication in the case of the use of antibiotics has become a dangerous trend, which begins at an early age (adolescence). Studies reveal that this practice is facilitated by easy access to antibiotics, low knowledge about antibiotics, low income, the cost of medical consultation, and prior use of antibiotics, among others.[5–8]

On the other hand, antibiotic self-medication (ABSM) can alleviate some symptoms, which leads some to stop attending medical advice. However, it has been shown to have negative consequences, such as treatment failure and adverse drug effects (leading to death in the most severe cases), but mainly increased bacterial resistance.[9–11]

Bacterial resistance is considered a global public health problem, and is caused by the indiscriminate use of antibiotics, as seen in ABSM.[12,13] The prevalence of this activity is greater in developing countries, in most cases due to a lack of regulatory systems worldwide, and reports indicate that self-medication is more prevalent in cities of low and middle income.[3,14] In addition, other factors have been identified in developing countries, such as foreknowledge of antibiotics, age, and monthly income, among others.[15] Another study reveals that this population tends to go to pharmacies, and their choice is mainly based on the recommendation of the pharmacist, as found in a Brazilian study, which concluded that 74% of the pharmacies in a municipality sold antibiotics without a prescription.[16]

ABSM rates are, on average, 50% in Africa, 40% in the Middle East, from 4% to 75% in Asia and 29% in South America, compared to developed countries in Europe, with an average of from 3 to 19%. Studies in China revealed rates of self-medication with antimicrobials from parents to their children to be 62%.[17]

The reasons for this high prevalence are multifactorial.[18] The liberal practice of undergraduates to self-medicate with antibiotics is common, and students base their use on previous successful experiences. However, we have identified that there is low awareness of antibiotic use and students often misuse them.[19]

In order to take action and prevent increased ABSM, which brings negative effects in the medium and long term, it was considered necessary to seek the prevalence of this activity in the university population of a city in Peru and to identify the main risk factors which could increase this prevalence.

Materials and methods

Population and study design

An analytical study using a cross-sectional survey of 1000 undergraduates from three universities in Trujillo was conducted, taking into account the population reference amount used in previous studies.[7,12,19] Among the four most representative universities of Trujillo, The National University of Trujillo (UNT by its Spanish acronym) was

Table 1 Sample size by proportional allocation.

University	Population	Percentage	Sample
	($N = 33,696$)	100%	($N = 1000$)
National University of Trujillo	16,741	49.70%	497
Antenor Orrego Private University	9263	27.50%	275
Northern Private University	7692	22.80%	228

selected as the only public university in La Libertad, along with 2 randomly selected private universities [The Private Antenor Orrego University (UPAO by its Spanish acronym) and The Northern Private University (UPN)]. The number of students used in the study was selected by proportional allocation based on the number of students enrolled in the 3 universities as per the university national census (INEI 2010) (http://censos.inei.gob.pe/cenaun/redatam_inei/) (see Table 1).

Study questionnaire

A bibliographical review of previous studies was performed to identify the elements that form part of the survey instrument. Based on this, and taking into account questionnaires previously validated in other countries adapted to the local population of each country, we developed a questionnaire of our own.[9,12] Then, a pilot with a group of 30 college students consistent with the study population was performed to establish changes in the content, design, reading comprehension or facility if needed. However, accurate data were obtained.

The questionnaire consisted of four sections, and contains open and closed questions. The first section recorded the socio-demographic characteristics of respondents such as age, sex, year of study, and economic monthly income. The second section consisted of nine closed questions to provide information on the practice of using antibiotics. The third section consisted of 13 questions to assess the respondents' knowledge of antibiotics in three aspects: action and use (6 statements), side effects (3 statements) and antibiotic resistance (4 statements). The five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used to assess the participants' responses.

Statistical analysis

The data obtained was entered into the Statistical Package for Social Sciences (SPSS version 23.0) for processing. The results are reported as percentages (95% confidence interval). The Chi Square test (χ^2) was used to establish significant difference. Associations were considered significant if $p < 0.05$.

Respondents that answered ''strongly agree'' or ''agree'' were classified as ''agree'', and those who answered ''strongly disagree'' or ''disagree'' were classified as