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Assessment of Antibiotic Self-medication Pattern among University Students in Eastern Democratic Republic of the Congo

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Authors' contributions

This work was carried out in collaboration between all authors. Author GKB designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author MM performed the statistical analysis and author FKM managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Self-medication with antibiotics has been reported among university students in many countries, but no study has been conducted on this issue in Democratic Republic of the Congo (DRC).
Aim: This study aimed to assess the knowledge and behaviours of university students in Eastern DRC regarding antibiotics self-medication.
Methods: A questionnaire-based data collection instrument was used. It was distributed to the students of the Université Catholique du Graben (UCG), a university comprising 7 faculties in Butembo, Eastern DRC and welcomes an average of 1100 students per year.
Results: From the 500 questionnaires distributed, 430 students responded (response rate 86%). Self-medication with antibiotics was influenced by gender, age, class level and the faculty. Students frequently self-medicated in 44.6% for genitourinary infections (76.1%), catarrh (63.9%), cough (54.1%), sore throat (49.2%), fever (26.9%) and diarrhoea (18.7). Factors influencing self-medication were predominantly the illness considered not serious for consultation (75.4%),

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whereas prior experience on antibiotics use and knowledge about drugs constitute respectively 60.3% and 54.6% of SMA reasons. The most used antibiotics were amoxicillin-clavulanic acid (75.1%), penicillin (69.5%), amoxicillin (65.9%), ciprofloxacin (54.1%), erythromycin (51.5%) and doxycycline (40.8%).

Conclusion: This study shows that prevalence of self-medication with antibiotics in Eastern Democratic Republic of the Congo among university students is alarmingly high and this situation may increase antimicrobial resistance.

Keywords: Self-medication; antibiotics; students; DRC.

1. INTRODUCTION

Defined as the intake of drugs for treating oneself without medical supervision for relieving an illness or a condition, self-medication constitutes an issue with serious worldwide implications [1]. Drugs that are used for self-medication include all types of drugs (analgesics, antimalarials, antibiotics and cough syrups, etc.) [2].

A major problem with irrational antibiotics use by self-medication is the emergence antibiotic resistant pathogen [3,4] and this may increase health cost and morbi-mortality [5]. Self-medication with antibiotics (SMA) is becoming a common type of self-care behaviour among the population of many countries [6]. It leads not only to the wastage of medical resources, but also leads to the re- or emergence of multiresistant bacteria [3,4,7].

Developing countries are breeding grounds for drug-resistant bacteria due to fewer supervision of antibiotic prescription, whereas developed countries have strict regulations on antibiotic use [8]. In developing countries, SMA is one form of irrational use of antibiotic [3,7]. In Africa, the SMA rate ranges from 24% to 73.9% [9,10]. Comparing with developed countries, lower SMA prevalence has been reported in northern Europe with 3%, 6% in central Europe, and 19% in southern Europe [11].

Several reports have been published for showing how the self-medication practices with antibiotics is extending among university students in other countries [3,7,9,10], but no study has been conducted in D.R. Congo on this issue. Thus, the aim of this study was to assess the knowledge and behaviours of university students in Eastern DRC regarding antibiotic self-medication.

2. MATERIALS AND METHODS

2.1 Type of Study and Study Site

This was a cross-sectional questionnaire-based study carried out among students of the Université Catholique du Graben (UCG), Butembo, North-Kivu, in Eastern DRC during a three-week period in April 2016 (see the study site in Fig. 1). Seven faculties are organized at UCG: Pharmaceutical sciences, Veterinary Medicine, Medicine, Agriculture, Economics, Law, and Political and social sciences. This university welcomes an average of 1100 students per year.

2.2 Study Population

We distributed a total of five hundred self-administered questionnaires to students from different class level of medical and non-medical faculties (Year 1 to year 5 for non-medical education and from Year 1 to Year 6 or 7 for medical education).

2.3 Sampling Method

This was an exhaustive and non-probabilistic sampling using a convenient sampling. Students who were present in the auditorium were considered. The questionnaire, which consisted of close and open-ended questions were pre-tested among students of the Year 1 of non-medical faculties for reliability and validity. Class representatives helped to give questionnaire to students and for giving back the filled ones. The questionnaire had two parts. The first part contained questions on demographics information of the respondents (age, gender, class level in the university, faculty attending, etc). The second part contained questions on socio-economic variables such as health seeking behaviour, drugs' names and sources, type of disease treated through self-medication among the respondents and the type of drug used in the past three months.

2.4 Ethical Considerations

An informed consent text was annexed on each questionnaire form and was signed before responding. The consent was signed by parents

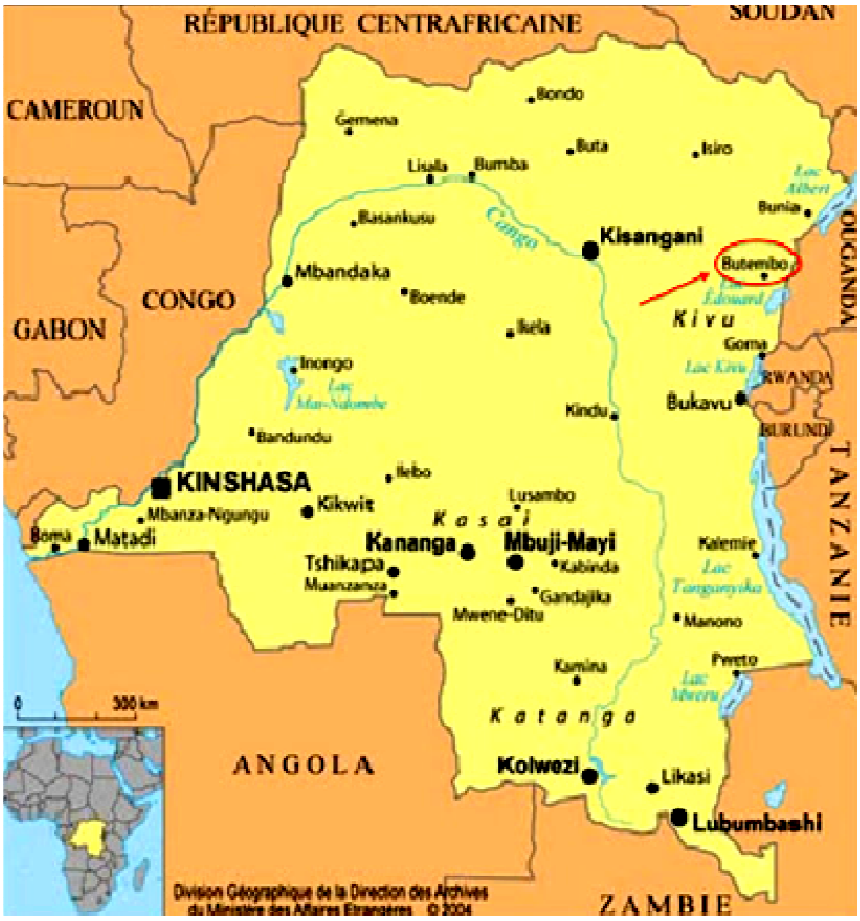

Fig. 1. Map of the study site (Source: Geographical division of the archives' direction of foreign ministry affairs)

or tutors for minors. The anonymization process consisted of using identification codes which masked personal identification information. The study protocol was approved by the Ethics Committee of North-Kivu.

2.5 Statistical Analyses

We used the statistical software SPSS version 20 for data analysis. We expressed results as counts and percentages, meanwhile we used Chi-square test for investigating possible associations between sex, class level of student and antibiotic self-medication practice regarding students' faculty. Association of variables and self-medication with antibiotics was analysed by calculating the odds ratio (OR), with a confidence interval of 95% (95% CI). We considered associations as significant when OR were greater than 1 with a *P* value of less than 0.05.

3. RESULTS

From the 500 questionnaire distributed, 430 students responded (response rate 86%). Among the students who responded, 390 (90.7%) confirmed that they self-medicated with antibiotics in the past three months. Among them, 62.1% were males and 37.9% were females. Table 1 shows the demographic characteristics and relationships between SMA students and non-SMA students, respectively. It shows the distribution according to the gender, age, class level and faculty attended by the respondents.

SMA was more frequent among the male students, there was not statistically significant difference (P>0.05). So, the practice of SMA was not significantly influenced by the gender of the respondents. The prevalence of SMA was generally high among the groups age of 16-25

and 26-35 years. The group age of 36-45 years exhibited lower prevalence of SMA behaviour, but it was not statistically significant (P>0.05 and CI: 0.23-1.79). Students from Year 1 and Year 2 exhibit a SMA practice statistically significant (P<0.05), and those of Year 7 whom the difference is also statistically proven (P<0.05). As it is shown in Table 1, the rate of SMA in non-medical students are statistically high (P>0.05) than in medical students. The rate of SMA at medical students was 13.6% against 86.4% at non-medical students.

The Table 2 shows the perception of respondent students about SMA. It is shown that 46.6% of students self-medicated frequently. Conditions for which students self-medicated are genitourinary infections (76.1%), catarrh (63.9%), cough (54.1%), sore throat (49.2%), fever (26.9%) and diarrhoea (18.7%). Factors influencing SMA among students are predominantly the illness considered not serious for consultation (75.4%), whereas the prior experience on antibiotics use and the knowledge about drugs constitute respectively 60.3% and 54.6% of SMA reasons. The financial constraints are incriminated in 50.5% of SMA and the lack of time in 23.9%. In the same table, it is shown that 60.8% of respondent who self-medicated confirmed that they purchased the drug used in community pharmacy but 42.3% affirmed to purchase the antibiotics they used in a drug open market.

The Table 3 resumes type of antibiotics used in self-medication by respondent students. The most used antibiotics are amoxicillin-clavulanic acid (75.1%), penicillin (69.5%), amoxicillin (65.9%), ciprofloxacin (54.1%), erythromycin (51.5%) and doxycycline (40.8%).

4. DISCUSSION

This study surveyed on the assessment of antibiotic self-medication pattern among university students in Eastern Democratic Republic of the Congo. The occurrence of SMA among students from “Université Catholique du Graben” is considerably high (90.7%). Similar findings have been reported in some

Table 1. Socio-demographic characteristics of respondents’ students

Variables	Respondents’ students		OR	95%CI	*P*-value
	SMA students n (%) [N=390]	No SMA students n (%) [N=40]			
Gender					
Male	242 (62.1)	23 (57.5)	1.21	0.59-2.45	0.57
Female	148 (37.9)	17 (42.5)	0.83	0.41-1.68	0.57
Age (years)					
16-25	254 (65.1)	23 (57.5)	1.38	0.68-2.80	0.34
26-35	97 (24.9)	11 (27.5)	0.87	0.40-1.94	0.72
36-45	39 (10.0)	6 (15)	0.63	0.23-1.79	0.33
Class level					
Year 1	97 (24.9)	3 (7.5)	4.08	1.17-16.99	0.01
Year 2	105 (26.9)	5 (12.5)	2.58	0.93-7.71	0.05
Year 3	83 (21.3)	11 (27.5)	0.71	0.33-1.59	0.36
Year 4	54 (13.9)	6 (15.0)	0.91	0.34-2.54	0.84
Year 5	30 (7.7)	4 (10.0)	0.75	0.23-2.67	0.61
Year 6	15 (3.8)	3 (7.5)	0.49	0.13-2.25	0.27
Year 7	6 (1.5)	8 (20.0)	0.06	0.02-0.21	0.0000
Faculty					
Pharmaceutical sciences [a]	23 (5.9)	6 (15.0)	0.36	0.13-1.05	0.03
Veterinary medicine [a]	17 (4.4)	2 (5.0)	0.87	0.18-5.65	0.85
Medicine [a]	13 (3.3)	3 (7.5)	0.43	0.11-1.97	0.18
Agriculture [b]	75 (19.2)	5 (12.5)	1.67	0.60-5.02	0.30
Political and social sciences [b]	93 (23.9)	11 (27.5)	0.83	0.38-1.83	0.61
Law [b]	100 (25.6)	4 (10.0)	3.10	1.02-10.54	0.03
Economics [b]	69 (17.7)	9 (22.5)	0.74	0.32-1.76	0.45

[a] *Students from pharmaceutical sciences, veterinary medicine and medicine constitute a group of medical students*

[b] *Students from agriculture, political and social sciences, law and economics constitute a group of non-medical students*

Table 2. Perception of SMA by respondent students

Variables	n	%
Frequency of self-medication		
Occasionally	91	23.3
Frequently	174	44.6
Most of time	125	32.1
Total	**390**	**100**
Conditions for which students self-medicated		
Genitourinary infections	297	76.1
Catarrh	249	63.9
Cough	211	54.1
Sore throat	192	49.2
Fever	105	26.9
Diarrhoea	73	18.7
Factors influencing SMA among students		
Illness considered not serious for consultation	294	75.4
Prior experience on use	235	60.3
Knowledge about drugs	209	54.6
Financial constraints	197	50.5
Lack of time	93	23.9
Nonchalant attitude of clinic staff	39	10
Others	63	16.2
Source of purchase of antibiotics		
Community pharmacy	237	60.8
Hospital	192	49.2
Private clinic	176	45.1
Drug open market	165	42.3

African universities. Olayemi et al. [3] have found 58.9% in Nigeria, Awad et al.[10] have found 73.9% in Sudan and 55% in Egypt by El Ezz et al. [1]. But, in our study, the SMA rate seems to be very high comparing to other studies. This may be explained by the fact that in DRC, there is a lot of medicines informal market [12] due to the lack of drug control policy [13]. The high rate of antibiotics use is also probably linked to the high rate of genitourinary infections (76.1%) (Table 2) as most of our respondents (87%), are in sexually active age (16 to 35 years old) (Table 1).

The tendency to indulge in SMA behaviour would be assumed to decrease with increase in age and respondents' class level in the university because with corresponding increases in age and educational status, students ought to be more knowledgeable on rational drug use. Our findings did not contradict this hypothesis as shown in Table 1. In the class age of 36 to 45 years old, only 10% of respondents confirmed that they self-medicated with antibiotics in past three months and more the class level increases, less respondents self-medicated; 24.9% for Year 1, 21.3% for Year 3 and 1.5% for Year 7. Our findings are similar to the one of Huang et al. [14] in China, who found that the increasing in grade is disproportional to self-medication with antibiotic.

Table 3. Type of antibiotics used in self-medication

Class of antibiotic	Antibiotics, n (%)
Amoxicillin	257 (65.9)
Amoxicillin-clavulanic acid	293 (75.1)
Ampicillin	85 (21.8)
Penicillin	271 (69.5)
Tetracycline	84 (21.5)
Doxycycline	159 (40.8)
Ciprofloxacin	211(54.1)
Cotrimoxazole	176 (45.1)
Erythromycin	201 (51.5)
Azitromycin	183 (46.9)
Metronidazole	148 (37.9)
Chloramphenicol	83 (21.3)

According to gender, male respondents seem to have a high rate (57.5%) of SMA but this is not statistically significant (P>0.05). similar results were found in other studies [6].

Medical students have fewer rates (13.6% in total) of SMA than non-medical students (86.4%). This may be explained by the fact that medical students are away of the danger of the irrational use of antibiotics, as in their courses curriculum there is a pharmacology course [13,14], as they learn them during their course of study. This is statistically significant as proven by *P*-value ($P<0.05$) in law faculty.

Regarding the perception of SMA by respondent students (Table 2), 44.6% of them confirmed that they frequently used antibiotics in the past three months and this was respectively for genitourinary infections (76.1%), catarrh (63.9%), cough (54.1%) sore throat (49.2%), fever (26.9%) and diarrhoea (18.7%). Our findings are so far from those of other studies [7]. In the survey of Cebotarenco et al., 74% of students used also antibiotics for treating cold and flu which are viral diseases [15]. Using of antibiotics in treatment of viral disease is also a factor of emergence or re-emergence of infectious diseases [16]. In their study on systematic review of public's knowledge and beliefs about the antibiotic resistance, McCullough et al. found that the excessive or unnecessary use of antibiotics increases the rate of antibiotic resistance [17].

And the most four reasons which influenced their self-medication were the illness considered not serious for consultation (75.4%), prior experience on antibiotics use (60.3%), knowledge about drugs (54.6%) and the financial constraints (50.5%).

The source where respondents purchased antibiotics was the drug open market (42.3%), private clinic (45.1%), hospital (49.2%) and community pharmacy (60.8%). In fact, in everyday practice in DRC, antibiotics are prescribed by medical and non-medical staff (traditional healers included) and there are no efficient drug use policies [13].

The most antibiotics used were amoxicillin-clavulanic acid (75.1%), penicillin (69.5%), ciprofloxacin (54.1%), erythromycin (51.5%), doxycycline (40.8%) and ampicillin (21.8%). As seen, the antibiotic group of penicillin (amoxicillin, amoxicillin-clavulanic acid, penicillin, and ampicillin) is more used by our respondents. It may be explained by the fact that they are most prescribed by doctors and patients are prone to use them in self-medication. In addition they are cheap and there are little restrictions on how and where to buy antibiotics in DRC [12].

5. CONCLUSION

Given the global growing resistance for antibiotics and documented health issues related to irrational use of antibiotics, our findings suggest that efforts should not be spared to address this growing concern worldwide and specially in the DRC. As a result of economic and political dysfunctions in DRC's health policies, SMA constitutes a big challenge in efforts to combat or prevent disease in the community.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of ethics committee has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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