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SELF-MEDICATION PRACTICES AMONG COLLEGE STUDENTS IN BELIZE: A NATIONWIDE CROSS SECTIONAL STUDY

Danladi Chiroma Husaini[1]*, David Datiba Mphuthi[2], Yusuf Abubakar[3] and Augustine Domingo[4]

[1]Pharmacy Program, Pharmacology & Toxicology unit, Allied Health Department, Faculty of Health Sciences, University of Belize C.A.

[2]Department of Health Studies, College of Human Sciences, The University of South Africa.

[3]Pharmacy Program, Pharmacognosy & Wet Lab unit, Allied Health Department, Faculty of Health Sciences, University of Belize.

[4]Department of Business, Lakeland College, Alberta, Canada.

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***Corresponding Author**
Danladi Chiroma Husaini
Pharmacy Program, Pharmacology & Toxicology unit, Allied Health Department, Faculty of Health Sciences, University of Belize C.A.

ABSTRACT

Background: With increased access to information and advertisements via the internet, college students are likely to be involved in self-medication practices that may result in increased resistance to antibiotics, adverse drug reactions, interactions and or other complications associated with self-medication. We conducted a self-reported assessment on self-medication among college students in Belize with a view to provide a baseline data on the knowledge and practices of self-medication and evaluate the reasons for self-medication among young people in the country of Belize. **Methods:** A cross-sectional study design was utilized to collect data from 600 college students across 9 colleges in the country of Belize. Data was collected randomly using convenience-sampling methods via a verified questionnaire from August to December 2017. 539 questionnaires were returned and analyzed using SPSS version 20. Results were presented in frequencies and percentages. **Results:** The distribution of respondents evaluated were as follows, 55% were females while 45% were males. Majority 234 (44%) of the student's first response when sick was to self-medicate because of convenience, 168 (38.7%) or cost 150 (34.6%). 71.2% of the students indicated that they self-medicate which represents 366 students out of the total surveyed. Most commonly self-medicated drugs reported were Analgesics 273 (50.5%) and Antibiotics

157 (29.2%) while pain 165 (30.8%), headaches 147 (27.3) and infections 145 (27.0%) were the common ailments students reported to self-medicate. **Conclusion:** The result of this study indicated college students reporting practicing self-medication with various medications inclusive of antibiotics. With the ease of accessibility to many medications especially antibiotics in Belize, college students involved in indiscriminate self-medication especially with antibiotics are likely going to be exposed to adverse drug reactions, bacterial resistance and drug interactions. There is need for proper implementation of antibiotics drug act and enlightenment of the young population on rational self-medication in Belize.

KEYWORDS: Medication use; Self-medication; college students; Belize.

INTRODUCTION

A worldwide public health concern regarding medication utilization in both developed and developing countries is self-medication.[1-2] A number of studies have reported self-medication as common problem among college students.[2-4] Although presently there is no known documented data on self-medication in Belize, the practice could exist leading to serious public health issues. The use of medications for self-treatment without a prescription is termed self-medication. It involves the use of over the counter medications; prescription only medicines; and other homemade medications for the self-treatment of a variety of diseases without a prescription from a medical practitioner. The practice of self-medication has been reported to be one of the causes of drug misuse, abuse and possible additions.[5]

Although the World Health Organization (WHO)[6] promotes responsible and informed self-medication as a way to self-care and as a means to reducing pressure on the already many over-stretched health care personnel/facilities; persons intending to self-medicate are always encouraged to utilize rational use of medications in consultation with qualified medical practitioners especially certified pharmacists for guidance.[7] According to WHO[7] rational medication use involves ―patients receiving medications appropriate to their health needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community. Increased resistance of many microorganisms to common antibiotics, increased wastages of meagre resources and the danger of adverse drug reactions, abuse and addictions can result if self-medication is not rationally practiced.[8] Ignorance to adverse drug reactions among college students have also been reported.[9] In Belize, as in a number of developing countries, many prescriptions only drugs can be purchased over the counter without a prescription.

Despite recent government's enforcements on purchase of antibiotics with prescriptions, a number of antibiotics for instance are still easily bought over the counter from many pharmaceutical stores without due regards to the correct regimen, allergies or even antibiotics resistance. The increased access to the Internet and exposure to the e-media among college students in Belize and the tendency to avoid waiting-time at government owned hospitals or the exorbitant cost of therapy at the private hospitals could be a huge motivational factor for self-medication. A common practice for self-medication is increased knowledge about medications and its low cost provides a quick alternative for self-medication.[10-12] Being a developing country, Belize's largest population is the young.[13] Presently, there is no known researches or publications on self-medication among college students in Belize even though the practice exists.

This study therefore was conducted with the aim of providing a baseline data on the knowledge and practice of self-medication among college students, and provide common reasons why college students in Belize self-medicate.

METHODOLOGY

A cross-sectional study design was utilized. Convenience sampling method was used for school selection and data was collected randomly from college students by means of a validated structured questionnaire adapted and modified.[14] The content of the questionnaire was validated by expert professional colleagues and pre-tested among 35 students. The reliability of the tool was further established using split half technique by means of the raw score method. The reliability coefficient was computed to be r = 0.872. The questionnaire was divided into 3 parts to gather information on demographics, self-medication knowledge, practice and reasons for self-medication among college students. Students from University of Belize, and other junior colleges in the country participated in the study. Data was collected between August to December of 2017.

Sample size was determined using OpenEpi, (Version 30, open source calculator.[15] A sample of 600 students from different colleges (University of Belize [UB]; Saint John's College [SJC]; Galen University [GU]; Sacred Heart College [SHC]; University of West Indies [UWI]; Wesley Junior College [WJC]; Corozal Junior College [CJC]; Stann Creek Ecumenical Junior College [SCEJC]; Belize Adventist Junior College [BAJC]) participated in the study. The purpose and objectives of the study were explained to students and strict

ethical considerations and confidentiality were explained and observed during the entire data collection process.

Inclusion criteria

The survey students were predetermined with some inclusion criteria such as age (≥17 years), actively enrolled and taking classes in the semester of current research, both genders with good command in English language, and good physical and mental health.

Exclusion criteria

Students who were ≤17 years, not actively enrolled in the semesters of current research, not mentally and physically fit, unable to understand the questionnaire or not good enough in English, were excluded.

Ethical concerns

The study and design of survey questionnaire followed strict ethical protocols. Consent was obtained from every student that participated in the study. The privacy of the students was also strictly maintained and kept confidential throughout the study. The participants reflected a cross-sectional population of students in the entire country of Belize.

DATA ANALYSIS

Collected data was entered into SPSS version 2.0 and analyzed using descriptive statistics. Descriptive statistics used to designate demographic data and questions on knowledge and practice of self-medication were presented. The main descriptive statistical procedures used were frequencies and percentages.

RESULTS

Of the total 600 questionnaires distributed to the students 539 were returned representing 89.83% return rate. Of the total respondents, 55% were females while 45% were males as shown in figure 1 below. Average age of students who participated in the study was 22.4. No significant difference was observed among gender.

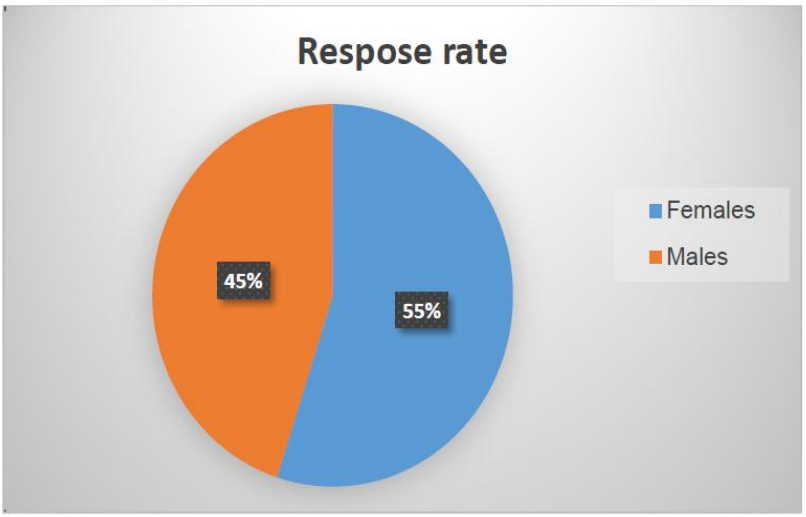

Fig. 1. Response rate by gender.

Data distribution according to the participant's districts showed that 44.3% of the students were from Belize City district; Cayo (22.1%); Corozal (10.4%); Toledo (10.2%); Orange Walk (9.6%) and Toledo (3.4%). Figure 2 below shows that most of the respondents were from Belize city. This means that most of the students in this region practice self-medication as compared to other districts.

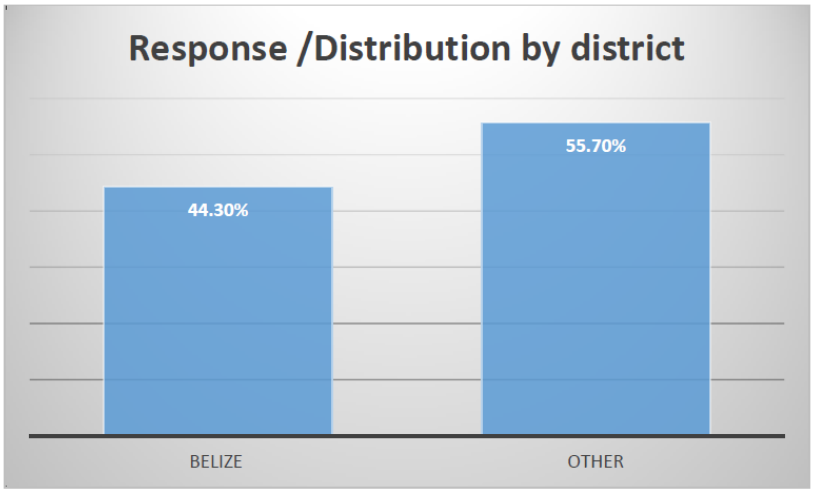

Figure. 2: Distribution of students by district.

Figure 3 illustrates that the Creole students in all the institutions are the ones involved in the self-medication practices while the Maya students showed to the lowest. This can be attributed to the belief systems of different ethnic groups about self-medication practices or based on the higher percentages of creole students that participated in the study.

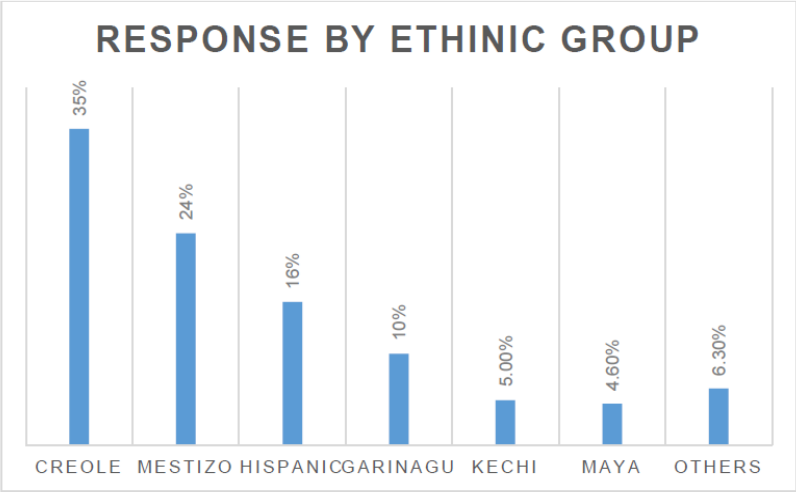

Fig. 3: Response of students according to ethnic group.

Overall, samples were collected from 9 colleges across the country of Belize. Majority [85] (15.8%) of the students were from the University of Belize, which is the national university. Other respondents were from Saint John's College 68 (12.6%); Sacred Heart College 55 (10.2%); Corozal Junior College 64 (11.9%); Wesley Junior College 64 (7.2%); Galen University 64 (11.9%); University of the West Indies 42 (7.8%); Belize Adventist Junior College 55 (10.2%); and Stann Creek Ecumenical Junior College 42 (7.8%). Out of the total respondents, 45.8% of the students were in their second year of studies, 24.7% in the first year while 13.7% and 10.9% were in the third and fourth years of study respectively; 4.9% represented other.

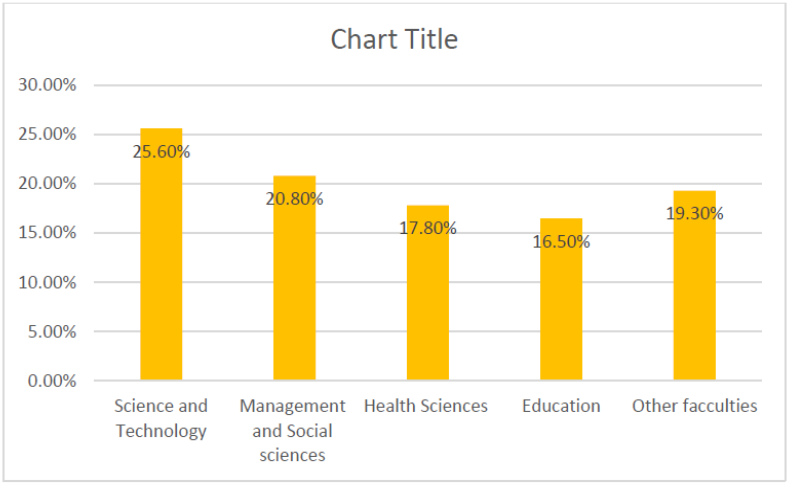

Fig. 4: Responses of students according to faculty of study.

Figure 4 above demonstrates that the Science and Technology students are the most involved in self-medication practices. Responses according to faculty indicated that majority (25.6%) of the students were from the sciences and technology. The management and social sciences had 20.8%; Health Sciences 17.8%; Education 16.5% while others 19.3%.

Table. 1. Characteristics of students about self-medication.

Variables	Frequency	Percentage
Self-medicated		
Self-medicated	366	71.2
Immediate response when sick		
Self-medicate	234	44
Go to hospital	175	32.7
Consult friends/family	68	12.7
Do nothing	49	9.2
Other	9	1.7
Reasons for self-medicating		
Convenience	168	38.7
Cost	150	34.6
Dislike for hospitals	21	4.8
Dislike for health personnel	15	3.4
Dependence	31	7.0
No hospital	15	3.4
Other	34	7.8
Reasons for not self-medicating		
Prefer professionals	84	41.0
I do not have knowledge of medications	80	39.0
It is harmful	26	12.7
Other	15	7.3
Source of medications		
Pharmacy	306	69.7
Leftovers	51	11.6
Family	30	5.6
Friends	16	3.6
Other	34	7.7
Who recommended the drug that you self-medicated		
Health professional	169	38.7
Family	127	29.1
Personal experience	72	16.5
Friends	22	5.0
Previous prescription	21	4.8
Advertisements	2	0.5
Other	23	5.3
Social Habits of students		
Alcohol consumption	244	52.0
Marijuana use	57	12.2
Cigarettes	16	3.4

Crack cocaine	6	1.3
None	121	25.8

Table. 2. Self-medication practices among college students.

Variables	Frequency	Percentage
Check drug info/instructions before self-medication.		
Yes	254	58.1
No	64	14.6
Sometimes	116	26.5
How to know dosage to self-medicate		
Drug package inserts	241	55.7
Consult health professionals	64	14.8
Previous experience	42	9.7
Family/friends	33	7.6
Internet	28	6.5
Guess dosage	12	2.8
Other	12	2.8
Taking multiple drugs when you self-medicating		
Yes	106	24.1
No	331	75.2
Combine medications with herbs		
Yes	106	24.6
No	333	75.2
Have you experienced adverse reactions from self-medication		
Yes	62	14.1
No	377	85.5

Table. 3: Common self-medicated agents.

Variables	Frequency	Percentage
Medications		
Analgesics	273	50.8
Antibiotics	157	29.2
Anti-emetics	7	1.3
Antidiarrheal	26	4.8
Antitussives	36	6.7
Antacids	23	4.3
Antihistamines/anti-allergy	29	5.4
Antipyretics	69	12.8
Vitamins	14	2.6
Herbs	23	4.3

Table. 4: Common ailments treated using self-medication practice.

Variables	Frequencies	Percentages
Ailments		
Cold	51	9.5
Fever	93	17.3
Pain	165	30.8
Allergies	30	5.6
Headaches	147	27.3
Antidiarrheal	26	4.8
Infections	145	27
Nausea/vomiting	14	2.6
Ulcers/hyperacidity	20	3.7
Other	51	9.4

Table. 5. Student's opinion of Self-medication.

Variables	Frequency	Percentage
Do you think you can treat common diseases successfully by self-medicating?		
Yes	110 (21.6)	21.6
No	117 (23.0)	23.0
Sometimes	180 (35.4)	35.4
Not sure	102 (20.0)	20.0
Opinion on Self-medication		
Acceptable practice	206 (40.9)	40.9
Good practice	84 (16.7)	16.7
Not acceptable practice	114 (22.6)	22.6
No opinion	100 (19.8)	19.8

DISCUSSION

The use of nonprescription drugs by the public without the need for a prescription or by their own initiative is termed self-medication. Nonprescription and prescription drugs use among college students is indisputably a very significant issue in any country especially a developing one like Belize. The results of this study on self-medication among Belize's college students indicated that majority (44%) of the student's immediate response when sick was to self-medicate; (71.2%) of the students reported they self-medicated and the major reasons given for self-medication were convenience and cost (Table 1).

The major reasons given by respondents for self-medication were convenience and cost (Table 1). Regarding cost, presently, all government owned hospitals and health centers provide free medication to all patients as long as the medication is available in the hospital pharmacy. Only the referral hospital (Karl Heusner Memorial Hospital), charges a minimal fee for consultation, other government facilities do not charge for consultation except for some special clinics. Regarding convenience, the waiting time to see a doctor and access

medications in most government owned hospitals could sometimes be wearisome. But, once a medication is prescribed and is available at the facility, it is dispensed to the patient without a cost. In this study, to claim cost, as a reason for self-medication therefore will mean spending more at the community pharmacy store than what is being provided at the government facilities. Convenience may be a valid motive for self-medication among college students in Belize. The number of patients at the government owned hospitals can sometimes be overwhelming to the medical team hence the waiting time might be discouraging to many college students. The waiting time to see a physician can range between 45 minutes to 2 hours depending on the time of the visit and the number of patients seeking attention at that time. Further studies to determine hospital waiting time, convenience, and their relationship with self-medication need to be explored in Belize with a view to encouraging college students patronize hospitals and to reduce the prevalence of self-medication especially for antibiotics.

More than half (52%) of the students reported alcohol consumption as part of their social habit (Table 1). A major public health concern among college students is alcohol consumption with the risks for developing detrimental health problems leading to low grades or withdrawal from college. The American College of health Associations (ACHA)[15] for instance, estimated that about 30% of students' binge drink indicating several detrimental health issues and poor academic performance. The chances for many college students taking medications even if occasionally after alcohol consumption, has been reported.[16] Alcohol has also been reported to interact with many medications leading to potentially serious health consequences. Serious impairment of a person's ability to operate machinery or drive has been reported with the additive effects of alcohol and sedative medications.[15] Individuals who drink are likely to use other medications to alleviate mood symptoms and are more than likely to develop dependence. Although this study did not explore the frequency of alcohol intake among college students, previous published and unpublished studies[17-18] have linked Belize and specifically college students to alcohol consumption. The link between alcohol consumption and other recreational substances such as marijuana has been associated with self-medication. Self-medication, has been reported to increases the chance of illegal substance use, dependence and masking the underlying disease which lead to public health problems, causing drug resistance and hamper correct diagnosis.[19] The findings from this study where students reported using alcohol and other substances of abuse needs further investigation with a view to avert serious public health issues of self-medications interactions

with substance abuse especially now that government has decriminalize the use of marijuana. Very limited data exists between the relationship on self-medication and substance abuse in Belize.

Multiple drug use (24.1%); taking drugs with herbs (24.6%); and adverse drug reactions (14.1%), has all been reported by the students in this survey (Table 2). Severe consequences of drug-drug interactions have been extensively studied and have so far been reported to cause organ failure, disabilities, hospital admissions, congenital abnormalities and even death.[20] Interactions from self-medication with drugs and herbs could cause serious detrimental effects. Several clinical studies have reported an increase of herbal remedies usage and interactions with varying harmful consequences that are of particular interest to public health.[21-23] Belize has a long history of herbal remedies usage but studies in this area are just beginning to develop. Understanding the clinical aspect of drug-drug or drug-herb interactions is a key issue of public concern in Belize especially among College students. Presently, very little information is available in this field of study hence the need for researches in this area.

More than half (58.1) of the students reported checking drug information/instruction before self-medication. 55.7% and about 15% of the students check drug package inserts or consult health professionals respectively to know the dosage of the drug they self-medicate. Although checking drug information from inserts is a good practice, the students were not professionals to be able to recognize issues of adverse drug reactions (Table 2). Additionally, students may not be able to fully understand some of the technical terms included in the drug inserts. Though a high percentage of students are involved in self-medication, it is worthy of note that the majority of college students surveyed consulted with health professionals before self-medicating. The professional obligation of sound and objective advice about pharmaceutical products and self-medication lies with the pharmacist. In Belize, pharmacists are always available and accessible to students and, mostly, seeking advice concerning any medication comes without a charge. It is obvious from the findings of this study; college students might be utilizing these services in regards to self-medication.

More than half (50.8%) of the students reported self-medicating with analgesics (Table 3). Also, some of the common ailments treated (Table 4) by the students surveyed using self-medication were pain (30.8%) and headaches (27.3%). Worldwide, the use of analgesics has been reported to be wide spread with users experiencing varying side effects while overuse

has been shown to be harmful or even lead to death. Analgesics were the most self-medicated reported by college students surveyed in Belize. Other studies[1,2,24-25] reported higher prevalence of analgesic use as compared to current findings. The most compelling symptoms leading to self-medication reported by college students in the present study were pain (30.8%) and headaches (27.3). About two thirds of the adolescent's population have been reported to be affected with headaches leading to decreased quality of life.[26-27] Several studies have reported problems of headaches among students.[28] Negative impact on learning due to missing classes and absenteeism affecting academic performance has been documented.[29-30] Difficulty concentrating in class and doing academic work has also been reported.[31-34] Furthermore, Tonini and Frediani,[35] reported student's inability to participate in sports and to complete academic work. With the high percentage of students indicating headaches in the current studies, further researches are required to examine the relationship between student's academic performance and headaches in Belize.

Results of this study further indicated that 29% of students reported self-medicating with antibiotics (Table 3) while infection (27%) was a common ailment treated by the students using self-medication (Table 5). This finding calls for further studies to review Antibiotics Acts enforcement in Belize. Although presently Belize has an Antibiotic Act, which prohibits anyone from purchasing antibiotics from any pharmacy store except with a prescription, the Act is hardly implemented by many pharmaceutical stores across the country. The few that implement such the Act, don't strictly adhere to it because depending on the economic or social status of the customer, antibiotics may still be purchased without prescriptions. It is common practice for some pharmaceutical stores sell antibiotics to customers at a higher price if they do not have prescriptions. In the end, antibiotics are still available to customers with or without prescriptions thereby increasing the risks of antibiotics resistance in the country. Self-medication with antibiotics causes excessive exposure and risks to public health. Careless prescription of antibiotics, ease of accessibility to antibiotics or lack of adherence to antibiotics regimen have been reported to be some of the causes of antibiotics resistance.[36-38] Apart from lack of enforcement of the antibiotics Act in Belize, lack of awareness of the dangers posed by antibiotics use could be a strong factor encouraging the use of antibiotics among college students in Belize. A number of studies have reported low perception of risk, media coverage, social status, ease of access to medication, low level or absence of education as factors that promote self-medication with attendant consequences.[39-41]

Finally, findings from this research presented student's opinion on self-medication and treatment of diseases. Students surveyed opined that self-medication is an acceptable practice and some believe they can treat common diseases successfully by self-medicating (Table 5).

CONCLUSION

The results of this study indicated college students reporting practicing self-medication with various medications inclusive of antibiotics. With the ease of accessibility to many medications especially antibiotics in Belize, college students involved in indiscriminate self-medication especially with antibiotics are likely going to be exposed to adverse drug reactions, bacterial resistance and drug interactions. Regular studies on medication utilization are important to identify, examine and describe the nature, practices, extent and determinants of medication use in the communities and by individuals. This study examined self-reported practices of self-medication among college students across the nation of Belize. Although majority of students reported being engaged with self-medication, such practices were usually done in consultation with a health practitioner. To a larger extent, college students in Belize practice safe medication except for a few drugs such as antibiotics that requires awareness, enforcement, further studies and monitoring.

RECOMMENDATIONS

More awareness on the harmful outcomes of self-medication and adverse drug reactions need to be done among college students. The antibiotics Act of Belize need to be strictly enforced to minimize ease of accessibility of antibiotics over the counter. Student's services need to be proactive in ensuring help to students on campuses presenting with common ailments prevalent among college students. With the decriminalization of marijuana in Belize, studies to monitor concomitant medication utilization with marijuana need to be in conducted.

LIMITATIONS

There were a few limitations worthy of considerations while interpreting the results of this research. The findings could be prone to recall bias since the study was based on assessment of self-reported use of medications. Although the questionnaire was tested, the non-probability sampling used to administer the questionnaire might result in selection bias among surveyed students. Peer influence between students may also not be totally ruled out during data collection. With all these limitations, the study also, has much strengths. To the best of our knowledge, this is the first national survey on self-medication among college students in Belize. Since the objective was to provide a baseline data for use in planning

much larger scale studies and monitoring of drug utilization among college students in Belize, we strongly believe the objectives have been achieved. These strengths, in no small measure make the current study distinctive and exceptional.

DECLARATION OF INTEREST

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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