Prevalence of Antibiotic Use and Factors Associated With Self-medication among University Students in Malaysia

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Authors’ contributions

This work was carried out in collaboration among all authors. Author IMA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SMA and RA managed the analyses of the study. Author AAA managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i1831313

Editor(s): (1) Dr. Mohamed Fawzy Ramadan Hassani, Zagazig University, Egypt.

Reviewers: (1) Ruth López Alcántara, Universidad Autónoma de Campeche, Mexico.
(2) Miguel Angel Amaró Garrido, University of Medical Sciences of Sancti Spiritus, Cuba.

Complete Peer review History: http://www.sdiarticle4.com/review-history/66995

Received 18 January 2021
Accepted 23 March 2021
Published 29 March 2021

Original Research Article

ABSTRACT

Self-medication with antibiotics is a global menace especially in developing countries due to lack of knowledge, poor access to the proper health care, and the weakness in the government’s role in monitoring and controlling the use of antibiotics. Thus, this study was carried out to identify the prevalence of antibiotic use during self-medication and the associated factors with self-medication among the students of Lincoln University College Malaysia. A quantitative research approach (i.e. cross-sectional study) was utilized. A simple sampling technique was employed to select 240 respondents among the students. The survey was used to collect data through the process of questionnaires’ validation. Descriptive statistics were used to examine all the research hypotheses. Though the prevalence of self-medication among the respondents as well as the misuse of

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antibiotics during self-medication was relatively low, there is, however, an urgent need to provide university students with health education programs to help them understand the proper use of the drugs and to increase their awareness about the risk of self-medication without supervision from qualified health providers.

Keywords: Antibiotics; antimicrobial resistance; self-medication; Malaysia.

1. INTRODUCTION

Since the discovery of penicillin in the early twentieth century by Scottish scientist and Nobel laureate Alexander Fleming; antibiotics have played a vital role in the treatment of contagious diseases particularly bacterial infection [1,2]. The irrational use of these drugs, however, has led to antimicrobial resistance which is becoming a global problem in public health [3-5]. Furthermore, antibiotic self-treatment may exacerbate bacterial infections, causing the disease to turn into their chronic or complicated forms, or may lead sometimes to death [6,7]. Moreover, antibiotic self-medication has been emphasized to have a significant role in the development of resistance to the antibiotics being used [8].

Self-medication (SM) refers to the use of drugs for the treatment of self-diagnosed symptoms or disorders or the continuous or intermittent use of a prescribed drug for recurrent symptoms or disease. It is a subset of self-care whose prevalence with antibiotics is high in low-income countries due to easy access to and availability of antibiotics, inappropriate use, lack of access to health care, poor regulation, poor awareness, lack of supervision by health professionals, increased antibiotic prescription, and high occurrence of infectious diseases [9]. SM with antibiotics is quite more common in developing countries compared with developed ones [10] due to lack of knowledge, poor access to the proper health care, and the weakness in the government’s role in monitoring and controlling the use of antibiotics [11]. It is one of the most disputed and debatable issues in the world and is gaining more popularity in the ongoing discussion [12]. It is considered as the first choice for the treatment of a minor illness which does not require patients to see a doctor for the treatment. The drugs for SM are popularly called over-the-counter drugs (OTC) which are sold to consumers by pharmacies. It has been estimated that over 92% of consumers have used one or three antibiotics at the same time in the last decades [13]. Moreover, OTC drugs require medical authorization before they could be sold to consumers. However, consumers adopt SM at home to treat particular illnesses like flu, cold, insect bites, skin problems, heartburn, etc [14]. Generally, there is a high prevalence of SM in Asian countries not only because of sociocultural problems but also because they have a higher population density, aging, easy access to medicines and little control of these by the government. For instance, in a study to compare the attitude, knowledge, and practice (KAP) on SM in urban and rural North Indian communities. The findings indicated that self-medication was more practiced among the rural population than urban [15,16]. Irrational and misuse of antibiotics have led to antibiotic resistance and serious health problem globally. Although the use of antibiotics during self-medication was investigated by many researchers from different countries, only a few studies were conducted among university students in Malaysia.

Ali, Kai, Keat, and Dhanaraj [17] reported that self-medication is common among Malaysian students. The major illnesses that the students used self-medication for were headache, cold and cough, fever and chills, allergy, fungal/microbial infections, pain, and diarrhea. They reported that the reasons given by the students for the self-medication include: quick relief of symptoms; the illness is mild and does not require seeing a doctor; they are already familiar with the illness; time-saving, and the economic cost. Some of the benefits of self-medication to patients include being a first aid in the treatment of different sicknesses, opportunities to control and manage health before seeing a doctor. Though the core benefits that the patients could derive from the self-medication include economic benefit, time-saving, and usefulness for minor illness. Self-medication of drugs without a prescription, however, could have caused adverse effects on a patient’s health such as disease aggravation, wrong medication, and drug interaction [11]. It has caused many damages to human health especially among the students of higher institutions [18,19]. It has been a common
practice used by the students when they feel certain pain. Based on such an assumption, students go to pharmacies to buy drugs to cure minor illnesses like flu, headache, pain, supplement, and cold without the knowledge of specialists and this, in turn, affects their overall health conditions [20]. It is also noted that students do not bother to read the leaflet instruction and precautions [19]. Most of these students had put their lives in danger and permanent disability [18].

This study was, therefore, carried out to identify the prevalence of antibiotic use during self-medication and the associated factors with self-medication among the student of Lincoln University College Malaysia. It is hypothesized that there is no significant relationship between the prevalence of illnesses in self-medication with antibiotics among students of Lincoln University College.

2. METHODOLOGY

In this study, a quantitative research approach (i.e. cross-sectional study) was chosen and utilized. The survey was used to collect data through the process of validated questionnaires. A survey was chosen because the target study populations were college students. Descriptive statistics were used to examine all the research hypotheses. The population for the present research was students of Lincoln University College Malaysia comprising students in medical and non-medical faculties. All registered students were eligible to participate with no specific inclusion and exclusion criteria.

The minimum sample size was calculated using Epi Info software (Version 3.5.2, 2010) with a level of significance of 95%, the marginal error of 0.05, and the prevalence of outcome factor in the population of 5% (0.05) [21]. Thus, the minimum positive sample size required for the present study was 240 students of Lincoln University College Malaysia. A simple sampling technique was employed to select the 240 respondents. The researcher attempted to choose equal participants from both medical and non-medical faculties. The researcher explained the purpose of the study to the participants, distributed the questionnaires among them at the beginning of their classes, and collected the questionnaire after the classes. The study was approved by the institute of postgraduate studies at Lincoln University College. The participants were asked to sign an agreement letter and informed consent. In this study, the instrument was adopted from previous studies that are related to our study. A previously validated questionnaire containing open-ended and closed-ended questions was used for this study [22]. There were two sections in the instrument of the study Part A and part B. Part A contained demographic information of the respondents while part B contains the items to be answered by the students. The part B section was based on “Yes or no” questions. Based on the objectives of this study, the bivariate analysis was used to identify the risk factors associated with self-medication practice with antibiotics among students. In this study, factors like age, gender, marital status, ethnicity, year of study, type of study, the ease of access to medical centers, the unavailability of medical health, awareness of bacterial resistance, respondent perception about the complications due to self-medication and the illnesses treated during self-medication, the reasons for self-medication, the source(s) of information for self-medication.

In this research, content validity was chosen to ascertain whether the instrument measured what was supposed to be measured. Three experts in the related field were consulted to examine the constructs and items that were going to be used. The Tests-retest method was also employed to determine the reliability of the instrument prepared for the study.

2.1 Data Analysis

The data were double entered into Microsoft Office Excel 2007 spreadsheets and cross-checked for accuracy before being exported to IBM SPSS statistical package version 20 (IBM Corp, NY, USA) for data analysis. For descriptive analysis, frequency and proportion were used to present the distribution categorical variables. All quantitative variables were examined for normality by skewness and kurtosis test before analysis. Statistical associations between self-medication response and explanatory variables, including age, gender, ethnicity, etc. were assessed using the percentage or Fisher’s exact test where applicable. The bivariate analysis was used to identify the risk factors associated with self-medication practice with antibiotics among students. In this study, factors like age, gender, marital status, ethnicity, year of study, type of study, the ease of access to medical centers, the
unavailability of medical health, awareness of bacterial resistance, respondent perception about the complications due to self-medication and death possibly due to self-medication were tested. Multiple logistic regression was used to identify the most important risk factors related to self-medication practice with antibiotics among medical and non-medical students at Lincoln College University.

3. RESULTS AND DISCUSSION

3.1 Socio-Demographic Characteristics of Respondents

Table 1 shows the age information of the respondents. From a total of 240 participants, 75.4% were from the age group 19-25 while 24.6% were from the age group 26-29. Thus, the majority of the survey respondents were from the age group 19-25. The result also revealed that 44.2% of the respondents were males while 55.8% were females. Thus, there were more female students in the survey and the University, by extension, than males. It was also found that 41.3% were Malay, 8.3% were Chinese while 23.3% were Indians and 27.1% were from other ethnicities. There were 13.2% married and 86.7% from single categories. This analysis further showed 22.1% of the respondents were from first-year students, 37.1% from second-year students, 25.0% from third-year students, 11.3% were from fourth-year students while 4.6% were from higher studies such as master and Ph.D. There were 50.0% non-medical students as well as 50.0% of respondents from medical schools. The results also revealed that 30.4% of the respondents had medical health insurance while 69.6% of respondents were without medical health insurance.

Conceptual Framework for Self-Medication:

![Conceptual Framework for Self-Medication](image)

Fig. 1. The conceptual framework for self-medication
Table 1. Socio-demographic characteristics of the respondents (N= 240)

| Variables          | N   | %    |
|--------------------|-----|------|
| **Age**            |     |      |
| 19-25              | 81  | 75.4 |
| 26-29              | 59  | 24.6 |
| **Gender**         |     |      |
| Male               | 106 | 44.2 |
| Female             | 134 | 44.8 |
| **Ethnicity**      |     |      |
| Malay              | 99  | 41.3 |
| Chinese            | 20  | 8.3  |
| Indian             | 56  | 23.3 |
| Others             | 65  | 27.1 |
| **Marital Status** |     |      |
| Married            | 32  | 13.3 |
| Single             | 208 | 86.7 |
| **Year of Study**  |     |      |
| First-year         | 53  | 22.1 |
| Second-year        | 89  | 37.1 |
| Third-year         | 60  | 25.0 |
| Fourth-year        | 27  | 11.4 |
| Others             | 11  | 4.6  |
| **Type of School** |     |      |
| Medical            | 120 | 50.0 |
| Non-medical        | 120 | 50.0 |
| **Medical health insurance** | |      |
| Yes                | 73  | 30.4 |
| No                 | 167 | 69.6 |
| **Access to physician** | |      |
| Yes                | 89  | 37.1 |
| No                 | 151 | 62.9 |

The prevalence of self-medication practice among university students in different countries was found to range from 20.33% to 81.5% [23-28]. The prevalence in this study was 22.1% which suggests that self-medication practice among university students is relatively low. The reason for the differences in the prevalence of self-medication in various studies may be due to the differences in socioeconomic status, education, culture, and health care system of each country [9].

3.2 The Prevalence of Antibiotic Use during Self-medication

The results (Table 2) showed 22.1% of respondents consumed antibiotics in the last six months while 77.9% did not. Only 53.8% of the respondents, however, were aware of antibiotic resistance while 46.3% were not. Moreover, 29.6% of the participants believed that antibiotic use with self-medication can lead to death while 70.4% did not. The results also show that 58.3% of the respondents believed antibiotics use may cause health complications while 41.7% did not.

Although the majority of the respondents did not believe that antibiotics with self-medication can lead to death. Such prevalence was expected especially as the majority of students were aware of bacterial resistance. Also, the majority of students believed that antibiotics with self-medication can have serious implications for their health.

3.3 Symptoms and Illnesses Treated with Antibiotics during Self-medication

The results, as shown in Table 3, revealed that proportion of the respondents using antibiotics to treat headache (43.8%), fever (14.2%), cough (15.4%), cold/sore throat (12.1%), ulcer (4.2%), allergy (1.7%), joint pain (4.2%), vomiting (1.3%), skin infection (4.0%), sexual problem (4.0%) and other related diseases (2.5%). Headache was found to be the major symptom responsible for
the practice of self-medication among the respondents while skin infections and sexual problems were the least symptoms.

The most common illnesses and symptoms reported by students during self-medication were sore throats, fever, and cough [28]. In another study, fever and pain were reported to be the most common symptoms treated during self-medication [25].

3.4 Reasons for Self-Medication with Antibiotics

Table 4 shows 21.7% of the respondents used antibiotics for self-medication because they did not have medical health insurance. Similarly, 27.1% believed that visiting a physician can be expensive while 13.8% believed that visiting a physician can be time-consuming. 25.0% believed that their condition was not serious, 6.3% believed that they had previous experience of a similar condition, 3.8% believed they needed to play an active role regarding their health, and 2.5% felt embarrassed to discuss their condition with the physician. These findings indicate that people could not go to the hospital due to time constraints, and information from the internet making people self-belief in caring for themselves.

Other reasons reported in the literature include saving the cost of physician’s consultation [29-31] and consultation time [30], previous knowledge about the illness [32], the case was not serious [29,31], previous experience [29,32,31], urgent usage [32], easy access to medications: [32] and traditional believes like protecting from witches [33].

3.5 Sources of Information during Self-Medication with Antibiotics

Table 5 shows the sources of information to practice self-medication among the participants. The result revealed that 45.8% got information from family members, 27.1% from a friend, 10.8% from a pharmacist, 7.5% from an old prescription, 2.5% from media, 5.0% from personal choice, and others 1.3%. Thus, the family member was the major source of information for the respondents to resort to self-medication with an antibiotic.

According to the literature, the most common source of information and advice during self-medication was the community drug dispenser [34,35]. This was expected as the pharmacy is the main supply for medication. Other sources like family members and media have also been reported [35,36].

4. BIVARIATE ANALYSIS

The Chi-square test was used to identify the risk factors associated with self-medication as shown in Table 6. It was found that age, gender, marital status, ethnicity, year of study, type of study, the ease of access to medical centers, awareness of bacterial resistance, respondent perception about the complications due to self-medication and death possibly due to self-medication do not have any association with self-medication practice. However, only the unavailability of medical health insurance was found to be a significant predictor of self-medication practice with antibiotics.

| Table 2. Self-medication practice among respondents |
|-----------------------------------------------------|
| Variables                                           |
| The use of antibiotics during self-medication       |
| Yes                                                 | 53  | 22.1 |
| No                                                  | 187 | 77.9 |
| Awareness of bacterial resistance                    |
| Yes                                                 | 129 | 53.8 |
| No                                                  | 111 | 46.3 |
| Antibiotics may cause health complications           |
| Yes                                                 | 140 | 58.3 |
| No                                                  | 100 | 41.7 |
| Antibiotics may lead to death                        |
| Yes                                                 | 71  | 29.6 |
| No                                                  | 169 | 70.4 |
Table 3. Common illnesses and symptoms treated during self-medication treated with antibiotics

| Variables                        | N   | %   |
|----------------------------------|-----|-----|
| **Headache**                     |     |     |
| Yes                              | 105 | 43.8|
| No                               | 135 | 56.2|
| **Cough**                        |     |     |
| Yes                              | 37  | 15.4|
| No                               | 203 | 84.6|
| **Cold and sore throat**         |     |     |
| Yes                              | 29  | 12.1|
| No                               | 211 | 87.9|
| **Ulcer**                        |     |     |
| Yes                              | 10  | 4.2 |
| No                               | 230 | 95.8|
| **Allergy**                      |     |     |
| Yes                              | 4   | 1.7 |
| No                               | 236 | 98.3|
| **Pain in general**              |     |     |
| Yes                              | 10  | 4.2 |
| No                               | 230 | 95.8|
| **Vomiting**                     |     |     |
| Yes                              | 3   | 1.3 |
| No                               | 237 | 98.7|
| **Skin infections and wounds**   |     |     |
| Yes                              | 1   | 0.4 |
| No                               | 239 | 99.6|
| **Sexual Problems**              |     |     |
| Yes                              | 1   | 0.4 |
| No                               | 239 | 99.6|

Table 4. Reasons for self-medication with antibiotics

| Variables                                          | N   | %   |
|----------------------------------------------------|-----|-----|
| **I don’t have a medical health insurance**        |     |     |
| Yes                                                | 52  | 21.7|
| No                                                 | 188 | 78.3|
| **Visiting a physician can be expensive**          |     |     |
| Yes                                                | 65  | 27.1|
| No                                                 | 175 | 72.9|
| **Visiting a physician can be time-consuming**     |     |     |
| Yes                                                | 33  | 13.8|
| No                                                 | 207 | 86.2|
| **My condition was not serious**                   |     |     |
| Yes                                                | 60  | 25.0|
| No                                                 | 180 | 75.0|
| **I have previous experience of similar condition**|     |     |
| Yes                                                | 15  | 6.3 |
| No                                                 | 225 | 93.7|
| **I need to play an active role regarding my health**|    |     |
| Yes                                                | 9   | 3.8 |
| No                                                 | 231 | 96.2|
| **I feel embarrassed to discuss my condition with the physician** | |     |
| Yes                                                | 6   | 2.5 |
| No                                                 | 234 | 97.5|
Table 5. Sources of information and advice during self-medication with antibiotics

| Variables          | N  | %    |
|--------------------|----|------|
| **Family member**  |    |      |
| Yes                | 110| 45.8 |
| No                 | 130| 54.2 |
| **Friends**        |    |      |
| Yes                | 65 | 27.1 |
| No                 | 175| 72.9 |
| **Pharmacists**    |    |      |
| Yes                | 26 | 10.8 |
| No                 | 214| 89.2 |
| **An old prescription** | | |
| Yes                | 18 | 7.5  |
| No                 | 222| 92.5 |
| **Media**          |    |      |
| Yes                | 6  | 2.5  |
| No                 | 225| 97.5 |
| **Personal choice**|    |      |
| Yes                | 12 | 5.0  |
| No                 | 228| 95.0 |
| **Others**         |    |      |
| Yes                | 3  | 1.3  |
| No                 | 237| 98.7 |
Table 6. Bivariate analysis (Chi-square test)

| Variables                      | Yes (%) | No (%) | Chi-Square | Odds Ratio | Lower  | Upper  | Sig.  |
|--------------------------------|---------|--------|------------|------------|--------|--------|-------|
| **Self-medication with antibiotics** |         |        |            |            |        |        |       |
| Age                            |         |        |            |            |        |        |       |
| 19-25                          | 42 (23.2) | 139 (76.8) | 0.538      |           |        |        | 0.588 |
| 26-29                          | 11 (18.6) | 48 (81.4) |            |           |        |        |       |
| **Gender**                     |         |        |            |            |        |        |       |
| Male                           | 28 (26.4) | 78(73.6) | 2.070      | 1.565      | 0.848  | 2.888  | 0.161 |
| Female                         | 25 (18.7) | 109 (81.3)|            |           |        |        |       |
| **Marital status**             |         |        |            |            |        |        |       |
| Married                        | 10 (31.3) | 22 (68.8) | 1.803      | 1.744      | 0.769  | 3.958  | 0.178 |
| Single                         | 43 (20.7) | 165 (79.3)|            |           |        |        |       |
| **Ethnicity**                  |         |        |            |            |        |        |       |
| Malay                          | 25 (25.3) | 74 (74.7) | 1.366      |           |        |        | 0.713 |
| Chinese                        | 3 (15.0) | 85 (85.0) |            |           |        |        |       |
| Indian                         | 11 (19.6) | 45 (80.4) |            |           |        |        |       |
| Others                         | 14 (21.5) | 51 (78.5) |            |           |        |        |       |
| **Year of study**              |         |        |            |            |        |        |       |
| First-year                     | 11 (20.8) | 42 (79.2) | 2.512      |           |        |        | 0.643 |
| Second-year                   | 19 (21.3) | 70 (78.7) |            |           |        |        |       |
| Third-year                    | 15 (25.0) | 45 (75.0) |            |           |        |        |       |
| Fourth-year                   | 4 (14.8) | 23 (85.2) |            |           |        |        |       |
| Others                         | 4 (36.4) | 7 (63.6) |            |           |        |        |       |
| **Type of school**             |         |        |            |            |        |        |       |
| Medical                       | 23 (31.5) | 50 (68.5) | 5.414      | 2.101      | 1.116  | 3.954  | 0.027 |
| Non-medical                   | 30 (18.0) | 137 (82.0)|            |           |        |        |       |
| **Availability of medical insurance** |         |        |            |            |        |        |       |
| Yes                            | 23 (19.2) | 97 (80.8) | 1.187      | 1.406      | 0.761  | 2.598  | 0.351 |
| No                             | 30 (25.0) | 90 (75.0) |            |           |        |        |       |
| **Access to the medical center** |         |        |            |            |        |        |       |
| Yes                            | 25 (28.1) | 64 (71.9) | 2.966      | 1.716      | 0.925  | 3.184  | 0.107 |
| No                             | 28 (18.5) | 123 (81.5)|            |           |        |        |       |
| **Awareness of bacterial resistance** |         |        |            |            |        |        |       |
| Yes                            | 29 (22.5) | 100 (77.5) | 0.26      | 1.051      | 0.570  | 1.939  | 1.000 |
### Self-medication with antibiotics

| Variables                          | Yes (%) | No (%) | Chi-Square | Odds Ratio | Lower | Upper | Sig. |
|------------------------------------|---------|--------|------------|------------|-------|-------|------|
| No                                 | 24 (21.6) | 87 (78.4) |            |            |       |       |      |

### Complications due to self-medication

| Variables                          | Yes (%) | No (%) | Chi-Square | Odds Ratio | Lower | Upper | Sig. |
|------------------------------------|---------|--------|------------|------------|-------|-------|------|
| Yes                                | 33 (23.6) | 107 (76.4) | 0.432 | 1.234 | 0.659 | 2.308 | 0.532 |
| No                                 | 20 (20.0) | 80 (80.0) |            |            |       |       |      |

### Death possibly due to self-medication

| Variables                          | Yes (%) | No (%) | Chi-Square | Odds Ratio | Lower | Upper | Sig. |
|------------------------------------|---------|--------|------------|------------|-------|-------|------|
| Yes                                | 20 (28.2) | 51 (71.8) | 2.170 | 1.616 | 0.851 | 3.071 | 0.172 |
| No                                 | 33 (19.5) | 136 (80.5) |            |            |       |       |      |

Table 7. Multivariate analysis (multiple logistic regression model)

| Variables B          | S.E.   | Wald  | Sig.   | Exp (B) | EXP (B) Lower | Upper  |
|----------------------|--------|-------|--------|---------|---------------|--------|
| Age                  | 0.655  | 1.988 | 0.159  | 1.925   | 0.775         | 4.784  |
| Gender               | -0.339 | 0.350 | .941   | 0.332   | 0.712         | 0.359  | 1.413 |
| Ethnic               | 0.197  | 1.841 | 0.175  | 1.218   | 0.916         | 1.620  |
| Marital status       | -0.656 | 0.462 | 2.020  | 0.155   | 0.519         | 0.210  | 1.283 |
| Type of school       | -0.982 | 0.430 | 5.226  | 0.022   | 0.374         | 0.161  | 0.869 |
| Medical insurance    | -0.718 | 0.373 | 3.701  | 0.054   | 0.488         | 0.234  | 1.014 |
| Access to medical    | -0.522 | 0.357 | 2.141  | 0.143   | 0.593         | 0.295  | 1.194 |
| Constant             | 1.229  | 574   | 4.593  | 0.032   | 3.419         |        |
The results indicated that medical students were more likely to use self-medication with antibiotics during self-medication compared to non-medical students. Such findings were consistent with other studies [37-40,18,20,41]. The reason for such a result may be due to better exposure of medical students towards medical knowledge compared to non-medical students.

5. MULTIVARIATE ANALYSIS

Multiple logistic regression was used to identify the most important risk factors related to self-medication practice with antibiotics among the respondents. Among all the variables tested by the Chi-square test, only the type of school was found to be a significant predictor of self-medication practice with antibiotics. When the multiple regression was conducted, only the type of school was found to be significantly predicting the use of antibiotics among students. The results (Table 7) indicated that medical students were more likely to use antibiotics during self-medication compared to non-medical students (OR= 0.374, CI 95% 0.161-0.869, p= 0.022).

Although the prevalence of self-medication among the respondents was not high compared to other studies [42,16,9], the misuse of antibiotics during self-medication was seen in this study. Studies have shown that self-medication practice among doctors develops during their undergraduate training [37]. Besides, the irrational use of antibiotics among medical students during self-medication may potentially increase the misuse or irrational use of medicines. Therefore, there is a need to review the pharmacy curriculum to include modules on self-medication and rational use of medicine.

6. CONCLUSION

There is a significant relationship between the prevalence of illnesses in self-medication with antibiotics among students of Lincoln University College, thus, our hypothesis was rejected. Though the prevalence of self-medication among the respondents as well as the misuse of antibiotics during self-medication was relatively low, there is, however, an urgent need to provide university students with health education programs to help them understand the proper use of the drugs and to increase their awareness about the risk of self-medication without supervision from qualified health providers. Moreover, the role of community pharmacists to ensure safe, rational, and effective self-medication practices is recommended.

CONSENT

As per international standard or university standard, Participants’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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