

## Original Research Article

# Pattern of antibiotic use and the influence of unregistered medicine sellers on students and staff of School of Life Sciences, Bamidele Olumilua University, Ikere-Ekiti, Nigeria

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## Abstract

**Purpose:** To investigate the consequences of patronizing unlicensed and unregistered medicine sellers, focusing on the risks associated with self-medication, the rise of drug-resistant strains of diseases, and the socioeconomic impacts of this issue.

**Method:** This survey was a descriptive, cross-sectional study of 491 people aged 10 – 50 years, randomly selected from the School of Life Sciences. A predesigned Google form was circulated for data collection. The study was conducted from 1st March to 31st May 2023. Data were analyzed using descriptive statistics (frequencies and percentages) and inferential statistics (Chi-square test) to examine associations between categorical variables.

**Result:** A survey involving 491 participants revealed that 211 (44.8 %) of respondents reported obtaining medications from chemists, while 191 (40.6 %) sought medical advice from a doctor when feeling unwell. The findings highlight a concerning prevalence of self-medication, with many individuals acknowledging that they acquire medications without prescriptions. Furthermore, 131 (27.8 %) participants experienced negative outcomes from their dealings with Unlicensed and unregistered medicine sellers, emphasizing the lack of professional guidance in medication dispensing. These results point to an urgent need for regulatory measures to oversee the activities of unregistered medicine sellers and promote safe medication practices.

**Conclusion:** There is widespread reliance on unlicensed medicine sellers, reflecting a troubling trend of self-medication among the population. These practices increase the risk of adverse drug reactions and treatment failures and also contribute to the emergence of drug-resistant diseases. There is therefore a need for stricter regulation of informal drug markets, improved access to qualified healthcare providers, and intensified public health education to promote responsible medication use and safeguard public health.

**Keywords:** Unlicensed medicine sellers, Chemist, Students, Staff, Self-medication

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## INTRODUCTION

The proliferation of unregulated drug sales by Unlicensed and unregistered medicine sellers in Ikere-Ekiti has become a significant public health concern, posing serious threats to the health and

well-being of the community [1,2]. In Nigeria, the phenomenon of unregistered medicine sellers has become commonplace, with these vendors operating without licenses or adequate training, dispensing medications without prescriptions or medical supervision. This situation has led to a

high incidence of self-medication, misuse of medications, and the emergence of drug-resistant strains of diseases, which are critical issues that need to be addressed [3]. The World Health Organization (WHO) emphasizes the importance of ensuring access to safe, effective, and quality medications. However, the activities of Unlicensed and unregistered medicine sellers put the health of the community at risk. Self-medication, often driven by the ease of access to medications from these chemists, can lead to inappropriate use of drugs, adverse drug reactions, and increased healthcare costs due to complications arising from untreated or improperly treated conditions [1-3].

Ikere-Ekiti is a prominent town located in the southwestern region of Nigeria, within Ekiti State. Geographically positioned along the Ado–Akure road, it serves as a strategic link between major cities and is known for its rich cultural heritage and deep-rooted traditions. The people of Ikere-Ekiti are widely recognized for their strong attachment to indigenous knowledge systems and traditional healing practices. However, the town also faces significant public health challenges, including the widespread patronage of unlicensed and unregistered medicine sellers, especially in informal markets and rural outskirts [3]. This common practice, driven by factors such as accessibility, affordability, and trust in local remedies, makes Ikere-Ekiti a highly relevant location for studying the implications and risks associated with unregulated drug distribution.

This lack of professional oversight in medication dispensing raises concerns about the quality and safety of the medications provided. Studies have shown that individuals who rely on unregistered medicine sellers for their healthcare needs are at a higher risk of experiencing negative health outcomes, including drug resistance and treatment failures [1]. This study aims to investigate the impact of non-regulated drug sales by unregistered medicine sellers, focusing on the risks associated with self-medication, the development of drug-resistant strains of diseases, and the socioeconomic implications of this phenomenon. By examining the complex factors contributing to the proliferation of these practices in Ikere-Ekiti. It further seeks to contribute to the development of effective strategies for addressing this critical public health issue

## METHODS

This study employed the use of a structured Google form to examine the practices and experiences of individuals regarding antibiotic

use and medications from unregistered medicine sellers in Ikere-Ekiti, focusing on non-regulated drug sales, self-medication prevalence, and health outcomes. The study was a descriptive, cross-sectional survey design.

### Ethical approval

Ethical approval for this study was obtained from the Health Research Ethics Committee of the Centre for Research and Development (CERAD), Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, Nigeria. The study was reviewed and approved with reference number CERAD/108-0108. All procedures performed in this study involving human participants were conducted following the ethical standards of the committee. Participation was voluntary, and informed consent was obtained from all respondents before data collection. Confidentiality and anonymity were strictly maintained throughout the research process.

### Study population

The research targeted students and staff of Bamidele Olumilua University, Ikere-Ekiti, with 471 participants recruited for a representative sample.

### Same size

The sample size for this study was determined using a non-probability convenience sampling method. A total of 471 participants, comprising students and staff of the School of Life Sciences, Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, responded to the questionnaire. The sample was not predetermined but was based on the number of willing participants who completed the survey during the data collection period.

The survey was distributed via a Google Form to ensure a wide reach, and participation was voluntary. Inclusion criteria were individuals aged 16–50 years who had access to the form and consented to participate.

### Data collection instrument

The response scale was phrased using a combination of formats, including frequency scales (e.g., *Always*, *Often*, *Sometimes*, *Rarely*, *Never*), Yes/No options, and multiple-choice responses. This variety allowed for the collection of both quantitative and qualitative data relevant to participants' experiences, behaviors, and perceptions.

A structured Google form was created to collect data on demographics, medication sources, self-medication experiences, perceived negative consequences from unlicensed and unregistered drug sellers, and attitudes toward health versus sales.

### Instrument reliability

The reliability of the questionnaire was assessed using the test-retest method. The instrument was administered twice to a group of 471 respondents from the School of Life Sciences students and staff, the same set that filled the first form, with a two-week interval between the two administrations. The responses from both rounds were compared using Pearson's correlation coefficient, which yielded a value of 0.85, indicating a high level of consistency over time. This result confirmed the stability and reliability of the instrument for measuring antibiotic use patterns and related behaviors.

### Data analysis

The collected data were analyzed using descriptive statistics (frequency counts and percentages) and inferential statistics (Chi-square test) to assess relationships between categorical variables, with a significance level of  $p < 0.05$  for hypothesis testing.

## RESULTS

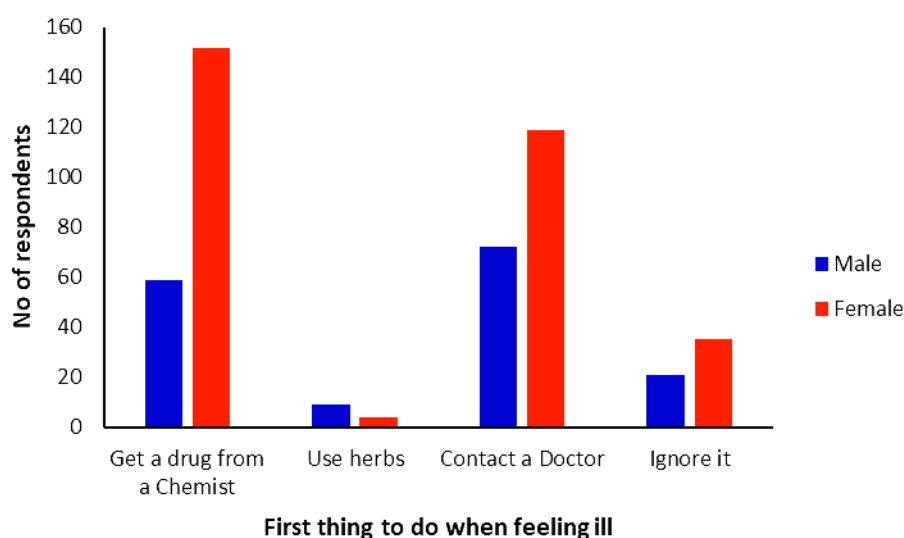
The students' responses to the questionnaire items were analyzed descriptively. The variables

of consideration are the gender and age of the respondents.

**Table 1:** Frequency and percentage of respondents' demographic characteristics

| Variable         | Total no (%)       |
|------------------|--------------------|
| <b>Gender</b>    |                    |
| Male             | 181 (34.2)         |
| Female           | 310 (65.8)         |
| <b>Total (%)</b> | <b>471 (100.0)</b> |
| <b>Age</b>       |                    |
| 16-20 years      | 87 (18.5)          |
| 20-30 years      | 338 (71.8)         |
| 30-40 years      | 21 (4.5)           |
| 40-50 years      | 16 (3.4)           |
| 50 years & above | 9 (1.9)            |
| <b>Total</b>     | <b>471 (100.0)</b> |

The gender distribution of the respondents at Bamidele Olumilua University of Education, Science, and Technology, Ikere-Ekiti, who were chosen for the study, is presented in Table 1. According to the results, 310 (65.8 %) female respondents and 181 (34.2 %) male respondents participated in the study. The frequency and proportion of respondents who were aged in the Bamidele Olumilua University of Education, Science, and Technology, Ikere-Ekiti, sampled for the study are also displayed in Table 1. According to the Table, 87 (18.5 %) of the respondents were between the ages of 16 and 20; 338 (71.8 %) are between the ages of 20 and 30; 21 (4.5 %) are between the ages of 30 and 40; 16 (3.4 %) are between the ages of 40 and 50; and 9 (1.9 %) are between the ages of 50 and over.



**Figure 1:** Participants' first responses to feelings of illness

Differences were found using the Chi-square test ( $\chi^2(1) = 0.149$ ,  $p < 0.700$ ), though not significant, relating to whether the participants ever experienced any negative consequences or misadvice from unregistered medicine sellers when purchasing medications. The result revealed that 131 (27.8 %) respondents indicated that they have experienced negative consequences or misadvice from unregistered medicine sellers when purchasing medications, while 340 (72.2 %) participants had no negative experiences. Furthermore, more female participants ( $n = 88$ ; 67.2 %) have experienced negative consequences or misadvice from unregistered medicine sellers when purchasing medications than their male counterparts ( $n = 43$ ; 32.8 %). Table 2 shows the practices regarding the use of antibiotics among male and female participants at Bamidele Olumilua University, Ikere-Ekiti. The responses of participants on the first thing they do when they start feeling unwell revealed that 211 (44.8 %) respondents indicated that they get a drug from a chemist, 13 (2.8 %) respondents use herbs, 191 (40.6 %) respondents contact a doctor, while 56 (11.9 %) respondents ignore the feeling. The Chi-square test ( $\chi^2(3) = 12.049$ ,  $p < 0.05$ ) showed a significant relationship between male and female participants regarding the first thing they do when they start feeling unwell. Negative consequences from unregistered medicine sellers when purchasing medications. Amongst all respondents, the largest percentage ( $n = 340$ ; 72.2 %) were those who have experienced negative consequences, and (131, 27.8 %) who have never had negative consequences. Amongst all respondents, the largest percentage ( $n = 219$ ; 46.5 %) sometimes take medication without a prescription from a doctor, those who do not take medication without a prescription from a doctor were next ( $n = 142$ ; 30.1 %), while the lowest percentage ( $n = 110$ ; 23.4 %) were those who consented to taking medication without a prescription from a doctor. The Chi-square test ( $\chi^2(2) = 3.747$ ,  $p = 0.154$ ) revealed no significant relationship between male and female participants in taking medication without a prescription from a doctor.

#### **Participants' use of medication without a prescription from a doctor**

The practices regarding when people normally stop taking their medications when they are unwell are shown in Table 2. Very few participants ( $n = 29$ ; 6.2 %) stop "whenever they feel like", though quite a number ( $n = 196$ ; 41.6 %) stop "when they start feeling well". The majority ( $n = 246$ ; 52.2 %) stop "when they complete the dosage as prescribed by the

doctor". The Chi-square test ( $\chi^2(2) = 3.786$ ,  $p = 0.151$ ) revealed no significant relationship between male and female participants on when they normally stop taking their medications when they are unwell.

#### **When participants stop taking their medications during an illness**

The consideration of whether participants have ever taken unregistered medicine sellers-recommended drug that did not work, and had to see a doctor revealed that slightly less than half of the total participants ( $n = 226$ ; 48.0 %) consented to have to take unregistered medicine sellers-recommended drug that did not work, and had to see a doctor while the remaining participants ( $n = 245$ ; 52.0 %) had no such experience. The Chi-square test ( $\chi^2(1) = 0.002$ ,  $p = 0.961$ ) revealed no significant relationship between male and female participants on whether participants took unregistered medicine sellers-recommended drugs that did not work, and had to see a doctor.

#### **Efficacy of unregistered medicine sellers is recommended**

Sampling participants' opinions on the priority of unregistered medicine sellers between an individual's health/well-being and sales showed that the majority of the participants ( $n = 278$ ; 59.0 %) felt unregistered medicine sellers prioritize an individual's health/well-being over sales, while the remaining participants ( $n = 193$ ; 41.0 %) held a contrary view. The Chi-square test ( $\chi^2(3) = 1.927$ ,  $p = 0.165$ ) revealed no significant relationship between male and female participants on the priority of unregistered medicine sellers between an individual's health/well-being and sales.

## **DISCUSSION**

The results of this study highlight critical public health issues related to the practices of Unlicensed and unregistered medicine sellers in Ikere-Ekiti, especially concerning antibiotic use and self-medication. The significant number of negative experiences reported by participants (27.8 %) when acquiring medications from these unregulated vendors underscores the dangers associated with non-prescription drug sales. This finding is consistent with existing literature that shows how a lack of regulation in drug sales can lead to misuse and negative health outcomes, including the emergence of drug-resistant diseases.

**Table 2:** Practices regarding the use of antibiotics among male and female participants

| Variable                                                                                                                                       | Total (%)  | Male (%)   | Female (%) | P-value |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---------|
| <b><i>What is the first thing you do when you start feeling unwell?</i></b>                                                                    |            |            |            | 0.007   |
| Get a drug from a chemist                                                                                                                      | 211 (44.8) | 59 (28.0)  | 152 (72.0) |         |
| Use herbs                                                                                                                                      | 13 (2.8)   | 9 (69.2)   | 4 (30.8)   |         |
| Contact a Doctor                                                                                                                               | 191 (40.6) | 72 (37.7)  | 119 (62.3) |         |
| Ignore it                                                                                                                                      | 56 (11.9)  | 21 (37.5)  | 35 (62.5)  |         |
| <b><i>Have you ever experienced any negative consequences or misadvice from unregistered medicine sellers when purchasing medications?</i></b> |            |            |            | 0.700   |
| Yes                                                                                                                                            | 131 (27.8) | 43 (32.8)  | 88 (67.2)  |         |
| No                                                                                                                                             | 340 (72.2) | 118 (34.7) | 222 (65.3) |         |
| <b><i>Do you take medication without a prescription from a Doctor?</i></b>                                                                     |            |            |            | 0.154   |
| Yes                                                                                                                                            | 110 (23.4) | 41 (37.3)  | 69 (62.7)  |         |
| No                                                                                                                                             | 142 (30.1) | 55 (38.7)  | 87 (61.3)  |         |
| Sometimes                                                                                                                                      | 219 (46.5) | 85 (38.7)  | 154 (70.3) |         |
| <b><i>When do you normally stop taking your medications when you are unwell?</i></b>                                                           |            |            |            | 0.151   |
| When I start feeling well                                                                                                                      | 196 (41.6) | 59 (30.1)  | 137 (69.9) |         |
| When I complete the dosage as prescribed by the Doctor                                                                                         | 246 (52.2) | 94 (38.2)  | 152 (61.8) |         |
| Whenever I feel like                                                                                                                           | 29 (6.2)   | 8 (27.6)   | 21 (72.4)  |         |
| <b><i>Have you ever taken an unregistered medicine seller-recommended drug that did not work, and had to see a Doctor?</i></b>                 |            |            |            | 0.961   |
| Yes                                                                                                                                            | 226 (48.0) | 77 (34.1)  | 149 (65.9) |         |
| No                                                                                                                                             | 245 (52.0) | 84 (34.3)  | 161 (65.7) |         |
| <b><i>Have you ever felt that unregistered medicine sellers prioritized sales over your health or well-being?</i></b>                          |            |            |            | 0.165   |
| Yes                                                                                                                                            | 193 (41.0) | 73 (37.8)  | 120 (62.2) |         |
| No                                                                                                                                             | 278 (59.0) | 88 (31.7)  | 190 (68.3) |         |

The study also found that a considerable portion of respondents (46.5 %) engage in self-medication, frequently obtaining medications without a doctor's prescription. This trend is particularly concerning as it raises the risk of incorrect self-diagnosis and inappropriate treatment, which can worsen health conditions and contribute to antibiotic resistance [1-3]. The World Health Organization (WHO) has stressed the necessity of regulating drug sales to ensure the safe and effective use of medications; however, the findings indicate that the current situation in Ikere-Ekiti fosters widespread self-medication and dependence on unregistered medicine sellers.

Gender disparities were apparent in the study, with a higher number of female participants reporting negative experiences with unregistered medicine sellers compared to males, and this was in line with the report that females patronize unregistered medicine sellers and practice self-medication more [1]. This may reflect broader societal patterns where women often assume caregiving roles, prompting them to seek medications more frequently for themselves and

their families. Furthermore, the significant correlation between gender and the initial response to feeling unwell suggests that educational interventions could be customized to address these differences, encouraging safer health-seeking behaviors among both genders [4].

The differing perceptions of health versus sales priorities among unregistered medicine sellers also merit attention. While most participants felt that health was prioritized over sales, a significant minority disagreed. This divergence points to a potential lack of public trust in the motivations of these vendors, which could be mitigated through community education and awareness initiatives [5].

In summary, the study highlights the compelling necessity for regulatory measures to control unregistered medicine sellers' activities and promote safe medication practices. The goal of public health campaigns should be to inform the public about the risks of self-medication and the value of seeking medical advice from qualified

professionals for a proper diagnosis and course of treatment.

Future research should investigate the long-term health consequences of these practices and assess the effectiveness of interventions designed to reduce reliance on unregulated drug sales [6,7].

In low-middle-income countries like Nigeria, the rate of non-prescription antibiotic use varies from 3.0 to 91.4 %, according to several studies [1,8,9].

Compared to the 23 percent reported by the WHO for Nigeria in 2015 and 31.1 % reported in another study conducted in Nigeria (both studies covering populations with and without university education), the survey's reported prevalence of self-medication is 47.7 %, which is significantly higher [11,12]. However, this rate of self-medication is comparable to 44.8 % reported [13] and 45.0 % observed [4] in earlier studies.

The non-prescription issuance of antibiotics may be linked to their non-prescription use in lower-middle-income countries (LMICs), such as Nigeria. According to some studies, up to 97 % of Nigerian pharmacists and over 59.9 % of patent medication dealers dispense antibiotics without a prescription [15,16]. According to Belachew, 69 % of antibiotics in sub-Saharan Africa are available without prescription [16]. Therefore, controlling the availability and distribution of antibiotics without prescription could greatly enhance appropriate antibiotic use and reduce antibiotic self-medication.

### Limitations of the study

This study was limited to a single academic institution, which may affect the Wider relevance of the findings to broader populations. Furthermore, data were obtained through self-administered questionnaires, which may be subject to recall and response bias. Nonetheless, the use of a large and diverse sample, as well as careful instrument design, enhances the credibility of the results. These limitations suggest the need for further studies across multiple settings and with additional qualitative methods to provide a more comprehensive understanding of the issues explored.

### CONCLUSION

This study set out to examine the consequences of patronizing unlicensed and unregistered medicine sellers, with particular focus on self-medication, drug resistance, and associated

socioeconomic effects. The findings revealed a high prevalence of self-medication among the respondents, with 44.8% resorting to chemists rather than qualified health professionals. Additionally, 27.8% reported experiencing negative outcomes after taking drugs from unregulated sources, underscoring the lack of professional oversight and the potential for harmful health consequences. These practices contribute to the development of drug-resistant infections, increase healthcare costs due to treatment failures, and reflect deeper gaps in access to quality care.

The results emphasize the urgent need for regulatory control of informal drug vendors, improved access to trained healthcare providers, and widespread public health education. Addressing these challenges is essential to reducing the misuse of antibiotics, curbing the spread of resistant infections, and protecting vulnerable populations from the socioeconomic burdens of unsafe medication practices.

### DECLARATIONS

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#### Conflict of interest

No conflict of interest is associated with this work.

#### Contribution of authors

We declare that this work was done by the author(s) named in this article and all liabilities about claims relating to the content of this article will be borne by the authors". In addition, OKE conceived and designed the study, KOA ensured the collection of the data, and 11A ensured the data were submitted for analysis and received the results from the data analyst. OKE wrote the manuscript, and other authors are aware of the manuscript and have approved it for publication, as they have all received an email to that effect.

#### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author

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