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# Self-medication with antibiotics and anti-malarial drugs among rural dwellers in Enugu State, Nigeria

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ABSTRACT

**Background:** Responsible self-medication is useful in preventing and treating minor illnesses that may not require medical consultation. However, Self-medication has been reported to cause increased costs, increased antimicrobial resistance, prolonged suffering and drug dependence. This study aimed to assess the practice of and associated risk factors for self-medication with antibiotics and antimalarial drugs among rural dwellers in South-Eastern Nigeria.
**Methods:** The study was a cross sectional survey carried out in Enugu state, Nigeria. A multistage sampling was done to recruit participants for the study and a 30-item self-administered questionnaire was used to elicit information from the respondents.
**Results:** A total of 464 out of the 500 respondents recruited completed the survey (92.8%) of which 437 (94.2%) and 425 (91.6%) of them had self-medicated with antibiotics and antimalarial drugs concurrently respectively. More than three-quarters of the study respondents reported self-medicating with antibiotics and anti-malarial drugs concurrently 359 (77.4%).The most common symptom for which antibiotics were used for self-medication was nasal condition 337 (72.6%). The most common symptom for which anti-malarial drugs were used for self-medication was fever. The most used antibiotic for self-medication was tetracycline 331 (71.3%) and sulfadoxine-pyrimethamine 314 (67.7%) for malaria.
Conclusion: Self-medication with antibiotics and anti-malarial drugs was high among the rural dwellers surveyed in this study. There is need for better regulation of prescription drugs in Nigeria.

## 1. Introduction

The World Health Organization (WHO) defined self-medication as "the selection and use of medicines by individuals to treat self-recognized illnesses or symptoms"[1]. People opt for self-medication for symptoms that they perceive to be problematic enough to need medications but notto justify the expert advice of a physician[2]. Most ailments are treated by self-medication in Low- and Middle-Income Countries due tothe poor financial status of low income country dwellers; hence they are unable to afford hospital bills[3]. Responsible self-medication is useful in preventing and treating minor illnesses that may not require medical consultation. This reduces the pressure on the overburdened health care systems, especially in resource-limited settings[4]. However, Self-medication has been reported to cause increased costs, increased antimicrobial resistance, prolonged suffering and drug dependence. It has been projected that 10 Million deaths will be caused by antimicrobial resistance worldwide by 2050[5]. Self-medication with antimicrobial agent is the most commonly cited factor contributing to drug resistance[6]. Unregulated supply chains have been cited as a major factor encouraging self-medication especially with antibiotics[7]. Self-medication with antibiotics has been pointed out to be a strong risk factor for antimicrobial resistance[8]. Poor knowledge and awareness has been cited as a predictor for antimicrobial misuse and resistance worldwide8. The deleterious effects of antimicrobial resistance include protracted illnesses, increasedhospital visits, prolonged stay in hospitals, need for more expensivedrugs, and ultimately death [9].

Fever is among the commonest symptoms in sub-Saharan Africa[10], and febrile illness is a leading cause of morbidity and death[11]. Malaria is the commonest cause of fever, although the cases havebeen on the decline since 2003[12]. Diagnosing patients presenting with fever may be somewhat difficult, due to the non-specificity of the symptom, and the unavailability of necessary diagnostic tests[13]. Many developing countries have reported antimalarial resistance which has been attributed to the irrational non-prescription use of antimalarial drugs [14]. The fact that prescription-only-medications can be freely obtained from community pharmacies and patent medicine vendors without prescription encourages inappropriate self-medication

practices in Nigeria, as in most developing countries. Furthermore, self-medication with antimalarial drugs is a common practice as documented by previous studies that have concentrated on self-medication practices among students[15], health care workers[16] and the general population[17]. Not much is known about the self-medication practices of rural dwellers who account for more than half of the Nigerian population.

This study was conducted to assess self-medication practices with antibiotics and antimalarial drugs among rural dwellers in South-Eastern Nigeria. Findings from this study are expected to guide educational and regulatory interventions to promote the rational use of drugs.

## 2. Methods

### 2.1 Study Design

The study was a cross sectional descriptive survey carried out in Enugu state which is located at latitude 6º26'28.75"N and longitude 7º29'55.79". Five rural communities from 2 local governments in Enugu state, namely: Opi Community, Obukpa Community Ede-oballa Community, Eha-alumona Community, and Orba Community were used. Participants were recruited through a multistage sampling procedure. Only people between the ages of 15 to 60 years, who could read and write and gave their consent to participate in the study, were enrolled. Two local government areas were randomly selected in the first stage. A cluster sampling was employed to select participants from the five communities. Each community was divided into ten clusters and ten participants were sampled from each cluster to give a total of hundred 100 participants in each community.

### 2.2 Study instrument

A self-designed semi-structured questionnaire which was accessed for face and content validity by experts in the Department of Clinical Pharmacy and Pharmacy management was used for the survey. The 30-item questionnaire was in three parts. The first section contained questions which elicited socio-demographic information from the respondents; the second and third sections had questions on self-medication with antibiotics and antimalarial drugs respectively. They contained questions that will give information on the involvement of participants in self medication with either antibiotics or antimalarial, how often they self medicate, what informs the choice of drug and dosage to be taken. The self-administered questionnaire was pre-tested among 20 respondents who were not part of the final survey. Minor adjustments were made on the questionnaire and reliability tests were carried out. The Cronbach alpha was 0.71 which is acceptable. Ethical approval for this study was obtained from the Ethics Review Board of the University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla Enugu State (NHREC/05/01/2008B-FWA00002458-IRB00002323). Respondents were also addressed on the aim and scope of the work and each gave an oral consent to participate.

### 2.3 Data Analysis

Data were presented as frequencies, percentages, means, and standard deviation. Chi-squared tests were carried out to assess the association between self-medication practices and socio-demographic variables. The statistical tests were considered significant at $p<0.05$. Data analyses were performed using SPSS version 20 (IBM Corporation, Armonk, NY, USA).

## 3. Results

A total of 464 out of the 500 respondents recruited completed the survey (92.8%). A greater proportion of the study respondents were between 25-34 years old 226 (48.7%) and were civil servants 117 (25.2%).One-third of them had a tertiary education163 (35.1%) and earned between N 10,000-N 50, 000, 196 (42.2%). (Table 1).

**Table 1:** *Socio-demographic information of study respondents*

| Variable | Frequency (n=464) | Percent (%) |
|---|---|---|
| **Age (Years)** | | |
| 15-24 | 103 | 22.2 |
| 25-34 | 226 | 48.7 |
| 35-44 | 80 | 17.2 |
| 45 and above | 54 | 11.6 |
| **Gender** | | |
| Male | 229 | 49.4 |
| Female | 235 | 50.6 |
| **Religion** | | |
| Christianity | 435 | 93.8 |
| Islam | 14 | 3.0 |
| Others | 15 | 3.2 |
| **Occupation** | | |
| Civil servant | 117 | 25.2 |
| Trader | 97 | 20.9 |
| Apprentice | 73 | 15.7 |
| Unemployed | 90 | 19.4 |
| Student | 87 | 18.8 |
| **Education** | | |
| No formal education | 23 | 5.0 |
| Primary | 51 | 11.0 |
| Secondary | 141 | 30.4 |
| Tertiary | 163 | 35.1 |
| Postgraduate | 86 | 18.5 |
| **Monthly Income** | | |
| ₦ 10,000 and Less | 143 | 30.8 |
| ₦ 10,000 - ₦ 50,000 | 196 | 42.2 |
| ₦ 50,000 and Above | 125 | 26.9 |

Almost all the respondents had self-medicated with Antibiotics and Antimalarial drugs concurrently 437 (94.2%), 425 (91.6%) respectively. More than half of them reported self-medicating with Anti-malarial drugs whenever they felt feverish 259 (55.8%).

The most common factor influencing the choice of antibiotic and anti-malarial for self-medication was previous prescription from a doctor 341 (73.5%), 305 (65.7%) respectively. (Table 2).

**Table 2:** *Prevalence and responses of the respondents on self-medication*

| Question | Responses | Frequency (%) | |
|---|---|---|---|
| | | **Antibiotics** | **Antimalarial** |
| Have you ever treated yourself with antibiotics or antimalarial drugs without prescription | Yes | 437(94.2) | 425(91.6) |
| How often do you self-medicate | Once in 2months | 176(37.9) | - |
| | Anytime I feel feverish | - | 259 (55.8) |
| | Once a week | 24 (5.2) | 9 (1.9) |
| | Once a month | 143 (30) | 40 (8.6) |
| | Every 3 months | 104 (22.4) | 84 (18.1) |
| | Once a while | - | 71 (15.3) |
| | Others | 17 (3.7) | 1 (0.2) |
| How did you select/choose the antibiotic or antimalarial you used? | Previous doctor's prescription | 341(73.5) | 305(65.7) |
| | Opinion of family members | 138 (29.7) | 107 (23.1) |
| | Opinion of friends | 130 (28.0) | 145 (31.2) |
| | My own experience | 158 (34.1) | 145 (38.6) |
| How did you know the dosage of antibiotics or antimalarial drugs for self-medication | From a health professional | 192(41.4) | 195(42.0) |
| | From my previous experience | 251(54.1) | 248 (53.4) |
| | By checking the package insert | 131 (28.2) | 207 (44.6) |
| | From books or TV programs | 53 (11.4) | 91 (19.6) |

The most common symptoms for which antibiotics were used for self-medication were nasal condition 337 (72.6%) and Cough/Cold 340 (73.3%). The most common symptoms for which anti-malarial drugs were used were fever 332 (71.6%) and headache 318 (68.5%) (Table 3).

**Table 3:** *Conditions for which Antibiotics and Antimalarial drugs were used for self-medication*

| Antibiotics | | Antimalarial drugs | |
|---|---|---|---|
| **Conditions** | **Freq. (%)** | **Conditions** | **Freq. (%)** |
| Nasal Congestion | 337(72.6) | Fever | 332 (71.6) |
| Cough and Cold | 340(73.3) | Headache | 318 (68.5) |
| Sore Throat | 288(62.1) | Running Nose | 119 (25.6) |
| Skin Infection | 161(34.7) | Catarrh | 126 (27.2) |
| Abdominal Pain | 174(37.5) | Common cold | 234 (50.4) |
| Headache | 130(28.0) | Loss of Appetite | 224 (48.3) |
| Malaria | 161(34.7) | | |
| Vomiting | 36(7.8) | | |
| Diarrhoea | 119(25.6) | | |

The most frequently used antibiotics were tetracycline 331 (71.3%) and metronidazole 283(61.0%). The most frequently used antimalarial drugs for self-medication were artemether-lumefantrine 290 (58.2%) and sulfadoxine-pyrimethamine (67.7%, n = 314). (Table 4)

**Table 4:** *Commonly Used Antibiotics and Antimalarial Drugs for Self -Medication.*

| Antibiotics | Freq. (%) | Antimalarial drugs | Freq. (%) |
|---|---|---|---|
| Tetracycline | 331(71.3) | Chloroquine | 221 (47.6) |
| Metronidazole | 283(61.0) | Sulfadoxine+ Pyrimethamine | 314 (67.7) |
| Ampicillin | 242(52.2) | Artesunate | 233 (50.2) |
| Amoxicillin | 224(48.3) | Artemether + Lumefantrine | 290 (58.2) |
| Ampiclox | 212(45.7) | Quinine | 158 (34.1) |
| Erythromycin | 124(26.7) | Halfan | 85 (18.3) |
| Ciprofloxacin | 189(40.7) | Dihydroartemisinin + Piperaquine | 133 (28.7) |
| Chloramphenicol | 115 (24.8) | | |
| Penicillin | 139 (30.0) | | |
| Doxycycline | 96 (20.7) | | |

More than three-quarters of the study respondents reported self-medicating with antibiotics and anti-malarial drugs concurrently 359 (77.4%). There was no statistically significant association between frequency of self-medication and respondents' socio-demographic characteristics. However, there was an evidence of statistically significant association between socio-economic status and frequency of self-medication with antibiotics ($X^2$= 10.23, p=0.029).

## 4. Discussion

Previous studies on self-medication practices in Nigeria have focused on various populations in urban areas, the present study has contributed information on self-medication practices in rural areas where more than half of Nigeria's population dwells. Almost half of the study respondents were between 24-35 years old. This age group is more likely to be internet users who seek medical information from the web and thus, go on to self-medicate. About one-third of the study respondents had a tertiary education. The prevalence of self-medication was 94.2% for antibiotics and 91.6% for anti-malarial drugs. The prevalence rates of self-medication with antibiotics are much higher than those obtained in pooled estimates of self-medication with antimicrobials in Sub-Saharan Africa (38%) and the middle east (34.1%)[18]. These rates are also higher than prevalence rates obtained from studies carried out in Sudan and Pakistan which are also developing countries like Nigeria[19]. This implies that the high prevalence is not because of low income or poor economic status of the country as other countries of lower financial status had lower prevalence. The Prevalence is however consistent with findings from other parts of Nigeria like Zaria where 75.9% of the respondents practiced self-medication and 82.2% in South-western Nigeria[20,21].

While self-medication is acknowledged to be helpful in the management of minor ailments and self-limiting illnesses, self-medication with antibiotics poses a serious concern especially in light of global concerns about antibiotic resistance[22]. Other problems associated with self-medication include drug addiction, masking of potentially malignant and lethal diseases and the possibility of misdiagnosis[23]. It is very worrisome that almost all of the respondents surveyed had self-medicated with antibiotics and anti-malarial drugs recently. More than three-quarters of the study respondents reported to have self-medicated with antibiotics and anti-malarial drugs concurrently. Although tetracyclines and macrolides and their derivatives are well known to have antimalarial properties and have been the focus of studies over the years[2,3] not much is known about other classes of antibiotics. More than half of them reported self-medicating with anti-malarial drugs whenever they felt feverish. Given the recent break out of hemorrhagic fevers like Lassa fever and Ebola in Sub Saharan Africa and the novel corona virus, fever of 38$^{o}$C for more than 48hrs should give a high index of suspicion. Self-medication in these cases may delay treatment and lead to poorer prognosis. A significant proportion of the study respondents were self-medicating with artemether-lumefantrine for febrile episodes, while others used monotherapies such as sulfadoxine-pyrimethamine (SP) or quinine. The use of ineffective anti-malarial is associated with increased resistance[4] and treatment failure, ultimately increasing costs of treatment. The most common factor influencing the choice of antibiotic and anti-malarial for self-medication was previous prescription from a doctor. The use of old prescriptions is a pointer to poor prescribing and dispensing practices and ineffective health education by healthcare professionals. Pharmacists should be discouraged from dispensing antibiotics from old prescriptions and should be more vigilant about antibiotic misuse among patients. The most common factor guiding the dosage of anti-malarial and antibiotics was previous experience. This is consistent with findings from the study among Pakistani rural dwellers where most of them never read the drug information leaflets and were guided by past experience[19]. The most common symptoms for which antibiotics were used for self-medication was cough and cold. This is in agreement with previous studies where antibiotics were mostly used for upper respiratory symptoms[24]. These are usually self-limiting and do not need the use of antibiotic. Thus, this should be an area of focus in public enlightenment campaigns. Fever is a symptom for a myriad of ailments and treating all patients with febrile symptoms with anti-malarial drugs may lead to drug shortage, non-treatment and possible worsening of underlying cause of fever in non-malarial febrile illnesses and avoidable side effects of drugs[25]. Furthermore, inappropriate prescription and dispensing of anti-malarial drugs have been linked to increased parasite resistance[26]. The commonest antimalarial drug used for self-medication in this survey was sulfadoxine-pyrimethamine followed by artemether-lumefantrine. This may be attributable due to the low cost and easy dosing regimen of SP. The most frequently used antibiotics for self-medication were tetracycline and metronidazole. This is in keeping with a study in Northwest Nigeria where undergraduate students were found to most frequently self-medicate with metronidazole[27]. Metronidazole was also the commonest antibiotic for self-medication amongst Bangladeshi undergraduates in a similar study[28]. The high prevalence of self-medication with antibiotics reveals the unregulated sale of antibiotics and the lax regulations on sale of prescription-only-medication. Selling antibiotics without prescription increase the likelihood of self-medication with antibiotics and consequently, the antibiotic resistance[27].

Although gender has been frequently cited as a factor affecting self-medication practice with more females engaging in the practice[29] there was no significant differences between both genders in the practice of self-medication in our study ($p=0.082$). Education had no association with the practice of Self-medication in the present study. This is in contrast with findings from previous studies which have consistently shown that level of education influences the practice of self-medication[30,31]. While illiteracy has been cited as a facilitating factor for the practice of Self-medication due to a lower awareness of the health risks involved, a high level of education may also facilitate the practice of self-medication due increased health literacy which leads to a false sense of confidence in self-diagnosis[29]. There was an evidence of statistically significant association between socio-economic status and frequency of self-medication with antibiotics in this study. People with lower income relied more on self-medication possibly due to the high cost associated with formal health care services. This calls for health education programs to improve the quality of self-medication among this population

The study findings indicate a need for a multipronged approach to address the predisposing factors to self-medication in Nigeria[32]. Firstly, there should be efficient implementation of already existing lawsthat give pharmacists the exclusive right to the sale of prescription only medicines.Secondly, service

delivery in primary health care facilities should be improved by increasing capacity and reducing waiting times thus encouraging hospital visits by sick people. Thirdly, public enlightenment campaigns at grassroot levels aimed at informing the public on rational drug use and the dangers of inappropriate self-medication should be embarked on by relevant agencies[27].

This study contributes to the sparse literature available on self-medication practices in rural areas in Nigeria. The strength of the study lies in the multiple sampling techniques employed and the high response rate. However, there's a possibility of recall bias since the practices are self-reported bythe respondents. The cross-sectional nature of the study also limits any causal inferences that may be made from the study. Current studies on self-medication practices in Nigeria and most other low-income countries are cross-sectional and quantitative in nature, longitudinal and qualitative research is needed in this area. Further research should also explore reasons for self-medication among rural dwellers in Nigeria and to address the public health problem.

## 5. Conclusion

Self-medication with antibiotics and anti-malarial drugs was high among the rural dwellers surveyed in this study. There is need for better regulation of prescription drugs in Nigeria and urgent health education on self-medication targeted towards people living in remote and rural areas.

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