WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Self-Medication Practices with Antibiotics, Assessment of Awareness of AMR and their Determinants in a Semi-Urban Community in Oyo State.

Philip Damilare Lazarus

Department of Epidemiology, & Medical Statistics University of Ibadan, Nigeria

A B S T R A C T

Background: Individuals who feel unwell commonly tend to treat themselves probably due to the innate survival instinct in humans. Self-medication with antibiotics (SMA) has been recognized as inappropriate and irrational use of antibiotics and overall self-medication is considered as irrational. Antimicrobial resistance (AMR) is the resistance of a microorganism to an antimicrobial drug that was originally effective for the treatment of infections caused by it.

Aim: This study evaluated the antibiotic self-medication practices, antimicrobial resistance awareness and their determinants among community residents of the selected communities in Ido local government area, Ibadan.

Method: This study is a descriptive cross-sectional study conducted among 450 community members using a multistage sampling technique. Data were collected using a pretested semi structured administered questionnaire. Data were analyzed using the SPSS version 20. Descriptive statistics was used for data summarization, chi-square test for associations and binary logistic regression test for predicting factors, level of significance was set at 5%.

Results: Mean age of the respondents was 34.2 ± SD 12.9 years. Out of 93.8% respondents that knew about antibiotics, 52.7% of the respondents self-medicate with antibiotics, with emergency use/to get quick relief been the major reason for self-medication and fever been the major complaints for using antibiotics. Amoxicillin was the most used antibiotics for self-medication, with community pharmacies (PMV) been the major source of antibiotics used for self-medication. 19.3% showed a low knowledge of the community residents on AMR. Respondents who have ever taken antibiotics ($p < 0.001$, AOR= 0.204) and those who could successfully treat themselves ($p< 0.001$, AOR= 0.064) were all significant to SMA. Religion, marital status, occupation, level of education, adverse reaction of taking antibiotics, stoppage of antibiotics before the 7days period were all associated with awareness of AMR (P value < 0.05). These factors were independently associated with the awareness of AMR.

Conclusion: Although majority of respondents considered SMA as an inappropriate practice, their SMA behavior was found to be prevalent and they had a poor knowledge about AMR. Measures should be put in place to check SMA

Keywords: Self-medication, Antibiotics, Antimicrobial resistance (AMR), Self-medication with antibiotics (SMA).

1. INTRODUCTION

Individuals who feel unwell commonly tend to treat themselves probably due to the innate survival instinct in humans. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO). Every day, all over the world, people act on their health without consulting qualified health personnel. They practice self-care, a lifelong habit and culture. Self-care is what people do for themselves to establish and maintain health as well as to prevent and deal with illness. The World Health Organization (WHO) defines self-medication as "the use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of a prescribed drug for chronic or recurrent disease or symptoms" [27]. Self-medication of antibiotics (SMA) has been recognized as inappropriate and irrational use of antibiotics and overall self-medication is considered as irrational [2]. Globally, the non-prescription consumption of antimicrobials has been growing and is recognized as a key risk factor for antimicrobial resistance (AMR).

In developing countries, especially in remote areas, self-medication practices are the norm. Self-medication practices have a major pitfall, which, is that users do not follow a prescribed course of drug dosage and usually stop the drug regimen once they are relieved of symptoms of illness. Self-medication in developing countries has been adjudged to be high due to unsupervised regulatory systems, poor supervision of antibiotic prescription and dispensing, availability of antibiotics as over the counter drugs and poor healthcare system. The prevalence ranges 36.1% to 45.8% in the Middle East, 29% in South America and up to 75% in Asia, from 24% to 73.9% in Africa, the prevalence of self-medication with antibiotics (SMA) is lower, with 3% in Northern

Europe, and 6% in Central Europe [20]. There is a wide variation in the extent of prevalence of self-medication with antibiotics among European countries [20]. For example, 3% antibiotic self-medication was reported in Denmark [17], 19 % in Malta [9], 22% in Lithuania [8], 77% in Greece [22] and 78% in Albania [13]. Other European countries prevalence of self-medication with antibiotics are Spain, where the prevalence ranges from 18% to 41% [26] and 18.7% in Italy [16]. The variation among countries in the prevalence of self -medication with antibiotics suggests that there is a set of complex factors that play a significant role in the difference among countries such as: socioeconomic factors, disparities in healthcare system, reimbursement policies, access to healthcare, drug prescription and dispensing policies [22].

Estimates suggests about 700,000 lives are lost annually to antibiotic resistance, and it is projected to lead to mortality of at least 10 million lives by 2050 [28]. Nigeria is among the developing countries of the world, where drugs are freely displayed for sale in unauthorized places such as markets, shops, roadside stalls, motor parks, and other public places by individuals not duly licensed. This occurs as a result of poor medical services and lack of professional control of pharmaceutical products, thus, forcing people to self-medicate irresponsibly [19]. There is a high incidence of self-medication with OTC and prescription medicines ranging from 15.0 to 81.5% in different localities, it is a serious problem in Nigeria, and a study from the southern part of the country showed that as many as 60–90% of the population in some communities practice self-medication in one way or the other [19]. The perception of illness and incessant advertising, among others, have increased the prevalence of irresponsible self-medication, which accounts for about 2.9–3.7% causes of death in hospitals in Nigeria as a result of drug–drug interactions [15].

Evidence indicates that rural residents in some part of Oyo state have a limited access to healthcare, and that rural area are underserved by primary care physicians, In the developing world, many rural individuals usually travel substantial distances for primary medical care, requiring significantly longer travel times to reach care than their urban counterparts could avail [11]. Since an inappropriate or dangerous self-medication is more likely to occur among poorly informed people in rural areas in Oyo state with poor terrain, limited health facilities, high illiteracy level and poverty, the level of knowledge, extent of inappropriate as well as appropriate self-medication in a rural community need to be assessed [5]. In addition, in Ido local government, access to good and effective medical care is limited due to inadequate hospital facilities, poverty and educational level. Patronage of quacks, untrained individuals providing unconventional and unhygienic health services is widespread and hence become the new normal. This research is motivated by the increasing spread of AMR in Ido local government as the paucity of data in Oyo state on self-medication with antibiotics, and the alarming rate of drug hawkers and patent medicine stores that sell antibiotics and prescription-only medicines that are unauthorized to do so.

This study is therefore necessary in order to describe the antibiotic self-medication practices, awareness of antimicrobial resistance and their determinants among community residents of the selected communities in Ido local government area, Ibadan.

2. METHODS

Study Design and Area

This was a community-based cross-sectional descriptive study conducted among adults aged 18years and above residing for at least a year during the period of the survey in the selected communities in Ido local government, Oyo state. Oyo state is located in the south west region of Nigeria. It occupies a landmass of 27,249km2 and state boundaries with Ogun State, Kwara State, Osun state and the republic of Benin. This study was conducted in Ido local government area in Oyo state. It is an area of 986km2and a population of 103,261 based on 2006 census. Ido Local Government covers the area spanning Apata, Ijokodo, Omi-Adio, Akufo and Apete. Ido has the longitude of 134.161968 and latitude of 34.266249. It shares boundaries with Oluyole, Ibarapa East, Akinyele, Ibadan South-West and Ibadan North-West Local Governments in Oyo State and Odeda Local Government in Ogun State. The council formerly has six wards, which had been increased to ten (10). Among the major towns within the local Government Area are Ijokodo, Ido, Omi -Adio, Apata, Apete, Akufo and Bakatari as well as Ogunweide, Dada, Olowofela, Apooyin, Oderemi, Odetola, Erinwusi, Tade, Alagbaa, Iku- senla among others.

Sample size and sampling

The sample size was calculated using prevalence of self-medication with antibiotics is given as 22.3% which was conducted among community residents living in Jos (Auta et al., 2013).

The minimum sample size was 444 due to the design effect. However, this study recruited 450 participants during the study period.

The study participants were selected by multistage cluster sampling technique was used to select the communities. 2 wards (ward 7 (Fenwa/Oganla/Elenusonso) and ward 10 (Omi-Adio/Omi Ongbagbo Bakatari) were randomly selected from the 10 wards found in Ido LGA. 10 communities each were selected from each ward and organized into clusters and all the eligible community residents are enumerated by proportionate sampling allocation to give a good representativeness for each selected community. A central location in the selected community was identified and spinning a bottle for direction to take in the street was done. Community residents in each street were administered the questionnaire and this process was repeated for all the streets in the selected communities until the sample size was complete.

Data collection methods

A semi-structured questionnaire which was developed in context to the objectives of the study was used. The data was collected from selected community adults from age 18 and above. Pretest of the questionnaire was also done at Moniya, Akinyele local government with a sample size of 50 in order to ascertain the measurability of the data to be collected and also to assess the understanding of community members to the question. Reliability analysis was done to determine the internal consistency of the questions and the appropriateness of the questions on the likert scale using the Cronbach's alpha

with a value of 0.84(Good). The questionnaire had the following sections: Socio-demographic characteristics, Antibiotic self-medication practices, assessment of awareness about antimicrobial resistance, self-medication practices that can lead to antimicrobial resistance.

Data analysis

The questionnaires were collated and manually sorted. They were checked for errors. The consistent ones were imputed into the Statistics Package for Social Sciences (SPSS) version 22.0 for analysis. Frequencies and percentage were generated, the mean of the socio demographic factors like the age was calculated, frequency tables developed and appropriate graphs generated. Chi square was used to test association between socio demographic characteristics of the respondents and awareness of the risk associated with self-medication with antibiotics. Binary logistic regression was done to determine the determinants of self-medication and awareness of antimicrobial resistance. All statistical value at a significant level of $p > 0.05$.

Ethical considerations

Ethical approval was obtained from the Oyo state ministry of health.

3. RESULTS

A total of 450 respondents were recruited in the study. Table 1 shows the distribution of the socio-demographic characteristics of the respondents (n=450). The Age of the respondents was 34.15 ± SD 12.9 years, most of the respondents (28.2%) are less than 24 years followed by 25-34 years (27.8%), 35-44 years (19.8%) and the other age groups with 16.0% and 8.2% respectively. Also, the results show that there are more male respondents (55.6%), compared to the female respondents. (44.4%). Majority of the respondents practice Christianity (67.1%) compared to those that practices Islam and traditional religion.

Also, majority of the respondents (87.9) belong to the Yoruba ethnic group, followed by Igbo (10.1%), hausa (2.1%) other ethinicity identified are Ebira, Idoma, Itsekiri and Urhobo. For the marital status of the respondents, most of the respondents are married (56.7), single (41.3%), separated/divorced (2%). The result of the occupation reveals that about (39.2%) are students, business man/woman/traders (24.3%), Senior Civil servants (Teachers, Lawyers, Doctors etc.) (15.1%), Junior Civil Servant (Office Clerk etc.) and Artisans (Carpenter, Barber and Mechanic etc.) (11.6%) and Unemployed/Housewives (4.5%) which has the least respondents while other occupation identified are Evangelist, Retiree.

The distribution of the level of education reveals that most of the respondents have secondary education (47.9%), tertiary education (42.8%), primary education (7.3%), and those with no formal education (2.0%). The estimated income (naira) of the shows that most of the respondents (64.4%) earn less than 100,000 naira and greater than 100,000 naira.

Self-medication with antibiotics

Table 2 revealed the number of respondents that self-medicated (52.7%) with antibiotics, 42.7% do not self-medicate with antibiotics. The number of times that the respondents self-medicated with antibiotics in the past six month and it could be seen that majority of the respondent have used it once (43.1%), (30.5%) used it twice, (8.1%) have not used it, 11.5% used it thrice and (6.8%) used it more than thrice. The different reasons for self-medication with antibiotics by the respondents of which emergency use/to get quick relief was the major reasons (32.8%) while the lack of trust in prescribing (1.1%) is identified as the least reason for self-medication with antibiotics. The information on the complaints for using antibiotics for self-medication by the respondents of which fever is the major complaints (35.2%) they have for using antibiotics while nasal congestion is the least complaints (3.0%). Also, on the adverse reaction of self-medication of antibiotics, most of the respondents (84.2%) have not experience adverse reaction after self-medication of antibiotics while few other have had adverse reaction (15.8%). The sources of antibiotics that the respondent's uses for self-medication of which majority of them get it from community pharmacists (PMV) (80.5%), online shopping/E-pharmacies (9.2%), leftovers from previous prescription (10.1%). The practices of self-medication with antibiotics for self-health care reveals that majority of the respondents does not see it as an acceptable practice (72.8%), while (17.8%) identified it as an acceptable practice and very few of them identified it as a good practice (9.4%). This study shows that amoxicillin was the antibiotic mostly used for self-medication.

Determinants of self-medication

The table 2.1 shows the results of the bivariate analyses of the determinants of self-medication based on the socio-demographic variables and some salient determinants of self- medication. Majority of the respondent who self- medicate are between the ages of 25-34 years (57.6%), female had higher percentage (53.0%) of prevalence compared to male (52.4%). Traditionalist self-medicated more among the religionist with a prevalence of 66.7%, while Yoruba self- medicated more than other ethnic group with prevalence of 52.6%. Result also shows that separated people self-medicate more (100%) base on marital status. Senior Civil servant was reported to self-medicate more among different occupations with a prevalence of 60.3%. People with no formal education shows higher percentage (77.8%) of self- medication, while individual who earn less than 100,000 naira self- medicate more (56.5%). Individual that had prior knowledge of antibiotics (54.8%) and the possibility of its adverse effect when used (54.9%) are higher than those with no knowledge. Respondents that have taken antibiotics before have high percentage (57.4%) than those who have not taken it before, those who think antibiotics can be used to treat common infection successfully by self-medication are higher (87.1%) than those who disagrees. Respondents with prior knowledge about antimicrobial resistance are more (62.1%) than those who lack knowledge about it.

The table shows the results of the chi-square analysis of the determinants of self-medication which entails the socio-demographic variables and some salient determinants of self-medication. The chi-square analysis results produced the probability values which explains whether the variables are

significant or not. Some of the variables that are significant at 5% (0.05) level of significance are Marital Status (P<0.05), Knowledge of antibiotics (P<0.05), Usage of antibiotics (P<0.05) and treatment of common infection diseases with antibiotics successfully by self (P<0.05) while other considered variables are not significant at (0.05) 5% level of significant

Determinants or Predictors of Antibiotic self-medication

Table 2.2 shows the result of the binary logistics regression of the determinants of self-medication. The variables that were significant in table 2.1 were used for analysis which produced the crude Odds ratio and the adjusted odds ratio which explains the likelihood and the last levels were used as the reference category.

On a bivariate log-binomial regression, being a single (OR: 2.26; 95% CI (0.23–22.2), married (OR: 3.2; 95% CI (0.33–31.37), knowing about antibiotics (OR: 4.44; 95% CI (1.76–11.17), taking antibiotics (OR: 0.14; 95% CI (0.06–0.30), Self-treatment of common infection diseases with antibiotics (OR: 0.06; 95% CI (0.03–0.12)

On a multivariate log-binomial regression after adjusting for variables (marital status, knowledge of antibiotics, usage of antibiotics and Self-treatment of common infection diseases with antibiotics), single (OR: 1.51; 95% CI (0.12–19.60), married (OR: 2.04; 95% CI (0.16–26.16), Usage of antibiotics (OR:0.40; 95% CI (0.12–1.34), and self-treatment with antibiotics (OR: 0.06; 95% CI (0.03–0.13), remained to be associated with the increased risk of self-medication although not all the association are statistically significant at (p-value >0.05).

Assessment of awareness of antimicrobial resistance

Table 3 shows the assessment of awareness of the respondents on antimicrobial resistance of which majority of them (80.7%) have not heard of antimicrobial resistance while other few (19.3%) have heard about it. Also, it shows the results of the sources of knowledge of antimicrobial resistance of which majority of those that have heard about it heard it from a doctor/nurse (42.5%) which is quite below average while other heard it from Pharmacist (11.0%), family members (11.0%), Internet (Social Media) (24.2%) which is relatively high and (5.5%) heard from community pharmacist. The causes of antimicrobial resistance which reveals that antimicrobial resistance is caused by using antibiotics repeatedly as reported by the majority (42.5%), while other causes identified are self-medication (34.4%) and not completing medication dosage (21.3%). In table 3b, in those aware of AMR, definition of AMR was assessed. Correct knowledge was 40.2%, incorrect knowledge was 10.3% and those that had no knowledge of AMR although they were aware of it was 49.4%.

Determinants of the awareness of antimicrobial resistance

The table 3.1 shows the results of the bivariate analyses of the determinants of the knowledge of antimicrobial resistance (AMR) based on the socio-demographic variables and some salient determinants of antimicrobial resistance. Majority of the respondent are less than the 24 years of age (24.4%), female had higher percentage (21.0%) of prevalence compared to male (18.0%). Igbo has more knowledge than other ethnic group with prevalence of 25.0%. Result also shows that separated people have better knowledge of AMR (60.0%) base on marital status. Junior Civil servant understood AMR more among different occupations with a prevalence of 40.0%. Respondent with tertiary education shows higher percentage (31.2%) of knowledge, similarly with individual who earn less than 100,000 naira (19.9%).

Respondents who understand the adverse effect of taking antibiotics by self-medication are more (22.8%) than those who lack the understanding. Those who adhere to prescription of antibiotics are greater (20.5%) than those who do not adhere. Respondents who stop antibiotics before day 7 treatment are more (28.1%) than those who complete their treatment. Greater percentage (27.1%) of respondents sometimes (not all the time) perverse antibiotics until next sickness, while greater number (23.9%) of respondents discard the remaining or left over antibiotics.

The shows the results of the bivariate analysis of the determinants of knowledge of antimicrobial resistance which entails the socio-demographic variables and some salient determinants of knowledge of antimicrobial resistance. The chi-square analysis results produced the probability values which explains whether the variables are significant or not. Some of the variables that are significant at 5% (0.05) level of significance are Religion (P<0.05), Marital Status (P<0.05), Occupation (P<0.05), Level of education (P<0.05), Adverse reaction of antibiotics (P<0.05) and stoppage of antibiotics usage before 7days of treatment (P<0.05) while other considered variables are not significant at (0.05) 5% level of significant.

Determinants or Predictors of awareness of AMR

Table 3.2 shows the result of the binary logistics regression of the determinants of awareness of AMR. The variables that were significant in table 3.1 were used for analysis which produced the crude Odds ratio and the adjusted odds ratio which explains the likelihood and the last levels were used as the reference category.

On a bivariate log-binomial regression, being a single (OR: 2.26; 95% CI (0.23–22.2), married (OR: 3.2; 95% CI (0.33–31.37), knowing about antibiotics (OR: 4.44; 95% CI (1.76–11.17), taking antibiotics (OR: 0.14; 95% CI (0.06–0.30), Self-treatment of common infection diseases with antibiotics (OR: 0.06; 95% CI (0.03–0.12)

On a multivariate log-binomial regression after adjusting for variables (religion, marital status, occupation, level of education, adverse reaction to antibiotics and stoppage of antibiotics before treatment Christian (OR: 4.54; 95% CI (0.29–79.86), an Islam (OR: 7.65; 95% CI (0.42–140.09), single (OR: 1.41; 95% CI (0.12–16.96), married (OR: 3.18; 95% CI (0.27–37.84), separated (OR: 0.64; 95% CI (0.02–20.94), Senior civil servant (OR: 0.73; 95% CI (0.16–3.29), Junior civil servant (OR: 0.28; 95% CI (0.06–1.59), Artisan (OR: 0.77; 95% CI (0.16–3.77), Businessman/woman/trader (OR: 1.38; 95% CI (0.30–6.31), Student (OR: 1.14; 95% CI (0.26–4.99), Primary education (OR: 1.74; 95% CI (0.52–5.84), Secondary education (OR: 2.77; 95%

CI (1.52–5.05), Had adverse reaction of antibiotics (OR: 0.89; 95% CI (0.46–1.73) and Stoppage of antibiotics before 7-days treatment (OR: 0.62; 95% CI (0.36–1.07), remained to be associated with the increased risk of the knowledge of antimicrobial resistance although the association was not statistically significant (p-value >0.05))

4. DISCUSSIONS

In spite of extensive research, along with various rules and regulations put in place by governmental agencies to control self-medication it remains a major global problem. Prescription- only drugs (including antibiotics) are often self-administered as patients feel that they will save money and time, but could lead to substantial adverse drug reactions, antibiotic resistance, treatment failure and drug-related toxicity [7]. These could result to cost for both individuals and health services [24]. This study sets out to investigate self-medication with antibiotics, its determinants, the awareness of AMR and the determinants of the awareness among community residents in Ido local government area in Nigeria.

Most respondents who participated in this study are less than 24 years of age with male responding more than the females. Married people responded more to the study than singles and divorced. Most of them are Christians and most of the respondents are Yoruba, which is expected since the study was carried out in a Yoruba community. Results from occupation shows that majority are students, while majority of respondents have secondary education (47.9%) because of the ease to read and write. This is comparable to a study done in Accra Ghana by Eric *et al*., (2012) with a finding of 49%. Majority of respondents earn lesser than 100,000 naira since the study area is under developed. More than half of the study population has a good knowledge of antibiotic and its adverse effects since majority of them have formal education. This is similar to a study in Northern Nigeria [15] and among undergraduate students in Kogi, Nigeria (Odira and Umerah, 2014).

The prevalence of general self-medication is at 52.7% which is comparable to a study done in Northern Nigeria with a finding of 56.8% and 50.3% [18] but higher compared to a study carried out by Auta *et al*., (2013) in Jos (North central Nigeria) with a prevalent rate of 22.3%. This may be due to easy availability of antibiotics without a prescription or with an old prescription from the pharmacy, and the availability of these drugs as over- the counter drugs for perceived symptoms. Respondents that participate in self-medication with antibiotics once are more than those who participated twice or more. The most important reason for self-medication with antibiotics by majority of respondents is to get quick relief in case of emergency. This is similar to the report of Horumpende *et al*. (2018) on a cross-sectional study in North-eastern Tanzania, in which the most important reason for antibiotic medication given by participants were emergency illness to get immediate treatment. However, fever was complained most by respondents as the negative reaction of antibiotics, followed by skin wounds. This is similar to the report of Sandeep *et al*., (2013) on the knowledge and practices of self-medication among urban and rural population, where majority of respondents self-medicated for the same ailments. Most sources of antibiotics for self-medication are through community pharmacies to avoid delay in getting the antibiotics especially in case of emergency. Respondents that are not concerned with taking counterfeit antibiotics are more than those concerned, with more than half of the study population not concerned about the adverse reaction after self-medication with antibiotics. Greater percentage (72.8%) of respondents did not accept self-medication with antibiotics for self-health care, with Majority of them in doubt of the successful treatment of common infection with antibiotics.

Different respondents reacted in different ways toward self-medication with antibiotics. Majority slightly agrees that antibiotics should only be used when prescribed by a doctor, while majority agree strongly that doctor's prescription should be followed when taking antibiotics. This may be due to their experiences on the adverse effect of using antibiotics without doctor's prescription. This is similar to the study conducted by Horumpende *et al*., (2018) in North-eastern Tanzania in which 98% of respondent are aware of the negative consequences of antibiotics self- medication. Furthermore, most respondent disagree strongly that antibiotics should be used to treat all illness, while majority agrees strongly that antibiotics should be stopped anytime someone feels better. Greater number of people (41.8%) agrees strongly that people should not keep antibiotics and use them later for other illnesses, and that antibiotics can be used to treat cold. Majority disagree strongly that that one can skip doses when they forget to take their antibiotics, while higher percentage agree strongly (34.7%) that expensive antibiotics are more effective than cheap ones. This contradicts the report of Bandiola *et al*. (2016) on awareness and knowledge on antimicrobial and development of antimicrobial resistance, in which most respondents are uncertain that expensive antibiotics ate more effective than cheap ones.

In determining the criteria for self-medication, our result revealed that those aged between 25-34 years had the highest proportion of 57.6%. This is comparable to the study done in Nigeria by Osemene and Lamikana (2012) with a prevalent of 44%. There was no statistical difference observed between the different age groups and the practice of self-medication, which is similar to a study, conducted by Subhashini *et al*. (2017) on the prevalence of self-medication practice among people attending oral health outreach programmes in Tamil, Nadu. This suggests that all adult people who practice self-medication may have unrestricted access to drugs and this may lead to misuse of drugs. The prevalence of self- medication with antibiotics decreased with age probably because of knowledge and being responsible about individual healthcare. Female had a higher prevalent of self-medication of 53.0% compared to males at 52.4%. This is similar to the study carried out by Kopecna *et al*. (2015) among students of high schools in Czech Republic, reporting high prevalence of female participating in self-medication compared to male. In this study, educated people show prevalence of 51.7% cumulatively which is comparable to a study by Tsuzuki *et al*. (2020) in Japan with a prevalent of 37.8%. Higher prevalence of self-medication in educated people is because of their ability to read and understand labels of the consumed medicine [3]. This relationship between self-medication and education could be attributed to ease of access to information from many sources including the internet. Results of the occupation shows that majority that self-medicate are students (48.9%). This is similar to the study conducted by Ajibola *et al*., (2018) across the 21 local government areas in Northwest Nigeria, where 43% of students reported weekly usage of antibiotics for self-diagnosed illness. Those than earn <100,000 naira self-medicate more that those than earn more. This may be because they could not afford medical bill, therefore result into self-medication which is quite cheaper. Socio-demographic characteristics such as education, age, sex, marital status, among others were not significantly associated with frequency of self-medications. In addition, self-medication

was not associated with respondent's economic and house hold characteristics, in term of their occupation and income. This observation is similar to the report of Zeid *et al*., (2020) that economic factors such as family size and income, socio-demographic variables of respondents were not associated with frequency of self-medications. In this study, since prior knowledge about antibiotic, and its use for self- treatment of common infection are statistically significant ($p<0.05$) to self- medication, they are major determinants to self-medication. This is in comparable to the study conducted by Ayanwale *et al*., (2017) in Lagos, Nigeria in which prior knowledge of antibiotics and its use for self-treatment are determinant to self- medication.

Most of the social demographic variables, such as Religion, marital status, sex, occupation among others is significantly associated with awareness of antimicrobial resistance ($p<0.05$). This is similar to the report of Dnyanesh *et al*. (2017) in which variables such as education, income and health insurance plays an important role in awareness of antimicrobial resistance. In the study, respondents demonstrated a very high positivity attitude towards knowledge on the adverse reaction of using antibiotics by people, stopping of antibiotics before 7 days treatment and discarding of left over medication which could contribute to antimicrobial resistance. This is similar to the report in Philipines [6] on awareness and knowledge on antimicrobial and development of antimicrobial resistance, in which malpractices such as non-compliance to complete antibiotics therapy for 7 days, not discarding of left over antibiotics and giving away left over antibiotics drugs could contribute to antimicrobial resistance.

5. CONCLUSION AND RECOMMENDATION

Self-medication with antibiotics is practiced by nearly half of the community residents recruited in the study. Self-medication with antibiotics exist, the prevalence of self-medication was 52.7%. Self-medication was associated with marital status, knowledge of antibiotics, and usage of antibiotics and successful treatment of diseases infection by self. This study shows community residents don't have enough knowledge about antimicrobial resistance. Religion, marital status, occupation, level of education, adverse reaction of taking antibiotics, stoppage of antibiotics before the 7days period were all associated with the awareness of AMR.

Health education interventions on SMA should also be made available to target community residents of all ages, sex and educational level and awareness should be created to educate the public on the emergence of AMR and the effects of self-medication on AMR

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

1) Ajibola, O., Omisakin, O.A., Eze, A.A., and Omoleke, S. A. 2018. Self Medication with Antibiotics, Attitude and Knowledge of Antibiotic Resistance among Community Residents and Undergraduate Students in Northwest, Nigeria . Diseases. 6,32

2) Alhomoud F, Aljamea Z, Almahasnah R, Alkhalifah K, Basalelah L, Alhomoud F.K. 2017. Self-medication and self-prescription with antibiotics in the Middle East—do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. Int J Infect Dis.; 57:3–12

3) Aqeel, T., Shabbir, A., Basharat, H. 2014. Prevalence of Self medication among Urban and Rural Population of Islamabad, Pakistan. Trop J Pharm Res. 13: 627-633

4) Auta A., Banwat, S.B., David, S., Dangiwa, D.A., Ogole, E., Tor-anyiin, A.J 2013. Antibiotics use in some Nigerian Communities: Knowledge and Attitudes of Consumers. Tropical Journal of Pharmaceutical Research. 12(6):1087-1092

5) Ayanwale M.B, Okafor I.P, Odukoya O.O. 2017. Self-medication among rural residents in Lagos, Nigeria. J Med Trop; 19:65-71.

6) Bandiola, T.M., Amoin, R.B., Bautista, J.P., Birog, J.A., Cayanga, J.D and Tejada, J.F. 2016. Awareness, Knowledge and practice of community residents on Antimicrobials and the development of antimicrobials and the development of antimicrobial resistance. Research development and innovation center 32(3); 56-76.

7) Bennadi, D., 2013. Self-medication: A current challenge. J Basic Clin Pharm, 5(1):19-23.

8) Berzanskyte, A., Valinteliene, R., Haaijer-Ruskamp, F. M., Gurevicius, R., and Grigoryan, L., 2006. "Self-medication with antibiotics in Lithuania." International Journal of Occupational Medicine and Environmental Health, vol. 19, pp. 246–253.

9) Borg, M. A. and Scicluna, E. A., 2002. "Over-the-counter acquisition of antibiotics in the Maltese general population." International Journal of Antimicrobial Agents. vol. 20, pp. 253–257.

10) Dnyanesh L., Vaidehi, L., Gerard, K., and Gerhard, F. 2017. A systematic Review of the literature to Assess self-medication practices. Animal of medical and Health Sciences Research. 7(1): 1-14.

11) Global Health University. 2014. Unite for Sight: Urban Versus Rural Health.

12) Horumpende, P.G., Said, S.H., Mazuguni, F.S., Antony, M.L Kumburu, H,H, Sonda, T.B, et al., 2018. Prevalence, determinants and knowledge of antibacterial self-medication: A cross Sectional study in Norrth-eastern Tanzania. PLoS ONE 13(10): e0206623.

13) Jorgji, K., Bebeci, E., Apostoli, P., and Apostoli, A., 2014. "Evaluation of use of antibiotics without prescription among young adults in Albania case study: Tirana and fier district." Hippokratia, vol. 18, pp. 217-220.

14) Kopecna E., Mica, M, Vlcek. J.2015. Use of medicines among students of high schools in the Czech Republic. Acta Pol Pharm. 72:389-96.

15) Lawan U. M., Abubakar I. S., Jibo A. M., Rufai A. 2013. Pattern, awareness and perceptions of health hazards associated with self-medication among adult residents of Kano metropolis, north-western Nigeria. Indian J Community Med; 38:144-51.

16) Mistretta, A.,Grosso, G., and Contarino, F. S. S., 2008. "Drug misuse in the community: factors which influence mispatients to self-prescribe antibiotics." Ann Ig, vol. 20, pp. 287-295.

17) Muscat, M., Monnet, D. L., Klemmensen, T., Grigoryan, L., Jensen, M. H.,Andersen, M., and HaaijerRuskamp, F. M., 2006. "Patterns of antibiotic use in the community in Denmark." Scandinavian Journal of Infectious Diseases, vol. 38, pp. 597–603.

18) Olayemi J, Olayinka B, Musa I. (2010). Evaluation of Antibiotic Self-Medication Pattern Amongst Undergraduate Students of Ahmadu Bello University (Main Campus), Zaria. Journal Applied

19) Oyelola F.T, Razaq A, Eniola O. 2010. Self-medication among hospitalized patients in selected secondary health facilities in South-Western Nigeria. Pharm Pract; 8:233-7.

20) Pan, H., Cui, B., Zhang, D., Farrar, J., Law, F., and Ba-Thein, W. 2012. "Prior knowledge, older age, and higher allowance are risk factors for self-medication with antibiotics among University students in Southern China." PLoS ONE, vol. 7.

21) Sandeep, A., Mamath, G.T., Shaik, S.B., Bhimaray, K.G., Mahadevamma, L., and Kattti, R.V. 2013. Self- medication: knowledge and practice among urban and rural population. Int J Pharm Biol Arch. 4:488-492.

22) Skliros, E., Merkouris, P., Papazafiropoulou, A., Gikas, A., Matzouranis, G., Papafragos, C., and Sotiropoulos, A., 2010. "Self-medication with antibiotics in rural population in Greece: a cross-sectional multicenter study." BMC Family Practice, vol. 11, p. 58.

23) Subhashini, Garla, B.K., Karuppaiah, M., and Taranath. 2017. Prevalence of self-medication practice among people attending oral health outreach programmes in Tamil, Nadu. Journal of Advanced Oral Research. 8(1and 2)14-20.

24) Suleiman, A.K 2013. Self-medication and the advisory role of pharmacists in Riyadh, Saudi Arabia. Arch Pharma Pract. 4(4):180-185

25) Tsuzuki, S., Fujitsuka, N., Horiuchi, K., Ijichi, S., Gu, Y., Fujitomo, Y., Takahashi, R., and Ohmagari, N. 2020. Factors associated with sufficient knowledge of antibiotics and antimicrobial resistance in the Japanese general population. Scientific Reports. 10;3502

26) Väänänen, M. H. and Pietilä, K. A. M., 2006. "Self-medication with antibiotics—does it really happen in Europe?" Health Policy, vol. 77, pp. 166-171.

27) WHO World Health Organization. 2017. Global Priority List of Antibiotic-Resistance Bacteria to Guide Research, Discovery, and Development of New Antibiotics, World Health Organization, Geneva, Switzerland.

28) Williams-Nguyen J., Sallach J. B., Bartelt-Hunt S., Boxall A. B., Durso L. M., McLain J. E. 2016. Antibiotics and Antibiotic Resistance in Agroecosystems: State of the Science. J Environ

29) Zeid, W., Hammed, M., Mansour, N. et al., 2020. Prevalence and associated risk factors of self-medication among patients attending El-Mahsama family practices center, Ismaila, Egypt. Bull Natl Res Cent. 44, 92.

APPENDIX

Table 1 Socio-demographic characteristics of the respondents

Characteristics	**Frequencies**	**Percentage (%)**
Age		
Less than 24 years	127	28.2
25-34 years	125	27.8
35-44 years	89	19.8
45-54 years	72	16.0
55 years and above	37	8.2

Sex		
Male	250	55.6
Female	200	44.4
Religion		
Christianity	302	67.1
Islam	145	32.2
Traditional	3	0.7
Ethnicity		
Yoruba	384	87.9
Igbo	44	10.1
Hausa	9	2.1
Marital Status		
Single	186	41.3
Married	255	56.7
Separated/ Divorced	9	2.0
Occupation		
Senior Civil Servant	68	15.1
Junior Civil Servant (Office clerk etc.)	25	5.6
Artisans	52	11.6
Business man/woman/Trader	109	24.3
Student	176	39.2
Unemployed/Housewife	20	4.5
Level of Education		
No formal education	9	2.0
Primary	33	7.3
Secondary	215	47.9
Tertiary	192	42.8
Estimated Income (Naira)	Mean = 195320.07	SD = 903311.925
Monthly Income		
< 100,000	186	64.4
>100,000	103	35.6

TABLE 2: Self-medication with antibiotics.

Self-medication with antibiotics	Frequency	Percentages (%)
Yes	237	52.7
No	213	47.3

No of times of self-medication with antibiotics in the past six months	Frequency	Percentages (%)
Once	109	45.99
Twice	80	30.5
Thrice	30	11.5
More than thrice	18	6.8
Reasons for self-medication with antibiotics*	**Frequency N=451**	**Percentage (%)**
Cost saving	55	12.2
Convenience	72	16.0
Lack of trust in prescribing	5	1.1
Distance to purchase antibiotics	10	2.2
Poor economic status	21	4.7
No access to physician care	19	4.2
Emergency use/to get quick relief	148	32.8
Minor illness	69	15.3
Previous successful experience	52	11.5
Complaints for using antibiotics*	**Frequency N=432**	**Percentages (%)**
Runny Nose	20	4.6
Nasal congestion	13	3.0
Cough	42	9.7
Sore throat	33	7.6
Fever	152	35.2
Aches and Pains	52	12.0
Vomiting	25	5.8
Diarrhoea	27	6.2
Skin wounds	68	15.7
Adverse reaction after self-medication of antibiotics		
Yes	71	15.8
No	379	84.2

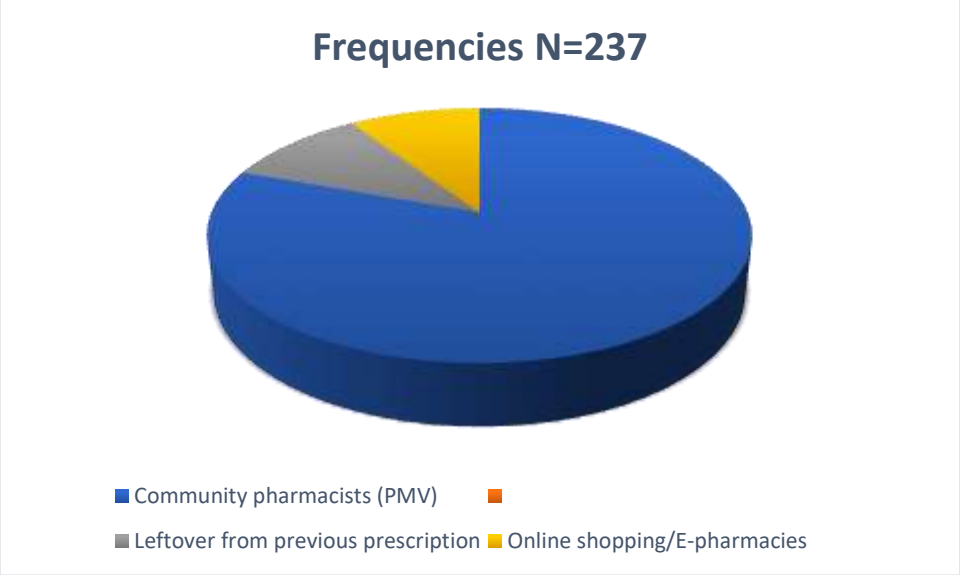

FIGURE 1: Source of antibiotics for self-medication

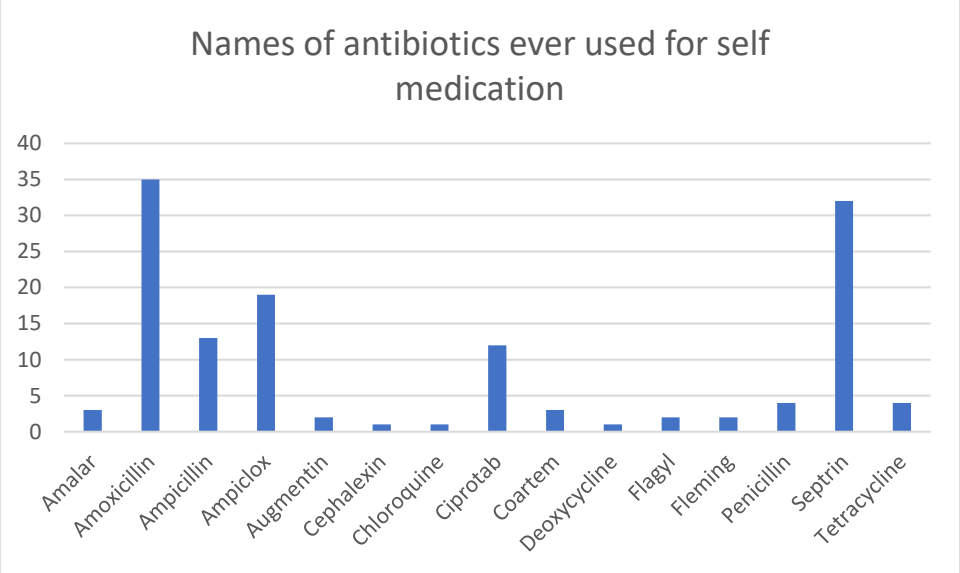

Figure 2: Antibiotics used for self-medication

Table 2.1: Relationship between selected characteristics and self-medication with antibiotics using chi square analysis

	Self-medication			
Variables	**Yes** **N (%)**	**No** **N (%)**	**Chi-square** χ^2	**P-value**
Age				
Less than 24 years	68 (53.5)	59 (46.5)	3.254	0.516
25-34 years	72 (57.6)	53 (42.4)		
35-44 years	43 (48.3)	46 (51.7)		
45-54 years	38 (52.8)	34 (47.2)		
55 years and above	16 (43.2)	21 (56.8)		
Sex				
Male	131 (52.4)	119 (47.6)	0.016	0.899

Female	106 (53.0)	94 (47.0)		
Religion				
Christianity	166 (55.0)	136 (45.0)	2.378	0.305
Islam	69 (47.6)	76 (52.4)		
Traditional	2 (66.7)	1 (33.3)		
Ethnicity				
Yoruba	202 (52.6)	182 (47.4)	1.309	0.520
Igbo	23 (52.3)	21 (47.7)		
Hausa	3 (33.3)	6 (66.7)		
Marital Status				
Single	106 (57.0)	80 (43.0)	8.697	0.034
Married	123 (48.2)	132 (51.8)		
Separated	5 (100.0)	0 (0.0)		
Divorce	3 (75.0)	1 (25.0)		
Occupation				
Senior Civil servant	41 (60.3)	27 (39.7)	5.835	0.321
Junior Civil Servant (Office clerk etc.)	13 (52.0)	12 (48.0)		
Artisan	23 (45.1)	28 (54.9)		
Businessman/woman/trader	64 (58.7)	45 (41.3)		
Student	86 (48.9)	90 (51.1)		
Unemployed/House wife	9 (45.0)	11 (55.0)		
Level of Education				
No former education	7 (77.8)	2 (22.8)	4.902	0.179
Primary school	18 (54.5)	15 (45.5)		
Secondary school	104 (48.4)	111 (51.6)		
Tertiary	108 (56.2)	84 (43.8)		
Monthly Income				
< 100,000	105 (56.5)	81 (43.5)	3.113	0.078
>100,000	47 (45.6)	56 (54.4)		
Do you know what antibiotics are?				
Yes	230 (54.8)	190 (45.2)	11.700	0.001
No	6 (21.4)	22 (78.6)		
Can people get adverse reactions from taking antibiotics?				
Yes	178 (54.9)	146 (45.1)	2.395	0.122
No	59 (46.8)	67 (53.2)		
Have you ever taken antibiotics?				
Yes	229 (57.4)	170 (42.6)	31.554	0.000

No	8 (15.7)	43 (84.3)		
Do you think you can treat common infection diseases with antibiotics successfully by yourself?				
Yes	115 (87.1)	17 (12.9)	91.416	0.000
Not sure	89 (45.9)	105 (54.1)		
No	33 (29.2)	80 (70.8)		
Have you heard of antimicrobial resistance?				
Yes	54 (62.1)	33 (37.9)	3.825	0.051
No	183 (50.4)	180 (49.6)		
Knowledge of antibiotic use				
Good knowledge	113 (65.7)	59 (34.3)	18.965	0.000
Poor knowledge	124 (44.6)	154(55.4)		

Table 2.2: Determinants or Predictors of Antibiotic self-medication

	Crude OR		**Adjusted OR**	
Variables	**(95% CI)**	**P-value**	**(95% CI)**	**P-value**
Marital Status				
Single	2.264 (0.231, 22.174)	0.483	1.514 (0.117, 19.600)	0.751
Married	3.220 (0.330, 31.365)	0.314	2.037 (0.159, 26.157)	0.585
Separated	0.000	0.999	0.000	0.999
Divorce		0.254	1	0.601
Do you know what antibiotics are?				
Yes	4.439 (1.764, 11.170)	0.002	0.400 (0.119, 1.338)	0.137
No	1		1	
Have you ever taken antibiotics?				
Yes	0.138 (0.063, 0.301)	0.000	0.204 (0.083, 0.497)	0.000
No	1	0.000	1	
Self-treatment of common infection diseases with antibiotics				
Yes	0.061 (0.032, 0.117)	0.000	0.064 (0.032, 0.126)	0.000
Not sure	0.487	0.004	0.479	0.005

	(0.297, 0.798)		(0.287, 0.798)	
No	1	0.000	1	
Knowledge of antibiotic use			3.197	
Good knowledge	2.379	0.000	1.967	0.006
Poor knowledge	(1.604, 3.526)		(1.213-3.192)	
Constant			2.903	

Table 3: Assessment of awareness of AMR

Heard of antimicrobial resistance	**Frequencies**	**Percentages (%)**
Yes	87	19.3
No	363	80.7
Causes of antimicrobial resistance	**Frequencies**	**Percentages (%)**
Self-medication	30	34.4
Not completing dosage	20	21.3
Using antibiotics repeatedly	37	42.5
Knowledge of AMR	**Frequencies**	**Percentages**
Correct knowledge	35	40.2
Incorrect knowledge	9	10.3
No knowledge	43	49.4

Table 3.1: Relationship between selected characteristics and awareness of AMR using chi square analysis

	Awareness of Antimicrobial resistance			
Variables	**Yes** **N (%)**	**No** **N (%)**	**Chi-square $\chi 2$**	**P-value**
Age				
Less than 24 years	31 (24.4)	96 (75.6)	8.756	0.067
25-34 years	30 (24.0)	95 (76.0)		
35-44 years	12 (13.5)	77 (86.5)		
45-54 years	9 (12.5)	63 (87.5)		
55 years and above	5 (13.5)	32 (86.5)		
Sex				
Male	45 (18.0)	205 (82.0)	0.641	0.423
Female	42 (21.0)	158 (79.0)		
Religion				
Christianity	67 (22.2)	235 (77.8)	10.337	**0.006**
Islam	18 (12.4)	127 (87.6)		
Traditional	2 (66.7)	1 (33.3)		

Ethnicity				
Yoruba	68 (17.7)	316 (82.3)	1.722	0.423
Igbo	11 (25.0)	33 (75.0)		
Hausa	1 (11.1)	8 (88.9)		
Marital Status				
Single	51 (27.4)	135 (72.6)	20.708	**0.000**
Married	32 (12.5)	223 (87.5)		
Separated	3 (60.0)	2 (40.0)		
Divorce	1 (25.0)	3 (75.0)		
Occupation				
Senior Civil servant	22 (32.4)	46 (67.6)	20.748	0.001
Junior Civil Servant (Office clerk etc.)	10 (40.0)	15 (60.0)		
Artisan	10 (19.6)	41 (80.4)		
Businessman/woman/trader	11 (10.1)	98 (89.9)		
Student	31 (17.6)	145 (82.4)		
Unemployed/House wife	3 (15.0)	17 (85.0)		
Level of Education				
No former education	0 (0.0)	9 (100.0)	30.968	0.000
Primary school	4 (12.1)	29 (87.9)		
Secondary school	23 (10.7)	192 (89.3)		
Tertiary	60 (31.2)	132 (68.8)		
Monthly Income				
< 100,000	37 (19.9)	149 (80.1)	0.251	0.616
>100,000	18 (17.5)	85 (82.5)		
Adverse reaction of taking antibiotics by people				
Yes	74 (22.8)	250 (77.2)	9.121	0.003
No	13 (10.3)	113 (89.7)		
Adherence to prescription of antibiotics				
Yes	81 (20.5)	314 (79.5)	2.888	0.236
No	2 (12.5)	14 (87.5)		
Don’t know	4 (10.3)	35 (89.7)		
Stoppage of antibiotics before 7-days treatment				
Yes	34 (28.1)	87 (71.9)	8.154	0.004
No	53 (16.1)	276 (83.9)		
Preservation of antibiotics until next sickness				
Yes	30 (16.0)	157 (84.0)	5.059	0.080
No	31 (18.6)	136 (81.4)		

Sometimes	26 (27.1)	70 (72.9)		
Discard of remaining/leftover medication				
Yes	26 (23.9)	83 (76.1)	5.831	0.054
No	33 (14.8)	190 (85.2)		
Sometimes	28 (23.7)	90 (76.3)		

Table 3.2 Determinants or Predictors of Awareness of AMR

	Crude OR		**Adjusted OR**	
Variables	**(95% CI)**	**P-value**	**(95% CI)**	**P-value**
Religion				
Christianity	7.015 (0.626, 78.555)	0.114	4.544 (0.259, 79.865)	0.301
Islam	14.111 (1.217, 163.636)		7.659 (0.419, 140.090)	0.170
Traditional	1	0.012	1	
Marital Status				
Single	0.882 (0.090, 8.678)	0.915	1.405 (0.116, 16.962)	0.789
Married	2.323 (0.234, 23.014)	0.471	3.181 (0.267, 37.839)	0.360
Separated	0.222 (0.012, 3.979)	0.307	0.642 (0.020, 20.964)	0.804
Divorce	1	0.000	1	
Occupation				
Senior Civil servant	0.369 (0.098, 1.393)	0.141	0.734 (0.164, 3.295)	0.687
Junior Civil Servant (Office clerk etc.)	0.265 (0.061, 13.146)	0.075	0.298 (0.056, 1.590)	0.156
Artisan	0.724 (0.177, 2.960)	0.653	0.774 (0.159, 3.773)	0.751
Businessman/woman/trader	1.572 (0.397, 6.228)	0.519	1.379 (0.302, 6.306)	0.678
Student	0.825 (0.228, 2.990)	0.770	1.143 (0.261, 4.996)	0.860
Unemployed/House wife	1	0.002	1	
Level of Education				
No former education	7343066756.5 (0.000)	0.999	607422352.2 (0.000)	0.999

Primary school	3.295 (1.109, 9.792)	0.032	1.738 (0.517, 5.843)	0.371
Secondary school	3.794 (2.235, 6.442)	0.000	2.773 (1.524, 5.046)	0.371
Tertiary	1	0.000	1	
Adverse reaction of taking antibiotics by people				
Yes	0.598 (0.333, 1.077)	0.087	0.895 (0.463, 1.731)	0.741
No	1	0.000	1	
Stoppage of antibiotics before 7-days treatment				
Yes	0.491 (0.300, 0.805)		0.615 (0.355, 1.065)	0.083
No	1	0.005		
Constant	5.208	0.000	0.315	0.555