Self-medication with antibiotics: Empirical evidence from Nigerian rural population

Abstract

Background: Self-medication is a strong determinant of antimicrobial overuse as well as a causative of drug resistance. Irrational antibiotic use among patients has led to antibiotic resistance—a serious health problem globally.

Objective: The objectives of the present study were to estimate the prevalence of self-medication with antibiotics in a sample of rural population presenting in primary health care centers in Northern Nigeria and evaluate factors associated with the practice.

Methods: This is a cross-sectional survey using a validated questionnaire to collect data from 1,150 randomly selected clinic attendees (602 men/548 women, mean age ± 52.6 ± 16.5 years), who visited the 25 Primary Health Centers in Niger State, Nigeria, between August 2014 and February 2015.

Results: Use of antibiotics within the past 12 months was reported by 945 clinic attendees (82.2%), while 689 (59.9%) reported that they had used antibiotics without medical prescription at least one time. The major sources of antibiotic self-medication were drug stores, chemist shops & pharmacy (89.5%). The antibiotics most frequently used for self-medication were Ampiclox – Ampicillin/Cloxacillin combination (29.2%), Ampicillin (25.5%), Amoxicillin (23.3%), Septrin (16.7%), and ciprofloxacin (5.3%). Cough with productive mucus (30.1%), Sore throat (23.7%), Un-remitting fever (20.7%), dysuria (10.6%) skin sepsis (7.5%), and vaginal discharge (7.4%) were the most frequent indications for the use of self-medicated antibiotics.

Conclusion: Nigerian rural population knowledge of antibiotics is insufficient. Despite the open and rapid access to primary health care services, it appears that a high proportion of Nigerian rural population use antibiotics without medical prescription. More information about antibiotic use should be provided by physicians, pharmacists and chemists before prescribing and dispensing antibiotics. Self-medication among Nigerian rural population is an important public health problem and this may reflect the situation among rural population in the whole of Nigeria. Self-medication with antibiotics is a serious problem in Nigeria and requires considerable attention.

Keywords: Self-medication; antibiotics; Nigeria; antibiotic use

INTRODUCTION: Antibiotics are revolutionary therapeutic agents for microbial eradication[1]. Unfortunately, despite public awareness and concern of health care providers, irrational use of antibiotics is on a rise globally (50% to almost 100%) [2,3]. Rampant irrational use of antimicrobials without medical guidance may result in greater probability of inappropriate, incorrect, or undue therapy, missed diagnosis, delays in appropriate treatment, pathogen resistance and increased morbidity[4,5]. Emergence of human pathogen resistance to antibiotics, both due to over and under use, is potentially dangerous for both individuals and societies[4, 6 ,7] .

'Self-medication has been defined as obtaining and consuming drugs without the advice of a physician either for diagnosis, prescription or surveillance of treatment' [3,8]. Self-medication with antibiotics constitute a major form of irrational use of medicine and can cause significant adverse effects such as resistance to microorganisms, treatment failures, drug toxicity, increase in treatment cost, prolonged hospitalization periods and increase in morbidity [9]. In majority of economically deprived countries, nearly 60- 80% of health related problems are treated through self-medicated as lower cost alternative [10, 11]. Self-medication particularly with antimicrobials is a phenomenon of increasing global relevance. The utilization of antibiotics without prescription is motivated by a complex set of factors, worth mentioning are unchecked sales, economic and time constrains, influence of family and friends, consumer attitudes and expectations and media campaigns [6,11,12,13]. In Nigeria, like many other developing countries, antibiotics are easily accessible to everyone without a prescription, a phenomenon seen in many economically deprived countries[14]. In Nigeria, there are limited controls on the sale or advertisement of antimicrobials, creating opportunities for misinformation and misperceptions that can exacerbate improper antibiotic use [15,16]. In addition, counterfeit drugs and poor pharmaceutical qualities of available antimicrobials (containing no or substandard active ingredients) have been widely reported [17,18,19]. These factors often lead to higher rates of resistance to less-expensive first-line regimens compelling subsequent changes in treatment protocols to include more expensive and sometimes more toxic drugs [20]. In addition, access to good and effective medical interventions is often limited due to poor hospital facilities; service fees; poverty and hunger; and illiteracy [15,16,21,22]. Patronage of "quacks," untrained individuals providing unconventional and unhygienic medical care, is therefore widespread and frequently becomes institutionalized as normal. Previous studies have sought to understand patterns of self-medication with antibiotics in

developing and other countries [23-27]. These studies have identified several indications for self-medication with antibiotics including the common cold, [23,24,26] diarrhea or constipation,[25] and sore throat [26].

While irrational use of antibiotics through self-medication tends to carry more significance in the developing world, the problem has been investigated in only a few of these countries. In Nigeria, a wide range of antibiotics are available on the market and acquiring drugs over the counter is a very common practice. This can facilitate self-medication which is thought to be highly common in Nigeria community, and a study like this is needed to support this assertion. Self-medication could result in treatment failures and several clinical complications. To help address these problems, and also provide a basis for relevant policy measures, the study was undertaken.

Antibiotics represent one of the most prescribed drugs worldwide and their resistance is a major public health threat, hence the need for research on antibiotic usage patterns to help develop appropriate interventions. The objectives of the study were to estimate the prevalence of self-medication with antibiotics among Nigerian rural population and to identify factors associated with this practice.

METHODOLOGY

Study setting: The study was carried out in Niger State, Nigeria, from August, 2014 to Feburary, 2015. Niger State is located in North Central Nigeria and has a population of above four million people [28]. The State has 25 General hospitals, 275 Primary health care centers (PHCs) and more than a thousand pharmacy and chemist shops, each of which is normally manned by a qualified pharmacist, pharmacy technician or primary health care worker.

Study design: A prospective cross-sectional study was designed based on a validated anonymous self-administered questionnaire. Approval was obtained from the officer-in-charges of the PHC facilities and informed consent from the participants. To be eligible for this study, participants had to provide signed or thumb printed informed consent. The study was conducted in 25 PHCs in the State (one per LGA). Selected PHCs were chosen by simple random sampling technique. Respondents were recruited by the researchers. All the patients who came to the selected PHCs during the study period were asked to fill out the questionnaire at the PHCs,

regardless of antibiotic acquisition at the time of visit or antibiotic use at any time in life. Respondents under 18 and those with occupation related to health care were not included in this study. A total of 1150 respondents were eligible for the study. No incentive was offered for participation in the study. It was completely optional.

Study instrument: Information was collected using validated questionnaire (in English language but translated to local language) containing both open- and close-ended (multiple-choice) questions. The questionnaire was developed based on a previously conducted literature review [29-36] and specific cultural considerations. The validity and reliability of the questionnaire were ascertained through a pilot study, in a sub-sample of 50 participants, to ensure that the questionnaire would be appropriate, comprehensive, and understandable among prospective respondents. The pilot testing allowed quality improvement of several questions by wording modification and achieved high internal consistency and reliability In this study, self-medication was considered as selection and use of antibiotics by the study participants (or their family members) to treat self-recognized or self-diagnosed condition at any time in life without prescription.

Sample size: A sample size calculation was performed using the following equation: $n = (Z^2 P(1-P))/(d^2)$, where n = sample size, Z = Statistic corresponding to a chosen level of confidence, P = expected prevalence, and d = precision [37]. In our calculation, we used Z = 1.96, P = 0.5 and d = 0.05. This calculation resulted in a sample size of 385. As the study was conducted in rural community PHCs, and to increase reliability of sampling and sampling-based generalizability, the required sample size was doubled resulting in a sample size of 670. In order to account for non-responses, the sample size was increased by 10% thus resulting into n=737. A total of 1200 questionnaires were distributed to the selected PHCs. In total, 1150 respondents completed the questionnaire and were included in the study. Therefore 1150 were finally used as the study sample size

Statistical analyses: Reported data were collated, checked, coded, and entered into a Microsoft Access database. The data were then cleaned and analyzed using descriptive and inferential statistics. A descriptive and comparative statistical data analysis was processed with the SPSS 17.0 (SPSS Inc., Chicago, IL, USA). Simple and multiple logistic regression models were used to evaluate associations between participant characteristics and reported usage of antibiotics. Odds ratios (OR), 95% confidence intervals (CI), and *p*-values were calculated for each

independent variable. Continuous data were presented as means, along with their 95% confidence intervals (CIs). A *p*-value less than 0.05 was considered to be statistically significant.

RESULT

***Study population characteristics*:** A total of 1150 out of 1225 administered questionnaires (93.9% response rate) were completed and returned by the participants from the 25 LGAs in Niger State, Nigeria. Out of 1150 participants, majority (61.1%) were males. Median age of the participants was 25 years (range 19-38). Majority of participants (58.2%) belonged to Zone C (39.1%). Very few participants (11.8%) had tertiary education. Majority of the participants categorized their health status as excellent (36.7%) and good (34.5%). The characteristics of the study population are summarized in Table 1.

Past experiences with antibiotics self-Medication: Use of antibiotics within the past 12 months was reported by 945 (82.2%) clinic attendees without medical prescription. Among 82.2% participants who had used antibiotics in their lifetime, almost every day (53.4%) reported un-prescribed use. A little more than half (50.8%) participant cited that they had used antibiotics through self-medication to treat their illnesses. About one quarter (24.3%) participants claimed that they rarely used antibiotic through self-medication when they were sick. More than one-third (35.8%) were completely satisfied with their experience of self-medication with antibiotics. Only 10% of participants ever encountered side effects with antibiotic self-medication, and of these majority (46.4%) experienced gastrointestinal system related side effects. Less than ten percent were un-decisive, most of the time, on their own whether they need antibiotic for illness or not. About half (48.2%) of the participants were of the view that self-medication with antibiotics was good while 51.8% were not sure about it. Just over one-third (34.7%) participants were not sure whether self-medication is safe or not. Percentage differences in those who experienced self-medication as safe (22.1%) and unsafe (24.8%) were not appreciable. Less than five percent (3.9%) participants were aware of the fact that self-medication with antibiotics may result in adverse effects. More than one-third (36.2%) of the participants reported that they would use antibiotics through self-medication in future.

Sources of Information: The major sources of antibiotic for self-medication without prescription were drug stores (91.5%), chemist shops (85.7%) & pharmacy (89.5%)

Prevalence of self-medication: This study demonstrated that an appreciably high percentage (59.9%) of Nigerians in the study area had self-medicated themselves with antibiotics

When asked about the self-medicated use of antibiotics, 82.2% reported that they had used antibiotics without medical prescription at least one time in the past 12 months.

Types of antibiotics and indications for self-medication: The antibiotics most frequently used for self-medication were Ampiclox – Ampicillin/Cloxacillin combination (24.1%), Ampicillin (20.3%), Amoxicillin (10.7%), Septrin- Sulphadiazole/Methoprin combination (14.2%), Ciprofloxacin (3.7%), Metronidazole (13.9%) and Tetracycline (13.1%) (Table 2). Cough with productive mucus (30.1%), Sore throat (23.7%), Un-remitting fever (20.7%), dysuria (10.6%) skin sepsis (7.5%), and vaginal discharge (7.4%) were the most frequent indications for the use of self-medicated antibiotics (Table 3).

Reasons for Antibiotic self-medication: Several reasons were cited for practicing self-medication (Table 4). The most important reasons for practicing self-medication were that it was less expensive compared to medical care in the health facility (79.3%), and secondly, medical care in health facility were associated with easy accessibility (68.4%). Difficulty in accessing health facility was the least reason for self-medication (18.7%).

Treatment of specific symptom/infection: Table 5 summarizes the types of antibiotics that were used to treat specific infection and provides estimates of the prevalence of use for each antibiotic. Ampiclox, Ampicillin, Amocixillin, Cotrimoxazole, ciprofloxacin, metronidazole and tetracycline were used to treat the symptoms/infections (6 infections/symptoms) like productive cough, sore throat dysuria, skin sepsis, vaginal discharge and unremitting fever. The higher the prevalence under each symptom/infection the more likelihood the preferred antibiotic for such symptom/infection . Generally Ampiclox seems to be most preferred antibiotic for self-medication for various ailments encountered by the participants. If a preferred antibiotic was not available, 21.3% (95% CI: 15.7% to 26.9) of study participants reported that they would use another type of antibiotic to treat the specific symptom/infection. The antibiotics were said to be effective in relieving symptoms/infections, a number of participants reported that the drugs relieved each of the symptoms/infections, of which the largest proportions indicated that antibiotics relieved cough with productive sputum, (16%, 95% CI: 12% to 20%), sore throat (15%, 95% CI: 11% to 19%), dysuria(21%, 95% CI: 17% to 25%) , skin sepsis (13%, 95% CI: 9% to 17%), vaginal discharge (18%, 95% CI: 14% to 22%) and unremitting fever (20%, 95% CI: 16% to 24%).

There was no significant difference between the self-medication practices of participants based on ethnicity ($p=0.07$) and having stock of antibiotics ($p=0.08$). Self-medication practices of participants were significantly affected by level of education ($p=0.0.03$), current health status ($p=0.42$), gender ($p=0.7$), and duration of stay in the study area ($p=0.4$). Ironically, self-medication rates were not significantly lower in participants who were aware of its harmful effects ($p=0.2$) and those who think it is not safe ($p=0.2$). There was statistically significant

difference between self-medication practices of those who got sick during last 6 months and those who did not (p=0.04), healthcare and non-healthcare related professionals (p=0.005). Only 17.8% (205/1150) of the participants, who did not report self-medication with antibiotics, had stored drugs at home compared to 59.2% (401/689) of the participants who reported self-medication ($P < 0.05$). About one-quarter 388 (25.9%) of the participants reported earlier discontinuation of antibiotics when symptoms improved and 175 (15.2%) continued to use antibiotics as preventive measure even when the symptoms have completely disappeared or when they engaged in un-protected sex.

DISCUSSION

The response rate in this study was 93.9%.Over the years, the response rate in surveys has always been a matter of concern for investigators. Response rate varies a lot, especially, in internet-based surveys [38, 39] It has been reported that response rate is an important indicator of level of success of a survey in collecting information from all eligible in a population or sample. Inability of some sample members to give the required information, disentitlement of some sample members, non-existence of some members of the sample, refusal to participate due to any reason, failure to find and contact targeted members, physical and language limitations could be the grounds resulting in failure to get required information in a survey. Additionally, reluctance, stigma and shame associated with self-perceived low performance or dispersal of information may result in refusal to participate and nonresponse [(40)].

To the best of our knowledge, this study represents the first published work on irrational antibiotic use through self-medication among rural dwellers in the study area.

This study aimed to estimate prevalence/magnitude of self-medication. The study further assessed self-reported use of non-prescribed antibiotics, as well as sources for obtaining antibiotics, reasons for self-medication and type of antibiotics. This study also assessed common types of illnesses, frequently used antibiotics and determinants of self-medication. The long-term aim of the study was to get an overview of antibiotic self-medication among Nigerian rural dwellers in order to help in planning future interventions to address this issue. Indirectly, this study also determined the reasons for self-medication with antibiotics. Self-medication would be acceptable and justified in real urgent/emergency situation and in treating minor ailments that do not require physician consultation and thus a way to cut down burden on healthcare system especially in resource-poor Countries like Nigeria. However, certain pre-conditions should be met to guarantee user safety like indication to use

the drug must be recognized, and user must know the right use and possible side effects/interactions with other drugs.

Unrestricted sales at pharmacies, experience with similar illness, good experience with antibiotic, assumed knowledge about antibiotics, earlier use of prescribed antibiotics, wrong prescription of antibiotic, compulsive antibiotic prescribing, saving time, problem too trivial, socioeconomic factors, emergency need, access to literature, leftovers, lifestyle and a potential to manage certain illnesses through self-care were the common factors triggering antibiotic self-medication.

Self-medication with antibiotics, a phenomenon practiced globally, is affecting both developing and developed countries. Worldwide, such human malpractice has resulted in inadequate dosing, incomplete courses and indiscriminate antimicrobial use and thus is thought to be associated with increase in the probability of inappropriate, incorrect, or undue therapy, adverse reactions, missed diagnosis, delays in proper treatment and pathogen resistance. Resultantly, the phenomenon has contributed to prolonged human sufferings in terms of morbidity and mortality [41-46]. Emerging pathogen resistance to antimicrobial, fueled by self-medication, is a real global problem[46]. To combat microbial resistance issues, new antibiotics are under development. Development of new and even more expensive drugs to fight resistant microbes will further add to the problems of unprivileged particularly in resource-poor countries such as Nigeria

This study demonstrated that an appreciably high percentage (59.9%) of Nigerian rural dwellers had self-medicated themselves with antibiotics, whereas the percentage of those who ever did so is even higher (82.2%). To the best of our knowledge no study like this exist before this in the study area, so far, thus no data is available for comparisons. High prevalence of self-medication in general and with antibiotics in particular is a universal problem and variations regarding such medications in terms of prevalence vary across the globe; Hong Kong (72.1%-94%) [47], Sudan (79.5% to 48%) [40], Lithuania (39.9%) [48], Ethiopia (38.5%) [49], Interestingly, some lower rates have been reported in Malta (19.2%) [50], Mexico (5%) [51] and Sweden (3%) [52]. These variations could be due to differences in attitudes, literacy, environment, culture and legislation in these countries. Evidence from the various studies including ours indicate that self- medication appears to be relatively higher in the developing world compared to the developed which is not surprising given the free access and marketing of antibiotics in the former. Prevalence rate in this study is much lower compared to some other countries but still high enough to be taken seriously.

Our study showed that self-medication practices among participants were significantly influenced by level of education ($p < 0.05$). Another Nigerian study identified level of education as a major factor that influenced self-medication patterns [53] . *Sapkota et al* further showed that a higher level of education is inversely associated with self-medication of antibiotics [42]. Another study contended that respondents with low education are less aware of consequences of self-medication and thus more prone to practice it [54]. Findings from this study are consistent with the findings of other studies [(53, 55)], where age was not significantly associated with antibiotic self-medication. On the other hand, in Lithuania, self-medication was found to be reasonably affected by age [48, 53, 55].

In this study males seemed more prone to self-medication than females. Our finding is similar to that of other studies where antibiotic usage is associated with gender [48, 56]. Chemist and Pharmacy shops were the most common source of antibiotics. Previous studies conducted in Africa have also identified pharmacies as important sources of self-administered drugs [46, 57]. Understanding the sources of information and sources of drugs for antibiotic self-medication can help in the formulation of community-based interventions that can help to reduce self-medication practices.

Many medical conditions are predisposing factors to antibiotic self-medication. In this study, self-medication was as a result of participants having cough with productive mucus (30.1%), Sore throat (23.7%), Un-remitting fever (20.7%), dysuria (10.6%) skin sepsis (7.5%) , and vaginal discharge (7.4%). These ailments were the most frequent indications for the use of self-medicated antibiotics. The indications for self-medication in this study was similarly found and reported in other previous studies [47, 56, 58]. Unfortunately, majority of the medical conditions/symptoms are of viral origin and usually need no antibiotic treatment for cure. The study by Afolabi et al [53] also reported dental symptoms as indications for antibiotic self-medication.

Ampiclox is the most commonly self-medicated antibiotic in this study. This finding is in contrast to that of other studies[59-61] that reported Amoxicillin as the most frequently used antibiotic for self-medication. Amoxicillin is the most frequent used antibiotic because of low-cost across the globe and its wide-spread prescription by health care providers, thus making it well-known to public [59-61]. *Other antibiotics used for self medication in this study include Ampicillin, Tetracycline, Ciprofloxacin* and *Metronidazole. This finding is consistent with* earlier studies [55, 61] as participants consumed antibiotics for self-medication belonging to five different types/classes and among those of *Penicillin* group were on the top. The diversities in selection of antibiotics among different study groups might be because of their different knowledge and attitude towards such medication.

Self- medication in this study appears to be more driven by economic factors meaning that the participants were unable to pay for the cost of health facility care and therefore resulted into self-medication which they considered to be cheaper and affordable. This finding agrees with studies done in Sudan [27] and Bogotá [62]. This therefore implies that providing affordable health care services may be crucial for dealing with the problem of irrational antibiotic associated with self-medication. However the medical services should also be convenient for patients in terms of waiting periods, as delays at hospitals/clinics was another major factor associated with self-medication[63]. The participants surveyed in this study represent a small but very important segment of Nigerian population. Thus, it is unclear whether the responses of the surveyed participants are representative of other Nigerians who did not participate in the survey.

CONCLUSION: This study has shown that irrational use of antibiotics through self- medication appears to be a common practice among Nigerian rural dwellers. This finding provides a vivid evidence about the abuse of antibiotics in Nigeria and explains the escalating trend of antibiotic resistance in the country. Despite easy accessibility to primary care services, it appears that a high proportion of rural adult population prefers to use antibiotics without medical prescription. The high prevalence of self-medication with antibiotics in Nigerian rural population underscores the role of the primary care physician in advising patients about the correct use of the prescribed antibiotics. Another important intervention to stem the tide of self-medication with antibiotics is effective legislation banning unregulated sale of antibiotics without medical prescription. Efforts should be made by appropriate health organizations to conduct annual Antibiotic Awareness campaign emphasizing the importance of using antibiotics responsibly. By targeting rural dwellers, this study addresses a population with fewer resources than the general population. Future research should include other populations of Nigerian to determine the overall prevalence of self-medication with antibiotic.

LIMITATIONS: Some limitations were identified and research ethics demands that they better acknowledged. These limitations include the following:

1. Recall bias: This is a cross-sectional study that utilized a self-administered survey to estimate the prevalence of self-medicated antibiotic use in the past. Therefore, by design, recall bias cannot be ruled out.
2. Definition of terms: Defining and explaining ‘self-medication’ and ‘antibiotic’ for the participants seemed somewhat complicated. In their responses, some participants

regarded non-antibiotics as antibiotics, this shows that either definition was not clear to them or they were not knowledgeable enough to differentiate the two Although questionnaire did not contain much difficult terms, irrespective of this fact, there is a theoretical possibility that participants' encountered difficulties in understanding, interpreting and answering few questions due to some medical and unfamiliar terms used. This might be due their educational background and language limitations.

Table 1: Study Population Characteristics

Demographic Characteristics	Frequency	Percentage
Geopolitical distribution		
Zone A	400	34.8
Zone B	300	26.1
Zone C	450	39.1
Education level		
Primary	623	54.3
Secondary	390	33.9
Tertiary	135	11.8
Age (Years)		
<18	44	3.8
18-22	206	17.9
23-27	417	36.3
28-32	323	28.1
33-37	100	8.7
>38	60	5.2
Sex		
Male	602	52.3
Female	548	47.7
Marital Status		
Single	301	26.2
Married	609	53
Separated	150	13
Divorce	90	7.8

Table 2: Prevalence of use of each antibiotic for self-medication

Antibiotic	Prevalence	Confidence Interval
Ampiclox (Ampicillin + Clocacillin)	24.1	0.20-0.27
Ampicillin	20.3	0.18-0.26
Amoxicillin	10.7	0.80-0.15
Cotrimoxazole	14.2	0.10-0.18
Ciprofloxacin	3.7	0.01-0.06
Metronidazole	13.9	11.6-15.8
Tetracycline	13.1	0.10 -0.16

Table 3: Multivariate analysis of factors that may influence self-medication with antibiotics for treatment of ailments

Independent Variable	Odd ratio	95% Confidence Interval	P-value
Productive Cough			
No (n=267)	1.00	-	
Yes (n=883)	0.68	0.32-096	0.03
Sore throat			
No (n=160)	1.00	-	
Yes (990)	0.84	0.47-1.24	0.02
Dysuria			
No (152)	1.00	-	
Yes (998)	0.76	0.34-1.38	0.02
Skin Sepsis			
Yes (275)	1.00	-	
No (875	0.62	0.29-1.17	0.05
Vaginal Discharge			
No (245)	1.00	-	
Yes (905)	0.71	0.31- 1.35	0.04
Unremitting fever			
No (n=352	1.00		
Yes (n=798)	0.48	0.22-0.96	0.005
Age (yrs)			
<20	1.00	-	
21-29	1.07	0.52-1.64	0.89
>30	1.59	0.27-0.83	0.63
Education			
Primary (n=623)	1.00		
Secondary (n=390)	0.24	0.23-0.87	0.046
Tertiary (n= 135)	0.32	0.18- 0.96	0.031
Gender			
Male	0.56	0.48-0.64	0.53
Female	1.00		

Table 4: Reasons for self-Medication

Reasons	Frequency	Percentage	95% CI
Affordability (Less expensive)	912	79.3	74.2-84.3
Accessibility (Antibiotics are easily obtained)	787	68.4	65.2-72.9
Application of previous prescription	695	60.4	57.2-63.5
Imitating others in drug usage	584	50.8	46.4-55.2
Hospital/Clinics delays	634	55.1	50.4-59.8
Previous knowledge of antibiotics	481	41.8	39.2-44.4
Difficulty in accessing Health Facility	215	18.7	15.2-22.2
Health workers attitude	603	52.4	48.3- 56.5

Table 5: Prevalence of each antibiotic to treat specific Infection/Disease

Antibiotic	Productive cough		Sore throat		Dysuria		Skin sepsis		Vagina discharge		Unremitting fever	
	Prev	95% CI	Prev	95% CI	Prev	95% CI	Prev	95% CI	Prev	95% CI	Prev	95% CI
Ampiclox	80.6	2.62-9.87	87.4	3.46-10.56	95.8	4.54-12.8	68.4	0.74-1.12	98.3	5.32-13.86	64.5	0.58-0.94
Ampicillin	71.5	0.78-1.46	81.3	2.90-11.32	88.7	2.68-13.49	66.8	0.66-092	72.8	0.82-1.36	58.4	0.36-0.79
Amoxicillin	75.2	0.94-1.86	94.8	4.22-1.34	69.5	0.75-1.14	58.1	0.39-071	60.3	0.42-0.69	52.3	0.27-061
Cotrimoxazole	83.6	2.86-10.75	82.8	2.99-10.68	78.0	1.73-8.42	52.5	0.26-0.64	51.2	0.19-0.48	69.4	0.29-0.78
Ciprofloxacin	91.8	2.94-10.43	85.6	2.97-11.66	97.8	5.27-13.59	70.5	0.93-1.58	96.7	4.59-12.44	57.9	0.27-0.69

Metronidazole	53.7 0.28-0.72	51 0.18 0.46	73.6 0.85-1.46	50.3 0.18-0.52	85.3 2.48-11.86	67.5 0.25-0.62
Tetracycline	50.1 017-0.56	51.4 0.19 0.49	82.4 0.82-1.77	50.7 0.22-0.64	60.7 0.66-0.82	64.3 0.84-1.46

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