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Inappropriate use of antibiotics, its reasons and contributing factors among communities of Yirgalem town, Sidama regional state, Ethiopia: A cross-sectional study

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Abstract

Objectives: The aim of this study was to assess the inappropriate use of antibiotics, its reasons and contributing factors among communities of Yirgalem town, Sidama regional state, Ethiopia.

Methods: The study was conducted in Yirgalem town from 1 March to 30 March 2019. A cross-sectional study with interviewer administered structured and pretested questionnaire was used. A multistage sampling procedure was employed involving a total of 568 participants who used antibiotics in the past 1 year prior to the study period. Data were entered into Epi data version 3.1, and then exported to statistical package for social science version 20 for analysis. Descriptive statistics, bivariate and multivariate logistic regression analysis were done. *p*-value < 0.05 was used to consider significant variables.

Results: The magnitude of inappropriate use of antibiotics was 37.9% (95% confidence interval (34.0, 41.5)). Main reason(s) for inappropriate use were long delays in health facility, cost-cutting and busy day's program. Being employed (adjusted odds ratio = 3.45, 95% confidence interval (1.98, 6.02)), age 25–34 years (adjusted odds ratio = 2.89, 95% confidence interval (1.43, 5.84)), being male (adjusted odds ratio = 1.90, 95% confidence interval (1.20, 3.02)), seeking modern healthcare in private clinic (adjusted odds ratio = 2.54, 95% confidence interval (1.20, 5.36)), delayed waiting time in healthcare facilities (adjusted odds ratio = 4.87, 95% confidence interval (2.17, 10.91)), experienced with similar symptom/disease (adjusted odds ratio = 3.02, 95% confidence interval (1.89, 4.83)) and family size above five (adjusted odds ratio = 8.92, 95% confidence interval (3.56, 22.38)) were predictors positively associated with inappropriate use of antibiotics.

Conclusion: The magnitude of inappropriate antibiotics use was high. Attention should be given to community education through involvement of the private health sector and healthcare providers about rational use of antibiotics.

Keywords

Inappropriate use, antibiotics, Ethiopia

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Background

Antibiotics and related drugs, as one called antimicrobial agents, have been used for the last 80 years to treat infectious disease. These drugs have greatly reduced illness and death from infectious disease.[1] Development and improvement in health systems the world has also lead to increase in accessibility and access to antimicrobials.[1] However, these drugs have been used so widely and for so long that the infectious organisms the antibiotics are designed to kill have adapted to them, making the drugs less effective.[2] Inappropriate use of antibiotics is a fairly widespread practice worldwide, both high-income and low-income nations.[3] Significant use of antibiotics the pattern 80 years, both appropriate and inappropriate, has led to increase incidence and spread of bacteria that are resistant to antibiotics.[4] The emergence of antimicrobial resistance (AMR), the main cause of morbidity and mortality from previously treatable infections, is mainly attributed to the use, over use or misuse of antimicrobials.[2]

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In Africa, antibiotics are among the commonest prescribed medicines and a survey on predictors of antibiotic use in five countries in Africa showed that 90% of individuals with acute illness sought care outside the home with 95% receiving medicines and 36% received antibiotics.[1] Of the antibiotics received, cotrimoxazole, amoxicillin and metronidazole represented 75% of received antibiotics.[1] Over 30% of individuals accessed antibiotics without prescription and one in four individuals obtained antibiotics from an informal dispenser.[1]

In Ethiopia, access to healthcare services has improved in the past two decades. However, the reports of Ethiopian Drug Administration and Control Authority[5] have shown an increased prescription of antibiotics in the country. However, there are insistences of unreasonable use of antibiotics by the community, patients as well as by healthcare providers.[5] As stated by the baseline survey conducted by food, medicine and healthcare administration and control authority of Ethiopia, about two-third of patients (70%) patients who visited outpatient clinics have had one or more antibiotics prescribed with a percentage of irrational prescribing close to 40%.[5]

Inappropriate use of antibiotics can potentially lead to AMR and increase the necessity to use more expensive antibiotics to treat common and life-threatening infections.[6] Annually, multi-drug resistant bacteria are estimated to claim the lives of more than 20,000 patients in North America, 25,000 patients in Europe and more than 90,000 patients in Southern Asia.[7]

Antibiotics are considered among the most usually sold drug classes in the low-income countries.[8] The most common sources of antibiotics in low-income countries were pharmacy (57%) and family member or neighbor.[9] Investigations found that inappropriate use of antibiotics was associated with different factors: sex,[10,11] engaged with a regular job[9,12,13] and satisfaction with healthcare services.[12,13] Thus, to draw effective intervention requires exploration of factor associated with inappropriate antibiotic use in the community.[14]

Abuse of antibiotics may lead to a wrong choice of medication.[3] Unlike other aspects of self-care, it involves the use of drugs, which is having of doing good as well as suffering harm.[8] Numerous studies reveal that there are risks, such as drug resistance, misdiagnosis, below or over dose of drugs, use of expired drugs, drug interactions, prolonged duration of use and poly-pharmacy risk associated with improper use of non-prescribed medicine medications.[3]

Ethiopia has been implementing many interventions in order to tackle the problem, such as responsible use of antimicrobials, disease prevention and control, public surveillance proposing for antimicrobials use, guideline and enforcement were ongoing interventions.[1] However, the extent of inappropriate use of antibiotics and the recent data were scarce in Sidama region, Ethiopia, particular in study area. Therefore, the aim of this study was to assess the magnitude of inappropriate use of antibiotics, its reasons and contributing factors among communities of Yirgalem town, Sidama region, Ethiopia.

Methods

Study area and period

Yirgalem town is one of the urban settings in Sidama regional state, Ethiopia, which found at 322 km and 47 km apart from Hawassa and Addis Ababa City, respectively. It has two subcities, Arada and Filewuha. The Yirgalem town has 6 kebeles with a total population of 79,506 of 9218 households in the town. The town has 1 health center, 12 community pharmacies, 6 medium clinics, 1 Family Guidance Association of Ethiopia (FGAE) clinic and 6 health posts with 10 health extension workers. The study was conducted from 1 March to 30 March 2019.

Study design and sample size determination

A community-based cross-sectional study was conducted. The sample size was determined using single population proportion formula making an allowance for the following assumptions: 95% confidence level, proportion of 0.359,[15] margin of error 5%, design effect 2 and estimated nonresponse rate of 10%. Accordingly, total sample size calculated was 582.

Sampling procedure and study population

A multistage sampling procedure was used to classify study subjects. Four kebeles (smallest administrative units of Ethiopia) were by randomly selected from six kebeles in the town. After that, the number of households to be selected from every selected kebele proportionally allocated based on the total number of households in the kebele. List of households was obtained from each kebele health post. Sampling frame was developed for each chosen kebele independently based on result of census. Then, calculated sample size was proportionally allocated to all selected kebeles based on its overall number of eligible households as well as finally study subjects were selected using simple random sampling procedure. Designed for every kebele, successive door-to-door interview was used to find appropriate study participant until the requested sample size was achieved. For fear that when there were two or extra eligible households, chance method was applied to select one of them. Source Population was all those over 18 years old with history of antibiotics use in the last 1 year, in Yirgalem town, Southern Ethiopia. Randomly selected individuals who satisfied inclusion criteria were considered as Study Population. The individuals whose ages over 18 years and had history of antibiotics use in last 1 year were included in the study as study participants and reside at least for 6 months in the selected kebeles have been included

in the study, but those who were sick, health personals and unable to respond during study period were excluded.

Data collection tool and procedure

Prepared questionnaire modified from related literatures was used once some modification to construct it consistent with the objective of the study and conceptual framework.[12] Data were collected using interviewer administered a structured and pretested questionnaire with the purpose of containing socio-demographic, personal and health service-related factors, of the study subjects. Data were collected by four data collectors who have diploma in pharmacy technician and had previous experience of data collection. One BSc nurse was recruited as supervisor. To guarantee data quality, properly designed data collection tool was developed in English after revising related literatures and translated in to local language (Sidaamu Afoo) and back to English by language experts to check its consistency. Four data collectors and one supervisor who can read and speak local language fluently were trained for 2 days by principal investigator before starting actual data collection. Training was given on general objective of the study, contents of the tool, how to approach the study participants and keep their confidentiality. Before starting actual data collection, the tool was pretested on 5% (29 individuals) of the sample in Aleta wendo kebele which was out of the selected kebeles. Collected data were checked for completeness and consistency by supervisors and principal investigator at the end of each day. To ease non-response rate, appropriate time was used to for frequent visits when the respondents were unavailable. Double data entry was applied to minimize data entry error. Dependent variable was inappropriate use of antibiotics and independent variables were socio-demographic, personal and health service-related factors.

Data analysis

After carrying out data collection, the data were cleaned, coded and entered into Epidata version 3.1. Exported to Statistical Package for Social Science (SPSS) version 20 and checked for missing values before analysis. Descriptive analysis was completed for all predictor variables. Cross tabulation was also performed to see the distribution of different variables in relation to outcome variable. Multicollinearity among independent variables was checked. The goodness-of-fit of the model was also checked by the Hosmer–Lemeshow goodness of model fit. Bivariate analysis was done for all independent variables with outcome variable and variables that were associated with outcome variable at p-value $\leqslant 0.25$ were considered as candidates for multivariate logistic regression and finally entered into multivariate logistic regression model to control possible confounders and get final model. Backward stepwise logistic regression was used to classify variables which had the major contribution to the model. Adjusted odds ratio (AOR) with 95% confidence interval (CI) was calculated to determine the presence and strength of association among predictors and outcome variables. p-value < 0.05 was used to consider significant variables. Outcome was described by texts, tables and figures.

Operational definition

Inappropriate use of antibiotics: it is defined as the use of antibiotics for self-medication and/or medication of family members (family medication) without prescription from health professionals, receiving antibiotics from anybody else and/or use of leftover drugs and/or use of prescribed antibiotics for any purpose other than prescribed for.

Without prescription use of antibiotics: it is based inappropriate antimicrobial use for treatment of common infections without consulting a medical practitioner and any medical supervision would be considered as use of antibiotics without prescription.

Waiting time: the length of time from when the patient entered the outpatient clinic/department to the time the patient actually leaves the outpatient department (OPD) (fast = less than 1 h, moderate = 1–2 h and delayed = more than 2 h) was considered as long waiting time.

Results

Socio-demographic and economic factors

From five hundred eighty-two study participants planned for interview, about 568 respondents were interviewed making a response rate of 97.5%. The mean (standard deviation) age of participants and the mean (standard deviation) of family size were (34.07 ± 10.69) years and 3.8 (± 1.46) size, respectively. Over half of the respondents were females 315 (55.5%), protestant followers 340 (59.8%), attended secondary education 184 (32.4%), married 353 (61.1%) and majority 348 (61.3) of the respondents were from Sidama ethnicity group (Table 1).

Place of receiving modern healthcare services and types of antibiotics used

Majority of respondents, 455 (80.2%) reported that they got healthcare service from public health facility and 62 (10.9%) from private clinic. The mean (standard deviation) waiting time of participants at OPD was 90.80 ± 48.75 min. Amoxicillin 115 (53.4%) was the most commonly utilized antibiotics followed by metronidazole 64 (29.8%) and doxycycline 12 (5.6%). Respondents who reported having taken antibiotics were then asked if they had obtained them (or a prescription for them) from a doctor or nurse on the occasion

Table 1. Socio-demographic characteristics of the respondents, Yirgalem town, Sidama regional state, Ethiopia, 2019.

Variables and categories (*N* = 568)	Frequency	Percentage
Age in years		
18–24	103	18.0
25–34	227	40.0
35–44	119	21.0
Above 44	119	21.0
Sex		
Male	253	44.5
Female	315	55.5
Marital status		
Single	182	32.1
Married	353	62.1
Others[a]	33	5.8
Religion status		
Protestant	340	59.8
Muslim	155	27.3
Orthodox	73	12.9
Educational status		
Unable to read and write	8	1.5
Able to read and write	61	10.7
Primary education	179	31.5
Secondary education	184	32.4
Tertiary education	136	23.9
Ethnicity		
Sidama	348	61.3
Oromo	62	10.9
Amhara	78	13.7
Gurage	67	11.8
Others[b]	13	2.3
Occupation		
Unemployed	186	32.7
Employed	382	67.3
Family size		
1–2 families	87	15.3
3–5 families	389	68.5
>5 families	92	16.2

[a]Divorced and separated.
[b]Silte and Wolaita.

Table 2. Place of receiving modern healthcare services and types of antibiotics used by respondents, Yirgalem town, Sidama regional state, Ethiopia, 2019.

Variables (*N* = 568)	Frequency	Percentage
Place of receiving modern healthcare services		
Public health facility	455	80.2
Pharmacy/drug store	13	2.2
Private clinic	62	10.9
NGO	38	6.7
Self perceived waiting time in healthcare facilities		
<1 h	112	19.7
1–2 h	375	66.0
>2 h	81	14.3
Treated yourself with antibiotics		
Yes	215	37.9
No	353	62.1
Self-medication antibiotics used the past 1 year		
Amoxicillin	115	53.4
Metronidazole	64	29.8
Doxycycline	12	5.6
Cloxacillin	11	5.2
Others[a]	13	6
On that occasion, antibiotics from a doctor or nurse		
Yes	353	62.1
No	215	37.9
Advice from a doctor, nurse or pharmacist on how to take		
Yes	353	62.1
No	215	37.9

NGO: non-governmental organization.
[a]Tetracycline and ampicillin.

when they last received them. Overall, the vast majority of respondents 353 (62.1%) reported that they got their antibiotics (or a prescription for them) from a doctor or nurse. Also the majority of respondents got advice from a doctor, nurse or pharmacist 353 (62.1%) on how to take treatments (Table 2).

Reasons for inappropriate antibiotics use about study participants and where people obtained the antibiotics

Almost all respondents obtained the antibiotics they last took from a medical stall or pharmacy (92.8%) and main reason(s) for indulging in self-medication with antibiotics long delays in health facility 99 (46.1%), cost-cutting 13 (6%), busy day's program 90 (41.8%) and previous experience of medical treatment of the same symptoms 13 (6%). The majority of respondents somebody advised 63 (29.4%) about self-medication and proposed by neighbor 25 (39.7). More than half 295 (51.9%) of the respondents were experienced with similar symptom in the past 1 year (Table 3).

Common complaints of respondents they had antibiotics utilized

Cough/common cold 218 (38.4%), fever 192 (33.8%) and acute diarrhea 74 (13.0%) were the three most common disease conditions for which antibiotics had been taken (Figure 1).

Status of study participants about what they did consider when selecting antibiotics and when to stop taking antibiotics

Respondents were then asked what they did consider when selecting antibiotics: the majority of respondents responded that price of antibiotics (40.9%) and how they knew the

dosage was enquired from the seller (85.1%). More than two-third (42.2%) of the respondents reported that they sometimes change the dosage of antibiotics deliberately and they change the dosage of antibiotics for improving conditions (23%).

Respondents were then asked when they thought they should stop taking antibiotics once they had begun treatment: when they feel better, or when they have taken all the antibiotics as directed. The majority of respondents answered that they should be taken as directed (47.8%). Most of respondents 168 (78.2%) somewhat concerned that might have taken counterfeit antibiotics. Nearly one-fifth of the respondents 115 (20.2%) responded that they had discontinued the use of antibiotics once their symptoms disappeared. The majority of respondents 319 (56%) think about antibiotics for self healthcare responded that not acceptable practice.

Table 3. Antibiotics use characteristics of respondents and where people obtained the antibiotics Yirgalem town, Sidama regional state, Ethiopia, 2019.

Variables ($N=568$)	Frequency	Percentage
Source of the antibiotics		
Medical store or pharmacy	527	92.8
Stall or hawker	24	4.2
Friend or family member	10	1.8
Saved up from a previous time	7	1.2
Advised by somebody to use self-medication		
Yes	63	29.4
No	152	70.6
Advice about self-medication from:		
A relative	17	27.0
Colleague	21	33.3
Neighbor	25	39.7
Ever experienced similar disease/symptoms		
Yes	295	51.9
No	273	48.1
Main reason(s) for self-medication		
Long delays in health facility	99	46.1
Cost-cutting	13	6
Busy day's program	90	41.8
Previous experience of the same symptoms	13	6

Magnitude of inappropriate use of antibiotics

Regarding characteristics of the respondents related to inappropriate use of antibiotics, about 215 (37.9%) of the total study participants have used inappropriate antibiotics.

Factors associated with inappropriate antibiotics use

In bivariate analysis, age, sex, marital status, family size, employment status, place of healthcare service, waiting time at health facility and experienced with similar symptom (disease) were associated with inappropriate antibiotics use. In multivariate logistic regression analysis, age, sex, family size, employment status, place of healthcare service, waiting time at health facility and experienced with similar symptom (disease) were significantly associated with inappropriate antibiotics use (Table 4).

Concerning of socio-demographic, respondents who found in the age group of 25–34 years were 2.89 times ((AOR)=2.89, 95% CI (1.43, 5.84)) more likely use inappropriate antibiotics than respondents those who in the age group of 18–24 years. Respondents those who being male were 1.90 times (AOR=1.90, 95% CI (1.20, 3.02)) more likely use inappropriate antibiotics than respondents those

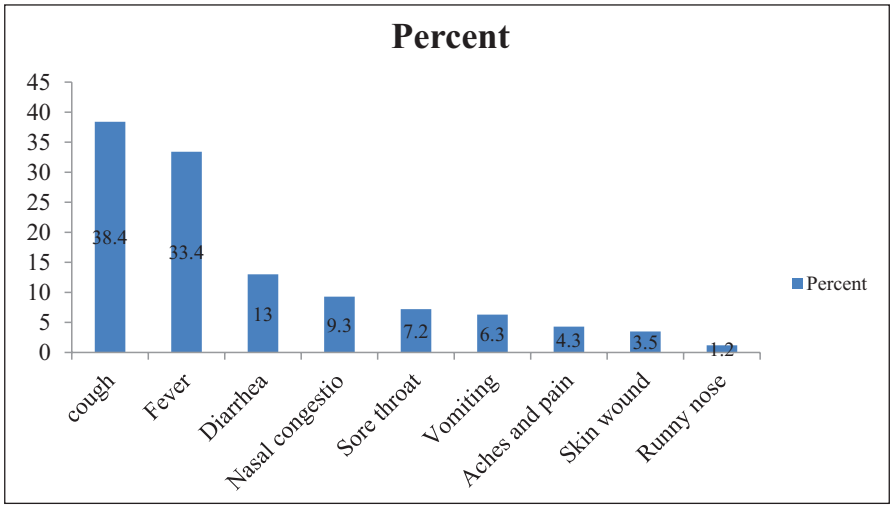

Figure 1. Common complaints of respondents for which antibiotics had been taken in community of Yirgalem town, Sidama regional state, Ethiopia, 2019.

Table 4. Bivariate and multivariate analysis of factors associated with inappropriate antibiotic among study participants, Yirgalem town, Sidama regional state, Ethiopia, 2019.

Variables ($n=568$)	Inappropriate		Crude OR (95% CI)	Adjusted OR (95% CI)
	Yes	No		
Age groups in years				
18–24	18	85	1	1
25–34	120	107	5.29 (2.99–9.37)	2.89 (1.43, 5.84)*
35–44	64	55	5.49 (2.94–10.24)	1.97 (0.84, 4.61)
Above 44	13	106	0.57 (0.26–1.24)	0.20 (0.07, 1.55)
Sex				
Female	82	233	1	1
Male	133	120	3.14 (2.21–4.48)	1.90 (1.20, 3.02)*
Marital status				
Single	60	122	1	1
Married	150	203	1.50 (1.03–2.18)	1.60 (0.90, 2.84)
Others	5	28	0.36 (0.13–0.98)	1.23 (0.36, 4.24)
Occupation status				
Unemployed	29	157	1	1
Employed	186	196	5.13 (3.29–8.01)	3.45 (1.98, 6.02)**
Family size				
1–2 families	10	77	1	1
3–5 families	155	234	5.10 (2.56–10.16)	4.87 (0.86, 10.91)
>5 families	50	42	9.16 (4.21–19.9)	8.92 (3.56, 22.38)**
Waiting time at outpatient department				
<1 h	25	87	1	1
1–2 h	144	231	2.16 (1.32–3.54)	2.34 (0.76, 4.41)
>2 h	46	35	4.57 (2.44–8.54)	4.87 (2.17, 10.91)**
Place of healthcare use				
Public health institute	147	308	1	1
Private pharmacy	5	8	1.31 (0.42–4.07)	1.39 (0.35, 5.42)
Private clinics	38	24	3.31 (1.91–5.73)	2.54 (1.20, 5.36)*
NGO	25	13	4.02 (2.00–8.10)	2.08 (0.82, 5.24)
Experienced with similar symptom				
No	59	214	1	1
Yes	156	139	4.07 (2.81–5.88)	3.02 (1.89, 4.83)*

OR: odds ratio; NGO: non-governmental organization; CI: confidence interval.
*$p<0.05$; **$p<0.01$.

who being female. Respondents those who being employed were 3.45 times (AOR = 3.45, 95% CI (1.98, 6.02)) more likely use inappropriate antibiotics than respondents those who being unemployed. Respondents those who have got healthcare services from private clinic were 2.54 times (AOR = 2.54, 95% CI (1.20, 5.36)) more likely to practice inappropriate use of antibiotics than those who have got healthcare service from public health institute. Respondents those who have had family size above five were 8.92 times (AOR = 8.92, 95% CI (3.56, 22.38)) more likely to practiced inappropriate use of antibiotics than those who have had family size 1–2. Furthermore, those who have experienced with similar symptom/disease were 3.02 times (AOR = 3.02, 95% CI (1.89, 4.83)) more likely to practiced inappropriate use of antibiotics than those who were not experienced with similar symptom/disease. Respondents those who have reported waiting time at OPD above 2 h were 4.87 times (AOR = 4.87, 95% CI (2.17–10.91)) more likely use inappropriate antibiotics than those with reported waiting time at OPD time less than 1 h.

Discussion

Inappropriate use of antibiotics was worse in many low-income countries including Ethiopia.[16] The growing of AMR is the main cause of morbidity and mortality from previously treatable infections.[2] This study has attempted to identify the magnitude of inappropriate use of antibiotics and associated factors among communities of Yirgalem town, in Sidama region, Ethiopia. Accordingly, the magnitude of inappropriate use of antibiotics in the past 1 year was to be found 37.9% (95% CI (34.0, 41.5)). This finding is consistent with similar

studies done in Ethiopia and Cameron.[13,17,18] However, this finding was higher than the findings of similar studies previously done in Ethiopia.[6] This difference might be due to improvement in health service delivery, difference in study period as well as socio-economic status of the study participants. However, this finding found to be lower when compared with study done in Jordan, Northern Uganda, Tanzania and Kenya.[15,19–21] This difference could be due to in this study context, the majority of study participants received healthcare service from public health facility; this makes them to practice appropriate antibiotics.

This study revealed that individuals who have middle age groups were 2.89 times (AOR = 2.89, 95% CI (1.43, 5.84)) more likely use inappropriate antibiotics than the older age groups. Studies done elsewhere indicated that the youngest age groups were higher users of antibiotics inappropriately than the older age groups[12,13,22] which are similar with the result of this study. This age-related difference in inappropriate use of antibiotics may be due to the extent of experience acquired in living within the community. The other possible reason is that the youth is especially exposed to the media and the increased advertising of pharmaceuticals which poses a larger threat to the young population.

Employed respondents were 3.45 times (AOR = 3.45, 95% CI (1.98, 6.02)) more likely use inappropriate antibiotics than respondents those who being unemployed, in this study, which is similar to other studies.[12,13,23] The possible explanation could be due to lack of time to visit healthcare facilities during working hours, which may enforce to obtain antibiotics without prescription.[18] The other possible reason could be having pocket money that might encourage them to buy antibiotics when they perceive sign and symptoms of health problems.[21]

Individual male were 1.90 times (AOR = 1.90, 95% CI (1.20, 3.02)) more likely use inappropriate antibiotics than respondents those who being female, which is similar to other studies.[15,18,22] This finding is contrary to other studies done in Egypt[24] and in Tanzania.[22] This difference may be due to in this study context, males have a better health seeking behavior compared to females. Also this can be attributed to the fact that males are more private to health needs than females.[21]

In this study, those respondents who previously received healthcare services from private clinic were 2.54 times (AOR = 2.54, 95% CI (1.20, 5.36)) more likely to practice inappropriate antibiotics compared to those who received healthcare from public health facilities. This finding is in line with study conducted in Central zone of Tigray, Northern Ethiopia.[18] The above finding might be related with longer waiting time in health facilities effect on perception of respondents for consulting physicians for every health complaints.

In this study, perceived delayed waiting time in healthcare facilities was 4.87 times (AOR = 4.87, 95% CI (2.17–10.91)) documented as a risk factor for practicing of inappropriate antibiotics use compared to perceived fast waiting time. Even though less literature available on the relationship between treatment-seeking behavior and self-medication or self-care in the populations of developing countries.[25]

In this study, experienced with similar symptom/disease were 3.02 times (AOR = 3.02, 95% CI (1.89, 4.83)) more likely practiced inappropriate antibiotics compared to none experienced with similar symptom/disease. Studies in Wuhan in China and Jimma zone in South West Ethiopia revealed that reasons for self-medication were previous experience with similar symptom.[23,26] The possible explanation could be due to communities' past experience and expectations level appeared to influence non-prescription medication practices.[27]

In this study, family size with above five was 8.92 times (AOR = 8.92, 95% CI (3.56, 22.38)) more likely practiced inappropriate antibiotic compared to family size 1–2. This was contrary to a study which had no a significant association with inappropriate antibiotics use in Ethiopia.[13] The possible explanation could be due to economic status of family makes them to practice inappropriate antibiotics.[28]

Limitation

The limitation of this study was the use of a cross-sectional design could not able to establish cause and effect relationship between factors and outcome variable. In addition, the study design could not examine the change of inappropriate use of antibiotics in the communities over time. The identification of the actual antibiotic taken may not have been accurately recalled. Respondents recall bias may a problem for participants to memorize events in responding for questions like for which complaints antibiotics had been taken.

Conclusion

The magnitude of inappropriate antibiotics was found to be high in the study area. The factors associated with inappropriate antibiotics use were age, male sex, employed, receiving healthcare services from private clinic, family size, waiting time in healthcare facilities and previous experienced with similar symptom. Public healthcare providers should shorten the waiting time during service for those patients who visit the OPD in order to leave the OPD within standard hour. Private clinics should advise not to dispense antibiotics over the counter, and health education on risk of inappropriate antibiotics. Health education should be given for those employers busy by day programs. In Yirgalem town, Health Office should encourage interventions like proper licensing and reducing access in obtaining antibiotics without prescription. Community pharmacies to ensure no antibiotics are sold over the counter without prescription. Health education interventions on inappropriate antibiotics practices should target people of all communities at large.

For further research, more research is required to be done to establish prevalence for inappropriate antibiotics use among children less than 18 years and to assess public knowledge and perception on self-medication with antibiotics.

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Author contributions

Az.D. involved in conception, designing, analyzing the data, interpreting the result and preparing the article. Ar.D. and A.E. participated in preparation and critically revised the manuscript. All authors read and approved the final manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Ethical approval

Ethical approval for this study was obtained from Hawassa University college of Medicine and Health Science Institutional Review Board (approval no./ID: IRB/046/11, date 26 February 2019).

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Informed consent

Verbal informed consent was obtained from all subjects before the study and this method of obtaining informed consent was approved by our Institutional Review Board/Ethics Committee and reason for obtained verbal consent from participants was a literacy problem.

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Availability of data and materials

The finding of this study is generated from the data collected and analyzed based on stated methods and materials. The original data supporting this finding are available from the corresponding author on reasonable request.

Supplemental material

Supplemental material for this article is available online.

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