



# Prevalence and Factors Associated With Antibiotic Self-Medication among the Community Members in Tanzania

<sup>1\*</sup>Michael Joseph Mosha, <sup>2</sup>Richard Mongi

<sup>1\*</sup>Research Schoral, <sup>2</sup>Lecturer

<sup>1&2</sup> Department of Public Health, College of Health Science, University of Dodoma, Tanzania.

**Corresponding Author** <sup>1\*</sup>Michael Joseph Mosha

**Address:** <sup>1</sup>Department of Public Health, College of Health Science, University of Dodoma, Tanzania.

**Email Address:** mikemichael933@gmail.com

**ABSTRACT:** Antibiotic self medication practices are presently one of the focal public health issues accredited by different factors not only for developed countries but developing countries. This study examined the prevalence and factors associated with antibiotic self-medication among the community members in Tanzania. This study opted mixed research approach where by cross-sectional survey research design were used in this study. Random sampling procedures was used in this study, purposively sampling procedure was used to select Dodoma city as study area. Both primary data and secondary data were used as methods of collecting data, questionnaires and observations is one of the data collection tools used in this study. Data was analysed through SPSS version 20 and also, Logistic Regression Model (LRM) was used to analyse data. The findings of the study revealed that religion, occupation, sex, education level and level of income have statistical significance with antibiotics self medication in Tanzania with P- Value (0.017), (0.000), (0.014), (0.026) and (0.004) respectively but age has no statistical significance with antibiotics self medication practices in Tanzania since P-Value is (0.262). The study recommends that, the government of Tanzania has to spotlight the interventions to the community level especially to address on improving awareness, the laws and regulations that governing drug providers and reducing the risks of antibiotics self medication practices. Education awareness and programs are supposed to be done by different stakeholders on the possible harmful effects of self-medication practices. The study concluded that the community members should seek healthcare services for the diagnosis of the disease before taking medicines. The social Implication of the study the antibiotics self medication practises leads to increased costs of health services, long hospitalization time, diseases such as liver cancer, kidney problems and hence increases the rate of death therefore it reduce manpower of nation.

**KEYWORDS:** Antibiotics, Self-Medication, Community Member, Tanzania

## 1. INTRODUCTION

Antibiotics play a significant and essential role in the treatment of infectious diseases, especially those caused by bacteria. However, inappropriate use of antibiotics leads to the development of antibiotic resistant bacteria with consequent Antimicrobial Resistance (AMR), which has become a worldwide public health problem [22]. The AMR leads to, increased burden of chronic diseases, higher medical costs; emotional burden, prolonged hospital stays, and increased mortality [4]. Misuse of antibiotics is presently one of the major public health issues attributed by different factors; self-medication is one of the key players, highly practiced and high prevalence being in the developing countries [13]. Self-medication practice refers to use of drugs to treat self-diagnosed disorders, or symptoms, or continued use of a drug for chronic or recurrent diseases without a consultation from a physician. According to [1, 29] found that self-medication practice is influenced by different factors, such as demographic factors; age, sex, marital status, occupation, income status, level of education.

Empirical evidence found that self-medication has a positive impact on individuals and health-care systems as it promotes community members to take responsibility and build confidence in how to take care of their own health [17]. According to World Health Organization (WHO) has pointed out that responsible self-medication is required to prevent and treat ailments that do not necessarily require medical consultation by the physician, and provides cheaper options for treating common illnesses [20]. Limited healthcare facilities and high number of uncontrolled drug dispensing outlets have resulted in an increased use of medicines by the community members and the dispensing options by the dispensers [27]. Consequently, self-medication with either antibiotic or antimalarial is a common practice in many areas of Tanzania [3]. However, information about community members, roles of the community dispensers and determinants on self-medication practices in Tanzania is limited. According to [5] antibiotics have been very important tools for preventing bacterial infections and diseases since their discovery in 1940. However, misuse of antibiotics leads to the development of antibiotic resistant bacteria. Self-medication is practiced in many parts of the world, which has been one of the contributing factors of drug misuse and is increasingly becoming a major public health concern. For example, in Pakistan and India, a high prevalence of 76% and 71% has been reported respectively [15]. Several studies conducted in various communities of developing countries; Yemen, Saudi Arabia and Uzbekistan on knowledge and misuse of antibiotics, revealed the prevalence of non-prescription use of antibiotics of 48%, 78%, 78% respectively and the most common indication of antibiotics was in cough (40%) and influenza (34%) [17]. Misuse of antibiotics, especially in the treatment of upper respiratory tract infections, either by healthcare providers through unnecessary dispensing, prescribing or by self-medication by the patients, is a major cause of antibiotic resistance [8] with serious worldwide health and economic consequences [10].

In Africa, the self-medication practice is a phenomenal problem and, in Tanzania, the prevalence for eye patients attending eye clinics was found to be 58.9% [6] while, in Kenya, the prevalence of 53.5% was reported [24]. According to [26] found that, in Tanzania, there is a high prevalence of self-medication practices of 68.8% among caretakers of the under-five year's old children and 71.5% for persons aged five (5) years old and above. The prevalence of self-medication with antibiotics and antimalarial drugs among Mbeya City community members was reported to be 59% and 57% respectively [19]. However, despite the efforts by the government and researchers to combat the self-medication practices in the community in Tanzania [2, 28], information on the role of pharmacy outlets and community members' practices is limited. Therefore, the study examined the prevalence and factors associated with antibiotic self-medication among the community members in Tanzania.

## 2. LITERATURE REVIEWS

Empirical evidence found that developed and developing countries show that incorrect dispensing, self-medication and employ of sub beneficial dose to be a major cause of irrational drug use [4]. In Ethiopia, there are irrational drug dispensing practices like other developing countries and poor understanding about medicines leading to non-adherence is a common phenomenon indicated by different studies conducted by different scholars [9]. The overall antibiotics dispensed without prescription was 56% [10]. Community pharmacies dispensed antibiotics without prescription by (eight) 8 (44.4%) while it was (twenty eight) 28 (56%) for Accredited Drug Dispensing Outlet (ADDO) pharmacies [1]. It is clear that much effort to address the adherence to antibiotic dispensing rules and regulations should be directed to pharma-

cies [16]. A study conducted in Dar es Salaam found that the non-prescription dispensing of medicines in private pharmacies to be 71% and 60% were prescription only medicines including antibiotics [21]. Empirical evidence indicates that antibiotic non-prescription dispensing in Tanzania remains a problem requiring attention [23]. The proportion of dispensing an antibiotic without any prescription for cough was high (75%) [9]. Cough is a symptom of many organ systems such as respiratory, cardiovascular and renal systems. Ideally the cause of cough should be identified. Having a cough and directly accessing antibiotics in a tuberculosis endemic region carries a risk of delay in proper tuberculosis diagnosis and treatment with consequent complications and death [14]. In most cases cough and runny nose are due to viral infection and there was no rationale for antibiotic use [16]; it is therefore inappropriate and poor pharmacy practice to sell or dispense an antibiotic for cough, a symptom with many causes. One of the consequences of excessive antibiotic consumption is bacterial antibiotic resistance [3, 5, 9].

### 3. RESEARCH METHODOLOGY

To achieve this objective, qualitative and quantitative research approaches were used. Cross-sectional survey research design technique of data collection method was used. Primary data and secondary data in the form of survey and documentary reviews were used. Questionnaires were used as a tool for collecting data, random sampling and purposive sampling procedures were used. According to Dodoma City Council (DCC)-2020 the population community members is 410,956 from population of the study the sample size was 382 community members of Dodoma city, the respondents of this study involved people who have 18 years and above in the Dodoma city. The study was ensured data validity by planning stage through pilot study while can be ensured the data reliability by using Cronbach alpha approach according to the study the Cronbach alpha is 0.892; from this result criteria of Cronbach alpha is justifiable and explained by different scholars by observing when Cronbach alpha is greater than 0.70 is more acceptable this means that the internal consistency of the data is more correctly.

**Model Development:** The objectives of the study were tested through the binary logistic regression model to the prevalence and factors associated with antibiotic self-medication among the community members. The aim of the researcher is to know if the self-medication is practiced (Yes) or not practiced (No) therefore the dependent variable of the study is categorical data so this model is suitable to use. The previous research conducted in Ethiopia, Kenya and Rwanda on the topic of the prevalence and factors associated with antibiotic self-medication among the community members used the binary logit model to prove the findings [1, 5, 16]. The equations of the model are drawn as follows:

$$\text{Logit}(\pi_i) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (1)$$

$$\pi = P(Y_i = 1 | x_1, \dots, x_k) \quad (2)$$

Then the estimates of the model can be of the form:

$$\text{Logit}(\hat{\pi}_i) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (3)$$

Where  $\beta = (\beta_0, \beta_1, \dots, \beta_k)$  are estimates of the coefficient  $\beta$  and  $x_i = (x_1, x_2, \dots, x_k)$  are the k independent Variable,  $\hat{\pi}_i$  is the estimate of the likelihood of increased or self medication

Given the explanatory variables,  $x_1, \dots, x_k, \pi_i$  can be estimated as:

$$\hat{\pi}_i = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)} \dots (4)$$

However, Bayesian framework is the combination of the likelihood function and the prior distribution to yield the posterior distribution. Consequently, the response variable  $y_i$  follows a Bernoulli distribution with probability  $\pi$  and is given as:

$$y_i \sim \text{Bernoulli}(\pi_i); \hat{\pi}_i = \frac{\exp(\mathbf{x}_i \boldsymbol{\beta})}{1 + \exp(\mathbf{x}_i \boldsymbol{\beta})}$$

Where,  $\boldsymbol{\beta} = (\beta_0, \beta_1, \beta_k)$ ,  $\mathbf{y}_i = (y_1, y_2, \dots, y_n)$  and  $\mathbf{x}_i = (x_1, x_2, \dots, x_k)$ . The distribution of  $(y_i | \mathbf{x}_i \boldsymbol{\beta}) = (\pi^{y_i} (1-\pi)^{1-y_i})$ ; for  $i = \dots, n$ ,  $y_i$  is the number of increase self medication and  $1 - y_i$  is the number of decrease self medication.

#### 4. RESULTS AND DISCUSSION

This study analyzed the demographic factors and self medication using Chi-square to find out the relationship between them, the findings showed that the sex of community member has statistical significant relationship with self medication practices. Females appear to practice self medication by 59.9% (32) while males reported 50.9% (166) with P-Value 0.023 because  $P < 0.05$ . Also findings showed that level of education has statistical significance with practice on self medication since 65.5% (125) of those who had tertiary education have practiced while 39.5% (130) of those with no formal education because ( $P < 0.05$ ). Similarly marital status was statistically related with the level of self medication practice 66.7% of divorced community members show to have low self medication practice ( $P < 0.001$ ). Other variables which were significant and not significant are shown in table 1.

**Chi-square analysis showing relationship between Demographic factors and Self Medication practices in Tanzania (N=382)**

Variable	Self -Medication		Chi-square ( $\chi^2$ )	P-Value
	Practiced (Yes)	Not Practiced (No)		
<b>Community Members</b>				
<b>Group Age</b>				
18-25	15(62.1%)	21(37.9%)		
26-33	19 (55.8%)	16(44.2%)		
34-41	13 (61.6%)	12 (38.4%)	5.257	0.262
42-49	105(49.4%)	145 (50.6%)		
50-Above	8 (52.5%)	28 (47.5%)		
<b>Sex</b>				
Male	166 (50.9%)	145 (49.1%)	5.145	<b>0.023</b>
Female	32 (59.9%)	39 (40.1)		
<b>Occupation</b>				
Self- Employed	49 (57.4%)	30 (42.6%)	3.792	0.150
Private Organisation Employee	139 (61.1%)	33 (38.9%)		
Government Employed	113 (46.9%)	18 (53.1%)		

<b>Education level</b>				
None	15 (42.9%)	20 (57.1%)	10.777	<b>0.013</b>
Primary	125 (60.5%)	130 (39.5%)		
Secondary	37 (54.9%)	33 (45.1%)		
Tertiary	13 (66.7%)	9 (33.3%)		
<b>Marital status</b>				
Single	25 (55.6%)	10 (44.4%)	22.262	<b>0.000</b>
Married	135 (59.1%)	148 (40.9%)		
Widow/widower	11 (91.7%)	12 (8.3%)		
Separated	11 (26.8%)	30 (73.2%)		
<b>Income of respondents per month (TZS)</b>				
Less than 100,000	80 (59.1%)	82 (40.9%)	8.393	<b>0.015</b>
100,000-500,000	40 (45.6%)	60 (54.4%)		
600,000-Above	70 (49.5%)	50 (50.5%)		

Source: Survey Field Data, 2021

These results show that the sex, education level, marital status and level of income has a statistical significance with antibiotic self medication practice in Tanzania with P- Value of (0.023), (0.013), (0.000) and (0.015) respectively but findings revealed that occupation has no statistical significance since P- Value is 0.150 because  $P > 0.05$ . These findings supported by different scholars who conducted on research about misuse of antibiotic self-medication in Ethiopia, Sudan, Egypt and South Africa [7, 9, 21, 23]. According to [3] found that occupation and antibiotics self medication practices has positive relationship, this empirical evidence contradict with this study that said that occupation and antibiotics self medication practices has negative relationship.

**TABLE 2: BIVARIATE AND MULTIVARIATE LOGISTIC REGRESSION ANALYSIS ON FACTORS INFLUENCING SELF-MEDICATION PRACTICES IN TANZANIA.**

Variable	OR	P-Value	Confidence interval Lower	AOR	P-Value	Confidence interval Lower Upper
<b>Religion</b>						
Christian	5.574	0.007	1.594	19.485	<b>4.820</b>	<b>0.017</b> 1.330 17.470
Muslim	5.194	0.011	1.460	18.473	<b>4.742</b>	<b>0.020</b> 1.281 17.558
<b>Occupation</b>						
Self- employed	1.602	0.102	0.911	2.815	<b>5.280</b>	<b>0.000</b> 2.356 11.831
Private Organisa-	2.399	0.006	1.289	4.463	<b>5.878</b>	<b>0.000</b> 2.578 13.402

tions Employees

<b>Sex</b>								
Male	0.328	0.003	0.158	0.682	<b>0.381</b>	<b>0.014</b>	0.176	0.825
Female	0.161	0.010	0.040	0.651	<b>0.206</b>	<b>0.037</b>	0.047	0.906
<b>Education level</b>								
None	0.205	0.009	0.063	0.671	<b>0.202</b>	<b>0.026</b>	0.050	0.823
Primary	0.191	0.004	0.062	0.591	<b>0.178</b>	<b>0.011</b>	0.047	0.671
Secondary	0.202	0.007	0.064	0.642	<b>0.254</b>	<b>0.042</b>	0.068	0.949
<b>Level of Income (TZS)</b>								
Less than 100,000	0.624	0.014	0.428	0.908	0.709	<b>0.004</b>	0.469	1.074
100,000-500,000	1.007	0.967	0.722	1.405	1.045	0.810	0.731	1.493

Source: Survey Field Data, 2021

From Logistic Regression Model (LRM) shows that the religion, occupation, sex, education level and level of income has statistical significance since the P- Value are 0.017, 0.000, 0.014, 0.026 and 0.004 respectively. This results supported by different scholars who conduct the study of the prevalence and factors associated with antibiotic self-medication among the community members in Ethiopia, Kenya and Rwanda [2, 9, 18]. These findings contradicted with the study done on Saudi Arabia that shows the marital status do not influence the self medication practices and suggest that the education programs are the one of the methods that can reduce the antibiotic self medication practices [5].

## 5. CONCLUSION

The study concluded that the community members should seek healthcare services for the diagnosis of the disease before taking medicines. The study recommends that, the government of Tanzania has to spotlight the interventions to the community level especially to address on improving awareness, the laws and regulations that governing drug providers and reducing the risks of antibiotics self medication practices. Education awareness and programs are supposed to be done by different stakeholders on the possible harmful effects of self-medication practices. The researchers suggested that the future researchers to expand sample size and to expand the study area in order to tackle well the issue of self medication practices

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