

## Self-medication practices and predictors for self-medication with antibiotics and antimalarials among community in Mbeya City, Tanzania

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### Abstract

**Background:** Self-medication with antimalarials and antibiotics is highly practiced worldwide particularly in developing countries including Tanzania. This study was carried out to determine self-medication practices with antimalarials and antibiotics, and as well as predictors for self-medication among urban communities of Mbeya in Tanzania.

**Methods:** A cross sectional descriptive community survey was conducted in Mbeya City in the South-western highlands of Tanzania from April to June 2016. The study population comprised of adults participants aged 18 years and above. Face to face interviews were conducted using a structured pre-tested questionnaires. Data on self-medication practices and predictors of self-medication was assessed. Descriptive statistics and logistic regression analysis were used to assess predictors associated with self-medication with either antibiotic or antimalarials.

**Results:** A total of 300 individuals (mean age= 35.4 ± 13.4 years) were involved in the study. Prevalence of self-medication with either of the drugs, antibiotic only and antimalarial only was 55.7%, 19.7% and 19.0%, respectively. Participants who were employed had higher odds of self-medicating with antibiotics than students (OR=4.13, 95% CI: 1.14-14.96). Participants who kept medicines at home had lower odds of self-medicating with either antibiotic or antimalarial than those who do not keep. The main reason that was indicated for the self-medication was emergency illness. The main source of medicines was the private pharmacies.

**Conclusion:** There is generally high self-medication practice among urban communities of Mbeya, Tanzania. Community awareness on the practice of self-medication and its implications especially on the harmful effects of self-medication that are less known. The self-medication rates with antibiotics and antimalarials are higher among urban communities of Mbeya, Tanzania. There is an urgent need for the government to enforce regulations on pharmacies dispensing medications, especially antibiotics, without prescriptions. Public education on the implication of self-medication is equally important to address to reduce self-medication with antibiotics and antimalarials among Tanzanian populations.

**Keywords:** self-medication, practices, antibiotics, antimalarial drugs, Tanzania

### Introduction

Self-medication is becoming a public health problem in most countries worldwide. Though self-medication is highly practiced worldwide and high prevalence is in developing countries (Shaghghi *et al.*, 2014), the frequencies of self-medication practices vary from country to country and from one geographical location to the other. The frequency of self-medication ranges from 11.9% to 75.7% in Africa (Ocan *et al.*, 2014). Given high burden of infectious diseases in Tanzania (GBD, 2010), self-medication is mainly triggered by limited health care services and an increase in the number of private pharmacies that sell medicines without prescription. This behaviour enables patients to have access to medicines without any difficulties, therefore encouraging self-medication. Self-medication with either antibiotics

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or antimalarials is a common practice in some part of Tanzania (Chipwaza *et al.*, 2014). The practice may result into resistance to drugs due to its inappropriate use (Awad *et al.*, 2005), increased side effects, drug interactions, and delayed in appropriate treatments (Hamel *et al.*, 2001), hence complicating the patient's condition (Novignon *et al.*, 2011). The increase in drug resistance in developing countries is of current public health concern as it results in resistant organisms difficult to treat (WHO, 2001; Wongsrichanalai *et al.*, 2007; Llor & Bjerrum, 2014).

Factors which are associated with self-medication have been documented to include socio-cultural factors, lack of knowledge on the consequence of self-medication, previous experience with similar symptoms, low or poor standard of life, high charges by hospitals, inaccessibility to health care services, urgency of the problem (emergency use), bureaucracy, overcrowding in hospitals, inadequate medicines in most public health facilities and trivial/minor illnesses treatment (Awad *et al.*, 2006; Mohanna, 2010; Widayati *et al.*, 2011; Mossa *et al.*, 2012). These factors vary from place to place (Gupta *et al.*, 2011). Therefore, the control of antibiotic or antimalarial use needs multifaceted interventions that involve knowledgeable and engaged healthcare workers and the community (Awad & Aboud, 2015).

A number of studies on self-medication have been carried out in Tanzania (Mnyika *et al.*, 1995; Lekashingo, 2003; Chipwaza *et al.*, 2014; Kazaura, 2017). However, little is known of the situation in the south-western highlands areas of the country. Thus, the objective of the present study was to determine the self-medication practices and predictors of self-medication among community in Mbeya, Tanzania.

## **Material and Methods**

### **Study area, population sampling and sample calculation**

A cross sectional descriptive community survey was conducted in Mbeya City in south-western Tanzania from April to June 2016. The study population comprised of adults 18 years and above. An inclusion criterion was residing in Mbeya City for the period of at least 12 months before data collection. The sample size necessary to reach the study objective was estimated on the assumption that the prevalence of self-medication (with either antibiotic or antimalarials in the population is 75.1% (Monjeza, 2013). Therefore,  $N = \frac{Z^2 P (1 - P)}{d^2}$ . Where N is the required sample, Z is the confidence level at 95%, P is the prevalence of 0.75, d is the margin of error at 5% and non-response correction=10%. Therefore,  $N = 313 + 10\% \text{ of } 313 = 344$ . Participants were recruited from 25 wards and in each ward a total of 14 participants randomly selected. From each of the selected household adults individuals were contacted and given explanation about the purposes of the research. Written consent to participate in the study was sought during this initial contact. The response rate was 87.2.0%.

### **Data collection**

Structured pre-tested questionnaires were distributed to the individuals who agreed to take part in the study. A structured modified questionnaire adopted from Monjeza (2013) was used for data collection. A questionnaire consisted of closed-ended questions. The questionnaires were structured into sub-themes that guided data analysis. Each enrolled participant was interviewed using a set of questions in the questionnaire that had three sections. Information on the socio-demographics characteristics such as gender, age, the highest attained education qualification, marital status, employment status and income was

collected from each participant. The participants were asked about of their knowledge of self-medication. A five-point Likert scale (strongly disagree-strongly agree) was used to evaluate the participants' responses. Section three investigated about self-medication practice. The respondents were asked whether they used medication without a prescription of a physician. For those who reported a self-medication in the previous twelve months, information was asked regarding their medical history and the drugs/drug groups used for self-medication, the dosage and the duration of medication, and also the reasons for self-medication.

### **Ethical considerations**

Ethical clearance was obtained from the Kilimanjaro Christian Medical University College Ethics Committee. Permission to conduct the study was obtained from the City authorities. Then informed consent was sought and provided by all individuals who agreed to participate in the study.

### **Data analysis**

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) Version 22 (SPSS Inc., Chicago, USA). Descriptive statistics was used to summarize data. Differences between categorical data were calculated using Pearson's Chi-square test ( $\chi^2$ ). In bivariate logistic regression analysis variables associated with self-medication at a level of significance  $p < 0.1$  entered into the final model of the multivariate logistic regression analysis, which was used to compute adjusted odds ratio (AOR) and 95% confidence intervals (95% CI) to assess the independent associations of these variables with outcome of interest (self-medication).

## **Results**

### **Socio-demographic characteristics**

Out of 300 participants, most participants were aged less than 40 years 189 (63.0%). More than half of participants were female 156 (52.0%). Most participants 133 (37.7%) had post-secondary education. More than half of participants 162 (54.0%) earned less than US\$100 per month. Participants mean age was  $35.4 \pm 13.4$  (Table 1).

**Table 1: Characteristic of the studied population and Prevalence of Self-Medication with any drug (Antibiotic or Antimalarial)**

Variable	Response	All n (%)	Self-medication n (%)		P-value
			YES	NO	
Age (years)	<40	189 (63.0)	102 (54.0)	87 (46.0)	$\chi^2 = 0.6$ P=0.6
	40-59	89 (29.7)	51 (57.3)	38 (42.7)	
	$\geq 60$	22 (7.3)	14 (63.6)	8 (36.4)	
Sex	Male	144 (48.0)	82 (56.9)	62 (43.1)	$\chi^2 = 0.18$ P=0.6
	Female	156 (52.0)	85 (54.5)	71 (45.5)	
Education	Illiterate	26 (8.7)	16 (61.5)	10 (38.5)	$\chi^2 = 15.6$ p<0.01
	Primary	87 (29.0)	33 (37.9)	54 (62.1)	
	Secondary	74 (24.7)	46 (62.2)	28 (37.8)	
	Post-Secondary	133 (37.7)	72 (63.7)	41 (36.3)	
Marital status	Single	118 (39.3)	62 (52.5)	56 (47.5)	$\chi^2 = 7.4$ P=0.05
	Married	129 (43.0)	76 (58.9)	53 (41.1)	
	Divorced	21 (7.0)	7 (33.3)	14 (66.7)	

Income per month (USD)	Widowed	32 (10.7)	22 (68.8)	10 (31.2)	$\chi^2= 22.9$ $p<0.01$
	<100	162 (54.0)	70 (43.2)	92 (57.8)	
	101-500	102 (34.0)	74 (72.5)	28 (27.5)	
	>500	36 (12.0)	23 (63.9)	13 (36.1)	
Occupation	Employed	121 (40.3)	70 (57.9)	51 (42.1)	$\chi^2= 4.1$ $P=0.2$
	Business	95 (31.7)	57 (60.0)	38 (40.0)	
	Unemployed	34 (11.3)	14 (41.2)	20 (58.8)	
	Student†	50	26	24 (48.0)	

†Secondary and college students

### Prevalence of self-medication

Prevalence of self-medication with any of the drugs, antibiotic and antimalarial were 167 (55.7%), 59 (19.7%) and 57 (19.0%) respectively. The results indicate that participants with post-secondary education had a significantly more practising self-medication that others ( $P<0.01$ ). Similarly, self-medical was more common among those who earn between US\$ 101- 500 that others ( $p<0.01$ ) (Table 1).

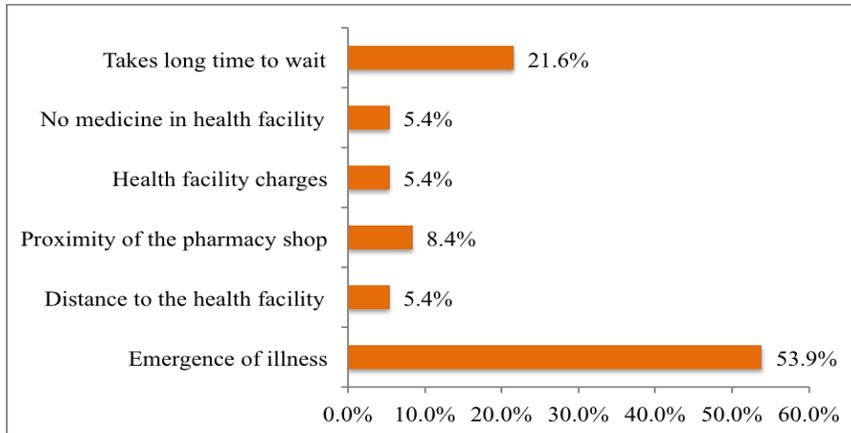
**Table 2: Association of predictors for self-medication with antibiotics**

Variable	Response	Antibiotic only		AOR (95% CI)	P-value
		OR (95% CI)	P-value		
Age (years)	<40 Years	1.91 (0.72-5.03)	0.1	2.25 (0.50-10.15)	0.2
	40-59	2.30 (0.80-6.61)	0.1		
	≥ 60	1	1		
Sex	Male	0.86 (0.49-1.53)			
	Female	1			
Marital status	Single	0.80 (0.28-2.33)	0.6	-	-
	Married	0.61 (0.21-1.72)	0.3		
	Divorced	1.75 (0.30-10.04)	0.5		
	Widowed	1			
Income per month (USD)	<100	3.02 (1.32-6.87)	<0.01	2.82 (0.47-16.68)	0.2
	101-500	1.62 (0.70-3.72)	0.2		
	>500	1	1		
Occupation	Employed	0.50 (0.21-1.19)	0.1	4.13 (1.14-14.96)	0.03
	Business	1.01 (0.39-2.59)	0.9		
	Unemployed	1.96 (0.48-8.02)	0.3		
	Student	1	1		
Education level	Illiterate	0.74 (0.29-1.89)	0.5	-	
	Primary	2.85 (1.26-6.42)	0.01	0.17 (0.03-0.80)	0.02
	Secondary	1.41 (0.68-2.90)	0.3		
	Post-secondary	1	1		
Keep medicines at home	Yes	0.53 (0.30-0.95)	0.03	0.38 (0.15-0.92)	0.03
	No	1			
Self-treated conditions	Fever	1.69 (0.75-3.81)	0.2	0.40 (0.16-1.02)	0.05
	Diarrhoea	0.10 (0.02-0.40)	<0.01		
	Headache	4.41 (0.54-35.99)	0.1		
	Malaria	1.01 (0.32-3.17)	0.9		
	*Others	1	1		

**Key:** OR= Odds ratio; AOR= Adjusted Odds Ratio; \*Others= includes injury, flu, eye infections

### Source of drugs and reasons for self-medication

Medicines purchased from private pharmacies were the most commonly (72.0%) used source of self-medication. Those who obtained medications from their friends or relatives were 29 (18.0%). The use of left-over drugs from previous illness was 16 (9.9%). The study identified patients' reasons for self-medication. The commonest was the emergency of the illness 90 (53.9%). Thirty-nine (21.6%) of participants indicated that they self-medicated because of long waiting time at the health care facilities. Then proximity to the private pharmacy was indicated by 14 (8.4%). Few participants highlighted that distance to the health facility 9 (5.4%), health facility charges 9 (5.4%) and unavailability of drugs in the health facility were the main reasons (Figure 1).



**Figure 1: Reasons for self-medication**

#### **Predictors for self-medication**

In univariate logistic regression analysis of self-medication with antibiotic only, variables such as age, income, occupation, education, keeping drugs at home and conditions for self-medication qualified for multivariate logistic regression analysis. Analysis of self-medication with antimalarial only, variables such as sex, marital status, occupation, education, keeping drugs at home and self-treated conditions qualified for multivariate logistic regression analysis. And lastly analysis of self-medication with any drug, variables such as marital status, income, education and keeping drugs at home qualified for multivariate logistic regression analysis. Here only results for multivariate logistic regression analyses are presented.

Participants who were employed and those who were unemployed had higher odds of self-medicating with antibiotic as compared to students (OR=4.13, 95% CI: 1.14-14.96) and (OR=11.10, 95% CI: 1.09-11.30), respectively. Surprisingly, participants who kept drugs at home had lower odds of self-medicating with antibiotic as compared to those who do not keep (OR=0.38, 95% CI: 0.15-0.92) (Table 2). Similarly, participants who kept drugs at home had lower odds of self-medicating with antimalarial than those who do not keep (OR=0.30, 95% CI: 0.12-0.76) (Table 3).

**Table 3: Association of predictors for self-medication with antimalarials**

Variable	Response	Antimalarial drugs only			
		OR (95% CI)	P-value	AOR (95% CI)	P-value
Age (years)	<40	1.34 (0.46-3.88)	0.5		
	40-59	1.16 (0.37-3.56)	0.7		
	≥ 60	1			
Sex	Male	1.75 (0.97-3.18)	0.06	1.75 (0.75-4.05)	0.1
	Female	1		1	
Marital status	Single	3.16 (0.25-2.73)	<0.01	2.83 (0.68-11.73)	0.1
	Married	3.32 (0.21-2.14)	<0.01	3.46 (0.88-13.49)	0.07
	Divorced	13.68 (0.20-7.89)	0.01	7.89 (0.63-98.48)	0.1
	Widowed				
Income per month (USD)	<100	1.64 (0.67-4.03)	0.2	-	-
	101-500	0.88 (0.35-2.17)	0.7		
	>500	1			
Occupation	Employed	1.72 (0.74-4.00)	0.2	1.78 (0.53-5.98)	0.3
	Business	0.74 (0.33-1.67)	0.4	0.88 (0.23-3.30)	0.8
	Unemployed	2.91 (0.74-11.36)	0.1	6.70 (0.65-68.76)	0.1
	Student	1			
Education	Illiterate	3.06 (0.67-13.39)	0.1	-	
	Primary	1.22 (0.59-2.52)	0.5	0.53 (0.15-1.87)	0.3
	Secondary	0.85 (0.42-1.74)	0.6	0.88 (0.31-2.52)	0.8
	Post-secondary	1		1	
Keep medicine at home	Yes	0.27 (0.14-0.51)	<0.01	0.30 (0.12-0.76)	0.01
	No	1		1	
Self-treated conditions	Fever	0.58 (0.26-1.29)	0.1	0.41 (0.16-1.05)	0.06
	Diarrhoea	2.51 (0.30-21.08)	0.3	1.09 (0.11-10.48)	0.9
	Headache	2.25 (0.25-6.30)	0.7	1.02 (0.17-6.13)	0.9
	Malaria	0.83 (0.24-2.92)	0.7	0.53 (0.12-2.32)	0.4
	*Others	1		1	

**Key:** OR= Odds ratio; AOR= Adjusted Odds Ratio; \*Others= includes injury, flu, eye infections

Participants who were single, married and divorced had higher odds of self-medicating with any drug as compared with widowed (OR=2.91, 95% CI: 1.11-7.61), (OR=2.68, 95% CI: 1.03-6.97) and (OR=10.11, 95% CI: 2.60-39.22) respectively. Participants who earned less than US\$100 had higher odds of self-medicating with any drug as compared with those who earn more than US\$500 (OR=2.98, 95% CI: 1.08-8.17). Participants who kept drugs at home had lower odds of self-medicating with any drug as compared to those who do not keep (OR=0.19, 95% CI: 0.11-0.34) (Table 4).

**Table 4: Association of Predictors for Self-Medication with any drug**

Variable	Response	Antimalarial drugs only			
		OR (95% CI)	P-value	AOR (95% CI)	P-value
Age (years)	<40	1.49 (0.59-3.72)	0.3	-	-
	40-59	1.30 (0.49-3.42)	0.5		
	≥ 60	1			
Sex	Male	0.90 (0.57-1.42)	0.6		
	Female	1			
Marital status	Single	1.98 (0.86-4.55)	0.1	2.91 (1.11-7.61)	0.02
	Married	1.53 (0.67-3.50)	0.3	2.68 (1.03-6.97)	0.04
	Divorced	4.40 (1.35-14.25)	0.01	10.11 (2.60-39.22)	<0.01

Income per month (USD)	Widowed	1			
	<100	2.32 (1.10-4.91)	0.02	2.98 (1.08-8.17)	0.03
	101-500	0.66 (0.29-1.50)	0.03	0.71 (0.27-1.83)	0.4
Occupation	>500	1			
	Employed	0.78 (0.40-1.53)	0.4		
	Business	0.72 (0.36-1.44)	0.3		
	Unemployed	1.54 (0.64-3.73)	0.3		
Education	Student	1			
	Illiterate	1.09 (0.45-2.64)	0.8	0.50 (0.17-1.49)	0.2
	Primary	2.87 (1.61-5.12)	<0.01	0.91 (0.39-2.11)	0.8
	Secondary	1.06 (0.58-1.96)	0.8	0.70 (0.33-1.51)	0.3
Keep medicine at home	Post-secondary	1			
	Yes	0.18 (0.11-0.31)	<0.01	0.19 (0.11-0.34)	<0.01
Self-treated conditions	No	1		1	
	Fever	1.27 (0.64-2.49)	0.4	-	-
	Diarrhoea	0.36 (0.07-1.76)	0.2		
	Headache	1.50 (0.46-4.79)	0.4		
	Malaria	1.63 (0.60-4.46)	0.3		
	*Others	1			

**Key:** OR= Odds ratio; AOR= Adjusted Odds Ratio; \*Others= includes injury, flu, eye infections

## Discussion

In this study, it was observed that self-medication by antibiotics and antimalarials was common among urban dwellers in Mbeya, Tanzania. The main source of these medicines were private pharmacy, this finding concurs with a study conducted in Tanzania which reported 66.2% and 41.6% respectively (Kagashe & Msela, 2012; Monjeza, 2013) and in Pakistan (Zafar *et al.*, 2008). Participants sourced the medications from the private pharmacies popularly known as “*duka la dawa*” in Kiswahili. This shows that generally, there is lack of adherence to regulations in the selling of medications by most of the pharmacies which enables and tolerate people to access medications without any prescription as observed by (Arikpo *et al.*, 2010; Verma *et al.*, 2010). This allows people to access any medications regardless of their illnesses and implications associated with the medications is that participants expose themselves to sub-optimal doses that may facilitate resistance and other implications of inappropriate use of medications (El-Ezz & Ez-Elarab, 2011).

There were varied reasons as to why the respondent’s self-medicated. Majority of participants self-medicated due to emergency illness, while others mentioned long time of waiting at health facilities, unavailability of medicines at health facilities, others claimed to self-medicate due to proximity to the pharmacy or drug shop. Others cited long distances to a health facility to be one of the main reasons. These results concur with reports of a similar study in Dar es Salaam, Tanzania (Kagashe & Msela, 2012; Monjeza, 2013), and India (Gupta *et al.*, 2011). Recently, Rather *et al.* (2017) described several reasons for self-medication to include advertisements on television, radio and print media and advice from friends and family as well as the expensive healthcare system. Nathan & Cars (2014) have reported that in the developing countries governments are encouraging people to treat minor health problems on their own to reduce the cost of treatment. Despite the difference in the reasons of practicing self-medication, self-treatment with antibiotics and antimalarial drugs for treatment of minor illness that are thought not to require medical care or

attention results to harmful effects (Rather *et al.*, 2017). There are potential risks associated with antibiotics use which include masking of malignant and potentially fatal diseases and development of resistance to pathogens (Gupta *et al.*, 2011).

This study has some limitations. Recalling of the medications used for the past one month was a challenge. Majority of participants seemed to be aware that self-medication practice is not encouraged; hence tend to withhold some information while they may be practicing it. This may have an impact on the prevalence of self-medication as observed in this study. Despite these limitations, the study has highlighted the high prevalence of self-medication with either antibiotic or antimalarial among urban communities of south-western Tanzania.

In conclusion, the self-medication rates with antibiotics and antimalarials are higher among urban communities of Mbeya, Tanzania. Community awareness on the practice of self-medication and its implications especially on the harmful effects of self-medication are less known. There is an urgent need for the government to enforce regulations on pharmacies dispensing medications, especially antibiotics, without prescriptions. Public education on the implication of self-medication is equally important to address to reduce self-medication with antibiotics and antimalarials among Tanzanian populations.

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### Conflicts of Interest

None declared.

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