



## **Self-medication with Antimicrobials Perceptions among the Households in Nyalenda Informal Settlement, Kisumu County, Kenya: Post- Community Mobilization Intervention**

**Isabel Akoth Owuor<sup>1\*</sup>, Harrysone Atieli<sup>1</sup> and Collins Ouma<sup>2</sup>**

<sup>1</sup>*Department of Public Health, School of Public Health and Community Development,  
Maseno University, Private Bag, Maseno, Kenya.*

<sup>2</sup>*Department of Biomedical Sciences and Technology, School of Public Health and Community  
Development, Maseno University, Private Bag, Maseno, Kenya.*

### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors IAO, HA and CO designed,  
carried out the study and participated in the drafting of the manuscript. Authors IAO and CO  
performed statistical analyses. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/IJTDH/2019/v39i130197

#### Editor(s):

(1) Dr. Cihad Dundar, Professor, Department of Public Health, Faculty of Medicine, Ondokuz Mayıs University, Turkey.

#### Reviewers:

(1) Ihudiebube-Splendor, Chikaodili N, University of Nigeria Nigeria.

(2) Syed Umer Jan, University of Balochistan, Pakistan.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/52245>

**Original Research Article**

**Received 12 August 2019**  
**Accepted 23 October 2019**  
**Published 04 November 2019**

### **ABSTRACT**

Self-medication is very common especially in developing countries and is documented to be associated with many health risks including antibiotic resistance. Antibiotic resistance is shrinking the range of effective antibiotics and is currently listed as a global health problem. This study investigated the perceptions of self-medication with antimicrobials (SMWA) after community mobilization intervention among the households in Nyalenda B, an informal settlement, within Kisumu County, Kenya. This enabled the study to establish the magnitude of SMWA and the perceptions that persist given such intervention within the region. Data was collected through structured questionnaires administered to 380 households. Focus group discussions (FGDs) were also facilitated and targeted purposively-selected 30 CHVs. Descriptive and binary logistic regression analyses were used to determine the association between socio-demographic

\*Corresponding author: Email: [isabelowuor@yahoo.com](mailto:isabelowuor@yahoo.com);

characteristics and the perceptions influencing SMWA. The study established that 316 households had used antimicrobials of which 20.9% were self-medicating with antimicrobials. Age (OR=0.647, 95% CI=0.431, 0.973,  $P=0.037$ ) is significantly related to SMWA, use of NHIF for outpatient services (OR=1.772, 95% CI=0.652, 2.887,  $P=0.133$ ) and use of Universal Healthcare Services (OR=1.165, 95% CI=0.922, 1.472,  $P=0.201$ ) may have contributed to SMWA reduction but not significantly as compared to other socio-demographic factors. Likewise, sources of information or advice on self-medication (OR=0.732, 95% CI=0.613, 0.873,  $P=0.001$ ) and illness or symptoms of illness (OR=1.324, 95% CI=1.129, 1.554,  $P=0.001$ ) may significantly influence SMWA as compared to other SMWA perceptions. Community mobilization using empowerment as a strategy and implemented through participatory learning and action is a successful method for reduction of SMWA level and development of SMWA perceptions with an experiential value especially when strengthened with structural modification. SMWA is a serious problem in developing countries and so such intervention should be prolonged and continuous to offer sustained changes in public perception and attitudes towards the misuse of antimicrobials.

*Keywords: Self-medication; antimicrobials perceptions; health risks; antibiotic resistance.*

## 1. INTRODUCTION

Self-medication has been defined to be the choice and usage of medications to treat diseases or illnesses which are recognized by yourself without a doctor/physician's prescription (WHO, 1998). The prevalence of self-medication with antibiotic ranges from 48% in Saudi Arabia to 78% in Yemen and Uzbekistan [1], in Sudan, Khartoum State 73.9% of a study population had self-medicated with antibiotics and/or anti-malarials [2], in Kenya, Nyalenda B Sub Location it is 76.9% of the households but in Ethiopia it is low (14.5%) but high among those that have higher income and higher education [3]. Previous studies in Nyalenda B Ward, an informal settlement in western Kenya, found a significant number (76.9%) of the households who perceived the practice of SMWA as convenient and appropriate.

SMWA perceptions are concerned with how the consumer views the practice as a product or a service. The marketer uses various props to stimulate the consumer through the five senses, to observe the product [4]. The process is pretty much the same in everyone however some aspects of perceptions are unique to individuals or members of a particular culture.

Self-medication of antibiotics is associated with the risk of inappropriate drug use, which predisposes patients to drug interactions, masking symptoms of an underlying disease, and the development of microbial resistance [5,6]. The inappropriate drug use practices common in self-medication include short duration of treatment, inadequate dose, sharing of medicines, and avoidance of treatment upon the

improvement of disease symptoms. The appearance of multidrug-resistant bacterial strains, which are highly resistant to many antibiotic classes, has raised a major concern regarding antibiotic resistance worldwide. This resistance may result in prolonged illnesses, more doctor visits, extended hospital stays, the need for more expensive medications, and even death [7]. WHO global report on antibiotic resistance reveals serious, worldwide threat to public health. It clearly mentions serious threat is no longer a prediction for the future, as it is happening right now in every region of the world and has the potential to affect anyone, of any age, in any country [8].

As such, the aim of the current study was to investigate the perceptions of self-medication with antimicrobials (SMWA) after community mobilization intervention among the households in Nyalenda B, an informal settlement, within Kisumu County, Kenya. This enabled the study to establish the level of SMWA and the perceptions that persist given such intervention.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Nyalenda is the second largest informal settlement in Kisumu, after Manyatta, and is situated to the south of the CBD. Nyalenda is on latitude  $-1.267$  and longitude  $34.7575$ . The area is bound by Ring Road to the North and marshlands to the South and consists of two separate settlements or Sub-Locations, Nyalenda A and B. Nyalenda A is subdivided into four units (Central, Dago, Kanyakwar and Western), while Nyalenda B features five smaller

units (Kilo, Got Owak, Dunga, Nanga and Western), the two slums occupy an area of 3.2 and 4.7 sq. km, respectively. In Kisumu an estimated 60 percent of the population lives in informal settlements, with the majority living in abject poverty [9]. The choice of the study area was informed by the proportion (76.9%) of self-medication with antimicrobials among the households in Nyalenda B yet it is the only informal settlement in Kisumu served by two government health facilities, it also has the highest percentage of household below the adjusted urban poverty line (Nyalenda A is 78% and Nyalenda B 65.3%) [10]. Nyalenda B went through SMWA community intervention that commenced 7 months earlier therefore it was important to establish perceptions of SMWA following the intervention. Nyalenda B Sub-Location has a population of approximately of 32,430, 16,189 male, 16,241 female, 8,561 households and a population density of 6,886 people per sq. km [11]. The study target population consisted of all households (8,561 hhs) as previously reported in our study [12]. The sample population of households was drawn from Nyalenda B population and the respondents were the household heads.

## 2.2 Study Design and Population

The study adopted a descriptive survey design and the data was collected through structured questionnaire and focused group discussions as we previously reported [12].

## 2.3 Sample Size Determination

The sample size was calculated based on our reported approach [12] and using Fisher's formula [13]. Based on that rationale, we used a total sample size of 380 households.

## 2.4 Sampling Method

As previously reported [12], the current study used a two-stage cluster sampling method. Nyalenda B is sub-divided into 4 aerial clusters. This study used 3 clusters for the survey. 1 cluster was left out as a buffer zone. The second stage was systematic sampling that helped in identifying the 380 respondents from Nyalenda B households. Table 1 shows the ratio of the households from the 3 chosen clusters and the number of the households sampled (hhs S) from each cluster. This information is worked out from the map showing Nyalenda household

distribution and mapping done by Pamoja Trust Research Team [10]. Systematic sampling was made possible because of the household mapping done by Pamoja Trust Research Team [10]. The sample size was 380 and this was divided among the 3 clusters in Nyalenda B Ward proportionally. The sample interval for each cluster is the ratio of households sampled in a cluster to the total population of households in that cluster. The sample interval for each cluster was 15. The first household was picked randomly by getting a central place in the village and numbering the households in vicinity. Each number was then assigned a piece of paper and one of them unconsciously picked leading to the first household to be interviewed. The next household was picked by jumping 15 households until the right number of households was reached in each cluster. The group for the discussion was purposively picked and it comprised of 30 Community Health Volunteers (CHVs). These activities took place from 3<sup>rd</sup> to 8<sup>th</sup> of February 2019, following an intervention that began 7 months before this date.

## 2.5 Data Collection

This study used structured questionnaires with standardized set questions in a 4 Likert scale and closed ended questions that were responded to as the questions suggested and FGDs. The structured questionnaires contained items assessing the prevalence and perceptions of self-medication with antimicrobials among households in Nyalenda B Sub-Location and were administered to the sampled households following informed consent. The head of each sampled household were the respondent, and in the absence of the household head, the interview was postponed to a later date. Help of Community Health Volunteers was taken to establish rapport with the respondents. Questionnaires provide a high degree of data standardization and adoption of generalized information amongst any population. They are useful in a descriptive study where there is need to quickly and easily get information from people in a non-threatening way [14]. The questionnaires were self-administered by the respondent in the presence of an enumerator to aid the respondents in understanding the questions wherever necessary. The questionnaires were structured so as to get definite responses, which the study required, in a relatively short time and to cover a larger number of respondents.

**Table 1. The number of households sampled from each cluster from Nyalenda B**

Villages (clusters)	Ratio	No. of households	No. of hhsS
Dunga	0.320	1773	122
Nanga	0.340	1886	129
Got Owak	0.340	1886	129
Total	1	5545	380

NB: hhsS= households sampled

## 2.6 Data Analysis and Presentation Techniques

All statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS, version 24) software. The coded and cleaned data were used to calculate frequencies and proportions of the socio-demographic characteristics of the 380 household representatives and responses on SMWA perceptions questions. Chi-square analysis was used to establish the people, for every category of socio-demographic characteristics that was practicing self-medication with antimicrobials. To verify association between socio-demographic characteristics and SMWA perceptions, Odd Ratio, 95% CI and *P*-values for SMWA practice were obtained using binary logistic regression for every SMWA perception. For all analyses,  $P \leq 0.05$  was considered statistically significant.

## 3. RESULTS

### 3.1 Socio-demographic Characteristics of the Study Population and Prevalence of SMWA

The study population comprised of 380 households of which 316 households used antimicrobials in the last 6 months. About 20.9% of the 316 households were self-medicating with antimicrobials after community mobilization intervention. Based on the household data, the household heads aged between 26-35 years reported household self-medication with antimicrobials more than the rest of the age categories (53.0%). Furthermore, children below 12 years (59.1%,  $P=0.002$ ) and the households whose heads were of primary level of education were self-medicating with antimicrobials more significantly (40.9%,  $P=0.007$ ) as compared to their respective categories. Likewise, those that were unemployed, had an average income of less than Ksh. 5,000, spent less than Ksh. 500 on purchasing drugs, and the Christian protestant were practicing self-medication with antimicrobials (47.0%, 60.6%, 54.5% and 57.6%,

respectively) more than the rest in their relevant categories but not significantly different (Table 2).

### 3.2 Perceptions of SMWA Practice

**Reasons for SMWA:** The most common reason for SMWA is its convenience in emergency (34.8%,  $P < 0.0001$ ) but others resorted to it when they considered their disease condition not serious (31.8%,  $P < 0.0001$ ), others found it easily accessible when they were faced with time constraint or scarcity of money (19.7%,  $P < 0.0001$ ) while others used it for diseases prevention (13.6%,  $P < 0.0001$ ) (Table 3). The responses from the FGD that supported these quantitative data were explained as follows: *“The hospital at times demands tests and examinations which demands for money and time but at the pharmacy, I will just ask and pay for the mediation which I think will treat me.”*

*“We are involved in small-scale businesses that are so demanding. Some of us are employed by individuals that demand your presence most of the time and any off-time is not paid. Time for seeking proper medical attention is scarce. When this is coupled with long queues and poor service provision, we easily seek help from the local pharmacies”.*

*“The local health facility gives as the kind of treatment which we can easily access and negotiate for from the pharmacies around”.*

*“It’s always amoxyl for coughs even if you are not responding”.*

**Methods of acquiring SMWA:** Majority of the self-medicating households (65.2%) were acquiring medicine by describing the symptoms of their illness, 15.2% by mentioning the name of the medicine, 12.1% by mentioning the group to which the drug belongs (e.g. antimalarials) while 6.1% by presenting a piece of paper on which the name of the drug is written but only 1.5% acquired SMWA by showing an old sample or package of the drug (Table 3).

Table 2. Socio-demographic characteristics of the study population and prevalence of SMWA

Socio-demographic characteristics	Non-SMWA	SMWA	Non-SMWA	SMWA	P-value
	Within the categories		In relation to other categories		
<b>Age</b>					
15-25	51 (81.0)	12 (19.0)	(20.4)	(18.2)	0.068
26-35	89 (71.8)	35 (28.2)	(35.6)	(53.0)	
36-50	81 (85.3)	14 (14.7)	(32.4)	(21.2)	
Above 50	29 (85.3)	5 (14.7)	(11.6)	(7.6)	
<b>Gender</b>					
Male	108(84.4)	20(15.6)	(43.2)	(30.3)	0.058
Female	142(75.5)	46(24.5)	(56.8)	(69.7)	
<b>Marital status</b>					
Single	53(81.5)	12(18.5)	(21.2)	(18.2)	0.419
Married	168(80.0)	42(20.0)	(67.2)	(63.6)	
Divorced	55(5.6)	44(4.4)	(2.0)	(6.1)	
Widowed	17(77.3)	5(22.7)	(6.8)	(7.6)	
Separated	7(70.0)	3(30.0)	(2.8)	(4.5)	
<b>Family member</b>					
Father	81(81.0)	19(19.0)	(32.4)	(28.8)	0.150
Mother	132(75.9)	42(24.1)	(52.8)	(63.6)	
Son/Daughter	33(91.7)	3(8.3)	(13.2)	(4.5)	
Others	4(66.7)	2(33.3)	(1.6)	(3.0)	
<b>Education level</b>					
Illiterate	11 (68.8)	5 (31.3)	(4.4)	(7.6)	0.007
Read and write only	36 (100.0)	0 (0.0)	(14.4)	(0.0)	
Primary school	70 (72.2)	27 (27.8)	(28.0)	(40.9)	
Secondary school	89 (78.1)	25 (21.9)	(35.6)	(37.9)	
College level	44 (83.0)	9 (17.0)	(17.6)	(13.6)	
<b>Employment status</b>					
Student	11 (68.8)	5 (31.3)	(4.4)	(7.6)	0.291
Government employee	6 (85.7)	1 (14.3)	(2.4)	(1.5)	
Self-employed	118 (84.3)	22 (15.7)	(47.2)	(33.3)	
Employed by a private business	20 (74.1)	7 (25.9)	(8.0)	(10.6)	
Unemployed	95 (75.4)	31 (24.6)	(38.0)	(47.0)	

Socio-demographic characteristics	Non-SMWA	SMWA	Non-SMWA	SMWA	P-value
	Within the categories		In relation to other categories		
<b>Income level</b>					
< 5,000	168 (80.8)	40 (19.2)	(67.2)	(60.6)	0.394
5000-10, 000	58 (78.4)	16 (24.2)	(23.2)	(24.2)	
> 10, 000	24 (70.6)	10 (29.4)	(9.6)	(15.2)	
<b>Approximate drug expenditure</b>					
< 500	100 (73.5)	36 (26.5)	(40.0)	(54.5)	0.105
500 to 1, 000	90 (83.3)	18 (16.7)	(36.0)	(27.3)	
> 1, 000	60 (83.3)	12 (16.7)	(24.0)	(18.2)	
<b>Religion</b>					
Christian Orthodox	49 (89.1)	6 (10.9)	(19.6)	(9.1)	0.318
Christian Protestant	122 (76.3)	38 (23.8)	(48.8)	(57.6)	
Muslim	6 (85.7)	1 (14.3)	(2.4)	(1.5)	
Christian Catholic	72 (77.4)	21 (22.6)	(28.8)	(31.8)	
Others	1 (100.0)	0 (0.0)	(0.4)	(0.0)	
<b>Maternal status</b>					
Pregnant	11(84.6)	2(15.4)	(4.4)	(3.0)	0.002
Breastfeeding	25 (80.6)	6 (19.4)	(10.0)	(9.1)	
Has a chronic disease	35 (79.5)	9(20.5)	(14.0)	(13.6)	
Child under 12 years	85 (68.5%)	39 (31.5)	(34.0)	(59.1)	
>12 years	94 (90.4)	10(9.6)	((37.6)	(15.2)	

Note: Figures are n (%).P-values generated by Chi-square analyses

**Table 3. Perceptions of self-medication with antimicrobial practice**

<b>Variables</b>	<b>Non-SMWA</b>	<b>SMWA</b>	<b>Non-SMWA</b>	<b>SMWA</b>	<b>P-value</b>
	<b>Within the categories</b>		<b>In relation to other categories</b>		
<b>Age</b>					
15-25	51 (81.0)	12(19.0)	(20.4)	(18.2)	0.068
26-35	89 (71.8)	35(28.2)	(35.6)	(53.0)	
36-50	81 (85.3)	14(14.7)	(32.4)	(21.2)	
Above 50	29 (85.3)	5 (14.7)	(11.6)	(7.6)	
<b>Reasons for SMWA</b>					
Emergency use	138(85.7)	23(14.3)	(55.2)	(34.8)	<0.0001
Disease is not serious	51(70.8)	21(29.2)	(20.4)	(31.8)	
For prevention of known or unknown diseases	38(80.9)	9(19.1)	(15.2)	(13.6)	
Prior experience about the drug	5(100.0)	0(0.0)	(2.0)	(0.0)	
less expensive in terms of time and money	13(50.0)	13(50.0)	(5.2)	(19.7)	
NA	5(100.0)	0(0.0)	(2.0)	(0.0)	
<b>Methods of acquiring SMWA</b>					
By mentioning the name of the drug	106(91.4)	10(8.6)	(42.4)	(15.2)	<0.0001
By mentioning the group to which the drug belongs e.g. antacid	26(76.5)	8(23.5)	(10.4)	(12.1)	
By telling the symptoms of your illness	92(68.1)	43(31.9)	(36.8)	(65.2)	
By showing an old sample or package of the drug	8(88.9)	1(11.1)	(3.2)	(1.5)	
By presenting a piece of paper on which the name of the drug is written	13(76.5)	4(23.5)	(5.2)	(6.1)	
NA	5(100.0)	0(0.0)	(2.0)	(0.0)	
<b>Illness or symptoms of illness that requires no doctor</b>					
Respiratory tract infections	161(87.0)	24(13.0)	(64.4)	(36.4)	<0.0001
Gastrointestinal diseases	40(90.9)	4(9.1)	(16.0)	(6.1)	
Sexually transmitted diseases	8(44.4)	10(55.6)	(3.2)	(15.2)	
Eye diseases	2(25.0)	6(75.0)	(0.8)	(9.1)	
Headache or fever	28(59.6)	19(40.4)	(11.2)	(28.8)	
Maternal or menstrual disorders	3(50.0)	3(50.0)	(1.2)	(4.5)	
NA	8(100.0)	0(0.0)	(3.2)	(0.0)	

Variables	Non-SMWA	SMWA	Non-SMWA	SMWA	P-value
	Within the categories		In relation to other categories		
<b>Sources of information or advice on SMWA</b>			0.042		
Received no advice because the respondent knows about the drug	52(71.2)	21(28.8)	(20.8)	(31.8)	
Read label or leaflet or promotion material of the drug	52(73.2)	19(26.8)	(20.8)	(28.8)	
Advised by neighbors friends or relatives	26(76.5)	8(23.5)	(10.4)	(12.1)	
Suggested by traditional healers	3(60.0)	2(40.0)	(1.2)	(3.0)	
Advised by doctors nurses health workers but without a prescription	72(90.0)	8(10.0)	(28.8)	(12.1)	0.042
Recommended by pharmacists or those working at the pharmacy	40(83.3)	8(16.7)	(16.0)	(12.1)	
NA	5(100.0)	0(0.0)	(2.0)	(0.0)	

Figures are n (%). P-values generated by Chi-square analyses.



**Sources of SMWA Information:** Majority of the households (31.8%) were SMWA because they knew about the drug (self-initiative), 28.8% read a label or leaflet or promotion material of the drug, 12.1% were advised by neighbors, friends or relatives, 12.1% were advised by doctors, nurses, health workers but without a prescription, 12.1% received the recommendation by the pharmaceutical personnel, and 3% were suggested by traditional healers (Table 3). A person from the FGD explains that, *“When I have malaria or pneumonia or typhoid I just know. So I just go to the chemist and buy the necessary drugs”*.

**Symptoms or illnesses managed by SMWA:** Among the illnesses or symptoms of illnesses that were managed by SMWA, respiratory tract infections rated highest (36.4%), followed by headache or fever (28.8%), sexually transmitted diseases (15.2%), eye diseases (9.1%), gastrointestinal diseases (6.1%) and maternal or menstrual disorders that rated lowest (4.5%) (Table 3).

### 3.3 Perceptions Influencing Self-Medication with Antimicrobials

In a regression model, we looked at use of NHIF for outpatient services, use of Universal Healthcare Services, age, gender, marital status, educational level, occupation, average monthly income, religion, health condition of the drug consumer, illness or symptoms of illness that does not need a doctor, reasons for not seeing a doctor, methods of acquiring self-medication, sources of information or advice on self-medication and how they relate to SMWA practice. Results revealed that age (OR=0.647, 95% CI=0.431, 0.973,  $P=0.037$ ) is significantly related to SMWA, use of NHIF for outpatient services (OR=1.772, 95% CI=0.652, 2.887,  $P=0.133$ ) and use of Universal Healthcare Services (OR=1.165, 95% CI=0.922, 1.472,  $P=0.201$ ) may have non-significantly contributed to SMWA reduction. Likewise sources of information or advice on self-medication (OR=0.732, 95% CI=0.613, 0.873,  $P=0.001$ ) and illness or symptoms of illness may (OR=1.324, 95% CI=1.129, 1.554,  $P=0.001$ ) significantly influenced SMWA practices (Table 4).

## 4. DISCUSSION

Our study reported low levels of self-medication with antimicrobials (20.9%) in Nyalenda B, comparing favorably against previous studies in

Nyalenda B Ward of which 76.9% of the households self-medicated with antimicrobials [15] and in Sudan, Khartoum State, where 73.9% of a study population had self-medicated with antibiotics and/or antimalarials [2]. The low level could be due to the SMWA community mobilization intervention with structural modification which was commenced 7 months before the current study.

The study indicated that most common illnesses that were managed by SMWA were respiratory tract infections, headache or fever, gynecological inflammations (sexually transmitted diseases and maternal or menstrual disorders), eye diseases and gastrointestinal diseases. This report is similar to the findings of a nationwide cross-sectional study among teachers from Yemen, Saudi Arabia, and Uzbekistan that reported respiratory tract infections and gynecological inflammations as the top clinical indications for SM with antibiotics [1]. In a different study that aimed at describing the factors associated with self-medicated consumption of drugs in Spain from a gender perspective, the results revealed that cold, influenza and sore throat as the top clinical indication for SMWA among women [16, 17], findings that are consistent to those in the current study. Similarities in the previous versus current study could be attributed to similarities in study design and fairly comparable socio-economic status and age groups across the study populations.

### 4.1 Reasons for SMWA

The most common reason for SMWA is its convenience in emergency, but others resorted to it when they considered their disease condition not serious. Other study participants indicated that they found it easily accessible when they were faced with time constraint or scarcity of money, while others used it for disease prevention as prophylactic drugs. These observations in the current study are similar to the findings of a cross-sectional study in North-Eastern Tanzania in which the most commonly reported reasons for self-medication with antibacterials were emergency illness, health facility charges and proximity of pharmacy to home place [17]. Similar reasons were also given by a study done among the of Silte Zone community, South Ethiopia where majority of the respondents practiced self-medication to avoid waiting time at health facilities [18]. The convenience and easy accessibility in SMWA practice, time constraint and cost of prescription medicine could be due to

**Table 4. Perceptions influencing self-medication with antimicrobials**

Variables	P-value	OR	SMWA	
			95% CI	
			Lower	Upper
Use of NHIF card for outpatient services	0.133	1.772	0.840	3.739
Use of the Universal Health Care services	0.404	1.372	0.652	2.887
Age	0.037	0.647	0.431	0.973
Gender	0.604	1.206	0.595	2.445
Marital status	0.228	1.233	0.877	1.732
Educational level	0.146	0.777	0.553	1.092
Occupation	0.659	1.062	0.813	1.387
Average monthly income	0.155	1.392	0.882	2.197
Religion	0.559	1.087	0.821	1.441
Health condition of the drug consumer	0.736	1.055	0.772	1.444
Illness or symptoms of illness that does not need a doctor	0.001	1.324	1.129	1.554
Reasons for not seeing a doctor	0.201	1.165	0.922	1.472
Methods of acquiring self-medication	0.057	1.296	0.992	1.694
Sources of information or advice on self-medication	0.001	0.732	0.613	0.873

*Analyses performed using logistic regression analyses. OR=Odds Ratio, 95% CI= 95% Confidence Interval*

the much lower density of doctors per 1000 population in African countries (0.21) as compared to the density in Eastern Mediterranean (0.74), Southeast Asia (0.52), and 3.2 doctors in EU [19]. Many studies have also cited reasons such as high absenteeism, poor quality of services, rampant corruption and long travel distances as prominent reasons for poor access of public sector health facilities [20-22]. Therefore, when medications are easily accessible in pharmacies and even in local shops, SM seems a “quick and cheap” method for people’s self-management of their self-diagnosed illness [23].

#### 4.2 Sources of Information

The common households’ sources of SMWA information were knowledge of the drug (self-initiative) label, leaflet, promotion material of the drug, advice by neighbors’ friends or relatives, health professionals, recommendation by the pharmaceutical personnel, and suggestions by traditional healers. These observations are similar to those in previous studies of a Lithuanian population in which more than one-tenth of the parents reported administering antibiotics to children according to their own knowledge or advice given by family members and friends [24]. It is also similar to studies done in Alexandria, Egypt [25] in which major sources of information about drugs were old prescriptions, pharmacist, family or friends, media [26] in which most common sources of information on self-medication were own

initiative, family/friends, healthcare professionals, and sales clerk at medical store. Thailand also reported Television and newspaper leaflets from hospital as the top sources for information about drugs for SM [20] and this is similar to our study findings.

In the regression analyses, age was significantly related to SMWA practice. Use of NHIF for outpatient services and Use of Universal Healthcare Services may have non-significantly contributed to SMWA reduction.

Our study findings on age can be compared to a study done in Uzbekistan in which age did not affect self-medication and a nationwide cross-sectional study among teachers from Yemen, Saudi Arabian that reported that younger women were more likely to keep medicine inventory at home and self-medicate. The relationship of Universal Health Care with SMWA findings from our study can be linked to the Pagan [19] report which stated that lack of government-sponsored health insurance coverage increases the propensity to self-medicate. Increasing health insurance coverage could reduce the demand for self-medication by making healthcare more affordable. Consultation fees in developing countries are high and high out-of-pocket costs make health services inaccessible to a significant proportion of households. Those accessing health care in the public sector generally receive poor quality services [23]. Unlike in the previous study by Pagan and findings in our study, an Indonesia study reported that participants with

health insurance still preferred to SM rather than visit health facilities, even though they had to pay out of pocket [23].

We experienced a limitation during the study: objective assessment of the level and perceptions of self-medication with antimicrobials after the intervention may have presented a challenge because of social pressure especially among the CHVs. We tried to address this limitation by engaging the same enumerators during baseline, interventions and end line studies and encouraging the respondents to be as truthful as possible since their responses were confidential, and would be used to guide critical interventions in their health.

## 5. CONCLUSION

The prevalence of SMWA after community mobilization intervention using empowerment as a strategy and implemented through participatory learning and action is comparatively very low. The household practicing SMWA after the intervention are persistent because of its convenience in emergency. Majority either knew about the medicine that would manage their illness or they would acquire them from the pharmacy by describing the symptoms of their illness. Therefore in close collaboration with this intervention, there should be an improvement in the quality of healthcare facilities with easy access, law enforcement, and control regulations regarding the inappropriate use of antibiotics. Pharmaceutical personnel should also be morally encouraged to educate patients and rationalize antibiotic use by strictly stopping antibiotic sales without an authorized prescription by physicians. SMWA is a serious problem in developing countries and so such intervention should be prolonged and continuous to offer sustained changes in public perception and attitudes towards the misuse of antimicrobials hence development of SMWA perceptions with an experiential value. This pilot study could be considered as the starting point for a wider scale community mobilization intervention study and national SMWA campaign.

## 6. RECOMMENDATION

The difference in SMWA after the intervention is great and recommendable (from 76.9% to 20.9%) but (20.9%) of SMWA is still a serious public health problem. Community health strategy should be strengthened to sustain community mobilization on SMWA results and

facilitate the improvement of quality of healthcare facilities with easy access.

## CONSENT

Not Applicable.

## ETHICAL APPROVAL

The Maseno University Ethics Review Committee approved the current study. The permission to conduct the study within Nyalenda informal settlement was provided by the area chief. Participants provided written informed consent prior to inclusion in the study.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Tatyana B, et al. Antibiotic use and knowledge in the community of Yemen, Saudi Arabia, and Uzbekistan. *J Infect Dev Countr.* 2014;8 (4):424 – 429.
2. Awad A, et al. Self-medication with antibiotics and antimalarials in the community of Khartoum State, Sudan. *J Pharm Pharm Sci.* 2005;8(2):326-31.
3. Nasir TW, Dargicho A, Mulugeta TA. Self-medication with antibiotics and antimalarials in the community of silte Zone, South Ethiopia. *TAF Preven Med Bull.* 2012;11(5):529-536.
4. Solomon MR, ed. *Consumer Behaviour.* 2<sup>nd</sup> ed; 2012.
5. Kiyangi KS, Lauwo JA. Drugs in the home: danger and waste. *World Health Forum,* 1993;14(4):381-4.
6. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self medication. *Drug Saf.* 2001;24(14):1027-37.
7. WHO. Global strategy for Containment of antimicrobial resistance: World Health Organization, Communicable Disease surveillance and Response. (WHO / CDS / CSR / DRS / 2001); 2001.
8. WHO. *Antimicrobial Resistance Global Report on Surveillance;* 2014.
9. Secretariat UN. *Expert group review of the draft handbook on designing of household sample surveys,* S.d.Editor; 2003.
10. IIED, *An enumeration and mapping of informal settlements in Kisumu, Kenya,*

- implemented by their inhabitants. 2010; 22(1):217-239.
11. KIHBS. Kenya Integrated Household Budget Survey (2005/06) (Revised Edition) Kenyan-Population-and-Housing-Census; 2012.
  12. Owuor IA, Atieli H, Ouma C. The Role of participatory learning and action on strengthening the different domains of empowerment on self-medication with antimicrobials in Nyalenda informal settlement, Kisumu County, Kenya. JAMPS. 2019;21(3):1-12.
  13. Fisher A, Laing AJ, Stoeckel J. Guidelines for overcoming design problems in family planning operations research. Studies in Family Planning. 1985;16(2).
  14. Kukathas C. The Liberal Archipelago: A Theory of Diversity and Freedom. Oxford university press; 2003.
  15. Owuor IA, Alwar J, Oyugi H. Perceptions influencing self medication with antibiotics and/or antimalarials. AJPHR. 2015;3(3): 116-121.
  16. Carrasco-Garrido P, et al. Sex—Differences on self-medication in Spain. Pharmacoepidemiol Drug Saf. 2010;19: 1293-1299.
  17. Horumpende PG, et al. Prevalence, determinants and knowledge of antibacterial self-medication: A cross sectional study in North-eastern Tanzania. PLoS One. 2018;13(10).
  18. Mossa DA, Wabe NT, Angamo MT. Self-medication with antibiotics and antimalarials in the community of Silte Zone, South Ethiopia. TAF Preventive Medicine Bulletin. 2012;11(5):529-536.
  19. Pagán J, Ross S, Yau J. Self-medication and health insurance coverage in Mexico. Health Policy. 2006;75:170-177.
  20. Kitikannakora N, Sitthiworrnanan C. Self-medication among undergraduate students in Thailand. Int J Disabil Hum Dev. 2009; 8:411-416
  21. Skliros E, Merkouris P, Papazafiropoulou A. Self-medication with antibiotics in rural population in Greece: a cross-sectional multicenter study. BMC Fam Pract. 2010; 11(58).
  22. Sarahroodi S, Arzi A, Sawalha A. Antibiotics self-medication among southern Iranian University Students. IJP. 2010;6: 48-52.
  23. Widayati A, et al. Self-medication with antibiotics in Yogyakarta City Indonesia: A cross sectional population-based survey. BMC. 2011;4:491.
  24. Pavydė E, et al. Public Knowledge, Beliefs and Behavior on Antibiotic Use and Self-Medication in Lithuania. Int J Environ Res Public Health. 2015;17(12):7002-7016.
  25. El-Nimr N, Wahdan I, Wahdan A. Self-medication with drugs and complementary and alternative medicines in Alexandria, Egypt: prevalence, patterns and determinants. East Mediterr Health J. 2015;21:256-65.
  26. Aqeel A, et al. Prevalence of Self-Medication among Urban and Rural Population of Islamabad, Pakistan. Trop J Pharm Res. 2014;13:627-633.

© 2019 Owuor et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<http://www.sdiarticle4.com/review-history/52245>