



Elvis T Amin¹, Njumkeng Charles¹, Johnson A Fondugallah², Akemfua Fualefac¹, Prudence Tatiana N Mvilongo², Denis Ako-Arrey¹ and Patrick A Njunkeng^{1*}

¹Global Health Systems Solutions, Limbe, Cameroon

²Global Research Education and Health Foundation, Buea

Received: 21 March, 2018

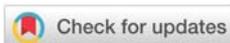
Accepted: 04 April, 2019

Published: 05 April, 2019

*Corresponding author: Patrick A Njunkeng, Professor, The Principle Investigator/Executive Director, Global Health Systems Solutions, Sonara Road, Mokinidi Layout-Isokolo, P.O BOX 732, Limbe, Cameroon, Email: p3njukeng@gmail.com

Keywords: Self-medication; Antimicrobials; Non-prescription; Antimicrobial resistance; Cameroon

<https://www.peertechz.com>



Research Article

Prevalence of antimicrobial self-medication among patients attending two hospitals in the Buea Health District, Cameroon

Abstract

Background: Self-medication is an important public health problem in developed and developing countries, with antimicrobial resistance increasing over time as a result of antimicrobial abuse. The aim of this study was to determine the prevalence of antimicrobial self-medication as well as associated factors among outpatient consultations of two hospitals within the Buea Health District, Cameroon.

Methods: This was a cross-sectional survey that was conducted in two hospitals in the Buea Health district from June to October 2018. 329 patients for outpatient consultations were selected by simple random sampling and interviewed. The data was analyzed using SPSS software version 21. Descriptive statistics such as frequencies, percentages was used to present data. Chi square test was applied to compare various variables of those who practiced self-medication and those who did not practice in order to find the statistical significance. Multivariate logistic regression analysis was used to determine factors associated with self-medication.

Results: Out of the 329 patients who consulted at the outpatient departments, 225 of participants had self-medicated with antimicrobials giving an overall prevalence of 68.4% (95% CI 63.38- 73.42). The highest prevalence of self-medication (81.8%) was found within the age group 30-49 years while 0-9 years had the lowest prevalence of 37.5%. Those unemployed had the highest prevalence of 78.0%. The factors associated with self-medication with antimicrobials were age ($p = 0.004$) and occupation ($p = 0.016$). The main reasons for self-medication were cost cutting (40.9%) followed by past experience from similar symptoms (29.3%). The main source of antimicrobials was from the community pharmacy (55.1%).

Conclusion: Health education interventions on self-medication with antimicrobial practices should target people of all ages, sex, education, occupation and community at large. Community pharmacies should not dispense or sell antibiotics without prescriptions to patients. Interventions to decrease self-medication with antibiotics should emphasize on reducing access in obtaining antibiotics without prescription.

Introduction

Self-medication is a human practice in which an individual self-administers treatment for a health condition. The World Health Organization (WHO) refers to self-medication as the selection and administration of a drug by an individual to treat a self-diagnosed illness or symptoms [1]. Its encompasses the purchase of medication without a prescription, administering medication based on the advice of the pharmacist, colleagues, friends, relatives and as well as consuming left over drugs stored at home or sharing medications with family members without a professional consultation [2]. Self-medication is

an important public health problem in both developed and developing countries. However, self-medication presents a greater problem in developing countries such as Cameroon with a physician-population ratio of 0.07 per 1,000 [3].

In countries where universal health coverage is not yet achieved, self-medication becomes the preferred practice patients resort to, in the management of minor emergency and acute health problems like vomiting, fever, cough, headache, nausea, diarrhea/dysentery, and cold among others [4-7]. Other reasons reported to lead to self-medication include; past treatment experiences with similar symptoms, advertisements and unavailability of health professionals [4,7].

A systematic review of self-medication practice has shown that self-medication prevalence ranges from 0.1% to 100% with most of the Sub-Saharan country having a prevalence of 50% and above [6]. In Cameroon the prevalence of self-medication has been reported as 61% [8].

The World Health Organization stipulated that proper self-medication be beneficial in the treatment of acute illnesses that don't require medical consultation or recurrent conditions that have already been diagnosed at previous consultations. Responsible self-medication leads to cost savings in resource limited settlements, and also provides prompt access to medication and thus, faster relief to the patient especially in countries with congested health services [9]. Self-medication makes the patient more independent in making decisions on minor health problems which enhances the modern idea of a well-informed patient actively participating in health care management. Nevertheless, self-medication also generates numerous setbacks and risks for the patient. Studies have reported inappropriate self-medication which has resulted to adverse drugs reactions, masking of a more severe underlying health condition, inaccurate self-diagnosis, failure to seek medical advice on time and increases antibiotics resistance [10-12].

Previous publications have reported that antimicrobial resistance increasing over time with antimicrobial abuse as one of the contributing factors [13]. It has also been demonstrated that there is lack of knowledge on the risk of antimicrobial resistance among self-medicating populations. Potential adverse effects of the irrational use of antimicrobial drugs have also been reported as disadvantages of self-medication as this leads to increase in the microbe's resistance to them [14].

Little has been documented about the prevalence of antimicrobial self-medication among patients seeking medical care from a professional. This study was conceived to determine the prevalence of self-medication with antimicrobials among patients consulting the outpatient department of two hospitals within the Buea Health District. The study also examined the various classes of antimicrobial drugs self-medicated per symptoms and the source of the drugs.

Methods

Study Area

The study was conducted in two health facilities within the Buea Health District, which constitute one of the four health districts in Fako Division of the South-West Region, Cameroon. The district has 21 health facilities, 8 pharmacies and over 50 drug stores. This health district has about 133,092 inhabitant distributed within 66 communities across 7 health areas, namely; Molyko, Muea, Buea Town, Bova, Bokwaongo, Tole and Buea Road health areas Error! Bookmark not defined.]. The hospitals within this health district are very accessible to patients and offer consultations, laboratory and pharmacy (for essential drugs) services to the population on regular basis.

Study design

This was a cross-sectional survey that was conducted in two

health facilities (Buea town Sub-divisional hospital and Kahwa Sumbele Medical Clinic) in the Buea Health District, between June and October 2018. The study participants consisted of patients seeking consultation at the outpatient department. Upon consultation, the consulting physician obtained the participants consent and collected information on self-medication with a structured questionnaire. For the patients who could not consult by themselves, questions regarding self-medications were asked from their caregivers or guardians accompanying them for consultations.

To minimize errors, the consulting physician displayed packs of common antimicrobials to help participants identify the self-medicated drugs.

Data collection

The data was collected with the aid of a structured questionnaire during consultations with the physician. In addition to the routine questions asked during consultations, the consulting physician used the structured questionnaire to probe further with additional questions regarding self-medication such as: sex, age, religion, marital status, occupation, advice on drug choice, source of drug and reasons for self-medication.

Data analysis

The data collected was entered into an excel spreadsheet and exported into SPSS software version 21 for analysis. Descriptive statistics such as symptoms that prompted self-medication, source of drug and reasons for self-medication were expressed as percentages. Pearson Chi square test was used to compare the differences between groups. A statistical significance was set at $p < 0.05$.

Ethical considerations

The Ethical approval for this study was obtained from the Cameroon Baptist Convention Health Board Institutional review board (CBCHB IRB) (Re: IRB2017-23). The South West Regional Delegation of Public Health provided Administrative authorization while consent and assent were obtained for the adults and minor participants respectively.

Results

Demographic characteristics, prevalence of AMR self-medication and its associated factors in the study population

A total of 329 individuals were enrolled in the outpatient department during our study period. Participants were aged 1 to 99 years with a mean age of 33.37 (SD 17.88) while the age group 20-29 years was the most represented. Of out the 329 participants, 227 (69.0%) were females and 205(62.3%) were Christians. Regarding participants' educational levels, majority 112(34.0%) had acquired secondary education while 32(9.7%) had acquired no former education. Most of the participant 136(41.3%) had no permanent jobs while 41(12.5%) were unemployed (Table 1).

The survey findings showed that 225 of the participants had self-administered at least one antimicrobial drug before seeking medical care in the health facility. This represents an overall prevalence of 68.4 (95% CI 63.38– 73.42) observed among the patients received in the outpatient department. The number of times each participant reported to have self-medicated before coming for consultation ranged from 1 to 8 times with an average of 2.63. The highest prevalence of self-medication (81.8%) was found within the age group 30–49 years while 0–9 years had the lowest prevalence of 37.5 (p =0.004). With respect to participants occupation the prevalence of self-medication was significantly higher among those who were unemployed (78.0) compare to those who had no permanent job (35.6) (p = 0.016). No significant difference was observed in self-medication with respect to marital status, religion, education and sex (Table 1).

Classes of drugs self-medicated and the symptoms that prompted self-medication

The drugs that were self-medicated were grouped into 10 classes as shown on table 2. The drugs comprised of antibiotics, antifungal, and antiprotozoa. Out the 225 self-medicated cases, Penicillin (dominated by Amoxicillin) was the most self-medicated class of drugs 73(32.4%). Among participants who used penicillin, 29(74.4%) used it for respiratory symptoms such as cough, catarrh and, dyspnea. Antimalarial (all arthemeter/lumefantrine) was another class of drugs highly

used 70(31.1%). Antimalarial was mostly self-medicated by those who had headache 13(92.9%) and fever 41(78.8%). Of the 49 participants who reported gastrointestinal tract symptoms (diarrhea, constipation, abdominal pains), 17 (34.7%) used Nitroimidazoles (metronidazole). On the other hand among the 34 participants who were prompted to self-medicate by urogenital symptoms (dysuria, urethral discharge, vaginal itches, and lower abdominal pains), most of them 10(29.4%) used penicillin.

Sources of information used for self-medication

Out of the 225 patients who resorted to self-medication in other to treat their health problems, 97 (43.1%, 95% CI 36.5–49.9) sought no advice while 86(38.2%, 95% CI 31.8– 44.9) got advice from non-medical personnel. Regarding the source of the drugs, 77(34.2%, 95% CI 28.0–40.8) bought from a local vendor and majority of the participants got their dosages from the drug seller 169(75.1%, 95% CI 68.9–80.6) as shown on table 3. The main reason for self-medication was cost cutting followed by past experience (40.9% and 29.3% respectively) (Figure 1).

Discussion

The prevalence of self-medication with antimicrobial drugs before seeking medical consultation in this study was 68.4%. This was similar to 67.8% reported as prevalence of self-medication for oral health problems in Cameroon established in a community based survey [8]. However, the prevalence reported in this study presents a different magnitude of the problem because it studied patients who were consulting because they were not relieved by self-medication. The fact that these patients seek professional advice only after failed self-medication brings forth some of the major problems reported to be associated with self-medication such as wastage of resources, increased resistance of microbes, inaccurate self-diagnosis and failure to seek timely medical advice [6,10–12,14].

The high prevalence of patients who sought medical care because self-medication failed to relieve them of their condition further highlights inappropriate use of antimicrobial agents as reflected by the source of advice they had on self-medication. Finding revealed that very few sought advice from a medical personnel, a good number bought their drugs from a shop and over 75% got their dosage from the seller. This further presents the incorrect self-diagnosis, poor drug handling and storage and inappropriate dosage which can go a long way to compromise the treatment benefits.

The prevalence of self-medication was found to be associated with patients' age and occupation. The prevalence of self-medication was lower among participant below 20years of age and those greater than 60years of age. The middle age group (20 to 60years) with higher prevalence of self-medication can be considered as the most active and challenging ages of life. It is therefore evident that some of the reasons for self-medicating such as advertisement, cost cutting and time saving can be associated to this age group. Several studies have reported similarly findings [5,8,15,16].

Table 1: Socio-demographic and factors associated with antimicrobial self-medication in the study population.

Variable	Category	Number enrolled	Number Self-medicated (%)	χ^2 P-value
Sex	Male	102	68(66.7)	0.652
	Female	227	157 (69.2)	
Age group (years)	0-9	24	9(37.5)	0.004
	10-19	31	19(61.3)	
	20-29	118	83(70.3)	
	30-39	55	45(81.8)	
	40-49	36	28(77.8)	
	50-59	32	22(68.8)	
	≥60	33	19(57.6)	
Education	No formal education	32	25(78.1)	0.147
	Primary	80	47(58.8)	
	Secondary	112	78(69.6)	
	Tertiary	105	75(71.4)	
Religion	Christian	305	205(67.2)	0.121
	Muslim	16	12(75.0)	
	Others	8	8(100)	
Marital Status	Single	214	139(65.0)	0.065
	Married	115	86(74.8)	
Occupation	Unemployed	41	32(78.0)	0.016
	Employed	69	53(76.8)	
	Business owner	83	60(72.3)	
	No permanent job	136	80(35.6)	

Table 2: Symptoms that prompted self-medication and the various class of drugs that were self-medicated by participants.

	Frequency of Symptom (N)	Number of times each Class of drug was used (N%)									
		Penicillin	antimalarials	Nitroimidazoles	Quinolones	Sulfonamides	Cephalosporins	Azole Antifungal	Tetracycline	Macrolide	Amino-glycosides
Body pain	22	1(4.5)	15(68.2)	0(00)	4(18.2)	1(4.5)	0(00)	1(4.5)	0(00)	0(00)	0(00)
Fever	53	10(24.5)	41(78.8)	1(4.3)	0(00)	1(1.9)	0(00)	0(00)	0(00)	0(00)	0(00)
GIT symptoms	49	12(24.4)	1(2.0)	17(34.7)	9(18.4)	3(6.1)	3(6.1)	4(8.2)	0(00)	0(00)	0(00)
Headache	14	1(7.1)	13(92.9)	0(00)	0(00)	0(00)	0(00)	0(00)	0(00)	0(00)	0(00)
Minor abrasions and lacerations	14	10 (71.4)	0(00)	1(7.1)	0(00)	0(00)	0(00)	2(14.3)	1(5.9)	0(00)	0(00)
Respiratory symptoms	39	29(74.4)	0(00)	1(2.6)	2(5.1)	6(15.4)	0(00)	0(00)	0(00)	1(2.6)	0(0.0)
Urogenital symptoms	34	10(29.4)	0(00)	1(2.9)	3(8.8)	0(00)	6(17.6)	2(5.9)	7(20.6)	3(8.8)	2(5.9)
Total	225	73(32.4)	70(31.1)	21(9.3)	18(8.0)	11(4.9)	9(4.0)	9(4.0)	8(3.6)	4(1.8)	2(0.8)

Table 3: Sources of information used as guide for self-medication.

Variable	Source of information	Frequency	Percentage (95% CI)
Advice on choice of Drugs	Medical	42	18.7 (13.3- 24.4)
	Non-Medical	86	38.2(31.8- 44.9)
	No advice was sought	97	43.1(36.5-49.9)
Source of drug	Community Pharmacy	124	55.1(48.4-61.7)
	Friends	8	3.6(1.5-6.9)
	Health Worker	16	7.1(4.1-11.3)
	Shop	77	34.2(28.0-40.8)
Dosage	Seller	169	75.1(68.9-80.6)
	Friend	20	8.9(5.5-13.4)
	Previous Prescription	19	8.4(5.2-12.9)
	Leaflet	17	7.6(4.5-11.8)

in Cameroon 46.5% of those who practice self-medication said they lack money to seek profession consultation [8].

The main symptoms that triggered self-medication were fever, body pain, headache, GIT symptoms (diarrhea, constipation, abdominal pains), urogenital symptoms (dysuria, urethral discharge, vaginal itches, and lower abdominal pains) and respiratory symptoms such as cough, catarrh and, dyspnea. These symptoms have been associated to self-medication in previous studies [5,6,17-19]. Penicillin and antimalarial drugs were the most self-medicated antimicrobial in this study. Penicillin (dominated by Amoxicillin) was commonly used for respiratory symptoms. Authors have reported that some of the self-diagnosis are self-limiting and antimicrobial drugs would not have been administered [18]. Previous research within this study area has reported that penicillin drugs such as ampicillin and amoxicillin have developed resistance above 50% to urogenital pathogens [13]. The author of the study also point at self-medication and drug abuse as possible causes of the reported resistance. The high prevalence of self-medication on antimalarial (all arthemeter/lumefantrine) can be related to the fact that Buea is a malaria endemic area [20]. Thus self-treatment of malaria could be common due to self-diagnosis based on presumptive signs and symptoms of malaria. High prevalence of antimalarial self-medication have been reported in other malaria endemic region [21].

Conclusion

Antimicrobial self-medication is a common practice among patients in Buea health district in Cameroon. Following the global threat on antimicrobials by the rapidly growing burden of antimicrobial resistance worldwide, health educational programs should be implemented nationwide regarding the use of antimicrobials. These educational programs should target people of all ages, sex, education, occupation and the community at large, emphasizing on the need of community pharmacies in avoiding the sale/dispense of antimicrobials without prescriptions to patients. Interventions to decrease self-medication with antibiotics should emphasize on reducing access in obtaining antibiotics without prescription.

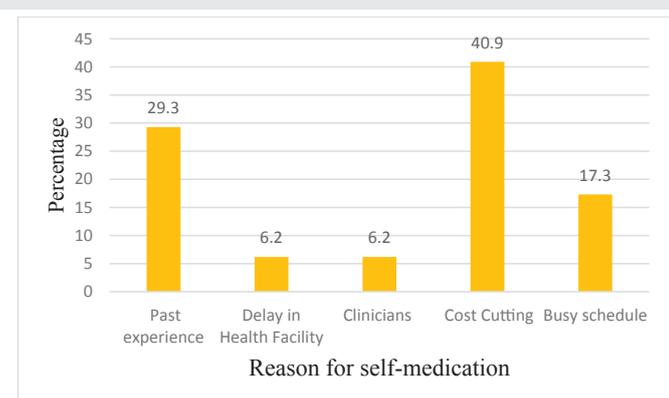


Figure 1: Reasons for self-medication in the study population.

The highest level of antimicrobial self-medication was seen among individuals who are unemployed. This goes a long way to show that self-medication is associated with income level. This finding was further supported by the fact that the main reason (40.9%) of self-medication was cost cutting. In Sudan it has been shown that the prevalence of self-medication was lower among individuals with higher income level [16], while

Ethical approval

Ethical approval for this study was obtained from the Cameroon Baptist Convention Health Board Institutional review board (CBCHB IRB) (Re: IRB2017-23).

Acknowledgements

Our special thanks go to our research assistants and all of the respondents who participated in this study. We are grateful to the administration of Buea town Sub-divisional hospital and Kahwa Sumbele Medical Clinic for their collaboration through the study.

References

- World Health Organization (2011) Role of the pharmacist in the healthcare system. Geneva: WHO.
- Gupta V, Bansal P, Manhas R, Singh Z, Ghaiye P (2011) Preferred system of medicine reasons of self-medication among college students in Malwa region of Punjab. *J Drug Delivery Therap* 1: 27-29. [Link: http://tinyurl.com/y33wt8sa](http://tinyurl.com/y33wt8sa)
- Tandi TE, Cho Y, Akam AJ, Afoh CO, Ryu SH, et al. (2015) Cameroon public health sector: shortage and inequalities in geographic distribution of health personnel. *International journal for equity in health* 14: 43. [Link: http://tinyurl.com/yyyy822hz](http://tinyurl.com/yyyy822hz)
- Marwa AF, Khaloud AB, Wefaq OH, Shah AK (2014) Evaluation of self-medication practices in acute diseases among university students in Oman. *Journal of Acute Disease*. 249-252. [Link: http://tinyurl.com/y3jqzct6](http://tinyurl.com/y3jqzct6)
- Selvaraj K, Kumar SG, Ramalingam A (2014). Prevalence of self-medication practices and its associated factors in Urban Puducherry, India. *Perspectives in clinical research* 5: 32-36. [Link: http://tinyurl.com/y3dt5xfq](http://tinyurl.com/y3dt5xfq)
- Dnyanesh L, Vaidehi L, Gerard K, Gerhard F (2017) A Systematic Review of the Literature to Assess Self-medication Practices. *Ann Med Health Sci Res* 7: 1-15. [Link: http://tinyurl.com/y3skfxa5](http://tinyurl.com/y3skfxa5)
- Subash VK, Shilpa S, Hima BPA (2014) Cross-sectional Study on Assessment of Self-medication Practice among Professional and Non Professional Subjects (CASPANs-WGL-1). *Inventi Impact: Pharmacy Practice* 85-92. [Link: http://tinyurl.com/y62n2fna](http://tinyurl.com/y62n2fna)
- Agbor M, Azodo C (2011) Self-medication for oral health problems in Cameroon. *Int Dent J* 61: 204-209. [Link: http://tinyurl.com/y33ghfj8](http://tinyurl.com/y33ghfj8)
- World Health Organization (1998) The Role of the pharmacist in self-care and self-medication: report of the 4th WHO Consultative Group on the Role of the Pharmacist, The Hague, The Netherlands, 26-28 August 1998. Geneva. World Health Organization. [Link: http://tinyurl.com/y3pxa88r](http://tinyurl.com/y3pxa88r)
- James H, Handu SS, Al Khaja KAJ, Otoom S, Sequeira RP (2006) Evaluation of the knowledge, attitude and practice of self-medication among first year medical students. *Med Princ Pract* 15: 270-275. [Link: http://tinyurl.com/y5jwnpfg](http://tinyurl.com/y5jwnpfg)
- Alam N, Saffoon N, Uddin R (2015) Self-medication among medical and pharmacy students in Bangladesh. *BMC Res Notes* 8: 763. [Link: http://tinyurl.com/y2eh92gl](http://tinyurl.com/y2eh92gl)
- Maria Esperanza Ruiz (2010) Risks of Self-Medication Practices. *Current Drug Safety* 5: 315-323. [Link: http://tinyurl.com/y5ff9lqm](http://tinyurl.com/y5ff9lqm)
- Elvis T AMIN, Charles NJUMKENG, Belmont T KIKA, Akemfua Fualefac, Njukeng P (2018) Pattern of Antimicrobial Resistance among Bacterial Isolates from Urogenital Clinical Specimens: A Descriptive Study from the Buea Health District, Cameroon. *Drugs - Real World Outcomes* 5: 101-108. [Link: http://tinyurl.com/y36je8fg](http://tinyurl.com/y36je8fg)
- Widayati A, Suryawati S, de Crespigny C, Hiller J (2011) Self-medication with antibiotics in Yogyakarta City Indonesia: a cross sectional population based survey. *BMC Res Notes* 4: 491. [Link: http://tinyurl.com/y3tmjrpk](http://tinyurl.com/y3tmjrpk)
- Yousef AMM, Al-Bakri AG, Bustanji Y, Mayyada W (2008) Self-Medication Patterns in Amman, Jordan. *Int J Clinical Pharmacy* 30: 24-30. [Link: http://tinyurl.com/yyup7486](http://tinyurl.com/yyup7486)
- Awad A, Eltayeb I, Matowe L, Thalib L (2005) Self-medication with antibiotics and antimalarials in the community of Khartoum State, Sudan. *J Pharm Pharm Sci* 12: 326-331. [Link: http://tinyurl.com/y2lt278c](http://tinyurl.com/y2lt278c)
- de Moraes A, Delaporte T, Molena-Fernandes C (2011) Factors associated with medicine use and self medication are different in adolescents. *Clinics* 66: 1149-1155. [Link: http://tinyurl.com/yyf5n5hf](http://tinyurl.com/yyf5n5hf)
- Grigoryan L, Haaijer-Ruskamp F, Burgerhof J (2006) Self-medication with antimicrobial drugs in Europe. *Emerging Infectious Diseases*. 12: 452-459. [Link: http://tinyurl.com/yy4s9zrq](http://tinyurl.com/yy4s9zrq)
- Araújo D, Leal M, Santos E (2013) Consumption of medicines in high-risk pregnancy: evaluation of determinants related to the use of prescription drugs and self-medication. *Brazilian Journal of Pharmaceutical Sciences* 49: 491-499. [Link: http://tinyurl.com/yxuhxoqg](http://tinyurl.com/yxuhxoqg)
- Apinjoh TO, Anchang-Kimbi JK, Mugri RN, Tangoh DA, Nyingchu RV, et al. (2015) The Effect of Insecticide Treated Nets (ITNs) on Plasmodium falciparum Infection in Rural and SemiUrban Communities in the South West Region of Cameroon. *PLoS ONE* 10: e0116300. [Link: http://tinyurl.com/y5klxpxe](http://tinyurl.com/y5klxpxe)
- Osemene K, Lamikanra AA (2012) Study of the Prevalence of Self-Medication Practice among University Students in Southwestern Nigeria. *Trop J Pharm Res* 11: 683-689. [Link: http://tinyurl.com/y4zdagjy](http://tinyurl.com/y4zdagjy)

Discover a bigger Impact and Visibility of your article publication with Peertechz Publications

Highlights

- ❖ Signatory publisher of ORCID
- ❖ Signatory Publisher of DORA (San Francisco Declaration on Research Assessment)
- ❖ Articles archived in worlds' renowned service providers such as Portico, CNKI, AGRIS, TDNet, Base (Bielefeld University Library), CrossRef, Scilit, J-Gate etc.
- ❖ Journals indexed in ICMJE, SHERPA/ROMEO, Google Scholar etc.
- ❖ OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting)
- ❖ Dedicated Editorial Board for every journal
- ❖ Accurate and rapid peer-review process
- ❖ Increased citations of published articles through promotions
- ❖ Reduced timeline for article publication

Submit your articles and experience a new surge in publication services (<https://www.peertechz.com/submission>).

Peertechz journals wishes everlasting success in your every endeavours.

Copyright: © 2019 Amin ET, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Amin ET, Charles N, Fondugallah JA, Fualefac A, Njukeng PA, et al. (2019) Prevalence of antimicrobial self-medication among patients attending two hospitals in the Buea Health District, Cameroon. *Arch Community Med Public Health* 5(1): 024-028. DOI: <http://dx.doi.org/10.17352/2455-5479.000048>