

Prevalence and Risk Factors of Self-Medication in Two Health Districts in Douala, Cameroon: Bonassama and Cite des Palmiers

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Abstract

Aims: The World Health Organisation defines self-medication as the act of selection and use of medicine by individuals to treat self-recognized illnesses and symptoms or by health professionals to use drugs not prescribed by the treating physician. WHO has reported a prevalence of self-medication of 32.5% to 81.5% worldwide. In Cameroon a prevalence of 67,8%, and 41,9% has been reported in some studies. This study sought to assess the socio-demographic characteristics, prevalence, associated risk factors and the common medications of self-medication at the Bonassama and Cite des Palmiers Health Districts of Douala, Cameroon. **Place and duration of the study:** the study was conducted from December 2022 to May 2023 in two health districts in Douala, Bonassama and Cite des Palmiers. **Methodology:** It was a descriptive and analytic cross-sectional study. Sociodemographic, reasons for self-medication, class of medications commonly self-medicated data was collected. Descriptive statistics, univariate and multivariate analyses will be made by Chi square and Fisher's exact test and reported as odd ratios, adjusted odd ratios and 95% confidence intervals. Statistical significance was set at $p < 0.05$. **Results:** 83% of participants carried out the practice of self-medication. One of the major reasons for self-medicate was the fact that they thought that the illness was not serious with a prevalence of 46,6%, followed by cost saving (33,2%). The most common disease treated by self-medication was headache (81,5%), and the most represented class of drug were analgesics (84,7%); drugs were bought in community pharmacies (64,7%) and illicit market (44,9%). The statistically significant reasons for self-medication were cost saving, convenience, not serious illness, prior experience, long wait times in hospitals and accessibility of pharmacies. **Conclusion:** Self-medication is a widespread practice throughout the world, particularly in developing countries. This study has illuminated the prevalence and causes of self-medication in our environment. The prevalence of self-medication is high due to several factors and arguments, including cost saving, convenience, illness was not serious, prior experience, long wait times at hospitals, and availability of pharmacies.

Keywords: Self-medication, prevalence, Bonassama, Cite des Palmiers, health district.

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I. INTRODUCTION

The WHO defined self-medication as the act of selection and use of medicine by individuals to treat self-recognized illnesses and symptoms or by health professionals such as the self-prescription of drugs not prescribed by the treating physician (1, 2). Self-medication is not only done in time of illnesses but in other circumstances such as; doping, aesthetic purposes (acne treatment), weight loss, termination of unwanted pregnancies etc.(1,2). There are 2 types of self-medication which are active self-medication; this is the

most common, here the patient self-diagnoses and comes up with a treatment plan and passive self-medication; here the individual has no control over their self-care, they're just a third party in the process e.g. children, mentally ill patients and old individuals.

The World Health Organisation (WHO) reported a prevalence of self-medication of 32.5% to 81.5% worldwide [3]. A study in Serbia showed a prevalence of 79.9% [4], Lei *et al.*, reported a prevalence of 45.4% [5] in China and another study

among University students in France reported 95% [2]. In Africa, a study at El-Mahsama Family Practice Centre in Egypt reported a self-medication of 96% [6]. Other African studies reported prevalences of self-medication varying from 35.9% in Ethiopia [7], 36% in Ghana [8] and 82.2% in Nigeria [9]. In Cameroon a prevalence of 67.8% [10] was established by Agbor *et al.*, on the use of self-medication to treat oral health problems and 41.9% [11] for patients with respiratory tract infection was established by Ngu *et al.*, in 2018 at the Baptist hospital Mboppi Douala, Cameroon.

There are several factors in favour of self-medication which has been established by many studies. These include : possession of home pharmacies and previous experience on self-medication [4, 7, 9], accessibility of pharmacies [7, 9], peer/family pressure [7, 12], the presumed non-severity of the medical condition [5], unavailability of drugs and long waiting time of patients in hospitals [6]. Finally, the concurrence between non-emergency work services, which are only available during working hours and working schedule makes it difficult for most people to go to hospitals for consultation hence the reason for self-medication [5, 6].

Self-medication leads to many lifelong health complications such as; antibiotic resistance, insomnia, depression, immune system weakness, abdominal discomfort, kidney and liver failure [13, 14]. Self-medication practices possess many risk and complications, these complications mostly come about due to the long term use of self-medication. Some of these risks include; risk of drug interaction, drug dependence and abuse, misdiagnosing conditions, severe adverse effects or wrong type of medication used [15, 16]. The potential risks of self-medication practices include; delays in seeking medical advice, incorrect manner of administration, incorrect dosage and masking of severe diseases [16].

Self-medication is responsible for multiple health problems in our society today, it has many adverse effects on the body and can lead to complication of illnesses, masking of disease, drug dependence and abuse also antibiotic resistance which is a major problem. It has been noticed that many individuals have been forced to self-medicate due to their socio-demographic background and the availability of pharmacies and roadside vendors in some neighbourhoods. It has also been noticed that the general population seldom goes to hospitals due to the many identified risk factors of self-medication that have been reported in the medical literature. That is why this study have decided to evaluate the prevalence and risk factors of self-medication in the Bonassama and Cite des Palmiers health districts.

II. MATERIALS AND METHODS

II.1 Study Design

A descriptive cross-sectional study was carried out.

II.2 Study Area

The study was carried out in the city of Douala, capital of the Littoral region and economic capital of Cameroon. It is a coastal town situated on the left bank of the Wouri estuary, close to about thirty kilometres from the ocean.

Douala population is evaluated at over 3,927,000 habitants [17] of whom indigenes are represented by the Doualas, Bassas and Bakokos. Being a metropolitan city, the population is heterogeneous. The inhabitants hail from all the 10 regions of Cameroon as well as other countries.

There are ten health districts in the city of Douala: Bangue, Boko, Deido, Newbell, Logbaba, Nylon, Bonassama, Cité des Palmiers, Japoma and Manoka health districts. This study took place in Douala, Cameroon more precisely at the Bonassama and Cite des Palmiers health districts located in the Douala IV and V Sub-division, respectively.

II.3 Study Period

This study was carried out from 1st of December 2022 to 1st of June 2023 (a duration of 6 months).

II.4 Study Population

The study population consisted of male and female participants above the age of 21years, both employed and unemployed individuals who participate in the self-medication or not.

Inclusion criteria

- Respondents of both genders aged 21years and above
- Participants who consent to the study
- Only people who can speak and understand English or French

Exclusion criteria

- Children and young adolescents below the age of 21 years
- Participants who do not consent to the study

II.5 sampling method and sample size determination

II.5.1 Sampling Method.

We used a simple random sampling method by balloting to determine the health districts in which we carried out the study. Thereafter, we used a consecutive sampling method to enrol study participants.

II.5.2 Sample size calculation

We calculated the sample size using the Cochran's formula for a cross-sectional study:

$$n = \frac{Z^2 P(1 - P)}{e^2}$$

Where,

n = sample size
 Z = standard normal variant = 1.96
 e = level of precision = 0.05
 P = prevalence from a previous study

The prevalence of antimicrobial self-medication among patients attending two hospitals in the Buea health district is 68.4% (0.684) [18].

$$n = \frac{1.96^2 \times 0.684(1-0.684)}{0.05^2}$$

$$n = 332.14$$

Minimal sample size = 332.14 + 10% lost to follow up
 $n = 332.14 + 33.214 = 365$ participants

To determine how many participants were enrolled from each health district according to the

population of the health district, we used the census of 2005 that determined the population of each health district in Cameroon [19] and considering a population growth of 2.61% per year in Cameroon [17] to extrapolate the population of the study health districts up to the year 2018.

Therefore the following figures were obtained for the study populations;

- Douala IV population has 335,659 inhabitants
- Douala V population has 729,805 inhabitants

To determine the participants required per health district according to the probability proportionate to size, calculation where; $size = \frac{population}{total\ population} \times minimum\ sample\ size$

Table 1: Study population by proportion to size of health district

Study area	Population	Proportionate to size
Douala IV	335,659	115
Douala V	729,805	250
Total	1,065,464	365

NB: calculations to 2022 was avoided because of the crisis in the North-west and South-west regions that has caused an influx of people in to Douala.

II.6 Study Procedure

II.6.1 Administrative procedure

Ethical clearance was sought from the Institutional Ethics Committee for Research on Human Health of the University of Douala (IEC-UDo) under N°3555IEC-UD/03/2023/T. Administrative authorization was sought from the Regional Delegation of Public Health for the Littoral Region under N°0164/AAR/MINSANTE/DRSPL/BCASS.

Investigations were carried out:

- In strict compliance with medical secrecy, anonymity and confidentiality.

For purely scientific and non-profit purposes

II.6.2 Technical procedure

II.6.2.1 Variables

Each questionnaire was divided into the following sections;

Section 1; Socio-demographic characteristics of respondents who self-medicate (age, gender, marital status, level of education, occupation and monthly revenue).

Section 2; Past medical history (presence of chronic disease, self-medication behaviours), risk factors of self-medication (cost saving, convenience, severity of illness, prior experience, possession of home pharmacies or previously used prescriptions, family or peer pressure, accessibility of pharmacies, long wait times at hospitals and clinics, availability of non-emergency services only during working hours.), general information on

self-medication (cold, malaria, fever, and cough medications)

Section 3; Recommendation of drug choice (community pharmacist, family, friend, internet, personal experience, advertisement, previous doctor's prescription), drugs frequently self-medicated (antibiotics, analgesics, anti-inflammatory, anti-malaria etc.), source of medication and thoughts on SM (recommended, acceptable or not acceptable).

II.7 Data management and Data analysis

II.7.1 Data Management

Data collected was cross-checked for errors before entering into a password protected computer using Microsoft excel version 2013. The questionnaires were kept separately and well protected. The data will be exported and analysed using the statistical package for the social sciences software (SPSS) version 23.0.

II.7.2 Data analyses

Data analyses was done according to the following objectives:

Objective 1: To find out the socio demographic characteristics of respondents who self-medicate; data was summarized using frequency and proportion tables for categorical variables. Continuous variables were expressed as means, median, standard deviation and interquartile range. Results were subsequently reported in tables and figures.

Objective 2: Determine the prevalence of self-medication; we used descriptive statistics (analysis)

and expressed participants who self-medicate as a percentage of the total number of study population

Objective 3: To identify the associated risk factors of self-medication. Continuous variables were summarized as means, median and standard deviation. P-values were calculated for categorical variables using Chi-squared test or Fisher exact test where appropriate. A univariable analysis was done to estimate the measure of association between risk factors and self-medication and reported as odd ratios and their 95% confidence intervals. Factors with a p-value of 0.2 in the univariate analysis were included in a multivariate logistic regression model and reported as adjusted odd ratios and their 95% confidence interval. A two tailed p-value of less than 0.05 was considered statistically significant.

Objective 4: To find out the classes of medications commonly self-medicated; Data was categorized into binary variables. The frequencies and proportions obtained will be summarized into tables and charts.

II.8 Ethical consideration

Ethical clearance will be sought from the ethics clearance committee of the Faculty of Medicine and Pharmaceutical Sciences of the University of Douala. Administrative approvals will be sought from the Regional Delegation of Health for the Littoral Region and the Faculty of Medicine and Pharmaceutical Sciences.

This study has been conducted using a validated protocol and according to the rules of medical ethics while fully respecting human rights and personal privacy according to the Declaration of Helsinki which include:

Respect of Autonomy:

A consent form was used in the study and all participants were explained in detail the nature, risks and benefits of the study. Participants had the right to participate or withdraw from the study at any time they desire.

Confidentiality:

The participants were promised that any information they provide were treated with confidentiality. Data collection forms were anonymous and the consent forms that contain the names of the participants were kept separately from the data collection forms. Both of them were kept separately in secure locations and the two were related by a coding sheet, which was kept secret by the principal investigator.

Beneficence:

The participants were told that they have no direct benefit but that this study will generate important data for future research and may help in policy making in our country. The participants may benefit from the answers they will obtain from the research team regarding self-medication.

Non-maleficance:

The participants were explained of the inconvenience of the study as it will be time consuming but there no harm. Participants had an interview with the research team but no invasive technique will be involved.

Justice:

All participants were treated equally and fairly. Participation were open to those found in the study health districts regardless of disability status, race, gender or religion. Only consenting participants were enrolled for study. Participants were allowed to withdraw from study at any time.

III. RESULTS

1. Flow chart of selected participants

A total of 02 health districts were visited. 5 major communities were visited and agreed to take part in the study whereas none refused. There was a total of 375 participants that answered the questionnaires. 10 were excluded due to incompletely filled questionnaires or the fact that they did not fit the inclusion criteria (unexploitable), thus 365 participants were finally retained as the effective population.

2. Sociodemographic Characteristics

Table I: Demographic characteristics of participants

Variable	Categories	Frequency	Percent
Sex	Male	212	58.1
	Female	153	41.9
	Total	365	100
Age group	21 - 30 Years	231	63.3
	31 - 40 Years	70	19.2
	41 - 50 Years	38	10.4
	51 - 60 Years	19	5.2
	Above 60	7	1.9
	Total	365	100
Marital Status	Married/Cohabiting	125	34.2

Variable	Categories	Frequency	Percent
	Widow(er)	8	2.2
	Divorced	6	1.6
	Single	226	61.9
	Total	365	100
Educational Qualification	University	207	56.7
	Secondary	107	29.3
	Primary	21	5.8
	No Formal Education	17	4.7
	Others	13	3.6
	Total	365	100
Occupation	Professional	41	11.2
	Technical	193	52.9
	Student	104	28.5
	Unemployed	27	7.4
	Total	365	100
Monthly Revenue (in FCFA)	≤ 50.000	212	58.1
	50.001 - 100.000	89	24.4
	100.001 - 250.000	44	12.1
	250.001 – 500.000	12	3.3
	500.001 – 1.000.000	6	1.6
	1.000.001 – 5.000.000	2	0.5
	Total	365	100

Professional: Doctors, Lawyers, Engineer, Teacher etc.

Technical: Electrician, Mechanic, Businessman, Security agent etc.

As shown in table II, most participants 231/365 (63.3%) were in the age group 21-30 years with a mean age of 31.6 years and 212/365 (58.1%) participants were males. Majority of the participants 226/365 (61.9%) were single meanwhile 207/365 (56.7%) and 170/365 (29.3%) had tertiary and secondary educational qualification respectively. Over half 193/365 (52.9%) were in the technical sector while only 27/365 (7.4%) were unemployed. Furthermore,

212/365 (58.1%) had a monthly income of about 50000FCFA.

3. Prevalence of self-medication

Of the 365 participants recruited in the 02 health districts, 303 carried out the practice of self-medication while 62 did not carry out self-medication hence a prevalence of 303 (83.0%).

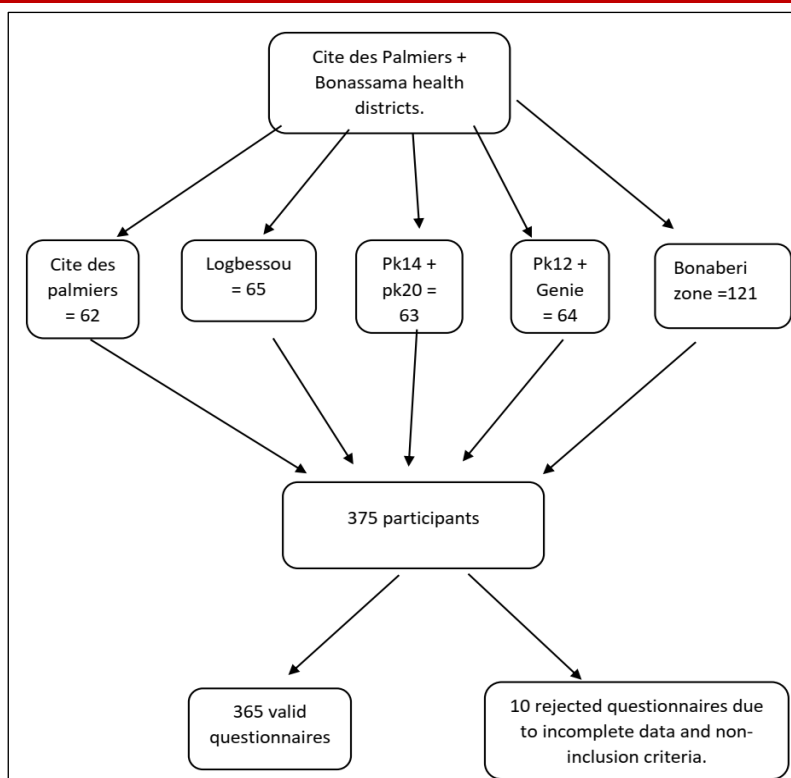


Figure 1: Flow chart of selected participants

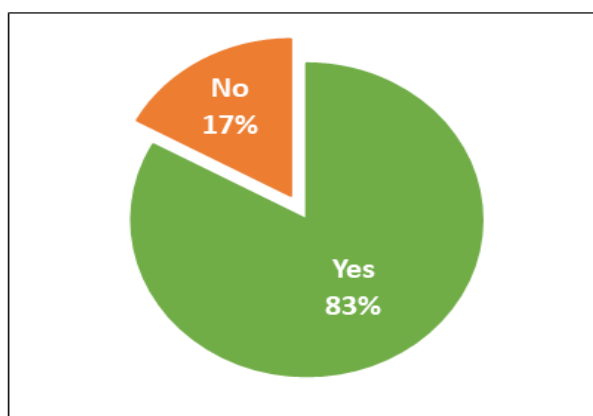


Figure 2: Prevalence of self-medication among study participants

4. Prevalence of chronic disease among study participants.

Table III: Prevalence of chronic disease among study participants

Variable	Categories	Frequency	Percent
Do you have any chronic health conditions?	Yes	31	8.5
	No	334	91.5
	Total	365	100
If yes type of chronic disease	Joint pains (arthritis)	4	12.9
	Asthma	5	16.1
	Diabetes	6	19.4
	Diabetes + Hypertension	4	12.9
	Gastric regurgitation (Gastritis)	2	6.5
	Hypertension	10	32.2
	Total	31	100

Of the 365 participants, 334/365 (91.5%) had no chronic disease meanwhile 31/365 (8.5%)

participants possessed chronic diseases. The disease with the highest frequency was hypertension with a percentage of 32.2%.

5. Reasons for self-medication

As shown in figure 3, it has been determined that one of the major reasons why people self-medicate

is the fact that the illness was not serious which had a frequency of 170 (46.6%), followed by cost saving and prior experience with a frequency of 121 (33.2%) and 65 (17.8%) respectively.

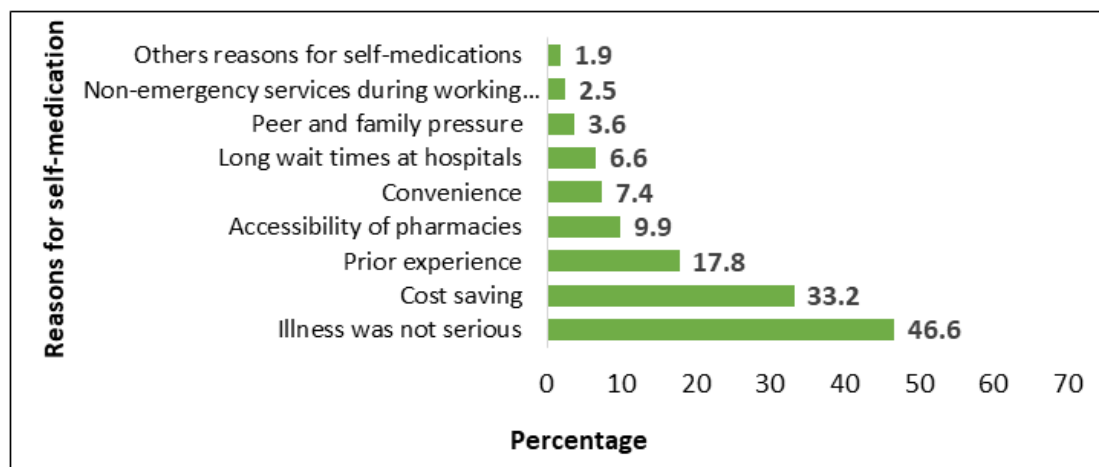


Figure 3: Reasons for self-medication among study participants

6. Most common diseases/symptoms treated by self-medication.

Table IV: Disease treated by self-medication

Diseases	N	Percentage
Headaches	246	81.5
Running nose	146	48.3
Fever	139	46
Cough	128	42.4
Migraine	110	36.4
Diarrhoea	75	24.8
Wounds	73	24.2
Body pain	61	20.2
Pains in joints	61	20.2
Vomiting	53	17.5
Dental pain	53	17.5
Muscle pain	51	16.9
Nausea	35	11.6
Loss of appetite	33	10.9
Difficulty in Swallowing	31	10.3
Menstrual problems	29	9.6
Eye Infection	28	9.3
Acne	20	6.6
Rash	19	6.3
Ear Pain	18	6
Dysentery	17	5.6
Skin disease on open areas	17	5.6
Birth control	12	4
Dandruff	11	3.6
Acidity	10	3.3
Mouth ulcer	10	3.3

Sexually transmitted disease (STD)	10	3.3
Genital infection	9	3
Appetite reducer	9	3
Hair fall	5	1.7
Skin disease in covered areas	5	1.7
Urination problems	5	1.7
Faints	4	1.3
Arthritis	4	1.3
Hypertension	4	1.3
Asthma	3	1
Varicose veins	3	1
Diabetes	2	0.7
Impotency	1	0.3
Total	1550	513.2

Note: This was a multiple response question. Reasons why the overall percentage is above 100. A respondent could choose several options.

We determined that the most common diseases that are treated by self-medicated are headaches, running nose, fever, cough with a frequency of 246 (81.5%), 146 (48.3%), 139 (46.0%), and (36.4%) respectively. On the other hand, impotency (0.3%), diabetes (0.7%), varicose veins (1.0%) were one of the least diseases self-medicated on (Table V).

7. Recommendation on Self-medication

Of the 365 participants recruited for this study we noticed that most people got their information on self-medication practices from personal experience, family and from the community pharmacists, giving a frequency of 162 (53.5%), 90 (29.7%), 91 (30.0%) respectively (Figure 4).

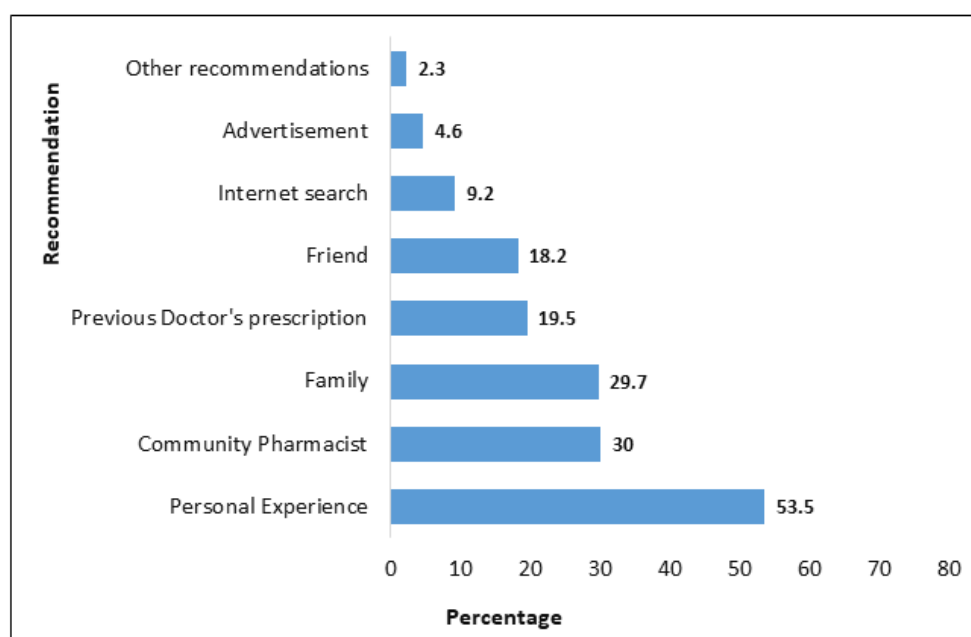


Figure 4: Source of information/recommendation on self-medication

8. Classes of drugs frequently Self-medicated

The classes of drugs usually used for self-medication have been determined and illustrated below. The most represented classes were pain and fever medication (analgesic) with a frequency of 254

(84.7%), anti-inflammatories 97 (32.3%), anti-malarial 91 (30.3%) and antibiotics 69 (23.0%). A small number of individuals i.e., 11 (3.7%) were said to have used other drugs such as traditional medicines (Figure 5).

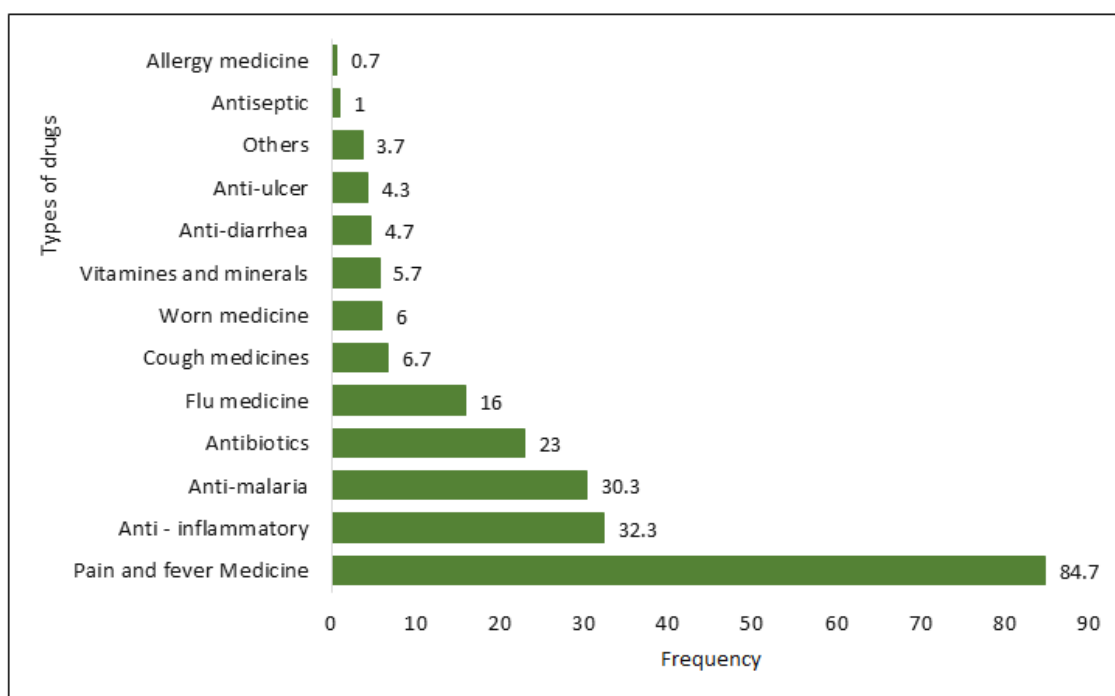


Figure 5: Classes of drugs frequently self-medicated by study participants

9. Source of drugs used for self-medication.

Of the various sources of drugs enunciated in our study, we noticed that the major sources were community pharmacies and illicit roadside vendors with

a frequency of 196 (64.7%) and 136 (44.9%) respectively. Meanwhile, other sources like traditional means were a minority with a frequency of 4 (1.3%) (Figure 6).

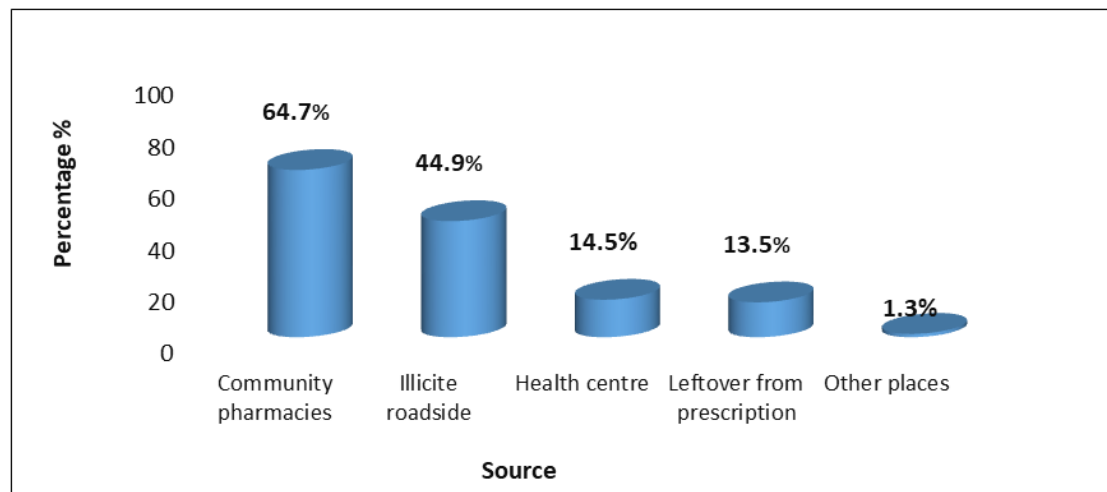


Figure 6: Source of drugs used for self-medication

10. Thoughts on Self-medication for Self-healthcare

Table V: Participants perception on self-medication

Variable	Categories	Frequency	Percent
What do you think about self-medication for self-health care	Recommended	49	13.4
	Acceptable practice	191	52.3
	Not acceptable practice	125	34.2
	Total	365	100
Do you think you can treat common diseases successfully by yourself?	Yes	179	49
	Not sure	108	29.6
	No	78	21.4

	Total	365	100
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Among the 365 recruited participants more than half of them think that self-medication is an acceptable practice 191/365 (52.3%) meanwhile a selected few recommend it 49 (13.4%). We also noticed that almost half of the respondents 179/365 (49%) think

they can treat themselves using self-medication (Table VI).

11. Association between the prevalence of self-medication and the demographic characteristics

Table II: Association between the prevalence of self-medication and the demographic characteristics

Variable	Categories	n	Have you ever treated self with any medicine				Chi-square	p-value
			Yes	%	No	%		
Age group	21 - 30 Years	231	194	53.15	37	10.14	6.15	0.270
	31 - 40 Years	70	57	15.62	13	3.56		
	41 - 50 Years	38	33	9.04	5	1.37		
	51 - 60 Years	19	12	3.29	7	1.92		
	Above 60	7	7	1.92	0	0.00		
	Total	365	303	83.01	62	16.99		
Sex	Male	212	178	48.77	34	9.32	0.32	0.570
	Female	153	125	34.25	28	7.67		
	Total	365	303	83.01	62	16.99		
Marital Status	Married/Cohabiting	125	99	27.12	26	7.12	3.18	0.291
	Widow(er)	8	6	1.64	2	0.55		
	Divorced	6	6	1.64	0	0.00		
	Single	226	192	52.60	34	9.32		
	Total	365	303	83.01	62	16.99		
Educational Qualification	University	207	171	46.85	36	9.86	2.36	0.671
	Secondary	107	91	24.93	16	4.38		
	Primary	21	18	4.93	3	0.82		
	No Formal Education	17	12	3.29	5	1.37		
	Others	13	11	3.01	2	0.55		
	Total	365	303	83.01	62	16.99		
Occupation	Professional	41	32	8.77	9	2.47	2.72	0.437
	Technical	193	163	44.66	30	8.22		
	Student	104	88	24.11	16	4.38		
	Unemployed	27	20	5.48	7	1.92		
	Total	365	303	83.01	62	16.99		
Monthly Revenue (in FCFA)	≤ 50.000	212	178	48.77	34	9.32	3.69	0.560
	50.001 - 100.000	89	73	20.00	16	4.38		
	100.001 - 250.000	44	36	9.86	8	2.19		
	250.001 – 500.000	12	9	2.47	3	0.82		
	500.001 – 1.000.000	6	6	1.64	0	0.00		
	1.000.001 – 5.000.000	2	1	0.27	1	0.27		
	Total	365	303	83.01	62	16.99		
Have a chronic health condition	Yes	31	26	7.12	5	1.37	0.018	0.894
	No	334	277	75.89	57	15.62		
	Total	365	303	83.01	62	16.99		

The correlation was valid when the P-values < 0.05.

A cross table was done between sex, marital status, age, chronic health conditions, occupational status, monthly revenue, and self-medication (yes or no). All variables had P-values greater than 0.05 hence, there is no association between the prevalence of self-medication and demographic characteristics. This mean

that the phenomenon of self-medication cut across age, sex, occupation, and monthly income (Table VII).

12. Association of the practice of self-medication and the reasons of self-medication.

Table III: Association of the practice of self-medication and its reasons

Variable	Total	Practice self-medication	Chi-square	p-value
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			Yes	%	No	%		
Cost saving	No	244	182	49.86	62	16.99	37.037	<0.001
	Yes	121	121	33.15	0	0.00		
	Total	365	303	83.01	62	16.99		
Convenience	No	338	276	75.62	62	16.99	5.966	0.015
	Yes	27	27	7.40	0	0.00		
	Total	365	303	83.01	62	16.99		
Illness was not serious	No	195	133	36.44	62	16.99	65.111	<0.001
	Yes	170	170	46.58	0	0.00		
	Total	365	303	83.01	62	16.99		
Prior experience	No	300	238	65.21	62	16.99	16.182	<0.001
	Yes	65	65	17.81	0	0.00		
	Total	365	303	83.01	62	16.99		
Long wait times at hospitals	No	341	279	76.44	62	16.99	5.257	0.022
	Yes	24	24	6.58	0	0.00		
	Total	365	303	83.01	62	16.99		
Accessibility of pharmacies	No	329	267	73.15	62	16.99	8.172	0.004
	Yes	36	36	9.86	0	0.00		
	Total	365	303	83.01	62	16.99		
Availability of non-emergency services only during working hours	No	356	294	80.55	62	16.99	1.888	0.169
	Yes	9	9	2.47	0	0.00		
	Total	365	303	83.01	62	16.99		
Peer and family pressure	No	352	290	79.45	62	16.99	2.758	0.097
	Yes	13	13	3.56	0	0.00		
	Total	365	303	83.01	62	16.99		
Other reasons for self-medications	No	358	296	81.10	62	16.99	1.46	0.227
	Yes	7	7	1.92	0	0.00		
	Total	365	303	83.01	62	16.99		

The correlation was valid for P-values < 0.05.

Table VIII shows that cost saving $p < 0.001$, convenience $p < 0.015$, illness not serious $p < 0.001$, prior experience $p < 0.001$, long wait times in hospitals $p < 0.001$ and accessibility of pharmacies $p < 0.004$ were the statistically significant reasons for self-medication (Pearson-chi square test).

IV. DISCUSSION

The aim of this study was to determine the prevalence, risk factors, and classes of drugs usually used for self-medication. It was founded out that 83% of this study population undergo self-medication; this was due to many reasons namely, cost saving, convenience, illness was not serious, prior experience, long wait times at hospitals, and accessibility of pharmacies. It was also noticed that the most common drugs used in self-medication were analgesics/antipyretics, anti-inflammatories, anti-malarial, and antibiotics.

1. Prevalence of self-medication

The prevalence of self-medication in this study was 83.0%. This is consistent with the 82.2% reported in Nigeria [9] and the 95.1% reported by Tollo *et al.*, in Douala Cameroon [17]. However, this prevalence is not consistent with the 41.9% reported by Ngu *et al.*, 2018 in Douala, Cameroon [11], the 67.8% reported in a multi-regional survey in Cameroon [10] and other studies in Ethiopia, Gabon and Ghana that reported prevalence's of self-medication of 35.9%, 36%, and 68.5% respectively [7, 20, 21]. The difference in

prevalence between the study by Ngu *et al.*, was because their study was limited to antibiotic resistance and a single centre study while in this study all classes of medications were included for study and it was also a community-based study in two health districts in Douala. The disparity between our study and those in other African countries may be because the studies were based on a particular population like pregnant women in Gabon [20], a retrospective study in Ghana [22]. They may also have more re-enforced policies on drug marketing and distribution. The high prevalence of self-medication in this study implies that health education on the dangers or pitfalls of self-medication has not been very effective in our study area therefore proper educational awareness programmes to the population about self-medication can control the issue.

There was no significant association between demographic characteristics and self-medication in this study. This is consistent with Wombo *et al.*, 2023 in Gabon [20] who did not find an association. However, Sridhar *et al.*, 2018 [21] in United Arab Emirates reported a statistically significant association between gender and employment status of participants with self-medication practices.

2. Risk factors impacting self-medication.

The factors impacting self-medication in this study were cost saving $p < 0.001$, convenience $p < 0.015$, illness not serious $p < 0.001$, prior experience $p < 0.001$, long wait times in hospitals $p < 0.001$ and accessibility of pharmacies. These factors were similar to those in

previous African studies by Zeid *et al.*, 2020 [6], Abdurraheem *et al.*, 2016 [9], Wombo *et al.*, 2023 [20], Ekambi *et al.*, 2019 [22], and Opoku *et al.*, 2023 [23] and to those in the developed world by Gras *et al.*, 2020 [2], Lei *et al.*, 2018 [5], and Tarcuc *et al.*, 2020 [24]. It has been noticed that the risk factors of self-medication do not really differ in both the developed and developing world since it is based on fundamental human behaviour and the nature of medication. Furthermore, the lack of severity of the illness was the highest frequency because individuals usually underestimate their illness, irrespective of their sociodemographic characteristics or geographic location. Hence leading to complications like; incorrect dosage, drug interactions, allergic reactions, and dependence [15]. These complications can lead to serious public health issues hence reducing life expectancy of the population.

3. Drugs commonly used in self-medication.

The most common symptoms that were treated by self-medication were headaches, running nose and fever with a frequency of 82%, 48% and 46% respectively. This is higher than the study of Horumpende *et al.*, in Tanzania [25] who reported 26% and that of Zeid *et al.*, in Egypt [6] who reported 17%. The difference maybe because our participants had multiple responses. There are numerous classes of drugs used for self-medication, in our study the classes which were observed to be mostly used were firstly analgesic and/or antipyretics mostly paracetamol, anti-inflammatory, anti-malarial, and antibiotics. This is consistent with studies done by Tollo *et al.*, 2014 [17], Chautrakarn *et al.*, 2021 [26] Gras *et al.*, 2020 [2] in France and Akande-Sholabi *et al.*, 2021 [27] in Nigeria. These drugs are easily used in self-medication because in our area most symptoms present themselves under this umbrella. The uncontrolled use of antibiotics for self-medication has negative effects on the general population. This may be associated with increased incidence of antibiotic resistance making the medication ineffective in time of need. Therefore, these medications that are commonly available in our community both in pharmacies and roadside vendors need strict laws to regulate their use. In conclusion these drugs can be effective in treating minor health issues, however it is important to use them responsibly and only for their intended purpose.

Among the 365 recruited participants more than half of them thought that self-medication is an acceptable practice meanwhile 49% of the study population thought they could treat themselves for common diseases with self-medication. This is in accordance with a study carried out by Akande-Sholabi *et al* in Nigeria [27].

V. CONCLUSION

In conclusion, self-medication is a widespread practice in the two health districts of Douala included in

the study. This study has illuminated the prevalence and causes of self-medication in our environment. Most participants were young, males and singles, had tertiary and secondary educational qualification, and thought that it is an acceptable practice. The prevalence of self-medication is high due to several factors and arguments, including cost saving, convenience, not serious illness, prior experience, long wait times at hospitals, and availability of pharmacies. The drugs commonly used in this practice were pain and fever medicine, anti-inflammatories, anti-malarial, and antibiotics; bought in community pharmacies and illegal market.

Ethical approval: All authors declare that 'ethical clearance was obtained from the Institutional Ethics Committee of the University of Douala for the conduct of this study and for the publication of this article'. All experiments were reviewed and approved.

Competing interests: Authors have declared that no competing interests exist.

Authors' contributions: This work was carried out in collaboration among all authors. Author GMMEL designed the study, supervised the work and corrected the first draft of the manuscript while author DEA carried out the tests and wrote the protocol. Author NNC supervised the realization of the tests while authors NL and JY managed the literature searches. Author CCN wrote the first draft while author BS managed the analyses of the study and corrected the written versions of the manuscript. All authors read and approved the final manuscript.

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