Original Article

Self-Medication during the COVID-19 Pandemic: Prevalence, Pattern and Risk Factors amongst Residents in a Semi-Urban Nigerian Community

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ABSTRACT

Context: The lack of proven treatment for COVID-19 compounded by limitless information on supposed useful remedies has led to a surge in self-medication (SM). A Google Trends search showed that the search for SM and related terms increased during the current pandemic.
Aims: The main aims of this study were to explore the prevalence, patterns and determinants of SM amongst residents in an Semi-urban community located in Southern Nigeria, during the COVID-19 pandemic period.
Settings and Design: This cross-sectional study was conducted in a semi-urban Nigerian community from April to June 2020.
Subjects and Methods: The stratified sampling method was used to select 384 study participants from the five wards in the community. A structured questionnaire was used to obtain socio-demographic data, psychographic information and history of SM since the onset of the pandemic.
Statistical Analysis Used: The statistical analysis used was SPSS 22.0 (IBM SPSS Statistics, New York, USA).
Results: The overall prevalence of SM was 25.5%; of these, 8.2% self-medicated for prevention or treatment of COVID-19 infection. Chloroquine (CQ) tablets were ingested by 46.6% of those who self-medicated. Those in Class I occupational level had five times the odds of self-medicating compared to those in Class V ($P = 0.035$).
Conclusions: A quarter of the respondents practised SM during the COVID-19 pandemic; one-third of these self-medicated to prevent or treat COVID-19. The most frequent drug used for prophylaxis and treatment of COVID-19 was CQ. Higher income and occupational level were associated with SM.

Key words: Chloroquine, COVID-19, self-care, self-medication

How to cite this article: Okoye OC, Ohaju-Obodo JO, Ntaji MI. Self-medication during the COVID-19 pandemic: Prevalence, pattern and risk factors amongst residents in a semi-urban Nigerian community. Niger J Health Sci 2020;20:51-6.

INTRODUCTION

The COVID-19 pandemic has brought uncertainties and fear amongst people worldwide. The lack of proven treatment for the disease compounded by unlimited media information on supposed suitable orthodox and unorthodox treatments has led to a surge in SM. A Google Trends study on the interest in SM during this pandemic revealed a relative increase in the number of searches worldwide since the 2019 pandemic began. This observation indicates an increase in the number of people interested and searching for information about SM of various ailments during the pandemic.[1]

SM or self-care is a worldwide public health challenge but disproportionately so in developing countries.[2] The World Health Organization (WHO) defines SM as 'the use of pharmaceutical or medicinal products by the consumer to treat self-recognised disorders or symptoms, the intermittent or continued use of a medication previously prescribed by a physician for chronic or recurring disease or symptoms or the

Submitted: 29-Sep-2020 **Revised:** 25-Dec-2020
Accepted: 16-Feb-2021 **Published:** 22-Sep-2022

Access this article online

Quick Response Code:

Website: www.chs-journal.com

DOI: 10.4103/njhs.njhs_50_20

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use of medications recommended by lay sources or health workers not entitled to prescribe medicine.'[3] SM patterns vary amongst different populations and are influenced by various factors such as age, sex, geographical setting, income level, educational status, religious inclination and the type and severity of symptoms experienced.[3-7]

Some negative consequences of SM include misdiagnosis of illnesses, drug overdose, use of expired drugs, prolonged duration of use, increased resistance to pathogens, drug interactions, poly-pharmacy, resource wastage and other untoward effects associated with improper use of medicines.[4,5,8] However, some benefits include usefulness in treating minor symptoms and illness not requiring medical attention, the convenience and the relatively low cost, especially in low socio-economic countries with constrained healthcare resources.[6,7] During pandemics, especially in countries with weak health systems, SM may significantly help ease the burden on frontline healthcare professionals who would have to cope with managing minor ailments and more urgent and critical ailments.[1] At the level of the healthcare institutions, SM during a pandemic can help free up spaces for more severe cases and avoid unnecessary in-hospital transmission of infections.

So far, treatments provided to the individuals diagnosed with COVID-19 are mainly supportive. The majority of drugs used for treatment worldwide include antiviral drugs, antimalarial drugs, anti-HIV drugs, anti-inflammatory drugs and supplements/immune boosters.[9] Additionally, a variety of unorthodox remedies are being used by the public, including local herbs, spices, citrus fruits, steam inhalation, hot drinks, amongst others. The WHO warns against the use of products that have not been thoroughly investigated for the management of COVD-19, emphasising that the practice can endanger the lives of users, give a false sense of security and distract them from hand washing and physical distancing which are critical in COVID-19 prevention and control.[10]

Considering the potential surge of SM during a pandemic and its negative consequences, it is necessary to have an insight into the practices of individuals residing in a low-resource setting. To our knowledge, there are currently no community-based data from the study locality informing on SM practices during the current COVID-19 pandemic.

The main objectives of this study were to explore the prevalence, patterns and determinants of SM among residents in a semi-urban community located in Southern Nigeria during the COVID-19 pandemic period.

SUBJECTS AND METHODS

Study design and setting

This community-based cross-sectional study was conducted from late April to June 2020 at Oghara community. Oghara is a semi-urban population in Ethiope-West Local Government Area of Delta State, Southern Nigeria, occupying an area of 1175 km^2 within the tropical rain forest belt. The total adult population of Oghara community was 288,070 according to the 2016 projection by the National Population Commission.[11] The only state-owned teaching hospital is located in Oghara with a primary healthcare centre and a few private hospitals. There are some higher learning institutions located in the community, and a significant proportion of its inhabitants are healthcare workers and students. The prevailing occupation is trading, farming and commercial transportation.

Sample size estimation and sample selection

Based on the known population, and an assumed SM prevalence of 50%, the minimum sample size calculated using the Cochran formula for descriptive studies was 384. The multi-stage sampling method was used to select study participants from the five wards in the community, which are Oghara efe-one, Oghara efe-two, Oghara efe-three, Oghara eki-one and Oghara eki-two. The total population of Oghara efe-one is 178,455, Oghara efe-two is 30,583, Oghara efe-three is 22,092, Oghara eki-one is 27,017, while Oghara eki-two is 29,923;[11] by proportional allocation, a total of 238, 41, 29, 36 and 40 participants were selected from these wards. Oghara efe-one has 13 communities, Oghara efe-two has six communities, Oghara efe-three has seven communities, Oghara eki-one has three communities, while Oghara eki-two has three communities. Within each ward, a simple random sampling technique was used to select one community. At the community level, every other house was selected, starting with the house of the eldest member of the community. Members of all households in the selected houses who met selection criteria were sampled until the proportionally allocated number per ward and the sample size was complete. Inclusion criteria were adults aged ≥18 years, residing in the study area and willingness to be part of the study.

Study protocol and instrument

Interviewers were trained before administering the informed consent and questionnaire; the tool was piloted in the community before the commencement of study. Written or signed/finger-stamped informed consent was obtained from eligible participants depending on their level of literacy. A structured questionnaire was used to obtain socio-demographic data and psychographic information. History of SM for COVID-19 since the onset of the pandemic was obtained, as well as the history of SM for other ailments/symptoms. The questionnaire and informed consent were in English but were verbally translated to 'pidgin English' where required. The researcher took steps to ensure that translation did not result in a loss of meaning or misinformation. Questionnaires were self-administered for the literate population and interviewer-administered for the illiterate population. Interviewers adhered to safety precautions by using face masks, shields and hand sanitisers.

The WHO definition of SM was adopted for this study. Occupation was categorised based on five-level classification as follows: I = white-collar workers, II = petty bourgeoisie, III = farmworkers, IV = skilled workers and V = non-skilled workers.[12]

Ethical consideration

The Hospital Human Research Ethics Committee gave expedited approval for the study. Participants were not identified in the data collection instrument, and they reserved the right to participate and withdraw from the study. The benefits of the research were explained to participants and were reassured of only minimal risks related to the study. All completed questionnaires were coded and only accessible to the researchers.

Data management, statistical methods and analysis

Data were analysed using the SPSS 22.0 (IBM SPSS Statistics, New York, USA). The primary statistical analysis was to calculate the overall proportion of the respondents who self-medicated. Patterns of SM were analysed using descriptive statistics. Percentages were used to present SM according to age, gender and other socio-demographic and psychotropic characteristics. Chi-square test or Fisher's exact test was used as appropriate to determine any relationship between participants' characteristics and the practice of SM.

RESULTS

Three hundred and sixty-four out of 384 questionnaires were returned and analysed, giving a response rate of 94.7%. Females represented 55.2% of the respondents, the overall mean age was 31.1 ± 8.8 years and 81.6% of the respondents were in the 21–40 years' age interval [Table I shows socio-demographic characteristics].

Ninety-three out of 364 respondents (25.5%) reported SM within the 6 months before the study; 8.2% self-medicated for prevention or treatment of COVID-19 infection, while 17.3% had self-medicated for other health complaints. These other complaints included fever/malaria (10.4%), headache (3.3%) and catarrh (3.0%). None of those who self-medicated had tested positive for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The majority (80.2%) obtained information about medication for COVID-19 from the media [Figure 1].

Patterns of self-medication for COVID-19 amongst respondents

Out of 30 respondents who self-medicated specifically for COVID-19 prevention or treatment, 14 persons (overall prevalence, 3.8%) ingested chloroquine (CQ), two persons reported ingesting remdesivir and none used hydroxychloroquine (HCQ). Six persons ingested local herbs with or without CQ. Table II shows the medications used by the respondents.

Factors associated with self-medication for COVID-19

A higher proportion of those in high-income categories practised SM compared to those in the least annual income category (18.9%, 31.3% vs. 5.9% $P \leq 0.0001$); concerning occupational level, 23.5% of those in Class I compared to 5.7% of those in Class V practised SM ($P = 0.087$) [Table III]. Sex, age and educational levels were not significantly associated with SM.

Table I: Demographics of all participants

Variables	Frequency (n=364), n (%)
Sex	
Male	163 (44.8)
Female	201 (55.2)
Age category (years)	
11-20	27 (7.4)
21-30	182 (50.0)
31-40	115 (31.6)
41-50	30 (8.2)
51-60	6 (1.6)
61-70	4 (1.1)
Marital status	
Never married	146 (40.1)
Currently married	142 (39.0)
Domestic partner	61 (16.8)
Separated	6 (1.6)
Divorced	5 (1.4)
Widowed	4 (1.1)
Employment status	
Employed	186 (51.1)
Full time homemaker	16 (4.4)
Unemployed	46 (12.6)
Temporarily unemployed	18 (4.9)
Retired	6 (1.6)
Student	91 (25.0)
Disabled	1 (0.3)
Occupational level (n=261)	
Class I	21 (5.8)
Class II	50 (13.7)
Class III	55 (15.1)
Class IV	62 (17)
Class V	73 (20.1)
Educational level	
Tertiary	239 (65.7)
Secondary	99 (27.2)
Primary	5 (1.4)
Pre-primary	1 (0.3)
None	20 (5.5)
Annual income (N) (n=271)	
<600,000	216 (59.3)
600,000-1,200,000	39 (10.7)
>1,200,000	16 (4.4)

DISCUSSION

This community-based study conducted in Nigeria reveals that 25.5% of the respondents have practised SM, while 8.2% took medications specifically to prevent or treat COVID-19. The most frequent drugs used were CQ and zinc.

Prevalence of self-medication

The prevalence of SM for prevention and treatment of COVID-19 was high (8.2%) considering the novelty of the infection, and this may be related to panic and anxiety about the infectiousness and fatality of the condition.[13] However, a study conducted in Lome, the capital city of Togo, reported the

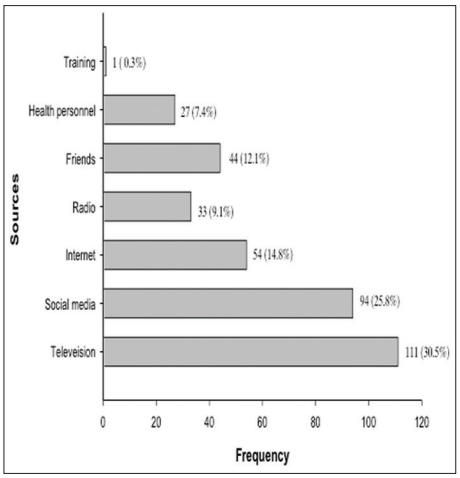

Figure 1: Sources of information about medications for treatment and prevention of COVID-19

Table II: Medications ingested by respondents for prophylaxis or treatment

Drug/remedy	*n*=30, *n* (%)
Chloroquine	9 (30.0)
Local herbal mixture*	4 (13.3)
Chloroquine, zinc and Vitamin C	3 (10.0)
Ginger, garlic and honey	3 (10.0)
Local herbs mixed with chloroquine	2 (6.7)
Zinc	2 (6.7)
Remdesivir	2 (6.7)
Hot water	1 (3.3)
Hot water and lemon	1 (3.3)
Hot water + lemon + lime + ginger	1 (3.3)
Lime and garlic	1 (3.3)
Azithromycin	1 (3.3)
Hydroxychloroquine	0

*Alcohol-based mixture with neem leaves and other unspecified herbs

prevalence of SM for COVID-19 prophylaxis as 34%, none of the respondents had tested positive for SARS-CoV-2.[14] The study location and population socio-demographics may partly explain the difference in prevalence rates observed compared to the current study. Lome is a capital city and an international entry port. It is likely to have a higher burden of COVID-19 infection compared to the current study location, which was a community several hours away from the international port of entry. The reported infection rates per city are likely to influence SM practice such that SM practice may be higher in settings with a high COVID burden.

The overall proportion of the study participants reporting self-treatment in this study (25%) was slightly higher than 20% reported in a study conducted in Spain using data from the 2006–2007 Spanish National Health Survey[15] but substantially lower than what has been reported in other studies.[5,16,17] In an Indian study, 75.1% reported that they had used at least a drug without prescription within 6 months preceding the study.[16] Another study conducted in Ijede community, a rural part of Lagos State, Nigeria, showed that the practice of SM was 92.3% one month before the study period.[5] The significantly lower prevalence of SM compared to the latter studies may also be related to the study location (semi-urban vs. rural). Furthermore, the current study was conducted in a community that accommodates a tertiary hospital, primary healthcare centre and private hospitals; this suggests accessibility of healthcare and may have positively influenced the health-seeking behaviour of residents.

Pattern of self-medication

Regarding SM due to COVID-19, it was observed that CQ was the most widely used drug; 3.4% of all respondents ingested CQ. Similarly, the study in Lome reported that 2% of the population used CQ/HCQ as SM.[14] This trend can be attributed to unconfirmed widespread media information on the role of CQ in this current pandemic; this may have raised awareness and acceptance of the drug in the absence of a proven and recommended drug for the treatment of COVID-19. Furthermore, CQ is well known to the general population and was once the drug of choice in the treatment of uncomplicated malaria.[18,19] CQ is readily available in many patent medicine shops in the study area even though its use was stopped since 2005 due to reported drug resistance to the medication.[20,21] Nevertheless, CQ and HCQ are not currently recommended for the treatment of COVID-19 in Nigeria, except under clinical trial conditions. The Nigeria Centre for Disease Control (NCDC) guidelines recommends supportive care, including antipyretics cough mixtures, multivitamins and dexamethasone for moderate-to-severe cases.[22] Empiric antibiotics are recommended for severe cases based on clinical diagnosis, local epidemiology and antibiotic sensitivity.[22] The antivirals recommended for treatment include the nucleotide-analogue inhibitor of RNA-dependent RNA polymerases such as remdesivir and lopinavir/ritonavir – a protease inhibitor. The NCDC recommends that empiric therapy should be de-escalated based on microbial sensitivity and clinical judgement.[22] No drug or non-drug remedy is recommended for prophylaxis.

No respondent reported taking HCQ, probably because HCQ is not as popular and accessible as CQ. HCQ is not a recommended treatment for malaria but reserved for the treatment of rheumatologic disorders and amoebiasis. Two respondents claimed that they had used remdesivir, an antiviral drug that was the approved drug by the US Food and Drug Administration to treat the novel coronavirus (COVID-19) on 1st May 2020, but for investigational purpose.[19,21,23,24] Remdesivir is expensive and unlikely to be available in the setting where this study was conducted. Although this study relied on self-report from participants which may be a source of misinformation bias, one cannot completely exclude the possibility of the participants obtaining remdesivir from relatives in diaspora.

In this study, more respondents self-medicated for other health complaints compared to COVID-19; expectedly most

Table III: Factors associated with self-medication for coronavirus disease-2019

Variables	Yes (*n*=30), *n* (%)	No (*n*=302), *n* (%)	Total (*n*=332), *n* (%)	*P*
Sex				
Male	12 (8.1)	137 (91.9)	149 (100.0)	0.573
Female	18 (9.8)	165 (90.2)	183 (100.0)	
Age (year)				
11-20	1 (4.2)	23 (95.8)	24 (100.0)	0.306
21-30	14 (8.4)	152 (91.6)	166 (100.0)	
31-40	9 (8.7)	95 (91.3)	104 (100.0)	
41-50	5 (17.2)	24 (82.8)	29 (100.0)	
51-60	0 (0.0)	6 (100)	6 (100.0)	
61-70	1 (33.3)	2 (66.7)	3 (100.0)	
Occupational level				
Class I	4 (23.5)	13 (76.5)	17 (100.0)	0.087
Class II	7 (14.3)	42 (85.7)	49 (100.0)	
Class III	2 (4.1)	47 (95.9)	49 (100.0)	
Class IV	5 (8.8)	52 (91.2)	57 (100.0)	
Class V	4 (5.7)	66 (94.3)	70 (100.0)	
Educational level				
Tertiary	21 (9.4)	203 (90.6)	224 (100.0)	0.222
Secondary	5 (5.9)	80 (94.1)	85 (100.0)	
≤Primary	4 (17.4)	19 (82.6)	23 (100.0)	
Annual income (N)				
<600,000	12 (5.9)	190 (94.1)	202 (100.0)	<0.0001*
600,000-1,200,000	7 (18.9)	30 (81.1)	37 (100.0)	
>1,200,000	5 (31.3)	11 (68.8)	16 (100.0)	

*Statistically significant

respondents self-medicated to treat fever or malaria using antimalarials and antipyretics. Antimalarials and antipyretics are the most common pharmacologic agents purchased over-the-counter drugs in Nigeria, which is an endemic malaria zone.[25] However, the chances of misdiagnosis and wrong treatment are common as all fevers are often inappropriately labelled as 'malaria' or 'typhoid fever'.

Concerning non-drug remedies for COVID-19, local herbal mixtures were most frequently used (6 out of 30); others were lemon, garlic, ginger and warm/hot water. In the study in Lome, 10.2% of the population used traditional medicines; this was only second to Vitamin C, which was the most widely used drug. Local herbs (often alcohol based) are commonly ingested in the study population and many African countries generally for the treatment of fever-related illnesses, although some persons take them habitually; this may explain its use amongst respondents. Furthermore, local herbs are cheap and readily available. Lemon/lime, garlic and ginger have been widely disseminated, particularly on social media, as potent remedies for COVID-19 prevention and treatment, and this reflects on the practice of respondents.

Risk factors of self-medication

Higher level of income and higher occupational level were significantly associated with self-treatment. Arnold *et al*. from Lome similarly observed that health sector workers (high occupational level) were associated with SM for COVID-19; other risk factors identified were female sex, secondary level education and higher and having a symptom related to SARS.[14]

A higher practice of SM amongst respondents with higher income and occupation suggests that SM amongst the respondents is determined by financial capability; healthcare is mostly paid out-of-pocket in the study population and Nigeria. CQ which was a cheap and widely available drug before the pandemic became in high demand and expensive (350% increase in price) during the pandemic;[26] this was also the case with HCQ, as renal and rheumatology patients who were using this medication complained of the extra high cost during this pandemic.

This study did not demonstrate any statistically significant association between educational level and SM. A few studies have reported that SM is more common amongst less educated persons;[27-29] however, the Lome study reported that SM was more common amongst those with a secondary level of education and higher, ascribing it to greater knowledge about the disease.[14] One may also argue that good knowledge about the disease and treatment can inform the decision not to self-medicate amongst those with a higher level of education.

This study has some limitations. Data were based on self-report of participants, which could have introduced information and recall bias; this may result in either an underestimation or overestimation of SM for the population. All components of the local herbs used were not ascertained.

CONCLUSIONS

About a quarter of the respondents practised SM during the COVID-19 pandemic; a third of these self-medicated for COVID-19. The most frequent drugs used for prophylaxis and treatment of COVID-19 were CQ and zinc, while non-drug remedies included local herbal mixtures, garlic, ginger and citrus fruits with or without hot water. Higher income and occupational level were associated with SM. There is a need for stricter control of medications such as CQ, which may not only cause harm but may also lead to a resurgence of resistant malaria in the region. The use of un-standardised local herbal remedies should be discouraged and efforts made to evaluate their potential usefulness scientifically.

Acknowledgement

The authors acknowledge Chigoze Offiah, Okeoghene Ogome and Temitope Adeyemo for assisting with data collection and Osarumen Uwaidiae for data entry.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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