

Original Article

# Home-Based Management of Covid-19 and Covid-19 Like Illnesses: The Nigerian Experience

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## ABSTRACT

The containment of the COVID-19 pandemic requires early treatment protocols which are absent in many countries. Sub-Saharan African countries have used off-label home-based remedies for mild-moderate symptoms of COVID-19. This study sought to evaluate the home-based remedies used by Nigerians and determine their effects on subsequent COVID-19 morbidities. The study was a cross-sectional study conducted across the six geo-political zones of Nigeria. Electronic self-administered questionnaires were filled via the internet by individuals with suspected/confirmed COVID-19 illness. Data analyses were done with Microsoft Excel® and SPSS® version 20. Of the 217 questionnaires received, 51 (23.5%) questionnaires were completely filled by individuals with suspected/confirmed COVID-19. Majority of COVID-19 illnesses were self-diagnosed (n=33/51, 58.9%). Extreme body weakness (n=43/51, 84%), headaches (n=38/51, 75%), and fever (n=36/51, 71%) were the most prominent symptoms. Azithromycin, Zinc, Ivermectin, and Vitamins C and E (mostly used in combination) were the popular home-based remedies used and were well tolerated. Azithromycin ± Zinc had a significant impact on the mean COVID-19 days (P-value 0.01). Steroid use was significantly associated with both subsequent hospitalization and post-COVID-19 complications (P-value <0.05). Higher mean COVID-19 days were observed with increasing age (r=0.31, P-value 0.02). Home-based remedies for early treatment of COVID-19 among Nigerians are not uncommon. These remedies reduced post-COVID-19 complications, rebound COVID-19 and COVID-19 hospitalizations.

**Keywords:** Alternative therapy; COVID-19; Hospitalizations; Nigeria

## INTRODUCTION

The COVID-19 pandemic discovered in Wuhan China has negatively impacted every sphere of life globally. The main aim of the response to this disease has been the containment of spread of infection and ultimately the reduction of in-patient mortality<sup>1</sup>. The containment of COVID-19 has been structured by various countries' health agencies. Protocols for self-quarantine/home-based

care/hospitalization in Nigeria have been developed by the Nigeria Centre for Disease Control (NCDC, Nigeria) which currently does not have an available management regimen for those with mild to moderate symptoms of COVID-19. Adopting an evidenced-based protocol for mild to moderate COVID-19 symptoms could indirectly reduce hospitalization and subsequent mortality due to

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COVID-19<sup>2</sup>.

Sub-Saharan Africa has been largely spared from the projected mortalities from COVID-19 with a case fatality rate of less than 2% in Nigeria despite the challenges in the health systems<sup>3</sup>. Among reasons adduced for these have been population demographics, weather and prior immunity to the coronaviruses<sup>4,5</sup>. Moreover, there has been wide off-label purchase of certain medications and preparations being used as home-remedies/home-based therapy which although has scientific actions against SARS-CoV-2 are yet to be certified for official use against COVID-19<sup>6</sup>. Could this be among the reasons for the apparent reduction of hospitalizations and mortalities due to COVID-19 in Nigeria? These therapies include anti-malarials such as Hydroxychloroquine and Artemisinin, anti-parasitic drugs such as Ivermectin, some anti-virals and even herbs. Inadequate clinical trials on many of these medications offered for home-remedies have hindered the scientific progress on such therapies<sup>7</sup> and hence the dependency on available vaccines against SARS-CoV-2. These vaccines are however not the expected utopia as many post-vaccinated individuals still maintain a mild to moderate (and even severe) susceptibility to SARS-CoV-2<sup>8</sup>.

With the high contagion of the SARS-CoV-2 and majority of infections ranging from asymptomatic to mild to moderate<sup>9</sup>, there is a need for a protocol on outpatient or home-based therapy in Nigeria. This can serve as the basis for more robust randomised clinical trials, reduction of drug toxicities, affirmation of appropriate drug use (stewardship) and the reduction of hospitalizations and mortalities due to COVID-19. This study is aimed at characterizing the home-based remedies (which are either orthodox/unorthodox) used by COVID-19 positive patients and identifying determinants that affect days with COVID-19 illness, COVID-19 hospitalizations, rebound COVID-19 infection and post-COVID-19 complications in Nigeria.

## MATERIALS AND METHODS

**Study setting:** The study was conducted across the six geo-political zones of Nigeria. With an estimated population of about 200 million persons at the time of

conducting this study, Nigeria had recorded about 215,000 cases of COVID-19 and a 1.3% case fatality rate.

The study was a cross-sectional study conducted from June, 2021 to November, 2021.

### Procedure

All respondents managed with either mild or moderate symptoms were assessed for duration of illness with/without use of remedies, subsequent occurrence of another episode of COVID-19 (rebound COVID-19), complications post-COVID-19 illness, or requiring a hospitalization from subsequent severity of COVID-19. COVID-19 days were calculated as the days with COVID-19 symptoms such as anosmia (loss of smell), fever etc. with or without any home-based remedies.

### Sample size determination

A minimum of 48 COVID-19 patient respondents with mild to moderate symptoms was estimated from a previous study by Osikomaiya *et al*<sup>9</sup> using appropriate sample size determination<sup>10</sup>. These respondents were randomly distributed across the six geo-political zones of Nigeria.

### Inclusion criterion

Individuals with suspected or confirmed COVID-19 illness (based on WHO case definition)<sup>11</sup> on self-quarantine or managed as out-patient during the study period.

### Data collection and management

Electronic self-administered questionnaires were filled via an internet enabled Google form to collect information about socio-demographic details, symptomatology, COVID-19 diagnoses, home-remedies used and complications experienced from respondents.

Univariate and bivariate analyses were carried out on the data set using frequencies, percentages and Chi-square/Fisher's exact, T-test and Pearson correlation test respectively where applicable. P-value of <0.05 was considered statistically significant. Statistical analyses were done with Microsoft Excel® and SPSS® version 20.

### Ethical Consideration

Ethical approval for this study was obtained with protocol number OSHREC/C/PRS/5691/191 by the Health and Ethics Research Committee of the Ministry of Health, Osun State. Respondents provided consent before voluntary participation in the study while confidentiality and anonymity were maintained. The metadata were double checked for safety and encryption.

### RESULTS

Of the 217 questionnaires filled, 51 (23.5%) questionnaires were completely filled by respondents who had suspected or confirmed COVID-19. They were spread across the six geo-political zones of Nigeria. Male to female ratio was 2:1. Majority were affiliated with medical profession (n=29/51, 57%) mainly nurses, doctors and medical students. Others were civil servants, marketers and students of other professions. Ages of respondents ranged from 6-57years with a mean age of 30.7years and standard deviation of 7.57years. Higher mean COVID-19 days were observed with increasing age ( $r=0.31$ , P-value 0.02) (Table 2).

Associated co-morbidities among the respondents were cancer-related conditions > hypertension > diabetes mellitus > peptic ulcer disease. The assessment of COVID-19 in the respondents were mostly self-diagnosed (n=33/51, 58.9%) based on clinical symptoms synonymous with those with laboratory confirmed COVID-19 (n=13/51, 23.2%), whereas five respondents (n=5/51, 8.9%) had a physician's diagnosis based on presenting signs and symptoms. Real-time reverse transcriptase polymerase chain reaction was the main investigational technique used for diagnosing COVID-19 among those who used the laboratory (n=11/13, 84.6%). Three (n=3/51, 5.8%) of the respondents were vaccinated against COVID-19 before their onset of COVID-19 symptoms.

Extreme body weakness (fatigue) > headaches > fever > cough > nasal congestion > anosmia (loss of smell) were the most frequent symptoms among respondents (Figure 1). Other less common symptoms included sore throat, ageusia (loss of taste), chest pain, diarrhoea, somnolence and difficulty in

breathing. Mean days of occurrence of these symptoms (COVID-19 days) was 6.5 ranging from 3-17 with standard deviation of 3 days. Furthermore, the use of Azithromycin alone or in combination with Zinc as home-based remedies was significantly impactful on the mean COVID-19 days (Table 2).

All (n=51/51, 100%) of the respondents used at least one home-based remedy for early COVID-19 treatment. These home-remedies were mostly self-prescribed (n=30/51, 58.8%) while 41.1% (n=21) had these remedies prescribed by a physician either directly or by proxy.

Some of the home-remedies used with their daily dosages are included in Table 1. Other home-based remedies used were steam inhalation, salbutamol and herbal concoctions of unspecific compositions and dosages. Mean days of occurrence of rebound COVID-19 was 18 days after the primary episode (n=9/51, 17.6%). None of the home-based remedies used was significantly associated with rebound COVID-19 (Table 2) while only three (n=3/9, 33.3%) of the respondents had a repeat laboratory check to re-confirm COVID-19 (rebound COVID-19). Fifteen (n=15/51, 29.4%) respondents had a laboratory check to confirm negative COVID-19 status after the overall COVID-19 experience. Complications were noticed in five respondents (n=5/51, 9.8%) after the primary episode of COVID-19 and these complications included diarrhoea, amnesia and heartburn. Older age group and the use of steroids were significantly associated with developing complications post-COVID-19 illness (Table 2). Only three (n=3/51, 5.9%) respondents had subsequent severe COVID-19 that necessitated hospitalization. Likewise, older age group and the use of steroids were significantly associated with COVID-19 hospitalizations (Table 2).

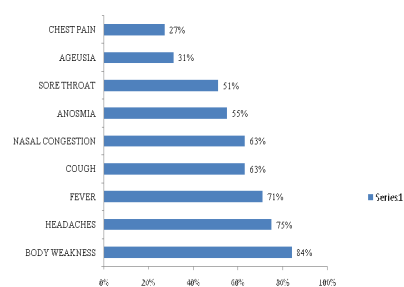


Figure 1: Prevalence of COVID-19 symptoms among respondents in Nigeria

**Table 1: Frequencies of Home-based remedies used with daily dosages among respondents in Nigeria**

Home -remedies	n/N	Percentage (%)	Daily dosages
Ivermectin	15/51	29.4	3mg -12mg
Hydroxychloroquine	6/51	11.7	200mg -1000mg
Artemisin ins (Artemether+Lumefantrin)	15/51	29.4	80mg/480mg
Azithromycin	30/51	58.8	500mg
Zinc	21/51	41.2	10-50mg
Vitamin C	33/51	64.7	100mg -600mg
Vitamin D	7/51	13.7	400iu
Vitamin E	10/51	19.6	200 -1000iu
Steroids	5/51	9.8	5mg -20mg
Aluvia ( Lopinavir/Ritonavir)	1/51	1.9	400mg/200mg
Ivermectin+A zithromycin	9/51	17.6	(3mg -12mg)+ (500mg)
Azithromycin + Artemisinins	12/51	23.5	(500mg) + (80mg/480mg)
Ivermectin + Artemisinins zithromycin +zinc	5/51	9.8	(3mg -12mg) + (10-50mg)
Azithromycin +Vitamin C	21/51	41.2	(500mg) + (10 0mg -600mg)
Azithromycin + Zinc	11/51	21.6	(500mg) + (10 -50mg)

**Table 2: Bivariate analysis of factors associated with COVID-19 outcomes among respondents in Nigeria**

Variables	Mean (symptoms) COVID-19 Days					Rebound COVID-19		COVID-19 Hospitalization		Post-COVID complications	
	(n/N)	Mean	SD	t-test/r#	p-value	$\chi^2$ /FE/t-test $\yen$	p-value	$\chi^2$ /FE/t-test $\yen$	p-value	$\chi^2$ /FE/t-test $\yen$	p-value
<b>DRUGS USED</b>											
Ivermectin	15/51	6.65	3.04	0.27	0.78	2.90	0.21	2.50	0.50	0.35	0.65
HCQ	6/51	6.44	2.93	-0.02	0.97	0.82	0.57	0.95	1.00	1.30	1.00
Artemisinin	15/51	7.08	3.16	0.90	0.37	1.55	0.58	0.94	1.00	0.35	0.65
Azithromycin	30/51	7.27	3.55	2.35	0.01 *	1.20	0.81	1.07	0.50	1.90	0.68
Zinc	21/51	7.11	3.07	1.27	0.21	0.16	0.11	1.45	1.00	0.52	0.68
Vitamin C	33/51	5.97	2.55	-1.62	0.11	0.48	0.34	0.88	0.12	0.35	0.22
Vitamin D	7/51	7.10	2.53	0.58	0.56	0.88	1.00	0.95	1.00	0.84	0.57
Vitamin E	10/51	7.04	3.14	0.66	0.51	0.80	0.32	0.95	1.00	0.82	0.32
Steroids	5/51	8.47	5.86	1.57	0.12	1.39	1.00	1.66	0.00 *	15.75	0.01 *
Ivermectin+Azithromycin	9/51	7.56	3.51	1.19	0.24	1.71	0.61	5.12	0.32	0.75	1.00
Azithromycin + Artemisinins	12/51	7.49	3.38	1.34	0.18	0.41	0.66	0.94	1.00	0.50	1.00
Ivermectin + Azithromycin +Zinc	5/51	8.10	3.96	1.27	0.21	0.82	0.58	11.25	0.18	1.66	0.53
Azithromycin +Vitamin C	21/51	6.75	2.81	0.54	0.58	1.52	0.70	0.93	0.50	0.52	0.68
Azithromycin + Zinc	11/51	8.51	3.22	- 2.67	0.01 *	0.80	0.17	3.90	0.38	0.56	1.00
AGE	51/51	30.78	7.57	0.31 <sup>#</sup>	0.02 *	-1.24 $\yen$	0.22	3.27 $\yen$	0.00 *	2.38 $\yen$	0.02 *
CO -MORBIDITIES	6/51	7.81	2.52	1.15	0.25	0.82	0.57	0.95	1.00	1.30	1.00
GENDER	51/51	5.99	2.63	-1.632	0.109	0.23	0.99	0.485	1.00	3.42	0.40

\*P-value<0.05-statistical significance;  $\yen$ - T-test;  $\chi^2$  - Chi-square; FE-fisher's exact; #-Pearson correlation co-efficient; SD-sandard deviation; HCQ-Hydroxychloroquine

## DISCUSSION

Early COVID-19 treatment has been advocated in many parts of the world especially for symptomatic patients<sup>12,13</sup>, but a substantive management protocol for this is yet to be fully elucidated. Sub-Saharan Africa has long maintained a low case fatality rate from the COVID-19 pandemic amidst the emergent

variants of COVID-19, poor accessibility and availability of the COVID-19 vaccines with its waning effectiveness<sup>14,15</sup>.

From this study, higher mean COVID-19 days were seen with increasing age. The older age group had more likelihood of a prolonged symptomatology period of COVID-19 (COVID-19 days),



hospitalization and experiencing post-COVID-19 complications. This has been corroborated by various studies where younger age group has been vastly spared from COVID-19 symptoms and its attendant complications<sup>16,17</sup>. Symptoms of COVID-19 varied across the respondents but most notable were extreme body weakness, headaches and fever. Although, these symptoms are non-specific (since COVID-19 is fast evolving to be a mimicry of many clinical syndromes), clinical judgement and laboratory investigation done indicated these symptoms were suggestive of COVID-19<sup>11</sup>.

As at the documentation of these findings, no robust randomised clinical trials have been conducted to identify early treatment options for COVID-19. Individuals have made use of relatively available over-the-counter medications for supportive therapy based on knowledge of mechanisms of action of some of these medications and remedies<sup>1,18</sup>. To reduce the chances of progression to a severe form of COVID-19 that might require hospitalization, majority of the respondents in our findings made use of these remedies mostly without a physician's prescription. These remedies were used without a laid down prescription pattern, hence an arbitrary dosage regimen was employed by most of the respondents. Most of these remedies were used in combination; with use of Ivermectin, Immune boosters and Multi-vitamins such as Vitamin C, D and E, Azithromycin and Artemisinin.

Anti-virals such as Aluvia was least used. Azithromycin alone or in combination with Zinc had a significant impact on the COVID-19 days. All these remedies can be experimented thoroughly in randomised clinical trials for effectiveness against COVID-19. Moreover, explorations can be made with herbal remedies which have been applied as an alternative medicine for COVID-19 in many countries<sup>19,20</sup>. Of all the home-based remedies used by the respondents, steroids use was significantly associated with both subsequent COVID-19 hospitalization and post-COVID-19 complications. This is quite controversial based on the widely acceptable study that identifies dexamethasone

(steroid) as a potent anti-COVID-19<sup>21</sup>. However, some other studies have noted discrepancies with enteral versus parenteral steroids in reducing uneventful outcomes in COVID-19<sup>22,23</sup>. More research is needed in this regards based on the genetic and immunologic peculiarities of Africans in responding to steroids. Furthermore, only two respondents (n=2/51, 3.9%) reacted adversely to the home-based remedies; headaches with ivermectin and tremulousness with salbutamol. These are recognised side-effects of these medications<sup>24,25</sup>.

At the time of this study, COVID-19 vaccines were just arriving in Nigeria, and a few respondents developed COVID-19 symptoms that were later laboratory confirmed post-vaccination. This is not surprising on account of waning immunity provided by the vaccine and the current terminology of 'breakthrough COVID' despite vaccination coverage<sup>14</sup>. Re-occurrence of COVID-19 (referred to in this study as rebound COVID-19) post infection is quite a rare phenomenon but its appearance in this study cannot be overlooked<sup>26</sup>. This might have occurred from a lingering or long COVID-19 syndrome<sup>9</sup> or a rather new COVID-19 infection from a new variant. The presence of co-morbidities in this study was not associated with any uneventful outcomes as otherwise stated in many studies as a risk factor for COVID-19 hospitalization<sup>27,28</sup>. We acknowledge the need for further robust research to evaluate these variables.

## CONCLUSION

Prior to this study, little was known about home-based remedies for early treatment of COVID-19 in Nigeria. This study finds these home-based remedies commonly used among suspected or confirmed COVID-19 with mild to moderate symptoms despite a lack of a substantive protocol. These remedies are largely well tolerated and have been mostly found to reduce post-COVID-19 complications, rebound COVID-19 and COVID-19 hospitalizations.

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### Conflict of Interest

The authors disclose no conflict of interest in the development of this study.

### Authors' Contribution

E.O.I conceptualized the idea for the manuscript. E.O.I, A.C.A and O.T.O designed the questionnaires and administered them. E.O.I analyzed the data set. E.O.I, A.C.A and O.T.O reviewed the manuscript for publication.

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