

Self-medication against COVID-19 in health workers in Conakry, Guinea

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Abstract

Data regarding the prevalence and consequences of self-medication during the COVID-19 pandemic in Africa are very limited. The study aimed to explore the frequency and risk factors of self-medication against COVID-19 by health personnel in this study. This cross-sectional study took place in June 2021, in Conakry, in the all three national hospitals and the six community medical centers, and five primary health centers. A multivariate logistic regression model was performed to identify factors associated with self-medication. A total of 975 health workers with a median age of 31 (IQR: 27-40) years, with 504 (51.7%) women were included. The majority were clinicians: physicians (33.1%) or nurses (33.1%). Of all, 46.2% reported having had at least one COVID-19 symptom during the 12 months preceding the survey. The proportion of self-medication was 15.3% among national hospital staff, 12.20% in municipality medical centers and 22.6% in primary health centers ($p=0.06$). More than two-thirds (68.7%) who self-

medicated did not have a test for SARS-CoV-2 infection. They took antibiotics including azithromycin, amoxicillin, ampicillin (42.2%), acetaminophen (37.4%), vitamin C (27.9%), hydroxychloroquine (23.8%) and medicinal plants (13.6%). The median duration of self-medication was 4 days. Fatigue or asthenia, sore throat, loss of smell and sore throat of a close person were independently associated with self-medication. Health care workers largely practiced self-medication during the Covid pandemic and without diagnostic testing. The results suggest the need for training and sensitization of medical personnel to avoid the consequences of the molecules used, including hepatotoxicity and antibiotic resistance.

Introduction

The world has been living with COVID-19 for almost two years since its December 2019 appearance in Wuhan, China. Guinea identified its first case three months later, just as the World Health Organization (WHO) was declaring a pandemic. By August 2021, the causal virus (severe acute respiratory syndrome coronavirus 2, SARS-CoV-2) had spread to over 218 countries, infecting over 200 million people and claiming more than 4.22 million lives.^{1,2}

The pandemic has created widespread paranoia and anxiety across the world and sub-Saharan Africa in particular. A literature review found symptoms of anxiety and depression (16-28%) and self-reported stress (8%) have been common reactions to the COVID-19 pandemic, including poor sleep quality.³ The psychological distress and fear engendered by a novel illness can also lead to behavioral changes. For example, people who have been exposed or been in exposure-risk situations and others resort to self-medication to prevent infection or to treat suspected COVID-19, using traditional medicine and unconventional treatments without knowing their safety or anti-COVID efficacy.^{4,5} Despite being strongly discouraged, self-medication with anti-infective agents is also likely to occur. Self-medication means taking medicine without a health professional's advice. WHO defines it as "the practice whereby individuals treat their ailments and conditions with medicines which are approved and available without a prescription, and which are safe and effective when used as directed".^{4,6}

There are little data regarding the prevalence and consequences of self-medication during the COVID-19 pandemic.⁶ To explore this behavior, a recent study looked

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at the number of requests for 'self-medication COVID-19' in web search engines such as Google Scholar.⁷ It found a growing worldwide trend in such searches, which demonstrated mounting public interest in the practice. These investigators pointed out

that health care workers' circumstances and work environment facilitate their accessing medicines for their own use.⁷ Therefore, we aimed to explore the frequency and risk factors of self-medication against COVID-19 by health personnel in this study.

Materials and methods

Setting and study design

This cross-sectional study took place in June 2021, in Conakry, the capital of the Republic of Guinea, which is also the country's COVID-19 epicenter. Conakry has three national hospitals, six municipal medical centers (CMCs) and fifty-five primary health centers. The study encompassed all three national hospitals and the six community medical centers, and five primary health centers, *i.e.* one in each municipality area.

Study population

The study targeted all staff present at a facility on the survey day, including physicians, pharmacists, nurses, midwives, laboratory personnel, housekeeping, and maintenance workers, administrative and clerical staff, and trainees.

Data collection

After pre-testing with twenty (20) health workers, data was collected by interviews with a standardised questionnaire. The questionnaire had three sections: exposure to COVID-19, self-medication practices (types of medicines taken, if any) and socio-demographics (*e.g.*, age, sex, marital status, level of education, residence location, professional experience). Interviewers were trained to use Kobocollect, a software program that incorporates data quality assurance.

Statistical analyses

Continuous variables were compared by the Wilcoxon test and the χ^2 or Fisher's exact test compared categorical variables.

A multivariate logistic regression model was performed to identify factors associated with self-medication. The distribution of continuous variables was checked. The variables significant at the 0.2 level in univariate analysis were entered into the multivariate models. The goodness-of-fit was assessed by the Hosmer-Lemeshow test. For all tests performed, 2-tailed p-values <0.05 were regarded as statistical significance. Statistical data were analyzed with statistical package for the social sciences (version 26.0 for Windows, SPSS, Inc., Chicago, IL).

Results

A total of 975 health workers with a median age of 31 (IQR: 27-40) years, with 504 (51.7%) women were included. The majority were clinicians: physicians (33.1%) or nurses (33.1%). Of all, 46.2% reported having had at least one COVID-19 symptom during the 12 months preceding the survey (Table 1). The main reported symptoms were fever (23.7%), chills (7.1%), fatigue (28.1%), myalgia (14.7%), cough (12%), difficulty breathing (2.5%), loss of taste (5%) and smell (2.8%). The onset of symptoms led 41.9% of participants to see a physician, but only 31.7% took time off work.

Of all, a total of 147 health workers reported having self-medicated corresponding to a frequency of 15.1%. This was 15.3% among national hospital staff, 12.20% in municipality medical centers and 22.6% in primary health centers ($p=0.06$). Prevalence was higher among those reporting having had a COVID-19 symptom (70.7% vs 41.8%; $p<0.001$) and their reported symptom frequency differed from those who did not report self-medication. Those who self-medicated were more likely to report fever (40.1% vs 20.8%; $p<0.001$), chills (12.2% v. 6.2%; $p=0.008$), fatigue or

Table 1. Characteristics of health professionals in the city of Conakry who practiced and those who did not practice self-medication against Covid-19.

	All (%)	Self-medication N=147 (%)	No self-medication N=828 (%)	p-value
Age, median (IQR) years	31 (27-40)	32 (27-40)	32 (27-40)	0.54
Gender		0.86		
Male	471 (48.3)	72 (49)	399 (48.2)	
Female	504 (51.7)	75 (51)	429 (51.8)	
Marital status		0.87		
Married	539 (55.3)	83 (56.5)	456 (55.1)	
Single	403 (41.3)	60 (40.8)	343 (41.4)	
Widowed	33 (3.4)	4 (2.7)	29 (3.5)	
Type of facility				0.06
National hospital	620 (63.6)	95 (64.6)	525 (63.4)	
Municipality medical center	271 (27.8)	33 (22.5)	238 (28.7)	
Primary health center	84 (8.6)	19 (12.9)	65 (7.9)	
Profession		0.90		
Physician	323 (33.1)	49 (33.3)	274 (33.1)	
Pharmacist	20 (2.1)	4 (2.7)	16 (1.9)	
Laboratory technician	78 (8)	11 (7.5)	67 (8.1)	
Intern/resident	33 (3.4)	2 (1.4)	31 (3.7)	
Nurse	323 (33.1)	47 (32)	276 (33.3)	
Student	99 (10.2)	18 (12.2)	81 (9.8)	
Health technician	32 (3.3)	5 (3.4)	27 (3.3)	
Hygienist	28 (2.8)	5 (3.4)	23 (2.8)	
Other	39 (4)	6 (4.1)	33 (4)	
Professional experience		0.53		
≤5 years	494 (50.7)	71 (48.3)	423 (51.1)	
>5 years	481 (49.3)	76 (51.7)	405 (48.9)	
Number of dependents		0.73		
≤10 people	895 (91.8)	136 (92.5)	759 (91.7)	
>10 people	80 (8.2)	11 (7.5)	69 (8.3)	

asthenia (49.7% vs 24.3%; $p < 0.001$), myalgia (29.9% vs 12.0%; $p < 0.001$), sore throat (15.0% vs 5.6%; $p < 0.001$), cough (21.8% vs 10.8%; $p < 0.001$), difficulty breathing (5.4% vs 1.2%; $p = 0.019$), loss of taste (13.6% vs 3.5%; $p < 0.001$), loss of smell (10.2% vs 1.4%; $p < 0.001$), or chest pain (5.4% vs 1.1%; $p = 0.002$).

To ask if anyone around them had tested positive, 36.1% and 26.3% ($p = 0.017$) of self-medicating and non-self-medicating staff respectively said yes. However, more than two-thirds (68.7%) who self-medicated did not have a PCR or rapid antigen test for SARS-CoV-2 infection. They took antibiotics including azithromycin, amoxicillin, ampicillin (42.2%), acetaminophen (37.4%), vitamin C (27.9%), hydroxychloroquine (23.8%) and medicinal plants (13.6%). The median duration of self-medication was four days (IQR: 2 - 7).

Multivariate analyses showed that fatigue or asthenia (OR=2.11; 95%CI: 1.38-3.23), sore throat (OR=1.89; 95%CI: 1.04-3.44), loss of smell (OR=4.64; 95%CI: 1.99-10.77) and sore throat of a close person (OR=2.32; 95%CI: 1.17-4.63) were independently associated with self-medication (Table 2).

Discussion

This study aimed to assess the frequency of self-medication for COVID-19 practiced by health facility staff in Conakry where over 80% of COVID-19 cases in Guinea have been reported. We found that in some health facilities more than one in five health workers practiced self-medication without any diagnostic tests. Moreover, the study found that misuse of some medicines, such as short antibiotic courses that promote resistant microorganisms, is currently a major global problem.

Other studies have found considerably higher prevalence,^{7,8} however, an evaluation of health workers' self-medication both before and during the COVID-19 pandemic in Kenya found 60.4% of 385 participants self-medicated.⁷ In Togo, a prevalence of self-medication of 34.2% was reported among 955 participants.⁸ This difference could be explained on the one hand by the difference in the sample size and the characteristics of the study populations. The results of the current study are consistent with those of Togo, which included more than 900 health workers.

Following national recommendations,

treatment can only be initiated once a biological diagnosis has been made.⁹ Unfortunately, although on the front line with easy access to the care system, a significant proportion of health personnel did not follow this recommendation for themselves. Probably fearing stigma, developing a severe form of the disease, or simply wanting quick symptom control, they turned to self-medication. This self-medication included antibiotics with inadequate treatment duration. They were probably influenced by the national Covid management protocol. Despite the discrepancy in the results of different studies on the efficacy of the combination of azithromycin and hydroxychloroquine, many countries in West Africa, including Guinea, use only this protocol to manage patients. The combination of azithromycin and hydroxychloroquine has been shown to have a synergistic effect against SARS-CoV-2.¹⁰ There have also been reports of possible anti-inflammatory properties of azithromycin that may lessen COVID-19 progression.¹¹ Azithromycin is able to inhibit NF- κ B during inflammation of the lungs and other tissues.¹¹ This effect has led to its use in COVID-19. However, its massive distribu-

Table 2. Factors associated with self-medication against Covid-19 in Conakry health workers.

	OR	Univariate 95%CI	p-value	ORadjusted	Multivariate 95% CI	p-value
Age						
≤ 31 years	1.0	Reference				
≥ 31 years	0.90	0.63–1.28	0.56			
Gender						
Male	1	Reference		-	-	-
Female	0.97	0.68–1.37	0.86	-	-	-
Marital status						
Married	1.0	Reference		-	-	-
Single	0.96	0.67-1.38	0.83	-	-	-
Widowed	0.76	0.26-2.21	0.61	-	-	-
Profession						
Physician	1.0	Reference		-	-	-
Pharmacist	1.39	0.45–4.36	0.56	-	-	-
Laboratory technician	0.95	0.62–1.47	0.83	-	-	-
Intern	0.92	0.45–1.86	0.81	-	-	-
Nurse	1.24	0.69–2.25	0.47	-	-	-
Student	1.04	0.38–2.82	0.95	-	-	-
Health technician	0.36	0.08–1.57	0.17	-	-	-
Hygienist	1.22	0.44–3.50	0.71	-	-	-
Other	1.02	0.41–2.56	0.97	-	-	-
Years of experience						
≤ 5 years	1.0	Reference				
≥ 5 years	1.11	0.79–1.60	0.53			
Symptoms						
Fatigue or asthenia (yes)	3.08	2.15-4.41	<0.001	2.11	1.38 - 3.23	0.001
Myalgia (yes)	3.15	2.09-4.74	<0.001	1.59	0.97 - 2.63	0.06
Sore throat (yes)	2.99	1.74-5.15	<0.001	1.89	1.04 - 3.44	0.03
Loss of smell (yes)	7.73	3.54-16.87	<0.001	4.64	1.99 - 10.77	<0.001
Chest pain (yes)	5.28	1.99-13.81	0.001	2.30	0.77 - 6.87	0.13
Other symptoms (yes)	1.79	0.64-4.96	0.265	2.70	0.96 - 7.64	0.06
Sore throat in a close contact (yes)	3.36	1.78-6.37	<0.001	2.32	1.17 - 4.63	0.01

tion, especially by self-medication risks macrolide resistance in *Streptococcus pneumoniae* colonizing the nasopharynx, as well as an increase in the genetic determinants of macrolide resistance in the gut.¹² The emergence and spread of antimicrobial resistance (AMR) are a major global health challenge.¹³ This concern is greater in developing countries such as Guinea, where antibiotics are used inappropriately by both patients and health care workers.^{14,15} It is estimated that by 2050, AMR will be responsible for the deaths of 10 million people and, in addition, will cost up to \$100 trillion.^{12,16} Essential to combating this problem is optimizing antibiotics use ensuring that the right antibiotic is administered at the right dose, for the right duration and in a way that elicits the best outcome while limiting's side effects and AMR.

In addition to the antibiotics, acetaminophen was used by the health workers. Similarly, acetaminophen abuse is not without harmful consequences. Misuse can lead to hepatotoxicity and other complications. Its overdose is a major cause of hepatotoxicity or devastating acute liver failure, triggered by increased plasma levels of aminotransferase.¹⁷

The results also showed self-medication with medicinal plants in to prevent COVID-19. Medicinal plants can enhance the host's antiviral immune response, which is an important protective mechanism against viral infection. Well-known natural immune stimulators include *Allium sativum*, *Camellia sinensis*, *Zingiber officinale*, *Nigella sativa*, *Echinacea spp.* *Hypericum perforatum* and *Glycyrrhiza glabra*. Historical data related to infection with other coronaviruses suggests that natural medicine has an important role in preventing COVID-19 infections, especially in high-risk patients.¹⁸ However, in this study, we did not collect data on the name of the plants and the dosage used.

Our study has some limitations which need to be considered when interpreting the data. The study was limited to public sector and did not include private and confessional health facilities. In addition, the study was conducted when only a part of the staff was coming to the hospital because of prevention measures taken by the authorities. In hospitals that did not receive Covid patients, a rotation system had been put in place to avoid contamination among health workers, which would not have made it possible to include everyone. However, the study has the advantage of having included the three national hospitals, all the municipality medical centers, and a sampling of

primary health centers with almost 1000 health care workers included.

Conclusions

Health care workers largely practiced self-medication during the Covid pandemic and without diagnostic testing. The onset of symptoms suggestive of Covid was the main reason for this self-medication, which included antibiotics. These results suggest the need for training and sensitization of medical personnel to avoid the consequences of the molecules used, including hepatotoxicity and antibiotic resistance.

References

- Palayew A, Norgaard O, Safreed-Harmon K, et al. Pandemic publishing poses a new COVID-19 challenge. *Nat Hum Behav* 2020;4:666–9.
- Weekly epidemiological update on COVID-19 - 3 August 2021 n.d. <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19--3-august-2021> (accessed August 5, 2021).
- Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian J Psychiatry* 2020;52:102066.
- Wegbom AI, Edet CK, Raimi O, et al. Self-Medication Practices and Associated Factors in the Prevention and/or Treatment of COVID-19 Virus: A Population-Based Survey in Nigeria. *Front Public Health* 2021;9:606801.
- Gras M, Champel V, Masmoudi K, Liabeuf S. Self-medication practices and their characteristics among French university students. *Therapie* 2020;75:419–28.
- Gras M, Gras-Champel V, Moragny J, et al. Impact of the COVID-19 outbreak on the reporting of adverse drug reactions associated with self-medication. *Ann Pharm Fr* 2021;79:522-9.
- Onchonga D, Omwoyo J, Nyamamba D. Assessing the prevalence of self-medication among healthcare workers before and during the 2019 SARS-CoV-2 (COVID-19) pandemic in Kenya. *Saudi Pharm J SPJ* 2020;28:1149–54.
- Sadio AJ, Gbeasor-Komlanvi FA, Konu RY, Bakoubayi AW, Tchankoni MK, Bitty-Anderson AM, et al. Assessment of self-medication practices in the context of the COVID-19 outbreak in Togo. *BMC Public Health* 2021;21:58.

- Jaspard M, Sow MS, Juchet S, et al. Clinical presentation, outcomes and factors associated with mortality: A prospective study from three COVID-19 referral care centres in West Africa. *Int J Infect Dis* 2021;108:45–52.
- Gautret P, Lagier J-C, Parola P, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *Int J Antimicrob Agents* 2020;56:105949.
- Khezri MR, Zolbanin NM, Ghasemnejad-berenji M, Jafari R. Azithromycin: Immunomodulatory and antiviral properties for SARS-CoV-2 infection. *Eur J Pharmacol* 2021;905:174191.
- Doan T, Worden L, Hinterwirth A, et al. Selection of Macrolide and Non-Macrolide Resistance with Mass Azithromycin Distribution: A Community-Randomized Trial. *N Engl J Med* 2020;383:1941–50.
- Toy T, Pak GD, Duc TP, et al. Multicountry Distribution and Characterization of Extended-spectrum β -Lactamase-associated Gram-negative Bacteria From Bloodstream Infections in Sub-Saharan Africa. *Clin Infect Dis* 2019;69:S449–58.
- Talassone Bangoura S, Toure A, Sidibé S, et al. Frequency and Determinants of Prescribing Antibiotics for Internal Medicine at Donka National Hospital (Guinea). *Cent Afr J Public Health* 2020;6:1.
- Sow M, Camara A, Fortes Deguenonvo L, et al. Evaluation of the Prescription of Antibiotics in the Lower Respiratory Tract Infections in Adults at the University Hospital of Conakry in Guinea n.d.
- Lucien MAB, Canarie MF, Kilgore PE, et al. Antibiotics and antimicrobial resistance in the COVID-19 era: Perspective from resource-limited settings. *Int J Infect Dis* 2021;104:250–4.
- Faqihi AHMA, Sayed SF. Self-medication practice with analgesics (NSAIDs and acetaminophen), and antibiotics among nursing undergraduates in University College Farasan Campus, Jazan University, K.S.A. *Ann Pharm Fr* 2021;79:275-85.
- Boozari M, Hosseinzadeh H. Natural products for COVID-19 prevention and treatment regarding to previous coronavirus infections and novel studies. *Phytother Res* 2021;35:864–76.