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Knowledge Of COVID-19 And Perception of Nigerians Towards the Use of Herbal Medicine in Its Treatment

G.O. ALABI[1A, B, D-F], S.O. DADA[2A-F], S.A. ADEBODUN[3 A, B, D-F], O.C. OBI[4A, B, D-F]

[1]Department of Physiology, Ben Carson (Snr) School of Medicine, Babcock University, Nigeria
[2]Department of Research, Innovation and International Cooperation, Academic Division, Babcock University, Nigeria
[3]Department of Pharmacognosy, Faculty of Pharmacy, University of Ibadan, Nigeria
[4]Bright Future and Sons Pharmaceutical and Multiglobal Services Limited, Enugu, Nigeria

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article.

Abstract

Background: The Alma-Ata Declaration acknowledged the role of traditional herbal medicine for the achievement of 'Health for All' and endorsed that proven traditional medicines and health practices should be integrated into the national essential medicine programme for primary health care.

Objectives: This study assessed Nigerians' knowledge on COVID-19, determined their perception on the use of herbal medicine in the treatment of COVID-19, and identified the factors that may influence their choice of acceptance of herbal medicines for the treatment of the disease.

Materials and Methods: A descriptive online survey (Google form) method was used to elicit information from 345 consenting adults in Nigeria. 11-point knowledge and 14-point perception scale were used. Data obtained were exported into an Excel sheet and descriptive statistics were used for data analyses.

Results: Although there are no globally certified herbal medicines in the treatment of COVID-19, most of the respondents had good knowledge of COVID-19 and good perception about the use of herbal medicine in the treatment of COVID-19 in Nigeria. Majority of the respondents were willing to use herbal medicines if made available for the treatment of COVID-19 and their reasons included its ready availability (70.9%) cost (80.3%) and perceived lack of side effects (63.8%).

Conclusion: This study has established the fact that respondents have good basic knowledge of COVID-19. The good perceptions reported in this study towards the use of herbal medicine in the treatment of COVID-19 are indications that herbal medicines, if researched and scientifically proven to be effective in the treatment of the disease, will be most welcome to the Nigerian populace.

Keywords: **COVID-19, Herbal Medicine, Nigeria**

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which belongs to the coronavirus family (Nugraha et al., 2020). Coronaviruses are RNA viruses which have distinct spikes of about 9-12nm, giving them a 'solar corona' appearance. The spike subunits of SARS-CoV-2 facilitate the entry of the virus into target cells and angiotensin-converting enzyme 2 (ACE2) has been discovered to be the entry receptor of this virus (Gupta et al., 2020). The SARS-CoV-2 is identified to cause pneumonia and acute respiratory distress syndrome (ARDS) but it has also been observed that asides the lungs been affected, the heart, endocrine organs, kidneys, gastrointestinal tract, brain are also affected (Guan et al., 2020; Shi et al., 2020; Wu et al., 2020; Zhou et al., 2020; Zhou et al., 2020). The mechanisms by which damage is done to other organs include dysregulation of the immune system and rennin-angiotensin-aldosterone system, thromboinflammation and endothelial cell damage (Gupta et al., 2020). The incubation period of this virus was discovered to be within 2-14 days (CDC, 2020). Adults above 60 years of age with underlying conditions such as cerebrovascular and cardiovascular diseases, diabetes, gastrointestinal tract disease, nervous system disease, malignant tumour, respiratory system disease have been reported to be more susceptible to this virus (Bai et al., 2020; Chen et al., 2020; Wang et al., 2020). Transmission of COVID-19 is believed to be through coughs or sneezes. Fever, fatigue, loss of appetite, dry cough, difficulty in breathing are common symptoms of the infection (Ahmed et al., 2020).

In the United State and United Kingdom, good knowledge of the COVID-19 including mode of transmission and common symptoms was recorded (Geldsetzer, 2020). According to Olapegba et al., (2020), Nigerians have relatively high knowledge about COVID-19. In a study carried out in the North-Central part of Nigeria by Reuben et al., (2020), a good knowledge and perception level was recorded.

Traditional herbal medicines are naturally occurring; plant-derived substances with minimal or no industrial processing that have been used to treat illness within local or regional healing practices. The Alma-Ata Declaration acknowledged the role of traditional herbal medicine for the achievement of 'Health for All' and endorsed that proven traditional medicines and health practices should be integrated into the national essential medicine programme for primary health care (Trapsida, 2003). It was reported that Chinese herbs combined with western medicine significantly improved symptoms of SARS, including reduced body temperature, cough and breathing difficulties, dosages of corticosteroids, improving absorption of pulmonary infiltration, and overall quality of life (Liu et al., 2012). Luo et al., (2020) also reported that the use of Traditional Chinese Medicine played a significant role in reducing deterioration and mortality rates and increasing the recovery time. There is currently no precise treatment for COVID-19 (Tang et al., 2020), isolation and antibiotics treatment for secondary infections are utilized (Habibzadeh and Stoneman, 2020). The best preventive measure is cleaning the hands with soap and water or using alcohol-based hand sanitizer and to avoid touching the mouth, eyes, nose, and face (WMHC, 2020). Nevertheless, there have been serious research going on in the development of plant-based vaccines and medicines for the treatment of COVID-19. Medicinal plants which possess active compounds with antimicrobial, anti-inflammatory, immunostimulatory or antiviral properties are being explored in the treatment of COVID-19 (Nugraha et al., 2020). Therefore, this study was designed to further assess the knowledge of Nigerians on COVID-19, determine their perception on the use of herbal medicine in the management of COVID-19 and identify factors that may influence their choice of acceptance of herbal medicine for the treatment of the disease.

METHODOLOGY

Study design and sampling method

This study was a descriptive cross-sectional survey using a convenience sampling method. The questionnaire was designed using Google forms with a respondent's consent form attached to each questionnaire.

Study Population

Study populations were Nigerians from age 18 years and above who had internet access and who can understand English language.

Sample size determination
Sample size for this study was estimated from the Leslie Kish formula for single proportion which is as follows:

$$N = \frac{Z^2pq}{d^2}$$

N= Minimum sample size

Z= Standard normal deviation set at 1.96 normal interval
p= Proportion estimated to be obtained in the target population [Prevalence of Covid-19 in Nigeria 14.6% (Salako et al, 2021)]

q= Proportions that does not have the characteristics being investigated

$$(q = 1 - p)$$

$$q = 1 - 0.146 = 0.854$$

d= Degree of accuracy set at 0.05 (precision set at 5% significant)

Therefore, the sample size

$$N = \frac{(1.96)^2 \times 0.146 \times 0.854}{0.05^2}$$

$$N = \frac{0.4789}{0.025}$$
$$N = 192$$

A non-response rate of 10% of 192 = 192 +19 = 211

Therefore, the minimum calculated sample for this study was 211. However, a total of 345 study participants fully filled the questionnaire and were used for data analysis. This helps to provide more robust responses.

Reliability and validity of study instrument
Face, content, and construct validity was ensured by subjecting the instrument to peer and experts review to ascertain that the variables in the instrument could significantly measure the objectives of interest. Reliability was ensured by pre-testing the study instrument on 20 young adult in Oyo State, Nigeria, and a Cronbach Alpha measure of 0.95 was obtained which was accepted to be reliable. However, after the reliability test, the instrument was also re-structured and ambiguous questions were reframed.

Study instrument
The questionnaire comprised of 4 sections which elicited information on the socio-demographic characteristics of the participants, the participants' knowledge on COVID-19 (11 items), perception about the use of herbal medicine in the treatment and management of COVID-19 (14 items), and factors influencing the willingness of the participants to use herbal medicine (4 items). The possible answers were "Agree" (Yes), Disagree (No) and Undecided. All the data were collected in one survey with different sections.

Methods of data collection
The links to the online questionnaires were posted on social media and sent to prospective respondents personally via their personal social media handles and e-mails. The prospective respondents were then encouraged to send out the survey link to their contacts and on their various social media platforms. Therefore, the link was forwarded to other people asides the first point of contact. The survey was conducted in English language and took about five minutes to be completed. Participation was consensual, anonymous, and completely voluntary. All participants gave informed consent before filling the questionnaires.

Data analysis procedure
The responses from the Google form were exported into Excel format to get the summary statistics. Descriptive statistics was used to describe the demographic characteristics of respondents, their knowledge and perception about COVID-19. An 11-point knowledge scale was used to assess the knowledge of respondents on Covid-19. Scores of 8-11 (70% and above) were categorized as good, 5-7 (less than 70% but greater than 40%) was categorized as fair knowledge, and a knowledge score of below 5 points (less than 40%) was categorized as poor knowledge (Aina, Oyedele & Dada et al., 2020). A 14-point perception scale was used to assess respondent's perception on the use of herbal medicine in the treatment of Covid-19. Score of 10-14 (70% and above) was categorized as good and scores of less than 10point (less than 70%) was categorized as poor perception (Dada, Oyewole & Desmennu, 2020).

RESULTS

Socio-demographic Characteristics of Respondents

Table 1 shows the socio-demographic characteristics of the respondents. The mean respondents' age was 32.1 ± 9.7 years with minimum and maximum ages of 19 and 56 years, respectively. More than half 178 (51.6%) of the respondents were male and 167 (48.4%) were female. 185 (53.6%) were single and 158 (45.8%) were married. Most, 318 (92.2%) had tertiary level of education while 170 (49.9%) were self-employed, 100 (29%) were students.

Table 1: Socio-demographic characteristics of respondents (*n=345)*

Variables	Responses	Frequency	%
Age as at last birthday (in years)	Below 20 years	22	6.4
	20-29	135	39.1
	30-39	118	34.2
	40-49	41	11.9
	50 and above	29	8.4
Gender	Female	167	48.4
	Male	178	51.6
Marital status	Single	185	53.6
	Married	158	45.8
	Separated	2	0.6
Occupation	Students	75	21.7
	Civil servant	100	29.0
	Entrepreneur/self-employed	170	49.3
Level of Education	Primary	3	0.9
	Secondary	24	7.0
	Tertiary	318	92.2

Knowledge of COVID-19

To ascertain the knowledge of the respondents on COVID-19, several questions were asked on the origin, symptoms, recovery rate and prevention of the virus. Majority of the respondents had good knowledge score with a mean score of 8.0 ±1.5 out of the total 11 score obtainable. Most 335 (97.1%) of the respondents were aware of COVID-19 and all 345 (100%) agreed that it is a global pandemic. Symptoms of COVID-19 as reported by the respondents were fever and difficulty in breathing 344 (99.7%), cough and shortness of breath 344 (99.7%). Also, 99.7% reported that COVID-19 if not well treated can lead to other complications and death. Majority (99.4%) also reported that all individuals with suspected cases of COVID-19 must be self-isolated for a minimum of 14 days. Most 342 (99.1%) of the respondents reported that COVID-19 can be prevented by personal hygiene and ensuring social distancing. The respondents' knowledge on COVID-19 is presented in Table 2.

Table 2: Knowledge of COVID-19
n=345

Statement	Responses	
	Yes (%)	**No (%)**
I have heard of COVID-19 (Corona Virus)	335 (97.1)	10 (2.9)
COVID-19 is a global problem.	345 (100.0)	0 (0.0)
COVID-19 is caused by a type of Corona Virus.	331 (95.9)	14 (4.1)
COVID-19 can be prevented by personal hygiene and ensuring social distancing.	342 (99.1)	3 (0.9)
The disease if not well treated can lead to other complications and death.	344 (99.7)	1 (0.3)
Symptoms of COVID-19 include cough and shortness of breath.	344 (99.7)	1 (0.3)
Fever and difficulty in breathing are symptoms of COVID-19.	344 (99.7)	1 (0.3)
The first Outbreak of COVID-19 was at Wuhan, China.	345 (100.0)	0 (0.0)
Patients with mild symptoms of COVID-19 can recover after one week of isolation and appropriate treatment.	315 (91.3)	30 (8.7)
Severe cases of COVID-19 can lead to death.	342 (99.1)	3 (0.9)
All suspected cases of COVID-19 must go for self-isolation for a minimum of 14 days	343 (99.4)	2 (0.6)

Perception of the Respondents about the Use of Herbal Medicine in the Treatment of COVID-19

Majority of the respondents have good perception towards the use of herbal medicine in the treatment and management of COVID-19 with mean perception score of 12.1±1.2 out of the total 14 score obtainable. About 207 (60%) reported that COVID-19 can be treated using herbal medicine and 144 (44.6%) believed that the adequate use of herbal medicine can protect them from the virus, 277 (80.3%) disagreed that they cannot contact the virus due to adequate use of herbal medicine when they were young. Also, 271 (78.6%) agreed to use the herbal medicine for the treatment and management of COVID-19 if made available and 153 (44.3%) preferred herbal medicine to chemical drugs. The perception of the respondents about the use of herbal medicine in the treatment and management of COVID-19 is presented in Table 3.

Table 3: Perception about the use of herbal medicine in the treatment of COVID-19 (n=345)

Perception Statement	Responses		
	Agree (%)	Disagree (%)	Undecided (%)
COVID-19 diseases can be treated by herbal medicine.	207(60.0)	25(7.2)	113(32.8)
The diseases require a local solution.	172(49.9)	47(13.6)	126(36.5)
Adequate use of herbal preparation can protect me from corona virus.	154(44.6)	77(22.3)	114(33.0)
I believe that COVID-19 can be adequately treated using herbal medicine.	216(62.6)	44(12.8)	85(24.6)
The drugs of our forefathers can cure the Corona Virus.	182(52.8)	46(13.3)	117(33.9)
I cannot contact COVID-19 because I have used enough herbal preparation when I was young.	22(6.4)	277(80.3)	46(13.3)
Herbal medicine has no side effect, so I can use it.	73(21.2)	218(63.2)	54(15.7)
Herbal medicine cost less and it is effective for diseases treatment and management.	207(60.0)	82(23.8)	56(16.2)
COVID-19 is curable with herbal preparation.	170(49.3)	58(16.8)	117(33.9)
COVID-19 is not death sentence once I take herbal medicine.	122(35.4)	116(33.6)	107(31.0)
If herbal medicine is available for treatment and management of COVID-19, I will use it.	271(78.6)	21(6.1)	53(15.4)
I will prefer herbal medicine to chemical drugs.	197(57.1)	82(23.8)	66(19.1)
COVID-19 vaccine would be preferred to be herbal.	153(44.3)	99(28.7)	93(27.0)
I would like to take herbal medicine for the management and treatment of COVID-19	205(59.4)	55(15.9)	85(24.7)

Factors influencing the willingness of the respondents to use herbal medicine.

Majority (63.8%) of the respondent were willing to use herbal medicine to treat COVID-19, 35(10.1%) were unwilling while 90(26.1%) were not sure if they can use herbal medicine for COVID-19 treatment or not. Identified factors listed among respondents to influence their willingness to use herbal medicine include cost (80.3%), ready availability of herbal medicine (70.9%), herbal medicine has no side effect (63.8%) and it is traditional with organic content (90.3%).

DISCUSSION

Since the emergence of COVID-19 in 2019, it has then become a global pandemic involving about 219 countries as of March 2021 (Woldometers, 2020). There is currently no precise treatment for COVID-19 but there have been some acclaimed herbal modes of treatment.

More than half (51.6%) of the respondents were male while 48.4% were female. Majority (92.2%) of the respondents had tertiary level of education which was apparent in the level of awareness and knowledge of the respondents on COVID-19. This is in consonance with studies conducted in China (Zhong et al., 2020), Saudi Arabia (Alahdal et al., 2020), Egypt (Abdelhafiz et al., 2020), Nigeria (Habib et al., 2021; Olapegba et al., 2020; Reuben et al., 2020) where the mean knowledge score was significantly lower in participants with low educational level. Lower educational level may limit the individual's access to

sufficient information on COVID-19, as their literacy level may be low and this may consequently inhibit their perusal of information especially via social media and other communication channels. This may therefore be responsible for the lower mean knowledge score observed within this group.

About 97.1% of the respondents had heard of COVID-19 and 95.5% reported that COVID-19 is caused by a virus, this further supports that the respondents have a good knowledge of the disease. According to Almutairi et al., (2015) and Rabhani et al., (2020), high level of knowledge and awareness could help in reducing the rate at which a pandemic or an epidemic spread. Therefore, the high level of knowledge of COVID-19 among the respondents could help in curtailing the spread of COVID-19. This also indicates the efficiency of awareness creation about COVID-19 in the country.

The findings on the incubation period, symptoms, self-isolation guidelines of COVID-19 are supported by findings of Reuben et al., (2020) and Saqlain et al., (2020) where 99.5% and 93.2% of the respondents respectively had good knowledge of the symptoms, incubation period and self-isolation guidelines. In another study by Nemati et al., (2020), only 56.5% of the respondents had adequate knowledge on the incubation period, symptoms and self-isolation guidelines of COVID-19 when compared with this study.

Majority (99.1%) of the respondents were aware of the preventive guidelines which included personal hygiene (proper washing of hands and the use of hand sanitizers) and maintaining social distancing. This signifies that the laid down preventive guidelines by the NCDC and the Federal Ministry of health were properly followed.

About 62.6% of the respondents believed that COVID-19 can be adequately treated using herbal medicine and 49.3% reported that COVID-19 is curable with herbal preparation. Interestingly, 78.6% reported that they would use herbal medicine for the treatment and management of COVID-19 if available and 57% preferred herbal medicine to chemical drugs. Less than half (44.6%) agreed that adequate use of herbal medicine could protect them from COVID-19. Majority (80.3%) disagreed with the fact that they could not contact COVID-19 due to the use of herbal medicine when they were young. This shows that most of the respondents will be receptive to the use of herbal medicine if made available. This could serve as an eye-opener to the government agencies to fund research involved in discovering herbal medicines that could be used for the treatment and management of COVID-19.

Also, 63.2% disagreed with the fact that herbal medicine has no side effect, and this claim is supported in a study by Farah et al., (2000) and Nudrat and Naira (2016), where it was stated that herbal medicines could also have side effects because of incorrect usage, drug-herbal medicine interactions, allergies, poor quality, prescription from unqualified practitioners.

About 70.9% of the respondents were willing to use herbal medicine to treat and manage COVID-19 due to its availability, 80.3% due to cost-effectiveness. This is in line with a report by Braun et al., (2010) and Amorha et al., (2018) that the high rate of the use of herbal medicine could be due to the perception that the medicines are cost-effective compared to chemical drugs. 63.8% due to no side effect of herbal medicine and 90.3% because it is traditional.

The relatively good perception of the respondents on the use of herbal medicine may be due to the growing commercial interest in herbal based products which has increased the incentive for adulteration and substitution within the herbal market (Pradhan et al., 2015). Herbal medicine (or phytomedicine) represents the most conceptually accessible area of the exploding field known as complementary and alternative medicine. Developing novel strategies to exhaustively assess and monitor both the quality of raw materials and final marketed herbal products is therefore a challenge in herbal pharmacovigilance.

Even though herbal supplements are indeed drugs, there are lots of misconceptions among the public and the health care professionals alike regarding the safety and efficacy of botanical agents. Also, adverse effects which are caused by pharmacokinetic interactions at the level of altered absorption, metabolism, distribution, and/or excretion makes the populace sceptical about consumption of herbal medicine in the treatment of COVID-19 (Ahlawat et al., 2014; Kroll, 2001).

Therefore, with assurance of quality and safety, herbal preparation can be used with extreme caution on the advice of an herbalist familiar with the relevant conventional pharmacology. The manufacturers, the researchers, and the regulatory agencies of the herbal products in Nigeria (NAFDAC and SON) must adhere to rigorous scientific methodologies, good manufacturing practices (GMPs) and preclinical testing (in their bid to standardize herbal products) to gain public trust and to bring quality herbal products into the mainstream of today's health care system for safer and affordable healthcare.

Study Limitations

The survey was conducted online and only people with phones and internet access participated in this study, the old people and those living in rural areas devoid of social amenities could not partake in this study.

CONCLUSION

This study has established the fact that respondents have good basic knowledge of COVID-19. The good perceptions reported in this study towards the use of herbal medicine in the treatment of COVID-19 are indications that herbal medicines, if researched and scientifically proven to be effective in the treatment of the disease, will be most welcome to the Nigerian populace.

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List of abbreviations

COVID-19: Coronavirus Disease 2019
NCDC: Nigeria Centre for Disease Control
SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2
WHO: World Health Organisation
NAFDAC: National Agency for Food and Drug Administration and Control
SON: Standard Organisation of Nigeria

ETHICAL APPROVAL

Ethical approval was obtained from Osun State University Health Research Ethics Committee, Nigeria with approval number HREC 2021/0019; to ensure the study met all the principles and National guidelines in research involving human participants.

REFERENCES

Abdelhafiz, A.S., Mohammed, Z., Ibrahim, M.E and Ziady, H.H. (2020). Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19), J. Community Health. 45(5):881-90.

Ahlawat, J., Verma, N and Sehrawat, A.R. (2014). Globalisation of herbal drugs: A bliss and concern, Int J Sci Res. 3(11):466-74.

Ahmed, S.F., Quadeer A.A and McKay, M.R. (2020). Preliminary identification of potential vaccine targets for the COVID-19 coronavirus (SARS-CoV-2) based on SARS-CoV immunological studies, Viruses. 12(3):254.

Alahdal, H., Basingab, F and Alotaibi, R. (2020) An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia, J. Infect. Public Health. 13(10):1446-52.

Almutairi, K.M., Al Helih, E.M., Moussa, M., Boshaiqah, A.E and Saleh Alajilan, A. (2015). Awareness, attitudes, and practices related to coronavirus pandemic among public in Saudi Arabia, Fam Community Health. 38(4):332-40.

Amorha, K.C., Nwabunike, I.A., Okwumuo, B.M., Ayogu, E.E., Nduka S.O and Okonta M.J. (2018). Use of herbal medicines in a Nigerian community and their reported adverse effects: A pilot study, Trop. J. Pharm. Res. 17(10):2067-72.

Aina, F.O, Oyedele, M.A, Dada, S.O and Aina, D.A. (2020). Knowledge and Utilization of Non- pneumatic Anti-shock Garment for the Management of Postpartum Hemorrhage among Midwives in Government Hospitals in Ogun State, Nigeria, Babcock University Medical Journal, 3(1): 59-66.

Bai, Y., Yao, L., Wei T., Tian, F., Jin D.Y., et al. (2020). Presumed asymptomatic carrier transmission of COVID-19. Jama. 323(14):1406-7.

Braun, L.A., Tiralongo, E., Wilkinson, J.M., Spitzer O., et al. (2010). Perceptions, use and attitudes of pharmacy customers on complementary medicines and pharmacy practice, BMC Complement Altern. Med. 10(1):1-7.

Centers for Disease Control and Prevention (CDC) (2020). Symptoms of Novel Coronavirus (2019- nCoV) https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

Chen, N., Zhou, M., Dong, X., Qu, J., Gong, F., Han Y., et al. (2020) Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study, lancet. 395(10223):507-13.

Dada, S.O, Oyewole, O.E and Desmennu, A.T. (2020). Knowledge as Determinant of Healthy Eating Among Male Postgraduate Public Health Students in a Nigerian Tertiary Institution. International Quarterly of Community Health Education 0(0) 1–12.

Elton, H.D. "Elementary Sampling Theory." (1968): 165-166.

Farah, M.H., Edwards, R., Lindquist, M., Leon, C and Shaw, D. (2000). International monitoring of adverse health effects associated with herbal medicines. Pharmacoepidemiol Drug Saf. 9(2):105-12.

Fatima, N and Nayeem, N. (2016). Toxic effects as a result of herbal medicine intake. Toxicology-New Aspects to This Scientific Conundrum, London, UK: InTech Open. 26:193-207.

Geldsetzer, P. (2020). Knowledge and perceptions of COVID-19 among the general public in the United States and the United Kingdom: a cross-sectional online survey, Ann. Intern. Med. 173(2):157-60.

Guan, W.J., Ni, Z.Y., Hu, Y., Liang, W.H., Ou, C.Q. He, J.X., *et al*. (2020). Clinical characteristics of coronavirus disease 2019 in China, N. Engl. J. Med. 382(18):1708-20.

Gupta, A., Madhavan, M.V., Sehgal, K., Nair, N., Mahajan, S. Sehrawat T.S., *et al*. (2020). Extrapulmonary manifestations of COVID-19, Nat. Med. 26(7):1017-32.

Habib, M.A., Dayyab, F.M., Iliyasu, G and Habib, A.G. (2016). Knowledge, Attitude and Practice survey of COVID-19 pandemic in Northern Nigeria. PloS one. 16(1):e0245176.

Habibzadeh, P and Stoneman, E.K. (2020). The novel coronavirus: a bird's eye view. Int J Occup Med Environ Health. 11(2):65.

Kish, Leslie. 1965. Survey Sampling. New York: John Wiley and Sons, Inc.

Kroll, D.J. (2001). Concerns and needs for research in herbal supplement pharmacotherapy and safety. J. Herb. Pharmacother. 1(2):3-23.

Liu, X., Zhang, M., He, L and Li, Y. (2012). Chinese herbs combined with Western medicine for severe acute respiratory syndrome (SARS), Cochrane Database Syst. Rev. 2012(10).

Luo, L., Jiang, J., Wang, C, Fitzgerald, M., Hu, W. Zhou Y.I. et al. (2020). Analysis on herbal medicines utilized for treatment of COVID-19. *Acta Pharmaceutica Sinica B.* 10(7):1192-204.

Nemati, M., Ebrahimi, B and Nemati F. (2020). Assessment of Iranian nurses' knowledge and anxiety toward COVID-19 during the current outbreak in Iran. Arch Clin Infect Dis. 15(COVID-19):e102848.

Nugraha, R.V., Ridwansyah, H., Ghozali, M., Khairani, A.F and Atik N. (2020). Traditional herbal medicine candidates as complementary treatments for COVID-19: A Review of Their Mechanisms, Pros and Cons. Evid. Based Complementary Altern. Med.

Olapegba, P.O., Ayandele, O., Kolawole, S.O., Oguntayo, R. Gandi J.C., et al. (2020) COVID-19 knowledge and perceptions in Nigeria, Social Sciences and Humanities Open.

Pradhan, N., Gavali, J., and Waghmare N. (2015). WHO (World Health Organization) guidelines for standardization of herbal drugs, Int. J. Ayurvedic Res. 3:2238-43

Rabbani, S.A., Mustafa, F and Mahtab, A. (2020). Middle East Respiratory Syndrome (MERS): awareness among future health care providers of United Arab Emirates, Int J Med Sci Public Health. 10(1).

Reuben, R.C., Danladi, M.M., Saleh, D.A and Ejembi, P.E. (2020). Knowledge, attitudes and practices towards COVID-19: an epidemiological survey in North-Central Nigeria, J. Community Health. 2020:1-4.

Saqlain, M., Munir, M.M., Rehman, S.U., Gulzar, A., Naz, S. Ahmed, Z., et al. (2020). Knowledge, attitude, practice and perceived barriers among healthcare workers regarding COVID-19: a cross-sectional survey from Pakistan, J. Hosp. Inf. 105(3):419-23.

Salako, A.O., Amoo, OS, Odubela, O.O., Osuolale, K.A., James, A.B., Oladele, D.A., Musa, A.Z., Ige, F.A., Okwuraiwe, A.P., Onwuamah, C.K., Shaibu, J.O., David, A.N., Audu, R.A., Ezechi, O.C., Odunukwe, N.N., Salako, B.L. (2021). Prevalence and Clinical Characteristics of Coronavirus Disease 2019 Seen at a Testing Centre in Lagos Nigeria. West African Journal of Medicine 2021 Jan;38(1):54-58. PMID: 33463708.

Shi, S., Qin, M., Shen, B., Cai, Y., Liu, T Yang, F., et al. (2020). Association of cardiac injury with mortality in hospitalized patients with COVID-19 in Wuhan, China, JAMA cardiology. 5(7):802-10.

Tang, J.W., Tambyah, P.A., and Hui, D.S. (2020). Emergence of a novel coronavirus causing respiratory illness from Wuhan, China, The Journal of infection. 80(3):350.

Trapsida J. Traditional Medicine, Our Culture, Our Future. (2003). African Health Monitor. 4(1):12.

Wang, D., Hu, B., Hu, C., Zhu, F., Liu, X. Zhang J., et al. (2020). Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China, Jama. 323(11):1061-9.

WMHC (2020). Wuhan Municipal Health and Health Commission's Briefing on the Current Pneumonia Epidemic Situation in Our City. http://wjw.wuhan.gov.cn/front/web/showDetail/2019123108989

Worldometers (July 28, 2020). Coronavirus Update (Live). Available online at https://www.worldometers.info/coronavirus/

Wu, C., Chen, X., Cai, Y., Zhou, X., Xu, S. Huang, H., et al. (2020). Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China, JAMA internal medicine. 180(7):934-43.

Zhong, B.L., Luo, W., Li, H.M. Zhang Q.Q., et al. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. Int. J. Biol. Sci. 16(10):1745.

Zhou, F., Yu, T., Du, R., Fan, G, Liu, Y, Liu Z., et al. (2020). Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study, lancet. 395(10229):1054-62.

Zhou, P., Yang, X.L., Wang, X.G., Hu, B., Zhang, L. Zhang W., et al. (2020). A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*. 579(7798):2.

*Address for correspondence: Samuel Abayomi Adebodun

Department of Pharmacognosy,
Faculty of Pharmacy,
University of Ibadan,
Nigeria
Telephone: +2348147098756
E-mails: *yadebodun@gmail.com*

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