## *Original Research Article*

**Compliance with WHO recommended measures against Covid-19 among a Nigerian population**

**Abstract**

**Background:** The fright and devastation that accompanied COVID-19 pandemic these past two years cannot be totally quantified. More so, the cycle of fear, panic, uncertainty and attempts at curtailment repeats itself every time the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) mutates and produces a new variant. The World Health Organization recommended personal protective measures are very important in slowing down the spread of infection. This study assessed the compliance of a Nigerian population with protective measures recommended by WHO in curbing the spread of COVID-19 infection.

**Materials and Methods:** A cross-sectional survey among patients attending medical outpatient in a Teaching Hospital. Interviewer administered questionnaire was used to collect data on participants demographics and compliance with WHO recommended preventive measures towards prevention of COVID-19 infection. Data analysis was carried out with Statistical Package for Social Science (SPSS) version 25(IBM Corp., Armonk, USA). The results were presented as frequency tables and cross-tabulations. Chi-square test was carried out with consideration for statistical significance at $P < 0.05$.

**Results**: One hundred and ninety-six consecutive participants who gave consent were recruited for the study. There was a male predominance. Participants' age ranged between 18 and 84 years with mean age of $34.92\pm14.10$ years. Median age was 30 years Half of participants had university education and about one tenth are professionals. About two-fifth earned less than 100 dollars monthly. Though about three-fifth of participants have heard of WHO recommended hand washing for COVID-19 prevention., only two-fifth practice it. One third of participants regularly use face mask in the public and 85.2% still shake hands. Less than 10 % do not use soap and water or sanitizer to clean their hands. Majority of participants attitudinal change to handwashing as a preventive measure for COVID-19 prevention was good. Participants' most practiced personal preventive measures against COVID-19 were regular washing of hands and boosting immunity with vitamins. The association between participants' demographics and WHO recommendation for hand washing in the prevention of COVID-19 showed a significant based on sex (p= 0.04). Females paid attention to washing of hands than males. The association between participants' demographics and use of face masks in the prevention of COVID-19 showed that education was significant in determining use (P=0.04)

**Conclusion:** Awareness of personal preventive measures to COVID-19 in the area of washing of hands is increased among participants but there is the need to improve in the use of face masks and physical distancing.

**Key words: COVID-19, personal protective measures, demographics**

**Introduction**

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) discovered in Wuhan; China in December 2019 has undergone several mutations. The recent discovery of omicron variant threw the world into another cycle of uncertainties and fears especially because of information that was scanty.[1,2]

Globally, as of 26 January, 2022, 356,955,803 confirmed cases of COVID-19, including 5,610,291 deaths have been reported to the World Health Organization (WHO).[3] In addition, a total of 9,679,721,754 vaccine doses have been administered.[4] In Africa as of January 25, 2022, there are 10,639,436 confirmed cases, 237,524 deaths and 94,293,113 vaccinated. In Nigeria, there were 252,750 confirmed cases and 3134 deaths as of January 27, 2022.[5]

There is the need to implement personal protective measures by the public in order to mitigate the spread of infection. The World Health Organization still advocates the avoidance of close contact, close and crowded environment, hand hygiene, respiratory hygiene, vaccination and if these are unavoidable, to increase the amount of natural ventilation and wear a mask.[6]

The effectiveness of WHO advocated measures is dependent on depends on people's levels of adherence.[7-9] Nigerians are highly superstitious and religious people who have their own ways of handling issues. For example, the stay-at-home measures and restrictions (i.e., compulsory lockdown) showed lower effectiveness in reducing mobility when implemented in March 30, 2020.[10,11]

This study assessed the use of personal protective measures recommended by WHO by a group of Nigerians.

**Methodology**

A cross-sectional survey among patients attending Family Medicine outpatient clinic in University of Port Harcourt Teaching Hospital in Rivers State, South-South, Nigeria. Ethical approval was given by the Hospital's ethics Committee.

Interviewer-administered questionnaire was used to collect data on participants demographics and compliance with WHO recommended personal preventive measures for prevention of spread of COVID-19 infection. Participants' hand hygiene was assessed using WHO recommendations with options such as soap and water for 40 seconds, soap and water < 40 seconds, soap & sanitizer, sanitizer 5 seconds, sanitizer 20 seconds. Face mask use was assessed with options like 'yes always' and 'yes sometimes' taken as compliance and 'no, it can't reduce spread of COVID-19' as non-compliance.

Two hundred and ten participants who gave consent were recruited for the study using simple randomization. Response rate was 93.8%.

Data analysis was done with Analysis was carried out with Statistical Package for Social Science (SPSS) version 25(IBM Corp., Armonk, USA). The results were presented as frequency tables and cross-tabulations. Chi-square test was carried out with consideration for statistical significance at $P < 0.05$.

**Results**

Table 1 shows participants' characteristics. One hundred and ninety-six participants with age ranged between 18 and 84 years with mean age of $34.92\pm14.10$ years. Half of participants had at least university education with one tenth as professionals and two-fifth earn less than what is equivalent to 100 dollars monthly.

Though about three-fifth of participants have heard of WHO recommended hand washing for COVID-19 prevention., only two-fifth practice it. One third of participants regularly use face mask in the public and 85.2% still shake hands. Less than 10 % do not use soap and water or sanitizer to clean their hands. Table 2

Majority of participants attitudinal change to handwashing as a preventive measure for COVID-19 prevention was good. Table 3

Most participants' personal preventive measures against COVID-19 were regular washing of hands and boosting immunity with vitamins. Table 4

The association between participants' demographics and WHO recommendation for hand washing in the prevention of COVID-19 showed a significant based on sex (p==0.04). Table 5

The association between participants' demographics and use of face masks in the prevention of COVID-19 showed that education was significant in determining use (P=0.04). Table 6

**Discussion**

In the wake of COVID-19 outbreak, WHO recommended the use of 5 personal protective measures in order to curb the spread of the infection among the populace. These are to perform hand hygiene frequently with an alcohol-based hand rub (sanitizer) if hands are not visibly dirty or with soap and water if hands are dirty; to avoid touching the eyes, nose, and mouth; to practice respiratory hygiene by coughing or sneezing into a bent elbow or tissue and to immediately disposing of the tissue; wearing a medical mask if you have respiratory symptoms and performing hand hygiene after disposing of the mask and maintaining social

distance (a minimum of 1 meter) from persons with respiratory symptoms. However, in February 2020, it was recommended that asymptomatic persons do not need to wear masks. [12]

Covid-19 cases in Nigeria to date accounts for 7% of all confirmed cases worldwide.[13] However, this is under reported as there are undetected imported cases as well as unreported potential contacts of identified cases in the community. Although Nigerians initially followed the instruction from Nigeria Centre for Disease Control (NCDC) to practice WHO recommended personal measures, however along the way, majority stopped wearing facemasks despite the pressure claiming that the virus does not exist in the country because the seasonal temperatures are high. The question is if those who stopped the use of face masks were correct in their assumptions or if there are other factors present among Africans that made the case fatality to be low? There is the need to evaluate the effectiveness of mask-wearing in the public to protect healthy individuals from infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of coronavirus disease (COVID-19) among Nigerians.[14,15] The prevalence of regular facemask use in this study was 35.2% and only about two-fifth (38.3%) regularly follow WHO recommended handwashing preventive measures. A study done in Thailand reported that the risk for SARS-CoV-2 infection was negatively associated with personal protective measures with crude odd ratios decreasing among those who washed hands often (0.19), those wearing a mask all the time during contact with a COVID-19 patient (0.16) and those who maintain a distance of >1 m from a COVID-19 patient (0.08).[16] Other studies reported the effectiveness of mask wearing in influenza-like illness, SARS infection and SARS-CoV-2 infection.[17-20]

Frequent hand washing has been shown to be very effective in reducing spread of infection.[21]

Hand washing is a simple, low-cost intervention that have been proven to reduce transmission of epidemic respiratory viruses. A hand soap solution (1:49) has been reported to have some effect (≥3.6 log10 reduction of viral infectivity) against SARS-CoV-2 in 5 min.[22]

Although SARS-CoV-2 has never been detected on hands of the public population yet, it is reasonable to assume that the hand contamination by droplets from others may take place in the public with an unknown viral load.[23] Thus, decontamination of hands, especially after returning home from public places with many close contacts and potentially infected people is highly recommended.

Ethanol and iso-propanol inactivate SARS-CoV-2 at 30% to 80% concentration (both v/v) in 30s has been reported to be effective against viruses.[24] Both WHO-recommended hand rubs based on 75% iso-propanol or 80% ethanol (both v/v) also inactivate SARS-CoV-2 in only 30s.[24] Similar results were obtained with a propanol-based hand rub against SARS-CoV-2.[25]

The use of alcohol-based hand rub on a clean hand for decontamination has been reported to be effective against nosocomial pathogens including bacteria and yeasts and it is also better tolerated dermally.[26-28] The prevalence of handwashing and use of sanitizer in this study was 93.4%.

In this study, more females than males practiced WHO recommendation for hand washing while education influenced the use of face masks among the participants. This compares with the study done among 10 sub-Saharan African countries that reported that handwashing was influenced by age, gender and education. Younger, males and less educated participants had reduced odd of handwashing.[29]

**Conclusion**

There has been an improvement in handwashing since COVID-19 outbreak among the study population though the prevalence of face mask use was low. There remains room for improvement in use of WHO recommended personal protective measures.

## Recommendation

All participants who consented to be part of te study

<mark>**COMPETING INTERESTS DISCLAIMER:**</mark>

<mark>**Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.**</mark>

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**Tables**

**Table1. Participants' characteristics**

| Variables | Frequency | Percentage |
|---|---|---|
| **Sex** | | |
| Female | 79 | 40.3 |
| Male | 117 | 59.7 |
| **Age group (years)** | | |
| 10-20 | 18 | 9.2 |
| 21-30 | 81 | 41.3 |
| 31-40 | 49 | 25.0 |
| 41-50 | 22 | 11.2 |
| 51-60 | 8 | 4.1 |
| 61-70 | 14 | 7.1 |
| >70 | 4 | 2.0 |
| **Mean age ± SD = 34.92±14.10 years** | | |
| **Tribe** | | |
| Hausa | 8 | 4.1 |
| Igbo | 76 | 38.8 |
| Yoruba | 10 | 5.1 |
| South-South | 102 | 52.0 |

| Marital status | | |
|---|---|---|
| Single | 101 | 51.5 |
| Married | 88 | 44.9 |
| Divorced/Separated | 7 | 3.6 |
| **Education** | | |
| Secondary and below | 46 | 23.5 |
| Diploma | 52 | 26.5 |
| Bachelor | 85 | 43.4 |
| Master/PhD | 13 | 6.6 |
| **Profession** | | |
| Students | 52 | 26.5 |
| Self-employed | 84 | 42.8 |
| Professionals | 18 | 9.2 |
| Civil servants | 26 | 13.3 |
| Retiree | 16 | 8.2 |
| **Monthly income** | | |
| <50,000 naira | 88 | 44.9 |
| 51,000-100,000 naira | 55 | 28.1 |
| 101,000-200,000 naira | 34 | 17.3 |
| 201,000-400,000 naira | 15 | 7.7 |
| >400,000 naira | 4 | 2.0 |
| **Total** | **196** | **100.0** |

**Table 2. Participants' use of personal protective measures against COVID-19 as recommended by WHO**

| Variables | Frequency | Percentage |
|---|---|---|
| **Have you heard of WHO recommendation for hand washing?** | | |
| Yes | 113 | 57.7 |
| No | 83 | 42.3 |
| **Do you follow WHO recommendation for hand washing** | | |
| Yes always | 75 | 38.3 |
| Sometimes | 54 | 27.5 |
| Rarely | 64 | 32.7 |
| Never | 3 | 1.5 |
| **Regular public use of face mask** | | |
| Yes always | 69 | 35.2 |
| Yes sometimes | 102 | 52.0 |
| No, it can't reduce spread of COVID-19 | 21 | 10.7 |
| Never | 4 | 2.0 |
| **Do you still shake hands during this Covid-era?** | | |
| Yes always | 38 | 19.4 |

| | | |
|---|---|---|
| Yes Often | 43 | 21.9 |
| Yes sometimes | 86 | 43.9 |
| No, I don't | 29 | 14.8 |
| **Hand hygiene (Use of soap and water and use of sanitizers)** | | |
| Soap and water for 40 seconds | 72 | 36.7 |
| Soap and water < 40 seconds | 63 | 32.1 |
| Soap & sanitizer | 25 | 12.8 |
| Sanitizer 5 seconds | 17 | 8.7 |
| Sanitizer 20 seconds | 6 | 3.1 |
| Neither use soap nor sanitizer | 13 | 6.6 |
| **Total** | **196** | **100.0** |

**Table 3. Participants' attitudinal change to hand washing since COVID-19**

| What changed since COVID-19? | Frequency | Percentage |
|---|---|---|
| Frequency and method of hand washing | 93 | 47.4 |
| Frequency of hand washing | 56 | 28.6 |
| Method of hand washing | 19 | 9.7 |
| Nothing changed | 28 | 14.3 |
| **Total** | **196** | **100.0** |

**Table 4. Participants' personal preventive measures against COVID-19**

| Variables | Frequency | Percentage |
|---|---|---|
| **What can be done to prevent contacting COVID-19** | | |
| 1. Regular washing of hands | 72 | 36.7 |
| 2. Boosting immunity with vitamins | 25 | 12.8 |
| 3. Mouthwash | 1 | 0.5 |
| 4. Vaccine | 6 | 3.1 |
| 5. Social distancing | 7 | 3.6 |
| 1&2 | 15 | 7.7 |
| 1&3 | 7 | 3.6 |
| 1&5 | 9 | 4.6 |
| 2&5 | 22 | 11.2 |
| 1&6 | 6 | 3.1 |
| 1-3 | 2 | 1.0 |
| 1,2&4 | 2 | 1.0 |
| 1,2&5 | 18 | 9.2 |
| 1,2,4,5 | 1 | 0.5 |
| 1-5 | 3 | 1.5 |
| **Total** | **196** | **100.0** |

**Table 5.  Association between participants' demographics and WHO hand washing recommendations for COVID-19 prevention**

| Variables | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | $\chi^2$ | *P* |
|---|---|---|---|---|---|---|---|---|---|
| | Hand washing with soap and water and use of sanitizers | | | | | | | | |
| | Soap & water 40 seconds | Soap & water < 40 seconds | Soap & water sanitizer | Sanitizer for 5 seconds | Sanitizer for 20 seconds | No washing of hands | Total | | |
| **Sex** | | | | | | | | 14.16 | 0.05 |
| Female | 29 (39.2) | 26 (40.6) | 11 (44.0) | 11 (64.7) | 0 (0.0) | 2 (20.0) | 79 (40.3) | | |
| Male | 45 (60.8) | 38 (59.4) | 14 (56.0) | 6 (35.3) | 6 (100.0) | 8 (80.0) | 117 (59.7) | | |
| **Age group (years)** | | | | | | | | 37.82 | 0.66 |
| 10-20 | 7 (9.5) | 7 (10.9) | 2 (8.0) | 0 (0.0) | 2 (33.3) | 0 (0.0) | 18 (9.2) | | |
| 21-30 | 24 (32.4) | 29 (45.3) | 11 (44.0) | 9 (52.9) | 1 (16.7) | 7 (70.0) | 81 (41.3) | | |
| 31-40 | 21 (28.4) | 13 (20.3) | 5 (20.0) | 8 (47.1) | 1 (16.7) | 1 (16.7) | 49 (25.0) | | |
| 41-50 | 8 (10.8) | 8 (12.5) | 3 (12.0) | 0 (0.0) | 1 (16.7) | 2 (20.0) | 22 (11.2) | | |
| 51-60 | 6 (8.1) | 1 (1.6) | 1 (4.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 8 (4.1) | | |
| 61-70 | 6 (8.1) | 4 (6.3) | 3 (12.0) | 0 (0.0) | 1 (16.7) | 0 (0.0) | 14 (7.1) | | |
| >70 | 2 (2.7) | 2 (3.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 4 (2.0) | | |
| **Education** | | | | | | | | 16.40 | 0.75 |
| Secondary & below | 15 (20.3) | 17 (26.6) | 6 (24.0) | 2 (11.8) | 3 (50.0) | 3 (30.0) | 46 (23.5) | | |
| Diploma | 22 (29.7) | 13 (20.3) | 7 (28.0) | 6 (35.3) | 2 (33.3) | 2 (20.0) | 52 (62.5) | | |
| Bachelor | 32 (43.2) | 30 (46.9) | 9 (36.0) | 8 (47.1) | 1 (16.7) | 5 (50.0) | 85 (43.4) | | |
| Master/PhD | 5 (6.8) | 4 (6.3) | 3 (12.0) | 1 (5.9) | 0 (0.0) | 0 (0.0) | 13 (6.6) | | |
| **Profession** | | | | | | | | 37.41 | 0.11 |
| Students | 15 (20.3) | 23 (35.9) | 6 (24.0) | 3 (17.6) | 2 (33.3) | 3 (30.0) | 52 (26.5) | | |
| Self-employed | 37 (50.0) | 24 (37.5) | 11 (44.0) | 8 (47.1) | 2 (33.3) | 2 (20.0) | 84 (42.9) | | |
| Professionals | 5 (6.8) | 7 (10.9) | 2 (8.0) | 0 (0.0) | 1 (16.7) | 3 (30.0) | 18 (9.2) | | |
| Civil servants | 8 (10.8) | 5 (7.8) | 5 (20.0) | 6 (35.3) | 1 (16.7) | 1 (10.0) | 26 (13.3) | | |
| Retiree | 9 (12.2) | 5 (7.8) | 1 (4.0) | 0 (0.0) | 0 (0.0) | 1 (10.0) | 16 (8.2) | | |
| **Monthly income** | | | | | | | | 17.47 | 0.94 |
| <50,000 naira | 28 (37.8) | 31 (48.4) | 13 (52.0) | 7 (41.2) | 3 (50.0) | 6 (60.0) | 88 (44.9) | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 51,000-100,000 naira | 19 (25.7) | 15 (23.4) | 7 (28.0) | 9 (52.9) | 2 (33.3) | 3 (30.0) | 55 (28.1) | | |
| 101,000-200,000 naira | 16 (21.6) | 12 (18.8) | 3 (12.0) | 1 (5.9) | 1 (16.7) | 1 (10.0) | 34 (17.3) | | |
| 201,000-400,000 naira | 8 (10.8) | 5 (7.8) | 2 (8.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 15 (7.7) | | |
| >400,000 naira | 3 (4.1) | 1 (1.6) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 4 (2.0) | | |
| **Total** | **74 (100.0)** | **64 (100.0)** | **25 (100.0)** | **17 (100.0)** | **6 (100.0)** | **10 (100.0)** | **196 (100.0)** | | |

## Table 6. Association between participants' demographics and use of face mask

| Variables | N (%) | N (%) | N (%) | N (%) | $\chi^2$ | $P$ |
|---|---|---|---|---|---|---|
| | **Regular use of face masks** | | | | | |
| | **Yes, always** | **Yes, sometimes** | **No. it can't reduce spread** | **Total** | | |
| **Sex** | | | | | 2.17 | 0.54 |
| Female | 27 (37.5) | 46 (44.7) | 6 (28.6) | 79 (40.3) | | |
| Male | 45 (62.5) | 57 (55.3) | 15 (71.4) | 117 (59.7) | | |
| **Age group (years)** | | | | | 14.00 | 0.73 |
| 10-20 | 9 (12.5) | 7 (6.8) | 2 (9.5) | 18 (9.2) | | |
| 21-30 | 31 (43.1) | 42 (51.9) | 8 (38.1) | 81 (41.3) | | |
| 31-40 | 12 (16.7) | 29 (28.2) | 8 (38.1) | 49(25.0) | | |
| 41-50 | 8 (11.1) | 14 (13.6) | 0 (0.0) | 22 (11.2) | | |
| 51-60 | 4 (5.6) | 4 (3.9) | 0 (0.0) | 8 (4.1) | | |
| 61-70 | 7 (9.7) | 5 (4.9) | 2 (9.5) | 14 (7.1) | | |
| >70 | 1 (1.4) | 2 (1.9) | 1 (4.8) | 4 (2.0) | | |
| **Education** | | | | | 17.37 | 0.04* |
| Secondary & below | 13 (18.1) | 26 (25.2) | 7 (33.3) | 46 (23.5) | | |
| Diploma | 15 (20.8) | 28 (27.2) | 9 (42.9) | 52 (26.5) | | |
| Bachelor | 37 (51.4) | 43 (41.7) | 5 (23.8) | 85(43.4) | | |
| Master/PhD | 7 (9.7) | 6 (5.8) | 0 (0.0) | 13 (6.6) | | |
| **Profession** | | | | | 8.79 | 0.72 |
| Students | 20 (27.8) | 26 (52.2) | 6 (28.6) | 52 (26.5) | | |
| Self-employed | 28 (38.9) | 49 (46.6) | 7 (33.3) | 84 (42.9) | | |
| Professionals | 5 (6.9) | 11 (10.7) | 2 (9.5) | 18 (9.2) | | |
| Civil servants | 11 (15.3) | 12 (11.7) | 3 (14.3) | 26 (13.3) | | |
| Retiree | 8 (11.1) | 5 (4.9) | 3 (14.3) | 16 (8.2) | | |
| **Monthly income** | | | | | 13.30 | 0.35 |
| <50,000 naira | 27 (37.5) | 47 (45.6) | 14 (66.7) | 88 (44.9) | | |
| 51,000-100,000 naira | 19 (34.5) | 32 (31.1) | 4 (19.0) | 55 (82.1) | | |
| 101,000-200,000 naira | 14 (19.3) | 17 (16.5) | 3 (14.3) | 34 (17.3) | | |
| 201,000-400,000 naira | 9 (12.5) | 6 (5.8) | 0 (0.0) | 15 (7.7) | | |
| >400,000 naira | 3 (4.2) | 1 (1.0) | 0 (0.0) | 4 (2.0) | | |
| **Total** | **74 (100.0)** | **64 (100.0)** | **25 (100.0)** | **17 (100.0)** | | |