

## Hand Hygiene Practice and Face Mask Use among Eye Health Workers at the Guinness Eye Centre Onitsha, Nigeria

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### ABSTRACT

**Background:** Health care-associated infections (HCAI) constitute a significant risk to patients and hospital staff including eye health workers. These are major causes of morbidities and mortalities. Eye health workers are at risk of exposure to infections including SARS-CoV-2 infection. **Objectives:** To assess hand hygiene practice and face mask use among health workers of Guinness Eye Center, Onitsha, Nigeria. **Materials and Methods:** This was a cross sectional study. Hand hygiene practice and face mask use of eye health workers were assessed using the WHO hand hygiene observation form. Trained observers recorded the workers' hand hygiene practice before touching patient, aseptic procedure, after body fluid exposure, after touching patient and patient surrounding. Face mask use was also recorded. Data analysis was with descriptive and inferential statistics with alpha level at 0.05. **Results:** Sixty-nine workers were studied. A total of 492 worker-patient interactions were documented. Overall hand hygiene practice compliance was 46.4%. It was highest after touching patients 288 (60.3%), followed by after touching patients' surroundings 253 (53.9%). Doctors had the highest hand hygiene compliance before and after touching patients: 193 (69.2%) and 202 (72.9%) respectively ( $p=0.001$ ). Facemask was correctly worn in 418 (85.0%) observations. Doctors wore face masks properly more than other workers ( $X^2= 18.34, p<0.001$ ). **Conclusions:** Correct face mask use was fairly high but overall hand hygiene compliance was suboptimal among the eye health workers. Continuing education is recommended to improve hand hygiene and face mask use among eye care workers.

**Keywords:** Eye health worker; Face mask; Hand hygiene; Touching patients.

### INTRODUCTION

Health care-associated infections (HCAI) are major causes of morbidities and mortalities; they also constitute significant risks to patients and hospital staff including eye health workers. With the advent of the highly contagious novel corona virus (COVID-19) pandemic, eye health workers have been identified to be at a high risk of exposure to the SARS-CoV-2 infection[1,2]

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This is because of close contact with patients during clinical examinations and procedures. The high volume and equipment-intense eye clinics procedures constitute a potentially lethal occupational hazard.[1,2] The corona virus has been found in tears and conjunctival tissue and thus poses a possible risk to eye health workers.[3,4] Nosocomial transmission of corona virus has been reported to occur in 12-15% of hospitalised patients.[5]

Hand hygiene (HH), which involves washing of hands with soap and water or use of alcohol-based hand rub (locally called hand sanitizer), is a key measure recommended by the World Health Organisation (WHO) for the prevention of HCAI.[6] Face mask use is known to be useful in the prevention of respiratory infections.[7] The WHO recommends that in areas with community transmission of COVID-19, there should be universal wearing of face mask for all persons (staff, patients, visitors, service providers and others) within the health facility, in order to help reduce transmission of the infection to staff, patients and others.[8]

Previous studies had reported poor compliance with hand hygiene practice by health workers, including eye care personnel.[9,15] Similarly it has been reported that only 10% of health professionals wear face masks correctly at work.[16] But hand hygiene and face mask use are the recommended non-pharmaceutical measures for the prevention of COVID-19 spread.[17] While these measures have been recommended for application in ophthalmic practice, reports on studies involving direct observation of the extent of compliance by eye health workers are lacking. Our study aimed to assess the practice of hand hygiene and face mask use among health care workers of a tertiary eye hospital in Nigeria.

## MATERIALS AND METHODS

This was a cross-sectional study conducted in March 2021 among eye health care workers involved with clinical duties at different service points (outpatients, wards and operation room) of Guinness Eye Center, Onitsha, Nigeria. All workers that have direct patient

interactions were included in the study. Excluded were workers who do not routinely have direct clinical patient interactions in the course of their duties including security personnel, administrative staff and those in the Works department. The study was conducted in accordance with provisions of the Helsinki Declaration on research involving human subjects.[18] Six months preceding our study, all the eye health workers were sensitized by the hospital management on the importance of face mask wear and hand hygiene especially during clinical duties in the hospital. A week was devoted to this due to the importance attached to prevention of COVID-19 transmission by the hospital management. This was held in small groups in the form of seminars with COVID-19 protocol observed and was mandatory for all staff. Reminders were also placed on the walls at service points in the hospital. Written informed consent was obtained. Assurances of maintenance of confidentiality of their information at all times and that information obtained will not affect their career, were given. They were however not aware of when the observation actually took place, to avoid bias.

Eight research assistants were specifically trained to observe and record face mask and hand hygiene habits of the workers using the World Health Organisation (WHO) Hand Hygiene Observation form.[19] A Kappa inter-observer agreement score of 0.8 was obtained between one of the researchers (AAO) and each of the assistants. The assistants unobtrusively observed and recorded the findings during clinical duties in the outpatients, wards and operating room. The WHO hand hygiene form sought information on hand washing with soap and water or alcohol-based hand rub (hand sanitizer) for the five WHO hand hygiene moments (or indications) viz: before touching a patient, before clean/aseptic procedure, after body fluid exposure/risk, after touching a patient and after touching patient surroundings. Missed hand hygiene action was recorded when no hand hygiene action was performed when an indication has been identified. Wearing of gloves was recorded when hand hygiene action is missed while a health care worker is wearing gloves. Each observation opportunity/health-worker-patient interaction could have more than one

indication for hand hygiene. The use of face mask including properly worn face mask (covering mouth and nose all through the interaction), improperly worn face mask (face mask worn other than above) and no face mask was also observed and documented for each health worker-patient interaction. To minimise bias and alteration of usual practices, the health workers were unaware that they were being observed. Face masks, running water, soap and alcohol-based hand sanitizers were regularly provided daily at all service points by the hospital management.

Data analysis was done with SPSS version 23(SPSS Inc. Chicago Illinois USA) using descriptive and inferential statistics with alpha level at 0.05.

Proper face mask use was defined as face mask worn to cover both the mouth and nose.

## RESULTS

Sixty-nine eye care workers were observed, including 26 (37.7%) doctors, 20 (29.0%) nurses, 6 (8.7%) optometrists, 6 (8.7%) laboratory scientists and 11 (16.0%) hospital attendants. A total of 492 health care worker-patient interactions were studied, majority of which involved doctors, 280 (56.9%) followed by nurses 101 (20.5%) (Table 1).

**Table 1: Healthcare Worker-Patient Interactions by Professional Category**

Professional category	No of Interactions	%
Doctor	280	56.9
Nurse	101	20.5
Optometrist	80	16.3
Ward attendant	17	3.5
Lab scientist	14	2.8
Total	492	100.0

Individual observations depended on the indications (moments) i.e. not every indication was observed 492 times. Median duration of observation was, 23.0 minutes; range 2 to 62 minutes. Overall correct hand hygiene practice was 46.4%. Correct hand hygiene practice (hand washing or +hand rub) was highest after touching patients 288 (60.3%), followed by after touching patient surroundings, 253 (53.9%), before touching patients. (Table 2).

**Table 2: Hand hygiene (HH) Actions for different Indications**

HH Action	Indications for Hand Hygiene				
	Before touching patient No (%)	Before clean procedure No (%)	Body fluid exposure risk No (%)	After touching patient No (%)	After touching patients' surroundings No (%)
Missed	164 (33.7)	167 (35.7)	99 (27.4)	135 (28.2)	170 (36.2)
Wore glove	66 (13.6)	174 (37.2)	135 (37.4)	55 (11.5)	46 (9.8)
Hand wash	243 (50.0)	127 (27.1)	127 (35.2)	276 (57.8)	238 (50.7)
Hand rub	13 (2.7)	0.0 (0.0)	0.0 (0.0)	12 (2.5)	15 (3.2)
Total	486(100.0)	468 (100.0)	361 (100.0)	478 (100.0)	469 (100.0)

Compliance with correct hand hygiene practice before touching the patient was highest among doctors, 193(69.2%) [Table 3]; similarly doctors also complied most with hand hygiene after touching the patients, 202(72.9) [Table 4]. Compliance with hand hygiene before touching patient was lowest among optometrists, 1 (1.3%) (Table 3) while hospital attendants 2 (15.4) had lowest compliance with correct hand hygiene after touching patients. (Table 4).

**Table 3 : Hand Hygiene (HH) Practice before Touching Patient by Professional Category**

HH Action	Professional category					
	Doctor No (%)	Nurse No (%)	Optometrist No (%)	Laboratory scientist No (%)	Hospital attendant No(%)	Fisher's Exact Test (p value)
Hand washing or hand rub	193 (69.2)	51 (51.0)	1 (1.3)	4 (28.6)	7 (53.8)	140.531 (0.001)
Missed or glove worn	86 (30.8)	49 (49.0)	79 (98.8)	10 (71.4)	6 (46.2)	df=4
Total	279(100.0)	100(100.0)	80 (100.0)	14 (100.0)	13 (100.0)	

**Table 4: Hand Hygiene (HH) Practice after touching patient by professional category**

HH Action	Professional category					
	Doctor No (%)	Nurse No (%)	Optometrist No (%)	Laboratory scientist No (%)	Hospital attendant No (%)	Fisher's Exact test (p value)
Hand washing or hand rub	202 (72.9)	58 (60.4)	23 (29.1)	3 (23.1)	2 (15.4)	68.383 (0.001)
Missed or glove worn	75 (27.1)	38 (39.6)	56 (70.9)	10 (76.9)	11(84.6)	df=4
Total	277(100.0)	96(100.0)	79(100.0)	13 (100.0)	13(100.0)	

Compared to out-patients and wards, hand hygiene compliance was highest in the operating theatre both before 30 (68.2%) [Table 5] and after 40 (90.9%) touching patients [Table 6].

**Table 5: Hand Hygiene (HH) Practice Before touching patient by section service point**

HH Action	Service point					
	Optometry No (%)	Laboratory No (%)	Ward No (%)	Operating Theatre No (%)	OPD* No (%)	Special investigation Room No (%)
Hand washing or hand rub	0 (0.0)	9 (40.9)	9(37.5)	30 (68.2)	206(65.0)	2 (40.0)
Missed/ glove worn when Missed	74(100.0)	13 (59.1)	15(62.5)	14 (31.8)	111(35.0)	3 (60.0)
Total	74 (100.0)	22(100.0)	24(100.0)	44(100.0)	317(100.0)	5(100.0)

Fisher's exact test=133.561; p =0.001. df=5 \*OPD = Out Patient Department

**Table 6: Hand Hygiene (HH) Practice after touching patient by service point**

HH Action	Section					
	Optometry No (%)	Laboratory No (%)	Ward No (%)	Operating Theatre No (%)	OPD* No (%)	Special investigation room No (%)
Hand washing or hand sanitizer use	22 (30.1)	3 (14.3)	16(76.2)	40 (90.9)	207 (65.9)	0(0.0)
Missed or glove worn	51 (69.9)	18 (85.7)	5(23.8)	4 (9.1)	107(34.1)	5(100.0)
<b>Total</b>	<b>73 (100.0)</b>	<b>21 (100.0)</b>	<b>21(100.0)</b>	<b>44 (100.0)</b>	<b>314(100.0)</b>	<b>59(00.0)</b>

$\chi^2=79.005$ ;  $p=0.001$ .  $df=5$ . \*OPD =Out Patient consulting room

Face mask was correctly worn in 418 (85.0%) observations, not properly worn in 65 (13.2%) and not worn at all in 9 (1.8%). Proper face mask use was highest among doctors, 251 (93.3%) and lowest among hospital attendants 10 (58.8%), (Fisher's exact test = 18.34,  $df=4$ ,  $p=0.001$ ) (Table 7).

**Table 7: Face mask use by Professional Category**

Face mask use	Professional Category Observations					Fisher's exact (p value)
	Doctor No (%)	Nurse No (%)	Optometrist No (%)	Laboratory Scientist No (%)	Ward/theatre Attendant No (%)	
Properly worn	252 (90.0)	82 (83.7)	64 (80.0)	10 (71.4)	10 (58.8)	18.34
Improperly worn/not worn	28 (10.0)	19 (18.8)	16 (20.0)	4 (28.6)	7 (41.2)	$df=4$ (0.001)
<b>Total</b>	<b>280 (100.0)</b>	<b>101 (100.0)</b>	<b>80(100.0)</b>	<b>14 (100.0)</b>	<b>17 (100.0)</b>	

## DISCUSSION

As found in this study, compliance with good hand hygiene practice was generally suboptimal among eye care workers with a significant proportion not performing hand hygiene at all. This is surprising as staff had been sensitized on the need for hand hygiene before the commencement of this study. This underscores the need for regular update of staff on correct hand hygiene practices known to significantly reduce nosocomial infections.[13] It would also be important to maintain surveillance of staff hand hygiene practice in order to ensure good compliance. The overall compliance with hand hygiene in our study though unsatisfactory was higher than findings reported in Ibadan,[20] and Jos,[11] Nigeria at 30.4% and 31% respectively. Other studies in Kenya and Ethiopia had a 23.9% and 14.9% compliance with good hand hygiene practice respectively. [13,21] This may be because unlike the present study, the studies cited above were conducted prior to the COVID-19 pandemic. There have been increased

hand hygiene awareness activities globally during the COVID-19 pandemic and this may positively impact the practice of hand hygiene. On the other hand, a meta-analysis in Ethiopia reported a slightly higher level of compliance (57.8%).[22]

More doctors were found to practice good hand hygiene than other ophthalmic personnel. A study in Port Harcourt, Nigeria and another in Cairo Egypt similarly reported that doctors were more likely than nurses to wash hands before interacting with patients. [23, 24] This may be because examination procedures such as direct ophthalmoscopy, external eye examination, including palpation which doctors perform routinely often entail direct contact with patients. In many cases, these lead to soiling of examining hands or spillage of body fluid which would necessarily warrant hand hygiene before continuing with other procedures. As leaders of the medical team, doctors are in the forefront of sensitization and enforcement of disease prevention measures and thus of necessity would practice what they preach. However, studies in Kuwait, Ethiopia and Lagos, Nigeria found that nurses were more likely to wash their hands.[13,22, 25] These differences may be related to individual and organisational differences as well as some reasons that have been reported to influence non-compliance such as non-availability of needed hand hygiene materials at work station, forgetfulness, feeling that hands are not dirty, lack of time, avoidance of skin irritation.[26]

The finding of a higher hand hygiene compliance in the operating theatre, compared to other sections of the hospital is not surprising as standard procedure which involves mandatory hand washing is upheld in operating theatre at all times and staff are usually trained on hand hygiene and are more precaution-conscious because of the need to avoid surgical infections. In fact 100% compliance was actually expected in the operation room. Thus although higher compliance was recorded relative to the wards and outpatients, anything less than 100% would still be considered sub-optimal in the operation room. Rate of proper face mask use among the workers was high. However, there was a small proportion who did not wear any mask or did so incorrectly in spite of the

COVID-19 pandemic. These workers could be exposing themselves and patients to risk of infection. Contrary to our finding, a study in Ethiopia found only a 10% overall correct face mask use among health care workers. [16] The incorrect use of face mask may be, as reported in a previous study in our hospital, related to feelings of discomfort, claustrophobia or not finding a compelling enough reason to use face mask.[27]

The one-month period of our study was adequate for observation of habitual hand hygiene and face mask practices of staff during patient health worker interactions across various service points in the hospital and for different hand hygiene moments. It is also adequate to maintain unobtrusive observation thereby ensuring reduction of bias. Allowing for much longer periods could possibly undermine the unobtrusive method of observation. By utilising observation methods, our study was not confounded by the recall bias and other errors in reporting that may be found in self-reported methods. However, it was not without limitations. Our study did not explore reasons for suboptimal hand hygiene compliance among the eye health workers. Also only a segment of the teaching hospital staff was studied and therefore conclusions of this study may not be generalizable to all health workers.

## CONCLUSION

In conclusion, the present study found a poor compliance with hand hygiene and good face mask use among eye health workers. Continuous and repetitive health education and training of health care workers on proper hand hygiene practices and correct use of face mask are vital, especially during a pandemic like COVID-19. Optimal compliance would help ensure protection of patients and health care workers from health care associated infections.

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## Author contributions

All authors contributed to the implementation of the study. Specifically, SNNN, AAO, CUU and CUA

conceptualized and designed the study. NEO and EAC conducted a literature search. All authors were involved in the writing and revision of the manuscript. The authors read, approved the final manuscript and agree to be accountable for all aspects of the work.

## Data availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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## Conflict of interest

None declared.

## Ethical approval

The study was approved by the Institutional Ethics Committee.

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