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Evaluation of Hand Hygiene Facilities and Compliance of Healthcare Workers at The University of Medical Sciences Teaching Hospital, Ondo

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ABSTRACT: *Hand Hygiene (HH) is the leading measure for preventing the spread of pathogens and reducing health care associated infections, health care providers' adherence to recommended practices remains suboptimal in most settings, and maintaining its standards is difficult to sustain. However, Healthcare-associated infections (HAIs) remain the most common adverse event in healthcare, resulting in a significant burden on patients, their families, and health care systems. This study examines evaluation of hand hygiene facilities and compliance of health care workers at the University of Medical Sciences Teaching Hospital, Ondo. This was a cross-sectional descriptive study that was made up of 324 participants. Multi-stage sampling technique was used for the selection of participants. Self-administered questionnaire and observational checklists were used as tools for data collection. The reliability value of the questionnaire eliciting responses on self-reported compliance to hand hygiene technique techniques ranges from 0.703 to 0.764. Data were analysed using SPSS version 27. Inferential statistics of Chi Square was used test the hypothesis generated at 0.05 level of significance. The results revealed that none of the wards met the standard for hand hygiene facilities set by the WHO. 83.3% of the units had no poster or written policy on HH; 87% did not have alcohol-based hand rubs; 100% had at least one handwash sink; 100% had flowing tap water all day; and 100% had no hand drying facilities. Assessment of self-reported hand hygiene compliance showed that 86.42% of the respondents have good compliance to hand washing technique guideline with a mean score is 23.72 of 27 (87.85%) and 90.1% of the respondents have good compliance to hand hygiene using alcohol-based hand rub technique with a mean score is 19.68 of 21 (93.71%). A total of 1,016 hand hygiene opportunities were observed during the three-week period with an overall compliance rate of 29.9%. The compliance rate among nurses (31.2%) is higher than among doctors (21.8%). In recorded hand hygiene actions, hand washing is used slightly more frequently than alcohol-based hand rubs. The use of gloves is a major reason for missed opportunities in hand hygiene, responsible for 39.3% of missed opportunities.The study concluded that the availability of hand hygiene facilities and HCWs compliance at the University of Medical Sciences Teaching Hospital, Ondo is poor. The study also confirmed that while the self-reported hand hygiene compliance is high, the observed compliance with hand hygiene techniques is low. Specific measures such as improved facilities, training and monitoring are needed to improve HH compliance.*

KEYWORDS: compliance, evaluation, hand hygiene, facility, health care worker

INTRODUCTION

There is worldwide demonstrated effort and continued commitment by policy makers, administrators and health care workers to provide healthcare services that are accessible, affordable and of high quality. Entwined in quality healthcare is ensuring no patient acquires infections in the hospital setting while receiving medical care. Herein lies the role of Infection, Prevention and Control (IPC) programmes in the various facilities. The mandate of IPC programmes is to prevent and control HAIs, with three principal goals: Protect the patient; Protect the healthcare worker, visitors and others in the healthcare environment; and accomplish this in a cost-effective manner whenever possible (Public Health Agency of Canada, 2020).

Prevention and control of infection in the health care setting is described as "a complex task with variety of challenges, and a task that requires input from the various levels of health structures-government policy, finance, and the executioners at the points of care" (Johnson, Reyes, & Zervos, 2019). They go on to summarize the numerous guidelines, policies and resources on Infection Prevention and Control (IPC) that exist and their variations among countries and organizations.

The purpose of such extensive guidelines is to deal with the growing burden of Healthcare Associated Infections (HAIs). The World Health Organization (WHO) classifies HAIs as a major cause of death and disability worldwide. HAIs affect not only the patient, but the patients' families, health systems at large and consequently the economy of a country. To put it into perspective, HAIs are placed among the top three killers causing approximately 3% of deaths worldwide. Estimates show that 1 in 10 hospital admissions result in HAIs. At any given time, 1.4 million people worldwide are affected. Developed countries carry a burden of between 5-15% of patients having HAIs whereas in the developing countries rates could be 2-20 times higher (WHO, 2020). At the core of IPC practices, is hand hygiene. Hand hygiene is ranked by the WHO as one of the primary modes to reduce HAIs, complete with evidence-based recommendations on hand hygiene in health care facilities (WHO, 2020). Pittet, Allegranzi, and Boyce did a summary of these guidelines in 2020, which state that health care workers should wash their hand with soap and water or use an alcohol-based hand rub (ABHR). The concept is further entrenched in "my five hand washing moments", that details methods and duration of hand washing that is ideal to achieve sanitization critical to preventing the transmission of pathogens.

Despite these frightening statistics, most countries especially the low and middle-income countries (LMICs) lack surveillance systems for HAIs. Those that do have a semblance of a surveillance system, often struggle with the complexity, lack of consistency and lack of standardized criteria for diagnosing the infections. This makes it difficult to gather reliable global information on HAIs, and as is the \trend globally, HAIs usually receive public attention when there are epidemics. This may be hidden from public attention but the very real endemic, ongoing problem is one that no institution or country can claim to have solved, despite many efforts.

A study demonstrated that although many countries have guidelines regarding hand hygiene for healthcare settings (Agbana, Ogundeji, Owoseni, 2020), overall compliance among HCWs remains poor. A systematic review of 96 studies was conducted in high income countries and results showed a hand washing compliance rate of 40% among health care workers (Erasmus, Otto, De Roos, Eijsden, Vos, Burdorf, Beeck, 2020). Another study indicated that the compliance rates are much lower in developing countries, some reporting rates as low as 2.1% (Awoke, Geda, Arba, Tekalign, Paulos, 2018). Global compliance with hand hygiene practices, even in resource rich settings, can be as low as 0% with compliance levels most frequently well below 40% (Erasmus et al., 2020). There are quite a number of studies on hand hygiene practices in developing countries. A study carried out at the Infectious Disease Hospital, Kano, showed that time spent washing hands by health care workers was 12.36% of the 40-60 seconds recommended by WHO (20-30 seconds if using an alcohol-based hand rub) with only 28% of nurses and 23% of doctors following hand hygiene practices (Aliyu, 2019). A similar study carried out in Babcock University Teaching Hospital, Nigeria, revealed an overall compliance of 32.5% (Shobowale, Onyedibe, Adegunle, Elikwu, 2017).

Again, the above local studies reinforced the fact that compliance with hand hygiene practices was poor but failed to extensively highlight the hand hygiene techniques used by the health workers, the available facilities, and the relationship between the facility availability and compliance. The WHO in its mandate targets to have countries provide Universal Health Care (UHC) to its citizenry. UHC as defined by WHO encompasses three objectives: equity of access, quality of services and financial risk protection (WHO, 2020). The lack of, or inadequate hand hygiene definitely compromises on the ability of health workers to deliver quality care to patients, and therefore hinders progress to achieving UHC.

For effective hand hygiene, all staff in healthcare facilities (HCF) must wash or disinfect their hands at 5 critical moments: before patient contact, before an aseptic task, after body fluid exposure risk, after patient contact, and after contact with patient surroundings. Sanitary gloves and other prophylactic materials must be kept in continuous supply, worn during patient interactions, and safely discarded to reduce the spread of germs. Healthcare staff should also wash their hands when entering or exiting HCFs, before eating, and after using the toilet, and should encourage patients and visitors to do the same.

Basic hand hygiene facilities are defined by the WHO/UNICEF Joint Monitoring Program as “hand hygiene materials, either a basin with water and soap or alcohol hand rub, available at points of care and toilets.” Good hand hygiene requires the presence of functional and well-maintained hand washing stations located in or near sanitation facilities, at main entrances and exits of the healthcare facility, and in all treatment and recovery wards. The WHO recommends a 1:10 sink to bed ratio in healthcare facilities and hand washing stations within 5 meters of toilets. Sinks or hand washing stations should be designed to make hand washing user-friendly for all staff, patients, and visitors.

A healthcare facility without sufficient hygiene supplies practices cannot provide high quality healthcare. Clinics around the world face several challenges in fostering a clean environment for their patients. A study of water, sanitation, and hygiene (WASH) in HCFs in 54 countries

found that 38% did not have an improved water source, 19% lacked sanitation facilities, and 35% failed to offer soap and water for hand washing.

Failure to observe hygiene protocol impedes the delivery of safe services, increases the likelihood of HAIs, and allows antibiotic-resistant bacteria to spread. WHO found that on average, 61% of healthcare workers—in some facilities up to 90%—do not adhere to best hand washing practices, even when supplies are available. (WHO, 2020) Poor hygiene practices contribute to higher rates of HAIs, increased risk of antimicrobial resistance (AMR), and the amplified burden on health systems which results from HAIs and AMR.

The researcher is interested in evaluating the hand hygiene facilities available at the University of Medical Sciences Teaching Hospital, Ondo, evaluate hand hygiene compliance and the techniques used by healthcare workers working in the hospital. More so, to determine the relationship between the availability of hand facilities and compliance, and to determine if there is a difference in compliance with hand hygiene technique between different categories of health care workers (doctors and nurses). The findings in this study was help create a template on which a programme to improve hand hygiene facilities and compliance at the University of Medical Sciences Teaching Hospital, Ondo can be based.

RELATED LITERATURE

The WHO introduced “My five moments for hand hygiene” (WHO, 2019) which describes the fundamental reference points for healthcare workers (HCWs) in a time–space framework and designates the moments when hand hygiene is required to effectively interrupt microbial transmission during the care sequence. The concept applies to a wide range of patient care activities and healthcare settings which includes 1) before patient contact, 2) before an aseptic procedure, 3) after bodily fluid exposure risk, 4) after patient contact, and 5) after contact with patient surroundings. WHO recommends using the “My five moments for hand hygiene” as a validated methodology for training observers to directly monitor hand hygiene practices.
WHO also introduced these printable posters can be used to help raise awareness about proper hand hygiene techniques using both hand washing and alcohol-based hand rub.

Table 1: WHO Hand Hygiene Posters

MATERIALS AND METHODS

Study Design: This study is a quantitative research design using the descriptive cross-sectional method. This design was used because it allows for comparison of the various variables selected for the study with those obtained by other researchers from other studies. It is also cost effective and allows for evaluation of multiple variables (availability of hand hygiene facilities, and evaluation of hand hygiene compliance and technique) at the same time.

Study Setting: The study was conducted at the University of Medical Sciences Teaching Hospital, Ondo which is a 600-bed capacity tertiary healthcare centre in Ondo State, Southwest, Nigeria. The hospital serves a population of around 10 million which includes that of the neighbouring 4 states as a major referral hospital. Ondo state is located within an area of 15,500 km^2.

Study Population: The hospital has 17 clinical departments: anaesthesia, community medicine, chemical pathology, family medicine, haematology and blood transfusion, histopathology, medical microbiology, obstetrics & gynaecology, ophthalmology, orthopaedics & trauma, otorhinolaryngology (ENT), psychiatry, radiology and various sub-departmental units. There are 570 nurses and 202 doctors working in the hospital, however, there are 350 nurses and 150 doctors that are actively working in the wards where the study was be carried out.

Methodology: One questionnaire and two checklists were used for this study. The questionnaire used has three (3) sections – the first contain demographic profile of the respondents, the second and third sections were adaptations of the WHO Hand Washing Technique and Alcohol-based Hand Rub Technique posters respectively, to assess self-reported compliance to hand hygiene techniques. The first of the checklists is an observation Checklist for Assessing Hand Hygiene Facilities. It is an adaptation of the Infection Control Self-Assessment Tool created by the US Agency for International Development (USAID)'s Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. The checklist is used in assessing status of hand hygiene supplies. The second checklist is a Structured WHO Hand hygiene observation tool based on the "My five (5) moments of hand hygiene". It assesses compliance with indications, as well as opportunities. The observations were carried out by trained research assistants using unobtrusive method to prevent observation bias.

Statistical Analysis: Data was analysed and summarized using frequencies, distribution table and cross tabulation. The Chi square was used to test the level of significance between the categorical variable.

RESULTS

Table 1: The Demographic Data of Participants

	Frequency	Percentage
Gender		
Male	120	37.0
Female	204	63.0
Total	324	100.0
Mean Age		
26-30 years	72	22.2
31-35 years	128	39.5
36-40 years	80	24.7
41-45 years	32	9.9
46-50 years	12	3.7
Total	324	100.0
Mean Age	34.67	
Profession		
Nurse	204	63.0
Doctor	120	37.0
Total	324	100.0
Mean Years of experience		
0-5	156	48.1
6-10	124	38.3
11-15	40	12.3
16-20	0	0
21-25	4	1.2
Total	324	100.0
Mean years of experience	6.15	

Table 1 shows demographic data of participants. The highest age group is 31-35 years which is 39.5% while the lowest is 46-50 years which is 3.7%. The mean age is 34.67 years. The mean of years of experience is 6.15 years. There are 120 doctors and 202 nurses.

Table 2: Responses of Participants on Assessment of Hand Hygiene Facilities

	Number of beds	Number of sinks	Is running water available?	Is liquid soap present?	Are hand dryers, disposable towels or individual towels available?	Are alcohol-based hand rub available?	Are there posters or written policy on HH?	All 4 supply components met?
MRW	10	2	Yes	Yes	No	Yes	No	No
MSW	10	1	Yes	Yes	No	Yes	No	No
PW	20	2	Yes	Yes	No	Yes	Yes	No
PNW	10	3	Yes	Yes	No	Yes	No	No
A&E	26	4	Yes	No	No	No	No	No
SOPD	6	1	Yes	Yes	No	No	No	No
% of wards fulfilling all criteria								0%

Table 2 shows that all the six (6) wards have running water available, all the six (6) wards did not have disposable towels. None of the wards fulfil all the criteria of having all the 4 hand hygiene facility components.

Table 3: Responses of Participants on Compliance with Hand Washing Technique Guidelines

Hand hygiene techniques	**Always**	**Sometimes**	**Rarely**	**Never**	**Total**
My hands are free of jewelleries and other accessories	192 (59.3)	84(25.9)	36(11.1)	12 (3.7)	324 (100)
My sleeves are above the elbow	224 (69.1)	72(22.2)	20(4.9)	12 (3.7)	324 (100)
I wet hands with water	216 (66.7)	64(19.8)	16(4.9)	28 (8.6)	324 (100)
I apply soap to cover all hand surfaces	260 (80.2)	48(14.8)	8(2.5)	8(2.5)	324 (100)
I rub palm and back of hand, fingers, spaces between fingers and wrist	232 (71.6)	88(27.2)	-	4(1.2)	324 (100)
My hands are rinsed with sufficient running water	280 (86.4)	36(11.1)	-	8(2.5)	324 (100)
I dry my hands with paper towel or electric hand drier	88 (27.2)	144(44.4)	72(22.2)	20 (6.2)	324 (100)
I avoid re-contamination of my hand when switching off the tap	188(58)	112(34.6)	20(6.2)	4(1.2)	324 (100)
I wash my hand for 40 to 50 seconds	196 (60.5)	116(35.8)	8(2.5)	4(1.2)	324 (100)

Table 3 shows the responses of participants to the questionnaire on self-reported compliance to hand washing which is based on the WHO Hand Washing Poster

Table 4: Summary of Participants' Responses on Compliance with Hand Washing Technique Guidelines

Category	Score	Frequency	Percentage (%)
Good Compliance	22-27	280	86.42
Moderate Compliance	14-21	40	12.34
Low Compliance	0-13	4	1.23
Total Mean Score	 23.7	324	100 87.85

Table 4 shows that an overwhelming majority (86.42%) of the respondents have good compliance to hand washing technique guideline. The mean score is 23.72 (87.85%).

Table 5: Responses of Participants on Compliance with Hand Hygiene Using Alcohol-based Hand Rub

Table 5 shows that the response of participants to the questionnaire on self-reported

Alcohol-based Hand Rub Technique	**Always**	**Sometimes**	**Rarely**	**Never**	**Total**
My fingernails are clean and short	66(81.5)	47(18.5)	-	-	324(100)
I cover cuts and abrasions with waterproof dressing	53(65.4)	31(23.4)	28(8.6)	8(2.5)	324(100)
I ensure my hands are free from obvious dirt or organic materials	62(76.5)	24(22.3)	4(1.2)	-	324(100)
I squirt the alcohol-based hand rub once or twice into the palm of my left hand	41(50.6)	56(43.2)	20(6.2)		324(100)
I rubbed my right finger tips with the gel in my left palm	19(23.5)	74(46.9)	40(12.3)	56(17.3)	324(100)
I transfer the remaining gel into my right palm and also rub my left finger tips with the gel in my right palm	27(33.3)	63(40.7)	40(12.3)	44(13.6)	324(100)
I rubbed the remaining gel on my palm as well as back of my palm, my thumb and the wrist.	47(58)	57(33.3)	8(2.5)	20(6.2)	324(100)

compliance to hand washing which is based on the WHO Hand Rub Poster

Table 6: Summary of Participants' Responses on Compliance with Hand Hygiene Using Alcohol-based Hand Rub

Category	Score	Frequency	Percentage (%)
Good Compliance	16-21	292	90.1
Moderate Compliance	11-15	28	8.7
Low Compliance	0-10	4	1.2
Total Mean Score	 19.68	324	100 93.71

Table 6 shows that an overwhelming majority (90.1%) of the respondents have good compliance to hand washing technique guideline. The mean score is 19.68 (93.71%).

Table 7: Compliance Rate According to the Departments

Department	**Total Opportunities**	**Actions Done**			**Missed Opportunities**	**Compliance Rate (%)**
		Hand Wash	**Hand Rub**	**Total Actions**		
Male surgical Ward	176	36	24	60	116	34.1
Male Renal Ward	116	20	4	24	92	20.7
Post-Natal Ward	140	36	20	56	84	40
Paediatrics Ward	108	20	8	28	80	25.9
Surgical Emergency Transit Ward	288	44	48	92	196	31.9
Surgical Outpatient	188	24	20	44	144	23.4
Total	1,016	180	124	304	712	29.9

Table 7 shows that the Post-Natal Ward had a higher compliance rate at 40% and the Male Renal Ward had the least compliance rate of 20.7%. The commonest hand hygiene action in most of the wards is Hand Washing except in the surgical emergency transit ward.

Table 8: Compliance Rate According to Profession

Profession	**Total Opportunities**	**Actions**			**Compliance Rate (%)**
		Hand Wash	**Hand Rub**	**Total Actions**	
Nurses	628	104	92	196	31.2
Doctors	388	60	48	108	27.8
Total	1,016	164	140	304	29.9

Table 8 shows that there was a total of 1,016 hand hygiene opportunities available to both cadre of health workers during the observation. Overall compliance rate among the healthcare

workers was 29.9%. Nurses had the highest compliance rate at 31.2%, while doctors were seen to have a compliance rate of 27.8%.

Hand hygiene operations according to indications, as presented in Table 5, showed that 140 (13.8%) of the hand hygiene actions was by the use of hand rub and 164 (16.1%) was by hand washing. Also, of the 712 (70%) missed opportunities, 280 was as a result of the use of gloves.

Table 9: Hand Hygiene Operations According to Indications

Indications	**Opportunities**	**Action Done**		
		Hand Wash	**Hand Rub**	**Missed**
Before touching Patient	356	12	8	336
Before aseptic procedure	100	0	0	100
After body fluid exposure	176	32	72	72
After touching patient	196	40	52	104
After exposure to patient Surrounding	188	56	32	100
Total	1,016	140	164	712

Table 9 shows that 712 (70.1%) of hand hygiene opportunities are missed, hand washing is the most preferred form of hand hygiene action and the hand hygiene indication with most and least compliance rates being "after body fluid exposure" and "before aseptic procedure", respectively.

Table 10: Mean Difference Between Self-Reported and Observed Compliance with Hand Hygiene Techniques

Self-Reported and Observed	**Compliance with Hand Hygiene Technique**						
	N	Mean	Mean diff	F	t	Df	Sig
Self-Reported	324	23.72	23.580	0.086	273.621	1338	<0.0001
Observed	1016	0.14					

Table 4.10 shows that there was difference in the self-reported and observed compliance with hand hygiene techniques. The self-reported compliance is far better than the observed compliance. The compliance mean difference (23.580) was found to be of statistical significance (P-value < 0.0001). Therefore, the null hypothesis two (H_o1) was rejected.
This shows that, while the healthcare workers know what to do in terms of proper hand hygiene techniques, the unavailability of adequate hand hygiene facilities prevented them from doing so.

Table 11. Comparison of the Compliance of Doctors and Nurses with the Five Moments of Hand Hygiene

	Mean ± *SD*		
Hand hygiene techniques	**Nurse**	**Doctor**	**P-value**
My hands are free of jewelleries and other accessories	3.43±1.04	2.93±1.28	0.061
My sleeves are above the elbow	3.80±0.63	2.83±1.29	0.000
I wet hands with water	3.33±1.31	3.10±1.27	0.435
I apply soap to cover all hand surfaces	3.78±0.64	3.43±1.1	0.074
I rub palm and back of hand, fingers, spaces between fingers and wrist	3.73±0.67	3.53±0.63	0.204
My hands are rinsed with sufficient running water	3.88±0.59	3.50±0.97	0.030
I dry my hands with paper towel or electric hand drier	2.73±1.31	2.20±1.16	0.073
I avoid re-contamination of my hand when switching off the tap	3.59±0.73	2.97±1.13	0.003
I wash my hand for 40 to 60 seconds	3.67±0.62	3.10±0.99	0.002

Note: P-value less than 5% signifies a statistical significance at 95% confidence interval

The table 4.11 above showed that there is a significant difference in the use of hand hygiene techniques such as "My sleeves are above the elbow", "My hands are rinsed with sufficient running water", "I avoid re-contamination of my hand when switching off the tap" and "I wash my hand for 40 to 60 seconds".

Similarly, there is a significance difference in the mean score of nurses and doctors in the compliance to alcohol-based hand rub technique on the two items; "My fingernails are clean and short and "I cover cuts and abrasions with waterproof dressing" with nurses having higher level of compliance than doctors. However, doctors level of compliance is higher than that of nurses on the item "I dip the right-hand fingers into the gel making contact with my left palm" but the difference is not statistically significant (P-value= 0.586). Therefore, the null hypothesis two (H_02) was accepted.

DISCUSSIONS

The study had 324 participants, 204 of which were nurses and 120 doctors. This amount to a nurse: doctor ratio 2:1 which corroborated the findings of Salama et al (2017) that have similar nurse: doctor ratio. The mean age of the respondents was 34.67, which showed a relatively young generation of health workers as also observed by Raimi et. al (2018). Majority of the respondents have between 0 and 10 years of experience which represents a combined total of 86.4% of the respondents which is similar to similar studies in both developed and developing countries (Zhao et. al (2018), Shobowale et. al (2017)). The mean year of experience is 6.15years.

A general review of hand hygiene facilities in the different wards used for the study showed that none of the wards have the complete set of facilities needed for hand hygiene. While there are functional sinks with running taps in all the wards, which shows an improvement over Shobowale et al 2017), the common component missing are written hand hygiene instructions and charts, and facilities for hand frying after hand washing. Lack of hand hygiene facilities

was the main causative factor of poor compliance with hand hygiene practices, followed closely by lack of time, the perception that the risk of acquiring infection was low, and forgetfulness. A study in Uganda highlighted that lack of hand hygiene facilities was one of the main barriers to hand hygiene, as well as health workers' perceptions on the risk of infection and increased workload (Mearkle, Houghton, Bwonya, & Lindfield, 2018). The similarity was evident in this study.

The result of the self-reported hand hygiene compliance with the use of soap and water, and alcohol-based hand rub are very high (87.85% and 93.7% respectively). While this is far above the global benchmark of 40% (WHO, 2020), its corroborates the findings of Iqbal et al (2018) which has a value of 72.9%. Also, of note is the fact that the reported compliance to hand hygiene using alcohol-based hand rub is higher than hand washing, which has been attributed to the campaign for the use of alcohol-based hand rub following the COVID-19 pandemic (Roshan et al., 2020). This, however, is in variance to the observed hand hygiene compliance which showed very low values; that goes to show that the healthcare workers have a fairly good knowledge of what good hand hygiene entails but are constraint by the working environment, the main culprit here being the unavailability of hand hygiene facilities.

From the results we see an overall observed compliance rate of 29.9%. This is below the global rate of 40% as outlined by the World Health Organization report (World Health Organisation (WHO), 2019). However, this rate quoted from WHO is mostly from systematic studies conducted in high income countries (Erasmus et al., 2020). The report cited that it was difficult to get data from low and middle-income countries because no research was conducted in those countries, and if there was, inaccurate documentation made data collection more difficult.Authors who did studies in African countries representing the low and middle-income countries like Awoke and colleagues in Ethiopia (Awoke et al., 2018) found an extremely low compliance rate of 14.9%. A similar study carried out in Babcock University Teaching Hospital, Nigeria, revealed an overall compliance of 32.5% (Shobowale et al., 2017).

With regard to the 5 moments of hand hygiene as stipulated in the WHO report (World Health Organisation (WHO), 2019), two moments are seen to elicit the greatest compliance with hand hygiene practices. Two studies, one in Taiwan (Wu et al., 2017) and another in Jamaica (Nicholson et al., 2017) showed highest compliance with hand hygiene practices during two moments: after patient contact and after body fluid exposure respectively, mirroring what was found in the study at the University of Medical Sciences, Ondo. A similar study in Kosovo found that the highest compliance is after exposure to body fluids (93%) and lowest before touching a patient at 18.5% (Sopjani, 2017). This suggests that healthcare workers are more diligent in performing hand hygiene in situations where there is highest risk to them first, then to the patient. Interestingly though, despite these 5 moments having been tested and approved for use in healthcare settings, their feasibility has been questioned in overcrowded settings as is the case in most healthcare facilities in low and middle-income countries (Salmon, Pittet, Sax, & McLaws, 2018). The authors suggest a modification of the moments to focus on those that pose the greatest risk of contamination. This could see an improvement in compliance rates when the time pressure to perform in all five moments is reduced.

In comparing the clinical departments, findings from the study indicate a lowest compliance in the paediatrics department, where there is the highest risk of contamination. This is also seen in a study in Colombia where complying with safety standards including hand hygiene was low in the paediatrics units (Amaya-Arias, 2017). This was attributed to high workloads in the units compounded by overcrowding in the wards which led to inadequate time to perform hand hygiene as required.

This study also revealed a higher compliance rate among nurses than doctors. This result is in keeping with an observational study in Istanbul, doctors had a lower compliance at 31.9% as compared to nurses whose compliance was 41.4% (Keralan et al., 2020). Most studies comparing cadre compliance with hand hygiene cited reasons such as the doctors feeling superior than other workers to be held accountable for such 'mundane' procedures, to claiming to have more pressing matters to attend to so they couldn't waste time on a repetitive process.

CONCLUSION

The study results highlight structural factors, such as the lack of hand hygiene facilities as playing a big role in poor hand hygiene compliance. It also brings out comparisons between cadres and departments where differences in compliance rates suggest an interplay of factors well beyond the lack of facilities. Perceptions and attitudes that influence hand hygiene action are also seen when psychological theories of behaviour are applied.

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