

HAND HYGIENE PRACTICES AMONG MEDICAL STUDENTS IN A TERTIARY HOSPITAL IN SOUTH EAST NIGERIA

Chinyerem Cynthia Nwachukwu¹, Amaechi Chinedu Nwachukwu², Gabriel Ifeanyi Eyisi³, Ifeoma Anne Njelita⁴, Chijioke Amara Ezenyeaku⁵.

^{1,3,4}Department of Community Medicine & Primary Health Care, Chukwuemeka Odumegwu Ojukwu Teaching Hospital, Awka, Anambra State, Nigeria.

²Department of Surgery, Chukwuemeka Odumegwu Ojukwu Teaching Hospital, Awka, Anambra State, Nigeria.

⁵Department of Community Medicine & Primary Health Care, Nnamdi Azikiwe Teaching Hospital, Nnewi, Anambra State, Nigeria.

DOI: <https://doi.org/10.5281/zenodo.7845171>

Published Date: 19-April-2023

Abstract: Health Care Associated Infections (HCAI) are a major cause of morbidity and mortality in patients. Hand hygiene is pivotal to controlling these infections. The perception and practice of hand hygiene among clinical medical students of Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria were studied. Many knew that infections can be transmitted between patients through the hands of healthcare workers and students (95.6%). Only 63.0% had received formal training on hand washing. Some believe that wearing gloves reduces the need for hand hygiene (44.5%). Those that practice hand hygiene before and after touching patients were 17.0% and 43.7%, respectively. Reasons given for not practicing hand hygiene adequately were lack of water (88.1%), lack of sanitizer (76.3%), forgetfulness (79.3%) and insufficient time as they had many things to attend to (54.1%). Medical students should receive training on hand hygiene, and facilities for its practice should be adequately provided.

Keywords: Hand, hygiene, washing, medical student, sanitizer, alcohol, practice, challenges.

I. INTRODUCTION

The practice of hand hygiene is considered a frontline measure for the prevention of Health Care Associated Infections (HCAI) which are known to be a major cause of illness and death among hospitalized patients thereby contributing to 7-10% of the hospital admissions. Hand hygiene broadly includes hand washing with soap and plain water, use of antiseptics, use of alcohol based hand rubs and surgical hand antiseptic.(1)

The Centre for Disease Control and Prevention (CDC) guidelines for health care settings noted that health care workers contribute to the transmission of these infections through contaminated hands. The concept of hand hygiene and antisepsis was introduced by a Hungarian physician, Ignaz Semmelweis in 1846 who demonstrated that cleansing heavily contaminated hands with an antiseptic agent between patient contacts may reduce healthcare associated transmission of contagious diseases more effectively than hand washing with plain soap and water.(2)

Medical hand hygiene refers to hand hygiene practices related to the performance of medical care that prevents or minimizes disease spread. The main purpose of hand hygiene is to clean or kill the pathogen or micro-organism and chemical that can cause infection in patient.(3) According to World Health Organization (WHO), an infection is considered HCAI if it occurs in a patient in the course of care in a health facility but was not present or incubating at the time of admission. These include

infection acquired in the hospital but appearing after patient is discharged; and also, occupational infection among staff in the facility.(4) According to WHO report, 1.4 million Patients are estimated to be affected by HCAI in developing and non-developing world at any given time.(5)

If clean running water is inaccessible as it is common in many parts of the world, an alternative is the use of alcohol-based hand sanitizer that contains at least 60% alcohol to clean hands.¹⁰ The practice of hand hygiene for medical students as future health care providers is vital. This should be done at key points to disrupt the transmission of micro-organisms to patient including before patient contact, after contact with blood, body fluids, or contaminated surface (even if gloves are worn), before invasive procedures and after removing gloves. Wearing gloves is not enough to prevent the transmission of pathogen in health care settings.(3) Absence of adequate hand hygiene facility is one of the factors affecting compliance with hand hygiene by health workers.(7)

In order to overcome these challenges, the CDC Healthcare Infection Control Practices Advisory Committee (HICPAC) published comprehensive Guideline for Hand Hygiene in Health-Care Settings in 2002. One key recommendation of this guideline is that waterless, alcohol-based hand rubs either as liquids, gels, or foam, are the preferred method for hand hygiene in most situations as a result of the superior efficacy of these agent in rapidly reducing bacteria count on hands and as well as their ease of use. Alcohol preparations also rapidly kill many fungi and viruses that cause HCAI. The guideline recommended that health care facilities should develop multidimensional programmes to improve hand hygiene practices.(8)

Recognizing a worldwide need to improve hand hygiene, the World Health Organization (WHO) launched its guidelines on hand hygiene in October 2005. These global consensus guidelines reinforce the need for multidimensional strategies as the most effective approach in promoting hand hygiene. Key elements include staff education and motivation, adoption of an alcohol-based hand rub as the primary method for hand hygiene, use of performance indicators, and strong commitment by all stake holder such as frontline staff, managers and health care leaders to improve hand hygiene.(9) In modern practice some hospital have installed electronic devices that notify and send feedback on hand hygiene routine of health care givers.(10) It was noted in a study in Michigan, USA that proper hand washing and other simple procedure can decrease the risk of contact-transmissible diseases by 66%.(11)

In a study among nursing and medical students in a tertiary care hospital in India, the overall knowledge on hand hygiene among the participants was moderate (medical 64%, nursing 63.1%). Based on the scoring system, 13.6% scored well, 80% had moderate scores and 6.4% had poor scores. Nurses had better knowledge on hand hygiene than medical student. Overall, their attitude towards hand hygiene was poor. However, nurses showed positive attitude towards hand hygiene (70.7%) when compared to the medical students (47.1%). Most of them had poor hand hygiene practice, medical (73%) and nursing (57%) and only few showed good hand hygiene practice, medical 3% and nursing 5%. Nurses showed better hand hygiene practice than medical students. Both the groups agreed that they missed out hand hygiene sometimes because they had more important works to attend to, which showed that hand hygiene, was not in their priority. Nearly 36.4% of medical students and 63.5% of the nurses had the misconception that wearing gloves obviates the need for practicing hand hygiene. Most (79%) of the nurses and few medical students (43.9%) felt that following hand hygiene was difficult in the current set up. This could be due to the lack of facilities in our institution and could be overcome by setting up bedside hand rubs, maintaining the patient to sink ratio, etc.(12)

Another study among medical and nursing students in a tertiary healthcare centre in India found that 79% had received formal training in hand washing (medical 74.2%, nursing 95.4%). Knowledge of the correct technique of hand washing was 91.3% for medical students and 97.8% for nursing students. The majority of students had poor attitudes with regard to hand hygiene. Nursing students had significantly better attitudes (52.1%) compared to medical students (12.9%). Nursing students had significantly better practices (62.1%) compared to medical students (19.6%). Some respondent attributed failure to comply to hand hygiene to forgetfulness (medical students 16.2%, nursing students 46.1%), insufficient time (medical students 37.5%, nursing students 57.6%), and inconvenient location of sinks (medical students 28.3%, nursing students 16.9%).(13)

A study in Pakistan among medical students about hand hygiene showed that only 39% received any formal training in hand hygiene either before or during their clinical education. Only 33% of students reported that they routinely use an alcohol-based hand rub for hand hygiene. Alcohol rub was the choice of 48% before palpation of abdomen, 31% before giving an injection, 22% after removing gloves and 31% after making patient's bed. Among respondents, hand washing was selected

by 61% after emptying a bedpan and 56% after visible exposure to blood. When asked about the perceptions of students regarding the timing of hand hygiene actions. For prevention of transmission of germs to the patients, the preferred timings of hand hygiene actions were before touching the patient (76%), immediately after a risk of body fluid exposure (70%), after exposure to the immediate surroundings of patient (60%) and immediately before a clean/ aseptic procedure (68%).(14)

A study among medical students in Uganda reported that 71.4% of the respondents knew of the “five moments” in which hand hygiene should be observed. Most of the respondents, 85.1% knew that WHO has a recommended procedure for hand hygiene. Some barriers to adequate hand hygiene were non-availability of running water (89.6%), non-availability of soaps, antiseptics, detergents and alcohol sanitizers (82.3%), frequency required for washing hands in ‘the five moments’ (41.3%), lack of knowledge of hand hygiene importance (40.8%), negligence (24.4%), laziness (6%), a lot of work in the facility (16%) forgetfulness (36%), poor personal habit (13%) and lack of government support (2%).(15)

A study among medical student in Port Harcourt, Nigeria showed that the participants were able to identified the components of good hand washing which included rubbing soap on wet hands for about 20 seconds before rinsing (42.6%) and washing of the front and back of hands including under the nails (59.4%). The most practiced techniques of hand washing were rubbing soap on wet hands for about 20 seconds before rinsing (44.1%), washing of the front and back of hands including under the nails (18.9%) and use of soapy water in a basin (18.6%). Students washed their hands always (37.6%) or sometimes (38.4%) after clerking their patients. Some (31.8%) sometimes wash hands after simple procedures on their patients and 33.3% wash their hands after the day’s work. Only 66.7% washed hands with soap and running water in the clinics, while 20.7% used water alone. Some of the students (36.1%) used personal handkerchiefs to dry hands after washing while 28.6% used the common towels provided on the wards. The greatest motivating factor for washing hands was the fear of contracting disease (58.1%), while the greatest constraint to hand washing both at home (36.8%) and in the clinics (36.4%) was lack of water. Other factors were laziness (29.9%) and forgetfulness (14.2%).(16)

A survey of dentists and dental students in Benin, showed that majority strongly believe that hand washing helps to prevent transmission of infection to patient (91.4%), health workers (92.4%), and health workers family members (89.5%).²³ About 65.5% desired more information on hand hygiene with the most indicated area on information need being the indications and steps in hand washing in form of seminar and pamphlets. This study revealed positive attitude to hand hygiene. Their results showed that 25.7% of the respondents washed their hand before wearing gloves and 98.1% washed their hands when they were visible soiled and 46.7% washed their hands when the worn gloves are torn.(17)

II. RESEARCH METHODS

Study area

The study area is Chukwuemeka Odumegwu Ojukwu University Teaching Hospital [COOUTH] Awka, Anambra. It is located in the southeast geographical zone of Nigeria.

Study design

A cross-sectional descriptive study design was used to determine the perception and practice of medical students on hand hygiene.

Study population

Clinical medical students of Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria.

Sample size determination

Minimum sample size was determined to be 135 using the Leslie and Kish formula for sample size estimation.

Sampling technique

Stratified sampling technique was used across the clinical classes (400, 500 and 600 levels).

Research instrument

The research instrument was a semi-structured, self-administered questionnaire.

Data analysis

Data analysis was done using the Statistical Package for Social Sciences (SPSS) software.

Ethical consideration

Ethical approval was obtained from the Ethical Review Committee of COOUTH. Informed consent was obtained from the respondents.

Limitations of the study

Due to the self-reporting nature of the study, there may be the tendency for respondents to report more than they actually do.

III. RESULTS

Table 1: Sociodemographic characteristics

Variables		Frequency	Percentage (%)
Age	15 – 19	6	4.4
	20 – 24	95	70.4
	25 – 29	21	15.6
	30 – 34	9	6.6
	>35	4	3
	Mean 23.76 (±3.876)		
Sex	Female	75	55.6
	Male	60	44.4
Marital Status	Single	126	93.3
	Married	9	6.7
Level	400	62	45.9
	500	37	27.4
	600	36	26.7

Table 2: Knowledge of hand hygiene

Knowledge of hand hygiene	Frequency	Percentage (%)
As a means of cross transmission of pathogens between patients in hospital	129	95.6
As a way of preventing transmission of pathogens among health care workers	135	100
As a cost-effective means of reducing transmission of infection	103	76.3
Aware of hand hygiene	133	98.5



Figure 1: Students who have received formal training on hand washing

Table 3: Attitude towards hand hygiene

Variables		Frequency	Percentage (%)
Medical students should practice effective hand hygiene in line with their career	Strongly agree	118	87.4
	Agree	11	8.1
	Indifferent	3	2.2
	Disagree	3	2.2
	Strongly disagree	0	0.0
Wearing gloves reduces the need for hand hygiene	Strongly agree	34	25.2
	Agree	26	19.3
	Indifferent	14	10.4
	Disagree	50	37.0
	Strongly disagree	11	8.1
I would rather complete other tasks assigned than performing hand hygiene	Strongly agree	24	17.8
	Agree	7	5.2
	Indifferent	22	16.3
	Disagree	39	28.9
	Strongly disagree	43	31.9
It is negligence not to perform hand hygiene as recommend	Strongly agree	55	40.7
	Agree	42	31.1
	Indifferent	13	9.6
	Disagree	21	15.6
	Strongly disagree	4	3.0
It is difficult to adhere to hand hygiene practices	Strongly agree	32	23.7
	Agree	55	40.7
	Indifferent	4	3.0
	Disagree	29	21.5
	Strongly disagree	15	11.1
I feel confident enough to remind my colleague of hands hygiene	Strongly agree	52	38.5
	Agree	50	37.0
	Indifferent	26	19.3
	Disagree	7	5.2
	Strongly disagree	0	0.0

Table 4: Times when medical students practice hand hygiene

Variable		Frequency	Percentage (%)
Before touching a patient	Never	9	6.7
	Rarely	26	21.5
	Sometimes	57	42.2
	Often	17	12.6
	Always	23	17.0
After touching a patient	Never	0	0.0
	Rarely	26	19.3
	Sometimes	26	19.3
	Often	24	17.8
	Always	59	43.7
After body fluid exposure	Never	0	0.0
	Rarely	12	8.9
	Sometimes	9	6.7
	Often	28	20.7

Before a clean/aseptic procedure	Always	86	63.7
	Never	0	0.0
	Rarely	26	19.3
	Sometimes	15	11.1
	Often	17	12.6
After exposure to immediate surroundings of the patient	Always	77	57.0
	Never	5	3.7
	Rarely	20	14.8
	Sometimes	27	20.0
	Often	36	26.7
	Always	47	34.8

Table 5: Challenges with hand hygiene practice

Variables	Frequency	Percentage (%)
Lack of running water in the campus and wards when they are in practicum	119	88.1
Lack of soaps, antiseptics, detergents and alcohol sanitizers	103	76.3
Forgetting	107	79.3
Negligence as a barrier to hand hygiene compliance	78	57.8
A lot of other academic work in the faculty	73	54.1
Poor personal habit	73	54.1
Laziness and tiredness	99	73.3
Lack of government support	86	67.7

Table 6: Association between academic levels and practice of hand hygiene before touching a patient

Level	Before touching a patient					Total	X ²	P-value
	Never	Rarely	Sometimes	Often	Always			
400	2	14	30	6	10	62		
	1.5%	10.4%	22.2%	4.4%	7.4%	45.9%		
500	4	8	14	5	6	37		
	3.0%	5.9%	10.4%	3.7%	4.4%	27.4%		
600	3	7	13	6	7	36	4.439	0.816*
	2.2%	5.2%	9.6%	4.4%	5.2%	26.7%		
Total	9	29	57	17	23	135		
	6.7%	21.5%	42.2%	12.6%	17.0%	100.0%		

There was no significant association between the participants' academic levels and hand hygiene practice before touching a patient.

Table 7: Association between academic level and practice of hand hygiene after touching a patient

Level	After touching a patient				Total	X ²	P-value
	Rarely	Sometimes	Often	Always			
400	4	20	11	27	62		
	3.0%	14.8%	8.1%	20.0%	45.9%		
500	12	2	7	16	37		
	8.9%	1.5%	5.2%	11.9%	27.4%		
600	10	4	6	16	36	20.398	0.002*
	7.4%	3.0%	4.4%	11.9%	26.7%		
Total	26	26	24	59	135		
	19.3%	19.3%	17.8%	43.7%	100.0%		

There was a significant association between the participants' academic levels and practice of hand hygiene after touching a patient.

IV. DISCUSSION

Almost all the respondents (98.5%) had heard of hand hygiene, 63.0% had received formal training on hygiene, 95.6% agree that hand hygiene reduces cross transmission of pathogens among patients in hospital, while 100% agreed that hand hygiene prevents transmission of organisms to health care workers. A study done in Benin, Nigeria showed similarities in findings as they majority strongly agreed that hand washing helps to prevent transmission of infection to patient (91.4%) and to health workers (92.4%).(17) It was noted in a study in Michigan, USA that proper hand washing and other simple procedure can decrease the risk of contact-transmissible diseases by 66%.(11) This is collaborated by our participants' knowledge that proper hand hygiene can decrease transmission of infection between patients (95.6%) and to health care workers (100%).

Some medical students (36.4%) had the misconception that wearing gloves removes the need for practicing hand hygiene. Some (43.9%) felt that practicing hand hygiene was difficult in the current set-up. This was due to inadequate hand hygiene facilities and could be overcome by setting up bedside hand rubs, maintaining the patient to sink ratio, etc.(12) Similar results were obtained by our study as the participants believed that wearing gloves reduce the need for hand hygiene (25.2%). The majority (88.1%) attributed lack of running water in the campus and wards as a challenging factor and 76.3% stated lack of soaps, antiseptics, detergents and alcohol sanitizers.

Another study in India found that 74.2% of medical students received formal training in hand. Medical students who had good practice of hand hygiene were 19.6%. Some respondent attributed failure to comply with hand hygiene to forgetfulness (16.2%), insufficient time (37.5%), and inconvenient location of sinks (28.3%).(13) Similarly, our study found that 63.0% of respondents received formal training on hand washing, 17.0% and 43.7% practice hand hygiene before and after touching a patient respectively. Reasons given for not practicing hand hygiene adequately were lack of water (88.1%), lack of sanitizer (76.3%), forgetfulness (79.3%) and insufficient time (54.1%). On the contrary, a study in Pakistan among medical students showed that only 39% received any formal training in hand hygiene either before or during their clinical education.(14)

A study among medical students in Uganda reported that some barriers to adequate hand hygiene were non-availability of running water (89.6%), non-availability of soaps, antiseptics, detergents and alcohol sanitizers (82.3%), frequency required for washing hands in 'the five moments' (41.3%), lack of knowledge of hand hygiene importance (40.8%), negligence (24.4%), laziness (6%), a lot of work in the facility (16%) forgetfulness (36%), poor personal habit (13%) and lack of government support (2%).(15) A study among medical student in Port Harcourt, Nigeria reported that the greatest constraint to hand washing both at home (36.8%) and in the clinics (36.4%) was lack of water. Other factors were laziness (29.9%) and forgetfulness (14.2%).(16) These are consistent with our findings.

REFERENCES

- [1] Haley R.W, Culver D.H, White J.W, Morgan W.M, and Emori T.G Et al. The efficacy of infection surveillance and control programs in preventing nosocomial infection in US hospitals. *Am. J. Epidemiology*, 1985;121:182-205.
- [2] Centre for disease control and prevention: CDC guidelines for health care settings. <http://www.cdc.gov/handhygiene/>.
- [3] USAID. "The Hygiene Improvement (HIP) – Tippy Tap: A simple low cost technology for hand washing when water is scarce". Retrieved 30 September 2015
- [4] World Health Organization. Save lives clean your hands-Guide to Implementation. A Guide to implementation of the WHO Multimodal Hand Hygiene Improvement Strategy 2009; WHO/IER/PSP/2009;02, Geneva.
- [5] World Health Organization (WHO), Practical guidelines for infection control in health care facilities. Geneva, WHO 2004;1:76-80.
- [6] Centres for Disease Control and Prevention: CDC 24/7: Saving Lives, Protecting People December 2010
- [7] Mani A, Shubangi A.M, Saini R. Hand hygiene among health care workers *Indian Journal of Dental Research* (serial online) 2010 (cited 2021 July 01):21:115-8.
- [8] Anargh V, Singh H, Kulkarni A, Kotwal A. Hand hygiene practice among health care workers in a tertiary care facility in Pune. *Medical Journal Armed Forces India*. 2013;69: 54-56.

- [9] Boyce JM, Potter D. Guideline for hand hygiene in health care settings: Recommendation of the Healthcare Infection Control Practices Advisory Committee; HIPAC/SHEA/APIC/IDSA Hand Hygiene Taskforce. Morbidity mortality weekly report. *Recommend. Rep.* 2002; 51:1-45.
- [10] Boyce Jm. Measuring healthcare worker hand hygiene activity: Current practices and emerging technologies. *Infection Control and Hospital Epidemiology.* 2011; 32(10):1016-28.
- [11] Pronovost P, Needham D, Berenholtz S, Sinopoli D, Chu H, Cosgrove S, Sexton B, Hyzy R, Welsh R, Roth G, Bander J, Kepros J, Goeschel C. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med.* 2006 Dec 28;355(26):2725-32. doi: 10.1056/NEJMoa061115. Erratum in: *N Engl J Med.* 2007 Jun 21;356(25):2660. PMID: 17192537.
- [12] Arthi E, Abarna V, Bagyalakshmi R, Anitharaj M, Vijayasree S. Assessment of Knowledge, Attitude and Practice of Hand Hygiene among Nursing and Medical Students in a Tertiary Care Hospital in Puducherry, India. *International Journal of Contemporary Medical Research* 2016;3(4):1203-1206.
- [13] Sreejith SN Ramesh H, Shashidhar G H, Mohammed A S, and Pooja R. Knowledge, Attitude, and Practice of Hand Hygiene among Medical and Nursing Students at a Tertiary Health Care Centre in Raichur, India. *ISRN Preventive Medicine.* 2014; 608927 dx.doi.org/10.1155/2014/608927.
- [14] Daud S, Shuja H, Mahwish R. Perceptions of Medical Students about Hand Hygiene. *Professional Medical Journal.* 2013; 20(1):164-70.
- [15] Muiru HW. Knowledge, attitude and barriers to hands hygiene practice: a study of Kampala International University undergraduate medical students. *International Journal of Community Medicine and Public Health.* 2018; 5(9):3782-3787.
- [16] Opara P.I, Alex-Hart B.A. Hand Washing Practices amongst Medical Students in Port Harcourt, Nigeria. *The Nigerian Health Journal.* 2009;9:1-4.
- [17] Omoghai JJ, Azodo CC, Ehizele AO, Umoh A. Hand hygiene amongst dental professionals in a tertiary dental clinic (2011). *African Journal of Clinical and Experimental Microbiology.* 2001;12(1):9-14.