# **Original Research Article**

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# Knowledge, attitude and barriers to hands hygiene practice: a study of Kampala International University undergraduate medical students

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# **ABSTRACT**

**Background:** Hand hygiene is the simplest method that is effective in terms of cost with its importance in preventing transmission of microorganisms and infections. Though this being the case, it has been found to be clumsy and faulty in most healthcare settings. What has been done on assessing the medical students' knowledge, attitude and practice and comparisons of these factors between the medical disciplines is not exhaustive.

**Methods:** A descriptive cross sectional study was conducted among the undergraduate medical students to assess the knowledge in medical students, their attitude and barriers to hand hygiene practice where simple random sampling technique was applied to obtain a sample size. A questionnaire on alcohol-based hand rubs and WHO recommendations on hand hygiene was used for data collection.

**Results:** A total of 392 respondents were interviewed. The respondents comprised of 232 males and 160 females. The overall mean score for individual knowledge was 49.4%. The study revealed that more than half of the respondents 203 had poor knowledge on hand hygiene while 43.1% had average and 5.1% were consider to have good knowledge. Most of the respondents had good attitude on hand hygiene on most of the aspects that were assessed. Several barriers to effective hand hygiene practice were highlighted by the respondent.

**Conclusions:** The study concluded that more sensitization was needed to increase awareness and knowledge of the practice in medical students which could be achieved by adding a course on hand hygiene practice to the undergraduate medical students' curriculum amongst others.

Keywords: Cross infection, Simple hand wash, Alcohol-based hand rubs, Hand hygiene, Barriers

# INTRODUCTION

"Prevention is better than cure". Therefore, proper hands hygiene practice stand out to be one of the measures of reducing transmission of disease to patients and to health care providers. The practice is considered to be in the front line in prevention of health care associated infections (HCAI) and nosocomial infections/hospital acquired infections. Washing hands is taking a second position from hand rub to meet the recommended standards with optimum time considered to be between 30 seconds and one minute. The alcohol antiseptics are

recommended worldwide due to their broad spectrum antimicrobial effects, the application process is easy and they are tolerable to many people skins. The scope of hand hygiene includes hand washing, use of antiseptics to wash hands or rub and surgical hand antisepsis.<sup>3</sup>

Hand hygiene is a health care issue attracting attention globally. It is considered a cost effective way of reducing cross infections in health facilities from advanced health care system to primary health care centers.<sup>4</sup> In most health care facilities the practice has been found faulty with little compliance to the recommended standard by

WHO.<sup>5,2</sup> The practice of hand hygiene is considered simple yet met with little compliance of less than 40% among the health care providers. To address this problem strategies that are sustainable are being developed with maximum effort like "my five moments of hand hygiene" by World Health Organization. The moments included are before being in contact and after being in contact with the patient, before performing aseptic techniques and procedure, when exposed to body fluids that are hazardous and after being in touch with the patient environs. Another strategy is proper training of health workforce trainee though the health facility on how to prevent and control infections.<sup>6</sup> The concept of "my five moments of hand hygiene" is recommended to be the foundation for examining how much are the undergraduate medical students aware and comply with the practice of hand hygiene.<sup>2</sup>

According to WHO report, 1.4 million Patients are estimated to be affected by HCAI in developing and nondeveloping world at any given time. This continues to increase the burden of diseases to already strained health care systems since these infections results to prolonged hospital stay.<sup>7,8</sup> Most of these health care associated infections are transmitted through health workers contaminated hands. According to Centre for Disease Control (CDC) reports, washing hands is simple, and one of the most effective way that is applicable for preventing the spreading of pathogens, viruses and bacteria. World Health Organization reported that health professionals fails in washing of hands or do not wash long enough.<sup>2</sup> CDC studies also showed that doctors and nurses too fails in attaining the recommended 60% times hand washing between patient contact and medical procedures.

Some of the guidelines provided by CDC in 2000 are in line with those released by WHO in 2009 and recommends that visible dirt is supposed to be washed with soap or antiseptic and water since hand rubs do not clean soiled hands and rinsing is important in this case, routine hand washing require a minimum of 15 seconds with antiseptics and water, those working in health sectors are supposed to use hand cream to reduce skin damages since skin that is destroyed inhabit many pathogens and microorganisms, health care workers should use cold water to clean their hands since hot water leads to a drying effect that spoil the skin, after alcoholbased hand rubs are applied, the hands should be rubbed together for complete drying, paper towel should be used for drying of hands or single use towel, multiple use or hang roll towel should not be used and Alcohol -based hand rubs should be applied in 'my five moments of hand wash" and not on contaminated hands that have dirt that is visible. Also before wearing and after removing of sterile and non-sterile gloves.9

Several studies have shown there is reduction of healthcare acquired infections with hand hygiene compliance. In 1847, Semmelwels demonstrated that

decontaminating hands with chlorine prior to delivering a baby would reduce child death from 11.4% to 3.05%. Backman, Zoutman, and Marck reviewed 31 studies 18 of all the reviewed studies showed that intervention on hand hygiene compliance lead to reduction of hospital acquired infections. Other studies that showed reduction had a range between 0.37% in rotavirus to 57% in MRSA bacteria. 11,12

Despite the evidence that complying with hand hygiene reduces hospital acquired infections, CDC report shows that health care workers have only showed 40% compliance. Recent studies in USA have shown even more dismal performance with a record of 26% in intensive care unit and 36% in non–intensive care units. Despite the much effort that has been put on finding out the factors that leads to poor hand hygiene practice and the interventions put forward little seems to be happening. This study sought to assess if the undergraduate medical student had knowledge on hand hygiene and what were their attitude and barriers on the practice which has received minimal attention yet could be a root cause of poor hand hygiene compliance in the healthcare settings.

# **METHODS**

A cross sectional descriptive study design was conducted in Kampala International University undergraduate medical students between the months of January to August 2016. The sample size was calculated using finite population estimation method by Kothari.<sup>14</sup> The sample size was approximated to be 392 respondents and simple random sampling was used and respondents joined the study voluntarily. Self structured questionnaire written in English which were pre coded and pre tested were used to collect data. A written consent was obtained from each respondent before commencing of the interview session. The data from the questionnaire was fed into Microsoft excel to obtain the summarized data. E-views (version 9.5s) a statistical package was used to analysis data and carry out descriptive statistics i.e. means and proportions. Also framework analysis was applied with the relevant themes being coded and results presented.

# **RESULTS**

The data was obtained from 392 undergraduate medical students from Kampala International University. The number of the males who participated in the study were 232 (59.2%) while the females were 160 (40.8%). Majority of the respondents were below the age of twenty years. The respondents' socio demographic characteristics were summarized in the table below (Table 1).

# Respondents knowledge on hand hygiene practice

The overall students' knowledge ranged from 18% to 72.7% and the overall mean score was 49.4%. The male

respondents recorded the lowest score 10.3% and the highest score of 96.6% in individual assessment while the female respondents lowest was 20% and the highest was 90%. From the male respondents, the questions on alcohol-based rubs posed a bit of challenge compared to the female counterparts but they were better in general knowledge Questions on hand hygiene than their female colleague. The mean scores were 47.2% and 52.3% for males and females respectively. This clearly shows that females had a higher mean score than the males. Out of total respondents, 27.6% knew that water and soap are not supposed to be used concurrently with alcohol-based hand rubs for hand hygiene. Once alcohol-based hand rubs are used the hands should be rubbed together until completely dried was known by 38.8%. Alcohol-based hand rubs causes stinging effects in some people due to existing skin irritation was known to 14.3%. Hand washing with soap and water is not recommended by WHO, when wearing sterile or non-sterile gloves was known to 34.7%. Majority of the respondents 77.6% knew it was false that Clostridium difficule (the causative agent of antibiotic-associated diarrhea) is readily killed by alcohol-based hand hygiene products. Also 57.1% of the respondents knew that alcohol-based hand rubs should not be used on gloved hands.

Table 1: Respondents socio demographic characteristics (n=392).

Socio-demographic characteristics		Frequency	Percentage (%)	
Sex	Male	232	59.2	
Sex	Female	160	40.8	
	>20	328	83.7	
A (20 (200 mg)	20-30	32	8.2	
Age (years)	31-40	24	6.1	
	41-45	8	2.0	
	Certificate	120	30.6	
Education	Diploma	96	24.5	
	Degree	176	44.9	
Year of	1 <sup>st</sup>	50	28.6	
study for	$2^{\text{nd}}$	58	32.7	
degree	3 <sup>rd</sup>	54	30.6	
students	4 <sup>th</sup>	14	8.2	

Further analysis showed that 71.4% of the respondents knew of the "five moments" in which hand hygiene should be observed. Also most of the respondents, 85.1% knew that WHO has a recommended procedures for hand hygiene. From the respondents, 46.9% knew that colonization or infection with methicillin-resistant *Staphylococcus aureus*, respiratory syncytial virus infection, hepatitis B virus infection, and herpes simplex virus infection could be potentially transmitted from patients to clinical staff if appropriate glove use and hand hygiene are not performed. Jewelries like bracelets and watches should be removed when conducting surgical hand scrub was known to 49.0% of the respondents.

Majority of the respondents totaling to 93.9% knew that poor hand hygiene could lead to hospital acquired infections.

# Respondents attitude on hand hygiene

Majority of the respondents 93.9% strongly agreed that medical students should practice effective hand hygiene in line with their career while 2.0% strongly disagreed and 2.7% agreed on the statement. Also 1.4% were not sure of the statement with 3.0% who agreed that medical students should practice effective hand hygiene in line with their career. From the respondents, 80.3% strongly agreed that hand hygiene should be acquired personal habit with 12% who agreed on the same statement while 5.1% strongly disagreed on the statement and 1.7% were not sure of the same with 0.9% disagreeing on hand hygiene being an acquired personal habit.

From the respondents 73.5% strongly disagreed that they would better complete other tasks assigned than performing hand hygiene. 14.3% disagreed on the statement with 2.0% not sure, 4.1% agreed and 6.1% strongly agreed on statement. Hand hygiene should be included in the curriculum for medical students was strongly agreed on by 56.9% of the respondents, 20.4% agreed, 8.2% were not sure of the same, while 2.0% disagreed and 12.5% strongly disagreed on the inclusion of hand hygiene course in the medical students curriculum.

Majority 48.2% on the statement that after joining the work force I have power to change my colleague poor hand hygiene practice strongly agreed. 23.2% agreed on the same, 8.2% were not sure with strongly disagreed and disagreed recording 10.2% of the responses. Most respondents 48.2% strongly agreed that it is negligence not to adhere to hand hygiene as recommended. Also on the same statement 20.4% strongly disagreed, 3.8% disagreed, 17.3% were not sure and 10.2% agreed it is negligence not to adhere to hand hygiene practice as recommended.

It is hard to adhere to hand hygiene practice was strongly disagreed on by 38.7% which was the majority followed by 29.3% who agreed on the statement.18.3% disagreed,10.2% strongly agreed on the statement and 3.35 were not sure. Majority 47.8% strongly disagreed on the statement that I feel confident enough to remind my colleague in attachment to wash hands. 14.2% disagreed, 10.2 were not sure, 17% agreed while 10.8% strongly agreed towards it. I would feel disappointed by my supervisors on omission of hand hygiene was strongly agreed on by a majority which was 36.3%. Also, 12% agreed on the statement, 11.7% were not sure, 9.2% disagreed and 30.8% strongly disagreed on the statement. The respondents' attitude responses were summarized as show in the table (Table 2).

Table 2: Respondent attitude regarding hand hygiene practice (n=392).

		Responses				
No.	Statement	Strongly disagree (%)	Disagree (%)	Not sure (%)	Agree (%)	Strongly agree (%)
1	Medical students should practice effective hand hygiene in line with their career	8 (2.0)	11 (2.7)	5 (1.4)	12 (3.0)	356 (90.9)
2	Hand hygiene practices should be an acquired personal habit in life.	20 (5.1)	4 (0.9)	7 (1.7)	47 (12)	314 (80.3)
3	I better complete other tasks assigned than performing hand hygiene.	288 (73.5)	56 (14.3)	8 (2.0)	24 (6.1)	16 (4.1)
4	Hand hygiene should be included in the curriculum for medical students	49 (12.5)	8 (2.0)	32 (8.2)	80 (20.4)	223 (56.9)
5	After joining the work force I have power to change my colleague poor hand hygiene practice	40 (10.2)	40 (10.2)	32 (8.2)	91 (23.2)	189 (48.2)
6	It is negligence not to perform hand hygiene as recommend	80 (20.4)	15 (3.8)	68 (17.3)	40 (10.2)	189 (48.2)
7	it is hard to adhere to hand hygiene practice	152 (38.7)	72 (18.3)	13 (3.3)	115 (29.3)	40 (10.2)
8	I feel confident enough to remind my colleague in attachment to wash hands	187 (47.8)	56 (14.2)	40 (10.2)	67 (17)	42 (10.8)
9	I would feel disappointed by my supervisors on omission of hand hygiene	121 (30.8)	36 (9.2)	46 (11.7)	47 (12)	142 (36.3)

Table 3: Students responses on barriers to hand hygiene practice (n=392).

Responses	Frequency	Percentage (%)
Lack of running water in the campus and wards when they are in practicum	351	89.6
Lack of soaps, antiseptics, detergents and alcohol sanitizers	322	82.3
Lack of awareness or knowledge on hand hygiene importance	160	40.8
Forgetting	141	36
Negligence as a barrier to hand hygiene compliance	96	24.4
A lot of work in the facility	63	16
Poor personal habit	51	13
Laziness "uzembe"	24	6
Lack of government support	08	2

# Barriers to hand hygiene practice

From the respondents a yes/no question was paused on whether the frequency required for washing hands in the five moments made it difficult for them to practice. Majority 230 (58.7%) responded with a no while 162 (41.3%) responded with a yes. This is an indication that majority of the respondents didn't find the number of times one is supposed to wash hands to be a barrier to hand hygiene. Some barriers were highlighted where 89.6% mentioned unavailability of materials for carrying out hand hygiene like lack of running water in the campus and wards when they are in practicum. Lack of soaps, antiseptics, detergents and alcohol sanitizers were highlighted recording 82.3%. Also 40.8% of the respondents mentioned lack of awareness or knowledge on hand hygiene importance. From the respondents feedback 24.4% highlighted negligence as a barrier to hand hygiene compliance. Other mentioned reasons were laziness (6%), a lot of work in the facility (16%) forgetting (36%), poor personal habit (13%) and lack of government support (2%). The barriers were summarized in a table from the highest mentioned to the least (Table 3).

### DISCUSSION

The knowledge score of 49.9% and below was considered poor, 50%-69.9% was consider average while 70% and above was consider good. The study revealed that more than half of the respondents 203 (51.8%) had poor knowledge on hand hygiene with 169 (43.1%) of the respondents getting between 50%-69.9% which was an average score and 20 (5.1%) of the respondents scoring 70% and above which was considered good. Though this being the case the overall mean score of 49.4% on the respondents was a dismal performance indicating poor knowledge level on hand hygiene. Similar dismal results were reported by Mann and Wood who examined 3rd year medical students in Birmingham medical school in UK using a semi structured questionnaire with hand hygiene component where a mean score of 52.3% was

obtained on hand hygiene knowledge and 58% didn't know the correct indication to use alcohol-based hand rubs. This is on the contrary to Sreejith, Ramesh, Shashidhar, Mohammed and Pooja findings. Their study showed that 74% of the students had moderate knowledge on hand hygiene and only 9% had good knowledge which were good findings. This moderate knowledge level would be explained in that the medical students received formal training on hand hygiene.

In regard to the respondent attitude majority had positive attitude on the assessed aspects of hand hygiene. This is on the contrary to a study by Sreejith, Ramesh, Shashidhar, Mohammed and Pooja which findings showed that majority of the students had poor attitude with regard to hand hygiene. 16 From the highlighted barriers, there is a clear indication that social environmental factors influences the medical students hand hygiene practice as indicated by Bandura in his social cognitive theory which explains beyond the individual factors to other factors (environmental and social) that shapes human behaviour. 17 In reference to hand hygiene barriers, Al-Naggar and Al-Jashamy in their study majority of the participant mentioned laziness as the major and leading barrier to hand washing practice which was followed by lack of nearby water supply and a feeling that their hands were not dirty enough to get infected.<sup>18</sup> Lack of time and negligence has also been cited as a barrier to hands hygiene in nursing students.<sup>19</sup>

#### **CONCLUSION**

Hand hygiene is the simplest and basic way of preventing infections in hospital setting, homes and schools. Also it's prevent transfer of microorganisms from one person's hands to another. Though this being the case, several challenges hinders hand hygiene compliance in medical students. The study shows that 43.1% and 5.2% of the respondent had average and good knowledge respectively on hand hygiene which they could put to practical use but the barriers could be limiting the impact of knowledge in this study. This means that for effective hand hygiene the barriers need to be addressed or needs some urgent intervention if we are to realize the benefits that come with hand hygiene compliance. From the study findings, 51.8% of the respondents recorded poor knowledge level. This being the case, it is suggested that the medical schools could modify their medical students curriculum to includes hand hygiene so that as students learn other aspects they may also learn about hand hygiene that could also be examined since students attach more importance to examinable subjects. Also use of alcohol hand sanitizers in the skill laboratories where preclinical students train on models should be emphasized and taken seriously so that they can cultivate the behaviour to effectively apply it in real work setting.

#### Recommendations

The study focus is on medical students but not limited to them only but hand hygiene is a global issue of concern where emphasis on hand hygiene is needed to increase public awareness on the importance of hand hygiene practice. This can be done through campaigns that can be conducted throughout the year and other activities that could help increase awareness like seminars, short course studies, inclusion of the hand hygiene activities in orientation program of medical student and more engagements on the international hand washing day that is usually celebrated in October every year. Also other intervention models could be researched on and developed. The study was limited to a single setting but it is suggested that similar studies could be conducted in different medical school settings for comparisons and summative conclusion.

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