

## KNOWLEDGE ABOUT HAND HYGIENE AMONG MEDICAL STUDENTS AND NURSING STUDENTS IN MASAKA REGIONAL REFERRAL HOSPITAL

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### ABSTRACT

**Aim:** The pathogenic bacterium on the hands of healthcare workers (HCWs) is considered as the main route of spread of hospital-acquired infections. This study determines the knowledge regarding hand hygiene among medical and nursing students in a Regional Referral Hospital.

**Material and Methods:** 100 students participated in the study. Data was collected using the World Health Organization hand hygiene knowledge questionnaire (revised 2009). The questionnaire contains questions on the participant's demographics, formal training in hand hygiene and questions to assess hand hygiene knowledge. Descriptive statistics of the variables were computed as Mean±SD and frequencies (n, %). The relationships between the categorical variables were investigated by using Pearson Chi-Square test. Also independent-samples t-test were used to investigate the difference between groups with regard to numerical variables. In all calculations, P< 0.05 is considered as the level of statistical significance. Statistical analysis was performed using SPSS 20 (IBM SPSS statistics, Somers, NY).

**Results:** 90.8% of the students reported receiving formal training in hand hygiene. However only 2% of the students had good knowledge, 74% moderate knowledge and 24% low knowledge about hand hygiene. The study did not find any significant difference in the knowledge level between the students who had received formal training in hand hygiene and those who had not (p=0.392). Also, the mean knowledge score was not associated with gender (p=0.82), or profession (p=0.179).

**Conclusion:** It is of importance to devise effective teaching methods that will help the students retain the knowledge on hand hygiene.

**Keywords:** Hand hygiene; medical students; nursing students; health students; Uganda.

### Masaka Bölge Sevk Hastanesindeki Tıp Öğrencileri ve Hemşirelik Öğrencileri Arasındaki El Hijyeni Hakkında Bilgi

#### ÖZ

**Amaç:** Sağlık çalışanlarının elindeki patojenik bakteri, hastane kaynaklı enfeksiyonların ana yayılma yolu olarak kabul edilmektedir. Bu çalışma, bir Bölge Sevk Hastanesindeki tıp ve hemşirelik öğrencilerinin el hijyenine ilişkin bilgilerini belirlemektedir.

**Gereç ve Yöntemler:** Araştırmaya 44'ü tıp öğrencisi, 56'sı hemşirelik öğrencisi olan 100 öğrenci katılmıştır. Anket, katılımcının demografik bilgilerini, el hijyeni konusundaki resmi eğitimi ve el hijyeni bilgisini değerlendirmek için sorular içermektedir. Değişkenlerin tanımlayıcı istatistikleri Ortalama±SD ve frekanslar (n, %) olarak hesaplandı. Kategorik değişkenler arasındaki ilişkiler Pearson Ki-Kare testi kullanılarak araştırıldı. Ayrıca, sayısal değişkenler açısından gruplar arasındaki farkı araştırmak için independent-samples t-testi kullanıldı. Tüm hesaplamalarda, istatistiksel anlamlılık düzeyi olarak p<0,05 kabul edildi. İstatistiksel analiz, SPSS 20 (IBM SPSS istatistikleri, Somers, NY) kullanılarak yapıldı.

**Bulgular:** El hijyeni konusunda öğrencilerin % 2'si iyi, % 74'ü orta düzeyde ve % 24'ü düşük bilgiye sahipti. Araştırmada el hijyeni konusunda örgün eğitim almış öğrenciler ile almayanlar arasında bilgi düzeyinde anlamlı bir fark bulunmamıştır (p=0,392). Ayrıca ortalama bilgi puanı cinsiyet (p=0,82) veya meslek (p=0,179) ile ilişkili değildi.

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**Sonuç:** Öğrencilerin el hijyeni konusundaki bilgilerini korumalarına yardımcı olacak etkili öğretim yöntemlerinin geliştirilmesi önemlidir.

**Anahtar Kelimeler:** El hijyeni; tıp öğrencisi; hemşirelik öğrencileri; sağlık öğrencileri; Uganda.

## INTRODUCTION

Hand hygiene is universally acknowledged to be the single most important measure to prevent cross-transmission of microorganism from one patient to another and preventing Health Care Associated Infections (1). Alcohol-based hand disinfection represents the key infection control measure to prevent healthcare-associated infections and nosocomial transmission of pathogens. Epidemiologic studies have also continued to demonstrate the favourable cost-benefit ratio and positive effects of simple hand washing for preventing transmission of pathogens in health care facilities (2).

Although adherence to hand hygiene practices is considered as an integral part of quality health care and that it is a Joint Commission requirement that Centres for Disease Control and Prevention hand hygiene guidelines be implemented in hospitals, compliance among health care workers remains low (3-6).

Compliance to hand hygiene varies among professional categories, hospital wards, working conditions and according to definitions used in different studies. For example, in an outpatient clinic hand hygiene among physicians could be as low as 6.48 %, while in a paediatric oncology ward hand hygiene compliance rates of 53.4%, 42.5% and 32.6% are observed for nurses, doctors and other HCWs respectively (7,8).

Studies have found the lack of compliance to handwashing to be due to allergies to hand washing products, insufficient knowledge among staff about risks and procedures, lack of appropriate equipment, the time required and casual attitudes among HCWs towards bio-safety and low staff to patient ratio (9,10). To improve hand hygiene practices, there is need for continuing medical education programs for all level of health care providers and easy access to hand hygiene measures (11,12).

Medical and nursing students represent a big percentage of prospective HCWs with the potential to carry bacterium from one patient to another as they continuously move from one department to another during study. It is of importance to regularly improve hand hygiene compliance among these students. This study determines the knowledge regarding hand hygiene in this group and to assess the potential for optimizing education.

## MATERIAL AND METHODS

### Study Aim and Design

The current descriptive study is aimed at determining the hand hygiene knowledge among medical and nursing students. The study was carried out on 11th November 2021.

### Research Population and Sampling Method

All final year students in a teaching hospital were invited to participate in the study. At the time of study, there were 60 medical students and 70 nursing students. 44 (73%) medical students and 56 (80%) nursing students

participated in the study. The questionnaire was filled by all the students who consented to participate in the study.

### Data Collection Tools

This study involved a questionnaire with 10 questions. The questions are based on the hand hygiene Knowledge Questionnaire for Health-Care Workers from the World Health Organization (WHO; revised version of August 2009 (13). It consists of 9 multiple choice questions with some having one correct choice and others a number of correct choices. To answer correctly, a respondent should mark all the correct answers. These 9 questions are used to evaluate the students' knowledge (knowledge score). Question 10 asks the participants for an estimate of hand hygiene compliance (in percentage) in clinical practice. Students are also asked to provide some social demographic characteristics like age and gender.

### Ethical Aspects

The study was approved by the ethics committee of Islamic University in Uganda, written consent was signed by all participants in the study (RCC/FHS/20/005). Written approval was obtained from the hospital administration at the hospital where study is carried out.

### Statistical Analysis

Descriptive statistics of the variables were computed as Mean±SD and frequencies (n, %). The relationships between the categorical variables were investigated by using Pearson Chi-Square test. Also independent-samples t-test were used to investigate the difference between groups with regard to numerical variables. In all calculations, P< 0.05 is considered as the level of statistical significance. Statistical analysis was performed using SPSS 20 (IBM SPSS statistics, Somers, NY) (14).

## RESULTS

### Demographics

The study consisted of 100 students. 48% women with average age 28 years and 52% male with average age 29.7 years. 44 were medical students and 56 nursing students. Demographic information is summarized in Table 1. 86% of the students reported that they used alcohol based hand rub regularly and 90.8% had received formal training in hand hygiene.

**Table 1.** Descriptive statistics of variables

Variables	Categories	n (%) or Mean±SD*
Gender	Female	48(48)
	Male	52(52)
Job	Medical student	44 (44)
	Nurse student	56 (56)
Hand Hygiene training	Yes	89 (90.8)
	No	9 (9.2)
Age	female	28.42±1.068
	male	29.75±1.135

\*: SD: Standard Deviation

**Knowledge on Hand hygiene**

The hand hygiene knowledge of the participants is summarised in Table 2. There was significant difference in the average knowledge score between the nurses and doctors on answering the question ‘What is the most

frequent source of germs responsible for HCAI?’ (P = 0.018) and ‘What is the recommended duration of hygienic hand disinfection in Uganda’ (P=0.008).

**Table 2.** Responses to the hand hygiene knowledge questionnaire for health-care workers from the world health organization. data presented in ‘n(%)’

Questions*	Responses	MEDICAL STUDENT n=44	NURSE STUDENT n=56	TOTAL N=100	P value
Which of the following is the main route of the transmission of potentially harmful germs between the patients?	<ul style="list-style-type: none"> <li>• <b>Healthcare workers hands when not clean</b></li> <li>• Air circulating in hospital</li> <li>• Patients exposure to colonized surfaces</li> <li>• Sharing non-invasive objects (e.g. stethoscope)</li> </ul>	10(23.3)	11(19.6)	42.9	0.707
What is the most frequent source of germs responsible for HCAI	<ul style="list-style-type: none"> <li>• Hospital water system</li> <li>• Hospital air</li> <li>• <b>Germs present on or within patient</b></li> <li>• Hospital environment</li> </ul>	11(25.6)	27(48.2)	73.8	<b>0.018</b>
Which of the following hand hygiene actions prevent transmission of germs to a patient?	<ul style="list-style-type: none"> <li>• <b>Before a healthcare worker touches a patient</b></li> <li>• <b>After a healthcare worker had contact with a body fluid</b></li> <li>• <b>After a healthcare worker had contact with the patient surrounding</b></li> <li>• <b>Before a healthcare worker performs an aseptic procedure</b></li> </ul>	21(47.7)	19(35.8)	40	0.209
Which of the following hand hygiene actions prevents transmission of germs to a healthcare worker?	<ul style="list-style-type: none"> <li>• <b>After touching a patient</b></li> <li>• <b>After a healthcare worker had contact with a body fluid</b></li> <li>• Before a healthcare worker performs an aseptic procedure</li> <li>• <b>After a healthcare worker had contact with the patient surrounding</b></li> </ul>	2(4.9)	7(12.7)	9	0.192
Which of the following statements on alcohol-based hand rub and hand washing with soap and water are true?	Hand rubbing is more rapid for hand cleansing than handwashing (true)	34(81)	42(77.8)	76	0.792
	Hygienic hand disinfection dries the skin out more than hand washing with soap (false)	20(50)	27(49.1)	47	0.784
	<b>Hand rubbing is more effective against germs than handwashing (false)</b>	14(35)	10(18.5)	24	0.105
	<b>Hand washing and hand rubbing are recommended to be performed in sequence (false)</b>	29(76.3)	30(68.2)	59	0.213
What is the recommended duration of hygienic hand disinfection (in Uganda)? (one answer only)	<ul style="list-style-type: none"> <li>• <b>20 seconds</b></li> <li>• 3 seconds</li> <li>• 1 minute</li> <li>• 10 seconds</li> </ul>	8(20.5)	23(46.9)	31	<b>0.008</b>
Which type of hand hygiene method is required in these situations: rubbing (R), washing (W) or none(N)?	Before palpitation of abdomen <b>R</b>	28(66.7)	44(78.6)	72	0.099
	Before giving an injection <b>R</b>	23(54.8)	28(50.9)	51	0.821
	After emptying a bed pan <b>W</b>	10(25)	15(25.5)	25	0.582
	After removing examination gloves <b>R/W</b>	7(15.9)	12(21.8)	19	0.257
	After making a patient’s bed <b>R</b>	14(32.6)	13(24.1)	27	0.336
	After visible exposure to blood <b>W</b>	23(53.5)	27(49.1)	50	0.687

**Table 2.** Responses to the hand hygiene knowledge questionnaire for health-care workers from the world health organization. data presented in 'n(%)' (continued)

What should be avoided as associated with increased likelihood of colonization of hands with harmful germs?	<b>Wearing rings on the hands (yes)</b>	32(74.4)	44(78.6)	76	0.497
	<b>Damaged skin (yes)</b>	37(86)	39(70.9)	76	0.093
	<b>Wearing artificial fingernails (yes)</b>	36(83.7)	43(76.8)	79	0.540
	Regular use of skin care lotion (no)	28(66.7)	39(70.9)	67	0.526
How high do you estimate overall compliance to hygienic hand disinfection in healthcare settings in percent?(Results as mean percentage)		74.83	78.49	76.87	0.548

\*Questions 1 to 9: The total number of participants with a correct answer is displayed in the columns; the percentages are given in the brackets. The answer options rated as correct are indicated in bold.

**Table 3.** Students' knowledge level

Hand hygiene Knowledge	Medical students n(%)	Nurse student n(%)	Total n(%)	P value
Good	0(0)	2(3.6)	2(2)	0.916
Moderate	33(75)	41(73.2)	74(74)	
Low	11(25)	13(23.2)	24(24)	

The Nurses seemed to have more knowledge on these questions than the doctors. The question that had most incorrect answers is 'Which of the following hand hygiene actions prevents transmission of germs to a healthcare worker?' Only 9% of the students got this question correct. This was followed by 'What is the recommended duration of hygienic hand disinfection (in Uganda)?' with 31% of participants getting a correct answer. 45.5% of the medical students and 37.5% of nurses said it was 10 seconds.

#### Comparison of Participants Knowledge score.

Overall percentage 2% have good knowledge, 74% moderate knowledge and 24% low knowledge. Table 4 shows the comparison of knowledge according to age, gender, profession and whether received training on hand hygiene. Female performed better than the male with  $56 \pm 10.3$  compared to  $55.7 \pm 10$  of the male. Also those who did not receive formal training in hand hygiene performed better than those who received formal training in hand hygiene. Nurses performed better than Medical students;  $56.1 \pm 11.2$  compared to  $55.6 \pm 8.7$ . The knowledge score did not differ significantly among all the comparisons.

**Table 4.** Comparison of knowledge scores.

		Knowledge score Mean $\pm$ SD	P value
Gender	Female	$56 \pm 10.3$	0.820
	Male	$55.7 \pm 10.0$	
HH training	Yes	$55.7 \pm 9.6$	0.392
	No	$59 \pm 16.5$	
Profession	Medical student	$55.6 \pm 8.7$	0.179
	Nurse student	$56.1 \pm 11.2$	

#### Opinion of participants

Question 10 assessed the opinion of participants on what is the average percentage of hospitalized patients who will develop a health care associated infection (between 0 and 100). The average was found to be  $40.21 \pm 24.1$ .

#### DISCUSSION

In this study, the students had moderate level of knowledge. Other studies also had similar results. The average knowledge level in our study is higher compared to another study in Uganda but lower than other studies in developed countries (15). Although 86% of students reported receiving hand hygiene training their average knowledge level was lower than those who had not received training. This finding is in line with a study in India (16) where those who received formal training had lower average score than those who hadn't and also in line with a study by Calabro et al (17).

A study in Turkey also found that despite regular HH trainings, healthcare workers could not differentiate when HH was not required which suggested failure to understand HH rationale (12). This study may necessitate another study of attitude and practices towards hand hygiene to better explain the result. It also necessitates that it is needed to evaluate our hand hygiene training course and reduce the time between training programs.

The average knowledge score of the nurses were higher than the medical students although not significantly different. It seems hand hygiene is considered more central in nursing curriculum than medical curriculum. Our results show no difference in knowledge score between male and female. This is similar to some studies (16) but different from (18).

An in-depth analysis reveals that the students answer to Question 1, 'Which of the following is the main route of the transmission of potentially harmful germs between the patients?' is poorly answered. Only 21% got a correct answer which is; Healthcare workers hands when not clean, while 35% believed it is the air circulating in hospital and 36% believed patients exposure to colonised surfaces.

Another area that needs to be emphasised during training is what kind of hand hygiene method is to be done in different situations for example; there is no student who got all correct answers to question seven. Other studies however showed that most of the health care workers were aware of the conditions before or after when HH activity

has to be performed (19). The separate role of hand washing compared to hygienic hand disinfection needs to be clear.

Our study is limited to final year medical students and nurses in one institution in Uganda. The results may thus not be generalised to other students.

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