Assessment of knowledge of hand washing among health care providers in Juba Teaching Hospital, South Sudan

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Background: Nosocomial infections increase mortality and morbidity although adherence to simple hand washing procedures is suggested to reduce these.

Purpose: To assess knowledge of hand washing among health care providers in Juba Teaching Hospital (JTH) in South Sudan and establish associations with demographic, professional and clinical factors.

Methods: A total of 204 participants (126 men and 78 women) enrolled in a cross-sectional survey. Demographic, professional and clinical factors and knowledge scores (correct answers from 25 questions) were obtained and compared using t-test, ANOVA,chi-square test and correlation coefficient (r) as appropriate.

Results: Participants were aged 29.8 (SD, 5.4) years. The majority (62.7%) had no hand washing training within the last three years. Inconsistent answers regarding knowledge were obtained witha mean knowledge score 15.02 (SD, 2.73). Age was associated with hand hygiene training as those untrained (mean 30.6, SD 5.5 years) were significantly older than those trained (28.5, SD 4.9 years); $t = 2.60$; $p < 0.01$. Age was also associated with knowledge score ($r = -0.14$, $p = 0.048$). However, there was no significant association between hand hygiene training and knowledge score (trained, 15.39, SD 3.07; untrained, 14.80, SD 2.48); $t = 1.41$; $p = 0.15$.

Conclusion: Insufficient and inconsistent knowledge of hand hygiene was evident and younger workers were more likely to have attended recent hand hygiene training and had better knowledge of hygienic patient care than older health care workers in JTH.

Introduction

Nosocomial infection is a global public health problem with an estimated 1.5 million suffering consequences at any given time [1, 2] noted that at least 25% of all hospital infections in the developing world are nosocomially acquired. The hands of health care providers are major agents of infection transmission in hospitals leading to the campaign to improve hand hygiene, Clean Care is Safer Care [3]. Two types of hand colonizing flora are predominant in hand skins. These are the Resident flora that are not easily removed by the simple friction associated hand washing and the Transient micro-organisms which are not usually hand colonizers but they are most likely associated with infection [4]. Various types of such microbes are found on patients, instruments and other items and are important in infection transmission [5]. Improper hand washing practices serve as means of infection transmission in hospital wards [6,7,8] and proper hand washing is the single most important means of reducing cross-infections in hospitals [3, 9] but adherence remains a major challenge [10,11].

Methods

A cross-sectional survey was conducted among healthcare workers at JHT using a validated self-administered questionnaire [10]. Data were collected on demographic factors, hand washing training provided within the last three years and knowledge regarding hand washing. Correct answers to the 25 questions regarding hand washing knowledge were summed and percentages calculated. Frequencies for categorical data (sex, education level, profession, department and having received hand washing training within the last three years or not) and means and SDs for age and knowledge scores for participants were determined. The Chi-square test was used to establish which factors were associated with having had hand washing training within the last three years and t-test and

Table 1. Professions of participants

Profession	Frequency	Percent
Nurses	26	12.7
Midwives	16	7.8
Medical Doctors	42	20.6
Nurse Students	7	3.4
Medical Students	89	43.6
Other	24	11.8
Total	**204**	**100.0**

ANOVA were used for comparing knowledge scores between groups. Correlation coefficient (r) was applied for association between age and knowledge. Significance was set at $p < 0.05$.

Ethical clearance was obtained from the Ethical committee at the Ministry of Health of South Sudan and the University of Liverpool Research Ethics Committee.

Results

Of the 204 participants, 126 (61.8%) were men and 78 (38.2%) were women and they were aged between 18 and 50 (mean, 29.8; SD, 5.4) years. Educational background was: primary and secondary (36, 17.7%), college (116, 56.9%), graduate and post-graduate (52, 25.5%). Table 1 below shows professions of participants. Participants were from departments as follows: internal medicine (n = 27), surgery (20), mixed medicine/surgery (43), obstetrics (32), pediatrics (22) and 'other' (60).

The majority (128, 62.7%) did not receive formal training in hand washing within the last three years.

Table 2 shows a summary of the participants' correct responses to key questions pertaining to hand hygiene knowledge.

The level of knowledge shown by the proportions of participants answering correctly was clearly inconsistent and inadequate in a number of aspects of hand hygiene. For the individual questions there was a wide range of 11.3% to 97.0% of participants providing the correct answer. This variability was further indicated by a mean knowledge score for participants of 15.02 (SD, 2.73) correct answers to the 25 questions asked, or 60.1% (SD, 10.9%).

Association of hand hygiene training received within the past three years with professional and demographic factors.

The mean (SD) age of those who did not have hand hygiene training within the last 3 years (n = 128) was 30.6 (SD 5.5) years which was significantly older than those who did (n = 76) who were 28.5 (SD 4.9) years ($t = 2.6$; $p < 0.01$). There was no significant association with having received hand hygiene training of sex ($\chi 2$, 0.03; degrees of freedom (df), 1; $p = 0.87$), education ($\chi 2$, 4.23; df, 2; $p = 0.12$), profession ($\chi 2$, 3.00; df, 3; $p = 0.40$) or department ($\chi 2$, 1.90; df, 5; $p = 0.86$).

Association of knowledge score with professional and demographic factors.

A significant negative correlation ($r = -0.14$, $p = 0.048$) was found between age and knowledge scores implying that younger participants had greater hand hygiene knowledge. No significant difference ($t = 1.90$; $p = 0.058$) was found between knowledge scores of males (n = 126; mean = 15.3; SD = 2.76) and females (n = 78; mean = 14.56; SD = 2.62), apparently because of the wide variability observed despite the apparent difference in score.

Importantly, there was no significant difference observed ($t = 1.41$; $p = 0.15$) in the level of knowledge between those who had hand hygiene training (n = 76; mean = 15.39; SD = 3.07) and those who had not (n = 128; mean = 14.80; SD = 2.48). Again, even though those who had training were seemingly more knowledgeable, there was considerable variability that evidently led to the lack of significant difference between the groups.

No significant difference was determined using one-way ANOVA in knowledge between the various educational levels ($F(2,201) = 0.485$, $p = 0.61$), professions ($F(3, 200) = 0.51$, $p = 0.67$) or departments ($F(5, 198) = 0.69$, $p = 0.63$).

Discussion

Almost two-thirds of participants had not attended hand washing training within the past 3 years which may have been reflected in the variability in knowledge. This is consistent with other studies [12,13,14], although Joshi et al. [10] refute the association of knowledge or training with regular hand washing. Salama et al. [15] found no association between training and practice of hand hygiene, in contrast to other studies [12, 16, 17]. These inconsistencies may be because such studies considered the impact of training and knowledge on practice, with the intention known to participants, while this study only tried to determine the level of knowledge.

No associations were observed between level of hand hygiene knowledge and educational levels, departments of work, sex, etc. In contrast, Sethi et al. [18] found an increased knowledge level among doctors in comparison to nurses suggesting that the type and duration of education may be associated. Although younger age was associated with both hand hygiene training and greater knowledge, there was no association between training and hand hygiene knowledge which may imply that training is not adequate or is too infrequent, a finding consistent with that of Salama et al. [15].

Conclusion

The variability in these findings clearly showed gaps in knowledge of hand hygiene among health care providers at JTH. Although younger age was associated with having recent training and greater knowledge of hand hygiene, there was no association between training and hand hygiene knowledge implying that provision of hand washing training in hospitals may need to be reconsidered.

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Table 2. Frequency and percentages of healthcare participants correctly identifying if each statement was true

Correct statement (summary taken from multiple choice questions; Joshi et al., 2013)	**Number (%)**
1 That the main route of cross-transmission of potentially harmful germs between patients in a health-care facility was health-care workers' hands when not clean	105 (51.5%)
2 That the most frequent source of germs responsible for health care associated infections was germs already present on or within the patient	44 (21.6%)
3 That hand hygiene actions are necessary to prevent transmission of germs to the patient:	
Before touching a patient	153 (75%)
Immediately after a risk of body fluid exposure	107 (52.5%)
After exposure to the immediate surroundings of a patient	89 (43.6%)
Immediately before a clean/aseptic procedure	135 (66.2%)
4 That hand hygiene actions prevent transmission of germs to the health-care worker:	
After touching a patient	122 (59.8%)
Immediately after a risk of body fluid exposure	130 (63.7%)
Not immediately before a clean/aseptic procedure	91 (44.6%)
After exposure to the immediate surroundings of a patient	112 (54.9%)
5 a Thathand rubbing is more rapid for hand cleansing than hand washing	151 (74.0%)
5 b That hand rubbing does not cause skin dryness more than hand washing	46 (22.5%)
5 c That hand rubbing is more effective against germs than hand washing	104 (51.0%)
5 d Hand washing and hand rubbing are not recommended to be performed in sequence	23 (11.3%)
6 That minimal time for alcohol-based hand rub to kill most germs on hands is 20 seconds	47 (23.0%)
7 a That hand washing is required before palpation of the abdomen	84 (41.2%)
7 b That hand washing is required before giving an injection	103 (50.5%)
7 c That hand washing is required after emptying a bedpan	165 (80.9%)
7 d That hand washing is required after removing examination gloves	169 (82.8%)
7 e That hand washing is required after making a patient's bed	153 (75.0%)
7 f That hand washing is required after visible exposure to blood	157 (77.0%)
8 That the following be avoided as being associated with likelihood of colonization:	
a Jewellery	159 (78.3%)
b Damaged skin	197 (97.0%)
c Artificial fingernails	189 (93.1%)
d Hand cream	118 (58.1%)

Conflict of interest

There are no conflicts of interest.

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