



# Compliance of Nurses with Hand Hygiene Guidelines in Tripoli University Hospital, 2019

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## Abstract

**Background** Health care-associated infections (HAIs) result in high morbidity, decreased personal satisfaction, and mortality. Implementing infection prevention and control strategies such as hand hygiene (HH) promotion is critical to reduce the risk of the HAI and protect patients.

**Aims** This study aimed to determine the compliance rate of HH among nurses in Tripoli University Hospital (TUH, previously known as Tripoli Medical Center).

**Method** A cross-sectional study was conducted in different departments at TUH, starting from May 1st to October 31st, 2019. An observational checklist based on the “five moments for hand hygiene” of World Health Organization (WHO) was used. There were 271 nurses who interacted with 1,213 patients, a total of 3,452 HH episodes, and 6,065 cases of HH that were collected in this study, and data were statistically analyzed.

**Results** The overall HH compliance rate was 56.9%. Most of the nurses (86%) preferred to use HH after contact with individual patients and 71.6% after contact with patients’ environment. There was, however, low percentage of HH prior to patient contact (35.1%). The compliance rate was higher among nurses of the age group of less than 20 years (60.8%), non-Libyan (60.7%), and those who received formal training (60.5%).

**Conclusion** In general, the HH compliance rate was low among nurses working in TUH. Education is an important factor that impacts the practice of HH pre- and postpatient contact. Wider studies that include assessment of pre- and posteducation courses should be conducted in the future.

## Keywords

- ▶ hand hygiene
- ▶ compliance
- ▶ nurses
- ▶ Tripoli University Hospital

## Introduction

Health care-associated infections (HAIs) represent a significant risk to patient safety, affecting hundreds of millions of individuals worldwide.<sup>1</sup> HAIs increase morbidity and mortality, duration of hospital stay, resistance of microorganisms to antimicrobials, emerging infectious diseases, and health care

costs.<sup>1–3</sup> The frequency of HAIs is higher in low- and middle-income countries compared with that in high-income countries.<sup>4</sup> Studies conducted in low-income settings showed that the hospital-wide prevalence of HAIs is approximately 15.5%, which is much higher than reports from Europe and United States.<sup>5</sup> Hand hygiene (HH) among health care workers (HCWs) is considered one of the most important strategies

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to reduce the frequency of HAIs,<sup>1,2</sup> and sustained improvement of HH compliance has confirmed to reduce HAIs and is cost effective.<sup>6</sup> World Health Organization (WHO)'s "my five moments for hand hygiene" approach defines the key moments when health care workers should perform HH, which include before touching a patient, before clean/aseptic procedures, after body fluid exposure/risk, after touching a patient, and after touching patient surroundings.<sup>7</sup>

Monitoring HH compliance is considered the gold standard and an integral part of multidisciplinary HH improvement programs.<sup>8,9</sup> Therefore, studying HH behavior among HCWs in Libya plays an important role in controlling HAIs and planning HH campaign in the future, especially in the absence of sufficient data in this area. Hence, this study is performed to measure the compliance rate and describe HH compliance among nurses in Tripoli University Hospital (TUH, previously known as Tripoli Medical Center).

## Methods

This cross-sectional study was conducted in different departments of TUH, including medicine, surgery, pediatrics, and obstetrics and gynecology department, as well as intensive care units, outpatient clinic, and emergency room. Data were collected from 1st May to the 31st October 2019. All observations took place from Saturdays to Thursdays during the morning shift (09:00–14:00 hours). The time of observation and the nurse were randomly selected by the observer on the day of the observation. An observational WHO checklist that investigates the "five moments for hand hygiene" was used. It contained two sections; the first part included the socio-demographic characteristics of the nurses such as sex, age, nationality, practical experience, and previous HH formal training. The second part of the checklist consisted of using an observational checklist of an "HH opportunity" that included practicing HH before touching a patient, before the aseptic procedure, after body fluid exposure risk, after touching objects in the patient's environment, and after touching a patient. Direct HH observations were performed by intern doctors who were trained in HH observation techniques. The number of HH episodes (HHEs) (hand rubs performed) and HH opportunities were recorded.

During the entire observation period, the observer stayed in the wardroom or attended the major round and counted all HHEs and HH opportunities in accordance with the WHO's "five moments for hand hygiene." Applying and changing gloves without the use of alcohol hand rub was not counted as a proper HHE. The HH technique, such as the amount of time spent using an alcohol hand rub and the extent to which all surfaces of the hands are covered, was not evaluated. Observations were being done in one to nine bedrooms or patients with each nurse. When starting the observation, the observer introduced him/herself to the attending nurses who were responsible for patient care, took consent, and obtained data. Data were analyzed by using IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk, NY, United States). Descriptive statistics such as frequency, percentage, and mean  $\pm$  standard deviation were used to present all results. The HH compliance rate was calculated as the number of

observed HHEs according to the WHO's "five moments for hand hygiene" divided by the total number of HH opportunities observed, expressed as a percentage.<sup>9</sup>

The protocol of this study was approved by the Scientific Council of Community Medicine of the Libyan Board of Medical Specialties. Permission was obtained from TUH Administration. Nurse consent was taken before observation. Data were anonymous, kept strictly confidential, and were accessible only to the research team.

## Results

A total of 271 nurses who interacted with 1,213 patients at different departments in TUH during 6 months' period, 2019, were enrolled in this study. The mean age for the nurses 34.7 and SD  $\pm$  7.5 years. The maximum age of the nurses was 55 years, and the minimum age was 17 years. Regarding gender, 58 (21.4%) nurses were males, 135 (49.8%) of them were in the age group of 31 to 40 years, and the majority 254 (93.7%) were Libyan. Results revealed that 117 (43.2%) of the nurses had more than 10 years' practice experience, and 115 (42.4%) of participant nurses received formal training in HH in the past 3 years (**► Table 1**).

In this study, data of total 3,452 HHEs and 6,065 HH opportunities were collected. As a result, the overall HH compliance rate was 56.9% from the observation of 271 nurses who interacted with 1,213 patients (**► Table 2**). HH before touching a patient and before aseptic procedure and

**Table 1** Socio-demographic characteristics of Tripoli University Hospital nurses who participated in this study (from 1st May to 31st October 2019)

Character	No.	%
Gender		
Male	58	21.4
Female	213	78.6
Age		
< 20 y	5	1.8
20–30 y	77	28.4
31–40 y	135	49.8
> 40 y	54	20
Nationality		
Libyan	254	93.7
Non-Libyan	17	6.3
Working experience		
< 3 y	49	18.1
3–10 y	105	38.7
> 10 y	117	43.2
Training in HH		
Yes	115	42.4
No	156	57.6

Abbreviation: HH, hand hygiene.

**Table 2** Compliance rate with hand hygiene among Tripoli University Hospital nurses who participated in this study (from 1st May to 31st October 2019)

WHO moments for hand hygiene	No. of indications (hand hygiene opportunities)	HHEs	Compliance
Before touching a patient	1,213	403	33.2%
After touching a patient	1,213	1,036	85.4%
After a patient's body fluid risk	1,213	695	57.2%
After touching a patient's surroundings	1,213	872	71.8%
Before aseptic procedure	1,213	446	36.7%
Overall compliance rate	6,065	3,452	56.9%

Abbreviation: HHEs, hand hygiene episodes; WHO, World Health Organization.

**Table 3** Hand hygiene performance among Tripoli University Hospital nurses who participated in this study (from 1st May to 31st October 2019)

WHO' five moments	Number of nurses who perform hand hygiene	Number of nurses who don't perform hand hygiene	Total
First moment of HH	95 (35.1%)	176 (64.9%)	271 (100%)
Second moment of HH	233 (86%)	38 (14%)	271 (100%)
Third moment of HH	157 (57.9%)	114 (42.1%)	271 (100%)
Fourth moment of HH	194 (71.6%)	77 (28.4%)	271 (100%)
Fifth moment of HH	104 (38.4%)	167 (61.6%)	271 (100%)

Abbreviations: HH, hand hygiene; WHO, World Health Organization.

using gloves was performed only by 35.1 and 38.4% of nurses, respectively (►Table 3).

In the current study, less than 20-year-old nurses had 60.8% compliance rate, while the compliance rate of older nurses who were more than 40 years old was 54.1%; non-Libyan nurses showed higher compliance to HH than Libyan nurses (60.7 vs. 56.6%), and the compliance rate of nurses who received formal training in HH was 60.5% (►Table 4).

## Discussion

HAIs represent a major cause of preventable morbidity and mortality in low- and middle-income countries where infection rates are relatively higher due to poor infection control practices, inappropriate use of limited resources, understaffing of health care facilities, and overcrowding of hospitals.<sup>10</sup> In Libya, there are limited data about HAIs and compliance with HH; the previous study in Tripoli central hospital reported that the highest rate of methicillin-resistant *Staphylococcus aureus* is among nurses.<sup>11</sup>

The main aim of the present study was to measure and describe the compliance with HH among nurses in TUH that is the largest tertiary hospital in Tripoli; the study was performed during the morning shift; results showed that 21% of participants were male nurses, and most of them were Libyan. That result could be because male nurses at TUH are usually working during the night shift. In addition, due to the current situation in Libya, many foreign nurses have returned to their homes; hence, most of the participants were Libyans.

In the current study, the HH compliance rate among nurses was 56.9%, which was in agreement with a previous

study in Kuwait (50%),<sup>12</sup> as well as with Hagel et al study (52%).<sup>9</sup> In addition, it is higher than results reported from Tunisia, where the HH compliance rate among nurses was 34.1%,<sup>13</sup> and from Nigeria (36%).<sup>14</sup> The compliance rate with

**Table 4** Hand hygiene compliance according to socio-demographic characteristics of Tripoli University Hospital nurses who participated in this study (from 1st May to 31st October 2019)

Character	No. of indications (hand hygiene opportunities)	HHEs	Compliance rate
Age:			
< 20 y	115	70	60.8%
20–30 years	1,700	982	57.7%
31–40 y	2,895	1,667	57.5%
> 40 y	1,355	733	54.1%
Gender:			
Male	1,330	756	56.8%
Female	4,735	2,696	56.9%
Nationality:			
Libyan	5,670	3,212	56.6%
Non-Libyan	395	240	60.7%
Receiving formal training:			
Yes	2,580	1,563	60.5%
No	3,485	1,889	54.2%

HH among nurses in the present study was lower than the results demonstrated from Brazil (66.6%),<sup>15</sup> Saudi Arabia (69.4%),<sup>16</sup> and Finland in 2018 (88.5%).<sup>17</sup>

The results revealed that most of the nurses preferred to perform HH after contact with the patients (86%) or the patients' environment (71.6%); this is in accordance with the study conducted in Egypt (2017),<sup>18</sup> where higher HH compliance rates were observed after patient contact compared with before patient contact. Karaaslan et al<sup>19</sup> also reported that most of the HCWs prefer to use HH after contact with patients or the patients' environment, in contrast to a very low rate preferring HH prior to patient contact. These findings lead to the assumption that HCWs prefer to protect themselves rather than patients.

The current study showed that the nurses who received training in HH their compliance rate was 60.5% that was better than those who did not receive training in HH. Regular training in HH was found to be significantly associated with HH compliance of HCWs; it increased the awareness and knowledge and changed their attitudes, leading to improvement in compliance. Results from Engdaw et al study revealed that those who were trained had 8.07 times more compliance than those who were not trained.<sup>20</sup>

An observational method to assess compliance with HH had been used in this research, which is considered by WHO the "gold standard." Nevertheless, this method can represent a limitation because of the "observer effect" (Hawthorne effect).<sup>9</sup> However, in the present study, overall HH compliance remained low, although nurses knew they were being observed. Also, this study did not evaluate the HH technique and did not include nurses within the night shift.

## Conclusions

In general, the HH compliance rate was low among nurses working in TUH. Education is an important factor that impacts the practice of HH pre- and postpatient contact. Wider studies that include the assessment of pre- and posteducation courses should be conducted in the future.

### Funding and Sponsorship

None.

### Conflict of Interest

None declared.

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