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Hand hygiene compliance and associated factors among healthcare workers in selected tertiary-care hospitals in Bangladesh

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Abstract

Background: Hand hygiene (HH) is a fundamental element of patient safety. Adherence to HH among healthcare workers (HCWs) varies greatly depending on a range of factors, including risk perceptions, institutional culture, auditing mechanisms, and availability of HH supplies.

Aims: This study aimed to evaluate HH compliance and associated factors among HCWs in selected tertiary-care hospitals in Bangladesh.

Methods: During September 2020 to May 2021, we conducted non-participatory observations at 10 tertiary-care hospitals using the WHO's '5-moments for hand hygiene tool' to record HH

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Authors' contributions

M.G.D.H., M.M.U.A., S.A.S. and S.A.H.M.A., A.R.S. defined the objectives of the evaluation and led the evaluation design and development. M.G.D.H., M. M.U.A., S.A.S. and T.M.M. facilitated the data collection process. S.A.S. T.M.M., M.G.D.H. and M.M.U.A., contributed to data entry, management, analysis, interpretation of data, and drafted the article. A.R., S.C.K.D, M.G.D.H., P.M., L.P.O., M.A., S.A.H.M.A., A.R.S. and M.Z.H. critically reviewed and revised the article for content and language with the help and input of all listed co-authors. All authors approved the final version of the manuscript.

Conflict of interest statement

The authors have no competing interests to disclose.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jhin.2023.07.012.

compliance among physicians, nurses and cleaning staff. We also performed semi-structured interviews to determine the key barriers to complying with HH.

Results: We observed 14,668 hand hygiene opportunities. The overall HH compliance was 25.3%, the highest among nurses (28.5%), and the lowest among cleaning staff (9.9%). HCWs in public hospitals had significantly higher odds of complying with HH practices than those in private hospitals (adjusted odds ratio: 1.73, 95% CI: 1.55–1.93). The odds of performing HH after touching a patient were 3.36 times higher compared with before touching a patient (95% CI: 2.90–3.90). The reported key barriers to performing HH were insufficient supplies (57.9%), skin reactions (26.3%), workload (26.3%) and lack of facilities (22.7%). Overall, observed HH supplies were available in 81.7% of wards for physicians and 95.1% of wards for nurses, however, no designated HH facilities were found for the cleaning staff.

Conclusions: HH compliance among HCWs fell significantly short of the standard for safe patient care. Inadequate HH supplies demonstrate a lack of prioritizing, promoting and investing in infection prevention and control.

Keywords

Hand hygiene; Healthcare-associated infection; Healthcare workers; Resource-constrained settings; Bangladesh

Introduction

Healthcare-associated infections (HAIs) are a major global health challenge worldwide [1]. In low- and middle-income countries (LMICs) more than 25% of hospitalized patients may develop an HAI, which is two to 20 times higher than in developed countries [2,3]. HAIs adversely impact patient care and cause prolonged hospital stays, long-term disability, substantial morbidity and mortality, increased risk of antimicrobial resistance, and substantial economic loss [4,5]. The true burden of HAIs in resource-constrained settings, including Bangladesh, is unknown [6]; rates have been documented exceeding 15.5 cases per 100 patients [1]. This escalating global challenge has highlighted the importance of infection prevention and control (IPC) measures to ensure patient safety.

Hand hygiene (HH) with alcohol-based hand sanitizer or soap and water is a core element of patient safety and the single most important procedure for the prevention and control of HAIs [7]. During daily practice, healthcare workers' (HCWs) hands come into contact with a myriad of surfaces and substances including patients' intact or non-intact skin, mucous membranes, food, waste and body fluids, as well as inanimate objects in the vicinity of the patient, plus the HCW's own body [8]. Effective cleansing of contaminated hands at specific times of patient care is proven to prevent the transmission of pathogens from one surface or patient to another [9]. The World Health Organization (WHO) identified five key moments for HH during patient care to reduce HAIs [3]. As a standardized tool, the "My five moments for hand hygiene" approach allows hospital units a method to monitor HH adherence as a tool to intervene and improve HH compliance as well as a tool to compare HH performance across a broad range of healthcare settings [10].

Adequate HH depends on education and behaviour as well as infrastructure. Having an enabling environment – alcohol-based hand rub (ABHR) or basins with running water, soap and hand-drying materials at the point of care – increases the likelihood that HCWs will perform HH [11]. Addressing the problem of HAIs requires adequate training and education of HCWs to comply with HH recommendations [12]. Transmission of pathogens in healthcare settings can often occur through contaminated hands. Therefore, understanding and addressing barriers to HH adherence is critical for HAI prevention.

Improved HH practices by HCWs have been shown to reduce the incidence of HAIs [13,14]. Fewer HAIs mean fewer resources spent on the additional costs of treating infections that could have been prevented. Therefore, HH is an essential healthcare intervention that saves both lives and money. Yet, many studies have shown challenges with HH compliance in both high-, low-, and middle-income countries [15,16]. Thus far, there is a dearth of data on the HH practices of HCWs in Bangladesh. Therefore, the objective of this evaluation was to evaluate HH compliance and associated factors among HCWs in selected tertiary care hospitals in Bangladesh.

Methods

Study design and sites

We conducted this cross-sectional evaluation at 10 tertiary care hospitals: eight public and two private hospitals across Bangladesh, from September 2020 to May 2021. The approved bed capacity of enrolled hospitals was between 400 and 2600; on average, hospitals were over capacity with an average bed occupancy rate of 147%.

We used a mixed-methods approach consisting of three techniques for data collection. The first approach was direct observation of HH compliance by HCWs during patient care, followed by an open-ended questionnaire assessing barriers faced by HCWs when using soap and water or ABHR for HH. Finally, an environmental assessment of the available facilities necessary to facilitate HH was conducted. All assessments utilized paper-based tools to gather the information.

HH observation

We performed non-participatory, unobtrusive observations in 25% of the randomly selected inpatient wards to document HH compliance of HCWs during patient care using the paper-based WHO HH observation tool and methodology. Firstly, we listed the entire hospital wards and then randomly selected every fourth ward for HH observation. We classified anyone who was involved with direct patient care and present at the time of observation in the inpatient wards as an HCW. This included physicians, nurses and cleaning staff as cleaning staff also serve as patient assistants and partake in patient handling, in addition to maintaining the environmental cleanliness of the wards. We documented HH opportunities and actions according to the following HH indications: (1) before touching the patient; (2) before clean or aseptic procedure; (3) after body fluid exposure risk; (4) after touching the patient, and (5) after touching the patient's surroundings.

When two or more indications are applied simultaneously (e.g., after touching patient A and before touching patient B), a single opportunity requiring a single HH action was recorded. During observation, we noted two types of HH action: handwashing with soap/soapy water and the use of ABHR. Overall HH compliance was determined by dividing the number of observed HH actions performed by the total number of opportunities.

A dedicated group of enumerators consisting of epidemiologists, physicians and nurses was trained on the observation tools and data collection through detailed presentations, written guidelines, and simulated provider–patient interactions. Paired enumerators then piloted the assessment tool to ensure a complete understanding of the HH monitoring process and establish inter-rater reliability.

Barriers to HH

To better understand the barriers to HH compliance and complement observed findings, we interviewed HCWs using an open-ended questionnaire. Before the interview, we obtained written informed consent from the participant by explaining the purpose and structure of the evaluation. We enrolled HCWs from each of the observation wards, including physicians, nurses and cleaning staff. Feedback was gathered on the barriers to using hand sanitizer and washing hands with soap or soapy water.

HH stations and supplies assessment

We conducted a one-time structured observation to assess the availability of HH stations and the availability of HH supplies in selected wards. We used a monitoring checklist developed and approved by the Quality Improvement Secretariat (QIS), Ministry of Health, Bangladesh [17]. We systematically collected data on the functionality and location of handwashing basins for physicians and nurses. We recorded the availability of running water, soap/soapy water, and hand-drying materials or the availability of ABHR, and the availability of posters instructing on appropriate handwashing/hand rub techniques.

Statistical analysis

All collected data were coded and analysed using Stata 13 (Stata Corp., College Station, TX, USA). We calculated the frequency and percentage of HH compliance, barriers to HH performance, and availability of HH facilities. We used chi-squared tests to assess HH compliance variation by the 5-moments, profession, department or hospital type, and gender. We also applied this test to determine differences in proportions of HH opportunities adhered to across levels of professional categories of HCWs. We performed logistic regression to describe the multivariate results as unadjusted odds ratio (UOR) and adjusted odds ratio (AOR) with a 95% confidence interval (CI) and considered $P<0.05$ to be statistically significant. Multi-collinearity of independent variables was confirmed through variance inflation factor (VIF) and only variables with $P<0.25$ on univariate analysis were put into the multivariate regression model.

Ethical clearance

Ethical clearance for the evaluation was obtained from the institutional review board (IRB) and ethical review committee (ERC) of the International Centre for Diarrhoeal Disease

Research, Bangladesh (ICDDR,B). Written permission from the hospital authority was acquired for observation of HCW's HH practice and assessment of HH infrastructure.

Results

HH compliance

We observed a total of 14,668 HH opportunities in 186 observation sessions (Table I). The overall HH compliance was 25.3% which varied across HCW professional category, WHO 5-moments indications, hospital type, and departments observed ($P<0.001$). Nurses had the highest HH compliance at 28.5% (2264/7930), followed by physicians at 25.4% (1272/5008), whereas the cleaning staff had the lowest (9.9%, 171/3221) HH performance. We observed the highest HH for 'after body fluid exposure' (43.6%, 827/1897) and 'after touching a patient' (43.0%, 831/1934). The most commonly identified HH opportunity was 'after touching patient surroundings', though HH performance occurred after only 17.1% (1205/7057) of these instances. HH compliance was higher in public hospitals compared with private hospitals (27.4%, 3132/11,447 vs 17.9%, 575/3221, P<0.001). Compliance did not vary by gender of HCWs, and most (93.4%, 3461/3707) HH actions were performed using ABHR.

When considering HH compliance by indication and HCW role, HH compliance was significantly ($P<0.05$) higher among nurses and physicians compared with cleaning staff in all five indications (Table II). For the HH indicator of after body-fluid exposure risk, physicians had the highest compliance (49.5%, $P<0.001$). However, nurses displayed higher compliance than physicians for all other indicators. Only 20.7% of cleaning staff performed HH after touching a patient, which was the highest compliance among all moments for this staff group. In the other indicators, the average HH compliance of cleaning staff ranged from close to 3.7%–7.5%.

Associated factors related to HH compliance

Table III represents the association with HH compliance, reporting both unadjusted and adjusted odds ratios. Among HCWs, the AOR for HH performance was found to be three times higher for nurses (AOR: 3.36, 95% CI: 2.83–4.00) and physicians (AOR: 3.29, 95% CI: 2.76–3.92) compared with cleaning staff. Also, within indicators, HCWs had three times higher odds (95% CI: 2.89–3.89) of performing HH after touching a patient or after body fluid exposure than before touching a patient. HH compliance was significantly higher among the physicians and nurses of medicine (AOR: 2.10) and surgery (AOR: 1.85) departments compared with gynaecology and obstetrics department. HCWs working in public hospitals had significantly greater odds (AOR: 1.73, 95% CI: 1.55–1.93) of complying with HH practices than those in private hospitals.

Self-reported barriers to performing HH

A total of 1728 HCWs including physicians, nurses, and cleaning staff were surveyed to determine the key barriers to performing HH during patient care. The most frequently reported cause for poor compliance with using ABHR was insufficient supply (57.9%), skin reaction (26.3%), and shortage of time (14.5%). Supply of ABHR was the most common

barrier reported by cleaning staff (80.6%), whereas, for nurses, skin reaction following the use of ABHR (30.9%) was one of the major barriers.

Regarding handwashing with soap, inadequate supplies (27.0%), high workload (26.3%), and lack of facilities (22.7%) were the key factors for low compliance. The majority of nurses (33.5%) mentioned that their workload and the consequent shortage of time was the key barrier to performing handwashing using soap. Finally, the lack of functional handwashing facilities seemed to be a significant barrier common to both physicians (29.7%) and cleaning staff (22.0%) (Table IV). A lack of training and education was not reported by the participants.

Assessment of handwashing facilities in hospitals

We assessed handwashing facilities in 82 wards, of which handwashing facilities were available for physicians in 67 (81.7%, 67/82) and for nurses in 78 (95.1%, 78/82) wards. However, we found no dedicated handwashing facilities for the cleaning staff; they mostly used the handwashing facilities for patients or nurses. Among the observed wards, a total of 105 handwashing facilities were available for physicians and 90 for the nursing staff. Most (91.4%, 96/105) handwashing facilities had running water for physicians, and 83.8% (88/105) had soap or soapy water, or detergent. In addition, the availability of ABHR was observed for 77.1% of physicians and 78.9% of nurses at their working stations which was greater than reported. HH posters focusing on both handwashing and ABHR were found in one-fifth (21.9%, 23/105) of the facilities, and an electric hand dryer was found in 17.1% (18/105) of the handwashing areas. Conversely, running water and handwashing agent was available for nurses in 98.9% (89/90) and 88.9% (80/90) of the handwashing facilities. Six-step posters were seen in 17.8% (16/90) of handwashing facilities, and one-tenth (10.0%, 9/90) had hand dryers for the nurses.

Discussion

This evaluation assessed HH compliance and constraints among HCWs in Bangladesh during patient care activities and evaluated the factors influencing their HH practices. For a resource-constrained country such as Bangladesh, with insufficient data on HH compliance in the published literature, evaluating hospital-wide HH compliance is imperative to reduce HAIs.

Our evaluation found that about one-quarter of HCWs performed accurate HH compliance. Although this rate is higher than that documented in other resource-limited settings (6.4% in Iran, 16.5% in Ethiopia, 16.7% in Nigeria, 19.5% in Indonesia) [18–22], there is a concerningly high rate of non-compliance, which necessitates urgent intervention. This evaluation showed that the odds of HH compliance before patient contact was significantly lower than after patient contact. This finding is in line with a meta-analysis that also found lower compliance rates before patient contact (21%) compared with after patient contact (47%) [15]. To improve HH compliance, it is necessary to re-enforce the importance of HH for patient safety and infection prevention to the staff, to include hospital leadership in this advocacy campaign, and to find HH champions among the HCW staff who can help rally commitment to HH as an essential IPC activity. We also found low HH compliance

among HCWs after contact with patient surroundings. This is consistent with a study from London in which HH indications after contact with patient surroundings appear to be the most commonly neglected moment of HH [23].

In our evaluation, HH compliance was higher among nurses (28.6%) than physicians (25.4%), which is consistent with other studies conducted in similar settings [15,18]. This evaluation reported significantly low (9.9%) HH compliance among cleaning staff. Although this finding represents a higher compliance rate than a study conducted in Iran that documented less than 1.0% compliance [18], it is still concerningly low. Such low rates of HH compliance represents a missed opportunity for improving IPC as hospital cleaning staff in LMICs are often involved in patient care activities in addition to their environmental cleaning and waste disposal responsibilities. The lack of HH facilities for environmental cleaning staff compared with other cadres of HCWs show inequities in the healthcare system. Despite the importance of cleaning staff in safe delivery of healthcare, this cadre of HCWs continues to be seen as being of lower value than others [24]. Insufficient knowledge among cleaning staff might also be a critical cause of low HH compliance as the cleaning staff are usually neglected in the IPC training and orientation, however cleaners did not report a lack of training or education as a self-identified barrier [25]. Tailored IPC training, focusing on HH, may enhance the HH compliance among this cadre of HCWs.

Public hospitals showed two-fold higher compliance with HH than private hospitals. This finding is contradictory to a previous study in Bangladesh which found HCWs of private hospitals to be 1.5 times more compliant with HH practice [26]. The difference may be accredited to the amplified implementation of different IPC intervention and transmission-based precautions as well as hands-on training on HH procedures due to the COVID-19 pandemic in public healthcare facilities [27]. This evaluation provides evidence that regular IPC interventions, along with educational sessions regarding appropriate infection control measures can enhance the awareness, knowledge of, and practice of HH among HCWs [28–30].

The availability of functional and accessible HH facilities is essential for ensuring compliance with HH [31]. Our findings show that the availability of functional HH facilities within the wards for physicians and nurses was high. However, similar benefits were not available for cleaning staff who had no separate facilities within the wards for performing HH and were restricted from using HH facilities designated for clinical staff. This culture and norms could be a possible reason for low compliance of HH among the cleaning staff. They mostly used the same HH facilities dedicated for patients and visitors. Unlike high-resource countries, due to staffing shortages in the healthcare sectors of LMICs, cleaning staff in Bangladesh are often involved in patient-care activities such as assisting patients with moving in and out of wards (e.g., to the washroom or diagnostic areas), changing, emptying bed pans, draining catheter bags and feeding patients. As cleaning staff are required to perform tasks that involve contact with patients, access to existing HH facilitates for cleaning staff, especially in LMICs, may greatly contribute to lowering HAIs.

During the interviews with HCWs it was reported that the supply of ABHR was insufficient and identified as the greatest barrier (57.9%). In contrast, the HH observation found that

ABHR was available in more than 75% of the duty station designated for the doctors and nurses, which was higher than previously reported [32]. The availability of sanitizer observed in the physicians' and nurses' duty stations may be influenced by the COVID-19 pandemic. HH using ABHR was carried out more frequently than soap and water (93.4% vs 6.6%) as it is more efficient compared with handwashing with soap [33]. ABHR is also more convenient as it can be accessible at the point of care, and there is no need for a basin or drying facilities. Although we did not investigate handwashing basin placement relative to beds and could not infer much about access and convenience, adding HH infrastructure alone does not necessarily change behaviour [22,34]. Studies previously demonstrated that access to ABHR, along with multimodal promotion such as training and education of HCWs and monitoring and feedback on HH practice, was critical to improving HH compliance, in both developed and developing countries' healthcare settings [35,36].

This evaluation was conducted during the COVID-19 pandemic and hospital authorities strictly monitored IPC measures. As a result, the assessed HH compliance in this evaluation may be an overestimation of the regular scenario. HH observations were also not completed on night shifts when compliance may be lower. We also observed the HH practice only a single time, which might not adequately reflect the availability of supplies at all times because availability can fluctuate by day and shift. Lastly, we cannot rule out the possibility of the Hawthorne effect, although we attempted to be unobtrusive and discrete, resulting in inflated HH compliance, though it is unlikely this was a significant factor given the overall low rates of HH.

In conclusion, HH compliance among HCWs in this evaluation fell significantly short of the standard for safe patient care. This evaluation revealed that there is a need for routine IPC interventions focusing on all HCWs including cleaning staff and regular monitoring to identify the barriers to HH compliance in tertiary-healthcare settings in Bangladesh. Inadequate HH supplies in a resource-constrained setting such as Bangladesh demonstrates a lack of prioritizing, promoting and investing in IPC. Improving HH in Bangladeshi healthcare facilities will necessitate an integrated approach to improving resource management and changing behaviour. The findings of this evaluation may help to motivate and design interventions for HH compliance, which will help to reduce HAIs in hospital settings.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table I

Hand hygiene compliance among observed opportunities by hand hygiene indication, profession, and gender in 10 tertiary care hospitals, Bangladesh, 2020–2021

Outcomes	Observed opportunity	Hand hygiene action	Hand hygiene compliance	*P*
	N (%)	*N* (%)	% (*n*/*N*)	
Overall hand hygiene compliance among HCWs	14,668	3707	25.3 (3707/14,668)	
By HCW profession				
Physician	5008 (34.1)	1272 (34.3)	25.4 (1272/5008)	<0.001
Nurse	7930 (54.0)	2264 (61.1)	28.6 (2264/7930)	
Cleaning staff	1730 (11.8)	171 (4.6)	9.9 (171/1730)	
By WHO 5 moments				
Before touching a patient	1867 (12.7)	369 (10.0)	19.8 (369/1867)	<0.001
Before clean/aseptic procedure	1913 (13.0)	475 (12.8)	24.8 (475/1913)	
After body fluid exposure risk	1897 (12.9)	827 (22.3)	43.6 (827/1897)	
After touching a patient	1934 (13.2)	831 (22.4)	43.0 (831/1934)	
After touching patient surroundings	7057 (48.0)	1205 (32.5)	17.1 (1205/7057)	
By facility type				
Public	11447 (77.9)	3132 (84.5)	27.4 (3132/11,447)	<0.001
Private	3221 (21.9)	575 (15.5)	17.9 (575/3221)	
By Department				
Gynecology and obstetrics	3962 (27.0)	639 (17.2)	16.1 (639/3962)	<0.001
Medicine	4537 (30.9)	1301 (35.1)	28.7 (1301/4537)	
Surgery	6169 (42.0)	1767 (47.7)	28.6 (1767/6169)	
By gender				
Male	4094 (27.9)	1030 (19.4)	25.2 (1030/4094)	0.893
Female	10574 (72.1)	2677 (80.6)	25.3 (2677/10574)	

HCW, healthcare worker.

Table II

Hand hygiene compliance by the WHO 5 moments indications among healthcare workers in 10 tertiary-care hospitals, Bangladesh, 2020–2021

Hand hygiene indication by healthcare provider	Compliance (actions/opportunities) (%) (*n*/*N*)	*P*
Before touching a patient		
Physician	20.4% (162/793)	<0.001
Nurse	22.7% (189/834)	
Cleaning staff	7.5% (18/240)	
Before clean/aseptic procedure		
Physician	26.4% (111/420)	0.038
Nurse	24.7% (364/1475)	
Cleaning staff	0.0% (0/18)	
After body fluid exposure risk		
Physician	49.5% (197/398)	<0.001
Nurse	42.7% (629/1472)	
Cleaning staff	3.7% (1/27)	
After touching a patient		
Physician	46.4% (369/795)	<0.001
Nurse	47.5% (401/844)	
Cleaning staff	20.7% (61/295)	
After touching patient surroundings		
Physician	16.6% (433/2602)	<0.001
Nurse	20.6% (681/3305)	
Cleaning staff	7.9% (91/1150)	

Table III

Association between WHO 5 moments, profession type, facility type and department type and hand hygiene compliance in 10 tertiary-care hospitals, Bangladesh, 2020–2021

Variables	Unadjusted odds ratio		Adjusted odds ratio *	
	(95% CI)	*P*	(95% CI)	*P*
By profession				
Cleaning staff	Ref		Ref	
Nurse	3.64 (3.09–4.30)	<0.001	3.36 (2.83–4.00)	<0.001
Physician	3.10 (2.62–3.68)	<0.001	3.29 (2.76–3.92)	<0.001
By 5 moments				
Before touching a patient	Ref		Ref	
Before clean/aseptic procedure	1.34 (1.15–1.56)	<0.001	1.24 (1.06–1.45)	0.008
After body fluid exposure risk	3.14 (2.71–3.62)	<0.001	3.00 (2.58–3.48)	<0.001
After touching a patient	3.06 (2.64–3.54)	<0.001	3.36 (2.90–3.90)	<0.001
After touching patient surroundings	0.84 (0.74–0.95)	0.007	0.93 (0.82–1.06)	0.289
By hospital type				
Private	Ref		Ref	
Public	1.73 (1.57–1.91)	<0.001	1.73 (1.55–1.93)	<0.001
By department				
Gynecology and obstetrics	Ref		Ref	
Medicine	2.09 (1.87–2.32)	<0.001	2.10 (1.88–2.35)	<0.001
Surgery	2.08 (1.88–2.31)	<0.001	1.85 (1.67–2.06)	<0.001

CI, confidence interval.

*Adjusted for all variables from unadjusted odds ratio models.

Table IV

Barriers to using hand sanitizer and handwashing with soap among healthcare workers in 10 tertiary-care hospitals, Bangladesh, 2020–2021

Characteristics	Total (*N*=1728)	Physician (*N*=526)	Nurse (*N*=934)	Cleaning staff (*N*=268)
	n (%)	*n* (%)	*n* (%)	*n* (%)
Barriers to using hand sanitizer (multiple responses)				
Insufficient supply	1001 (57.9)	337 (62.2)	458 (49.0)	216 (80.6)
Skin reaction	454 (26.3)	109 (20.7)	289 (30.9)	56 (20.9)
Shortage of time	251 (14.5)	55 (10.5)	166 (17.8)	30 (11.2)
Lack of interest	119 (6.9)	34 (6.5)	47 (5.0)	38 (14.2)
Lack of awareness	87 (5.1)	30 (5.7)	49 (5.3)	8 (3.0)
Lack of motivation	62 (3.6)	14 (2.7)	42 (4.5)	6 (2.2)
Lack of facility	35 (2.0)	13 (2.5)	19 (2.0)	3 (1.1)
No barrier	198 (11.5)	77 (14.6)	82 (8.8)	39 (14.6)
Barriers to performing handwashing (multiple responses)				
Insufficient supply of liquid/bar soap	467 (27.0)	161 (30.6)	242 (25.9)	64 (23.9)
Quality of liquid or bar soap	64 (3.7)	15 (2.9)	45 (4.8)	4 (1.5)
Workload/shortage of time	454 (26.3)	102 (19.4)	313 (33.5)	39 (15.4)
Lack of dedicated hand hygiene facility	393 (22.7)	156 (29.7)	178 (19.1)	59 (22.0)
Lack of interest	152 (8.8)	34 (6.5)	88 (9.4)	28 (10.4)
Lack of awareness/knowledge	100 (5.8)	13 (2.5)	74 (7.9)	13 (4.9)
Forgetfulness	90 (5.2)	14 (2.7)	52 (5.6)	24 (9.0)
No barrier	234 (13.5)	90 (17.1)	103 (11.0)	41 (15.3)