Audit Report

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An Audit of hand hygiene practices in ICU's and wards of a tertiary care hospital

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ABSTRACT

Objective: To assess the extent to which Hand hygiene practices, as proposed by the WHO, were being followed by the healthcare workers based in different departments of Pakistan Institute of Medical Sciences (PIMS) Islamabad.

Methodology: An observation checklist was designed based on the recommendations of WHO. This checklist was then filled by nurses working in different departments while they observed the participants. The participants included consultants, post-graduate trainees, house-officers, nurses, and technicians. The observations were then compiled on data collection sheets and analyzed.

Results: A total of 106 healthcare workers took part in this audit. Out of them, only 57.5% of healthcare workers disinfected their hands before moving from infected to non-infected body site on the patient. Jewelry was worn by only 25.5% of healthcare workers out of which 45.5% wore the recommended type and the majority of healthcare workers had small and clean fingernails. As far as following the 5 steps for hand hygiene was concerned, only 75.5% of healthcare workers reported compliance. Availability of sinks which was found to be 75.5%, nearly a quarter of the participants reported no area designated for cleaning hands. Soap was provided in 86.4% of the cases and around 95% of the workers were provided with alcohol-based hand washing agent and the solution dispenser was filled.

Conclusion: Overall, it is obvious that hand hygiene plays a very crucial role in patient safety and the reduction of hospital acquired infections. An honest effort is required on part of the hospital administration to ensure that there is adequate infrastructure on ground for people to have access to hand washing areas.

Keywords: Hand hygiene, Health Care Professionals.

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Introduction

Healthcare associated infections have been drawing considerable attention from patients, governments, regulatory bodies, and even healthcare providers. Such infections that are acquired by the patient during a hospital stay are termed as nosocomial infections. The audit revealed several shortfalls in the implementation and compliance of hand hygiene practices, in light of the recommendations proposed by the WHO patient safety initiative.[1] Studies have shown that nearly one third of all hospital acquired infections are preventable[2] and that hand hygiene is the simplest and most effective way of preventing such infections.[3, 4]

In a study conducted by Mortimer et al, during the Staphylococcal epidemic in the 1950s, it was proven that the main mode of transmission of *S.aureus* in

nurseries was through direct contact and hand washing by the health care providers reduced the transmission of bacteria to babies[5]. In another investigation conducted to assess the effect of hand hygiene on hand flora, it was found that 42 out of 60 healthcare workers had a colony count of 100 or more on their hands while working, an amount that was reduced by 90-95% among doctors and nurses and, 70% among hospital attendants and 50% among sanitary workers[6] following the introduction of hand hygiene protocols.

According to some studies, two types of pathogens can colonize hands; those that colonize the inner layers of skin and those that reside near the surface. The so-called 'transient flora' near the surface can be removed through hand washing alone.[7]

It was recently described that there are sequential steps involved in the transmission of transient pathogens from one patient to another and that healthcare workers act as carrier in between. If hand hygiene practices are suboptimal, microbial colonization is easily established and transferred to other patients.[8] Several studies have highlighted how compliance with hand hygiene practices can virtually eradicate carriage of the MRSA virus by healthcare workers in ICUs and lead to a fall in MRSA rates.[9, 10]

It is important to understand what Hand Hygiene practices involves. It includes hand washing and hand disinfection. Hand washing includes washing hands with a non-medicated detergent and water or water alone, targeted to prevent cross transmission of bacteria by removing dirt and loose transient flora [11, 12]. Hand disinfection refers to the use of an antiseptic solution, medicated soap or alcohol, to clean hands. This is also termed as "degerming".[13]

There is now sufficient evidence to support the fact that adherence to hand hygiene practices alone, can significantly reduce the risk of cross transmission of infection in healthcare facilities.[7]

Taking into account such evidence, in 2002, revised guidelines for hand hygiene were published by the CDC which proposed the use of alcohol-based hand rubs for decontamination of hands between each non-soiling patient contact and to use liquid soap and water for visible contamination on hands.[14]

Additionally, to counter the growing burden of hospital acquired infections, the WHO also launched a global hand hygiene campaign[13] followed by the first Global Patient Safety Challenge "Clean Care is Safer Care (CCiSC)" launched in 2005.[15] By 2009 3,863 healthcare facilities employing over 3.6 million people, had registered with this initiative[7]. In the same year, WHO highlighted the importance of hand hygiene and proposed guidelines and tools based on its next phase of patient safety program 'SAVE LIVES: Clean Your Hands'.[1] The proposed guidelines included the following:

1. To wash hands with soap and water when they are visible contaminated with blood or other body fluids or if exposure to *Bacillus anthracis* is suspected or proven.
2. To wash hands with a non-microbial soap and water after using a restroom.
3. To wash hands before and after having food.

When hands are not visibly soiled an alcohol based hand rub should be used

1. Before direct contact with patient.
2. Before wearing gloves for insertion of a central venous catheter
3. Before inserting an indwelling catheter, peripheral venous catheter or other non-surgical invasive procedure.
4. After contact with patients' intact skin.
5. After contact with patients' intact skin.
6. After contact with non-intact skin, body secretions or wound dressing.
7. After contact with objects in the immediate vicinity of the patient.
8. After removing gloves
9. After moving from a contaminated body site to clean body site on the patient.

The program reinforces the "My 5 Moments for Hand Hygiene" which reminds healthcare workers to wash their hands thereby reducing the risk of disease transmission.[1,16,14] In addition, in 2002 the CDC/HICPAC recommended against wearing artificial fingernails and extenders by health care providers as they are associated with Gram negative bacillary and candidal infections.[17] It is also recommended to remove jewelry before washing hands, and drying hands after washing with a single use hand towel or air drying. Skin should be pat rather than rubbed during drying as skin excoriation can lead to greater colonization of bacteria and sore hands can also decrease compliance. [16]

In view of these guidelines it was pertinent that an audit be carried out to evaluate the extent to which these guidelines are being followed in the ICUs and wards of a major tertiary care hospital.

Methodology

The ethical approval was taken from IRB Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad. The audit was carried out in March 2018, by the patient safety department of the Pakistan Institute of Medical Sciences Islamabad. An observation checklist was designed keeping in mind the WHO hand hygiene patient safety initiative.[1] The checklists were then handed over to infection control nurses who observed the participants and filled out the forms in their respective departments.

A total of 106 participants took part in the audit out of which 28 were based in wards including Medical ward, Nephrology, Neurosurgery, Cardiac surgery, and Isolation ward. 78 participants were working in ICUs which included those in MCH, Children hospital (NICU and PICU), Surgical ICU, Medical ICU, and Burn center ICU.

The type of participants involved were Consultants, Postgraduate trainees, House-officers, Nurses and technicians. Thereafter, the observations were compiled on data collection sheets and analyzed. P-value of less than 0.05 was used as a test of statistical significance Observations having a P-value of less than 0.05 were cross examined to check their relation with each other.

As it was observed in several hospital-wide surveys, that predictors of non-compliance with hand hygiene protocols had much to do with a certain professional category or specific areas like ICUs and wards among other variables like understaffing, overcrowding, and intensity of patient care [18, 19] , the observations from the audit were cross examined with gender, professional category and department (Table II).

Results

The results were compiled into tabular form and the variables were then analyzed to determine their respective frequencies and relationship to gender, department and professional category.

Table 1 shows the cumulative frequencies of variables and their values in terms of whether the steps were followed or not. The majority of healthcare workers did manage to follow hand hygiene practices before and after patient contact, and before and after doing invasive procedure or dressing. However, only 57.5% of healthcare workers disinfected their hands before moving from infected to non-infected body site on the patient.

Table 1: Variable Frequencies

Variables	Yes (%)	No (%)
Before patient contact	86.8	13.2
After patient contact	96.2	3.8
Before moving from infected to non-infected sites on the same patient	57.5	42.5
Before doing invasive procedure or before doing dressing	92.5	7.5
After doing invasive procedure or dressing	88.7	11.3
Are they wearing jewelry	25.5	74.5
If yes, is it the recommended type	45.3	54.7
Are nails of healthcare workers small and clean	96.2	3.8
Did they follow the WHO steps for hand washing	75.5	24.5
Are sinks available	75.5	24.5
Is area of hand washing clean and dry	80.2	19.8
Are towels available	18.1	81.9
Are towels clean	14.6	85.4
Is soap provided	86.4	13.6
Is the hand washing agent alcohol based	94.3	5.7
Is the dispenser of solution filled	95.3	4.7

Jewelry was worn by only 25.5% of healthcare workers out of which 45.5% wore the recommended type and the majority of healthcare workers had small and clean fingernails. As far as following the 5 steps for hand hygiene was concerned [1], only 75.5% of healthcare workers reported compliance.

Certain variables were indicative of the institution's responsibilities in ensuring that the infrastructure required for compliance of hand hygiene was adequate. This included the availability of sinks which was found to be 75.5%, nearly a quarter of the participants reported no area designated for cleaning hands. The area for hand washing was clean and dry in 80.2% of cases and towels were only available to 18.1% of healthcare workers out of which 85.4% were not clean. Soap was provided in 86.4% of the cases and around 95% of the workers were provided with alcohol based hand washing agent and the solution dispenser was filled.

In light of the results, variables were compared amongst themselves to see if they affected each other (having a P-value of less than 0.05).

It was observed that female healthcare workers were remarkably more likely to follow hand hygiene protocols, before patient contact and when moving from infected to non-infected part of the patient's body, as compared to their male counterparts. Only 31.5% of male healthcare workers washed their hands before patient contact and 27.9% disinfected their hands when moving to different body sites on the same patient. Table II reports the contrast among the male and female participants of the Audit.

Table II: Gender based differences between Variables

Variables		Male n (%)	Female n(%)	p-Value
Before patient contact	Yes	29(31.5)	63(68.5)	0.02
	No	9(64.3)	5(35.7)	
Moving from infected to non infected body sites on same patient	Yes	17(27.9)	44(72.1)	0.03
	No	21(46.7)	24(53.3)	

Table III compares the compliance of hand hygiene practices with the professional category of doctors and paramedical staff. It is manifest that before patient contact, paramedical staff showed more strict adherence to hand hygiene protocols (44 out of 46) than doctors among whom 48 out of 60 washed their hands before patient contact. However, after patient contact, all doctors observed hand hygiene as compared to 42 out of 46 paramedical staff.

Table IV illustrates the differences of hand hygiene practices as observed in ICUs and wards. A striking dissimilarity observed was regarding the nail hygiene of healthcare workers.75.5% of those working in ICUs had small and clean nails, on the other hand, only 24.5% of healthcare workers inwards showed conformity to nail hygiene protocols. In addition to this, there was a major discrepancy in the provision of alcohol-based hand rub, 76% of healthcare personnel had access to it in ICUs compared to only 24% in wards.

Table III: Profession based differences between Variables

Variables		Doctor (n)%	Paramedics (n)%	P value
Before patient contact	Yes	48 (52.2)	44(47.8)	0.01
	No	12(85.7)	2(14.3)	
After Patient Contact	Yes	60(58.8)	42(41.2)	0.03
	No	0	4(100)	

Table IV: Variable differences between ICUs and Ward

Variables		Ward n (%)	ICU/HDU n (%)	P value
Natural nails of health worker small and clean	Yes	25(24.5)	77 (75.5)	0.05
	No	3(75)	1 (25)	
Hand washing agent alcohol based	Yes	24(24)	76 (76)	0.04
	No	4 (66.7)	2 (33.3)	

Discussion

A similar study conducted in allied hospitals of Rawalpindi Medical College showed that despite the bedside availability of antiseptic solution in all hospitals, inadequate compliance was seen amongst health-care professionals.[20]

There are multiple ways in which this serious lapse in patient safety can be tackled. First of all it must be recognized that a focused and a multi-dimensional approach is required which can identify and target the areas where these shortfalls are occurring.

Studies recommend system remodeling, administrative support and motivation, training of healthcare workers and reminders in the workplace as necessary changes, required to see an improvement in hand hygiene practices.[21]

As far as system remodeling is concerned, an important intervention that can be implemented is the introduction of interactive educational programs among medical students as well as doctors and paramedical staff working at the hospital to keep them updated regarding recent hand hygiene protocols. Literature shows that such programs when combined with free availability of disinfectants can have a sustained and lasting impact on hand hygiene compliance.[22]

Training healthcare workers play a very important role in long term compliance with hand hygiene protocols. A study conducted in Karachi showed that nearly half of its participants (45.75%) had never attended a formal lecture on hand hygiene and more than half (62.26%) of the participants were unenlightened about the complications of hospital-acquired infections.[23]

This is a clear indicator of how there is a serious shortfall on part of hospital administrations in ensuring that the staff in educated on the importance of hand washing practices.

Research conducted in the hospitals of Lahore showed that there was a statistically significant impact of

educational intervention on improving the knowledge of residents and nurses concerning hand hygiene practices.[24]

Motivation by hospital administration can have a positive impact on hand hygiene attitudes of its workers and infection control as proposed by a study which reported a drastic reduction in hospital acquired infections, especially MRSA and *S.Aureus*, over 4 years, following hospital wide hand hygiene promotion campaigns.[10]

In addition to this, it is also the responsibility of the hospital administration to ensure that its workers have an encouraging environment to exercise hand hygiene practices in. This includes providing them easy access to clean hand washing and drying areas, adequate supply of Alcohol based hand rubs, disposable towels and other facilities required for hand washing.

The availability of alcohol based hand rubs should be ensured as they have proven to be superior. They require less time, act faster, result in less local irritation and contribute to significant improvement in compliance to hand hygiene.[3,1] Switching to alcohol based hand rubs has shown to decrease the overall time for hand hygiene from 1.3h to 0.3h[25] and the availability of pocket sized individual bottles has shown to further increase compliance.[26]

It is also important to ensure that reminders to follow the hand hygiene practices should be present throughout the hospital especially in areas where workers go frequently to wash their hands.

On part of the individual, it is imperative for a healthcare worker to realize the position they hold in the healthcare system and own up to that responsibility by complying with the hand hygiene guidelines and setting an example for others to follow their footsteps. It has been proven that the hand hygiene behavior of senior practitioners has a significant impact on adherence to hand hygiene.[27]

Conclusion

The tertiary hospital under Audit had some shortcomings in this regard which mainly included a quarter of healthcare workers not complying with the hand hygiene protocol. In addition to this, the administration was unable to provide adequate facilities in some areas like the supply of clean towels for hand drying and of alcohol-based disinfectant in certain areas of the hospital along with the unavailability of sinks in 25% of the areas.

In addition to this, trainings need to be held at every level to re-iterate the importance of hand hygiene and the consequences if it is not followed. Healthcare workers need to feel responsible to themselves and their patients to ensure that they do not act as disease carriers by washing their hands regularly and serving as role models for their colleagues and juniors to follow.

However, if timely action is taken at individual, administrative, and government levels, the situation can be drastically improved with little but sustained effort.

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