Barriers to Hand Hygiene Compliance in Intensive Care Units From the Perspective of Healthcare Workers: A Qualitative Study

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Abstract

Background: Hand hygiene is one of the simplest and most important ways to prevent nosocomial infections. However, the available evidence indicates that hand hygiene is not fully practiced by healthcare workers. Several factors affect hand hygiene. Therefore, this study aimed to explain the experiences of healthcare workers in the barriers to hand hygiene compliance in intensive care units.

Methods: This qualitative study was performed on 25 doctors, anesthesiologists, nurses and physiotherapists working in intensive care units by using purposive sampling and semi-structured individual interviews. The data analysis process was performed with Lundman and Graneheim approach.

Results: The main theme of “barriers to hand hygiene practice” with three main categories, including 1- barriers related to healthcare providers with subcategories of workload, insufficient knowledge, inappropriate attitude and wrong behavioral patterns, 2- barriers related to management with the subcategories of improper planning and training, improper design of the physical space of the department and 3- barriers related to equipment and facilities with the subcategories of lack of equipment and poor quality equipment were identified in this study.

Conclusion: The results of the present study can help the relevant authorities in adopting appropriate strategies to remove barriers to hand hygiene practice and promote the right attitude and behavior in healthcare workers.

Background

Hand hygiene is one of the most important factors in preventing nosocomial infections in healthcare settings [1]. It is very important to consider the relationship between hand hygiene and the emergence of antibiotic resistance, which is a global threat to public health [2]. To promote hand hygiene practice and ensure the control and prevention of nosocomial infections, one of the key components in patient safety, the World Health Organization launched the first global challenge “Clean Care is Safer Care” in 2005 [3]. The reason is that close and frequent contact of healthcare workers with different patients has made their hands as one of the main sources of transmission of organisms and microorganisms [4]. Hands should be cleaned with soap and water or disinfectants before, after any contact with patients or equipment. Eliminating colonized microorganisms in the skin of the hands is the most effective way to prevent the cross-transmission of pathogens and is therefore recommended as the first step in the prevention and control of nosocomial infections [5].

Nosocomial infections can be defined as those occurring 48-72 hours after admission to a hospital or other health care facility where the infection and incubation were not present at the time of admission[6, 7]. According to the World Health Organization, 1.7 million nosocomial infections occur annually and 1 in 29 people develop nosocomial infections [8]. Globally, the incidence of these infections varies from 3.5 to 12 percent in developed countries and from 7.5 to 19.1 percent in low-income and middle-income countries [9]. The prevalence of nosocomial infections in Iran has been reported from 1.9 to 25% [10, 11].

One of the departments with the highest rate of this infection is the intensive care unit. Although the number of patients admitted to the intensive care unit is less than that of other wards of the hospital, the incidence of nosocomial infections in the intensive care unit is 2-5 times higher than other wards of the hospital [12]. Patients admitted to the intensive care unit are at higher risk due to risk factors such as multiple injuries, depressed level of consciousness and weak preventive mechanisms. These infections cause several problems in the treatment course of patients, including increasing the cost of laboratory procedures, increasing the use of drugs, increasing the length of hospital stay and increasing antibiotic resistance [13, 14]. They also kill 99,000 people and cost society $ 20 million annually [8].

Hand hygiene practice significantly reduces the rate of healthcare-associated infections and has become an important part of infection control programs as an easy and cost-effective method [15]. The effect of hand hygiene practice on reducing nosocomial infections is up to 50 % [16]. Several studies have shown that hand hygiene compliance will improve the health and safety of patients, reduce complications, length of hospital stay and mortality [17, 18]. However, although hand hygiene techniques are simple, they are very challenging for individuals and numerous studies have indicated low acceptance and poor performance of healthcare workers in this regard [19, 20]. Surveys by the World Health Organization have shown that compliance with hand hygiene in healthcare workers is less than 50% and it is less than 10% in hospitals with a large workload [4] . Global hand hygiene compliance is about 40% [21, 22]. Numerous reasons may prevent health care workers from hand hygiene practice such as lack of proper equipment, high patient-to-nurse ratio, allergy to hand hygiene products, and insufficient knowledge [23]. Paying attention to individuals' attitudes also plays an important role because hand hygiene is influenced by the attitudes, beliefs and opinions of individuals [24, 25]. Lack of awareness and knowledge of individuals is also one of the factors affecting the hand hygiene compliance, which can be increased by promoting knowledge and awareness [26].

Since hand hygiene compliance in the healthcare workers, especially those in the intensive care unit plays an important role in the prevention and control of nosocomial infections, the information and experiences of the healthcare workers in the barriers to non-compliance with hand hygiene seem very helpful. Qualitative research methods can be very helpful because they examine individuals' beliefs, attitudes, experiences and intentions [27]. Based on the review of literature, no qualitative study investigated this issue, so we decided to analyze the experiences and views of healthcare workers qualitatively and discover the barriers to hand hygiene practice in the southeastern Iran. Using a qualitative approach, we can examine the nature of the phenomenon in a real context.

Material And Methods

Design

Qualitative research with content analysis approach was used to collect and analyze data in 2020. Content analysis is used to examine and explain concepts, words and phrases within a text [28].

Sample and setting

This qualitative study was conducted in Kerman from late April to late May 2020. The study population consisted of healthcare workers working in the intensive care units (2 wards) of Shahid Bahonar hospital (the largest trauma center in southeastern Iran), including anesthesiologist (n = 3), nurse (n = 18), anesthesiology expert (n = 3) and physiotherapist (n = 1), who were selected by purposive sampling. Sampling was kept until saturation, meaning that no new data was added. Inclusion criteria included healthcare workers with at least 6 months of work experience in the intensive care unit, physical and mental health, who were fluent in Persian. Participants were selected with a variety of age, work experience and level of education. The time and place of the interview were determined at the health center with the consent of the participants.

Data collection procedure

A semi-structured individual interview was used in this study because participants could express their experiences and views more easily and purposefully, we could extract more in-depth information and ask more questions. Each interview took 30-45 minutes during which, the interviewer encouraged participants to take part in discussions and interactions and share their experiences. Some questions are as follows: "What facilities are available for hand hygiene in your ward? Do you know the five moments of hand hygiene? Based on your experience, what are the barriers that prevent you from observing the 5 moments while caring for the patient?" "What suggestions do you have for improving hand hygiene compliance? How effective is hand hygiene in controlling nosocomial infections?" Then, exploratory questions were asked proportional to the answers. The researcher also paid attention to non-verbal communication such as facial expressions and hand movements.

Data analysis

The data analysis process was performed as guided by Lundman and Graneheim [29]. The purpose of qualitative studies is to obtain a rich, broad description and perception of phenomena [30]. In the first stage, each interview was transcribed verbatim and read several times for a general perception of the content. In the second stage, the text was divided into meaning units. Each meaning unit consisted of words and sentences with related content. In the third stage, meaning units were collected and recorded with initial codes. In the fourth stage, the initial codes were divided into subcategories based on similarities and differences. One category contained similar manifest codes. Finally, the latent concept and content in the data was extracted. During the data collection and analysis process, the researcher recorded any sparks related to the data and used them for subsequent interviews. An example of an analysis process is shown in Table 1.

The Guba and Lincoln criteria expressed by Streubert and Carpenter were used to validate the study data [31]. To achieve data reliability, the participants reviewed the codes and head nurses revised them. A good communication was established between participants and the researcher. The researcher met the participants before the interview to build trust and provide an in-depth interview. Part of the text along with the initial coding was given to the participants to compare the degree of similarity between the ideas extracted by the researcher and their main opinions. To control the degree of appropriateness, qualitative

research experts created concepts and categories until they reached a consensus. The corresponding author with collaboration of an English translator translated the categories and quotations from Persian to English and professional editors edited the results.

Results

The mean age of the participants was 36.44 years, the majority of them were women (92%), the majority of them were married (88%) with a mean work experience of 11.32 years and 38.92% had overtime a month. Of 25 participants, 12% were anesthesiologists, 72% were nurses, 12% were anesthesiology experts and 4% were physiotherapists.

By analyzing the data, the main theme of “barriers to hand hygiene practice” and three main categories, including 1- barriers related to healthcare workers with subcategories of workload, insufficient knowledge, improper attitude and wrong behavioral patterns, 2- barriers related to management with subcategories of improper planning and training, improper design of physical space of the department, 3- barriers related to equipment and facilities with subcategories of lack of equipment and poor quality equipment were extracted (Table 2).

Barriers related to healthcare workers

High workload

Hand hygiene practice is inevitably forgotten during high workload due to stress, lack of peace of mind and speeding up the assigned tasks. Participants considered the high workload in the intensive care unit as an important barrier to hand hygiene practice. They also mentioned the large number of patients and the impossibility of keeping away from critically ill patients. Hand hygiene practice was also impossible for patients in need of intensive care in emergencies and critical situations. They sometimes had to provide care to two patients at the same time, and on the other hand, fatigue due to overwork in the intensive care unit and night shifts prevented them from complying with proper hand hygiene.

“Many times I did not have enough time to wash or disinfect my hands due to the high workload in the intensive care unit and the emergency situation of some procedures.” (A 37-year-old nurse with 12 years of work experience)

“When I have to take care of several patients at the same time especially in the night shift, I am less concerned about hand hygiene practice due to fatigue.” (A 48-year-old nurse with 24 years of work experience)

Insufficient knowledge

The knowledge of healthcare workers of nosocomial infections and direct and indirect transmission of infectious agents plays an important role in observing hand hygiene. The healthcare workers believed that lack of awareness of staff, especially novice ones of the importance of hand hygiene in the

incidence of nosocomial infections had an important role. Non-compliance with hand hygiene due to lack of awareness has led to increased antibiotic resistance, length of hospital stay, nosocomial infections and even mortality.

"Sometimes we do not take hand hygiene seriously because we do not know enough about the complications of poor hand hygiene practice." (A 35-year-old nurse with 18 years of work experience)

Improper attitude

The majority of participants acknowledged that beliefs and attitudes toward hand hygiene practice were influential components in the behavior of individuals and improving staff's behavior would play a significant role in increasing hand hygiene practice. Strengthening a positive attitude towards hand hygiene practice and convincing them that their behaviors will have a great impact on the behavior of others, individuals can adhere to hand hygiene more.

"Many times we do not practice hand hygiene because we do not believe in the importance of hand hygiene and do not get used to it. We would practice hand hygiene more if they reported monthly statistics of nosocomial infections and their complications clearly." (A 36-year-old nurse with 11 years of work experience)

Wrong behavioral patterns

A good pattern and positive norms are very important for people in social settings to play a role and observe the principles, rules and guidelines of that setting. The experiences of participants show that individuals imitate senior managers, doctors or residents in the workplace; therefore, if such people do not adhere to hand hygiene, it will directly affect the performance of other individuals.

"*Doctors, residents and head nurses, who can be good role models for us do not often pay enough attention to hand washing. Therefore, we underestimate the importance of hand hygiene practice and do not comply with it properly."* (A 35-year-old nurse with 18 years of work experience)

Barriers related to management

Improper planning and training

Managers can promote hand hygiene practice by proper planning and training, monitoring and positive feedback, provision of written policies, appropriate culture building and positive organizational support. Participants in the present study considered occasional water outage, insufficient control over the evening and night shifts, inappropriate culture, substitute of gloves for hand hygiene practice and no wounds or scratches on personnel hands as barriers to hand hygiene practice. Some participants also believed that hand hygiene was not practiced because of no obvious contamination on the skin of the hand during caregiving.

“When I use gloves, I feel that I no longer need to wash or disinfect my hands.” (A 48-year-old nurse with 24 years of work experience)

“I often forget hand hygiene practice while caring for patients, because I do not see obvious contamination on the skin of my hands.” (A 40-year-old nurse with 15 years of work experience)

“I easily neglect my hand hygiene because there is no positive culture for hand hygiene.” (A 29-year-old anesthesiology expert with 7 years of work experience)

Improper design of the physical space of the department

Workplace conditions are one of the most important factors in hand hygiene practice. For example, lack of access to the hand washing sinks for emergency use, especially for novice healthcare workers will prevent hand hygiene practice due to inconvenience and dissatisfaction. In this study, many participants acknowledged that the health system infrastructure was inefficient for hand hygiene practice and officials did not pay enough attention to the problems and barriers to the hand hygiene practice. Therefore, the availability of the hand washing sinks and the reduction of the distance between sinks and the patients' beds will facilitate access and increase hand hygiene practice.

“Many times there was no sink when I wanted to wash my hands.” (A 36-year-old anesthesiologist with 6 years of work experience) "

Barriers related to equipment and facilities

According to the participants, providing a sufficient amount of hand hygiene equipment in different and accessible areas, as well as providing quality equipment in different wards, especially in intensive care units, will increase hand hygiene practice, reduce nosocomial infections, their transmissions to the community and mortality. Participants frequently complained about barriers related to equipment and facilities in their workplace, which prevented them from proper hand hygiene.

Lack of equipment

Participants mentioned lack of enough sinks and smart faucets for hand washing, which can help control the infection better. The majority of them also could not dry their hands due to the limited tissue papers and the lack of a hand dryer, which plays an important role in controlling the infection. Some participants paid special attention to the quality of detergents and disinfectants, and the provision of hand moisturizers and considered lack of detergents or personal protective equipment, lack of skin moisturizers after hand washing and lack of resources for buying hand washing equipment as barriers to hand hygiene practice.

“I often could not practice hand hygiene due to lack of smart faucets and lack of time.” (A 26-year-old nurse with 2 years of work experience)

"Many times, I have neglected hand hygiene practice especially in the evening and night shifts due to the lack of tissue papers for drying my hands." (A 30-year-old nurse with 5 years of work experience)

Poor quality equipment

Considering quality equipment to reduce skin damage will increase hand hygiene practice and control of nosocomial infections. In the present study, the poor quality of soap and disinfectants for hand hygiene, skin dryness and itching caused by disinfectants were among the factors that caused hand hygiene non-compliance.

"I have not done hand rub for a month and substituted gloves for it because of the poor quality of the disinfectants and the allergy I felt after using them." (A 45-year-old nurse with 23 years of work experience)

Discussion

The findings of this study showed that healthcare workers in intensive care units face several obstacles to hand hygiene practice. The main theme of "barriers to hand hygiene" consists of three main categories, including "barriers related to healthcare workers", "barriers related to management" and "barriers related to equipment and facilities", each of which included subcategories.

In the present study, barriers related to the healthcare workers were identified as one of the most important barriers to hand hygiene practice. Numerous studies have identified workload as one of the barriers to healthcare workers' compliance with hand hygiene [32, 33]. Obviously, healthcare workers do not have enough time to practice hand hygiene due to the high workload, which along with environmental and social problems will lead to job burnout, lack of hand hygiene practice, and cross-transmission of the infection. Participants in the present study also considered workload, fatigue, and a large number of patients as the main reasons for non-compliance with hand hygiene. Dai et al. (2015) showed that healthcare workers were less concerned about hand hygiene practice at the end of their shift work due to fatigue, and the longer the rest period between shift work, the higher the hand hygiene was practiced [34]. Nicol et al. (2009) also mentioned fatigue related to high workload as a barrier to hand hygiene practice [35]. In the present study, healthcare workers believed that they did not have enough time to practice hand hygiene in emergencies, which was in line with the results of several studies [24, 36]. Therefore, it can be concluded that even if the healthcare workers are familiar with the correct hand washing technique, they will not be able to practice hand hygiene due to the large workload and a capable management system is needed to continuously train staff on how to manage emergencies, adjust high workload, and increase hand hygiene.

The results of the present study indicate that some healthcare workers are unaware of the importance of hand hygiene and its role in the incidence of nosocomial infections, the increased costs and problems caused by nosocomial infections. The results of some studies supported the results of the present study [24, 26]. Continuous training of healthcare workers on proper hand washing methods with reminder

posters plays an important role in increasing staff's awareness and knowledge and hand hygiene [1]. Oliveira et al. (2010) believed that non-compliance with hand hygiene was not necessarily related to the knowledge of healthcare workers. Although staff were aware of the importance of hand washing, they did not practice it due to high workload and insufficient motivation [37]. Joshi et al. (2012) demonstrated that the staff had sufficient knowledge and readiness to comply with hand hygiene, but they were not able to practice hand hygiene protocols according to the recommended guidelines due to lack of appropriate equipment and facilities [38]. Therefore, providing appropriate equipment and facilities, holding regular training sessions to increase staff's awareness and knowledge, and providing support and positive feedback can play important roles in implementing hand hygiene guidelines and preventing nosocomial infections [33].

In the present study, a number of healthcare workers had an inappropriate attitude towards hand hygiene practice, and some of them did not believe in hand hygiene, were inattentive to it, and sometimes even forgot hand hygiene practice. In several studies, the positive attitude of healthcare workers has been associated with an increase in hand hygiene practice [39, 40]. Nwaokenye et al. (2020) believed that lack of knowledge, high workload and high patient-to-nurse-ratio caused hand hygiene compliance to be forgotten or even impossible [41]. Wrong attitude of healthcare workers towards hand hygiene practice increases the rate of nosocomial infections. Therefore, designing programs to increase the attention and positive attitude of healthcare workers towards hand hygiene practice and standardization of health behaviors to increase hand hygiene will play important roles in reducing the rate of nosocomial infections and patient mortality [42].

In the present study, wrong behavioral patterns also prevented hand hygiene practice. Role modeling plays an important role in following the standards of hand hygiene [43]. Ravaghi et al. (2015) also addressed the compatibility of one's behavior with other people in the ward. Participants believed that the behavior of physicians, especially chief physicians, played an important role in their compliance with hand hygiene standards [26]. This issue highlights the effective role of senior individuals in promoting hand hygiene practice and improving patient safety. Therefore, it seems that the support and involvement of senior individuals, including physicians to promote hand hygiene practice and infection control standards can be a great help in removing barriers to hand hygiene practice. At the same time, the main principles of behavioral patterns of hand hygiene should be emphasized, which also are used to change individual attitudes [44].

In the present study, improper management and planning, and improper design of the physical space of the ward were mentioned as some of the obstacles to hand hygiene practice. Atif et al. (2019) considered high workload, lack of obvious contamination on the hands, substitute of gloves for hand hygiene, limited hospital space and unavailability of sinks as barriers to hand hygiene practice, which were consistent with our study. This study provided suggestions such as holding training sessions, positive feedback, managerial support and proper organization of the environment to promote hand hygiene practice [33]. Mclaws et al. (2015) believed that hospital authorities were responsible for good hand hygiene practice and should have more control over barriers to remove them [1].

In the present study, lack of equipment on the one hand and poor quality equipment on the other hand were also mentioned as important reasons for hand hygiene non-compliance. Ravaghi et al. (2015) also considered the provision of proper washing liquid, paper towels and tissue papers, the use of smart faucet, accessibility of hand washing sinks and alcohol containers effective in removing barriers and increasing staff's compliance with hand hygiene protocols [26]. Salmon et al. (2015) believed that lack of proper hand hygiene products, insufficient tissue papers, hand dryers, and skin damage due to repeated washing were important reasons for avoiding hand hygiene practice [45]. Adequate and quality equipment will reduce skin damage, cause hand hygiene compliance, and prevent cross-transmission of infection. Therefore, it seems that the attention of management helps promote the hand hygiene practice.

The qualitative design, small sample size and research conduction in the trauma center were among the limitations of the present study, so the results should be generalized with caution. It was also difficult to arrange interviews with some healthcare workers. Thus, there were a small number of participants in some groups, which may prevent the distinction between professional groups.

Conclusion

According to the results of the study, it can be concluded that several factors affect health care workers' non-compliance with hand hygiene. Regarding the sensitive position of intensive care units, the infection control department of the hospital must pay serious attention to this issue and develop various strategies to remove barriers to hand hygiene practice. Some of such strategies include training programs to increase awareness and create a positive attitude towards the importance of hand hygiene practice, staff's support and positive feedback, provision of quality and sufficient equipment to minimize transmission of nosocomial infections and maximize health of the clients, which will also reduce the costs of health care.

Declarations

Ethics approval and consent to participate

The ethics committee of Kerman University of Medical Sciences approved the study (No.: IR.KMU.REC.1398.581). After selection of the participants, the study objectives were explained to the participants and informed and written consent (signed) was obtained for audio recording at the beginning of the interview. Participants were ensured about the confidentiality of the data and the right to enter and withdraw from the study. Each participant was identified with a number. Interviews were conducted in person at a specified time and place in the health center. It is confirmed that all methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

Not applicable

Funding

Not applicable.

Authors' contributions

P.M, M.A, M.J and M.D contributed to original idea and protocol, conception of the work, conducting the study, revising the draft, approving the final version of the manuscript, and agreed for all aspects of the work. P.M and M.M was involved in data analysis, drafting of the manuscript and approval of the final version of the manuscript. M.D and P.M contributed to the design of the work, the draft revision and approval of the final version of the manuscript. All authors have read and approved the manuscript

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Tables

Table 1: An example of qualitative content analysis process

Category	Subcategory	Code	Semantic unit
Barriers related to healthcare workers	workload	Emergency care of an ICU patient	Many times, I did not have enough time to wash or disinfect my hands due to the high workload in the intensive care unit and the emergency of some procedure. When I have to take care of several patients at the same time especially in the night shift, I am less concerned about hand hygiene practice due to fatigue.
		Fatigue following intensive care of critically ill patients	
		High workload of staff	
		Impossibility of keeping away from critically ill patients	
		Simultaneous care of two patients	
		Fatigue following night shifts	
		High number of patients	

Table 2: Categories and Subcategories related to barriers to hand hygiene practice in intensive care units from the perspective of Iranian volunteers

main theme	Categories	Subcategories
Barriers to hand hygiene practice	Barriers related to health care workers	Workload
		Insufficient knowledge
		Improper attitude
		Wrong behavioral patterns
	Barriers related to management and planning	Improper planning and training
		Improper design of the physical space of the ward
	Barriers related to equipment and facilities	Lack of equipment
		Poor quality equipment