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Determinants of hand hygiene compliance among healthcare workers in intensive care units: a qualitative study

Salah Alshagrawi^{1*}  and Norah Alhodaithy²

Abstract

Background Practicing hand hygiene is a cost-effective method to decrease the occurrence of Healthcare-Associated Infections (HAIs). However, despite their simplicity, adhering to hand hygiene methods among healthcare workers (HCWs) can be highly challenging. We aim to examine the factors influencing hand hygiene compliance as perceived by HCWs working in the intensive care units (ICUs) at several major hospitals in Riyadh, Saudi Arabia.

Method This qualitative study was conducted by adopting a content analysis to examine the interviews of HCWs who are currently working in the ICUs of various major hospitals located in the capital city of Riyadh, Saudi Arabia.

Results We interviewed 49 HCWs working in ICUs, with an average age of 38 and 8 years of experience. The HCWs comprised doctors ($n = 12$), anesthesiologists ($n = 6$), and nurses ($n = 31$). There were 34 females and 15 males among the participants. Our analysis revealed several factors that impact hand hygiene compliance, including individual, work/environment, team, task, patient, organizational, and management concerns. Several obstacles and possibilities for enhancement have been identified.

Conclusion The results of this study would enhance our comprehension of hand hygiene practices and serve as a foundation for creating future strategies and assessment methods to enhance compliance with hand hygiene protocols in ICUs.

Keywords Hand hygiene, Intensive care units, Healthcare workers, Knowledge, Attitudes, Healthcare-associated infections

Introduction

Practicing hand hygiene is a cost-effective method to decrease the occurrence of Healthcare-Associated Infections (HAIs), impeding the advancement of antibiotic resistance, and enhancing patient safety [1]. Consequently, hand hygiene has become a vital element of

infection control protocols [2]. Proper hand hygiene alone can reduce hospital infections by 50% [3]. Several studies have shown that following hand hygiene guidelines can improve patient safety and health while reducing complications, length of hospital stay, and mortality [4, 5]. However, despite their simplicity, adhering to hand hygiene methods can be highly challenging, and several studies have demonstrated that healthcare workers (HCWs) struggle to consistently comply with proper hand hygiene protocols [6, 7]. There is evidence indicating a significant difference between how individuals

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perceive their performance in the setting of health care and how they perform [8].

Maintaining hand hygiene compliance poses a significant challenge, and numerous studies have demonstrated that HCWs exhibit inadequate performance and express limited acceptance of the practice [6, 7]. According to the World Health Organization (WHO), less than 50% of HCWs and less than 10% of institutions with heavy workloads adhere to hand hygiene regulations [9]. Globally, some estimates suggest that hand hygiene adherence is approximately 40% [10, 11]. The rate of compliance with hand washing was significantly lower among doctors (32%) compared to nurses (48%), and lower before (21%) compared to after (47%) patient interaction [12, 13]. Although the level of hand hygiene adherence by HCWs has historically been poor, using effective measures and interventions can greatly improve compliance with hand hygiene. A study found that when an institution makes a concerted effort to improve appropriate procedures, adherence rates increase to 65% [14].

Hand hygiene practices might be compromised by several factors such as individuals' attitudes, beliefs, perceptions, and knowledge [15–17]. Studies have demonstrated that factors such as motivation, sufficient working staff, effective leadership, and proper training are effective in promoting adherence to hand hygiene protocols [18, 19]. Additional research revealed barriers like irritation and damage to nails and hands; difficult-to-access faucets and hand wash basins; being overwhelmed or lacking enough time; being understaffed or overcrowded; interfering with patient and medical staff interactions; believing that patients' need for hand hygiene comes first; and not having enough time for hand hygiene [20–26].

The ICU is one of the departments that has the greatest susceptibility to HAIs. Although the ICU admits a lower number of patients in comparison to other departments within the hospital, it has a prevalence of HAIs that is two to five times higher [27]. ICU-admitted patients are at a heightened risk due to their potential to sustain severe injuries, the presence of invasive lines, diminished awareness, or inadequate immunity against infection [28]. ICU had lower rates of compliance with hand hygiene compared to other hospital wards. The compliance with hand hygiene protocols was much lower in ICUs (30–40%) compared to regular wards (50–60%) [28].

To the best of our knowledge, no qualitative study regarding the determinants of hand hygiene HCWs in the ICU has been conducted in Saudi Arabia. Therefore, this study aims to conduct a qualitative examination of the factors influencing hand hygiene compliance as perceived by HCWs working in the ICUs at several major hospitals in Riyadh, Saudi Arabia.

Methods

Study design

This study employed standard content analysis, a methodical process for categorizing and classifying data to evaluate, examine, and develop the fundamental concepts derived from the acquired data [29]. Qualitative research is an essential approach for examining emotions, and perspectives, and comprehending the complexities of human behavior that cannot be captured by quantitative investigations [30].

Sample and settings

We extended invitations to a total of forty-nine HCWs who are currently working in the ICU of various major hospitals located in the capital city of Riyadh, Saudi Arabia. Purposive sampling was employed to identify participants with the most diversity in age, sex, employment history, and educational attainment. The eligibility requirements for HCWs include having at least three months of prior experience working in critical care units and providing direct care to patients. The size of the sample is determined by the saturation of the data, which dictates whether there are enough findings to give comprehensive insight [29]. Data saturation was achieved in the current study after conducting interviews with 45 persons. However, an additional three interviews were conducted to confirm data saturation.

Data collection procedure

From January 4 to January 28, 2024, we conducted semi-structured individual online interviews utilizing open-ended questions to acquire an in-depth understanding of the factors that influence adherence to hand hygiene. The author performed the interviews in each of the cases. To develop the question guides and achieve the study's purpose, relevant research was reviewed [31]. The questions underwent modest adjustments to ensure their comprehensiveness and clarity following a pilot test involving four participants.

Each interview started with the typical introduction, including acquainting oneself with the researchers and gaining an understanding of the objectives and methodologies of the study (Table 1). In addition, the researcher employed a series of scripted dialogues to familiarize themselves with the participants and cultivate a friendly atmosphere. The duration of the interviews varied between 40 and 50 min, during which the researcher encouraged healthcare professionals to participate in a discussion while articulating their viewpoints. Online interviewing proved beneficial in preventing dropouts as it allowed for flexible scheduling and the ability to record the interview. However, there were some minor drawbacks related to technical difficulties that occurred during the interview.

Table 1 Interview questions

■ What do you think is the significance of practicing good hand hygiene?
■ What is the WHO's Five Moment for Hand Hygiene?
■ What is the major motivation behind your hand hygiene practices?
■ How frequently do you do hand massages with alcohol or wash your hands? Do you believe it is sufficient to stop infections from spreading?
■ What do you believe to be the causes of HCAs?
■ Do you believe that wearing gloves requires you to maintain good hand hygiene? Why?
■ How do you feel about the hand hygiene compliance of other healthcare job groups?
■ Do you think that their adherence to hand hygiene affects yours? Could you explain how?
■ When hand washing is vital for a patient's safety and you witness a coworker (or staff member of another organization) failing to wash their hands or doing it incorrectly, how would you respond?
■ What are the barriers to practicing proper hand hygiene regularly in your workplace?
■ Would you kindly provide anything else you believe is relevant to this matter?

Table 2 Main category, categories, and subcategories of determinants of hand hygiene compliance in ICU healthcare workers

Main Category	Categories	Subcategories
Determinants of hand hygiene compliance	Individual Factors	knowledge of healthcare workers Healthcare workers' attitude Healthcare workers' cognitive ability
	Team Factors	behavioral norms and patterns Participative leadership Effective communication
	Work Environment Factors	Heavy workload Shift pattern Ward layout and physical design
	Task Factors	Hand hygiene Frequency Physical damage and consequence
	Organizational and management factors	Equipment availability Equipment Quality Supervision and monitoring Safety and just culture

Data analysis

The data obtained was examined utilizing Graneheim and Lundman's five-step content analysis methodology [32, 33]. Through this methodology, codes, and themes are discovered via a methodical categorization procedure. Every interview was verbatim transcribed during the initial phase. To ensure the researchers' full immersion in the data and to get a thorough understanding of the topic, the interview texts were thoroughly examined on several occasions. Subsequently, a comprehensive analysis was conducted on the interview transcripts to pinpoint crucial areas that were relevant to the purpose of the study. The last step entailed compressing crucial segments and categorizing them with relevant codes. The initial codes were categorized into groups based on their similarities and differences. The latent content of the data was detected and retrieved using this approach. An assistant researcher and the primary author carried out all analytic methods. The trustworthiness was assessed using Guba and Lincoln's standards, which include confirmability, transferability, credibility, and dependability [34, 35]. Background information, data collecting techniques, procedure, handling of data, transcripts, data

evaluation, strategy, and study results were evaluated as part of the peer review process.

Ethical considerations

The study was approved by the King Fahad Medical City Institutional Review Board under number 1R800010471 and Federal Wide Assurance number FWA00018774. Following participant recruitment, the study's aims were described to the participants, and at the start of the interview, informed written consent was acquired before any audio recording started. Data confidentiality and the freedom to join and leave the research were disclosed to the participants.

Results

This study included 49 HCWs working in ICUs, with an average age of 38 and 8 years of experience. The HCWs comprised doctors ($n=12$), anesthesiologists ($n=6$), and nurses ($n=31$). There were 34 females and 15 males among the participants.

By employing the content analysis approach, we have identified 5 overarching categories and 15 subcategories that contribute to the factors influencing hand hygiene compliance among HCWs in ICUs. Table 2 provides a

concise overview of the primary categories and their corresponding subcategories.

Category 1: Individual factors

Subcategory A. Knowledge of healthcare workers

The perception that people were knowledgeable about hand hygiene guidelines was widely discussed. The majority of participants reported having the appropriate degree of knowledge regarding hand hygiene recommendations such as the WHO's Five Moments for hand cleanliness. Furthermore, most participants demonstrated comprehension of the repercussions of inadequate hand hygiene practices, such as the development of antibiotic resistance, prolonged hospital stays, nosocomial infections, and even death.

"I think that most of us know how to be clean and know how important it is to follow the rules. We know what will happen if some of us don't follow the rules, and it will have an effect on the care of the patients, the hospital, and the staff." (P8-A Doctor).

On the other hand, a few of the participants failed to recognize the significance of washing their hands and demonstrated a lack of understanding regarding the possibility of using gloves as an alternative to washing their hands.

"We don't all know the same things. Some of us don't understand how important it is to wash our hands and say we don't have time to do it. Also, I see that many of my coworkers wear gloves instead of washing their hands to save time and get the same level of protection." (P13-A nurse).

"Some people, especially those who are new or haven't done it before, don't have the information and skills to practice good cleanliness." (P28-A Anesthesiologist).

Subcategory B. Healthcare workers' attitude

The experiences of most participants indicated that the views and attitudes of HCWs towards hand hygiene practice were crucial factors contributing to their failure to comply with hand hygiene protocols. Most subjects had a favorable attitude towards hand hygiene.

"I think that washing my hands is easy, will save lives, and will benefit both the patient and me." (P15-A nurse).

Subcategory C. Healthcare workers' cognitive ability

The majority of respondents stated the cognitive competence and capability of the HCWs. Specifically, the impact of bias and memory on hand hygiene compliance was attributed to continuing stress and weariness.

"While I think I know how to properly wash my hands and am well aware of the benefits, I do forget to do it sometimes when I have too much on my mind. I think my mind is on more important things, though." (P37-A nurse).

"Unfortunately, your mind just can't work the same way it did at the start of the shift after a long day of work. I get sidetracked easily, forget some of the steps needed for good hand cleanliness, and can't concentrate." (P5-A Anesthesiologist).

Category 2: Team factors

Subcategory A. Behavioral norms and patterns

The majority of participants identified the behavioral norms and patterns advocated by the healthcare team as a crucial component in influencing the behavior of HCWs and determining the appropriate steps to be made regarding hand cleanliness. The establishment of these standards fostered a sense of collective accountability and specific anticipations among team members.

"People around me, like my fellow nurses, help me a lot to be steady and aware of how to wash my hands. There are things we need to do, and we all know that these things are necessary to give the patient the best care and keep us all safe. Everyone on the team keeps an eye on each other in case anyone forgets something or needs help. This makes us more confident in our ability to give our patients the right care." (P7-A nurse).

Subcategory B. Participative leadership

Most participants reported that effective leadership fosters an environment of shared accountability with a supportive atmosphere.

"The team leader might make a difference in following the right steps, like washing your hands. Our leader is our example, our teacher, and the person who wakes us up and tells us of our main goal: to take care of our patients." (P41-A nurse).

"I worked with different groups. If you have the right people on your team, they will give you the right advice and feedback and won't blame you for your mistakes. These kinds of acts show the rules that the

group and the ward follow, which may be different and better than those in other wards.” (P35-A nurse).

Subcategory C. Effective communication

The method of sharing knowledge among team members was identified as a significant factor in enhancing their adherence to hand hygiene measures. Facilitating transparent and candid communication of information and guidance enabled HCWs to overcome instances of forgetfulness and non-compliance with hand hygiene protocols.

“It was important for everyone on the team to talk to each other. It was easy to remember to wash our hands when someone said they were going to or asked if everyone was done. This helped us all form good habits.” (P27-A Anesthesiologist).

Moreover, when leaders demonstrate transparency and openness in disclosing past instances of infection, they provide the foundation for a cooperative learning environment.

“Our view on the problem has changed since we learned about the number of infections in our department and how they compare to other departments and hospitals. We began talking about it with our coworkers and other experts.” (P29-A nurse).

Category 3: Work environment factors

Subcategory A. Heavy workload

Most participants indicated that the number of monitored patients and the demanding workload were crucial factors influencing hand hygiene compliance.

“There are a lot of pressing and serious cases in the ICU, and we need to focus on a number of important tasks. Also, I have to deal with more than three people at once, and each one has different needs. This makes it hard to concentrate.” (P11-A nurse).

Several participants stated that the excessive workload in the ICU can be attributable to the insufficient number of workers.

“Not only do we have a lot of patients, but we also don’t have enough servers, which makes it hard to keep up with effective hand cleanliness. Too much needs to be done in too little time to make sure care is given.” (P19-A nurse).

Subcategory B. Shift pattern

The majority of participants have expressed concerns over the extended duration of their work shifts, which may exceed 12 h. Exhaustion and tension were additional significant obstacles to maintaining proper hand hygiene.

“It seems like days last longer than they do. At the end of the shift, I’m so worn out and tired that I can’t even think straight. This makes me worry that I might not give my patients the care they need.” (P23-A nurse).

“It feels like days are longer than they really are. When the shift is over, I’m so tired and worn out that I can’t even think straight. This makes me worry that I might not give my patients the care they need.” (P36-A nurse).

Subcategory C. Wards layout and physical design

Several participants have indicated that decreased adherence has been partly attributed to the physical configuration and arrangement of the space, as well as the fast-paced medical setting, notably in the critical care unit.

“Sometimes, going to the sink or hand cleaner takes too much time and effort. I have to walk a long way to get to a sink, and sometimes I have to wait because it’s being used or look for another one. This is very important when there are too many people.” (P32-A Doctor).

Category 4: Task factors

Subcategory A. Hand Hygiene frequency

Some participants reported that some aspects of performing hand hygiene were a factor in ensuring compliance. For instance, the frequency and time of the process were also mentioned as another task-specific factor.

“The constant washing of my hands has damaged the skin on my hands. Many dollars have been spent on medicated creams to protect my skin from too much cleaning and chemicals that make it sensitive.” (P2-A nurse).

“I have to make sure I have done the five moments of hand washing with every patient encounter. This would take too much time given the number of patients we are in contact with every day.” (P17-A Anesthesiologist).

Subcategory B. Physical damage and consequence

The nature of the task of performing hand hygiene involved using certain disinfectant and chemical ingredients which can pose skin irritation and nail damage over time.

“Keeping up with rules about hand hygiene requires me to wash my hands a lot, which has done a lot of damage to my nails. It hurts most of the time now, and washing it makes it worse.” (P24-A nurse).

Several participants have reported experiencing allergic reactions to certain disinfectants, soaps, or gloves utilized during the hand hygiene procedure.

“Unfortunately, certain products used in the hospital make me and some of my coworkers very uncomfortable. To follow hand cleanliness rules, we have to avoid using those items, so I have to find other ones or use them less often.” (P40-A nurse).

Category 5: Organizational and management factors**Subcategory A. Equipment availability**

One of the factors that contributed to compliance with hand hygiene was the availability of appropriate equipment, which was mentioned as a limitation.

“There isn’t enough hand sanitizer when there are a lot of patients and not enough workers, especially during the day shift. We have to move to other rooms or look for it in other places.” (P28-A nurse).

“Gloves and alcohol rubs are not always available when we need them, and we can’t always count on having enough. We sometimes have to make quick trade-offs and find other ways to get the tools we need to follow the needed hand hygiene routine.” (P1-A nurse).

Subcategory B. Equipment quality

The majority of participants cited the quality of the equipment as a significant factor that contributed to their compliance with hand hygiene recommendations.

“While we want to always follow the rules and wash our hands properly, the products and tools we have access to aren’t up to par. For example, some gloves aren’t very durable, and some chemicals in soap can irritate the skin.” (P38-A nurse).

Some participants have stated that skin allergy responses have occurred as a result of items and equipment that have poor standards.

“Itchy skin and an allergy to the chemicals in the gloves and sensitizers make me sick. These toxins hurt me a lot when I come in touch with them. My opinion is that the company should look out for its workers and keep them safe. I wish we had something that wouldn’t make allergies worse.” (P17-A nurse).

Subcategory C. Supervision and monitoring

Supervisor monitoring, together with proper planning, administration, and training opportunities, were crucial factors in achieving the desired level of hand hygiene.

“The supervisor of our hospital is dedicated to creating a mindset of patient safety. Too many training, motivator, tracking, and billboard warnings made it easy to forget.” (P16-A nurse).

“When you have responsive and helpful management, you can talk about a problem and know that they will do something about it and make things better.” (P5-A nurse).

Subcategory D. Safety and Just Culture

Most participants expressed that establishing a psychologically secure workplace and a fair culture, where the act of admitting errors is highly regarded, is a vital factor in ensuring compliance with hand hygiene.

“When violations happen, management has a system where no one is to blame. I see it as a way to report any mistakes I make or gaps in my skills without worrying about being blamed for bad behavior.” (P34-A Anesthesiologist).

“We care about having an atmosphere that helps each other. Some areas have a strict and organized way of handling and making sure that people wash their hands. I don’t think this will help. I want to know that my opinion is heard, and it should be used to make things better instead of to stop people from doing something.” (P15-A nurse).

Discussion

The present study sought to assess the perspective of HCWs in the ICU about the determinants of complying with hand hygiene protocols. This was accomplished using a qualitative research approach involving online interviews. The analysis of respondents’ narratives identified five major themes: individual, team, work environment, task, and organizational factors.

The participants in our study generally expressed a belief that they have sufficient knowledge of the

standards and optimal methods for hand hygiene. Other studies supported and confirmed these findings [17]. A recent study indicated that the amount of knowledge expressed was moderate [36]. Additionally, it was found that a prevalent misunderstanding among HCWs was the tendency to prioritize wearing gloves above washing their hands [13]. This finding aligns with previous research conducted in ICUs, which indicated that despite the frequent use of gloves by nurses, they often neglected to properly wash or sanitize their hands after removing them [37]. Notably, substantial levels of knowledge do not invariably correspond to substantial compliance. This was demonstrated in one study in which, despite possessing a high level of knowledge, HCWs exhibited below-average adherence to hand hygiene protocols [15, 24].

A significant proportion of our research participants had a positive attitude and perspective about hand hygiene. Other studies have shown similar findings [23]. Several studies have found that HCWs who have positive attitudes are more likely to consistently follow hand hygiene procedures [38–40]. However, some researchers have suggested that the attitudes of HCWs have a negligible effect on their compliance with hand hygiene protocols [41–43]. One plausible rationale is that these studies assessed numerous facets of attitudes toward different dimensions of hand hygiene [38, 44]. For instance, measuring HCWs' attitudes toward the benefits of hand hygiene could result in an agreement between the participants. The study we conducted was limited to exploring general perceptions concerning the importance and purpose of hand hygiene. As a result, it will be essential to develop educational initiatives to assess and improve HCWs' knowledge and attitudes regarding hand-washing techniques and the standardization of health practices to enhance hand hygiene among HCWs [45, 46].

The current study found that adherence to hand hygiene practice was significantly influenced by behavioral norms, patterns, and role modeling. Other studies have established that adherence to hand hygiene protocols is significantly influenced by the presence of role models [47]. Physicians, particularly those in high positions, have significant influence over the adherence of HCWs to hand hygiene standards [48]. This highlights the crucial role of staff and management in promoting and supporting hand hygiene measures to ensure patient safety [49]. Multiple studies have shown that a significant factor in determining hand-washing habits among young and inexperienced employees is the perception of social pressure from their superiors [50, 51]. Furthermore, further studies have discovered that the absence of favorable social norms and role models among physicians and managers acts as a hindrance to the adoption of effective hand hygiene practices [52]. Hence, it is imperative to utilize the assistance and involvement of senior personnel,

particularly physicians, to encourage strict compliance with hand hygiene practices. Simultaneously, the combination of direct monitoring and immediate feedback offers an unbiased evaluation and facilitates the provision of continuous education in real-time, resulting in improved patient care that is both more effective and safe [53, 54]. Furthermore, it is important to establish a safety culture when implementing the feedback process. Hence, organizational culture plays a crucial role in facilitating the exchange of hand hygiene feedback without instilling fear of criticism or retaliation [55–58]. Several research has demonstrated that a lack of affiliation with the ICU team and limited social cohesion mostly hindered these participants from properly addressing the problem [59, 60].

Work and environmental circumstances have the potential to impact HCWs adherence to appropriate hand hygiene protocols. Our research revealed that fatigue and burnout resulting from an excessive workload pose a significant obstacle. Staff fatigue has an impact on the effectiveness of hand hygiene [61]. HCWs were less attentive to hand hygiene practice toward the end of their shift work owing to exhaustion, and the longer the break interval between shift work, the more hand hygiene was performed [62]. In addition, HCWs are unable to allocate sufficient time for hand hygiene practices due to their heavy workload. This, along with environmental and social challenges, might contribute to job burnout [63]. Additional research has also documented a correlation between a high volume of work and situations of emergency and less adherence to hand hygiene protocols [64]. critical units have been associated with low compliance [25]. This assumption aligns with earlier research that has discovered a greater percentage of adherence in Neonatal Intensive Care Units (NICUs) compared to adult wards [65]. Multiple studies have highlighted overload as a significant obstacle to HCWs' adherence to hand hygiene protocols [64, 66]. The participants in the current study identified workload and a high patient volume as the primary factors contributing to failing to comply with hand hygiene. Participants expressed a belief that they lacked sufficient time to engage in hand hygiene under emergency situations, a finding consistent with the results of several research [64]. Thus, it may be inferred that HCWs may not be able to adhere to proper hand hygiene practices despite their familiarity with the recommended hand-washing procedure, as a result of their heavy workload [63]. Our research identified another obstacle, which is the inadequate physical space design. One of the barriers to practicing hand hygiene that was identified was the inadequate arrangement of the physical space in the ward, specifically with the accessibility to hand washing stations and alcohol containers. Substituting gloves for hand hygiene, limited hospital space, and unavailability

of hand wash basins have been considered as barriers to hand hygiene practice, which were consistent with our study [23, 64, 66].

Most participants indicated obstacles associated with the nature and characteristics of hand hygiene duties and processes. One contributing factor was the frequent repetition of the activity, which led to excessive use of chemical disinfectants. This overuse can result in skin damage, pain in the hands, and even loss of nails. Similar results have been reported in other studies [23, 67]. Insufficient availability of suitable hand hygiene products, inadequate supply of tissue paper, absence of hand dryers, and skin damage caused by repeated washing are significant obstacles to maintaining proficient hand hygiene [68]. The respondents also identified the time necessary to perform hand hygiene adequately, taking into account the five-second hand cleansing guidelines, as an additional task-specific barrier. Due to their heavy workload of patients and services, HCWs have limited time to adhere to hand sanitation protocols [12].

HCWs were unable to effectively adhere to hand hygiene protocols due to insufficient facilities and equipment, an issue that has also been noted in previous research [38]. Therefore, providing sufficient facilities and equipment is essential for effectively following hand hygiene requirements in practice [66]. Moreover, the use of proper supplies such as the correct detergent, disposable towels, and tissues, together with the implementation of automated faucets, were recognized as major reasons that led to hand hygiene protocols [63]. Therefore, the presence of adequate and high-quality equipment can promote compliance with hand hygiene regimens, thereby helping to prevent the transmission of infections.

Participants recognized the crucial role of healthcare institutions in providing the necessary assistance to enhance compliance with hand hygiene. Previous research has shown that attempts to improve hand hygiene have been insufficient due to a lack of attention given to the organizational culture [38, 69]. Compliance with hand hygiene is generally accepted to be significantly impacted by the participation of organization leaders in infection prevention [70]. Recommended methods to promote appropriate hand hygiene practices include constructive criticism, direction from management, and well-organized work environments [66]. Hospital authorities are responsible for ensuring that correct hand hygiene protocols are followed, and they would benefit from increased supervision to address any obstacles that may hinder the implementation of these measures [71]. Thus, Hospital management can employ a hand hygiene audit system to receive prompt feedback and provide ongoing interactive teaching until satisfactory compliance is attained.

While the participants acknowledged the need to maintain adequate hand hygiene, they expressed that a major obstacle was the absence of a secure setting to report any instances of non-compliance with hand hygiene procedures [72]. The majority of participants felt that a safety culture was beneficial in ensuring the maintenance of appropriate hand hygiene practices. When HCWs perceive hand hygiene as a shared and collaborative responsibility, they can achieve the highest degree of hand hygiene [73]. It has been demonstrated that programs that concentrate on altering the culture of the firm provide positive outcomes [74]. Hence, it is imperative that we develop innovative strategies to transform the blame culture prevalent in the healthcare sector into a culture of collaboration and collective responsibility.

The majority of participants have emphasized that training and education play a crucial role in affecting adherence to hand cleanliness. Similar results were corroborated by additional investigations [75]. Efficiently constructed training programs have the potential to accelerate the learning process, ensure that staff members are well-informed about guidelines, and enhance the relationships among HCWs. Furthermore, individualized on-site training conducted by the infection control team was found to have a more significant effect compared to training delivered in a group setting [58]. Hence, implementing frequent training sessions to enhance employee knowledge and comprehension, together with providing support and constructive criticism, might be an essential component in embracing hand hygiene regulations [66].

There are a few limitations in our study. Firstly, because of its qualitative nature, we should exercise caution when generalizing ours. In addition, the limited number of participants from some categories, such as physicians, may have hindered our ability to discern variations among the professional groups. Despite these constraints, we obtained valuable understanding regarding the fact that certain settings encouraged staff to wash their hands more often. The conceivable method to address this issue is to remove individual, managerial, and organizational obstacles. This solution can be beneficial for future research, education, and practice.

Conclusion

The main aim of this study was to examine the key factors that influence the behavior of HCWs in the ICU when it comes to hand hygiene. Our research revealed several factors that impact hand hygiene compliance, including individual, work/environment, team, task, patient, organizational, and management concerns. Several obstacles and possibilities for enhancement have been recognized. The results of this study would enhance our comprehension of hand hygiene practices and serve as a foundation for creating future strategies and assessment methods

to enhance compliance with hand hygiene protocols in ICUs. These treatments should incorporate these elements, considering the specific individual, cultural, and institutional aspects. We also recommend transitioning from a culture of blame to a culture of collaboration to enhance compliance with hand hygiene practices. Further research is necessary in the future to investigate the link between the discovered factors, uncover other drivers, and extend the findings to a broader context, given the nature of the qualitative study.

Author contributions

SA designed, analyzed, and wrote main manuscript the study.

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Data availability

Date are available on reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the King Fahad Medical City Institutional Review Board under number 1R800010471 and Federal Wide Assurance number FWA00018774. Following participant recruitment, the study's aims were described to the participants, and at the start of the interview, informed written consent was acquired before any audio recording started. Data confidentiality and the freedom to join and leave the research were disclosed to the participants.

Consent for publication

I give my consent for the publication of identifiable details to be published in the Journal.

Competing interests

The authors declare no competing interests.

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