
HANDS HYGIENE TRAINING AND ADHERANCE OF HEALTHCARE PROFESSIONALS FOR CONTROL HEALTHCARE-ASSOCIATED INFECTIONS

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Abstract: Healthcare-associated infections (HAIs) present a widespread challenge for healthcare facilities globally. To effectively prevent and control HAIs, it is crucial for all healthcare professionals to strictly adhere to standard hand hygiene protocols. Extensive examination of pertinent scientific literature confirms that repeated training in hand hygiene is indispensable to ensure compliance among healthcare professionals. Moreover, implementing reminders for hand hygiene, such as prominently displayed posters and the strategic positioning of gloves and hand sanitizers at workstations, has proven effective in HAI prevention. Following training, continuous monitoring of hand hygiene compliance becomes imperative. In light of the overarching objective of healthcare facilities and professionals to deliver high-quality healthcare, adopting a team-based approach to prevent HAIs emerges as the most effective strategy for promoting hand hygiene compliance. Healthcare professionals working as a cohesive team should undergo initial and recurrent training, while also engaging in ongoing support, correction, and reminders to emphasize the significance of hand hygiene in their daily routines. This collective effort is poised to significantly improve adherence to hand hygiene practices, thereby leading to a notable reduction in healthcare-associated infections.

Keywords: hand hygiene, training, compliance, adherence, health professionals

1. INTRODUCTION

Healthcare-associated infections (HAIs) pose a significant challenge in modern healthcare settings. These infections can be caused by infectious agents originating from within the patient's own body or from external sources (Graveto et al., 2018). HAIs are a major contributor to morbidity and mortality rates (Gould DJ et al., 2017), with healthcare professionals' hands being the primary route of transmission (Graveto et al., 2018). Implementing standard hygiene precautions has proven to be an effective approach to controlling HAIs among healthcare workers (HCWs) (Baccolini V. et al., 2019). Even the most advanced healthcare systems cannot claim to be entirely free of HAI problems (Laskar AM et al., 2018), as compliance with hand hygiene guidelines is often subpar, and the evidence regarding the proper use of gloves and gowns is limited and discouraging (Baccolini V. et al., 2019).

Patient safety is a critical priority in any healthcare system, and one of the most effective measures to ensure safety is proper hand hygiene. To achieve improved adherence to hand hygiene protocols, healthcare staff must be knowledgeable about the correct practices and consistently implement them (Martos-Cabrera et al., 2019). The knowledge, perceptions, and attitudes of nurses significantly influence their adherence to patient safety principles, with personal and professional values and attitudes having a greater impact on consistency than their workloads (Vaismoradi M et al., 2020).

Education and training regarding various types of hand hygiene products aim to enhance compliance by increasing healthcare workers' awareness of when hand hygiene is necessary and encouraging optimal techniques (Gould DJ et al., 2017). In addition to training, healthcare institutions utilize reminder mechanisms such as posters, strategically placing gloves near work areas, and providing more dispensers with hydroalcoholic solutions to maintain adherence to hand hygiene protocols (Martos-Cabrera et al., 2019).

Hand hygiene has been recognized as a critical factor in reducing the spread of infectious diseases and the incidence of colonization. It is considered the primary universal measure to control HAIs and should be continually promoted (Graveto et al., 2018).

2. AIM

The primary objective of this research is to assess the level of compliance among healthcare professionals regarding hand hygiene and to identify potential intervention strategies for enhancing this essential procedure

3. MATERIALS AND METHODS

This article provides a qualitative analysis of the existing literature, with a focus on relevant databases that were systematically searched using specific keywords related to hand hygiene, training, compliance, adherence, and nurses. The databases utilized for this review encompassed prominent platforms such as PubMed, Google Scholar, Medline, Science Direct, and Science Citation.

4. RESULTS

The findings of this study consist of a comprehensive review and examination of 12 scientific articles (as shown in Table 1). These studies were conducted in various countries, including Spain, Guinea, Egypt, Indonesia, Italy, India, Iran, Portugal, China, and Germany

Table 1. Overview of research studies and outcomes

<i>Citation</i>	<i>Country</i>	<i>Main aims</i>	<i>Results</i>	<i>Conclusion</i>
<i>Arredondo-Provecho et al. 2020</i>	Spain	The study aimed to understand the evolution of hand hygiene adherence among healthcare professionals and propose implementation measures.	Adherence to hand hygiene increased from 37% in 2011 to 57.8% in 2019. Compliance was higher after patient contact than before it, with nurses showing the highest compliance.	Compliance rates have improved but need to be maintained and increased, especially before aseptic procedures. Training and implementation of strategies are vital to sustaining and enhancing compliance.
<i>Müller et al. 2020</i>	Guinea	The PASQUALE project aimed to assess knowledge and compliance with hand hygiene in a regional hospital and improve it through WHO HH Strategy implementation.	After the intervention, knowledge score increased from 13.0/25 to 19.0/25, and compliance rose significantly from 23.7% to 71.5%. Compliance improved across professional groups and indications, especially "Before aseptic tasks."	The WHO HH strategy effectively improved knowledge and compliance in a resource-limited setting. Local production of ABHR proved feasible. Participatory approaches and hygiene committee ownership enhance sustainability.
<i>García-Vázquez et al. 2012</i>	Spain	The study aimed to assess hand hygiene compliance among ICU workers before and after implementing a promotion program and alcohol-based hand rub distribution.	Hand-washing rate increased significantly after the program (45.3% to 63% before and after patient care). The educational program was associated with improved compliance.	The study shows a significant increase in hand hygiene compliance among ICU personnel due to the educational program.
<i>Anwar & Elareed 2019</i>	Egypt	The study evaluated hand hygiene compliance among healthcare workers in an ICU before and after an educational intervention.	Overall compliance increased significantly from 30.9% to 69.5% post-intervention. Nurses exhibited the highest compliance rates.	The intervention educational program effectively improved hand hygiene compliance among ICU healthcare workers. Regular monitoring and sustained training programs are essential for efficient and effective care delivery.
<i>Saharman et al. 2019</i>	Indonesia	The research aimed to evaluate the impact of a multifaceted intervention on hand hygiene knowledge and compliance among ICU nurses and physicians.	After the intervention, hand hygiene knowledge score improved significantly (15 to 22), and compliance increased from 27% to 77%. Nurses had better compliance than physicians.	The multifaceted intervention resulted in significant improvements in hand hygiene knowledge and compliance. Continued monitoring and repeated interventions are necessary to maintain compliance levels over time.
<i>Baccolini et al. 2019</i>	Italy	The study assessed the impact of a multimodal intervention on healthcare workers' compliance with standard hygiene precautions over time.	Overall compliance significantly improved from 41.9% to 62.1% after the intervention. Nurses had the highest compliance rates.	The multimodal intervention effectively improved compliance with standard hygiene precautions. Regular educational reinforcement and feedback are crucial for sustaining high and uniform compliance levels.
<i>Madhura et al. 2018</i>	India	The objective was to evaluate the impact of a training module on hand hygiene practices of healthcare providers in a neonatal ICU.	Overall hand hygiene compliance rates significantly improved after the training module (77% to 97%).	Training modules significantly improved hand hygiene compliance rates among healthcare providers in a neonatal ICU.

<i>Farmani et al. 2019</i>	Iran	The study aimed to determine the effect of awareness of subtle control after training on hand hygiene compliance among nurses in ICUs.	Hand hygiene compliance in the intervention group significantly increased after the training ($p < 0.001$). Nurses showed higher compliance rates compared to the control group.	A fake CCTV, along with training, improved hand hygiene compliance among ICU nurses, indicating the potential effectiveness of this approach.
<i>Graveto João Manuel et al. 2018</i>	Portugal	The study aimed to identify determining factors in hand hygiene management among nurses and address collective health challenges associated with it.	Most nurses reported complying with hand hygiene recommendations, but none could identify all moments for hand hygiene.	Continuous training, adequate materials/structures, and redesigned administration/supervision practices are essential to achieve higher adherence to hand hygiene among nurses and improve care quality and safety.
<i>Ni et al. 2020</i>	China	The research investigated the effectiveness of hand hygiene improvement among hospital staff through a continuous intervention process.	Continuous intervention led to a gradual increase in hand hygiene compliance rates (76.61%, 79.95%, and 83.34% in different phases). Nurses had the highest compliance rates.	The hand hygiene improvement project effectively increased compliance rates among hospital staff. Proper planning, training, monitoring, and feedback contributed to its success.
<i>Magdalena Hoffmann et al. 2019</i>	Germany	The study explored the impact of an iterative process of information, training, and feedback on hand hygiene compliance among healthcare professionals.	Mean hand hygiene compliance increased from 81.9% to 94.0% over five years. Physicians' and nurses' compliance improved significantly.	An iterative process of information, training, observation, and feedback successfully increased hand hygiene compliance rates among healthcare professionals in different categories.
<i>Gaube et al. 2018</i>	Germany	The field experiment aimed to improve hand hygiene behavior through the use of emoticons as reminders.	Hand hygiene behavior significantly outperformed in rooms with emoticons compared to other conditions.	Activating injunctive norms, like emoticons, can effectively improve hand hygiene behavior, and this finding has important theoretical and practical implications

5. DISSCUSION

The reviewed studies primarily focused on investigating hand hygiene compliance among healthcare professionals and the effectiveness of education and training in improving adherence to hand hygiene practices. All authors emphasized that hand hygiene is a crucial measure in controlling the transmission of pathogens and preventing healthcare-associated infections (HAIs). Santosaningsih et al. highlighted the association between healthcare workers' compliance with hand hygiene and their perception and knowledge regarding its importance. Laskar et al. pointed out the low compliance among healthcare workers and proposed multimodal interventions to enhance adherence effectively. Arredondo-Provecho et al. and Engdaw et al. demonstrated a significant correlation between healthcare professionals' adherence to hand hygiene and their knowledge and training, emphasizing the need for continuous education on proper hand hygiene practices.

Besides hand hygiene, providing adequate resources for implementing it is essential for healthcare professionals. Ni et al. and Engdaw et al. emphasized the importance of having sufficient supplies of soap, water, and alcohol-based hand rubs at workstations. They also stressed the significance of promoting hand hygiene through posters and protocols in hospitals.

Hoffmann et al. highlighted the success of an iterative approach involving information, training, observation, and feedback in improving hand hygiene compliance. This underscores the importance of monitoring hand hygiene implementation by healthcare professionals as a critical measure in preventing HAIs.

To ensure high-quality healthcare and patient safety, efforts must be made to address the challenge of HAIs. Healthcare professionals need to be well-equipped with necessary materials and continuously trained in hand hygiene practices. Healthcare facility administrators should promote the significance of hand hygiene and encourage a team-based approach to deliver quality and safe healthcare.

Overall, fostering a culture of hand hygiene and providing necessary support and training to healthcare professionals will lead to better outcomes and a safer healthcare environment.

6. CONCLUSION

Given that hand hygiene plays a crucial role in preventing healthcare-associated infections, it is essential to prioritize continuous education on its importance for all healthcare facility employees, especially healthcare professionals. Regular hand hygiene training and ongoing monitoring of practices should be implemented to ensure compliance. A team-based approach, involving all healthcare professionals, would be most effective in preventing and controlling healthcare-associated infections. This collaborative effort would promote the adoption of appropriate hand hygiene practices in daily routines. Healthcare professionals should undergo training, retraining, and support each other in adhering to hand hygiene protocols consistently. Such collective efforts would lead to increased compliance with hand hygiene guidelines and subsequently reduce healthcare-associated infections.

REFERENCES

- Arredondo-Provecho, A.B., Horcajo-Díaz, E., Cerrillo-González, I., Morato-Cerro, V.M., Pérez-Ortiz, M., & Rodríguez-Caravaca, G. (2020). Evolución de la adherencia a la higiene de manos en un hospital de la Comunidad de Madrid [Evolution of hand hygiene adherence of health professionals of specialized care]. *Rev Esp Salud Publica*. 94:e202007075.
- Anwar, M.M., & R. (2019). Improvement of hand hygiene compliance among health care workers in intensive care units. *J Prev Med Hyg*. 60(1):E31-E35.
- Baccolini, V., D'Egidio, V., de Soccio, P., Migliara, G., Massimi, A., Alessandri, F., et al. (2019). Effectiveness over time of a multimodal intervention to improve compliance with standard hygiene precautions in an intensive care unit of a large teaching hospital. *Antimicrob Resist Infect Control*. 8:92.
- Engdaw, G.T., Gebrehiwot, M., & Andualem, Z. (2019). Hand hygiene compliance and associated factors among health care providers in Central Gondar zone public primary hospitals, Northwest Ethiopia. *Antimicrob Resist Infect Control*. 8:190.
- Farmani, Z., Kargar, M., Khademian, Z., Paydar, S., & Zare, N. (2019). The effect of training and awareness of subtle control on the frequency of hand hygiene among intensive care unit nurses. *BMC Res Notes*. 12(1):647.
- García-Vázquez, E., Murcia-Payá, J., Allegue, J.M., Canteras, M., & Gómez, J. (2012). Influencia de un programa de intervención múltiple en el cumplimiento de la higiene de manos en una unidad de cuidados intensivos [Influence of a multiple intervention program for hand hygiene compliance in an ICU]. *Med Intensiva*. 36(2):69-76.
- Gaube, S., Tsvirikos, D., Dollinger, D., & Lermer, E. (2018). How a smiley protects health: A pilot intervention to improve hand hygiene in hospitals by activating injunctive norms through emoticons. *PLoS One*. 13(5):e0197465.
- Graveto, J.M.G.D.N., Rebola, R.I.F., Fernandes, E.A., & Costa, P.J.D.S. (2018). Hand hygiene: nurses' adherence after training. *Rev Bras Enferm*. 71(3):1189-1193.
- Gould, D.J., Moralejo, D., Drey, N., Chudleigh, J.H., & Taljaard, M. (2017). Interventions to improve hand hygiene compliance in patient care. *Cochrane Database Syst Rev*. 9(9):CD005186.
- Graveto, J.M., Santos, C., Costa, P.S., Fernandes, E., Alarico, S., Osório, N., et al. (2018). Hand hygiene management among nurses: collective health challenges. *Rev. Bras. Enferm*. 71(1):562-7.
- Hoffmann, M., Sendlhofer, G., Pregartner, G., Gombotz, V., Tax, C., Zierler, R., et al. (2019). Interventions to increase hand hygiene compliance in a tertiary university hospital over a period of 5 years: An iterative process of information, training and feedback. *J Clin Nurs*. 28(5-6):912-19.
- Laskar, A.M., Bhat, P., Pottakkat, B., Narayan, S., Sastry, A.S., & Sneha, R. (2018). A multimodal intervention to improve hand hygiene compliance in a tertiary care center. *Am J Infect Control*. 46(7):775-780.
- Madhura, A., Golhar, S., Chauhan, U., Ughade, S., & Dhakne, S. (2018). Impact of hand hygiene training module among healthcare providers working in neonatal intensive care unit: A before and after trial. *Indian J Child Health [Internet]*. 5(4):276-9.
- Martos-Cabrera, M.B., Mota-Romero, E., Martos-García, R., Gómez-Urquiza, J.L., Suleiman-Martos, N., Albendín-García, L., et al. (2019). Hand Hygiene Teaching Strategies among Nursing Staff: A Systematic Review. *Int J Environ Res Public Health*. 16(17):3039.
- Müller, S.A., Diallo, A.O.K., Wood, R., Bayo, M., Eckmanns, T., Tounkara, O., Arvand, M., Diallo, M., & Borchert, M. (2020). Implementation of the WHO hand hygiene strategy in Faranah regional hospital, Guinea. *Antimicrob Resist Infect Control*. 2020;9(1):65.
- Ni, L., Wang, Q., Wang, F., Ni, Z., Zhang, S., Zhong, Z., et al. (2020). An interventional implementation project: hand hygiene improvement. *Ann Transl Med*. 8(18):1149.

- Saharman, Y.R., Aoulad Fares, D., El-Atmani, S., Sedono, R., Aditianingsih, D., Karuniawati, A., et al. (2019). A multifaceted hand hygiene improvement program on the intensive care units of the National Referral Hospital of Indonesia in Jakarta. *Antimicrob Resist Infect Control*. 8:93.
- Santosaningsih, D., Erikawati, D., Santoso, S., Noorhamdani, N., Ratridewi, I., Candradikusuma, D., et al. (2017). Intervening with healthcare workers' hand hygiene compliance, knowledge, and perception in a limited-resource hospital in Indonesia: a randomized controlled trial study. *Antimicrob Resist Infect Control*. 6:23.
- Vaismoradi, M., Tella, S., Logan, P., Khakurel, J., & Vizcaya-Moreno, F. (2020). Nurses' Adherence to Patient Safety Principles: A Systematic Review. *Int J Environ Res Public Health*. 17(6):2028.