Hand Hygiene Practices among Nurses in Saudi Arabia: A Systematic Review

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Abstract

Objectives: To evaluate the hand hygiene (HH) practices among nurses in Saudi Arabia.

Methods: To locate research that met the inclusion criteria, a thorough computerized search of relevant databases was carried out. A comprehensive search was carried out on PubMed, SCOPUS, Science Direct, Cochrane Library, and Web of Science to locate relevant material.

Results: Our data included eight trials with 1218 participants and 573 (47%) were males. This systematic review noted that compliance rates ranged widely, from 18.8% to 86.83%, and the most important factors in HH were gender-female nurses being more compliant; education targeted at and training of nurses; and, finally, behavioral factors related to self-efficacy, social pressure, and workplace culture. While there was some good compliance, generally HH practices were suboptimal and needed further improvement.

Conclusion: This systematic review indicates that factors that significantly contribute to compliance to HH among Saudi nurses include gender, with females generally showing better adherence, and targeted education and training. Behavioral factors include self-efficacy, while social factors include workplace culture, which greatly enhances the practice of HH. Although some studies were positive, the overall compliance was poor, and further efforts were required to improve the adherence to HH practices through better education, supportive environment, and strong monitoring mechanisms for ensuring patient safety and quality care.

Keywords: *hand hygiene; Work environment; Nursing; Saudi; Systematic review.*

Introduction

It has been demonstrated that practicing good HH in the healthcare setting lowers the prevalence of healthcare-associated illnesses (HAIs) [1]. HAIs continue to be a major problem despite preventative measures; they are linked to longer hospital stays, higher costs, and higher rates of mortality [2]. The SARS-CoV-2 epidemic has brought attention to the importance of reiterating basic infection control principles, such as hand cleanliness.

The World Health Organization (WHO) released "Five Moments for HH" in their May 2009 guidelines on HH in hospital settings [3]. These five

times are as follows: (1) prior to patient contact; (2) prior to sterile or aseptic procedures; (3) following bodily fluid exposure; (4) following patient contact; and (5) following patient surroundings contact. There are two types of approaches to monitoring HH: indirect methods (like product use or automated monitoring) and direct methods (like self-reported compliance or direct observation). Direct observation of HH compliance is currently advised as the "gold standard" because it is the only technique that can evaluate HH at all times. Direct observation is not without its restrictions, though. Selection, observer, and observation bias are examples of potential sources of bias. Prior studies have drawn attention to bias in HH compliance monitoring [3-5].

Healthcare personnel vary in their compliance with HH. Due to their position at the forefront of patient care and increased interaction with patients, nurses have a critical role in reducing HAI, cross-infection between nurses and patients, and patient mortality [6]. However, there is a large variation of reported HH compliance among nurses, making it unreliable for use in future programming [7, 8].

The healthcare system in Saudi Arabia is confronted with distinct obstacles, such as a population that is varied, a high patient turnover rate, and a growing incidence of multidrug-resistant pathogens. Strict attention to HH protocols is even more important in light of these concerns. Unfortunately, there is a dearth of thorough information regarding Saudi Arabian nurses' HH habits, which makes it challenging to pinpoint areas for improvement and compliance gaps. By combining the body of knowledge on the subject, this systematic review seeks to close this knowledge gap and offer a more comprehensive picture of the variables affecting hand cleanliness habits across the nation among nurses.

The aim of this systematic review is to assess Saudi Arabian nurses' HH habits. The purpose of this review is to determine how common it is for patients to follow HH instructions, what obstacles and enablers affect compliance, and how HH practices affect patient outcomes.

Methods

We implemented this systematic review in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [9] criteria. An internet-based search was performed on PubMed, Web of Science, SCOPUS, Cochrane Library, and Science Direct to find English-language studies on HH practices among nurses in Saudi Arabia. The search technique in these cases made use of pertinent keywords. To assess the quality of the included study, several reviewers sifted through the search results, chose relevant papers, collected data, and used the appropriate evaluation methods. These reviewers ensured that trustworthy studies and data were chosen for additional evaluation and summary in this systematic review by independently extracting pertinent material and critically assessing the included research's quality using established assessment processes.

Eligibility Criteria

Inclusion criteria:

1. Studies that reported the HH practices among nurses in Saudi Arabia.
2. Studies that investigated the prevalence of HH compliance or good practice.
3. Research that is printed in publications with peer review.
4. Studies available in the English language.
5. Research conducted on human subjects.

Exclusion criteria:

1. Studies that did not focus on HH practices.
2. Studies that did not report qualitative or quantitative data among nurses.
3. Studies not conducted in the determined geographic region (i.e. Saudi Arabia).
4. Studies not available in the English language.
5. Reviews, case reports, editorials, and opinion pieces.

Data Extraction

The search results were verified for correctness using Rayyan (QCRI) [10]. To determine if the titles and abstracts of the search results were relevant, the inclusion and exclusion criteria were used. Papers meeting the inclusion criteria were subjected to a thorough review by the study team. To settle disagreements, consensus was used. Key study data were recorded using an established data extraction form, including study titles, authors, year of publication, city, participant demographics, compliance rate/ prevalence of good practice, data collection tool, and main outcomes. To investigate

the probability of bias, a neutral evaluation instrument was developed.

Strategy for Data Synthesis

A qualitative review was made possible by the descriptions of the research findings and features that were created using data from pertinent studies. The best strategy to guarantee the utilization of the data from the included studies was identified following the completion of the data collection for the systematic review.

Risk of Bias Assessment

To assess the caliber of the research included in this analysis, the Joanna Briggs Institute (JBI) [11] critical assessment criteria created for studies reporting prevalence data will be used. This tool consists of nine questions, the responses to which are ranked as (1) positive, (0 being the lowest score), uncertain, or irrelevant. Study categories will be poor, moderate, and high quality, based on total scores that are below 4, between 5 and 7, and above 8. To ensure agreement and accuracy in the quality assessment process, researchers will evaluate the studies they conduct independently, and any disputes in the evaluations will be resolved through cooperative conversation.

Results

Systematic search outcomes

A comprehensive search turned up 591 study papers after 211 duplicates were discarded. 301 manuscripts were rejected after 380 studies' titles and abstracts were examined. Every article was located out of the 79 reports that were required. Nine papers had the inappropriate study setting, three were editor's letters, three were abstracts, and forty-one were rejected due to incorrect study results. Of the 79 articles that made it through the full-text screening process, fifteen were rejected due to incorrect population types. The eight research publications that make up this systematic review meet the eligibility criteria. The method used to choose the literature is shown in a diagram in **Figure 1.**

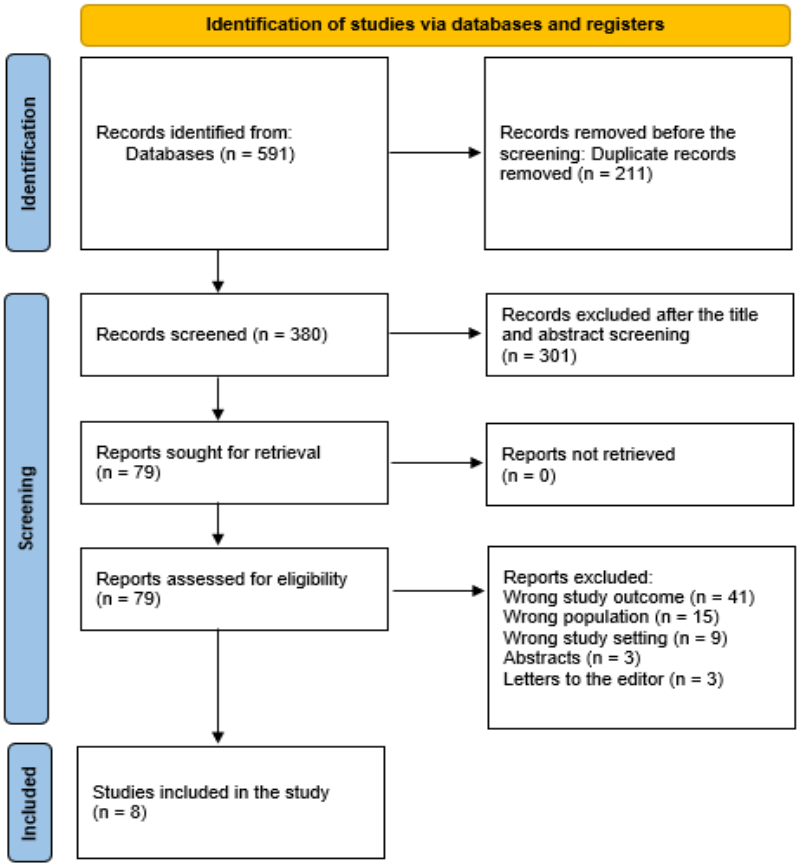

Figure 1: A PRISMA diagram is used to summarize the study decisions.

Sociodemographics of the comprised participants and studies

Table 1 displays the sociodemographic information from the research articles. Our data included eight trials with 1218 participants and 573 (47%) were males. All of the included studies were in cross-sectional design [12-19]. Two studies were conducted in Hail [13, 19], two in Riyadh [15, 17], one in Asir [12], one in Makkah [14], one in Sharqaa [16], and one in the Eastern region [18]. The earliest study was conducted in 2006 [15] and the latest in 2024 [17].

Clinical outcomes

The clinical data are presented in **Table (2)**. Several papers on Saudi Arabian nurses' HH practices were assessed in this systematic review. The results taken together show a wide variety of compliance rates, which reflects a considerable variation in the way HH practices are followed in various healthcare settings.

Overall, it was discovered that nurses' compliance with HH varied widely, with reported rates ranging from 18.8% [15] to 86.83% [13]. Gender is one of the many elements that influence this variance; generally speaking, female nurses exhibit higher compliance than their male counterparts. The requirement for continual in-service educational interventions was underlined by the research's persistent emphasis on the importance of education and training in enhancing HH behaviors [13-15]. Nurses who had received specialized training had a positive attitude toward hand cleanliness, and understood its significance in reducing HAIs were more likely to follow established protocols [17-19].

These are supported by the low rates of compliance reported in some studies, which indicate that ensuring consistent HH practices among nurses remains a challenge and requires more robust interventions to address these gaps [14, 15].

Good HH practices among nurses ranged from 29.8% [16] to 65.4% [12]. It was discovered that female participants practiced good HH considerably more often than male participants [12, 17].

Table 1: Sociodemographic parameters of the involved populations.

Study	Study design	City	Participants	Mean age	Males (%)
Mohaithef et al., 2020 [12]	Cross-sectional	Asir	243	20-54	126 (51.9%)
Alrimali et al., 2022 [13]	Cross-sectional	Hail	128	NM	4 (3.1%)
Bukhari et al., 2011 [14]	Cross-sectional	Makkah	92	NM	39 (42.8%)
Basurrah et al., 2006 [15]	Cross-sectional	Riyadh	110	NM	53 (48.2%)
Cruz et al., 2016 [16]	Cross-sectional	Sharqaa	198	21.8 + 1.3	107 (54%)
Syed & Al-Rawi, 2024 [17]	Cross-sectional	Riyadh	304	19 to >26	201 (66.1%)
Alshammari et al., 2018 [18]	Cross-sectional	Eastern Saudi	63	NM	35 (55.6%)
Albaqawi et al., 2021 [19]	Cross-sectional	Hail	80	20 to >36	8 (10%)

Table (2): Clinical parameters and outcomes of the comprised research.

Study ID	Tool	Prevalence of compliance/ practice	Main outcomes	JBI
Mohaithef et al., 2020 [12]	The standardized form of the WHO questionnaire	Good Practice 159 (65.4%)	It was discovered that female participants practiced good HH considerably more often (88%) than did the male participants (44%). To improve HH compliance, in-service educational interventions pertaining to the topic are necessary for male nurses and nurses employed in the internal medicine department.	High
Alrimali et al., 2022 [13]	Self-reported questionnaire	The overall HH compliance rate was 86.83%	This study emphasizes how crucial behavioral beliefs are to HH compliance. Social pressure indicates that HH rules will be followed. The significance of social impact, optimistic outlook, self-efficacy, and thorough understanding of HH.	High
Bukhari et al., 2011 [14]	Self-reported questionnaire	HH compliance rate 92 (56.4%)	Among healthcare professions, nurses had the highest rate of compliance with HH practices.	Moderate
Basurrah et al., 2006 [15]	Observation sessions	Hand washing compliance was 18.8%	An average of 75.5% of procedures were completed with gloves on. Insufficient handwashing compliance is a global issue.	Moderate
Cruz et al., 2016 [16]	Self-reported questionnaire	Good Practice (29.8%)	Five factors—a favorable attitude toward HH, being male, knowing how efficient HH is in reducing HAIs, attending HH training or seminars, and academic level—were found to be strongly predictive of practicing HH.	Moderate
Syed & Al-Rawi, 2024 [17]	Self-reported questionnaire	NM	There was a statistically significant correlation ($p = 0.004$) between the mean knowledge level of hand washing and gender. Female students indicated a higher mean knowledge level of 10.09 ± 1.27, compared to male students' 9.63 ± 1.48. In a similar vein, female students had a mean practice score of 5.00 ± 1.25, while male students had a mean practice score of 4.62 ± 1.46, with a significant correlation between the two ($p = 0.037$).	Moderate
Alshammari et al., 2018 [18]	Questionnaire and observation	NM	There were notable distinctions between the self-report questionnaires pertaining to HH behaviors between physicians and nurses.	Moderate
Albaqawi et al., 2021 [19]	Self-reported questionnaire	NM	8.8% of the individuals were categorized as high risk because they neglected to remove and replace their personal protective equipment; 6.3% were classified as high risk because they neglected to wash their hands both before and after interacting with COVID-19 patients; and 5% did not wash their hands according to recommended protocols after handling the patients' surroundings.	Moderate

*NM=Not-mentioned

Discussion

This systematic review revealed compliance with HH among nurses in Saudi Arabia to vary from as low as 18.8% to as high as 86.83%. These results therefore indicate that HH practice is a complex interaction of factors; based on the findings, several

areas that require targeted interventions to improve compliance are recommended in order to ensure patient safety. **Bredin *et al.*** reported that the pooled compliance rate for HH among nurses was (52%) [20] and 40.5% among Iranian nurses [21].

We found gender is one of the many elements that influence this variance; generally speaking, female nurses exhibit higher compliance than their male counterparts. The requirement for continual in-service educational interventions was underlined by the research's persistent emphasis on the importance of education and training in enhancing HH behaviors [13-15]. **Labrague *et al.*** also revealed that student nurses have an inadequate understanding of and adherence to HH. This review also emphasized how little research has been done on the organizational and individual aspects that affect nursing students' compliance and understanding of HH [22]. These are supported by the low rates of compliance reported in some studies, which indicate that ensuring consistent HH practices among nurses remains a challenge and requires more robust interventions to address these gaps [14, 15].

Because proper HH practices at the appropriate time and with the appropriate method can save lives, there needs to be ongoing teaching and monitoring of basic precautions [23, 24]. The primary factors influencing the adherence to HH among healthcare workers were identified through a systematic qualitative literature review as follows: perceptions of the work surroundings (resources, expertise, knowledge, and managerial culture) and motivating variables (severity of patient care, self-protection, and use of instructions) [25].

This review also found that good HH practices among nurses ranged from 29.8% [16] to 65.4% [12]. It was discovered that female participants practiced good HH considerably more often than male participants [12, 17]. The reasons behind health professionals' noncompliance with regulations have been linked to various factors, including severe workloads, forgetfulness, hard soaps that irritate the skin, and less knowledge about the significance of hand cleanliness. Research indicates that healthcare professionals should only wash their hands when absolutely essential, not every time their hands are likely to be highly polluted and their technique is still subpar [26]. The availability of hand sanitizer is another aspect. HH practice rates have been found to be considerably higher when alcohol-based hand rubs are more widely available [27]. The use of alcohol-based hand rubbing has several benefits over traditional soap-based hand washing, including shorter hand washing times and the ability to place HH product dispensers anywhere in the medical facility without the need for sinks, paper towels, or hand dryers [28]. To enhance the hand washing practice, additional strategies such as distributing an already-existing product, having health personnel carry individual dispensers, and putting dispensers in more noticeable places can be added [26].

The results of this review are consistent with the international concern about HH practice variability among healthcare workers. Indeed, the same challenges were echoed in regions such as workload, missing resources, and poor monitoring and feedback mechanisms were available to culminate in a low compliance rate [14]. These require an integrated approach to solve: these include not only education and training but also systemic changes, such as providing adequate facilities for HH, monitoring compliance on a routine basis, and ensuring a strong safety culture in healthcare institutions.

Limitations

Limitations to the systematic review must be considered in drawing the findings of this review. The reviewed studies had great heterogeneity in their designs and methodologies, such as the use of self-reported questionnaires versus direct observation. This can introduce bias into the review, particularly in the accuracy of the reported HH compliance rates. Self-reported data are always subject to social desirability bias in which the participants may overestimate adherence to HH practices. Furthermore, most studies did not look deeply into the root causes of non-compliance, which include issues such as workload-related problems, availability of HH resources, and organizational culture. Being able to identify these elements is an important first step in constructing interventions that will help improve compliance. Lastly, publication bias might have also affected the results of this review because studies with positive findings have a greater likelihood of being published, which may result in an overestimation of compliance with HH. Also, the review is limited to studies published in the English language, which

may also exclude other relevant research published in other languages. These are the major limitations that provide avenues for future research: such research should use standardized methodologies and explore barriers to compliance with HH in more detail, considering a broader range of health settings so as to afford comprehensive insights into nurses' practices related to HH in Saudi Arabia.

Conclusion

This systematic review indicates that factors that significantly contribute to compliance to HH among Saudi nurses include gender, with females generally showing better adherence, and targeted education and training. Behavioral factors include self-efficacy, while social factors include workplace culture, which greatly enhances the practice of HH. Although some studies were positive, the overall compliance was poor, and further efforts were required to improve the adherence to HH practices through better education, supportive environment, and strong monitoring mechanisms for ensuring patient safety and quality care.

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