Original Article

The Compliance of Health Workers Doing Five Moments Of Handwashing With The Incidence Of Nosocomial Infections: Literature Review

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ABSTRACT

Background: *Nosocomial infection is a cross-infection in nurses or patients during hospital treatment. One of the factors that can prevent nosocomial infections is health workers' compliance in carrying out 6 (six) hand washing steps. This literature review aims to determine the relationship between the compliance of health workers washing hands and the incidence of nosocomial infections in hospitals.*

Methods: *The method used in this article is a literature review using the PRISMA Approach. Journal databases from Science Direct, PubMed, and Google Scholar in the 2019-2023 time frame. Keywords "Handwashing," "Five Moments," and "Healthcare-Associated Infections (HAIS)" from the identification results based on inclusion criteria and eligibility review obtained ten articles for review.*

Results: *The literature review study found that adherence to five moments of hand washing significantly affected the prevention of nosocomial infections.*

Conclusion: *It is expected that all health personnel who provide health services to patients with complete self-awareness are disciplined to carry out five moments of hand washing.*

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Introduction

Hospitals are places where people get health services and care, including wanting to get the best recovery. Many patients contract the disease after being hospitalized, which, of course, adds to the patient's suffering, increases costs, and even results in death; such infections are commonly called Health-care Associated Infections (HAIs). Infectious diseases due to the health service process or healthcare-associated infections (HAIs) are among the health problems in various countries, including Indonesia (Intan, 2021; Purwaningsih et al., 2019).

Every day, HAIs kill 1.4 million people globally. Hospitals from 14 different countries in four distinct areas (regional) discovered that 8.7% of patients had an infection. As many as 1.4 million persons worldwide may develop HAIs at any given moment.. More than 8 million people have been exposed to blood or other bodily fluids, according to officers. According to Purnomo et al. (2019), the most common routes of contamination were contact with

contaminated sharp objects such needles, tools, and scalpels (82%), contact with the mucous membranes of the eyes, nose, or mouth (14%), and exposure to broken or chipped skin (3%).

Nosocomial infection comes from the Greek words nosos (disease) and komeion (treat). Nosokomion (or nosocomium in Latin) means hospital. In general, the agreed definition of nosocomial infection is any infection acquired during hospital treatment or associated with previous hospital care. These symptoms are generally caused by several microorganisms such as methicillin-resistant Staphylococcus aureus (MRSA), extended-spectrum beta-lactam (ESBL), klebsiella pneumonia carbapenemase (KPC), and pseudomonas aeruginos. This infection is usually characterized by a time of occurrence of 48 hours after the patient entered the hospital; most likely, there has been a nosocomial infection. According to WHO (World Health Organization, 2014) Infectious diseases are one the diseases that attack humans caused by various kinds of pathogenic microbes, one of which is bacteria (Kemenkes RI, 2021; Setiawan & Suwardianto, 2021).

The demand for nurses to have knowledge, skills, and good attitudes while caring for patients is increasing. Nurse compliance in carrying out permanent nursing procedures, including hand washing procedures, is one of the determinants of the success of preventing nosocomial infections (Purnomo et al., 2019). The World Health Organization (WHO) declared a patient safety program by triggering the Global Patient Safety Challenge, "Clean care is safe care," and launched Save Lives: Clean Your Hands with a strategy of 5 momenthand hygiene (My Five Moments for Hand hygiene) namely before contact with patients, before carrying out aseptic measures, after exposure to patient body fluids, after contact with patients, upon contact with the patient's surrounding environment"(Anugrahwati & Hakim, 2019).

Methods

The method used in this article is a literature review using a database of journals from Science Direct, PubMed, and Google Scholar in the period 2019-2023 with the keywords "Handwashing," "Five-Moment" and "Healthcare-Associated Infections (HAIS)" from the identification results based on inclusion criteria and feasibility reviews 10 articles were obtained for review.

Data was obtained in English, from full-text articles, and with open access using boolean operators (AND, OR). Inclusion Criteria: 1) handwashing of health workers, 2) Nosocomial infections. Exclusion criteria: 1) hand washing of the patient's family, 2) Illness caused by plague.

Approximately 8 million people were discovered by officers to have come into contact with human fluids, including blood. The most common routes of contamination were contact with contaminated sharp objects, like needles, instruments, and scalpels (82%), contact with the mucous membranes in the mouth, nose, or eyes (14%), and exposure to broken or chipped skin (3%). (Purnomo et al., 2019).

Results

A total of 2440 journal articles were identified. Then duplicate deletion and automatic tools were carried out so that there were 1086 journal articles left for review, and then as many as (177) journal articles based on the last four years, experimental test methods with *Randomized Controlled Trial* (RCT) designs in English, *full text, open access so that* 848

journal articles were obtained and 16 journal articles were excluded so that 832 research journal articles were taken for feasibility review so that 10 articles were received for review.

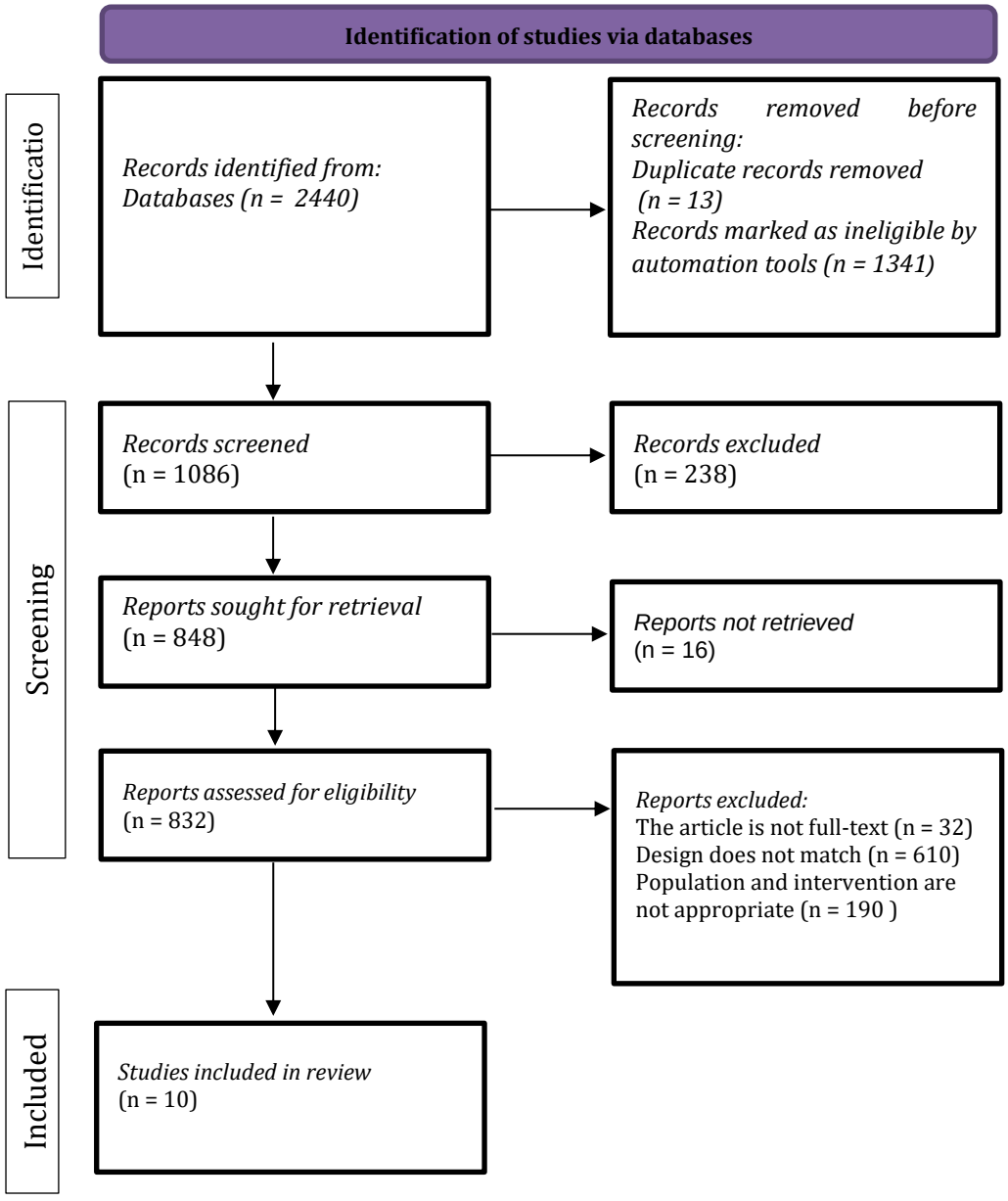

Figure 1. Literature Search Flow Diagram

Table 1. Data Distraction Method

No.	Title, Author, and Year of Article Publication	Research Methodology	Research Results
1.	Hubungan pengetahuan dan sikap perawat tentang pencegahan infeksi nosokomial dengan kepatuhan perawat dalam mencuci tangan di irna c1 dan c2 RSUP Prof dr. D Kandou Kota Manado (Pondaa et al., 2019)	This study used analytical descriptive method with cross-sectional study approach.	Based on the results of statistical tests using chi-square, it was obtained for the relationship of knowledge with Handwashing Adherence ρ-value = 0.002. In contrast, the Relationship of Attitude with Handwashing Adherence ρ-value = 0.005 is smaller than the value of α = 0.05. This means that H0 is rejected, so there is a relationship between nurses' knowledge and attitudes about preventing nosocomial infections with hand washing compliance at Irina C1 and C2 RSUP Prof. Dr. R. D Kandou Manado City.
2.	Faktor-faktor yang mempengaruhi kepatuhan perawat dalam melakukan hand hygiene five moments di RS. Hermina Jatinegara (Anugrahwati & Hakim, 2019)	This study used a cross sectional study survey design on 80 nurse respondents	The results showed the characteristics of 80 respondents, most of whom (75.0%) were female. Most (75.0%) respondents were over 30 years old. Regarding education, the vast majority (81.3%) of nursing diplomas. And the length of work of 11-20 years is mostly (73.8%). There is a significant relationship between age, gender, length of work, knowledge, availability of facilities, rules, and social environment of the hospital with nurse compliance by doing hand hygiene five moments at Hermina Jatinegara Hospital.
3.	Penerapan Cuci Tangan Five Momen Dengan Angka Kejadian Infeksi Nosokomial (Delima et al., 2018)	The research design used descriptive using a cross-sectional approach. The number of samples in this study was 44 respondents with total sampling techniques.	The results of this study showed that the application of five-moment hand washing was, 70.5%, 70.5% carried out 6-step hand washing, and 75.0% of nosocomial infections did not occur. This study found a relationship between applying five-moment hand washing and the incidence of nosocomial infections (ρ=0.001 and OR= 14,933). There is a relationship between 6-step handwashing and the incidence of nosocomial infections (ρ=0.001 and OR= 14,933). It can be concluded that there is a relationship between the application of five-moment hand washing and the incidence of nosocomial infections in the inpatient room of Dr. Achmad Mochtar Hospital in 2018
4.	Hubungan Kepatuhan Perawat	Type of quantitative research with a cross-	In this study, 29 (61.7%) respondents did not do 6 steps and 5 moments of hand

No.	Title, Author, and Year of Article Publication	Research Methodology	Research Results
	Melaksanakan Standar Prosedur Operasional (SPO) Cuci Tangan Terhadap Kejadian Phlebitis Di Rumah Sakit Graha Husada Bandar Lampung (Hermawan et al., 2018)	sectional approach. The population in this study consisted of nurses working in hospitals. Graha Husada Bandar Lampung in 2018 was 112 people.	washing, as many as 7 (24.1%) did not do 6 steps and 5 moments of hand washing and did not phlebitis, 22 (75.9%) did not do 6 steps and 5 moments of hand washing and experienced phlebitis with (p-value 0.001)
5.	Hubungan Kepatuhan Cuci Tangan Enam Langkah Lima Momen Dengan Kejadian Infeksi Nosokomial Di Ruang Mawar RUD DR.H.Soewondo Kendal (Windyastuti et al., 2020)	This type of research is quantitative using a prospective design. The number of samples was 30 teams of health workers, namely nurses and midwives, with total sampling techniques	: The results of statistical tests using the chi-square test with α = 0.05 showed a strong correlation of 0.675 adherence to hand washing six steps five moments with the incidence of nosocomial infections in the Rose Room of RSUD Dr. H.Soewondo Kendal (p-value=0.000).
6.	Hubungan Antara Motivasi Dengan Kepatuhan Perawat Melaksanakan Handhygiene Sebagai Tindakan Pencegahan Infeksi Nosokomial di Ruang Rawat Inap RS – AH (Riani & Syariani, 2019)	The study design used cross-sectional, which became the population and sample, namely all inpatient room nurses with a total of 47 nurses.	The study's results obtained that (P<0.05) P = 0.003. With a POR of 9,286 (CI = 2,225 – 38,750), Ha is accepted, which means that there is a significant relationship between motivation and nurse compliance to carry out six-step hand hygiene at five moments as a precaution for nosocomial infections in the inpatient room of AH hospital
7.	Hubungan Kepatuhan Cuci Tangan Perawat Dengan Hais Di Ruang Gading RSUD Soewondo (Purnomo et al., 2019)	Type of correlational research with a cross-sectional approach. Quantitative data collection. A total of 36 nurses	Data analysis obtained a p-value of 0.001 and an OR value of 2.0 (1.07-3.71). There is a relationship between nurses' compliance to wash hands and the incidence of HAIs in the Ivory Room of RAA Soewondo Pati Hospital.
8.	Kepatuhan Hand Hygiene di RS Immanuel Bandung (Damanik et al., 2022)	Data was collected by proportional random sampling method on 58 nurses.	The results of this study obtained nurse compliance with hand hygiene by 48.3%, and there was a significant relationship between working time (p = 0.026), knowledge (p = 0.000), and labor

No.	Title, Author, and Year of Article Publication	Research Methodology	Research Results
			availability (p = 0.000) with compliance with hand hygiene.
9.	Hubungan Pengetahuan Dengan Penerapan Limawaktu Cuci Tangan Pada Perawat Di Unit Rawat Inap BLUD RS Konawe Selatan (Purwaningsih et al., 2019)	Correlation with the cross sectional approach. The population in this study consisted of all nurses on duty in the inpatient room at BLUD South Konawe Hospital, which amounted to 67 people, with 41 samples taken by accidental sampling technique.	The results showed that most respondents were well knowledgeable, as many as 25 people (61.0%) and less knowledgeable as many as 16 people (39.0%). Most respondents applied five-moment hand washing, as many as 23 people (56.1%), and those who did not apply five moments were 18 people (43.9%). There was a knowledge relationship with the application of hand washing in inpatient nurses (X2 hit = 6,578 > X2 tab = 3,481)
10.	Pengaruh pendidikan terhadap peningkatan kepatuhan kebersihan tangan di kalangan petugas kesehatan (Mitchell et al., 2019)	An observational study was conducted for five weeks. A total of 120 participants, consisting of 40 doctors, 40 registered nurses, 40 technologists, were observed by pre-education and post-education secret shoppers.	Results showed an increase of 20% among doctors, 15% among nurses, and 5% among technologists. There is statistical significance for groups of doctors and nurses.

Discussion

Based on the results of a review of 10 journals, it is proven that the compliance of nurses and other health workers can significantly prevent nosocomial infections. From the results of research and data processing, it was found that most nurse respondents more than half of the nurses (70.5%) carried out five-moment handwashing and 6-step handwashing procedures. This result is in line with research conducted by (Basuki & Nofita, 2017) entitled The Relationship between Six Step Five-Moment Handwashing Adherence of Nurses with Phlebitis Incidence at Dr. Wahidin Sudiro Husodo Mojokerto Hospital, showing that most nurses are obedient in doing six-step five-moment handwashing, namely as many as 12 people (60%) and the smallest nurses as many as 8 people (40%). Disobediently do six-step-five-moment hand washing. Smet (Damanik et al., 2022) suggests that several factors, including internal factors, external factors, and other factors, influence nurses' compliance with washing hands in six steps and five moments. Internal factors influencing handwashing compliance include demographics (gender, ethnicity, age, race, education), motivation, ability, and nurse perceptions. Women, white races, parents, and children have a high degree of obedience. Education also influences nurses' behavior in carrying out work ethics. The higher the nurse's education, the better compliance in implementing work rules. External factors that affect nurse compliance include communication

patterns, values received by nurses, and social support. Other factors that influence nurses' compliance with handwashing are handwashing facilities, the time spent washing hands, the effect of handwashing materials on the skin, and lack of knowledge of standards (Delima et al., 2018)

From another study, 30 respondents adhered to six-step, five-moment hand washing with the incidence of nosocomial infection in as many as one person (3.3%), full compliance, no nosocomial infection occurred 7 people (23.3%), non-compliance, nosocomial infection occurred as many as 22 people (73.3%), and non-compliance did not occur nosocomial infection 0 people (0%). The results obtained during the study at the hospital showed that obedient hand washing was complete of the incidence of nosocomial infection one person was caused by other factors, namely because many were visited by the patient's family who did not wash their hands because the patient's family visited the patient carrying bacteria from outside so it could affect the occurrence of nosocomial infection, and for non-compliant hand washing there was a nosocomial infection as many as 22 people, because in that room is the maternity room, the most common causes are urinary tract infections and surgical wound infections in Post SC patients (sectio caesarea). The non-compliance of the health worker team was due to hand washing before the aseptic action, namely in the installation of DC (Dower Catheter). The team of health workers did not wash their hands, which could cause urinary tract infections. Likewise, in the case of surgical wound infection, the team of health workers, both before the postoperative wound care action and after the postoperative wound care action, did not wash their hands. The surgical wound was infected (Purnomo et al., 2019).

The Ministry of Health (2021) explained that universal vigilance is achieved through proper hand washing, protective equipment, disinfection, and sharp tool punctures to prevent the transmission of microorganisms through blood and body fluids. The primary prevention is done through proper hand washing because hands as limbs are often used to touch patients. So, hand hygiene must be done to prevent the transmission of microorganisms to patients. Hasibuan (2012) explained that compliance is a person's awareness and willingness to obey all applicable regulations and norms. Good obedience reflects the magnitude of a person's sense of responsibility towards the tasks assigned to him. Health workers, especially nurses, are among the personnel in the hospital who directly interact with patients.

Conclusion

This research uses the literature review method to collect analysis results from various research sources, such as national and international journals. The results of the analysis by researchers show that nurses are one of the factors that significantly influence the prevention of nosocomial infections. In preventing hospital infections, nurses must protect patients from infections by increasing understanding, behavior, and actions when washing hands properly and correctly. One of the efforts to prevent disease in hospitals is that nurses must carry out the 6 steps of washing hands. The 5 moments during treatment include before contact with the patient, before aseptic procedures, after exposure to the patient's body fluids, after contact with the patient, and after touching the environment around the patient. Increasing hand-washing behavior dramatically influences the significant

reduction in the incidence of nosocomial infections.

Authors Contributions

The contributions to this manuscript were distributed as follows: one author was involved in conceptualizing and designing the study, and another undertook data collection and analysis. In contrast, the third author participated in the literature review and manuscript drafting. All authors have reviewed and approved the final version for submission.

Conflicts of Interest

We now declare that no conflicts of interest related to the financial, personal, or professional aspects could have influenced the findings or interpretations presented in this research.

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