Jurnal Kebidanan dan Keperawatan Aisyiyah
Vol. 21, No. 1 (2025), pp. (50-61)
e-ISSN 2477-8184
p-ISSN 1858-0610
https://doi.org/10.31101/jkk.3992

Original Research Paper

Developing a model for the implementation of standard precautions of infection control

I Agung Ponco Nugroho*, Tri Ismu Pujiyanto
Master of Nursing, Faculty of Nursing and Health Sciences, Universitas Karya Husada Semarang, Indonesia
iagungponco@gmail.com

Submitted: January 15, 2025 Revised: February 26, 2025 Accepted: April 29, 2025

Abstract
The prevalence of Healthcare Associated Infections (HAIs) continues to rise, posing an increased risk of morbidity and mortality. One of the key efforts to prevent and control disease transmission between patients and healthcare workers is the implementation of Standard Precautions in accordance with health protocols. This study aims to develop a model for the implementation of standard precautionary measures by nurses. This research employed a Research and Development (R&D) approach with a quasi-experimental design using a one-group pre-test and post-test model. The population consisted of nurses working in inpatient wards, selected using purposive sampling, with a total of 171 respondents. Inclusion criteria included nurses working in inpatient rooms, having over one year of work experience, and willingness to participate in the study. Data were analyzed using descriptive statistics, the Wilcoxon test, and Structural Equation Modeling (SEM) with AMOS. Results showed that the majority of participants had good knowledge (87 respondents or 50.9%), good supervision (86 respondents or 50.3%), and good management support (85 respondents or 49.7%). Factors influencing compliance with standard precautions included knowledge ($p = 0.000$), supervision ($p = 0.000$), and management support ($p = 0.000$). The mean compliance score before the intervention was 67.99, increasing to 74.46 after the intervention. The development of a training module was found to be effective in improving nurses' compliance with standard precautions ($p = 0.000 < 0.05$). SEM analysis confirmed the significant influence of knowledge, supervision, and management support on compliance with standard precautions, with p-values < 0.05.

Keywords: compliance; infection; nurses; standard precautions

1. Introduction

Patient safety is a top priority in nursing care, particularly in the prevention of cross-infection, commonly referred to as Healthcare Associated Infections (HAIs) (Kemenkes RI, 2018). According to the World Health Organization (WHO), the prevalence of HAIs is estimated to be 8.7% across 14 countries. The incidence has been reported at 5% in North America and parts of Europe, and approximately 40% in several countries in Asia, Latin America, and Africa (CDC (Centers for Disease Control and Prevention), 2022). In developed countries, the prevalence reaches 7.6%, while in developing countries it is higher, at 10.1%, with variations ranging from 5.7% to 19.1% (CDC (Centers for Disease Control and Prevention), 2022). In Southeast Asia, the prevalence is around 20%. Notably, Malaysia reported the highest rate of phlebitis at 12.7%, while Indonesia reported an alarming 50.11% (CDC, 2021). Among healthcare workers, more than 8 million cases of exposure to blood or other bodily fluids have been reported. The most common route of contamination is through sharp instrument injuries (such as needles, surgical tools, and scalpels), accounting for 82% of cases. Other modes of exposure include contact with mucous membranes of the eyes, nose, or mouth (14%), and contact with peeled or damaged skin (3%). While the national prevalence of HAIs remains unclear, a survey conducted by Perdalin Jaya and Prof. Dr. Sulianti Saroso Hospital across 11 hospitals in Jakarta revealed

the following nosocomial infection rates: Surgical Site Infections (SSIs) at 18.9%, Urinary Tract Infections (UTIs) at 15.1%, Primary Bloodstream Infections (BSIs) at 26.4%, Pneumonia at 24.5%, other respiratory tract infections at 15.1%, and other infections at 32.1%. In Central Java, the prevalence of phlebitis among patients receiving intravenous therapy reached 34% (PERSI, 2021).

The Centers for Disease Control and Prevention (CDC) in the United States reported that 36% of infections acquired during hospital care could be prevented through strict management and adherence to proper patient care protocols (Soedarto, 2020). The rising prevalence of HAIs poses an increasing risk of morbidity and mortality. Contributing factors include invasive medical interventions, poor hospital environmental hygiene standards, and inadequate hygiene practices among healthcare staff and patients (Gugliotta et al., 2020). Efforts to prevent and control infections focus on the implementation of Standard Precautions (Kemenkes RI, 2018).

Standard precautions are often not properly implemented by nurses in hospitals due to nurse-related factors. Negligence in adhering to standard precautions increases the risk of infection-related problems. Previous studies have shown that infection prevention (universal precautions) is influenced by three major factors: predisposing factors (such as individual characteristics, knowledge, attitudes, and beliefs), enabling factors (such as the availability of facilities and healthcare infrastructure), and reinforcing factors (such as behaviors, attitudes, and support systems) (Runtu et al., 2020). Infection prevention practices are significantly influenced by knowledge ($p = 0.015$), attitudes ($p = 0.013$), and actions ($p = 0.012$) (Maharani et al., 2022), knowledge and training (Yotlely et al., 2019; Da'seh et al., 2023), knowledge (Noviantari et al., 2023), as well as the safety climate, availability of resources and facilities, and access to information and training, in supporting compliance with the implementation of standard precautions (Pradnyana & Muliawan, 2021). Management support, including guidance on implementing standard precautions and supervision, also plays a key role (Arifin et al., 2020).

The inadequate implementation of standard precautions is often attributed to nurses' lack of awareness in applying procedures according to established Standard Operating Procedures (SOPs) (Nasiri et al., 2019; Emilia et al., 2024). Efforts to improve compliance have focused on developing training programs for infection prevention. However, previous studies have not addressed the development of a specific training module on standard infection precautions. The development of behavioral models for infection prevention has identified several influencing variables, including supervision (27.50%), infrastructure (9.87%), infection prevention and control (IPC) training (10.44%), compensation (16.97%), work climate (10.78%), and work motivation (8.15%) (Ardiani, 2022). The advancement of nursing theory involves various levels, including philosophical theory, grand theory, nursing theory, middle-range theory, and practice theory (Iriani et al., 2023). The development of nursing models aims to enhance awareness, willingness, and the ability to live a healthy life (Mane et al., 2023). Such development serves as a conceptual framework in nursing practice (Arofiati, 2021), helping bridge the gap in decision-making by integrating the totality of human needs into clinical judgment (Riegel et al., 2021). Professional nursing development must be supported by relevant theories and models, research-based innovations, and practical implementation (Desmawati, 2021). Improving compliance with infection prevention measures can be achieved by applying conceptual nursing models (Susanto et al., 2023).

This study focuses on the development of a structured and systematic training module aimed at improving healthcare workers' compliance with standard infection precautions. The module includes periodic evaluations and a feedback mechanism to enhance the effectiveness of standard precaution implementation. Additionally, the research proposes the integration of digital technology for delivering the module content and real-time monitoring of healthcare workers' compliance. The primary objective of this study is to analyze the development of a model for implementing standard precautions among nurses in inpatient care settings.

2. Research Method

This study employed a Research and Development (R&D) method with a quasi-experimental approach. The design used was a one-group pre-test and post-test design. The population in this study consisted of nurses working in the inpatient wards at Mardi Rahayu Hospital, Kudus. The sampling technique used was purposive sampling. Sample selection was based on specific criteria, including the inclusion criteria: nurses working in the inpatient wards at Mardi Rahayu Hospital who had worked for more than one year and were willing to participate as respondents. The exclusion criteria were nurses assigned outside the ward or on leave, nurses in structural (administrative) positions, and those who declined to participate. The sample size was calculated using Slovin's formula, resulting in a total of 171 respondents. This study received ethical approval from the Ethics Committee of Universitas Karya Husada Semarang, Master's Program in Nursing, with approval number: 135/KEP/UNKAHA/SLE/XI/2024.

Data were collected quantitatively through questionnaires completed by the respondents. The questionnaire consisted of items on education level, knowledge, supervision, management support, and standard precautions. The questionnaire underwent validity testing using Pearson's product-moment correlation and reliability testing using Cronbach's alpha, with the following results:

Table 1. Validity and Reliability Test of Research Questionnaire

No	Questionnaire	r-value Range	Alpha
1	Knowledge (consisting of 20 items)	0.542-0762	0.887
2	Supervision (consisting of 10 items)	0.630-0.895	0.939
3	Management Support (consisting of 10 items)	0.571-0824	0.921
4	Standard Precautions (consisting of 25 items)	0.607-0.840	0.967

Source: Primary Data, 2024

These results indicate that all questionnaire items for the study variables are valid, as the calculated r-values exceed the critical r-value (0.444). The reliability test results show that all questionnaires are reliable, with Cronbach's alpha values greater than the critical r-value (0.444). Data analysis in this study was conducted using descriptive statistics, the Wilcoxon test, and Structural Equation Modelling (SEM) with AMOS.

3. Results and Discussion

3.1.Result

Based on the questionnaires completed by 177 respondents, the study obtained the following results for the variables: education, knowledge, supervision, management support, and standard precautions.

Table 2. Standard Frequency Distribution of Respondents Based on Standard Precautions Factors

Variable		F	%
Education	Registered Nurse	169	98.8
	Master's in Nursing	2	1.2
Knowledge	Good	87	50.9
	Moderate	65	38.0
	Poor	19	11.1
Supervision	Good	86	50.3
	Adequate	70	40.9
	Poor	15	8.8
Management Support	Good	85	49.7
	Adequate	68	39.8

Variable	F	%
Poor	18	10.5
Total	**171**	**100.0**

Source: Primary Data, 2024

The results of the study showed that the majority of respondents had an educational background as registered nurses, totaling 169 respondents (98.8%), while those with a master's degree in nursing were 2 respondents (1.2%). Regarding knowledge, most respondents were categorized as having good knowledge with 87 respondents (50.9%), while the fewest were in the poor knowledge category with 19 respondents (11.1%). For supervision, the majority of respondents were classified as good, with 86 respondents (50.3%), and the fewest were in the poor category with 15 respondents (8.8%). Management support was mostly rated as good by 85 respondents (49.7%), and the lowest category was poor, with 18 respondents (10.5%).

Table 3. Frequency Distribution of Respondents Based on Compliance with Standard Precautions Implementation

Compliance with Standard Precautions	Mean	Std. Deviation	Minimum	Maximum
Pre	67.99	7.844	44	88
Post	74.46	10.638	44	91

Source: Primary Data, 2024

The compliance with the implementation of standard precautions had a pre-intervention score of 67.99 and a post-intervention score of 74.46.

3.1.1. Full Measurement Analysis

The results of the full measurement analysis showed that the construct variable dimensions formed latent variables, and these indicators were declared valid because the factor loading values were > 0.5. Indicators with low values were dropped, resulting in the following equation:

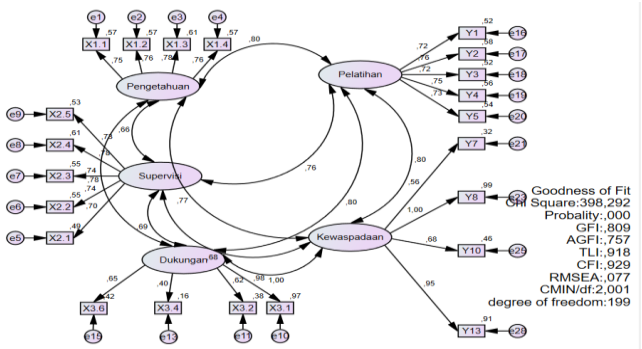

Figure 1. Confirmatory Factor Analysis Full Measurement
Source: Processed Data, 2024

The results of the modified model showed that the Goodness of Fit Index (GFI) met the required criteria, with at least three indicators, and was therefore accepted. Convergent validity (construct validity) testing indicated that the critical ratio (CR) values were greater than 1.96 and the p-values were above 0.05 (with significance at *** $p < 0.001$), which means the indicators significantly represent the dimensions of the construct variables forming the latent variables and are thus valid. Construct reliability analysis showed that all variables had reliability coefficients above 0.7, indicating good

construct reliability. Furthermore, the Average Variance Extracted (AVE) values for all variables were above 0.5, demonstrating a high level of construct reliability. The normality test revealed a multivariate critical ratio of 1.514, which is below the critical value of 2.58, indicating that the data are multivariately normally distributed and free from outliers.

3.1.2. Full Model Analysis

The full model equation was modified by dropping indicators with low factor loadings. The resulting model fit values are presented as follows:

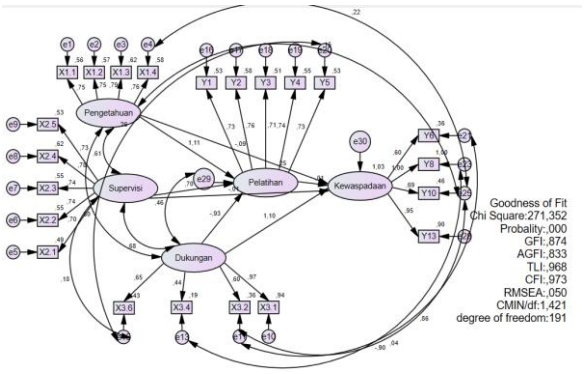

Figure 2. Full Model Analysis
Source: Processed Data, 2024

Based on the modification results, the goodness of fit values met the criteria for four indicators, indicating a good fit and thus the model was accepted.

3.1.3. Hypothesis Testing

Hypothesis testing for the full model analysis was conducted using AMOS, with the results presented in the form of Regression Weights output as shown in the following table:

Table 4. Regression Weights

			Estimate	S.E.	C.R.	P	Label
Training	<---	Knowledge	1,153	,407	2,836	,005	par_18
Training	<---	Supervision	,708	,227	3,124	,002	par_19
Training	<---	Support	,657	,413	1,593	,111	par_34
Precautions	<---	Support	,541	,057	9,415	***	par_20
Precautions	<---	Training	,010	,031	,334	,739	par_21
Precautions	<---	Knowledge	,062	,028	2,181	,029	par_22
Precautions	<---	Supervision	,006	,020	,312	,755	par_35

Source: Primary Data, 2024

The hypothesis testing results on the influence between variables showed that the path analysis for knowledge yielded a p-value of 0.000 (< 0.05) and a critical ratio (C.R.) of -2.360 (>|1.645|), indicating a significant effect. For supervision, the p-value was 0.755 (> 0.05) and C.R. was -0.312 (< 1.645), showing no significant effect. For management support, the p-value was 0.000 (< 0.05) with a C.R. of 9.415 (>|1.645|), indicating a significant positive effect. These results demonstrate that knowledge and management support have a significant direct positive influence on nurses' adherence to standard precautions at Mardi Rahayu Hospital, while supervision does not have a significant effect. Therefore, the hypothesis is accepted.

3.2.Discussion

3.2.1.Education

The study found that the majority of respondents, totaling 169 (98.8%), held a professional nursing degree (Nursing Profession), while 2 respondents (1.2%) had a master's degree in nursing. Nurses with a professional nursing education are expected to possess adequate competencies in cognitive, affective, and psychomotor domains, enabling them to perform their duties and responsibilities in accordance with the applicable standard operating procedures in their work environment, including the implementation of universal precautions (Sagita, 2020). Research by Kamil (2020) also indicated that the majority of respondents had professional nursing education. Professional nursing education shapes the knowledge necessary for delivering nursing care. Education level represents a long-term process involving systematic and organized procedures through which managerial staff acquire conceptual and theoretical knowledge aimed at general objectives (Yuliati, 2021).

Education is related to compliance with standard precautions, where better education shapes compliance behavior in infection prevention as a form of nurses' performance in healthcare services (Boro & Hariyati, 2020). Nursalam (2020) states that education is a long-term process involving systematic and organized procedures through which managerial personnel acquire conceptual and theoretical knowledge for general purposes. Education influences nurses' thinking and actions, including adherence to universal precautions (Yuliati, 2021). Infection prevention efforts are carried out through education, which is a process of teaching knowledge, specific skills, and attitudes so that nurses become more skilled and capable of carrying out their responsibilities according to standards (Hadi et al., 2021; Emilia et al., 2024). Education determines the level of an individual's compliance, whereby higher education leads to better compliance. Higher education (professional level) fosters positive attitudes and behaviors that support the implementation of universal precautions (Ghabayen et al., 2023).

3.2.2.Knowledge

The study found that most respondents had good knowledge of standard precautions, with 87 respondents (50.9%) categorized as having good knowledge. This good knowledge is reflected in respondents' agreement with the concepts of universal precautions. Universal precautions serve as guidelines that must be followed, making understanding (knowledge) a critical aspect of implementing these actions. Providing accurate information enhances nurses' understanding and confidence (Al-Faouri et al., 2021). Respondents' knowledge covered definitions of infection, types of nosocomial infections, risk factors, modes of transmission, preventive measures, and standard precautions (Ghabayen et al., 2023). Mahdizadeh et al. (2021) explained that knowledge about infections and their prevention must be adapted and modified to the new realities of the environment and must follow the individual knowledge formation process. Most knowledge of universal precautions falls into the good category for certain items, while specific actions remain lacking, influenced by nurses' education and length of work experience (Aryanto et al., 2023).

The study found that the smallest portion of respondents, 19 individuals (11.1%), fell into the category of having poor knowledge. This lack of knowledge regarding infections and standard precautions is associated with the acquisition of inaccurate or unclear information due to numerous ambiguous issues (Da'seh et al., 2023). Yanti (2021) in a study involving 210 nurses in Bali, found that 56.2% of nurses had moderate knowledge about hand hygiene as an infection prevention measure. This was attributed to the complexity of infection prevention procedures and modes of transmission, resulting in nurses' understanding being categorized as moderate. Aisyiah et al. (2020) reported that among 77 healthcare workers in Padang, 41.6% had insufficient knowledge. This deficiency was caused

by barriers to receiving information, leading to inadequate understanding of infection transmission processes. Similarly, Puspitasari (2020) and Emilia et al. (2024) explained that some respondents had poor understanding of infection transmission, which was linked to the acquisition process of information where invalid or incomplete information resulted in insufficient comprehension.

3.2.3. Supervision

The study found that the majority of respondents, 86 individuals (50.3%), rated supervision as good. This result indicates that nursing managers have effectively planned, guided, directed, encouraged, improved, and evaluated the implementation of standard precautions. Evidence from respondents shows that IPCN nurses teach proper handwashing techniques, conduct evaluations of nurses' compliance with hand hygiene, instruct on the decontamination process of medical instruments, and observe the decontamination procedures. Supervision also demonstrated a correlation with adherence to the implementation of standard precautions. Widiawati (2020) stated that effective supervision encourages improved compliance with standard precautions. Arifin et al. (2020) confirmed that supervision is associated with the practice of universal precautions. Conversely, Nurhandini (2020) revealed that inadequate nursing supervision leads to ineffective implementation in planning and supervision techniques.

The study explains that supervision is essential for improving nurses' performance. Supervision is closely related to the implementation of universal precautions. It is defined as the efforts of nursing managers (head nurses) in planning, guiding, directing, encouraging, improving, and evaluating the application of universal precautions (Arifin et al., 2020). Continuous and effective supervision by nursing managers ensures the delivery of nursing care that complies with nursing practice standards (Seniwati et al., 2022). Supervision encompasses all activities believed by management to help achieve administrative goals (Erita, 2021). Successful patient safety programs are supported by the role of nursing managers through supervisory activities (Maryani et al., 2024). The implementation of a patient safety culture is partly determined by the supervision provided by head nurses. The supervisory role of the head nurse is critical in ensuring proper actions in service delivery (Rahmadiana & Mulyana, 2020). The primary purpose of head nurse supervision is to enhance nurses' knowledge and competence (Maryani et al., 2024). However, insufficient supervision by head nurses is often due to their heavy workload, which limits their ability to conduct oversight, provide technical guidance, and effectively support staff (Irawati, 2022).

3.2.4. Management Support

The study found that the majority of respondents, totaling 85 (49.7%), perceived management support in the implementation of standard precautions as good. This strong support is reflected in respondents' answers, indicating that management prioritizes infection prevention, has established an Infection Prevention and Control (IPC) committee, develops policies that support healthcare workers in applying standard precautions, provides adequate facilities for infection control programs, formulates regulations in the form of standard operating procedures, and addresses recommendations related to infection prevention policies (Moralejo et al., 2020). Sagita (2020) highlights that management support acts as a form of motivation from leadership; when nurses are well-motivated, they are more likely to achieve organizational goals. Increased motivation leads to stronger commitment and clearer identification with organizational roles. Leadership's role in motivating staff is crucial for achieving shared objectives. Additionally, providing training and information to nurses as a form of management support significantly influences nurses' adherence to standard precautions (Madamang, 2022). Management support facilitates and motivates nurses in maintaining compliance (Nurmawati & Arofah, 2021).

3.2.5. Training

This study employed training supported by a module developed by the researcher. The training proved effective in improving compliance with the implementation of standard precautions. Adherence to standard precautions in the medical field is crucial as it serves to protect both patients and healthcare workers from potential risks of infection or disease transmission. The training aims to enhance nurses' knowledge and skills. It introduces healthcare personnel to the latest guidelines and standards for infection prevention, including proper use of personal protective equipment (PPE), correct handwashing techniques, and medical equipment sterilization procedures (Ghorbanmovahhed et al., 2023). Appropriate training can increase healthcare workers' understanding of the importance of standard precautions and the necessary steps to reduce the risk of nosocomial infections (Sahri et al., 2021).

Training is one of the efforts to improve nurses' skills in using personal protective equipment (PPE), especially when conducted periodically and continuously, thereby fostering habits and compliance in following procedures (Sartelli et al., 2023). Training is designed to help healthcare workers acquire knowledge, skills, and enhance attitudes and behaviors necessary to perform their duties effectively. This implies that training should encourage workers to behave in accordance with PPE usage policies, as it serves as a form of guidance aimed at promoting adherence to PPE protocols (Wagner et al., 2023).

3.2.6. Implementation of Standard Precautions

The results of the study showed that the compliance score for the implementation of standard precautions was 67.99 in the pre-test and increased to 74.46 in the post-test. Good compliance was demonstrated by respondents' consistent behaviors, such as washing hands before and after patient contact, washing hands after contacting the patient's environment, using hand sanitizer, wearing masks, donning aprons before performing procedures that risk contaminating clothing, and using protective equipment such as shoes, goggles, and head covers. Additionally, respondents adhered to proper decontamination of instruments, medical waste management, linen handling according to guidelines, periodic reporting, and the presence of designated personnel responsible for these tasks (Batran et al., 2025). According to Hadi et al. (2021), compliance with standard precautions reflects nurses' behaviors influenced by individual, organizational, and psychological factors.

A study by Irawati (2022) found that 75% (24 respondents) demonstrated compliance in infection prevention, while 65.6% (21 respondents) complied with hand hygiene practices according to standard operating procedures (SOPs). Pradnyana & Muliawan (2021) found that 59.21% of respondents were compliant in implementing standard precaution guidelines. Universal precaution actions represent a behavior that reflects a state of mind, which appears as an individual's response to external stimuli that may be either passive or active. The study found that 49.7% of nurses working in inpatient care were non-compliant or less compliant with the implementation of standard precautions (Aryanto et al., 2023). The factor that determines nurses' compliance in infection prevention is related to knowledge (Ghabayen et al., 2023). The aspect of knowledge serves as a driving force in forming compliance in infection prevention among nurses (Wong et al., 2022). Inadequate implementation of standard precautions will result in unfavorable health consequences suffered by many individuals as a result of medical errors (Al-Faouri et al., 2021; Yilma et al., 2024).

4. Conclusion

The results of the study showed that most respondents had good knowledge, with 87 respondents (50.9%) in the good category; supervision was mostly in the good category with 86 respondents (50.3%); and management support was also mostly in the good category with 85 respondents (49.7%).

The development of the training module was effective in increasing compliance with standard precautions among nurses in the inpatient ward, as indicated by a p-value of 0.000 < 0.05. The development of the standard precautions module was reflected in the compliance score, which increased from a pre-test score of 67.99 to a post-test score of 74.46. The SEM AMOS analysis showed a relationship between knowledge, supervision, and management support with compliance to standard precautions, as indicated by a p-value < 0.05.

Acknowledgments

The author extends sincere appreciation to the academic community of Universitas Karya Husada Semarang and the Institute for Research and Community Service (LP2M) of Universitas 'Aisyiyah Yogyakarta for their institutional support. Gratitude is also expressed to the leadership and management of RS Mardi Rahayu Kudus for their facilitation and cooperation throughout the research process. Special thanks are due to all participating nurses who generously contributed as respondents. It is hoped that the findings of this study will offer valuable insights and contribute to the ongoing development of nursing science.

References

Aisyiah, I. ., Ratni, P. ., & Ida, R. . (2020). Pengaruh Faktor Budaya, Sosial, Pribadi dan Psikologis terhadap Proses Keputusan Pasien Naik Kelas Rawat Inap di RSU Bunda BMC Padang. *Procuratio : Jurnal Ilmiah Manajemen Procuratio : Jurnal Ilmiah Manajemen*, *8*(2), 491–502.

Al-Faouri, I., Okour, S. H., Alakour, N. A., & Alrabadi, N. (2021). Knowledge and compliance with standard precautions among registered nurses: A cross-sectional study. *Annals of Medicine and Surgery*, *62*(December 2020), 419–424. https://doi.org/10.1016/j.amsu.2021.01.058

Ardiani, E. L. (2022). *Pengembangan Model Perilaku Pencegahan Penyakit Infeksi Pada Tenaga Kesehatan Di Wilayah Kerja Puskesmas Surade Kabupaten Sukabumi Tahun 2022*. Respiratory UIMA. http://repository.uima.ac.id/jspui/bitstream/123456789/6706/1/Tesis Eneng Linda Ardiani Fix.pdf

Arifin, A., Safri, & Ernawaty, J. (2020). Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Hand Hygiene Mahasiswa Profesi Ners Di Ruangan Rawat Inap. *JOM FKp*, *6*(1), 100–113.

Arofiati, F. (2021). Implementasi Teori Keperawatan Sebagai Upaya Peningkatan Kualitas Pelayanan Keperawatan. *Prosiding Seminar Nasional Program Pengabdian Masyarakat*, *2*(1), 1840–1846. https://doi.org/10.18196/ppm.39.127

Aryanto, E., Indrawati, L., & Rosa, T. (2023). Faktor-Faktor yang Mempengaruhi Tingkat Kepatuhan Perawat dalam Penerapan Kewaspadaan Standar di RSUP Persahabatan Tahun 2023. *Jurnal Manajemen Dan Administrasi Rumah Sakit Indonesia (MARSI)*, *7*(4), 379–388. https://doi.org/10.52643/marsi.v7i4.3567

Batran, R., Ayed, A., Batran, A., Ejheisheh, M. A., Alassoud, B., Hayek, M. F., & Batran, A. (2025). Determinants of Nurses' Compliance with Infection Prevention and Control Practices in Critical Care Units. *SAGE Open Nursing*, *11*(1), 1–8. https://doi.org/10.1177/23779608251339193

Boro, M. F. V., & Hariyati, R. T. S. (2020). Implementasi Telenursing Dalam Praktik Keperawatan : Studi Literatur. *Carolus Journal of Nursing*, *2*(2), 161–169. https://doi.org/10.37480/cjon.v2i2.40

CDC (Centers for Disease Control and Prevention). (2021). *Preventing Healthcare-associated Infections | HAI | CDC*. Centers for Disease Control and Prevention; U.S. Department of Health & Human Services HHS. https://www.cdc.gov/hai/prevent/prevention.html

CDC (Centers for Disease Control and Prevention). (2022). *HAI Data and Statistics*. Centers for Disease Control and Preventio; U.S. Department of Health & Human Services HHS. https://www.cdc.gov/hai/surveillance/index.html

Da'seh, A., Al-Zaru, I. M., Hayajneh, A. A., & Obaid, O. (2023). The Nurses' Knowledge and Compliance with Standard Precautions to prevent Healthcare-associated Infections. *The Open Nursing Journal*, *17*(1), 1–7. https://doi.org/10.2174/18744346-v17-e20230711-2023-3

Desmawati. (2021). *Teori Model Konseptual Keperawatan*. UPN Veteran.

Emilia, A. E., Aheebwa, A., Obiezu, E. J., Jennifer, E., Isah, A., Narayana, G., & Victoria, U. C. (2024). Knowledge And Predictors Of Implementation Of Standard Precautions For Infection Prevention And Control Among Health Care Practitioners. *African Journal of Infectious Diseases*, *18*(2), 22–33.

Erita. (2021). *Buku Materi Pembelajaran Manajemen Keperawatan*. Fakultas Vokasi D 3 Keperawatan. https://books.google.co.id/books

Ghabayen, F., ALBashtawy, M., Abdelkader, R. H., Jarrah, S., Eshah, N., Abdalrahim, A., Saifan, A., Alkhawaldeh, A., Rayan, A., Ayed, A., Al-Amer, R., Mohammad, K. I., Al-Dwaikat, T., Omari, O. Al, ALBashtawy, S., ALBashtawy, B., & Dameery, K. Al. (2023). Knowledge and Compliance With Standard Precautions Among Nurses. *SAGE Open Nursing*, *9*(2), 1–10. https://doi.org/10.1177/23779608231189966

Ghorbanmovahhed, S., Shahbazi, S., Gilani, N., Ostadi, A., Shabanloei, R., & Gholizadeh, L. (2023). Effectiveness of implementing of an infection control link nurse program to improve compliance with standard precautions and hand hygiene among nurses: a quasi-experimental study. *BMC Med Educ*, *19*(1), 265.

Gugliotta, C., Deiana, G., Dettori, M., Sotgiu, G., Azara, A., & Castiglia, P. (2020). Prevalence study on health-care associated infections and on the use of antimicrobials carried out with the light protocol of the European Centre for Disease Prevention and Control. *Ann Ig*, *32*(4), 357–367. https://doi.org/10.7416/ai.2020.2359. PMID: 32744294

Hadi, S., Sastrawan, S., & Zuhro, R. (2021). Analisis Tingkat Pengetahuan, Sikap, Motivasi Dan Kompleksitas Tugas Dengan Kewaspadaan Standar Di Rumah Sakit. *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, *5*(4), 855–862. https://doi.org/10.58258/jisip.v5i4.2325

Irawati, T. (2022). Hubungan Supervisi Dan Motivasi Terhadap Tindakan Dalam Pencegahan Infeksi Melalui Penggunaan APD Dan Hand Hygiene. *Jurnal EDUNursing*, *6*(1).

Iriani, M. R. F. C. R., Yari, H. L. R. Y., Desi, M. D. K. E. D. F. de F. J., Sholihin, R. E. R. R. M., Kosasih, R. A. U. S., & Nurdin, S. (2023). *Konsep Dasar Keperawatan*. Kurnia Persada.

Kamil, H. (2020). Penerapan Prinsip Kewaspadaan Standar Oleh Perawat Pelaksana Di Ruang Rawat Inap Penyakit Bedah RSUDZA Banda Aceh. *Idea Nursing Journal*, *2*(1).

Kemenkes RI. (2018). *Peraturan Menteri Kesehatan Republik Indonesia Nomor 27 Tahun 2017 Tentang Pedoman Pencegahan dan Pengendalian Infeksi Di Fasilitas Pelayanan Kesehatan*. Kementerian Kesehatan RI.

Madamang, I. (2022). Identifikasi Peran Dukungan Pimpinan Terhadap Program Pencegahan Dan Pengendalian Infeksi Dengan Pendekatan Integrative Review. *(Doctoral Dissertation, Universitas Hasanuddin)*. http://repository.unhas.ac.id/id/eprint/14823/

Maharani, Ridha, Simanjorang, Asyiah, & Jamaluddin. (2022). Perilaku Bidan dalam Penatalaksanaan Pencegahan Infeksi Terhadap Kejadian Infeksi pada Pertolongan Persalinan di Wilayah Kerja Puskesmas Natam Kutacane. *Excellent Midwifery Journal*, *5*, 28.

Mahdizadeh, S. M., Sany, S. B. T., Sarpooshi, D. R., Jafari, A., & Mahdizadeh, M. (2021). Predictors of preventive behavior of nosocomial infections in nursing staff: a structural equation model based on the social cognitive theory. *BMC Health Services Research*, *21*(1), 1–8. https://doi.org/10.1186/s12913-021-07205-6

Mane, G., Siregar, H. K., Batubara, K., Yunita, S., Hati, Y., & Armiyati, Y. (2023). *Praktik Keperawatan : Konsep Dasar dan Implementasi*. Madani Berkah Abadi.

Maryani, L., Anggreny, Y., Rohita, T., Astari, D. W., Sakti, B., Susilowati, Y. A., Andriana, N., Maryati, Suntoro, H., Mukaromah, R. S., Djajanti, C. W., Oktizulvia, C., Setyowati, S., Noprianty, R., Putra, A., Noyumala, Lastari, R. F., Sari, S. M., Wijayanti, C. D., … Sihombing, F. (2024). *Buku Ajar Kepemimpinan Dan Manajemen Keperawatan*. CV. Eureka Media Aksara.

Moralejo, D., R, E. D., Ra, P., Barretti, P., Corrêa, I., Moralejo, D., R, E. D., Ra, P., Barretti, P., & Corrêa, I. (2020). Improving adherence to Standard Precautions for the control of health care-associated infections (Review). *Cochrane Database Syst Review*, *2*(1), 1–8. https://doi.org/10.1002/14651858.CD010768.pub2.www.cochranelibrary.com

Nasiri, A., Balouchi, A., Rezaie-Keikhaie, K., Bouya, S., Sheyback Mahmood, & Rawajfah, O. Al. (2019). Knowledge, attitude, practice, and clinical recommendation toward infection control and prevention standards among nurses: A systematic review. *American Journal of Infection Control*, *47*(7), 827–833. https://doi.org/https://doi.org/10.1016/j.ajic.2018.11.022

Noviantari, A. E., Marti, E., & Rahayu, M. H. (2023). Level Of Knowledge Of Nurses About The Prevention Of Nosocomial Infections And The Behavior Of Treating Urinary Catheters. *Cendekia Medika : Jurnal STIKES Al-Ma'arif Baturaja*, *8*(1).

Nurhandini, A. (2020). Hubungan Karakteristik dan Supervisi terhadap Kepatuhan Perawat pada Kewaspadaan Standar di Rumah Sakit Umum Madani Medan. *Jurnal Keperawatan*, *2*(1), 1–11.

Nurmawati, I., & Arofah, K. (2021). Analisis Aspek Dukungan Organisasi dan Manajemen terhadap Terjadinya Duplikasi Nomor Rekam Medis Puskesmas. *Jurnal Manajemen Kesehatan Indonesia*, *9*(1), 14–20. https://doi.org/10.14710/jmki.9.1.2021.14-20

PERSI. (2021). *HAIs*. Persatuan Rumah Sakit Indonesia. https://www.persi.or.id/

Pradnyana, I. G. A. N. A., & Muliawan, P. (2021). Determinan Kepatuhan Perawat Dalam Penerapan Kewaspadaan Standar Di Rumah Sakit Umum Di Kota Denpasar Tahun 2020. *Archive of Community Health*, *8*(1), 43. https://doi.org/10.24843/ach.2021.v08.i01.p04

Puspitasari, P. (2020). Determinan Kepatuhan Dalam Penerapan Universal Precaution. *IJOSH*, *4*(2), 94–103.

Rahmadiana, A., & Mulyana, H. (2020). Perbandingan Persepsi Perawat dengan Observasi Kepatuhan Kewaspadaan Standar Penggunaan APD di RSUD dr. Soekardjo Kota Tasikmalaya. *Jurnal Skolastik Keperawatan*, *6*(2), 145–152.

Riegel, F., Crossetti, M. da G. O., Martini, J. G., & Nes, A. A. G. (2021). Florence Nightingale's theory and her contributions to holistic critical thinking in nursing. *Rev. Bras. Enferm*, *74*(2).

Runtu, L., Haryanti, F., & Rahayujati, B. (2020). Faktor-Faktor Yang Berhubungan Dengan Perilaku Perawat Dalam Penerapan Universal Precautions. *Juiperdo*, *2*(1). http://eprint.jurnalugm.ac.id.

Sagita, R. (2020). Factors Affecting Nurses' Compliance In Implementing Standard Precautions In Government Hospital In Yogyakarta. *Indonesian Contemporary Nursing Journal*, *3*(2), 1–7.

Sahri, M., Zuhro, R., Hutapea, O., & Dwimarisiana, W. (2021). The Relationship of Organizational Factors and Compliance Level in the Application of Standard Precautions. *Journal of Vocational Health Studies*, *5*(2), 65. https://doi.org/10.20473/jvhs.v5.i2.2021.65-72

Sartelli, M., Bartoli, S., Borghi, F., Busani, S., Carsetti, A., Catena, F., Cillara, N., Coccolini, F., Cortegiani, A., Cortese, F., Fabbri, E., Foghetti, D., Forfori, F., Giarratano, A., Labricciosa, F. M., Marini, P., Mastroianni, C., Pan, A., Pasero, D., … Moro, M. L. (2023). Implementation Strategies for Preventing Healthcare-Associated Infections across the Surgical Pathway: An Italian Multisociety Document. *Antibiotics*, *12*(3). https://doi.org/10.3390/antibiotics12030521

Seniwati, Ita, Anugrahwati, R., Silitonga, M. J., Hutagaol, R., Gunawan, D., Sihura, S. S. G., Dherlirona, Lilis Kamilah, S. A., & Solehudin. (2022). *Buku Ajar Manajemen Keperawatan*. CV. Feniks Muda Sejahtera.

Soedarto. (2020). *Hospital Nosocomial Infections* (Soedarto (ed.); Pertama). Sagung Seto.

Susanto, W. H. A., Lembang, F. T. D., Yulianti, N. R., Hasniati, Syarif, I., Aji, R., & Sinaga, M. R. E. (2023). *Holistic & Transcultural Nursing*. PT Global Eksekutif Teknologi.

Wagner, A. D., Beima-Sofie, K., Awuor, M., Owade, W., Neary, J., Dettinger, J. C., Pintye, J., Abuna, F., Lagat, H., Weiner, B. J., Kohler, P., Kinuthia, J., John-Stewart, G., & O'Malley, G. (2023). Implementation determinants and strategies in integration of PrEP into maternal and child health and family planning services: experiences of frontline healthcare workers in Kenya. *Frontiers in Reproductive Health*, *5*(September), 1–11. https://doi.org/10.3389/frph.2023.1205925

Widiawati, S. (2020). Hubungan Supervisi Dan Motivasi Dengan Pemberian Cairan Infus Sesuai Spo Oleh Perawat Pelaksana. *Jurnal Endurance*, *2*(3), 280–284.

Wong, E. L.-Y., Ho, K.-F., Dong, D., Cheung, A. W.-L., Yau, P. S.-Y., Chan, E. Y.-Y., Yeoh, E.-K., Chien, W.-T., Chen, F. Y., Poon, S., Zhang, Q., & Wong, Y.-S. S. (2022). Compliance with Standard Precaution and Its Relationship with Views on Infection Control and Prevention Policy among Chinese University Students during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *19*(9). https://doi.org/10.3390/ijerph19095327

Yanti, N. P. (2021). Gambaran Pengetahuan Perawat Tentang Apd Dan Kebersihan Tangan Di Masa Pandemi Coronavirus Disease 2019. *Jurnal Keperawatan*, *13*(2).

Yilma, M., Taye, G., & Abebe, W. (2024). Magnitude of standard precautions practices among healthcare workers in health facilities of Low and Middle Income Countries: A systematic review and meta-analysis. *PLOS ONE*, *19*(4), e0302282. https://doi.org/10.1371/journal.pone.0302282

Yotlely, A. S., Fitryasari, R., & Mishbahatul, E. (2020). Faktor Yang Berhubungan Dengan Kepatuhan Perawat Dalam Penerapan Kewaspadaan Standar Pencegahan Infeksi. *Fundamental and Management Nursing Journal*, *2*(1), 24. https://doi.org/10.20473/fmnj.v2i1.12575

Yuliati. (2021). *Konsep Keperawatan Kritis Serta Fungsi Dan Peran Perawat Dalam Keperawatan Kritis*. Esa Unggul.