



PERCEPTIONS OF HAND HYGIENE COMPLIANCE AMONG NURSES IN HOSPITAL DURING COVID-19

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ABSTRACT

Nosocomial infection is a health problem experienced in various countries in the world. One of the ways to prevent cases of nosocomial infections in hospitals is to perform good and correct hand hygiene. The purpose of this study was to determine perceptions related to nurse adherence to hand hygiene in the surgical inpatient room at Dr. Mohammad Hoesin Palembang. The research design uses a cross-sectional approach with data collection methods carried out online using a questionnaire. The sample used in this study were nurses in H, J and P buildings with a total of 66 respondents. Chi square analysis is used to analyze the data. 81.8% of respondents adhered to hand hygiene. There is a significant relationship between the variables of motivation, the completeness of hand hygiene facilities, and the supervision of the head of the room on the compliance of nurses to carry out hand hygiene. The hospital can improve nurse compliance in carrying out hand hygiene by increasing monitoring and evaluation in the application of hand hygiene.

Keywords: *hand hygiene*, hospital, nosocomial, perception, nurse

Introduction

Nosocomial infection or Healthcare Associated Infection (HAIs) is one of the health problems experienced in various countries in the world.¹ HAIs are infections that occur in patients during the treatment process in hospitals or other health facilities that are not incubated at the time of admission. This is an unwanted impact in health services where the risk of occurrence is still increasing.² According to the Centers for Disease Control and Prevention, the types of HAIs that can occur in hospitals are divided into Central Line-associated Bloodstream Infections (CLABSI), Catheter-associated Urinary Tract Infections (CAUTI), Surgical Site Infections (SSI), and Ventilators-associated Pneumonia (VAP).³

HAIs infect hundreds of millions of patients worldwide each year, causing long hospital stays, resulting in disability, increased resistance of microorganisms to antimicrobials, enormous additional financial burdens, and increased mortality.⁴ In a survey of 11,282 patients in 183 hospitals in the United States, 4% of patients were infected with at least one type of HAIs.⁵ In high-income countries, about 30% of patients in the ICU are infected with at least one type of HAIs. At the same time, the frequency of ICU infections is at least 2-3 times higher in low- and middle-income countries than in high-income countries.⁶ In Asian countries, the incidence of nosocomial infection reaches 10%, whereas in the United States, among 40 million patients treated annually, the incidence of nosocomial infection is around $\pm 5\%$, the mortality rate is as high as 1%, and the

burden of medical expenses is up to \$4. 5 billion per year. The prevalence of HAIs infection in patients in developed countries ranges from 3.5% to 12%, while in developing countries including Indonesia, the prevalence of HAIs infection is 9.1%, varying from 6.1% to 16%.⁶

Based on a study conducted by Ling et al in 2015⁷, It is known that the countries in Southeast Asia with the highest prevalence rate of HAIs were Malaysia at 19.4%, followed by Vietnam at 7.79%, Thailand at 7.09%, and Indonesia at 6.89% for an overall prevalence of 9.01%. Meanwhile, the incidence density of HAIs in the hospital ICU obtained numbers; Malaysia 27.30%, Philippines 12.20%, and Thailand 21.80% The prevalence rate of HAIs in the ICU Hospital is 20.01%. Although the number of HAIs infections in Indonesia is lower than other ASEAN countries, this figure is still much higher than other developed countries.

The Indonesian government has not made any specific surveillance efforts related to Healthcare-Associated Infections. Data related to these infection cases (all cases of infection) are put together in one table as a whole, so researchers must explore information about these Healthcare-Associated Infections through related research articles. The high prevalence rate of HAIs in Indonesia is directly proportional to the low compliance rate of medical staff in carrying out hand hygiene procedures in Indonesia. According to WHO, one of the most appropriate ways to prevent cases of nosocomial infections in hospitals is to perform good and correct hand hygiene according to the guidelines submitted by WHO.⁴ In addition to reducing nosocomial infections, hand hygiene is also an act of preventing the transmission of pathogens when providing health services to patients, especially health workers. In practice, nurses are medical personnel who have the highest frequency of dealing with patients directly. The high frequency of dealing with patients directly makes nurses also have the greatest opportunity to transmit nosocomial infections to patients compared to other medical personnel.⁸

A study compared nurse adherence to hand hygiene in the United States, Australia and Indonesia. Nurse hand hygiene compliance rates in the US are 50%, Australia is 65%, and Indonesia is 20% - 40% [9]. In research conducted at RSUD dr. Iskak Tulungagung by Pratama et al¹⁰, overall nurse compliance was only 36%. In addition to that in research conducted at Ade Muhammad Djoen Sintang Hospital¹¹, showed a compliance rate of 30.9%. Meanwhile at PKU Muhammadiyah Yogyakarta Hospital¹², compliance rate of 52%. From the results of this previous study, it can be shown that the compliance of medical staff is still low in carrying out one of the procedures of patient safety namely hand hygiene. In general, the factors found to be related to nurse compliance in carrying out hand hygiene procedures include knowledge, attitudes, motivation, availability of supporting facilities for hand hygiene, work culture and supervision. Studies related to this topic are still limited. The purpose of this study was to analyze perceptions related to nurse adherence to hand hygiene in the surgical inpatient room of Dr. Mohammad Hoesin

Palembang. It is hoped that the results of this study can be used as a reference in increasing nurse compliance with the implementation of infection prevention and control.

Methods

The design of this study uses a cross-sectional approach. The data collection method was carried out online using a questionnaire. The population in this study were 80 nurses who were in Building H, J & P RS Mohammad Hosein Palembang. This study used a total sampling technique, where the sample was the entire population, namely 66 respondents who met the inclusion and exclusion criteria.

The dependent variable is the compliance of nurses in carrying out hand hygiene procedures. Nurse compliance in carrying out hand hygiene procedures is measured as a real action taken by nurses directly in carrying out hand hygiene. The outcome variable is defined in binary form, Compliant (if the ordinal of the respondent carries out the 5 moment hand hygiene procedure). Non-compliant (if the respondent does not carry out one or more of the 5 moment hand hygiene procedures). Independent variables consist of knowledge, attitude, motivation, availability of hand hygiene supporting facilities, and supervision. Data was collected through a google form which was distributed online at the hospital. Data analysis was presented using univariate (descriptive) and bivariate analysis using the chi square test. The confidence level used is 95% ($\alpha=0.05$).

Results

Based on Table 1 it shows that most of the respondents aged 26-35 years were 68.2%. The sex of the respondents was dominated by the female sex of 87.9%. More than 50 percent of respondents' educational status was in the S1 category of 66.7%. Most of the respondents are employees who have worked for more than 3 years as much as 60.6%. The majority of respondents had attended Infection Prevention and Control (PPI) training of 93.9%. most of the respondents' level of knowledge about good and correct hand hygiene is at a good level of 69.7%. The majority of respondents had a positive attitude in carrying out good and correct hand hygiene by 92.4%. Most of the respondents' motivation levels are at a high level of 62.1%. Most of the hand hygiene facilities were in good condition at 80.3%. Supervision of hand hygiene is mostly good at 60.6%. Most of the respondents obeyed in doing hand hygiene by 81.8%.

Table 1. Characteristics of Respondents

Variables	Frequency	Percentage (%)
Age		
17-25	7	10.6
26-35	45	68.2
36-45	9	13.6
46-55	5	7.6
Gender		
Male	8	12.1
Female	58	87.9
Education Background		
D3	21	31.8
D4	1	1.5
S1	44	66.7
Length of work		
New (1-3 years)	26	39.4
Old (> 3 years)	40	60.6
Infection Prevention and Control training		
Once	62	93.9
Never	4	6.1
Knowledge		
Good	46	69.7
Not good	20	30.3
Attitude		
Positive	61	92.4
Negative	5	7.6
Motivation		
High	41	62.1
low	25	37.9
Facility Availability		
Good	53	80.3
Not good	13	19.7
Supervision		
Good	40	60.6
Not good	26	39.4
Obedience		
Obey	54	81.8
Not obey	12	18.2

Subsequent analysis using bivariate analysis. This analysis was conducted to determine the relationship between the dependent variable, namely the compliance of nurses in performing hand hygiene with each independent variable, including knowledge, attitudes, motivation, availability of supporting facilities for hand hygiene, and supervision. Bivariate analysis in this study used the chi-square test. Based on table 2 based on the chi-square test it is known that the independent variables that have a significant relationship ($p < 0.05$) with the nurse's compliance in performing hand hygiene are motivation, availability of facilities, and supervision.

Table 2. Independent Variable Relationship with Nurse Compliance in Performing Hand Hygiene

Variable	Obedience				Total		<i>p-value</i>
	obey		Not obey				
	n	%	n	%	n	%	
Knowledge							
Good	36	78.3	10	21.7	46	100	0.256
Not good	18	90.0	2	10.0	20	100	
Attitude							
Positive	51	83.6	10	16.4	61	100	0.188
Negative	3	60.0	2	40.0	5	100	
Motivation							
High	38	92.7	3	7.3	41	100	0.003
Low	16	64.0	9	36.0	25	100	
Facility availability							
Good	47	88.7	6	11.3	53	100	0.004
Not good	7	53.8	6	46.2	13	100	
Supervision							
Good	36	90.0	4	10.0	40	100	0.033
Not good	18	69.2	8	30.8	26	100	

Discussion

The purpose of this study was to determine perceptions related to nurse adherence to hand hygiene in the surgical inpatient room at Dr. Mohammad Hoesin Palembang. We found that 81.8% of respondents adhered to hand hygiene. Knowledge is a very important factor in determining one's actions. Actions based on knowledge will last longer than actions that are not based on knowledge.¹⁸ The results of this study indicate that there is no relationship between knowledge and nurse compliance in carrying out hand hygiene. The results of this study are in line with research conducted by Dewi at Djoen Sintang Hospital in 2017 shows that there is no significant relationship between knowledge and compliance of respondents. Research conducted by Hamdana in 2021¹⁹, also shows that there is no significant relationship between nurses' knowledge and adherence to hand hygiene. The results of this study are different from research conducted at the Rajawali inpatient installation at RSUP Dr. Kariadi Semarang²⁰, the results of the study showed that there was a significant relationship between knowledge and nurses' compliance in performing hand hygiene. Research conducted by Ernawati²¹, also shows that there is a relationship between knowledge and nurse compliance in the implementation of hand hygiene.

In this study, most of the nurses had good knowledge, but there were still some who had not carried out hand hygiene properly and correctly according to standards. Explanations that are possible because knowledge of hand hygiene compliance will help to comply with hand hygiene in the recommended way, knowledge will help to identify the advantages and disadvantages of hand hygiene compliance and identify ways of transmitting HAIs and how to prevent them.¹³ However, the level of knowledge about hand hygiene is not only limited to the importance of its implementation, but must also include indications and techniques for its implementation. Many nurses understand the purpose of hand hygiene to prevent cross contamination between health

workers and patients, but only a few nurses know the indications and techniques for implementing hand hygiene.²²

The results of the study showed that there was no relationship between attitudes and respondents' compliance in carrying out hand hygiene. In line with the research conducted by Sari and Hastuti in the inpatient room of the PKU Muhammadiyah Bantul General Hospital²³, the results of this study indicate that there is no significant relationship between attitude and nurse compliance in carrying out hand hygiene. Research conducted by Syamsulastri in 2017²⁴, also shows that there is no significant relationship between attitudes towards nurse compliance in carrying out hand hygiene. In contrast to several studies which stated that there was a significant relationship between attitudes and hand hygiene adherence in nurses.^{19,25,26}

Attitude is a closed response to a particular stimulus or object. The manifestation of attitude cannot be seen directly, but can only be interpreted in advance from closed behavior. Changes in attitude can be influenced by information received and owned by individuals, views or judgments of an object and one's experience.¹⁸

Motivation is the impetus in a person to do something.²⁷ This urge is in a person who moves to do something according to the urge that is in him. Therefore, an action based on high motivation will increase adherence to performance.²⁸ The results of this study indicate that there is a significant relationship between motivation and respondents' compliance in carrying out hand hygiene. Respondents who have high motivation tend to obey in carrying out hand hygiene 1.45 times greater than respondents who have low motivation. In line with research conducted by Riani in 2019²⁹, The results of this study indicate that there is a significant relationship between nurses' motivation and compliance in carrying out hand hygiene. Research conducted by Parwa in 2019³⁰, also shows a relationship between nurse motivation and compliance in carrying out hand hygiene according to standards.

Motivation can encourage, control, maintain, and channel a behavior. Appreciation from other people, especially colleagues, influences compliance, which has a positive impact on the quality of services provided. This shows that motivational factors are related to personal rewards that are directly related to work.¹⁵ Based on the results of the study it can be concluded that high nurse motivation will increase nurse compliance in carrying out hand hygiene. Giving rewards to nurses who meet hand hygiene standards can increase their positive motivation, while sanctions and reprimands increase negative motivation, with sanctions and reprimands nurses who do not comply are more motivated to carry out hand hygiene properly in the future.²³

Every health facility must provide sufficient resources to support the implementation of infection prevention and control. Hospital leadership should develop an infection prevention and control committee and also provide sufficient resources to implement effective infection prevention and control. Facilities and infrastructure including resources that are very important to do.³¹

According to several studies, the lack of facilities and infrastructure is one of the reasons why the implementation of PPI in hospitals is inadequate. Therefore, the implementation of the PPI program must be balanced with the provision of facilities and infrastructure that meet the requirements so that program implementation can run optimally.³²⁻³⁴

Based on Notoatmodjo's theory, hand hygiene facilities consist of facilities and infrastructure that can be used to prevent the spread of infection. WHO states that a multidimensional strategy is needed to increase compliance in maintaining hand hygiene. This method includes changing the system by giving alcohol-based handrub in addition to the sink and antiseptic soap at each treatment point.¹⁸

It is known from the results of this study that there is a significant relationship between the availability of hand hygiene facilities and the compliance of respondents in carrying out hand hygiene. The existence of adequate hand hygiene facilities tends to make nurses comply in carrying out hand hygiene 1.65 times greater than the lack of available hand hygiene facilities. In line with the results of research conducted by Anugrahwati and Hakim at Hermina Jatinegara Hospital.³⁵ The results of this study indicate that there is a significant relationship between the availability of facilities and the compliance of nurses in carrying out hand hygiene. Research conducted by Felyani in 2019³⁶, also shows a relationship between the availability of facilities and nurses' compliance with hand hygiene. In contrast to the research conducted by Fatma in 2020³⁷, the results of the study showed that there was no significant relationship between the availability of facilities and the compliance of nurses in performing hand hygiene. The availability of hand hygiene facilities is very important and crucial in the nosocomial infection prevention program, without the availability of adequate facilities it will be very difficult for health workers to carry out standard hand hygiene procedures.

Supervision is part of the process or implementation of the oversight and control function. Supervision as a process of providing the resources needed to complete tasks or decision-making activities that are closely related to planning and organizing activities and information from leadership and evaluating each performance. Supervision can be concluded as a planned activity of a manager through the activities of guidance, direction, observation, motivation and evaluation of his staff in carrying out daily activities or tasks.³⁸

Our results show that on supervision with compliance shows that there is a relationship between the supervision of the head of the room on the compliance of respondents in carrying out hand hygiene. good supervision tends to make nurses comply in carrying out hand hygiene 1.3 times greater than those who are not supervised. In line with research conducted by Sinaga at the 2016 Rangkas Bitung Mission Hospital³⁹, shows that there is a relationship between the supervision of the head of the room and adherence to hand hygiene at the Mission Rangkas Bitung Hospital. The research was conducted in the Inpatient Room of RSUD dr. Zubir Mahmud, East Aceh District

⁴⁰, also shows a relationship between supervision and nurse compliance in performing hand hygiene.

The strategy for increasing hand hygiene compliance among health care workers, especially nurses, is to ensure that the necessary facilities and infrastructure are available to improve hand hygiene in the treatment room. Among these are access to a water supply, availability of disposable soap and towels, and alcohol-based hand sanitizer products that are safe and tolerable in treatment settings.^{41–44} It is very important for all health care workers especially nurses to receive regular training to raise awareness of hand-borne microbial transmission. This training should show staff the importance of maintaining hand hygiene and demonstrate proper hand hygiene procedures. To achieve this goal, healthcare providers can improve adherence to hand hygiene by using regular presentations, e-learning modules, posters, focus groups, reflective discussions, videos, self-study modules, practical demonstrations, feedback from assessments, or a combination of these. and other methods and health service providers hand hygiene compliance can be improved through the placement of reminders and prompts (eg posters, stickers, leaflets, voice prompts, etc.) about the importance of maintaining hand hygiene and the indications and procedures needed.^{45–50}

This research has several limitations. First, because of the Covid-19 pandemic during the study, this research was conducted online and researchers could not directly observe conditions in the field, so the observation sheet was omitted. Second, this study uses an online form as an alternative solution in collecting data during a pandemic, so there is a possibility that the information provided by the respondents has the opportunity for information bias to occur. Third, researchers cannot assist respondents in filling out the questionnaire form so that there is a possibility that the answers given by respondents may not necessarily reflect the actual situation.

Conclusion

The level of compliance of nurses in carrying out hand hygiene at the Mohammad Hosein Hospital Palembang, especially in the H, J, & P Buildings, was mostly in the obedient category, which was 81.8%. Independent variables that have a significant relationship with nurse compliance in carrying out hand hygiene are motivation, availability of hand hygiene facilities, and supervision. The hospital can improve nurse compliance in implementing hand hygiene by conducting training with updated material, providing rewards to those who carry out hand hygiene obediently, and increasing monitoring and evaluation in the application of hand hygiene.

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Competing Interest

The authors declare no conflicts of interest.

References

1. Al-Abdely HM, Khidir Mohammed Y, Rosenthal VD, Orellano PW, ALazhary M, Kaid E, et al. Impact of the International Nosocomial Infection Control Consortium (INICC)'s multidimensional approach on rates of ventilator-associated pneumonia in intensive care units in 22 hospitals of 14 cities of the Kingdom of Saudi Arabia. *J Infect Public Health* [Internet]. 2018;11(5):677–84. Available from: <https://doi.org/10.1016/j.jiph.2018.06.002>
2. Rahmawati SA, Dhamanti I. Infections Prevention and Control (IPC) Programs in Hospitals. *J Heal Sci Prev*. 2021;5(1):23–32.
3. Hapsari AP, Wahyuni CU, Mudjianto D. Knowledge of Surveillance Officers on Identification of Healthcare-associated Infections in Surabaya. *J Berk Epidemiol*. 2018;6(2):130.
4. WHO. on Hand Hygiene in Health Care First Global Patient Safety Challenge Clean Care is Safer Care. World Heal Organ. 2009;270.
5. Haque M, Sartelli M, McKimm J, Bakar MA. Health care-associated infections – An overview. *Infect Drug Resist*. 2018;11:2321–33.
6. World Health Organization. Report on the Burden of Endemic Health Care-Associated Infection Worldwide Clean Care is Safer Care. World Heal Organ [Internet]. 2011;3:1–21. Available from: www.who.int
7. Ling ML, Apisarnthanarak A, Madriaga G. The Burden of Healthcare-Associated Infections in Southeast Asia: A Systematic Literature Review and Meta-analysis. *Clin Infect Dis* [Internet]. 2015 Jun 1 [cited 2023 Jun 23];60(11):1690–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/25676799/>
8. Öncü E, Vayisoğlu SK, Lafcı D, Yıldız E. An evaluation of the effectiveness of nursing students' hand hygiene compliance: A cross-sectional study. *Nurse Educ Today*. 2018;65(June 2017):218–24.
9. Apriani F, Yunita P. Hubungan Pengetahuan Dan Sikap Petugas Kesehatan Terhadap Kepatuhan Melakukan Hand Hygiene Di RSUD Raja Ahmad Tabib Tanjungpinang. *Zo Kebidanan* [Internet]. 2020;10(2):42–52. Available from: <http://ejurnal.univbatam.ac.id/index.php/zonabidan/article/view/637>

10. Pratama BS, Koeswo M, Rokhmad K. Faktor Determinan Kepatuhan Pelaksanaan Hand Hygiene pada Perawat IGD RSUD dr . Iskak Tulungagung Determinant Factors of ER Nurses ' Hand Hygiene Compliance at dr . Iskak Hospital Tulungagung. J Kedokt Brawijaya. 2015;28(2):195–9.
11. Dewi K, Ria R. Faktor Determinan Kepatuhan Perawat Dalam Melakukan Praktik Cuci Tangan Di Rsud Ade Muhammad Djoen Sintang. J Kesmas (Kesehatan Masyarakat) Khatulistiwa. 2019;4(4):232.
12. Septyaningrum S. Hubungan Motivasi Dengan Tingkat Kepatuhan Perawat Dalam Melakukan Hand Hygiene di Ruang Rawat Inap Kelas II dan III Rumah Sakit PKU Muhammadiyah Yogyakarta. Universitas 'Aisyiyah Yogyakarta. Universitas 'Aisyiyah Yogyakarta; 2017.
13. Engdaw GT, Gebrehiwot M, Andualem Z. Hand hygiene compliance and associated factors among health care providers in Central Gondar zone public primary hospitals, Northwest Ethiopia. Antimicrob Resist Infect Control. 2019;8(1):1–7.
14. Al-Wazzan B, Salmeen Y, Al-Amiri E, Abul A, Bouhaimed M, Al-Taiar A. Hand hygiene practices among nursing staff in public secondary care Hospitals in Kuwait: Self-report and direct observation. Med Princ Pract. 2011;20(4):326–31.
15. Hutahaean S, Anggraini NV, Nababan D. Analysis of Factors Related to the Head of the Nurses in the Implementation of Prevention and Control of Infections in the Hospital. J Medicoeticolegal dan Manaj Rumah Sakit. 2019;8(3):158–62.
16. Octaviani E, Fauzi R. Analisis Faktor yang Berhubungan dengan Kepatuhan Mencuci Tangan pada Tenaga Kesehatan di RS Hermina Galaxy Bekasi. J Kedokt dan Kesehat. 2020;16(1):12–9.
17. Handiyani H, Ikegawa M, Hariyati RTS, Ito M, Amirulloh F. The determinant factor of nurse's hand hygiene adherence in Indonesia. Enferm Clin. 2019;29(Insc 2018):257–61.
18. Notoatmodjo S. Promosi Kesehatan dan Perilaku Kesehatan. Jakarta: Rineka Cipta; 2012.
19. Hamdana, Alfira N, Nurhidayah I. Faktor-Faktor Yang Berhubungan Dengan Perilaku Penerapan Hand Hygiene Di Rsud Lanto Dg Pasewang. J Skala Kesehat. 2021;12(2):149–59.
20. Amalia R, Widagdo L, Syamsulhuda. Faktor-Faktor yang Berhubungan dengan Tingkat Kepatuhan Tenaga Kesehatan Melakukan Cuci Tangan (Studi Kasus di Instalasi Rawat Inap Rajawali RSUP Dr. Kariadi Semarang). J Kesehat Masy [Internet]. 2016;4(3):1083–9. Available from: <http://ejournal-s1.undip.ac.id/index.php/jkm>
21. Ernawati. Faktor-Faktor Yang Berhubungan dengan Kepatuhan Perawat Dalam Pelaksanaan Hand Hygiene Sebelum Tindakan Keperawatan di BLUD RS Konawe Utara. J Ilm Karya Kesehat. 2021;01(02):8–16.

22. Rikayanti KH. Hubungan Tingkat Pengetahuan Dengan Perilaku Mencuci Tangan Petugas Kesehatan Di Rumah Sakit Umum Daerah Badung Tahun 2013. *Community Health (Bristol)* [Internet]. 2014;2(1). Available from: <http://ojs.unud.ac.id/index.php/jch/article/view/7693>
23. Sari TN, Hastuti SKW. Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Perawat Dalam Pelaksanaan Hand Hygiene Di Ruang Rawat Inap RSUD PKU Muhammadiyah Bantul. *Fak Kesehat Masy Univ Ahmad Dahlan* [Internet]. 2019;1–10. Available from: <http://eprints.uad.ac.id/14960/>
24. Syamsulastri. Faktor Yang Berhubungan dengan Kepatuhan Perawat Dalam Melakukan Hand Hygiene [Internet]. Universitas Muhammadiyah Pontianak. 2017. Available from: <http://repository.unmuhpnk.ac.id/>
25. Setiawan Y. Faktor- Faktor Yang Berhubungan Dengan Kepatuhan Perawat Dalam Melakukan Cuci tangan Sebelum Dan Setelah Tindakan Keperawatan Diruang Punica Rumah Sakit Sentra Medika Cisalak Depok. *J Ilmu Keperawatan* [Internet]. 2017;6(1). Available from: <https://www.google.com/search?q=faktor+faktor+yang+berhubungan+dengan+perilaku+mencuci+tangan+perawat&ie=utf-8&oe=utf-8>
26. Zainaro MA, Laila SA. Hubungan Motivasi Dan Sikap Dengan Kepatuhan Perawat Dalam Pelaksanaan Hand Hygiene Di Ruang Rawat Inap RSUD Dr. a. Dadi Tjokrodipo Kota Bandar Lampung. *Malahayati Nurs J*. 2020;2(1):68–82.
27. Yun MR, Lim EJ, Yu B, Choi S. Effects of Academic Motivation on Clinical Practice-Related Post-Traumatic Growth among Nursing Students in South Korea: Mediating Effect of Resilience. *Int J Environ Res Public Health*. 2020 Jul;17(13).
28. Nguemeleu ET, Boivin S, Robins S, Sia D, Kilpatrick K, Brousseau S, et al. Development and validation of a time and motion guide to assess the costs of prevention and control interventions for nosocomial infections: A Delphi method among experts. *PLoS One* [Internet]. 2020;15(11 November):1–19. Available from: <http://dx.doi.org/10.1371/journal.pone.0242212>
29. Riani, Syafriani. Hubungan Antara Motivasi dengan Kepatuhan Perawat Melaksanakan Hand Hygiene Sebagai Tindakan Pencegahan Infeksi Nosokomial di Ruang Rawat Inap Rumah Sakit A. *J Ners*. 2019;3(23):49–59.
30. Parwa D, Krisnawati MS, Yanti ED. Hubungan Supervisi dan Motivasi Dengan Kepatuhan Perawat Mencuci Tangan Di RSUD. *J Kepemimp dan Manaj Keperawatan*. 2019;2(1):28.
31. Sapardi VS, Machmud R, Gusti RP. Analisis Pelaksanaan Manajemen Pencegahan Dan Pengendalian Healthcare Associated Infections Di Rsi Ibnu sina. *J Endur*. 2018;3(2):358.
32. Lee MH, Lee GA, Lee SH, Park YH. Effectiveness and core components of infection prevention and control programmes in long-term care facilities: a systematic review. *J Hosp*

- Infect [Internet]. 2019;102(4):377–93. Available from: <https://doi.org/10.1016/j.jhin.2019.02.008>
33. Ramayanti R, Semiarty R, Lestari Y. Analisis Pelaksanaan Program Pencegahan dan Pengendalian Infeksi Nosokomial di RSUD Pasaman Barat (Standar Akreditasi Versi 2012). *J Kesehat Andalas*. 2019;8(3):617.
 34. Herman MJ, Handayani RS. Sarana dan Prasarana Rumah Sakit Pemerintah dalam Upaya Pencegahan dan Pengendalian Infeksi di Indonesia Government Hospital Facilities and Infrastructure to Prevent and Control Infection In Indonesia Saat ini Indonesia menghadapi beban ganda dalam pemban. *J Kefarmasian Indones*. 2016;6(2):137–46.
 35. Anugrahwati R, Hakim N. Faktor-Faktor Yang Mempengaruhi Kepatuhan Perawat Dalam Melakukan Hand Hygiene Five Moments Di Rs. Hermina Jatinegara. *J Ilm Keperawatan Altruistik*. 2019;2(1):41–8.
 36. Ali F., Riu SD., Yahya I. Hubungan Perilaku Dan Ketersediaan Fasilitas Rumah Sakit Dengan Kepatuhan Perawat Melakukan Hand Hygiene Di Ruang Rawat Inap Bedah Flamboyan RS TK. II Robert Wolter Mongisidi Manado. *J Kesehat Amanah*. 2019;3(2).
 37. Jama F. Faktor Yang Berhubungan Dengan Kepatuhan Perawat Dalam Melakukan 6 Langkah Cuci Tangan. *J Keperawatan Widya Gantari Indones*. 2020;4(2):96.
 38. Agus I, Gea Y, Fitriani AD, Theo D, S2 BM, Kesehatan I, et al. Analysis Of Factors Nurse Compliance In The Application Of Hygiene Hands In The Hospital Installation Of Gunungsitoli Kab. Nias. *J Kesehat Glob*. 2018;1(3):102–9.
 39. Sinaga SEN. Kepatuhan Hand Hygiene di Rumah Sakit Misi Rangkasbitung. *J Kesehat Caring Enthusiasm*. 2016;6(2):7–12.
 40. Nasution HL, Laksana B. Faktor yang Berhubungan Dengan Kepatuhan Perawat dalam Melaksanakan Five Moment Hand Hygiene di Ruang Rawat Inap RSUD dr.Zubir Mahmud Kabupaten Aceh Timur Tahun 2019. 2019;2(1):1–10.
 41. Mathur P. Hand hygiene: Back to the basics of infection control. *Indian J Med Res*. 2011;134(5):611–20.
 42. Boyce JM, Pittet D. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/Association for Pro. *MMWR Recomm reports Morb Mortal Wkly report Recomm reports*. 2002 Oct;51(RR-16):1–45, quiz CE1-4.
 43. Rynga D, Kumar S, Gaiind R, Rai AK, Author C. Hand hygiene compliance and associated factors among health care workers in a tertiary care hospital: Self-reported behavior and direct observation. *Int J Infect Control [Internet]*. 2017;13(13):1–1. Available from: www.ijic.info

44. Rosenberg A. Hand Hygiene Barriers faced by Health Care Workers in The Gambia: A Health Belief Model Approach. 2016;
45. Albright J, White B, Pedersen D, Carlson P, Yost L, Littau C. Use patterns and frequency of hand hygiene in healthcare facilities: Analysis of electronic surveillance data. *Am J Infect Control* [Internet]. 2018;46(10):1104–9. Available from: <https://doi.org/10.1016/j.ajic.2018.04.205>
46. Alp E, Ozturk A, Guven M, Celik I, Doganay M, Voss A. Importance of structured training programs and good role models in hand hygiene in developing countries. *J Infect Public Health* [Internet]. 2011;4(2):80–90. Available from: <http://dx.doi.org/10.1016/j.jiph.2011.03.001>
47. Chavali S, Menon V, Shukla U. Hand hygiene compliance among healthcare workers in an accredited tertiary care hospital. *Indian J Crit Care Med* [Internet]. 2014 Oct 1 [cited 2023 Jun 30];18(10):689–93. Available from: <https://pubmed.ncbi.nlm.nih.gov/25316980/>
48. Cruz JP, Bashtawi MA. Predictors of hand hygiene practice among Saudi nursing students: A cross-sectional self-reported study. *J Infect Public Health* [Internet]. 2016;9(4):485–93. Available from: <http://dx.doi.org/10.1016/j.jiph.2015.11.010>
49. Ellingson K, Haas JP, Aiello AE, Kusek L, Maragakis LL, Olmsted RN, et al. Strategies to prevent healthcare-associated infections through hand hygiene. *Infect Control Hosp Epidemiol*. 2014 Aug;35(8):937–60.
50. Mu X, Xu Y, Yang T, Zhang J, Wang C, Liu W, et al. Improving hand hygiene compliance among healthcare workers: an intervention study in a Hospital in Guizhou Province, China. *Brazilian J Infect Dis* [Internet]. 2016;20(5):413–8. Available from: <http://dx.doi.org/10.1016/j.bjid.2016.04.009>