

Strategies for Prevention and Control of Nosocomial Infections: Literature Review

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ABSTRACT

Nosocomial infections are a serious issue in Indonesia, with a prevalence of 6–16%. These infections increase morbidity, mortality, hospital stays, and healthcare costs. Infection Prevention and Control (IPC) in hospitals is crucial to reducing the risk of transmission among patients, healthcare workers, and the community. However, IPC program implementation faces challenges such as limited resources, inadequate infrastructure, and noncompliance with protocols. This literature review analyzes the implementation of IPC programs, healthcare workers' adherence to hand hygiene, and factors influencing program success. Data were collected through journal searches using keywords “Nosocomial Infection Prevention,” AND “Infection Control in Hospitals,” OR “Hand Hygiene Compliance.” Findings indicate that Continuous Quality Improvement (CQI) programs and hand hygiene practices effectively reduce nosocomial infections. However, challenges persist in implementing and maintaining IPC programs. Factors such as knowledge, motivation, supervision, and workload play a critical role in determining the success of these initiatives in healthcare facilities.

Keywords: Infection Prevention and Control, Nosocomial Infections, Hospital

INTRODUCTION

Nosocomial infections or Healthcare-Associated Infections (HAIs) are currently one of the main factors causing increased morbidity and mortality in hospitals. These infections can occur through non-invasive actions, namely direct contact between infected patients and other patients, medical personnel, visitors, or family, as well as through hospital equipment and environments, which have the potential to transmit the disease suffered (Chairani et al., 2022). The United States Centers for Disease Control and Prevention released data that, every year, almost 1.7 million hospitalized patients experience nosocomial infections while receiving treatment for other medical conditions. As a result, more than 98,000 patients, or about one in 17, die from these infections (Haque et al., 2018). Nosocomial infections are acquired by patients while receiving treatment in hospitals or other health facilities. This infection can occur after 2x24 hours of treatment, where previously, the patient did not show symptoms of infection and was not in the incubation period of a particular disease (Yudha et al., 2025). The prevalence of nosocomial infections in Indonesia is reported to range from 6-16%, indicating a high risk of health service-related infections (Depi Simanjutak et al., 2025). The occurrence of nosocomial infections not only has an impact on increasing patient morbidity and mortality but also prolongs the length of hospitalization and increases healthcare costs. Therefore, hospitals must be responsible for implementing infection prevention and control programs to prevent nosocomial infections. Several studies have been conducted to evaluate implementing the Infection Prevention and Control (IPC) program in hospitals to improve the quality of health services and reduce infection rates. Implementing an effective IPC program can improve the quality of health services and protect all parties from the threat of health service-related infections. Therefore, hospitals need to establish a IPC Unit to enhance the quality of healthcare services by safeguarding patients, the community, and healthcare resources from the risk of infectious diseases associated with medical treatments (Pandeiroot et al., 2023).

However, implementing the IPC program in various hospitals still faces various challenges. Several studies have shown that although the IPC program has been

implemented, there are still obstacles, such as lack of human resources, adequate facilities and infrastructure, and non-compliance with the IPC protocol (Sahputra et al., 2023). Research conducted by (Mawo et al., 2025) at Bajawa Regional Hospital found several reasons why the implementation of the IPC program has not run optimally, including: first, Bajawa Regional Hospital has a Standard Operating Procedure (SOP) and reporting flow related to work accidents and work-related diseases. However, nurses' understanding of the SOP and reporting flow is uneven. Second, although there is a budget for Occupational Health and Safety activities, the funds have not been explicitly allocated for recording and reporting work accidents. In addition, the reporting process is still carried out verbally. Based on these challenges, a comprehensive and sustainable strategy is needed to increase the effectiveness of the IPC program in hospitals. Commitment from hospital management and adequate resource support are essential for the success of the IPC program. In addition, educating patients and families about the importance of infection prevention and control also reduces the risk of transmission. To support the success of the IPC program in hospitals, transparent procedures and policies are needed. Nurses must have a comprehensive plan with the leadership to monitor and implement programs such as hand hygiene, gloves, septic and aseptic measures, and sterilization and disinfection. These steps aim to limit the spread of organisms between patients and control the risk of infection from the environment (Putra Ritonga & Silaban, 2022).

This literature review aims to analyze the most effective strategies for increasing the success of IPC programs and reducing the number of nosocomial infections. By reviewing previous studies, this study will identify factors that support the success of IPC programs and the challenges still faced in their implementation. In addition, this study seeks to provide evidence-based recommendations from previous studies that hospitals can use to increase IPC program effectiveness. Thus, the results of this review are expected to be a reference in developing better policies and procedures to strengthen efforts to prevent nosocomial infections in healthcare facilities, especially in hospitals.

METHOD

This study uses a literature review method, with data sources from the Google Scholar database due to its ease of access and wide coverage. However, this study has limitations, namely the lack of coverage of highly reputable articles more often found in PubMed or Scopus. The data collection process was carried out through several systematic stages. The first stage involved searching for journals by determining the central theme of the study, then exploring articles using the keywords: "Prevention of Nosocomial Infections" AND "Infection control in hospitals" OR "Hand hygiene compliance." The search focused on full-text and open-access articles to ensure data accessibility. Researchers used the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram guide in selecting and assessing the articles' quality. The inclusion criteria in this study were: (1) Journals published in Indonesian or English in the period 2023-2024. This year's range was chosen to ensure that the data used reflects the latest developments in nosocomial infection prevention and control strategies, as well as current policy implementation in hospitals, (2) Articles discussing nosocomial infection prevention and control strategies in hospitals, (3) Articles available in full-text form.

The initial search results obtained 89 articles. After filtering, articles that did not meet the inclusion criteria were excluded, with the following details: (1) articles excluded from the initial criteria (n=65), (2) articles that met the 2023-2024 publication year criteria (n=24), (3) articles excluded because they were not relevant to the main topic (n=10), (4) articles that did not meet the theme criteria (n=3), (5) articles excluded due to title mismatch (n=5), (6) the total number of articles finally used in the analysis was (n=6). The exclusion criteria in this study included articles that were only abstracts, non-peer-reviewed research reports, and theses and dissertations that were not published in scientific journals. The selected articles were then analyzed and mapped in a table with references, research objectives, methods, and results.

The analysis was carried out by comparing the similarities and differences of each article to identify trends, challenges, and practical strategies for implementing the IPC program in hospitals.

The six selected articles have good quality by fulfilling the following requirements: using valid and reliable research methods, the research objectives are well explained, the reported results supported by strong data and adequate analysis, and having a clear relationship to the prevention and control of nosocomial infections.

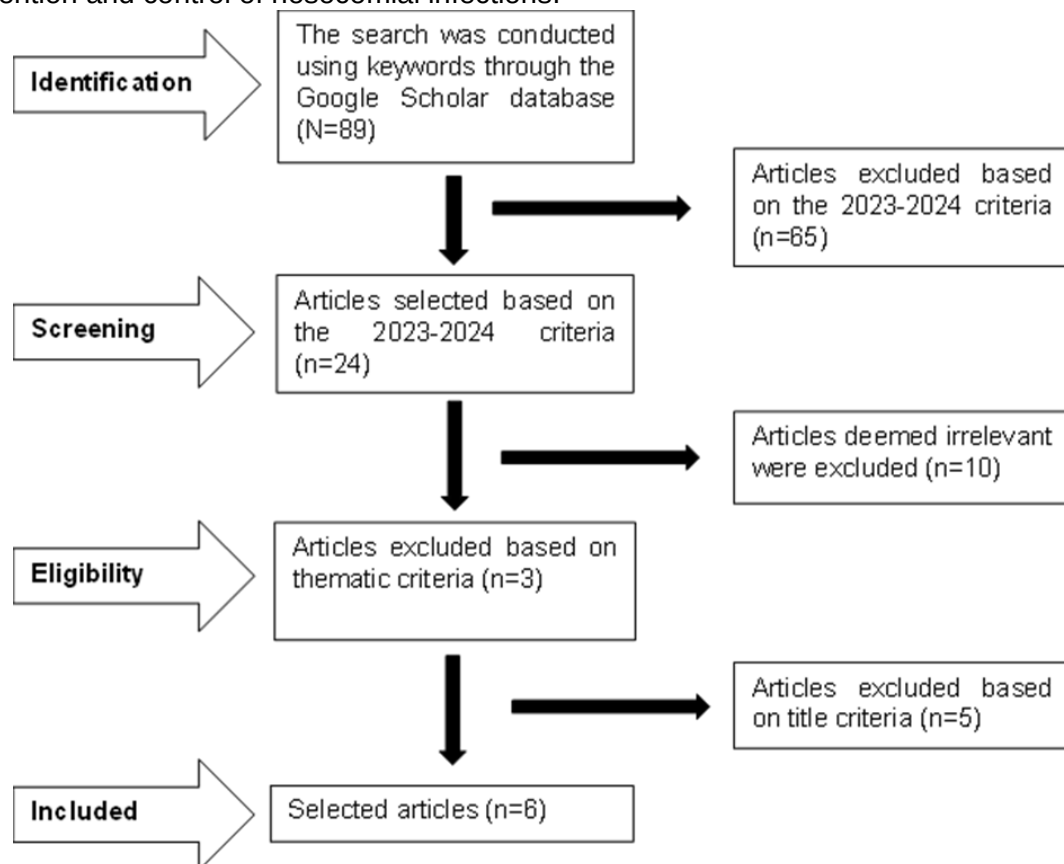


Figure 1. PRISMA Flow Diagram

RESULT AND DISCUSSION

Table 1. Research Results

No	References	Purpose	Method	Result
1	Pandeiroot et al., 2023. Analysis of the Implementation of the Nosocomial Infection Prevention and Control Program at Anugerah Regional General Hospital, Tomohon	To conduct an in-depth exploration of the implementation to enhance service quality at Anugerah Tomohon Hospital.	A descriptive qualitative approach was employed, utilizing data collection techniques such as in-depth interviews with five informants and observations. The data analysis process involved data reduction, field data verification, and drawing research conclusions.	There is no full commitment from all IPC members and related parties to implementing IPC, so the SOP has not run the program. Although hospital management has provided supporting facilities and infrastructure, these facilities are often vacancies or damaged.

2	(Mulia Pradana & Fadillah Nasution, 2024) Nurses' Compliance Level in Implementing the Five Moments for Hand Hygiene Technique and the Incidence of Nosocomial Infections at Sembiring General Hospital, Delitua	To analyze the relationship between the level of nurse compliance in implementing the Five Moments hand washing technique and the incidence of nosocomial infections at RSU Sembiring Delitua.	Descriptive correlation with a cross-sectional approach. The research subjects consisted of 35 nurses working at Sembiring Delitua General Hospital.	The compliance rate of nurses in implementing the Five Moments hand hygiene technique at Sembiring Delitua General Hospital reached 100% (35 individuals). Meanwhile, the average incidence of nosocomial infections from January to October was 1.16%.
3	(Sahputra et al., 2023) Analysis of Implementation of Infection Prevention and Control at Royal Prima Marelan General Hospital.	To examine the implementation of infection prevention and control programs at Royal Prima Maryland General Hospital.	A quantitative study utilizing an analytical observational approach with a cross-sectional study design. The population consisted of 100 individuals, with a sample of 50 selected based on inclusion and exclusion criteria.	The bivariate analysis results indicate that infection prevention and control factors include knowledge, motivation, supervision, and workload. Meanwhile, the multivariate analysis reveals that knowledge is the primary factor independently influencing nosocomial infection prevention and control in hospitals.
4	(Zulkarnain et al., 2024) The Compliance of Health Workers Doing Five Moments of Handwashing With The Incidence Of Nosokomial Infections: Literature Review	To assess the correlation between healthcare workers' compliance with hand hygiene practices and the incidence of nosocomial infections in hospitals.	Literature review with the PRISMA approach. The keywords used included "Handwashing," "Five Moments," and "Healthcare-Associated Infections (HAIs)."	Adherence to the Five Moments in handwashing has a significant impact on preventing nosocomial infections.
5	(Karmidah et al., 2024) Analisis Implementasi Continuous Quality Improvement dalam Pencegahan dan	To examine the impact of Continuous Quality Improvement implementation on personal hygiene aspects within infection prevention and	A descriptive correlation study with a cross-sectional design. The research sample was selected using a purposive sampling technique, involving 54 respondents. Data analysis was	The implementation of Continuous Quality Improvement influences personal hygiene in infection prevention and control programs. Additionally, its application to the management of untreated wounds also impacts the

	Pengendalian Infeksi di RSUD dr. La Palaloi	control programs.	conducted using the Pearson correlation coefficient.	effectiveness of infection prevention and control measures.
6	(Zhafarina & Hutahaeen, 2023) Relationship between Nurse Performance and Implementation of Infection Prevention and Control at Hospital X Bogor, Indonesia	To examine the correlation between nurse performance and respondent characteristics in the implementation of infection prevention and control measures in the inpatient ward of Hospital X in Bogor Regency, Indonesia.	A descriptive-analytic study with a cross-sectional approach. The sampling technique employed was total sampling, involving 45 respondents.	The chi-square test results demonstrated a significant correlation between nurse performance and the implementation of infection prevention and control measures. Based on these findings, it can be concluded that better nurse performance increases the likelihood of effective implementation of infection prevention and control measures.

Although various regulations have been implemented, implementing the IPC program still faces various challenges. A study at RS X Malang Regency showed that one of the main obstacles to implementing IPC was the minimal allocation of funds for this program (Nadin et al., 2022). Another study by (Putra Ritonga & Silaban, 2022) stated that a strong hierarchical culture in hospitals is an obstacle to the implementation of IPC, where policies are often determined by management without involving health workers in the field (Depi Simanjutak et al., 2025). (Yudha et al., 2025) in their research at RSAU, Dr. Esnawan Antariksa said that despite strict regulations, many health workers still do not fully understand the importance of IPC or do not comply with established procedures. (Nadin et al., 2022) In their research, they argue that many hospitals in Indonesia still have limitations in terms of facilities and infrastructure to support the implementation of IPC; this statement is supported by (Dwinata et al., 2023), who stated that inadequate facilities, such as personal protective equipment (PPE) and limited isolation rooms, are the main obstacles in preventing the spread of infection. In addition, the lack of monitoring and evaluation is also the cause of the IPC program not running optimally. (Nadin et al., 2022) their research found that reporting infections is still often done verbally without systematic recording (Mawo et al., 2025), which strengthens this statement with the results of their research that the process of reporting work accident incidents at Bajawa Hospital is still done verbally. Based on these challenges, several strategies are needed to implement and run the IPC program effectively and optimally.

Continuous Quality Improvement (CQI) in Infection Prevention and Control

In healthcare, CQI is often used to improve patient safety, service efficiency, and compliance with clinical standards. CQI often applies methods such as Plan-Do-Study-Act (PDSA), Six Sigma, and Lean Healthcare to improve hospital care and management processes. In Infection Prevention and Control, CQI can help optimize compliance with infection prevention procedures, increase efficiency in early detection, and improve coordination among health workers (Karmidah et al., 2024). The spread of infection is a challenge for hospitals because it can increase mortality and morbidity, as well as increase treatment costs and prolong patient stays (Nadin et al., 2022).

Research conducted by (Karmidah et al., 2024) directly examines the impact of Continuous Quality Improvement (CQI) on hospital infection prevention and control practices.

The results showed a significant positive correlation between implementing CQI and improving personal hygiene, which contributed to the infection prevention and control program. These results indicate that CQI is an effective way to improve infection control practices in hospitals where CQI can be used to monitor the level of compliance of health workers in implementing IPC protocols, such as hand hygiene, use of Personal Protective Equipment (PPE), and sterilization procedures. In addition, the results of this study also found that implementing CQI has a significant effect on open wound care in infection control programs. Implementing wound care by CQI principles has been shown to increase the effectiveness of infection prevention, thus emphasizing the need for adequate training and supervision for health workers. The high prevalence of nosocomial infections in Indonesia further underlines the importance of implementing effective infection control measures, where CQI has emerged as a promising strategy.

With a data-driven approach, CQI helps conduct routine audits of hospital nosocomial infection incidents. CQI emphasizes improving the competence of health workers through ongoing training and workshops on infection prevention. Studies show that nurses who receive repeated training on CQI and IPC have higher levels of compliance than those who do not receive training. CQI allows for periodic evaluation and feedback for health workers in implementing IPC, and hospitals can use the results of this evaluation to improve ineffective SOPs (Karmidah et al., 2024). However, in its implementation, CQI requires investment in information technology, training of health workers, and procurement of medical devices that meet standards. However, many hospitals in Indonesia have limited funds (Nadin et al., 2022). In addition, hospitals with limited medical personnel often face challenges in implementing CQI optimally because the high workload reduces the focus on compliance with IPC procedures (Yudha et al., 2025).

Relationship between Handwashing Compliance and the Incidence of Nosocomial Infections

Hand washing is one of the methods used by the public to clean their hands as a preventive measure and control of disease infection. This process can be done using running water and soap or with alcohol-based antiseptics (Mulia Pradana & Fadillah Nasution, 2024). One study by (Zulkarnain et al., 2024) analyzed health workers' compliance in carrying out the "Five Moments of Hand Washing" and its impact on nosocomial infections. The study's results consistently confirmed that compliance with hand washing plays an important role in preventing nosocomial infections in hospitals. The study also showed that nurse compliance directly relates to their knowledge and attitudes towards preventing nosocomial infections. These results are also supported by research conducted by (Mawo et al., 2024) on nurses at hospital X, where the results of the data analysis showed that there was a relationship between nurses' knowledge of nosocomial infections and hand hygiene behavior, so it can be concluded that the higher the nurse's knowledge of nosocomial infections, the better the hand hygiene behavior they do. Therefore, regular training programs on proper handwashing techniques and their impact on nosocomial infections can increase awareness and compliance of health workers (Chairani et al., 2022). WHO recommends the Five Moments for Hand Hygiene method, namely washing hands before touching patients, before aseptic actions, after contact with patient body fluids, after touching patients, and after touching the patient's environment (Zulkarnain et al., 2024); research at the Advent Hospital Bandung found that the application of this method was able to significantly reduce the number of nosocomial infections (Situmorang & Widiyarti, 2024).

Research conducted by (Chairani et al., 2022) showed the same results where the results of statistical tests showed that there was a relationship between knowledge of

nosocomial infection prevention and attitudes with nurses' compliance in washing their hands in the integrated inpatient room of the Aceh Besar Regional General Hospital in 2022. Nurses' compliance with hand hygiene practices is an important factor that plays a significant role in preventing nosocomial infections in hospitals (Mawo et al., 2024). To reduce the prevalence of nosocomial infections, nurses are expected to always wash their hands according to the government's procedures to reduce the risk of transmission of nosocomial infections in hospitals. In addition, hospitals are also expected to be able to guarantee the availability of facilities and infrastructure that support hand hygiene, especially for health workers, such as hand and liquid soap. In addition, the available facilities, such as running water taps, must also be ensured to function optimally (Chairani et al., 2022).

To increase compliance with hand washing, adequate facilities are needed. (Mulia Pradana & Fadillah Nasution, 2024) Stated that the availability of sinks, soap, alcohol-based antiseptics, and educational posters on hand hygiene in each care unit has been shown to increase compliance of health workers, conversely (Chairani et al., 2022) in their research at RSU Aceh Besar showed that inadequate facilities are an obstacle to implementing hand washing habits. Providing incentives and awards can also increase nurses' hand-washing compliance; hospitals that implement a reward system for health workers with high levels of compliance in hand-washing experience an increase in compliance of up to 20% compared to hospitals that do not implement the system (Mulia Pradana & Fadillah Nasution, 2024). Using an audit system and direct supervision by the IPC team has also been shown to increase compliance with hand washing (Zulkarnain et al., 2024). Making hand hygiene part of the patient safety culture in hospitals can also increase awareness and compliance of health workers (Chairani et al., 2022); this can be done through internal campaigns, such as installing posters, slogans, and visual reminders in work areas, can help strengthen hand washing habits (Mulia Pradana & Fadillah Nasution, 2024).

Relationship between Nurse Performance and Implementation of Infection Prevention and Control (IPC)

The role of nurses in implementing IPC is crucial, considering that they are at the forefront of providing health services. However, the effectiveness of IPC implementation depends not only on nurses' individual skills but is also influenced by organizational factors such as safety culture and management support (Pandeiroot et al., 2023; Zhafarina & Hutahaeen, 2023). Based on research conducted (Zhafarina & Hutahaeen, 2023) on the relationship between nurse performance and implementing infection prevention and control. The study's results showed a significant relationship between nurse performance and the implementation of IPC. Although most nurses showed good performance (51.1%), a relatively large proportion (60%) did not implement IPC correctly.

In contrast, nurses who had received IPC training showed a slight increase in implementing IPC practices. However, the correlation was not statistically significant. These results indicate that training alone may not be enough to ensure optimal IPC implementation but also emphasize the importance of motivation, skills, and top management support in influencing nurse performance in implementing IPC.

The results of the study were partly confirmed by research (Sahputra et al., 2023), which highlighted the influence of knowledge, motivation, and supervision on infection prevention in their research at the Royal Prima Marela General Hospital, found that knowledge was the most significant factor influencing infection prevention efforts. In addition, workload proved to be another influential factor, indicating that high workload can hurt health workers' compliance with implementing the IPC protocol. A strong safety culture in a hospital can increase nurses' awareness and compliance with IPC procedures. A study at the Anugerah

Tomohon Hospital showed that even though there was an IPC policy, lack of awareness and compliance with SOPs were still significant obstacles to its implementation (Pandeiroot et al., 2023), research at the Royal Prima Maryland General Hospital found that nurses with a high level of awareness of patient safety had a better level of compliance with IPC procedures compared to those who did not understand the importance of safety culture (Sahputra et al., 2023). In addition, support from hospital management in the form of policies, budgets, and ongoing training greatly influenced the implementation of IPC. A study at Hospital X Bogor showed that active management in providing supervision and incentives for nurses was able to improve performance in implementing IPC (Zhafarina & Hutahaeen, 2023).

Challenges in Implementing Infection Prevention and Control (IPC) Programs

Several studies have highlighted challenges in implementing the IPC program. A study by (Pandeiroot et al., 2023) evaluated the implementation of the IPC program at Anugerah Tomohon Hospital and found that although the IPC program had been implemented, there were significant challenges. The main obstacles included a lack of commitment from all stakeholders and non-compliance with SOPs. Although hospital management has provided facilities and infrastructure, its maintenance still has obstacles. This study recommends solutions by increasing training, education, and management support for the IPC team. The challenges identified in the study at Anugerah Tomohon Hospital have also been found in other studies. For example, a study by (Sahputra et al., 2023) highlighted that high workloads can hinder health workers' compliance with IPC protocols. This indicates the need for a management strategy to adjust the number of staff to the workload adequately. Thus, there is an increase in IPC implementation, not only by relying on changes in individual behavior but also through policy reform, infrastructure support, and the active involvement of all stakeholders in healthcare facilities. To address these challenges, several policy recommendations can be made, namely:

- 1) Hospital management should be more proactive in supporting the IOP team, including providing an adequate budget for training and facilities.
- 2) Provision of personal protective equipment (PPE), alcohol-based antiseptics, and easily accessible handwashing facilities in every care unit should be a priority,
- 3) Regular training and workshops on IPC procedures according to WHO standards need to be conducted to increase awareness and compliance of health workers,
- 4) Implementation of a periodic audit system and feedback to health workers,
- 5) Patient safety culture can be strengthened through educational campaigns, poster placement, and incentives for health workers who comply with IPC SOPs

To improve the effectiveness of IPC in hospitals, a comprehensive approach is needed, including management commitment, provision of adequate facilities, ongoing training, a strong monitoring system, and strengthening of patient safety culture. By implementing this strategy, the number of nosocomial infections is expected to be reduced, and the quality of health services can be increased. However, the success of implementing this policy can vary in each hospital, depending on the infrastructure conditions and work culture. Large hospitals with complete facilities, a good Occupational Safety and Health culture, and management support inadequate budget allocation tend to be faster and more effective in reducing the number of nosocomial infections compared to hospitals with limited resources

CONCLUSION

Hospitals can improve the effectiveness of their IPC programs by implementing policies that include ongoing training, infrastructure improvements, robust monitoring systems, and management support. These policies reduce the number of nosocomial infections and

improve patient safety and the overall quality of health care. Some specific recommendations related to IPC policies include:

- 1) Routine IPC training is required for all health workers every six months.
- 2) Provision of adequate handwashing facilities, including alcohol-based hand sanitizers, procurement and maintenance of PPE, and routine and regular sterilization of medical devices
- 3) Invest in an electronic recording system to facilitate reporting and monitoring of nosocomial infection cases
- 4) Establish performance-based incentives for health workers who comply highly with IPC procedures.
- 5) Integrate IPC policies into hospital strategic planning with clear and measurable achievement targets.
- 6) Encourage the involvement of hospital leaders in hand hygiene campaigns and patient safety culture.
- 7) Involve patient families in IPC education, especially in maintaining hand hygiene

Following the implementation of these strategies, further research is needed to explore the effectiveness of the various IPC strategies that have been implemented, identifying specific barriers to their implementation. The authors declare no conflict of interest in this study, and all funding was independent. A limitation of this literature review is the lack of coverage of highly reputable articles more often found in PubMed or Scopus. Therefore, it is recommended that future studies conduct literature reviews on the same topic using databases from PubMed or Scopus to strengthen nosocomial infection prevention strategies in Indonesia further.

REFERENCES

- Chairani, R., Riza, S., & Putra, Y. (2022). Hubungan Pengetahuan dan Sikap Pencegahan Infeksi Nosokomial dengan Kepatuhan Perawat dalam Mencuci Tangan di Ruang Rawat Inap Terpadu Rumah Sakit Umum Daerah Aceh Besar Tahun 2022. *Journal of Healthcare Technology and Medicine*, 8(2), 2615–109.
- Depi Simanjutak, L. P., Wahyuni Nasution, S., & Novalinda Ginting, C. (2025). Faktor-Faktor Yang Mempengaruhi Keberhasilan Program Pencegahan dan Pengendalian Infeksi Di RSU Mitra Sejati Kota Medan. *Jurnal Vokasi Kesehatan*, 11(1), 1–8. <http://ejournal.poltekkes-pontianak.ac.id/index.php/JVK>
- Dwinata, R. T., Kusumapradja, R., Hilm, M. R., & Handriyanto, N. T. (2023). Analisis Rancangan Model Pengembangan Pengelolaan Program Pencegahan dan Pengendalian Infeksi Di Instalasi Gawat Darurat Rumah Sakit Pada Masa Pandemi COVID-19. *Jurnal Ilmiah Permas : Jurnal Ilmiah STIKES Kendal*, 4(13), 1253–1264.
- Haque, M., Sartelli, M., McKimm, J., & Bakar, M. A. (2018). Health care-associated infections – An overview. In *Infection and Drug Resistance* (Vol. 11, pp. 2321–2333). Dove Medical Press Ltd. <https://doi.org/10.2147/IDR.S177247>
- Karmidah, N., Rizki Amelia, A. A., & Afrianty Gobel, F. (2024). Analisis Implementasi Continuous Quality Improvement dalam Pencegahan dan Pengendalian Infeksi di RSUD dr. La Palaloi. *Journal of Aafiyah Health Research (JAHR) 2024*, 5(2), 16–24. <https://doi.org/10.52103/jahr.v5i2.1607>
- Mawo, F. H. M., Sakti, E. M., & Abdullah, A. A. (2024). Hubungan Pengetahuan Dan Sikap Perawat Tentang Infeksi Nosokomial Dengan Perilaku Hand Hygiene di Rumah Sakit X Yogyakarta. *NAJ: Nursing Applied Journal*, 2(3), 41–54. <https://doi.org/10.57213/naj.v1i3.270>
- Mawo, F. H. M., Arumdani, I. S., & Khusna, T. N. (2025). Analysis Of The Reporting System For Accidents and Occupational Diseases Among Hospital Nurses In Indonesia: A Case Study. *Journal of Public Health Research and Community Health Development*, 8(2), 157–165. <https://doi.org/10.20473/jphrecode.v8i2.53409>

- Mulia Pradana, R., & Fadillah Nasution, M. (2024). Tingkat Kepatuhan Perawat Dalam Melaksanakan Teknis Cuci Tangan Five Moment Dengan Kejadian Infeksi Nosokomial Di Rumah Sakit Umum Sembiring Delitua. *Jurnal Kebidanan Darmas (JKD)*, 1, 104–111.
- Nadin, A., Putra, P., Wahyuni, I. D., Rupiwardani, I., Widyagama, S., & Malang, H. (2022). Program Pencegahan dan Pengendalian Infeksi (IPC) Di Rumah Sakit X Kabupaten Malang. In *Media Husada Journal of Environmental Health* (Vol. 2, Issue 1).
- Pandeiroot, I., Niode, N. J., & Rampengan, N. H. (2023). Analisis Pelaksanaan Program Pencegahan dan Pengendalian Infeksi Nosokomial di Rumah Sakit Umum Daerah Anugerah Tomohon. *E-Clinic*, 12(1), 111–115. <https://doi.org/10.35790/ecl.v12i1.45864>
- Putra Ritonga, E., & Silaban, N. Y. (2022). Hubungan Fungsi Manajemen Kepala Ruang Dengan Pelaksanaan Pengendalian Infeksi Nosokomial Di Rumah Sakit Umum Imelda Pekerja Indonesia Medan. *Jurnal Ilmiah Keperawatan Imelda*, 8(1). <http://jurnal.uimedan.ac.id/index.php/Jurnalkeperawatan>
- Sahputra, F., Girsang, E., & Napiah Nasution, A. (2023). Analysis of Implementation of Infection Prevention and Control at Royal Prima Marelan General Hospital. *Jurnal Penelitian Pendidikan IPA*, 9(12), 11790–11795. <https://doi.org/10.29303/jIPCpa.v9i12.5421>
- Situmorang, R. W., & Widiyarti, S. H. (2024). Tingkat Kepatuhan Perawat Dalam Melaksanakan Teknis Cuci Tangan Five Moment Dengan Kejadian Infeksi Nosokomial Di Rumah Sakit Advent Bandung. *Klabar Journal Of Nursing*, 6(1), 2685–7154. <http://ejournal.unklab.ac.id/index.php/kjn>
- Yudha, A. M., Retnowati, D., & Purwati. (2025). Analisis Sistem Deteksi Dini Pencegahan dan Pengendalian Ancaman Infeksi Nosokomial (Biohazard) (Studi Pada Rsau Dr. Esnawan Antariksa, Jakarta). *Jurnal Ners Universitas Pahlawan*, 9(1), 762–771.
- Zhafarina, Z., & Hutahaean, S. (2023). Relationship between Nurse Performance and Implementation of Infection Prevention and Control at Hospital X Bogor, Indonesia. *International Journal Of Multidisciplinary Research And Analysis*, 06(07). <https://doi.org/10.47191/ijmra/v6-i7-37>
- Zulkarnain, E. V., Muhith, A., & Chilyatiz. (2024). The Compliance of Health Workers Doing Five Moments Of Handwashing With The Incidence Of Nosocomial Infections: Literature Review. *Journal of Applied Nursing and Health*, 6(1), 27–35. <https://doi.org/10.55018/janh.v6i1.170>