

Evaluation of occupational safety and health management system in a hospital related to infection prevention and control program: hand hygiene

Maria Saraswati Kinasih Hapsari^{1*}, Anggit Wirama Siwidati¹, Asri Deismawaranti¹, Ratna Hafitri Astutik¹

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¹Master of Public Health, Department of Health Behavior, Environmental, and Social Medicine, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

***Correspondence:**

mariasaraswatikinasihhapsari@mail.ugm.ac.id

Abstract

Purpose: This study evaluates the implementation of the Occupational Safety and Health Management System (OSHMS) through a hand hygiene program at Griya Mahardhika General Hospital, focusing on five elements: policy establishment, planning, implementation, monitoring, and performance improvement. **Methods:** This study employed a descriptive qualitative approach involving the Infection Prevention and Control (IPC) team and hospital management, with documents, facilities, and procedures related to hand hygiene implementation as the research objects. Data were collected through in-depth interviews with five key informants, direct observations, and document reviews based on hospital regulations and Ministry of Health standards. **Results:** Griya Mahardhika General Hospital has implemented internal policies aligned with Ministry of Health Regulation No. 27 of 2017 through a Director's Decree and established an IPC Team with a clear organizational structure. Implementation efforts include sanitation facilities, educational posters, routine training, and collaboration with professional infection control associations. Monitoring of hand hygiene compliance using the "6 steps" and "5 moments" checklists is reported internally and through the mutu fasyankes platform, with support from the local health office. However, compliance varies across departments, and monitoring is conducted only occasionally due to staffing limitations. **Conclusion:** The hand hygiene program at Griya Mahardhika General Hospital has been implemented in accordance with the five elements of the Occupational Safety and Health Management System. Structured implementation, internal monitoring, and external supervision are crucial for preventing infections. Strengthening staff awareness and maintaining cross-sector collaboration are key to sustaining the Occupational Safety and Health Management System (OSHMS) in hospital settings.

Keywords: hand hygiene; healthcare-associated infections (HAIs); infection prevention and control (IPC); occupational safety and health management system (OSHMS)

INTRODUCTION

Hospitals, as one of the health care facilities, play a strategic role in accelerating improvements in public health. Hospitals provide comprehensive individual health services, including promotive, preventive, curative, and rehabilitative efforts, by providing inpatient, outpatient, and emergency services [1]. Under Government Regulation No. 50 of 2012, every workplace with at least 100 employees and a high level of potential danger is required to implement the Occupational Safety and Health Management System (OSHMS) [2]. Hospital Occupational Safety and Health (HOSH) encompasses all activities aimed at guaranteeing and protecting the safety and health of hospital personnel, patients, patient companions, visitors, and the Hospital environment through efforts to prevent work-related accidents and occupational diseases. HOSH is essential for the optimal, effective, efficient, and sustainable implementation of Occupational Safety and Health in the hospital [3].

To ensure that HOSH runs smoothly, it is necessary to establish a Hospital Occupational Safety and Health Management System (HOSHMS). HOSHMS is an integral part of the hospital's overall management system, aimed at controlling risks associated with hospital work processes, thereby creating a healthy, safe, secure, and comfortable working environment for hospital staff, patients, patient companions, visitors, and the hospital itself [3]. The implementation of OSHMS primarily involves establishing Occupational Safety and Health (OSH) policies, planning OSH measures, implementing OSH plans, monitoring and evaluating OSH performance, and reviewing and improving OSHMS performance [2].

Although HOSHMS is mandatory for hospitals, many OSH issues persist. The Centers for Disease Control and Prevention (2022) explains that Healthcare-Associated Infections (HAIs), or infections related to healthcare services, remain a serious threat to patient safety. Approximately 1 in 10 hospital patients experiences at least one healthcare-associated infection. This number may be higher in developing countries [4]. One of the commitments in HOSHMS made by hospitals is to provide optimal care by preventing negligence, including the spread of infections. Therefore, a program called Infection Prevention and Control (IPC) was established (Karmidah et al., 2024). This program is universally known as IPC or Infection Prevention and Control. Regarding Healthcare-Associated Infections (HAIs), global data shows that hospital infection rates range from 3.5% to 12%. In developed countries, the

prevalence of HAIs reaches 7.6%, while in developing countries it reaches 19%, including Indonesia [5].

One aspect that requires attention in hospitals is hand hygiene. According to research by Chairani et al. (2022), hand hygiene can influence hospital infection rates. Healthcare workers' compliance with hand hygiene is also determined by their knowledge [6]. A similar study by Fauziah et al. (2025) found that hand hygiene can influence the incidence of infectious diseases in hospitals. The study also highlighted that an infection prevention and control team is essential for improving healthcare workers' compliance with hand hygiene [7].

Kartika and Nasution's (2024) research explains how the Occupational Safety and Health Management System is implemented. The study showed that implementation efforts depend on hospital management's commitment. Deficiencies were found in the mechanism for appointing OSH officers at the unit level, as well as the lack of routine monitoring and evaluation. This illustrates that although policies exist in Indonesia, their implementation in the field is not necessarily comprehensive. Many studies on OSH in hospitals focus solely on the Occupational Safety and Health Management System, without addressing its relationship to hand hygiene. Specific programs, such as hand hygiene, reflect not only infectious disease control efforts but also a culture of workplace safety. Therefore, there remains a research gap regarding how hand hygiene programs function as a form of implementation of the Occupational Safety and Health Management System, especially in hospitals in Indonesia, where compliance levels vary.

This study aims to evaluate the implementation of the Occupational Safety and Health Management System at Griya Mahardhika General Hospital through a hand hygiene program to prevent healthcare-associated infections (HAIs) by assessing five core elements: policy establishment, planning, implementation, monitoring and evaluation, and performance review and improvement.

METHODS

This study used a descriptive qualitative approach. The research subjects included the Infection Prevention and Control (IPC) team and hospital management, while the research objects comprised documents, facilities, and procedures related to hand hygiene implementation. This research was conducted at Griya Mahardhika General Hospital in Bantul, Yogyakarta, from April to May 2025.

Informants in this study were selected using purposive sampling. The informants of this study were determined based on the inclusion criteria as follows: (1) This study involved parties directly involved in the implementation of the Infection Prevention and Control (PPI) program at Griya Mahardhika Hospital consisting of members of the PPI committee and heads of installations in the Inpatient, Central Surgical Installation, Outpatient, ICU and Emergency Department; (2) Have at least 1 year of experience in implementing hand hygiene programs or activities related to Hospital Occupational Safety and Health; and (3) Willing to be informants, have received an explanation of the research, and signed an informed consent. Informants who were not involved in PPI activities, hand hygiene, or the implementation of HOSHMS, and were not willing to participate in the interview, or withdrew before the data collection process was completed. Thus, 5 informants were obtained.

Data were collected through in-depth interviews, direct observations, and document reviews, guided by applicable hospital regulations and the Minister of Health of the Republic of Indonesia No. 50 of 2012. Each interview lasted approximately 45 minutes. The entire interview process was recorded and then transcribed. The transcripts were re-verified to ensure the accuracy of the transcript content and the recording. Data analysis was conducted using a thematic approach, which coded each important piece of information and grouped them into categories to form themes according to the evaluation components of the HOHMS. Each theme was analyzed to describe

policy planning, implementation, monitoring, evaluation, and improvement of the hand hygiene program. These results were then combined with field notes and observations. Triangulation of sources, methods, and data was carried out to ensure the reliability and credibility of the data. This study has obtained ethical approval from the Airlangga University Faculty of Dental Medicine Health Research Ethical Clearance Commission and has obtained informed consent from each informant who participated.

RESULTS

Characteristics of interview informants

Table 1 shows five key informants who participated in this study. All informants were directly involved in implementing the Infection Prevention and Control (IPC) program and hand hygiene activities at Griya Mahardhika General Hospital. All informants were experienced IPC personnel with more than one year of experience in Infection Prevention and Control activities. Their individual and professional characteristics support the credibility of the qualitative data obtained in this study. Based on the Regulation of the Minister of Health of the Republic of Indonesia No. 50 of 2012 concerning Occupational Safety and Health in Health Service Facilities, there are 5 stages of OSHMS. The findings are presented in these stages, following the description of the informants' characteristics. Conceptual map of OSHMS implementation through the hand hygiene program at Griya Mahardhika General Hospital (Figure 1).

Table 1. Characteristics of informants

Code	Gender	Age (years)	IPC role	Unit	Years of expertise
I1	Female	38	IPC Committee Member	Inpatient Unit	≥ 5 years
I2	Female	41	IPC Committee Member	Central Surgical Installation	≥ 5 years
I3	Female	47	IPC Committee Member	Intensive Care Unit (ICU)	≥ 5 years
I4	Male	39	IPC Committee Member	Emergency Department	≥ 5 years
I5	Male	50	IPC Committee Member	Outpatient Unit	> 5 years

Establishment of occupational safety and health policy

The hospital has formal policies related to hand hygiene as stated in several Director's Decrees, including: (a) Director's Decree No. 1 of 2023 concerning Infection Prevention and Control Policy, (b) Director's Decree No. 17 of 2023 concerning Hand Hygiene Policy, (c) Director's Decree No. 51 of 2023 concerning Standard Operating Procedures for washing hands using water and soap (handwash) and antiseptic liquid (handrub).

In addition, the establishment of the IPC Committee as a technical implementer was determined through Director's Decree No. 3 of 2023. This committee is responsible for formulating policies, preparing guidelines, implementing field activities, and conducting program evaluations. One informant explained:

"The entire hand hygiene policy was formulated based on a decree issued by the director and hospital standard operating procedures. Before the program was implemented, a PPI Committee was formed to act as technical support" (Member of the IPC Quality Committee, Interview, April 2025).

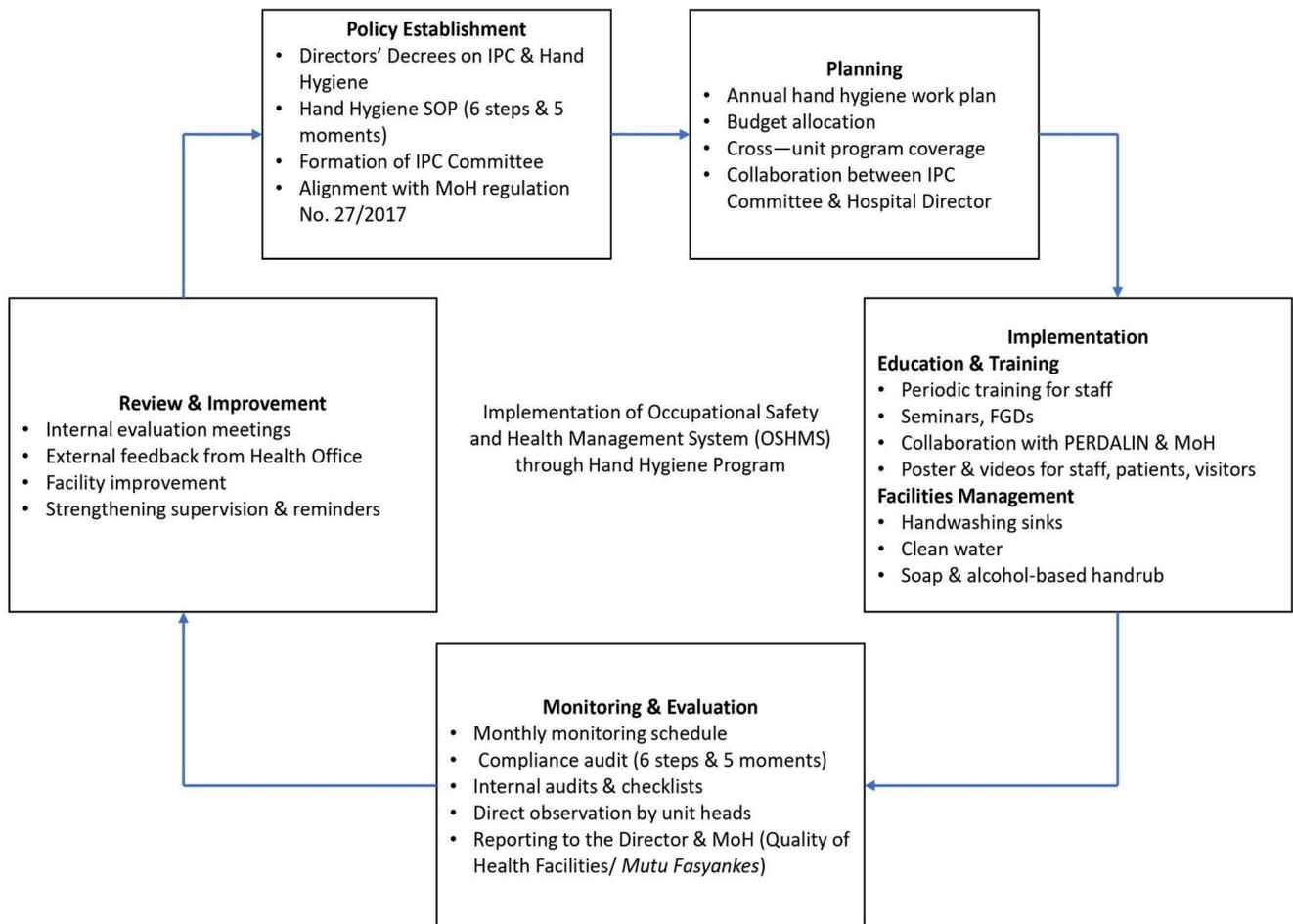


Figure 1. Conceptual map of OSHMS implementation through the hand hygiene program at Griya Mahardhika General Hospital

Occupational safety and health planning

Planning is done annually and involves collaboration between the IPC Committee and the Hospital Director. Planning includes preparing work programs and budgets for all service units. The main focus of planning is to prevent Healthcare-Associated Infections (HAIs) through a comprehensive program that reaches all hospital staff, both medical and non-medical.

“Hand hygiene programs are created at the beginning of each year with the Director and accompanied by a budget” (IPC Quality Committee Member, Interview, April 2025).

Implementation of the occupational safety and health plan

The implementation of the IPC program, Hand Hygiene, is carried out in accordance with the prepared plan. The program consists of 2 main aspects: periodic IPC education and training, and management of handwashing facilities.

“The hand hygiene programs that have been implemented vary, from seminars and training on the six steps of handwashing and the five moments

of handwashing to the creation of handwashing posters and videos to educate employees, both healthcare and non-healthcare workers. Furthermore, the management of handwashing facilities, including sinks, clean water, soap, and handrub, is carried out by the PPI Committee (IPC Quality Committee Member, Interview, April 2025).

The education and training program is conducted periodically for new employees, including health workers and non-health workers, as well as patients, families, and hospital visitors. The education focuses on the importance of hand hygiene, including the 6 steps and 5 moments, which are practiced routinely through Forum Group Discussions (FGD), Seminars, and training by the IPC Team, as well as through external Collaboration with Perdalín and the Ministry of Health. In addition, indirect education is delivered through hand hygiene videos and posters showing the steps and moments of hand washing in each installation unit and toilet. The IPC Committee and the Hospital also work together to implement programs related to the management of hand-washing facilities by providing adequate sanitation and hygiene facilities, including: hand-washing sinks with a foothold system, clean

water for hand washing, liquid hand-washing soap, and alcohol-based hand rub. Furthermore, observations revealed that implementation quality varied across units. Departments with frequent supervision demonstrated better compliance, while others exhibited inconsistent compliance, particularly during peak service hours.

Monitoring and evaluation of occupational safety and health performance

Monitoring and evaluation of the hand hygiene program are formally scheduled monthly and conducted by the Infection Prevention and Control (IPC) Committee in collaboration with the heads of service units. Evaluation includes compliance observations, facility inspections, internal audits, and reporting.

"The PPI Committee conducts monthly monitoring and evaluations in collaboration with the heads of each unit's installations to conduct internal audits and checklists for compliance and hand hygiene facilities. The results of these internal audits are reported to the Director and the Ministry of Health monthly through the health facility quality website." (IPC Quality Committee Member, Interview, April 2025).

Monitoring and evaluation are important stages in ensuring the success of hospital hand hygiene programs. Monitoring and evaluation are carried out systematically, with a primary focus on assessing staff compliance with hand hygiene procedures and ensuring that hand washing is performed at the right time, in accordance with the 6-step and 5-moment hand washing guidelines. Evaluation also includes monitoring the number of healthcare-associated infections (HAIs) associated with hand hygiene compliance. This is an important indicator for assessing the effectiveness of the hand hygiene program. In addition, external audits are conducted by the local Health Office as part of regulatory supervision. The results of these external audits are subsequently reported to the Ministry of Health and integrated into the national quality monitoring system, where they can be accessed through the Mutu Fasyankes website.

Monitoring is carried out periodically through 5 methods: 1) Creating a checklist of 6 hand washing steps and 5 hand washing moments as a measuring tool for observing compliance tests and individual knowledge, so that it can assess the understanding and attitudes of health workers in implementing the correct principles of hand hygiene. 2) Direct observation by the head of each installation unit, which aims to monitor the behavior of each health worker in hand washing

practices. 3) Routine inspections by the IPC Team and the Quality OSH Team of each work unit, to evaluate the condition of sanitation facilities and hand hygiene practices as a whole. 4) Preparation of internal reports related to hand washing compliance and HAIs indicators addressed to the IPC Committee and the Director of Medical Services as part of managerial supervision. 5) Sending external reports related to hand washing compliance and HAI indicators by the IPC Team to the Ministry of Health through the Fasyankes Quality digital platform.

Observations indicated that the external audit findings were generally consistent with internal monitoring, particularly in identifying variations in hand hygiene compliance across service units and the need for ongoing monitoring. Observations indicated that compliance improved after training and audits, but declined gradually when routine monitoring was limited, indicating the need for ongoing strengthening.

Review and improvement of occupational safety and health performance

Performance review is conducted through two main mechanisms: internal evaluation and external feedback. The Health Office periodically visits hospitals to evaluate facilities and the compliance of health workers. In addition, hospitals routinely submit infection and compliance data to the national system.

"We collaborate with the Health Office, which regularly visits hospitals. During these visits, they typically find findings and assess the adequacy of sanitation facilities and healthcare workers' compliance with hand hygiene procedures. We also routinely report data from internal monitoring and infection rates through the quality of healthcare facilities. The Health Office will provide recommendations for improvements that will assist us." (IPC Quality Committee Member, Interview, April 2025).

The performance of the hand hygiene program is continuously reviewed and improved to maintain service quality and encourage a culture of safety in the hospital environment. This review involves feedback from external parties, especially the Health Office, both through direct hospital visits and online monitoring of data on the Mutu Fasyankes website. During these visits, the Health Office will directly assess the availability and adequacy of sanitation facilities. The Health Office will also monitor compliance among health workers with handwashing procedures. The results of this monitoring and the recommendations serve as the basis for continuous improvement in the quality of the hand hygiene program's implementation.

Additionally, internal reports indicate that units with higher adherence to hand hygiene tend to report fewer HAI-related events, although numerical data were not recorded in this study.

DISCUSSION

Establishment of occupational safety and health policy

Based on the interviews, Occupational Health and Safety (OSH) policies, especially those related to hand hygiene, have been systematically determined and align with the hospital's internal regulations. This policy is integral to the Infection Prevention and Control (IPC) efforts, which are the primary priority in hospital health services. The process of determining the hand hygiene policy begins with the formation of the IPC Committee, which is responsible for implementing the team and policy formulation. This step reflects the hospital's commitment to aligning the implementation of the hand hygiene program with the basic principles of patient safety and efforts to prevent Healthcare-Associated Infections (HAIs). This finding aligns with research by Wang et al. (2020), which shows that strengthening nursing quality management can significantly reduce the number of nosocomial infections [8].

This decrease contributes to the patient's recovery and improves the overall assessment of hospital service quality. A basic understanding of infectious diseases is also very important for health workers in formulating IPC policies. This has been accommodated in the Regulation of the Minister of Health of the Republic of Indonesia Number 27 of 2017 concerning Guidelines for Infection Prevention and Control in Health Care Facilities. This guideline provides a framework for all relevant parties to ensure the quality of health services, protect the public, ensure patient safety, improve facility management efficiency, and encourage improvements in service quality [9].

Occupational safety and health planning

The planning of the hand hygiene program at Griya Mahardhika General Hospital demonstrates strategic integration between the Infection Prevention and Control Committee (IPC) and hospital management, particularly the Director. This process is carried out annually and starts with preparing the work program and allocating the budget, covering all service units. This collaboration reflects a participatory approach to managing the Occupational Health and Safety (OSH) program, which is important to the program's effectiveness in the field. Planning in the Hospital Occupational Health and Safety (HOSH) program is a

crucial initial step to ensure the safety and health of all parties in the hospital environment, including medical personnel, patients, and visitors. [10].

The main focus of this planning is to prevent HAIs through strategies that reach all hospital staff, both medical and non-medical. The hospital's efforts to implement infection prevention and control continue, because HAIs can be prevented if health care facilities consistently implement the IPC program. Infection prevention and control in health care facilities is very important, but officers and policymakers must first understand the basic concepts of infectious diseases. Guidelines for infection prevention and control in health care facilities need to be prepared in order to realize quality health services and can be a reference for all parties involved in the implementation of infection prevention and control in health care facilities and can protect the community and realize patient safety which will ultimately also have an impact on efficiency in health care facility management and improving the quality of service [11]

Implementation of the occupational safety and health plan

In the interview, the implementation of hand hygiene at the Griya Mahardhika Hospital has gone well. Health promotion was carried out by the IPC Team through socializing the five hand movements, conducting focus group discussions and seminars, and training, and through external collaboration with Perdalim and the Ministry of Health. The 6 steps in the five moments of hand washing were also socialized through print media and audio media. So that not only health workers, patients, and visitors, but also know about the five hand movements. The provision of supporting facilities for the five hand movements at the Griya Mahardhika Hospital is very appropriate and is always updated.

Several studies, such as those by Maryana and Rima (2023), found that hand hygiene at the Depati Hamzah Pangkalpinang Hospital and the Griya Mahardhika Hospital was effective. The implementation of the five hand movements was successful not only for health workers but also for patients and visitors, through peer-to-peer support. In this study, hand hygiene was shown to reduce the incidence of infections or HAIs in hospitals by almost 50% [12]. Also supported by the research of Idawati and Rita (2020), there is a relationship between health workers' compliance in hand hygiene behavior and the incidence of phlebitis infection at TKG Chik Ditiro Sigli Hospital. A p-value of 0.000 for the compliance variable regarding hand hygiene behavior indicates that individuals who

comply with hand hygiene do not contract phlebitis, a nosocomial infection [13].

Monitoring and evaluation of occupational safety and health performance

The hospital team's monitoring of the 6 steps and 5 moments of hand washing at Griya Mahardika Hospital has been very good. The hospital formed an IPC committee that monitors and evaluates monthly, conducts internal audits, and uses checklists to assess hand hygiene compliance and facilities. Audit results are reported to the hospital Director and the Ministry of Health via the health facility quality website. Monitoring is carried out through 5 methods, making a checklist of 6 steps and 5 moments of hand washing as an observation, each head of the installation unit carries out mandatory observations, routine inspections are carried out by the IPC Team and the OSH Team in each work unit, there is internal reporting of hand washing compliance and HAIs indicators, and external reports regarding hand washing compliance. The IPC Team sends Hais indicators to the Ministry of Health through the Health Facility Quality website.

Monitoring and evaluation strengthen the hand hygiene program and ensure it works well. In Fauziah et al. (2025), the IPC Team is associated with increased compliance with the 6 steps and 5 moments of handwashing. The p-value was 0.044 for the relationship between the IPC Team's role in the 6-step 5-moment handwashing program and compliance with it. Hand hygiene in hospitals is associated with a decrease in HAIs; in the study, there was a more than 70% reduction in nosocomial infections at Harapan Bunda Hospital. The IPC Team that works is one proof of the hospital's commitment to preventing infection of health workers, patients, and visitors [14]. This aligns with a review by Smiddy et al. (2019), which shows that a structured audit and feedback program can improve hand hygiene compliance and, in some studies, reduce HAI rates. Interventions that combine direct observation, targeted feedback, and periodic audits generally provide more consistent results than single interventions. However, long-term effectiveness depends on the continuity of oversight and the quality of feedback [14]

At Kardinah Tegal Hospital, the IPC Team's role strengthens the relationship with the ongoing hand hygiene program. It contributes to reducing HAIs (p-value = 0.0001) and to increasing handwashing compliance among health workers, patients, and visitors to 88%. The IPC Team at Kardinah Tegal Hospital always conducts supervision and evaluation, including improving supporting facilities for the 6-step

5-moment handwashing. Improvements to these facilities are intended to increase handwashing compliance. Increasing handwashing compliance reduces the incidence of nosocomial infections (HAIs) at Kardinah Tegal Hospital [15]. Harun et al (2023) also explained that the main determinants of compliance are the availability of facilities (soap/handrub), high workload, and managerial supervision [16].

Review and improvement of occupational safety and health performance

Improving hand hygiene performance in hospitals is part of a comprehensive, integrated infection-control program within the hospital's health and safety management system. Based on interviews with members of the IPC Quality Committee, it is known that evaluation and quality improvement are implemented continuously through synergy among internal hospital parties and external agencies, such as the Health Office and the Ministry of Health.

In the evaluation, the role of internal supervision by the IPC committee and the head of the installation section is a key factor in increasing hand hygiene compliance. In a study conducted by Budianto et al (2021) at the Mitra Keluarga Tegal Hospital, it was found that there was a significant relationship between the supervision of the head of the room and the handwashing habits of nurses, as indicated by the results of the Chi-Square test with a P value = 0.001 (<0.05). This shows that the higher the quality of supervision by the head of the room, the better the hand hygiene behavior demonstrated by the implementing nurses. This finding indicates that compliance is not only determined by the availability of facilities or technical policies, but also by managerial support and direct leadership in the field [17].

On the other hand, periodic field visits by external installations, such as the Health Office, are useful for monitoring compliance among health workers with hand hygiene procedures and for assessing the adequacy of available sanitation facilities. This is very effective in improving the performance of the hand hygiene program. This is reinforced by the results of a study by Fitriani et al. (2024), which found that hand hygiene compliance at Bangkinang Regional Hospital has been consistent with the Regulation of the Minister of Health No. 27 of 2017 [18].

This regulation is described in standard operating procedures (SOPs) that outline 5 moments and 6 steps of hand hygiene, as recommended by WHO. The implementation of the SOP aims to support the achievement of the National Quality Indicator (INM) and to fulfill hospital accreditation standards. Factors that support this compliance include officers'

knowledge, awareness of its implementation, and management's active role in supervising and evaluating. In addition, data from internal monitoring are routinely reported through the Mutu Fasyankes platform and used as a basis for evaluating improvements in service quality. By combining online monitoring-based evaluation, field visits to external installations, and strong internal supervision, the hand hygiene program in hospitals can be run optimally. This approach not only reflects a commitment to patient and staff safety but also supports the achievement of national service quality standards.

To ensure the quality of the data obtained in this study, triangulation of data sources and methods, including in-depth interviews, observations, and document reviews, enhanced the credibility of the findings. The use of a structured interview guide and thematic analysis, aligned with the five stages of the OSHMS, enhanced the reliability and consistency of the analysis process. Confirmability was strengthened by grounding interpretations in multiple sources of evidence rather than in the researcher's assumptions. Regarding transferability, the findings provide contextual insights into the implementation of OSH through a hand hygiene program in a hospital setting. However, generalization to other settings should be approached with caution, as this study has limitations, including the small number of informants, all of whom were members of the Infection Control and Prevention Committee (IPC), which may limit perspectives from frontline healthcare workers. Furthermore, the lack of quantitative compliance data and infection rates may impact interpretations of the program's effectiveness.

Despite these limitations, the findings offer important practical implications for hospital management. Strengthening routine oversight, allocating adequate human resources for monitoring activities, and integrating hand hygiene compliance into regular performance evaluations can improve the sustainability of OSHMS implementation. For future research, involving frontline healthcare workers and implementing a mixed-methods approach that combines quantitative compliance data and infection outcomes is recommended to provide a more comprehensive assessment of hand hygiene programs within the Occupational Safety and Health Management System.

CONCLUSION

Based on the evaluation results, the Occupational Safety and Health Management System (OSHM) and the Hand Hygiene Program at Griya Mahardika Hospital have been implemented as preventive measures against nosocomial infections. The stages of policy

formulation, planning, implementation, monitoring, evaluation, review, and performance improvement are carried out in accordance with Ministry of Health standards and implemented in a structured manner. The implementation of the Hand Hygiene Program involves continuous education, adequate sanitation facilities, and systematic monitoring of hand hygiene compliance, with regular reporting to the Ministry of Health.

The strong commitment of Griya Mahardika Hospital's management, the active role of the Infection Prevention and Control Committee (IPC), and collaboration with external parties, such as the Health Department, are key factors in the program's success. These efforts have contributed to reducing the risk of Healthcare-Associated Infections (HAIs). The sustainability of the program requires increased staff awareness and strengthened internal and external oversight to maintain the quality of healthcare services and safety within the hospital environment.

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Authors' contribution

M.S.K.H.: Conceptualization, Methodology, Supervision, Writing; A.W.S.: Data curation, Formal analysis, Investigation, Writing original draft; A.D.: Validation, Writing; R.H.A.: Methodology, Writing.

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Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethics statement

The Health Research Ethical Clearance Commission approved this study, Faculty of Dental Medicine, Universitas Airlangga, approval number 0951/HRECC.FODM/IX/2025. Informed consent was obtained from all participants prior to data collection.

Conflicts of interest

The authors declare no conflict of interest regarding the publication of this article.

Use of artificial intelligence (AI)

Portions of this manuscript were edited using ChatGPT to improve grammar and clarity. All AI-assisted content was carefully reviewed and validated by the authors, who take full responsibility for the accuracy, integrity, and originality of the

final manuscript. AI was not used for data analysis, result interpretation, or the generation of scientific conclusions.

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