

THE EFFECT OF HEALTHCARE WORKERS' HAND HYGIENE COMPLIANCE ON THE INCIDENCE OF PHLEBITIS MOTHER AND CHILD HOSPITAL, TULUNGAGUNG

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Abstract

Background : Phlebitis is one of the most frequent side effects of intravenous medication, and healthcare-associated infections (HAIs) continue to be a significant indicator of hospital service quality. Although hand hygiene compliance is seen as a crucial intervention in infection control, more research is needed to determine how beneficial it is in lowering the prevalence of phlebitis.

Aims : The purpose of this study was to examine how healthcare personnel' adherence to hand cleanliness practices affected the prevalence of phlebitis at FH Mother and Child Hospital in Tulungagung.

Methods : This study used a cross-sectional, quantitative analytic observational strategy. The FH Mother and Child Hospital in Tulungagung's 2025 Infection Prevention and Control (IPC) annual report, which covered phlebitis incidence and hand hygiene compliance from January to December 2025, provided secondary data. The method of total sampling was used.

Results : The results demonstrated a good degree of adherence, with an average hand hygiene compliance rate of 87.7%. Phlebitis was still common, though, with an average of 18.6% and a peak of 44% in December. The results of the investigation showed no significant relationship between the incidence of phlebitis and hand hygiene compliance.

Conclusion : A lower incidence of phlebitis was not substantially correlated with good hand hygiene compliance. Numerous factors, such as aseptic insertion techniques, catheter care practices, patient-related diseases, and the workload of healthcare professionals, might have an impact on phlebitis. Therefore, to lower the prevalence of phlebitis and enhance patient safety, comprehensive infection prevention techniques are required.

Keywords : Hand Hygiene, Phlebitis, Compliance, Healthcare-associated Infections, Hospital.

Abstrak

Latar Belakang : Flebitis adalah salah satu efek samping yang paling sering terjadi akibat pengobatan intravena, dan infeksi terkait perawatan kesehatan (HAIs) terus menjadi indikator penting kualitas layanan rumah sakit. Meskipun kepatuhan kebersihan tangan dianggap sebagai intervensi penting dalam pengendalian infeksi, penelitian lebih lanjut diperlukan untuk menentukan seberapa bermanfaatnya dalam menurunkan prevalensi flebitis.

Tujuan : Tujuan penelitian ini adalah untuk meneliti bagaimana kepatuhan petugas kesehatan terhadap praktik kebersihan tangan memengaruhi prevalensi flebitis di Rumah Sakit Ibu dan Anak FH di Tulungagung.

Metode : Penelitian ini menggunakan strategi observasional analitik kuantitatif potong lintang. Laporan tahunan Pencegahan dan Pengendalian Infeksi (IPC) Rumah Sakit Ibu dan Anak FH di Tulungagung tahun 2025, yang mencakup insiden flebitis dan kepatuhan kebersihan tangan dari Januari hingga Desember 2025, menyediakan data sekunder. Metode pengambilan sampel total digunakan.

Hasil : Hasil menunjukkan tingkat kepatuhan yang baik, dengan rata-rata tingkat kepatuhan kebersihan tangan sebesar 87,7%. Meskipun demikian, flebitis masih umum terjadi, dengan rata-rata 18,6% dan puncaknya 44% pada bulan Desember. Hasil investigasi menunjukkan tidak ada hubungan signifikan antara kejadian flebitis dan kepatuhan kebersihan tangan.

Kesimpulan : Kejadian flebitis yang lebih rendah tidak berkorelasi secara substansial dengan kepatuhan kebersihan tangan yang baik. Banyak faktor, seperti teknik pemasangan aseptik, praktik perawatan kateter, penyakit terkait pasien, dan beban kerja tenaga kesehatan, dapat berdampak pada flebitis. Oleh karena itu, untuk menurunkan prevalensi flebitis dan meningkatkan keselamatan pasien, diperlukan teknik pencegahan infeksi yang komprehensif.

Kata Kunci : Kebersihan Tangan, Flebitis, kepatuhan, Infeksi Perawatan Kesehatan, Rumah Sakit.

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Introduction

Healthcare-associated infections (HAIs) continue to be a major global public health concern and one of the main markers of hospital service quality. In addition to raising rates of morbidity and mortality, HAIs also lengthen hospital stays and raise medical expenses. HAIs have a substantial impact on patient safety and are among the most common adverse events in hospital settings worldwide (Allegranzi et al., 2021).

Phlebitis, which is defined as vein inflammation brought on by intravenous therapy, is one of the most prevalent forms of HAIs. Serious side effects like systemic infection and

worsening of the patient's health can result from phlebitis. Numerous studies show that the type of intravenous fluid, infusion insertion techniques, and healthcare personnel's proficiency with aseptic procedures all have an impact on the occurrence of phlebitis (Azni et al., 2021). Additionally, keeping an eye on and supervising medical personnel is crucial for preventing phlebitis (Noviana et al., 2021).

Hand hygiene compliance is one of the main strategies for preventing HAIs. In healthcare settings, hand hygiene is thought to be the most straightforward, efficient, and cost-effective way to stop the spread of pathogens (Idris et al., 2021). Improved hand hygiene

compliance has been linked to lower rates of nosocomial infections, according to numerous studies. However, healthcare workers' compliance levels vary widely and are impacted by a number of factors, including knowledge, motivation, facility availability, and supervision (Fitriani et al., 2024).

However, other research has also shown that high hand hygiene compliance does not always directly lower the incidence of HAIs because patient-related conditions, clinical technique, and adherence to care bundles all have a significant impact on infections like phlebitis (Ulfa et al., 2024). This implies that rather than concentrating on just one issue, infection prevention necessitates a multifaceted strategy.

According to the FH Mother and Child Hospital (RSIA FH) Tulungagung's 2025 surveillance report, the incidence of phlebitis continued to be high and showed a rising trend, going from 25% in January to 44% in December. The defined quality indicator threshold of $\leq 5\%$ is significantly exceeded by these numbers.

Method

This study used a cross-sectional, quantitative analytic observational design to examine the relationship between healthcare workers' hand hygiene compliance and the incidence of phlebitis at FH Mother and Child Hospital (RSIA FH), Tulungagung.

The population in this study consisted of all monthly Infection Prevention and Control (IPC) surveillance records of RSIA FH Tulungagung for the period January–December 2025, encompassing hand hygiene compliance audits of healthcare workers across all professional categories (physicians, nurses, midwives, medical analysts, nutritionists, pharmacy staff, cleaning service personnel, and other health workers) as well as monthly phlebitis incidence records obtained from the hospital's Healthcare-Associated Infection (HAI) surveillance. The sample in this study was the entire population of 12 monthly data points recorded during 2025, selected using a total sampling technique because the number of monthly reporting periods was limited and all were included in the analysis.

The data used were secondary data extracted from RSIA FH Tulungagung's official 2025 Annual IPC Report. Two main variables were analyzed: (1) the monthly hand hygiene compliance rate, obtained through direct observation audits conducted by the hospital's IPC team based on the World Health Organization's Five Moments for Hand Hygiene, and (2) the monthly phlebitis incidence rate, obtained from routine HAI surveillance of patients receiving intravenous therapy. Both variables were recorded as monthly aggregate percentages for

the period of January to December 2025.

Data analysis was carried out in two stages. First, a descriptive analysis was performed to determine the mean, minimum, and maximum values of hand hygiene compliance and phlebitis incidence throughout 2025. Second, because the data consisted of only twelve monthly observations and were not normally distributed, the Spearman rank correlation test was used to examine the relationship between hand hygiene compliance and the incidence of phlebitis, with a significance level of $p < 0.05$. All statistical analyses were processed using SPSS statistical software.

Result and Discussion

Healthcare Workers' Compliance with Hand Hygiene

Healthcare workers' monthly hand hygiene compliance rates regularly reached the acceptable level of $\geq 85\%$, according to data from FH Mother and Child Hospital (RSIA FH) Tulungagung's IPC annual report for 2025. The following is how compliance was distributed from January to December

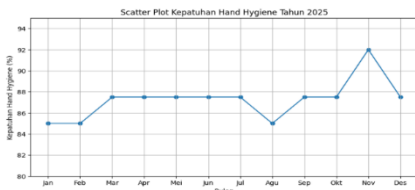


Figure 1. Distribution of Hand Hygiene Compliance in 2025 Mean = 87.7%

The data demonstrate that hand hygiene compliance was good and remained stable throughout the year.

Phlebitis Incidence

According to HAI surveillance data, the incidence of phlebitis continued to be high and was trending increasing at the end of the year.

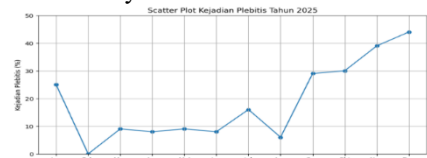


Figure 2. Distribution of Phlebitis Incidence in 2025 Mean = 18.6%

This figure substantially exceeds the hospital quality indicator standard of $\leq 5\%$. The analysis revealed that:

High compliance rates were not consistently followed by a reduction in phlebitis incidence.

In months with the highest compliance rates (November–December), phlebitis incidence paradoxically increased.

Discussion

Compliance with Hand Hygiene at RSIA FH Tulungagung

The average hand hygiene compliance rate among healthcare staff at RSIA FH Tulungagung in 2025 was 87.7%, fulfilling the hospital quality indicator criteria of $\geq 85\%$, according to the study's findings. In general, hand hygiene compliance ranged from 85% to 92% between January and December of 2025. These results imply that the hospital's Infection Prevention and

Control (IPC) program has been fairly successful in educating medical staff about the value of hand cleanliness.

The World Health Organization (WHO) states that the best, easiest, and least expensive way to stop the spread of pathogenic microbes in medical institutions is to practice good hand hygiene. The main strategy for breaking the chain of infection transmission between medical personnel and patients is the application of the Five Moments for Hand Hygiene (Lotfinejad et al., 2021). The high degree of hand hygiene compliance found in this study indicates that healthcare professionals have come to understand the significance of hand cleanliness as a crucial part of patient safety culture.

These results are in line with those of Idris et al. (2021), who found that higher hand hygiene compliance in ordinary clinical practice is linked to healthcare personnel' knowledge and awareness. Similarly, Fitriani et al. (2024) discovered that increased hand hygiene compliance among healthcare professionals is influenced by supervision, education level, and routine monitoring. Additionally, a strong patient safety culture inside hospital organizations can improve healthcare personnel' commitment to infection prevention protocols, according to Bawean et al. (2023).

IPC audit reports revealed a number of issues, including uneven compliance within professional groups, a lack of supportive facilities, and inadequate

direct monitoring of hand hygiene procedures, despite RSIA FH Tulungagung's generally high levels of compliance. According to Houghton et al. (2020), the availability of facilities, organizational support, workplace culture, and continuous monitoring are all important factors in the successful implementation of hand hygiene.

Phlebitis Incidence at RSIA FH Tulungagung

The 2025 IPC surveillance report indicated that the incidence of phlebitis at RSIA FH Tulungagung remained high, with a mean rate of 18.6%. This figure substantially exceeds the hospital quality indicator standard, which mandates a phlebitis rate of $\leq 5\%$. Notably, the phlebitis rate reached 44% in December, indicating a heightened risk of complications related to intravenous therapy.

Inflammation of the veins that frequently follows intravenous catheter implantation is known as phlebitis. Mechanical, chemical, or viral factors could be the cause of the disorder. In addition to causing pain and suffering, phlebitis can develop into a more dangerous infection if left untreated (Gorski et al., 2021). As a result, phlebitis incidence is widely used as a measure of the quality of nursing care and the success of hospital IPC initiatives.

It is assumed that the high prevalence of phlebitis in this study is related to the significant number of inpatients (1,740)

in 2025. Intravenous treatment insertions and other invasive operations became more common as a result of the increased patient volume, putting more strain on medical staff and possibly jeopardizing the consistent use of aseptic technique.

These results are in line with those of Azni et al. (2021), who found that a number of parameters, such as infusion insertion technique, intravenous fluid type, catheter size, insertion site, and catheter dwell duration, contributed to the incidence of phlebitis. Additionally, Yasuda et al. (2022) showed that the main factors influencing phlebitis are catheter-related factors and patient clinical features. Furthermore, a comprehensive study by Garcia-Expósito et al. (2023) found that adherence to intravenous therapy procedures and the quality of catheter care are crucial in lowering the prevalence of phlebitis.

Beyond hand hygiene compliance, the literature identifies several determinant factors contributing to phlebitis incidence, which can be grouped into five categories as follows.

Patient-related factors – such as age, comorbidities, and vein fragility, which increase individual susceptibility to vein inflammation. Çiftçi et al. (2024) found that phlebitis was significantly associated with patient clinical characteristics and the specific drugs administered at the catheter site.

Catheter-related factors – including catheter gauge, insertion site, and dwell

time. Yasuda et al. (2022) showed that catheter-related characteristics, together with patient clinical features, were the main determinants of phlebitis among critically ill patients.

Procedural factors – encompassing aseptic insertion technique and the insertion skill of healthcare workers. Azni et al. (2021) and Garcia-Expósito et al. (2023) both emphasized that adherence to proper insertion procedures and catheter care practices substantially reduces the risk of phlebitis.

Infusate-related factors – such as the osmolarity, pH, and irritant properties of the intravenous fluids or medications administered. Uslusoy and Mete (2008) reported that the use of hypertonic fluids increased the risk of phlebitis by 1.8 times compared with isotonic fluids, and that drug administration frequency was an independent risk factor.

Organizational factors – including nurse-to-patient ratio and workload. Jiménez-Martínez et al. (2024) demonstrated that lower nurse staffing coverage was independently associated with a higher risk of peripheral intravenous catheter failure, including phlebitis, across a multicentre cohort of hospitalised patients.

Taken together, these five categories indicate that the high phlebitis incidence found in this study is unlikely to be explained by hand hygiene compliance alone. Rather, it reflects the combined influence of patient

characteristics, catheter and procedural factors, infusate properties, and organizational conditions such as nurse staffing and workload, all of which warrant closer clinical monitoring at RSIA FH Tulungagung.

Based on these results, the researchers propose that the high phlebitis rate at RSIA FH Tulungagung suggests that intravenous therapy-related infection prevention programs need to be strengthened, especially in the areas of clinical auditing, invasive procedure supervision, and consistent application of prevention bundles

Analysis of Hand Hygiene Compliance and the Incidence of Phlebitis at FH Mother and Child Hospital, Tulungagung

Theoretically, by stopping the spread of pathogens, better hand hygiene compliance should lower the risk of illness. However, in this study, phlebitis rates did not decrease in tandem with high hand cleanliness compliance. Phlebitis incidence actually rose to 39% and 44% in November and December, when hand hygiene compliance reached 92% and 87.5%, respectively.

These results imply that phlebitis is a complex issue. Compliance with hand hygiene is just one aspect of preventing infections. Phlebitis incidence is likely to be more influenced by other factors, such as aseptic technique in intravenous insertion, adherence to preventative bundles, catheter care quality, patient clinical state, kind of intravenous

therapy, and workload of healthcare workers.

These findings support the findings of Buetti et al. (2022), who claimed that a thorough strategy including insertion technique, catheter care, and continuous clinical monitoring is necessary to prevent intravenous catheter-related infections. Additionally, Garcia-Expósito et al. (2023) showed that following intravenous therapy guidelines has a greater impact on preventing phlebitis than hand hygiene compliance alone. However, the current results are different from those of Fitriani et al. (2024) and Idris et al. (2021), who found that lower incidence of nosocomial infections were linked to better hand hygiene compliance. Different outcome markers employed in different research could be the cause of this disparity. While other studies evaluated the prevalence of HAIs in general, this study focused on the incidence of phlebitis, which involves a more intricate and particular combination of risk variables.

The non-significant correlation between phlebitis incidence and hand hygiene compliance, according to the researchers, shows that hand hygiene adherence alone cannot be used to gauge the effectiveness of IPC programs. To successfully and sustainably lower the incidence of phlebitis and enhance service quality and patient safety, a thorough assessment of prevention bundle

implementation, human resource sufficiency, clinical supervision quality, and adherence to intravenous catheter insertion and maintenance procedures is necessary.

Implications of the Study

The findings of this study carry both practical and theoretical implications for hospital service quality and patient safety knowledge development, as outlined below.

Practical Implications for Service Quality Development

For hospital management and the IPC team at RSIA FH Tulungagung, these findings indicate that infection prevention efforts need to extend beyond hand hygiene promotion alone. Concrete steps include strengthening clinical supervision of intravenous catheter insertion and maintenance, ensuring nurse staffing levels are adequate relative to patient volume, and consistently implementing evidence-based infusion care bundles. This is consistent with Braga et al. (2018), who established phlebitis as a nursing-sensitive quality indicator, meaning that its incidence rate can be used directly by hospital management as a measurable benchmark for evaluating and improving the quality of nursing service. Monitoring this indicator alongside hand hygiene compliance would provide a more complete picture of service quality than either measure alone.

Theoretical Implications for Patient Safety Knowledge Development

This study contributes to the growing body of knowledge on patient safety by reinforcing the understanding that hand hygiene compliance, while essential, is only one component of a multifactorial infection prevention system. This is supported by Batran et al. (2025), who found that nurses' compliance with infection prevention and control practices is shaped not only by individual knowledge but also by institutional support and clinical experience, indicating that patient safety outcomes such as phlebitis incidence result from the interaction between individual, procedural, and organizational determinants rather than hand hygiene behavior in isolation. This insight can serve as a conceptual reference for future research and for the development of more comprehensive, evidence-based patient safety policies in maternal and child healthcare settings.

Conclusion

The frequency of phlebitis persisted despite healthcare staff good hand hygiene compliance. Numerous factors, such as aseptic technique in intravenous insertion, adherence to intravenous therapy bundles, catheter care quality, patient-related circumstances, and the workload of healthcare workers, are likely to have an impact on the occurrence of phlebitis. Therefore, to lower the frequency of phlebitis and

enhance patient safety, a more thorough infection prevention plan is required.

Declarations

Ethical Approval and Participant Consent

This study utilized anonymized secondary data from RSIA FH Tulungagung. Permission for data use was obtained from the hospital management of RSIA FH Tulungagung prior to the commencement of the study. The research did not involve direct intervention with study subjects.

Ethics Approval and Consent Participant

This study was conducted in accordance with the ethical principles governing research involving human participants. All respondents participated voluntarily and provided informed consent prior to data collection.

Conflict of Interest

The authors declare no financial, professional, or personal conflicts of interest that could have influenced the conduct or reporting of this research.

Authors' Contribution

The first author designed the study and developed the methodology; the second author performed the data analysis; both authors collaboratively wrote, reviewed, and edited the manuscript.

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