LEVEL OF KNOWLEDGE AND BEHAVIOR PREVENTIVE FOR SURGICAL SITE INFECTIONS AMONG NURSES IN INDONESIA: A CROSS-SECTIONAL CORRELATIONAL STUDY

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Abstrak

Surgical Site Infections (SSIs) are serious postoperative complications that increase the risk of morbidity, mortality, and healthcare costs. Nurses play a crucial role in preventing SSIs, particularly in inpatient wards. Data from 2024 recorded an SSI incidence rate of 0.18%, highlighting the need to improve adherence to prevention protocols. This study aimed to examine the relationship between nurses' knowledge and practices in preventing SSIs. A descriptive correlational design with a cross-sectional approach was used. A total of 96 nurses were selected through total sampling. Data were collected using valid and reliable questionnaires and analysed using univariate and bivariate methods, including the Spearman test. Results showed that 30.2% of nurses had good knowledge, 68.75% had moderate knowledge, and 1% had poor knowledge. Additionally, 52.1% demonstrated positive practices, while 47.91% demonstrated negative practices. The analysis shows that the Spearman correlation coefficient (ρ) between knowledge level and preventive behaviour is 0.235, indicating a positive but weak relationship. This suggests that higher levels of knowledge are generally associated with better SSI prevention behaviour, although the strength of this association is limited. The p-value (p = 0.021) is below the significance threshold of α = 0.05, demonstrating that the relationship is statistically significant. It is recommended that hospitals enhance training, education, and supervision to improve compliance with SSI prevention protocols.

Keywords*: Surgical site infection, Knowledge, Practice*

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INTRODUCTION

Surgical Site Infections (SSIs) are infections that occur at the site of a surgical incision following an operation. SSIs are serious complications caused by the entry of pathogenic microorganisms into the surgical wound, leading to inflammatory responses such as pain, swelling, redness, and discharge of pus (Lubis et al., 2024). According to data from the World Health Organization (WHO, 2016) approximately 11% of patients undergoing surgery in low- and middle-income countries experience such infections. Furthermore, data from the Asia Pacific Society of Infection Control (APSIC, 2021) indicate that the incidence of SSIs in Southeast Asia is around 7.8%. In Indonesia, SSI rates vary between 2% and 18% of all surgical procedures (Nirbita et al., 2017). Consequently, SSIs have been included as one of the key standards in the National Hospital Accreditation Standards (SNARS) and are a primary focus of nursing care in Indonesia, as regulated by Ministry of Health Regulation No. 27 of 2017 concerning infection prevention in healthcare facilities.

The role of nurses is centred on infection prevention through appropriate risk management and the protection of patient data confidentiality (Ministry of Health, 2017). Nurses' knowledge and behaviour in preventing surgical site infections (SSIs) play a vital role in reducing the risk of postoperative infections. A deep understanding of hand hygiene, prophylactic antibiotics, and sterilisation techniques is essential to minimising infection risks, as highlighted in the Infection Prevention and Control (IPC) Program (PPI, 2022). Nurses' awareness of the importance of preventing infections in surgical patients significantly influences the incidence of SSIs (Novitasari et al., 2024).

The prevention of SSIs involves adherence to the SSI bundle, which is a collection of evidence-based practices. When implemented consistently and collaboratively, these practices can improve health outcomes (Zywot et al., 2017). The SSI bundle includes preventive measures during the preoperative, intraoperative, and postoperative phases (JDIH BPK, 2017). Therefore, it is essential for hospitals and healthcare facilities to implement effective infection prevention and control programs. These systems not only ensure the quality of healthcare services but also protect patients, staff, visitors, and families from infection risks, including the transmission of communicable diseases during visits to healthcare settings (Retnawati et al., 2024).

A private hospital in Eastern Indonesia reported cases of Surgical Site Infections (SSIs). According to supporting data obtained by the researcher, from August to October 2024, the number of surgical procedures increased each month, with a total of 551 procedures. Among these, one SSI case was recorded (0.18%), which is well below the hospital's threshold standard of >2.1%. In addition, only 3 nurses (1.2%) were certified in wound care, far below the national recommendation that large hospitals should have a dedicated wound care team comprising 5–10% of their nursing staff (Indonesian National Nurses Association [PPNI], 2013). The prevention of SSIs is highly dependent on the active role of nurses, who are at the frontline of postoperative patient care.

Nurses' actions in preventing infections are significantly influenced by their level of knowledge. Adequate knowledge empowers nurses to implement infection prevention procedures with heightened awareness and responsibility. Continuous training programs can be designed to improve awareness and accountability, thereby promoting proactive behaviour in infection prevention and enabling assessment of nurses' knowledge levels (PPI, 2022).

METHODS

This study employed a descriptive correlational design with a cross-sectional approach. The population and sample consisted of nurses working in inpatient wards in Indonesia, with a total of 96 participants selected using a total sampling technique. The validity and reliability tests of the questionnaires yielded excellent results, with a Cronbach's Alpha of 0.85 for the knowledge questionnaire and 0.87 for the behaviour questionnaire.

RESULTS AND DISCUSSION

Table 1. Distribution of Respondents' Characteristics (n = 96)

Respondent	Frequency	Percentage

Characteristics	(n)	(%)
Age		
21-26 years	41	42.7
27-32 years	43	44.8
33-38 years	12	12.5
Gender		
Male	15	15.6
Female	81	84.4
Educatonal level		
Diploma Nursing	10	10.4
Bachelor's in Nursing	86	89.6
Years of Work Experience		
≤ 5 years	67	69.8
> 5 years	29	30.2
SSI Training Participation	51	53.1
Yes	45	46.9
No	96	100
Total		

Based on Table 1, the distribution of respondent characteristics shows that the majority were aged 27–32 years, accounting for 43 respondents (42.7%). In terms of gender, the majority were female, with 81 respondents (84.4%). Regarding educational background, most respondents held a Bachelor's degree in Nursing with professional certification (Ners), comprising 86 respondents (89.6%). For work experience, the majority had ≤ 5 years of experience, represented by 67 respondents (69.8%). In terms of training, more than half of the respondents had participated in SSI (Surgical Site Infection) prevention training, with 51 respondents (53.1%).

Table 2. Distribution of Respondents' Level of Knowledge (n = 96)

Category	Frequency (N)	Percentage (%)
Good	29	30.20
Moderate	66	68.75
Poor	1	1.00
Total	96	100

Based on Table 2, the majority of respondents (66 individuals or 68.75%) demonstrated a moderate level of knowledge, followed by 29 respondents (30.20%) with a good level of knowledge, and only 1 respondent (1.00%) with a poor level of knowledge.

Table 3. Distribution of Respondents' Behaviour in Preventing SSIs (n = 96)

Category	Frequency (N)	Percentage (%)
Positive	50	52.10
Negative	46	47.91
Total	96	100

As shown in Table 3, 52.10% of respondents exhibited positive behaviours in the prevention of surgical site infections, while 47.91% demonstrated negative behaviours.

Table 4. Relationship Between Knowledge Level and Behaviour in SSI Prevention (n = 96)

Variable		Level of Knowledge	Behaviour in preventing
Level of Knowledge	Correlation coefficient	1.000	0,235
	Sig. (2-tailed)		0,021
	n	96	96
Behaviour in preventing	Correlation coefficient	0,235	1000
	Sig. (2-tailed)	0,021	
	n	96	96

Table 4 presents the results of the Spearman correlation analysis examining the relationship between nurses' level of knowledge and their behaviour in preventing Surgical Site Infections (SSI). The analysis shows that the Spearman correlation coefficient (ρ) between knowledge level and preventive behaviour is 0.235, indicating a positive but weak relationship. This suggests that higher levels of knowledge are generally associated with better SSI prevention behaviour, although the strength of this association is limited. The p-value ($p = 0.021$) is below the significance threshold of $\alpha = 0.05$, demonstrating that the relationship is statistically significant. Therefore, it can be concluded that there is a significant positive correlation between knowledge level and behaviour in SSI prevention. The analysis was conducted with a total of 96 respondents.

Discussion

The results showed that the majority of respondents were aged 27–32 years (44.8%). This finding aligns with Muthiah et all (2022) who described this age group as early adulthood nurses possessing wisdom in decision-making, responsibility, and good emotional control, which supports better job performance. Conversely, this result contrasts with Widyastuti (2018) who found that younger nurses (under 31 years) tend to perform worse in infection prevention compared to older nurses (>31 years). Therefore, nurses in this age range still require guidance and development of responsibility (Hasanah & Maharani, 2022). Overall, no significant relationship was found between age and performance since younger nurses generally have high motivation (Hasanah & Maharani, 2022).

Regarding gender, most respondents were female (84.4%), consistent with Lastari. F. R et al. (2024), who reported that the nursing profession is predominantly female (91.9%). This is supported by 2022 Ministry of Health data indicating that 77% of nurses are women. Similarly Afriyani & Siregar (2024) noted that female nurses remain the majority, reflecting the common perception that women's empathy, meticulousness, and patience align well with nursing roles.

Most respondents held a Diploma or Bachelor's degree in Nursing with Ners certification (89.6%), which concurs with Sunarti et al. (2023) showing that inpatient ward nurses generally have this education level. The Bachelor's program with Ners certification ensures clinical competence, ethics, and management and communication skills necessary to provide quality care and maintain patient safety (Universitas Pendidikan Indonesia, 2024). This supports Ghofur (2015) assertion that higher education correlates with better knowledge and positive behaviours in infection prevention.

Regarding work experience, most nurses had ≤ 5 years of service (69.8%), consistent with Majannang et all (2021) who reported good performance among nurses with this experience. Nurses with ≤ 5 years already have sufficient work experience and can adapt well to the work environment (Pujiarti & Idealistiana, 2023). Work experience relates to behaviour because the longer someone works, the better their skills and experience (Hasanah et al., 2024).

In terms of training, the respondents were almost evenly split between those who had and had not participated in SSI prevention training. Habtie et al. (2025) emphasize that lack of training increases the risk of SSIs due to inadequate knowledge and skills in infection prevention. Their study also notes that globally, knowledge of SSI prevention remains low. The majority of respondents had a moderate level of knowledge (68.75%). This aligns with Novitasari et al. (2024), who found that most nurses have moderate knowledge but generally exhibit better preventive actions. Moderate knowledge means

nurses understand basic principles but may not consistently apply best practices (Habtie et al., 2025). Conversely Alsaadi dan Elfeshawy (2024) found the majority of nurses had good knowledge, which is crucial in reducing SSIs by preventing cross-contamination and improving patient safety. Hasanah et al. (2024) also reported that nurses with good knowledge display better behaviours in SSI prevention, significantly reducing SSI rates.

Regarding behaviour, the majority showed positive behaviour (52.10%), consistent with findings by Wirawan & Cusmarih (2024) and Sigalingging et al. (2021) who reported most nurses have good behaviour in infection prevention. Poor behaviour negatively affects nurses' adherence to infection prevention protocols (Retnawati et al., 2024).

The study found a significant relationship between knowledge level and behaviour in SSI prevention (p = 0.017). This agrees with Hasanah et al. (2024), who reported a significant association (p = 0.000) between nurse knowledge and infection prevention behaviour at Gatot Soebroto Hospital, Jakarta. Novitasari et al. (2024) similarly found a strong positive correlation between nurse knowledge and SSI preventive actions in Charitas Hospital, Belitang. Saifullah Arif (2015) also found knowledge significantly influences nursing actions, with higher knowledge fostering better understanding of risks and benefits, leading to positive attitudes and supportive behaviours. Consequently, nurses' compliance in infection prevention is grounded in knowledge reflected through their behaviour (Mardhiati, 2023). However, Feng et al. (2022) reported contrasting results where nurses had high attitudes and practices towards SSI prevention despite low knowledge, with no significant relationship between knowledge and practice. This suggests that good knowledge does not always guarantee good behaviour.

CONCLUSION

This study concludes that the majority of respondents were female nurses aged 27–32 years, predominantly holding diploma or bachelor Nursing with Ners qualification, and most had work experience of five years or less. Over half had participated in training on surgical site infection (SSI) prevention. While most nurses demonstrated adequate knowledge of SSI prevention, only a minority showed good knowledge, highlighting the need for ongoing education to elevate overall understanding. Just over half of the nurses exhibited positive behaviour towards SSI prevention, though a significant proportion still require increased awareness and commitment to improve infection control practices. Importantly, the study shows that the Spearman correlation coefficient (ρ) between knowledge level and preventive behaviour is 0.235, indicating a positive but weak relationship. This suggests that higher levels of knowledge are generally associated with better SSI prevention behaviour, although the strength of this association is limited. The p-value (p = 0.021) is below the significance threshold of α = 0.05, demonstrating that the relationship is statistically significant. Given nurses' close role in patient care, targeted training and continuous education are vital to fostering effective infection control. Future research should explore additional factors influencing nurses' behaviour, such as workplace environment, motivation, and workload, to comprehensively understand and improve SSI prevention efforts.

Conflict of Interest

The author(s) declare no conflict of interest related to this study.

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