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Knowledge and Attitudes of Family Members Toward Nosocomial Infection Prevention in Hospital Settings

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ABSTRACT
Introduction: Hospital-acquired infections (HAIs) remain a major challenge to patient safety, particularly in low- and middle-income countries. Family members who accompany hospitalized patients may contribute to the transmission of infection when preventive behaviors are inadequate. This study aimed to examine the relationship between family members' knowledge and attitudes toward nosocomial infection prevention in a hospital setting.
Method: A cross-sectional survey was conducted among 88 family members of inpatients at a primary hospital, North Minahasa, Indonesia. Data were collected using a validated questionnaire adapted from Abbate et al. and analyzed using descriptive and inferential statistics.
Result: The results showed that most respondents had low levels of knowledge (60.2%) and negative attitudes (60.2%) toward infection prevention. A statistically significant association was found between knowledge and attitudes ($p < .05$), indicating that higher knowledge levels were associated with more positive attitudes.
Conclusion: The findings suggest that improving family members' knowledge through structured health education programs may enhance their attitudes and participation in infection prevention practices. Integrating family-centered infection control education into hospital safety programs is recommended.

Keywords: *Hospital-Acquired Infections; Knowledge; Family Caregivers*

Introduction

Hospital-acquired infections (HAIs), also known as nosocomial infections, are infections that develop 48–72 hours after hospital admission and were not present at the time of admission. HAIs remain a major contributor to morbidity, mortality, prolonged hospitalization, and increased healthcare costs worldwide (World Health Organization [WHO], 2022). The global burden of HAIs is disproportionately higher in low- and

middle-income countries, where limited resources and inconsistent adherence to infection prevention measures exacerbate transmission risks (Allegranzi et al., 2022).

Infection prevention and control (IPC) programs traditionally focus on healthcare workers; however, family members and visitors also play a critical role in infection transmission dynamics. Family caregivers often stay for prolonged periods at the patient's bedside and may assist with feeding, mobilization, and hygiene. Without adequate knowledge and appropriate attitudes toward infection prevention, these caregivers may inadvertently contribute to cross-contamination (Jiang et al., 2021).

Hand hygiene (HH) remains the single most effective strategy to prevent HAIs, yet compliance extends beyond healthcare professionals (WHO, 2022). Recent studies emphasize the importance of engaging patients and families in IPC strategies to strengthen hospital safety culture (Storr et al., 2019; Tartari et al., 2021; Tschudin-Sutter et al., 2019)), yet HH adherence among patients, families, and visitors is often substantially lower than among staff (Khalish & Gautama, 2025; Lee et al., 2021). Evidence also supports that higher caregiver knowledge is associated with more favorable IPC attitudes and adherence in nonprofessional caregivers (Jiang et al., 2021). Therefore, assessing knowledge and attitudes among family caregivers is crucial to improving infection prevention compliance.

In Indonesia, research examining infection prevention has predominantly focused on healthcare workers, with limited attention to family members. Understanding the relationship between knowledge and attitudes among family caregivers may provide evidence to inform family-centered IPC interventions. This study aimed to analyze the association between knowledge and attitudes of family members toward nosocomial infection prevention in a hospital setting.

Method

Study Design

A cross-sectional study was conducted between July and October 2024 at a primary hospital in North Minahasa, Indonesia.

Participants

The sampling frame included family members who accompanied inpatients during the study period. Slovin's formula (e = 0.10) applied to the estimated eligible caregiver population produced a target sample of 88 respondents. Participants were enrolled by accidental sampling when they met the inclusion criteria: age ≥17 years, literate, having accompanied the patient for >24 hours, and consenting to participate.

Instrument

Data were collected using a structured questionnaire adapted from Abbate et al. (2008). The instrument consisted of demographic characteristics, knowledge items related to infection transmission and prevention, and attitude statements measured on a three-point Likert scale. Knowledge items were coded and categorized as good/moderate/poor based on percentage correct; attitude scores were categorized as positive/moderate/negative. The instrument underwent face validity with IPC clinicians and a pilot reliability check (Cronbach's α for attitude scale = 0.78).

Data Analysis

Descriptive statistics were used to summarize demographic characteristics, knowledge levels, and attitudes. Knowledge and attitude scores were categorized into good, moderate, and poor. The association between knowledge and attitudes was analyzed using the Chi-square test, with statistical significance set at $p < .05$.

Ethical Considerations

Written informed consent was obtained from all participants, responses were anonymized, and participants could withdraw at any time.

Results

Eighty-eight family caregivers completed the questionnaire. Table 1 summarizes demographics. The modal age group was 41–50 years (47.7%), and 55.7% were female. Educational attainment varied; nearly half (47.7%) had completed senior high school.

Table 1 Demographic Characteristics of Respondents (n = 88)

Characteristic	Frequency	Percentage (%)
Age 21–30 years	19	21.6
Age 31–40 years	27	30.7
Age 41–50 years	42	47.7
Male	39	44.3
Female	49	55.7
Elementary School	16	18.2
Junior High School	20	22.7
Senior High School	42	47.7
Diploma/Bachelor	10	11.4

Source: Primary Data, 2024

a. **Knowledge and Attitude Distributions**

Most respondents scored in the poor knowledge category (n = 53; 60.2%) and negative attitude category (n = 53; 60.2%). Table 2 provides the full distribution.

Table 2. Knowledge and Attitude Levels Toward Infection Prevention (n = 88)

Variable	Category	Frequency	Percentage (%)
Knowledge	Good	24	27.3
	Moderate	11	12.5
	Poor	53	60.2
Attitude	Positive	20	22.7
	Moderate	15	17.1
	Negative	53	60.2

Source: Primary Data, 2024

b. Association Between Knowledge and Attitudes

Chi-square analysis revealed a statistically significant association between knowledge and attitudes toward infection prevention, $\chi^2(4, N = 88) = 45.62$, $p < .001$. The strength of association was large (Cramer's V = 0.51), indicating that higher knowledge levels were strongly associated with more positive attitudes toward infection prevention.

Table 3 Cross-Tabulation Between Knowledge and Attitudes Toward Infection Prevention (n = 88)

Knowledge Level	Positive	Moderate	Negative	Total	p-value
Good	15	5	4	24	0.001
Moderate	3	5	3	11	
Poor	2	5	46	53	
Total	**20**	**15**	**53**	**88**	

Source: Primary Data, 2024

Discussion

This study reveals that most family caregivers possess limited knowledge and unfavorable attitudes toward nosocomial infection prevention, a pattern consistent with international observations that family/visitor HH compliance and IPC awareness remain suboptimal across settings (Lee et al., 2021; Zahradnik et al., 2024).

The findings demonstrate a strong, statistically significant association between knowledge and attitudes. Respondents with good knowledge were substantially more likely to have positive attitudes, while those with poor knowledge predominantly had negative attitudes. The large effect size (Cramer's V = 0.51) indicates that knowledge meaningfully influences caregivers' attitudes toward infection prevention. The significant association between knowledge and attitude aligns with behavioral models and recent empirical studies indicating that increasing caregivers' knowledge enhances attitude and intention to perform preventive actions (Jiang et al., 2021; Srigley et al,. 2020; Tartari et al., 2021).

The findings also echo across-country qualitative and quantitative studies that identify barriers to family engagement in IPC, including lack of targeted education, cultural norms of caregiving, and limited access to HH stations for visitors (Neri et al., 2021; Park et al., 2022; Park, 2024). Interventions that combine education, readily available HH infrastructure for visitors, visual cues, and active encouragement from staff have demonstrated promise in improving visitor and caregiver compliance (McNicholl et al., 2024; Storr et al., 2019).

Integrating family-centered IPC education during admission and routinely reinforcing messages at the bedside could increase caregivers' knowledge and shift attitudes toward safer practices, thereby contributing to reduced HAI risk in resource-limited hospitals.

This study has several limitations. The cross-sectional design prevents causal inference, and the accidental sampling limits the study's generalizability. Self-reported attitudes may be influenced by social desirability bias. Future studies would be strengthened by observation of actual behaviors (e.g., direct behavioral observation).

Conclusion

A substantial proportion of family caregivers accompanying inpatients had poor knowledge of and negative attitudes toward HAI prevention. There is a significant association between knowledge and attitudes. To improve engagement and reduce HAI risk, hospitals should implement structured, culturally appropriate, family-centered IPC education and facilitate visitor-friendly HH stations.

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