Caring behavior and its impact on patient safety activities: Investigating the role of safety competency

Lusianah Lusianah[1]*⊙**, Muliyadi Muliyadi[2]**⊙**, Any Kurniawati[3]**⊙**, Mira Asmirajanti[4]**⊙

[1] Institut Kesehatan dan Teknologi Pondok Karya Pembangunan DKI Jakarta, Daerah Khusus Ibukota Jakarta, Indonesia
[2] Politeknik Kesehatan Kemenkes Palembang, Palembang, Indonesia
[3] Rumah Sakit Umum Bhakti Asih Ciledug, Tangerang, Indonesia
[4] Universitas Esa Unggul Jakarta, Indonesia

Abstract

Background: Patient safety is a critical component of healthcare. Caring behavior among nurses is hypothesized to enhance patient safety activities. However, the relationship between caring behavior and patient safety activities, particularly the moderating role of patient safety competency, remains underexplored.

Purpose: This study aims to examine the influence of caring behavior on patient safety activities, while assessing the moderating role of patient safety competency.

Methods: This study employed Structural Equation Modeling (SEM) to analyze the relationship between caring behavior and patient safety activities. A total of 154 nurses from a private hospital in Tangerang participated. The caring behavior inventory (CBI) was used to assess the nurses' caring behaviors across four subscales: respectful communication, ensuring human presence, communication with a positive disposition, and professional knowledge and skills. The safety nursing activities scale evaluated comprehensive patient safety activities across eight subcategories, such as communication, operations, and risk management. The Patient Safety in Nursing Education Questionnaire (PaSNEQ) was employed to assess patient safety competency, comprising three subdomains: basic patient safety competency, clinical analysis and action effectiveness, and error prevention strategies and additional training.

Results: The analysis showed that caring behaviour significantly influenced patient safety activities (T-value = 7.70, p < 0.05). Patient safety competency did not significantly moderate this relationship (T-value = 1.21).

Conclusion: Caring behavior significantly improves patient safety, although increased patient safety competency does not show significant moderation effects. Future research should explore alternative moderators and emphasize interventions that foster caring behaviour to strengthen patient safety outcomes.

Keywords: caring behavior, patient safety, safety activities, safety competency, SEM model

Introduction

Patient safety is a critical component of healthcare delivery, focusing on error prevention, harm reduction and high-quality care. Patient safety activities in hospitals, such as medication reconciliation and communication protocols, are vital for minimizing errors and improving care quality. The implementation of patient safety improvement programs that focus on error analysis and prevention through structured methods and a culture of continuous enhancement is a critical initiative. Initiatives like surgical safety checklists and communication protocols have shown substantial improvements in patient outcomes (Dicuccio, 2015; Lee & Quinn, 2020).

Research indicates that the patient safety activities conducted among

nurses generally have a positive trend with an average score of 4.19 out of 5 (Ha & Lee, 2019). The factors influencing these activities include patient safety education, the hospital environment, and the attitudes of supervisor/managers. The perceived patient safety culture scores are moderate, ranging from 3.26 to 3.34 out of 5 (Jangland et al., 2018). Nurses report high scores for supervisor/manager expectations and event reporting frequency but lower scores for staffing and non-punitive error response (World Health Organization, 2020). Additionally, incident reporting knowledge and attitudes significantly impact safety care activities (Ha & Lee, 2019). The average importance of patient safety activities was 3.51±0.41, while the average performance was 3.37±0.43, indicating that the importance of these activities exceeds their performance. According to the Importance-Performance Analysis, components in the second quadrant, characterized by high importance but low performance, included three medication-related items and one test/procedure/surgery-related item (Baek & Shin, 2024). Consistent with the existing literature, this study finds that the nurses' caring behaviors significantly enhance patient safety activities. Caring nurses are more attuned to patient needs and potential risks, fostering enhanced communication and reducing medication and procedural errors. Their behaviors also promote adherence to safety protocols and the effective reporting of medical errors, thereby improving patient safety (Ambarika & Anggraini, 2021). Despite establishing a positive correlation between caring behaviors and patient safety outcomes, the existing studies often lack a comprehensive framework to capture the complexities of this relationship. Predominantly cross-sectional in nature, these studies provide a static view of the association, failing to explore the dynamic interactions and longitudinal effects of caring behaviors on patient safety activities.

Patient safety competencies encompass the nurses' ability to understand and apply safety principles in clinical practice (Sari et al., 2024). These competencies underpin patient safety activities, including standard procedures, infection control, and clinical risk management, which is aimed at minimizing adverse events. A combination of knowledge, skills, and a positive attitude is essential for aligning actions with patient safety goals. Enhancing patient safety competency among healthcare professionals significantly improves patient safety activities. Research demonstrates a strong link between safety competencies and effective safety management. For example, the critical reflection and person-centered care practices of clinical nurses are positively associated with improved patient safety outcomes (Zaitoun et al., 2023). In intensive care units, patient safety competency significantly influences nursing activities (β = .58), underscoring its pivotal role in ensuring safe practices (Shin & Jang, 2023).

Caring behavior, patient safety competence, and patient safety activities are interdependent and mutually reinforcing elements. Caring behavior enhances communication, patient safety competencies equip nurses with the necessary skills, and patient safety activities ensure the effective implementation of protocols (Mårtensson et al., 2024; Rezende et al., 2024). The synergy among these elements is essential for achieving optimal safety and quality in healthcare services. This study addresses these gaps by employing Structural Equation Modeling (SEM), a robust analytical technique that enables a nuanced exploration of the relationships between caring behaviors, patient safety competencies, and patient safety activities. Unlike previous cross-sectional studies, this research adopts a longitudinal approach to examine the correlation between these variables, including specific patient safety activities such as patient identification, medication safety, and infection prevention. The study seeks to elucidate how caring behaviors influence patient safety activities and how patient safety competencies mediate these relationships.

Theoretical Framework and Relevant Research

This study integrates Jean Watson's Theory of Human Caring, which emphasizes the moral, spiritual, and interpersonal aspects of nursing care, particularly relational care, trust, and empathy, as vital to improving the patient adherence to safety protocols and reducing errors (Hunt, 2022; Wang et al., 2024; Watson, 2018). Caring behaviors, which are foundational to safety practices, enhance patient outcomes and satisfaction by fostering trust and understanding. Key behaviors such as knowing the patient, patient monitoring, and forming trusting relationships align with Watson's Caritas Processes, promoting both emotional and physical well-being, reducing stress, and facilitating healing (Almukhaini et al., 2020; Hunt, 2022).

Caring behaviors in nursing—respectful communication (CR), human presence (HP), positive attitude (CPA), and professional knowledge and skills (PKS)—are integral to fostering effective nurse-patient relationships (Ghafouri et al., 2021). Respectful communication builds trust and enhances patient satisfaction (Sirera et al., 2024; Vujanić et al., 2022). Human presence, signified by attentive care, is perceived as therapeutic by patients (Wu, 2021). Positive attitudes improve care experiences, linking directly to patient satisfaction (Iwanow et al., 2021). Competence in professional skills ensures effective care delivery, which is a core component of caring behavior (Vujanić et al., 2020, 2022). Systemic challenges such as staffing shortages and high patient loads can limit the demonstration of these behaviors, potentially impacting care quality. Generational differences further complicate patient advocacy, especially for millennial nurses who must navigate traditional cultural norms while promoting

Table 1. Demographic sample characteristics (N=154)

Variables	Frequency	Percent
Age		
≤ 25 years old	26	16,89
> 25 years old	128	83,11
Education Degree		
Vocational	110	71,4
Bachelor	44	28,6
Gender		
Woman	135	87,7
Men	19	12,3
Workplace Unit		
Inpatient care	93	60,4
Outpatient care	14	9,1
Intensive Unit	25	16,2
Operating room	22	14,3
Employment Status		
Temporary	25	16,2
Permanent	129	83,8

safety and quality care (Kramer et al., 2018; Kuntarti et al., 2018).

Patient safety encompasses practices to prevent harm, including secure access, precise identification, safe operations, medication administration, blood transfusion protocols, infection control, fall and sore management, and fire safety (Ha & Lee, 2019; Yang, 2021). Competency frameworks such as Building Patient Safety Competence (BPSC), Competence to Act After an Error (CAAE), and Ensuring Safety Standards (EST) empower healthcare professionals to foresee risks, prevent incidents, and ensure adherence to safety guidelines (Langari et al., 2017). Evidence-based interventions like medication reconciliation, surgical safety checklists, and hand hygiene programs reduce errors and improve outcomes (Falade et al., 2024). Positive patient experiences also correlate with clinical safety, treatment adherence, and resource efficiency, underscoring the importance of integrating safety activities into care delivery (Lungu, 2023).

The current study seeks to address this gap by employing Structural Equation Modeling (SEM), a more advanced analytical technique that allows for a nuanced exploration of these relationships. This study addresses this gap by proposing a hypothetical model using a sample of 154 nurses and the Structural Equation Modeling (SEM) method to investigate these relationships. This study aims to explore how caring behavior influences patient safety activities and how these relationships are mediated by patient safety competencies. The proposed hypotheses are:

Caring behaviors (CR, HP, CPA, PKS) has a direct, positive effect on patient safety activities (SC, PI, SO, MA, BTS, IC, MFS and FM)

Patient Safety Competency (BPSC, CAAE, EST) moderates the relationship between Caring Behavior and Patient Safety Activities, enhancing the positive effect of Caring Behavior on Patient Safety Activities.

Materials and Methods

Design
This research is an observational study with a quantitative cross-sectional design that sought to analyze the relationship between caring behavior (respectful communication, human presence, positive attitude, and professional skills) and patient safety activities (patient identification, medication management, invasive procedures, blood transfusion, infection control, fall prevention, pressure sore management, and firefighting preparedness). In particular, the addition of fire management and blood transfusion demonstrates a more comprehensive approach to addressing patient safety risks in healthcare settings. Ethical approval for this study was obtained on June 8, 2024, under registration number KEPK/UMP/79/VI/2024. Data collection was conducted from July 3, 2024, to August 3, 2024.

Sample and Setting
The population in this study included all nurses actively engaged in patient care across departments such as outpatient services, intensive care units, inpatient wards, and operating rooms within private inpatient hospitals in Tangerang. A sample size of 154 participants was determined using the Finite
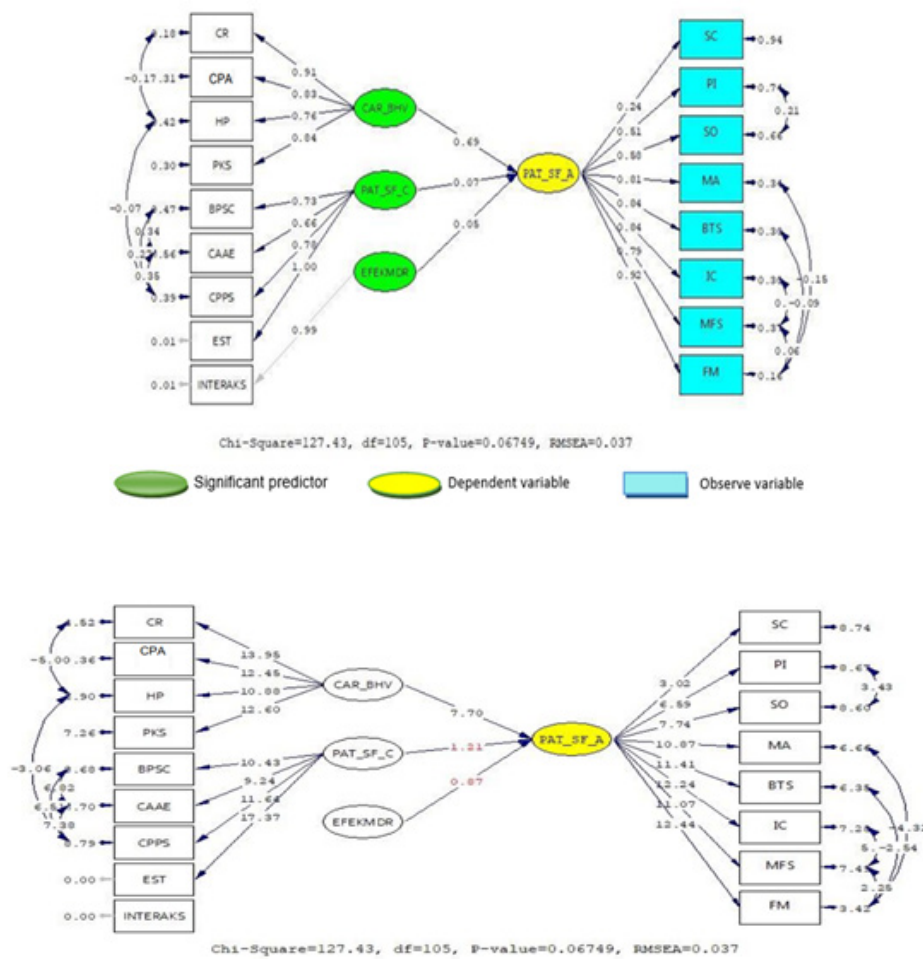
Figure 1. Fitted structural equation model on Patient Safety Activities

Population Correction (FPC) adjusted Cochran's formula. This calculation ensured a 95% confidence level and a 5% margin of error for a population of 256. The formula was applied considering a maximum variability (p = 0.5) and a Z-score of 1.96 for the desired confidence level.

The sampling technique used to select the nurse respondents was systematic random sampling, with the inclusion criteria specifying that the nurse respondents must not be on leave, sick, or on study assignment. This process involved organizing all eligible nurses from the nursing staffing database and systematically selecting every fourth nurse from the compiled list, thereby guaranteeing that each registered nurse possessed an equal probability of being included in the study. A total of 154 nurses successfully completed the online survey. We sent polite reminders to those who hadn't. The participants were invited to complete the online survey through an email which included the information letter, and a validated questionnaire.

Variables

Independent Variable: The independent variable in this study is caring behavior operationalized through the dimensions of CR, HP, CPA, and PKS. Caring behavior is proposed to have a direct positive impact on patient safety activities.

Dependent Variable: Patient safety activities serve as the dependent variable, encompassing subcategories that include SC, PI, SO, MA, BTS, IC, MFS, and FM. These dimensions reflect the comprehensive safety actions taken by nurses to uphold patient safety standards.

Moderating Variable: The moderating variable, Patient Safety Competency, is expected to enhance the relationship between caring behavior and patient safety activities. This competency is assessed via three key dimensions: BPSC, CAAE, and EST. By moderating the impact of caring behavior on patient safety activities, patient safety competency is hypothesized to strengthen the positive effect of caring behavior.

Instruments

The instruments employed in this research encompass the Caring Behavior Inventory (CBI) (Ghafouri et al., 2021) and the Safety Nursing Activities Scale, which was developed by Yang (2021). The CBI comprises 16 items categorized into four subscales: respectful communication (items 1, 2, 3, 4, 7, 8, and 10), ensuring human presence (item 11), communication coupled with a positive disposition (items 5, 6, 9, 12, and 15), and professional knowledge alongside skills (items 13, 14, and 16). The responses are evaluated utilizing a 6-point Likert scale, with response options extending from 1 (never) to 6 (almost always). This instrument has exhibited significant validity and reliability, as evidenced by a Cronbach's alpha of 0.99.

The Safety Nursing Activities Scale comprises 44 inquiries distributed across 8 subcategories: security, precise patient identification, operations (invasive procedures), medication administration, blood transfusion, management of infections, management of falls and sores, and firefighting management (Yang, 2021). Responses are assessed on a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). This scale has similarly undergone validation for reliability, attaining a Cronbach's alpha of 0.96. Contemporary instruments that evaluate safety care activities generally address only select aspects of the healthcare accreditation standards, concentrating on five subscales, which include precise patient identification, effective communication, operations (invasive procedures), medication administration, and the management of falls.

The patient safety competency scale was developed using the Patient Safety in Nursing Education Questionnaire (PaSNEQ), a modified instrument based on the work of Langari et al. (2017). The modified PaSNEQ consists of 20 items, which were adapted from the original scales of the Basic Patient Safety Competency (BPSC), Clinical Assessment of Adverse Events (CAAE), and Educational Safety Training (EST). The questionnaire employs a 4-point Likert scale, ranging from "fully disagree" to "fully agree." Rigorous validation and reliability testing were conducted, and the total Cronbach's alpha for the patient safety competency items was calculated to be 0.89, indicating strong internal consistency and reliability.

Data collection

The data for this research was obtained via a structured questionnaire administered to 154 nurses at a private hospital in Tangerang, utilizing validated instruments such as the Caring Behavior Inventory (CBI) and the Nursing Safety Activity Scale to assess caring behaviors and patient safety activities, with participants responding anonymously and voluntarily to uphold data integrity and confidentiality during a designated timeframe while strictly adhering to ethical standards.

Data analysis

Descriptive statistics alongside the reliability of the scales were meticulously examined utilizing the Statistical Package for the Social Sciences (SPSS) software, specifically version 22. Prior to the assessment of the proposed model, preliminary confirmatory factor analysis (CFA) was performed to investigate the factor structure of all measures, employing structural equation modeling (SEM) via Lisrel version 8.8. The SEM analysis incorporated maximum likelihood estimation to evaluate the alignment between the empirical data and the proposed model (Wang & Wang, 2019).

In order to assess the significance of the indirect effects present within the model, a bias-corrected bootstrapping technique consisting of 1,000 iterations was implemented due to its superior statistical power when applied to small sample sizes and its capacity to effectively regulate the type I error rate (Wang & Rhemtulla, 2021). This investigation employed SEM to scrutinize the interrelations between the observed and latent variables, specifically focusing on how elements such as CR, EHP, CPA, and PKS impact the principal dependent variable (DV). Gaining insights into these relationships is crucial for the formulation of effective interventions and policies designed to address these variables. In accordance with Hoyle's (1995) recommendations, model fit was evaluated through the application of various criteria: Chi-square (χ^2), the Chi-square to degrees of freedom ratio, incremental fit index (IFI), comparative fit index (CFI), Tucker–Lewis index (TLI) and the root mean square error of approximation (RMSEA). A threshold value of 0.90 or above is typically regarded as acceptable for both IFI and CFI, while an RMSEA value below 0.06 suggests an excellent model fit (Wang & Rhemtulla, 2021).

Ethical consideration

The ethical considerations for this study have been thoroughly addressed. Ethical approval for this study was obtained from the Research Ethics Committee of Universitas Muhammadiyah Purwokerto (UMP), as stated in approval letter No. KEPK/UMP/79/VI/2024. The participants received a cover letter outlining the study's purpose and providing the names and contact details of the researchers. They were informed of their right to participate voluntarily, assured of their anonymity and confidentiality, and reminded of their ability to withdraw from the study at any time without any consequences. The collected data was securely stored and accessible exclusively to the research team. The study adhered to the principles of beneficence, ensuring that participants were not exposed to any harm, guaranteeing justice, equal treatment and opportunity for all participants. The research complied with the Helsinki Declaration and other relevant international ethical guidelines, ensuring that the integrity of the process and the rights of participants were fully respected (Al-Durra et al., 2020).

Results

The data reveals the key demographic and employment trends among the respondents. Most are aged over 25 (83.11%) and have vocational education (71.4%), indicating a mature, technically skilled workforce. Women dominate the sample, representing 87.7%, suggesting a gender imbalance typical in certain sectors like healthcare. In terms of employment distribution, the majority work in inpatient care (60.4%), followed by smaller proportions in outpatient care (9.1%), intensive care (16.2%), and operating rooms (14.3%). Employment status shows that 83.8% are in permanent roles, while 16.2% hold temporary positions, reflecting job stability for the majority. These insights suggest a predominantly older, female, and vocationally educated workforce concentrated in inpatient care, with a stable employment status. Based on the results from the uploaded SEM analysis document, here's a breakdown of the findings with the inclusion of relevant statistical values:

Caring Behavior (CAR_BHV) and Patient Safety Activities (PAT_SF_A):
The analysis reveals a significant path between CAR_BHV and PAT_SF_A with a path coefficient of 0.69. This shows that caring behavior among healthcare professionals has a strong and direct positive impact on patient safety activities. The t-value for this relationship is substantial (T > 1.96), indicating a statistically significant relationship. A low p-value (<0.05) confirms that the effect of caring behavior on patient safety is not due to random chance.

Patient Safety Competency (PAT_SF_C) and Patient Safety Activities (PAT_SF_A):
Despite the theoretical expectation that competency in patient safety protocols influences safety activities, the model does not show a significant effect (path coefficient = 0.05). This path's t-value is below 1.96, suggesting no significant direct influence. This might indicate that competency training, while important, needs to be supplemented with practical applications to translate into actual safety practices.

Moderating Effect (EFEKMDR):
The moderating effect (EFEKMDR) does not have a significant impact on the relationship between CAR_BHV and PAT_SF_A, with a low path coefficient (0.05). The t-value for the moderation effect is also insignificant, indicating that EFEKMDR does not play a strong moderating role in this model. The insignificant moderation effect suggests that broader systemic factors—such as workload, organizational culture, and leadership support—may have a more substantial impact on safety outcomes than patient safety competency alone (Mazumder et al., 2023).

The results of the analysis show that the proposed model is generally in accordance with the data, supported by the value of Chi-square = 127.43 and degree of freedom (df) = 105, where a Chi-square that is not excessively large relative to the degrees of freedom suggests a reasonable model fit. P-value = 0.06749 (a p-value slightly above 0.05 indicates that the model fits the data well, although it is not perfect). RMSEA = 0.037. Here, the RMSEA value is below the 0.05 threshold, indicating a good fit of the model to the data. This confirms that the overall model is robust and reliable. In summary, while caring behaviors have a significant and positive effect on patient safety, the role of patient safety competency and moderating factors (EFEKMDR) is less clear.

Discussion

The results of this study show that caring behavior has a significant influence on patient safety activities. These findings underscore the importance of caring behavior in improving patient safety. Caring behaviors not only help build a better relationship between nurses and patients, but also improve the adherence to safety procedures and the implementation of safer clinical practices. These discussions align closely with Watson's Theory of Human Caring, which emphasizes the importance of caring behaviors in creating a healing and supportive environment for patients. Watson's theory integrates the concepts of empathy, compassion, and holistic care, proposing that caring relationships are central to achieving positive patient outcomes (Norman et al., 2016; Watson, 2018; Wei et al., 2021). The instruments used in this study were carefully selected to capture the essence of caring behaviors as defined by Watson's theoretical framework. These instruments measured not only the technical aspects of caring behaviors but also the emotional and interpersonal dimensions that are integral to Watson's vision of patient-centered care (Ghafouri et al., 2021; Oktaviana & Dwiantoro, 2018). By highlighting the impact of empathy and caring communication, this study validates Watson's theory, demonstrating that caring practices directly contribute to the improved safety and well-being of patients. While these strategies are effective, some argue that the inherent challenges of emotional labor in nursing can lead to burnout, potentially undermining the very empathy these strategies aim to cultivate. Balancing emotional demands with self-care is essential for sustaining caring communication in nursing practice.

Recent research confirms that the caring behavior of healthcare workers can reduce the risk of medical errors and increase patient involvement in the treatment process which, in turn, contributes to patient safety (Ahmed et al., 2024; Wang et al., 2024). Developing empathetic and caring communication skills in nurses is crucial for enhancing patient safety and overall care quality. Effective strategies include targeted training programs, fostering a supportive environment, and utilizing technology to enhance empathetic interactions. Research has proven that higher levels of empathy correlate with emotional support and better quality of care (Atta et al., 2024).

Structured empathy training can significantly

improve the nurses' caring communication skills, leading to better patient outcomes. Simulation-based learning allows nurses to practice empathetic communication in realistic scenarios, enhancing their emotional intelligence and responsiveness (Cho & Kim, 2024). It is important to create a culture that prioritizes empathy within healthcare teams and encourages nurses to engage in caring communication, which is linked to improved patient safety (Haribhai-Thompson et al., 2022). Peer support and mentorship programs can reinforce empathetic practices among nursing staff (Kramer et al., 2018). Using digital health platforms designed with empathetic interfaces can facilitate better caring communication between nurses and patients, ensuring that emotional needs are met during care (van Lotringen et al., 2023).

Patient Safety Competency (PAT_SF_C) in this study did not have a significant influence on patient safety activities. This indicates that safety competencies may not play a strong role as a mediator in this model. Although safety competencies are conceptually important, these results suggest that having safety competencies alone is not enough to significantly affect patient safety. Studies show that structural empowerment and systems thinking correlate positively with safety competency (Lusianah & Kurniawati, 2023; Mazumder et al., 2023). A systematic review has highlighted that basic safety competencies, such as teamwork and communication, are vital for maintaining a sustainable safety climate (Rahman et al., 2022).

The Moderation Effect (EFEKMDR) was also not significant, which showed that moderation in the relationship between caring behavior and patient safety activities did not occur. The contemporary study by Macphee et al. (2017) supports these findings by showing that systemic factors such as high workloads and less frequent management support play a greater role in influencing these relationships. This means that safety training and competency development programs may not be effective enough if they are not accompanied by efforts to address the systemic factors that affect the performance of health workers. The overall success of patient safety requires a more holistic approach. This approach must include strong management support, an organizational culture that supports safety, and a work environment that is conducive to the optimal implementation of safety competencies.

Conclusion

This research identified that caring behaviors (CR, HP, CPA, PKS) directly and positively influence patient safety activities (SC, PI, SO, MA, BTS, IC, MFS, FM). The expected moderating effect of patient safety competencies (BPSC, CAAE, EST) on this relationship was insignificant. These outcomes emphasize the importance of caring behaviors in bolstering patient safety while also indicating that current approaches to implementing patient safety competencies may need revision to produce meaningful results. This study highlights the need for further exploration into approaches that can strengthen both caring behaviors and patient safety. Simulation-based training programs that replicate real-life scenarios are highly recommended, particularly when combined with randomized controlled trials (RCTs). RCTs can provide robust evidence regarding the efficacy of such simulations in improving patient outcomes and enhancing safety practices among healthcare professionals. Additionally, longitudinal and qualitative studies are essential to evaluate the sustained impacts of these interventions on clinical outcomes and patient safety.

Understanding systemic factors like workload, burnout, and supportive organizational environments is crucial in determining their influence on caring behaviors and patient safety practices. Comparative studies across diverse healthcare settings can reveal how organizational culture and systemic factors interact to shape patient safety outcomes. This study's single-site design limits the generalizability of its findings, as the private healthcare institutions' unique characteristics—such as organizational structure, patient demographics, and resource availability—may lead to different approaches to compassionate care and patient safety compared to public facilities. Future research should explore a broader range of healthcare settings, encompassing both private and public sectors, to validate these findings and identify more comprehensive patterns.

In summary, this study underscores the crucial role of caring behaviors in fostering patient safety; however, the moderating function of patient safety competencies warrants further investigation. Future research should prioritize simulation-based RCTs, examining systemic factors, the role of organizational culture, and the integration of emotional intelligence into patient safety initiatives as fundamental components to improve both caring behaviors and patient safety practices within healthcare environments.

Institut Kesehatan dan Teknologi PKP DKI Jakarta. No additional funding was received from public, commercial, or other not-for-profit sectors.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request, subject to institutional and ethical guidelines.

References

Ahmed, Z., Ellahham, S., Soomro, M., Shams, S., & Latif, K. (2024). Exploring the impact of compassion and leadership on patient safety and quality in healthcare systems: A narrative review. *BMJ Open Quality, 13*, 1–8. https://doi.org/10.1136/bmjoq-2023-002651

Al-Durra, M., Nolan, R. P., Seto, E., & Cafazzo, J. A. (2020). Prospective registration and reporting of trial number in randomised clinical trials: Global cross sectional study of the adoption of ICMJE and Declaration Of Helsinki recommendations. *The BMJ, 369*. https://doi.org/10.1136/bmj.m982

Almukhaini, S. J., Goldberg, L., & Watson, J. (2020). Embodying caring science as islamic philosophy of care: Implications for nursing practice. *Advances in Nursing Science, 43*(1), 62–74. https://doi.org/10.1097/ANS.0000000000000300

Ambarika, R., & Anggraini, N. A. (2021). Patient safety analysis review of nurse caring behavior in patients with risk of fall. *Indonesian Journal of Nutritional Epidemiology and Reproductive, 5*(1), 114–122.

Atta, M. H. R., Hammad, H. A. H., & Elzohairy, N. W. (2024). The role of empathy in the relationship between emotional support and caring behavior towards patients among intern nursing students. *BMC Nursing, 23*(1), 1–13. https://doi.org/10.1186/s12912-024-02074-w

Baek, O.-J., & Shin, Sun-Hwa. (2024). An importance-performance analysis of patient safety activities for inpatients in small and medium-sized hospitals. *The Journal of Korean Academic Society of Nursing Education, 30*(2), 170–181. https://doi.org/doi.org/10.5977/jkasne.2024.30.2.170

Cho, M. K., & Kim, M. Y. (2024). Effectiveness of simulation-based interventions on empathy enhancement among nursing students: A systematic literature review and meta-analysis. *BMC Nursing, 23*(1), 1–12. https://doi.org/10.1186/s12912-024-01944-7

Dicuccio, M. H. (2015). The relationship between patient safety culture and patient outcomes: A systematic review. *Journal of Patient Safety, 11*(3), 135–142. https://doi.org/10.1097/PTS.0000000000000058

Doyle, C., Lennox, L., & Bell, D. (2013). A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. *BMJ Open, 3*(1). https://doi.org/10.1136/bmjopen-2012-001570

Falade, I., Gyampoh, G., Akpamgbo, E., Chika, O., Obodo, O., Okobi, O., Aguguo, J., & Chukwu, V. (2024). A comprehensive review of effective patient safety and quality improvement programs in healthcare facilities. *Medical Research Archives, 12*(8). https://doi.org/10.18103/mra.v12i7.5649

Ghafouri, R., Nasiri, M., Atashzadeh-Shoorideh, F., Tayyar-Iravanlou, F., & Rahmaty, Z. (2021). Translation and validation of caring behaviors inventory among nurses in Iran. *PLoS ONE, 16*(7 July), 1–11. https://doi.org/10.1371/journal.pone.0254317

Ha, S., & Lee, M. (2019). A study on patient safety culture, incident reporting and safety care activities of clinical nurses in a university-affiliated hospital. *Journal of Muscle and Joint Health, 26*(1), 35–45.

Haribhai-Thompson, J., McBride-Henry, K., Hales, C., & Rook, H. (2022). Understanding of empathetic communication in acute hospital settings: A scoping review. *BMJ Open, 12*(9). https://doi.org/10.1136/bmjopen-2022-063375

Hunt, D. D. (2022). A Holistic Approach for Nurses: Putting the pieces together for safe, effective care. *Fast Facts for Patient Safety in Nursing,* 137–152. https://doi.org/10.1891/9780826151568.0008

Iwanow, L., Jaworski, M., Gotlib, J., & Panczyk, M. (2021). A model of factors determining nurses' attitudes towards learning communicative competences. *International Journal of Environmental Research and Public Health, 18*(4), 1–15. https://doi.org/10.3390/ijerph18041544

Jang, H., Lee, M., & Lee, N. J. (2022). Communication education regarding patient safety for registered nurses in acute hospital settings: A scoping review protocol. *BMJ Open, 12*(2), 1–6. https://doi.org/10.1136/bmjopen-2021-053217

Jangland, E., Teodorsson, T., Molander, K., & Muntlin Athlin, Å. (2018). Inadequate environment, resources and values lead to missed nursing care: A focused ethnographic study on the surgical ward using the fundamentals of care framework. *Journal of Clinical Nursing, 27*(11–12), 2311–2321. https://doi.org/10.1111/jocn.14095

Kramer, D., Hillman, S. M., & Zavala, M. (2018). Developing a culture of caring and support through a peer mentorship program. *Journal of Nursing Education, 57*(7), 430–435. https://doi.org/10.3928/01484834-20180618-09

Kuntarti, K., Yetti, K., & Novieastari, E. (2018). The contributing individuals in developing caring behaviors of nursing students: The focus group finding. *International Journal for Human Caring, 22*(4), 169–178. https://doi.

org/10.20467/1091-5710.22.4.169

Langari, M. N. M., Tella, S., Smith, N.-J., & Turunen, H. (2017). Self-assessment of patient safety competence: A questionnaire survey of final year British and Finnish pre-registration nursing students. *International Journal of Caring, 10*(3), 1212–1223. https://www.proquest.com/scholarly-journals/self-assessment-patient-safety-competence/docview/1988004119/se-2

Lee, S. E., & Quinn, B. L. (2020). Safety culture and patient safety outcomes in East Asia: A literature review. *Western Journal of Nursing Research, 42*(3), 220–230. https://doi.org/10.1177/0193945919848755

Lungu, D. (2023). Patient safety: A systematic review of the literature with evidence based measures to improve patient safety in healthcare settings. *Texila International Journal of Academic Research, 10*(2), 27–35. https://doi.org/10.21522/tijar.2014.10.02.art003

Lusianah, L., & Kurniawati, A. (2023). The relationship between patient safety competency and safety behavior in nurses at RSU X Tangerang. *Dunia Keperawatan: Jurnal Keperawatan dan Kesehatan, 11*(2), 176–183. https://doi.org/10.20527/jdk.v11i2.530

Macphee, M., Dahinten, V. S., & Havaei, F. (2017). The impact of heavy perceived nurse workloads on patient and nurse outcomes. *Administrative Sciences, 7*(1), 1–17. https://doi.org/10.3390/admsci7010007

Mårtensson, S., Knutsson, S., Hodges, E. A., Sherwood, G., Broström, A., & Björk, M. (2024). Development of caring behaviour in undergraduate nursing students participating in a caring behaviour course. *Scandinavian Journal of Caring Sciences, 38*(1), 47–56. https://doi.org/10.1111/scs.13189

Mazumder, B., Sultana, S., Sharma, S., Akhter, S., & Nessa, Z. (2023). Structural empowerment and clinical competency among the nurses in Bangladesh. *IOSR Journal of Nursing and Health Science (IOSR-JNHS), 12*(6), 1–10. https://doi.org/10.9790/1959-1206010110

Norman, V., Rossillo, K., & Skelton, K. (2016). Creating healing environments through the theory of caring. *AORN Journal, 104*(5), 401–409. https://doi.org/10.1016/j.aorn.2016.09.006

Oktaviana, Y., & Dwiantoro, L. (2018). Development of nurses' empathy attitudes in patient center care through transformational leadership: A literature review. *Jurnal Kepemimpinan Dan Manajemen Keperawatan, 1*(2), 9–14. https://doi.org/http://dx.doi.org/10.32584/jkmk.v1i2.62

Rahman, F. A., Arifin, K., Abas, A., Mahfudz, M., Cyio, M. B., Khairil, M., Ali, M. N., Lampe, I., & Samad, M. A. (2022). Sustainable safety management: A safety competencies systematic literature review. *Sustainability (Switzerland), 14*(11), 1–17. https://doi.org/10.3390/su14116885

Rezende, H. De, Morais, A. S., Vitorio, A. M. F.,

Quadrado, E. R. S., Garzin, A. C. A., Martins, M. S., Lourenção, D. C. de A., Modesto, R. C., & Nicole, A. G. (2024). Effectiveness of educational interventions to develop patient safety competencies in undergraduate nursing students: A systematic review. *Nurse Educator, 50*(1), 37–42. https://doi.org/10.1097/NNE.0000000000001750

Sari, D. W. P., Arief, Y. S., Ahsan, A., & Abdurrouf, M. (2024). The development of clinical education model based on community of practice for the patient safety competency achievement in nursing students: A pls-sem approach. *Journal of Law and Sustainable Development, 12*(1), e2712. https://doi.org/10.55908/sdgs.v12i1.2712

Shin, J. Y., & Jang, E. H. (2023). Influence of person-centered perioperative nursing and patient safety competency on patient safety management activities among operating room nurses: A descriptive survey study. *Korean Journal of Adult Nursing, 35*(2), 97–106. https://doi.org/10.7475/kjan.2023.35.2.97

Sirera, B., Naanyu, V., Kussin, P., & Lagat, D. (2024). Impact of patient-centered communication on patient satisfaction scores in patients with chronic life-limiting illnesses: An experience from Kenya. *Frontiers in Medicine, 11*(March). https://doi.org/10.3389/fmed.2024.1290907

van Lotringen, C., Lusi, B., Westerhof, G. J., Ludden, G. D. S., Kip, H., Kelders, S. M., & Noordzij, M. L. (2023). The role of compassionate technology in blended and digital mental health interventions: Systematic scoping review. *JMIR Mental Health, 10*(April). https://doi.org/10.2196/42403

Vujanić, J., Mikšić, Š., Barać, I., Včev, A., & Lovrić, R. (2022). Patients' and nurses' perceptions of importance of caring nurse–patient interactions: Do they differ? *Healthcare (Switzerland), 10*(3), 1–16. https://doi.org/10.3390/healthcare10030554

Vujanić, J., Prlić, N., & Lovrić, R. (2020). Nurses' self-assessment of caring behaviors in nurse–patient interactions: A cross-sectional study. *International Journal of Environmental Research and Public Health, 17*(14), 1–15. https://doi.org/10.3390/ijerph17145255

Wang, J., & Wang, X. (2019). Structural equation modeling: Applications using mplus (Second edition). John Wiley & Sons, Incorporated.

Wang, K. L., de Montemas, W., Dey, S., Johnson, A., Nguyen, H., Tuqiri, K., Crawford, B., & Murray, S. (2024). Not just a 'nice to have': Team compassionate care behaviours and patient safety. *Australian Journal of Management, June*. https://doi.org/10.1177/03128962241270743

Wang, Y. A., & Rhemtulla, M. (2021). Power analysis for parameter estimation in structural equation modeling: A discussion and tutorial. *Advances in Methods and Practices in Psychological Science, 4*(1). https://doi.

Lusianah, L. et al. (2025)

org/10.1177/2515245920918253

Watson, J. (2018). Unitary caring science: Philosophy and praxis of nursing. University Press of Colorado.

Wei, H., Hardin, S. R., & Watson, J. (2021). A unitary caring science resilience-building model: Unifying the human caring theory and research-informed psychology and neuroscience evidence. *International Journal of Nursing Sciences, 8*(1), 130–135. https://doi.org/10.1016/j.ijnss.2020.11.003

World Health Organization. (2020). Patient safety incident reporting and learning systems: Technical report and guidance. World Health Organization. https://iris.who.int/handle/10665/334323ance

Wu, Y. (2021). Empathy in nurse-patient interaction: A conversation analysis. *BMC Nursing, 20*(1), 1–6. https://doi.org/10.1186/s12912-021-00535-0

Yang, Y. K. (2021). Development of a patient safety care activity scale for clinical nurses in Korea. *Archives of Public Health, 79*(1), 1–13. https://doi.org/10.1186/s13690-021-00596-2

Zaitoun, R. A., Said, N. B., & de Tantillo, L. (2023). Clinical nurse competence and its effect on patient safety culture: A systematic review. *BMC Nursing, 22(*1), 1–10. https://doi.org/10.1186/s12912-023-01305-w