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The impact of smart checklist implementation on bedside handover quality: A quasi-experimental study

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Abstract

Background: Bedside handover of patients in inpatient rooms is an important element in the continuity of nursing care. Suboptimal bedside handover quality often leads to ineffective communication and potential risks to patient safety. The implementation of a smart checklist as a structured tool is expected to improve the quality of bedside handover by primary nurses.

Purpose: To investigate the effect of smart checklist implementation on the quality of bedside handovers.

Method: A quasi-experimental design with a pretest–posttest control group was employed. Twelve primary nurses were recruited through total sampling based on inclusion criteria. Bedside handover quality was assessed using a validated questionnaire encompassing information completeness, communication clarity, patient involvement, and timeliness, alongside observation sheets documenting checklist use. Data were analyzed using paired and independent t-tests, with statistical significance set at $p < 0.05$.

Results: The intervention group demonstrated a significant improvement in bedside handover quality following smart checklist implementation, whereas no significant changes were observed in the control group.

Conclusion: Smart checklist utilization positively influences the quality of bedside handovers by primary nurses. Routine adoption of this tool is recommended to strengthen communication, patient engagement, and safety in inpatient care settings.

Keywords: Bedside Handover; Handover Quality; Primary Nurse; Smart Cchecklist.

INTRODUCTION

Handover is a series of activities or routine activities carried out by nurses in conveying clinical information about patients, the personal circumstances of patients, and intervention plans or follow-up plans for patient care, as well as ensuring the effectiveness and safety of patient care carried out at each shift change (Scovell, 2010). Bedside handover is the process of transferring patient information carried out by nurses at the patient's bedside during shift changes. In this practice, the nurse on duty conveys important information related to the patient's clinical condition, needs, care plan, and progress directly in front of the patient and their family (Makkink, Stein, Bruijns, & Gottschalk, 2019).

The quality of bedside handovers has a direct impact on continuity of care, quality of service, and, most importantly, patient safety. However, in practice, bedside handovers often face various obstacles, such as unsystematic communication, fragmented information, lack of patient involvement, and differences in competence among nurses. These obstacles have the potential to cause human error, medical error, errors in clinical decision-making, and even increase the risk of patient safety incidents (Cohen, Drach-Zahavy, & Srulovici, 2025; Abdelhadi, Drach-Zahavy, & Srulovici, 2022). To overcome these challenges, various innovative approaches have been developed, one of which is the use of Smart checklists in bedside handovers.

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The smart checklist serves as a structured guide containing important information that nurses must convey when handing over patients. With this guide, the communication process becomes more systematic, consistent, and accurate, thereby minimizing the possibility of information being overlooked (Yakusheva, Lee, Fial, & Weiss, 2025; McHugh, Aiken, Sloane, Windsor, Douglas, & Yates, 2021). The implementation of the smart checklist is a new breakthrough that is very important to develop. The use of this checklist is expected to minimize negligence, increase patient involvement, and strengthen the accountability of nurses in carrying out bedside handovers.

The implementation of smart checklist not only improves the quality of communication between nurses but also strengthens patient safety by reducing the potential for miscommunication or missed information. Thus, smart checklist is very important in bedside handover because it acts as a tool that ensures the effectiveness, efficiency, and safety of the information transfer process in the healthcare environment (Hackman, Häggman-Laitila, & Hult, 2025).

From a nursing management perspective, smart checklist provides significant benefits in establishing uniform quality standards among nurses. The checklist ensures that all nurses, both experienced and new, have the same reference in conveying information. This is in line with the patient safety goals principle established by the WHO, namely the importance of effective communication between health workers in every transition of care (Serafin, Wesolowska-Górniak, Malewska, Kruszewska, Kujawa, & Czarkowska-Pączek, 2025). In addition, smart checklist also encourages patient involvement in the handover process, especially in the bedside handover model. Smart checklist is an important instrument in the implementation of bedside handovers. Its use is not only a technical tool, but also a managerial strategy that can improve the quality of communication, strengthen team coordination, optimize patient involvement, and ultimately reduce the risk of medical errors. The urgency of implementing smart checklist is even greater when linked to the demands of healthcare services that focus on patient safety, nurse accountability, and continuous quality of nursing care. This process can be carried out under the leadership of the primary nurse (Nela, Machmud, & Susanti, 2021).

The primary nurse plays a central role in bedside handovers. The primary nurse is a nurse who is selected and fully responsible for patients from the moment they are admitted until they are discharged, as well as ensuring the comprehensive quality of patient care, from assessment and planning to implementation and evaluation. The primary nurse's competence in managing handovers is crucial to the quality of information transfer during handovers. Nurses' low competence in communication can increase the potential for missed information and reduce the effectiveness of care (Scovell, 2010). In other words, the role of primary nurse is not only as an implementor, but also as a guarantor that the handover takes place safely, accurately, and continuously. The role of primary nurse as a leader is very important in maintaining the continuity of nursing care from the time the patient is admitted until the patient is discharged. Therefore, the competence of a primary nurse is crucial in coordinating every handover activity carried out during the patient's treatment. As an effort to improve the quality of bedside handover.

Experts categorize primary nurse competency dimensions into three areas: knowledge, skills, and attitude (Nela et al., 2021). These three dimensions of competence cannot stand alone, because competence is a combination of knowledge, skills, and attitudes. Specifically for nursing, the American Nurses Association adds the dimension of clinical judgment to the competencies of professional nurses. Thus, there are four domains of competence that a primary nurse must possess, namely knowledge, skills, attitudes, and clinical judgment. Primary nurses will become leaders in primary nursing care. In order for nursing care to be carried out safely and with high quality, proper management led by competent leaders is necessary. Thus, primary nurse competency can be defined as the expected level of performance by integrating knowledge, skills, abilities, and judgment (American Nurses Association, 2008).

Patient involvement in bedside handovers can increase patient trust in healthcare professionals and reduce anxiety during the treatment process (Johnson, 2022). Along with the development of health science and technology today, the quality of bedside handovers is also advancing (Kagonya, Odinga, Onyango, Waithira, Imam, Mutua, & Group, 2025). In almost all internationally accredited

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hospitals, bedside handovers are carried out not only by nurses, but also involve other healthcare professionals such as doctors, pharmacists, nutritionists, radiologists, and others. This requires good and effective standards for bedside handovers (Nela et al., 2021)

The use of checklists has been proven to help nurses convey information in a more focused manner, thereby reducing the risk of ambiguous communication (Scovell, 2010). Bedside handover with checklists can increase nurses' satisfaction with the handover process and provide a sense of security because the information conveyed is more complete and organized (O'Connell & Penney, 2001). In fact, research conducted in several teaching hospitals shows that consistent use of smart checklists reduces the incidence of adverse events and improves the quality of nursing documentation (Raqueno, Rückholdt, Ndwiga, Gupta, & Raeburn, 2025)

Bhayangkara Hospital Level III, a type C general hospital under the Lampung Regional Police Headquarters, has adopted the primary nurse assignment method to strengthen service quality and human resource development. Despite routine implementation of bedside handovers, a preliminary study in the internal medicine ward revealed notable gaps: limited awareness of task distribution, incomplete communication of patient conditions, insufficient discussion of follow-up plans, and the absence of a structured checklist. These variations in primary nurse competence compromise the accuracy and consistency of information transfer, highlighting the need for interventions to standardize and improve bedside handover practices.

RESEARCH METHOD

A quantitative approach using a quasi-experimental design was employed with a pretest-posttest control group framework. The design was selected to evaluate the impact of implementing the Smart Checklist on the quality of bedside patient handovers conducted by primary nurses. Two groups were established: the intervention group, which utilized the Smart Checklist, and the control group, which performed bedside handovers according to standard procedures without an additional checklist (Rachman, Yochanan, Samanlangi, & Purnomo, 2024).

The study population comprised all primary nurses working in the inpatient ward of Bhayangkara Bandar Lampung Hospital, totaling 12 individuals. Sampling was conducted using total sampling, meaning all nurses who met the inclusion criteria were included. The inclusion criteria were: (1) nurses with primary nurse status in the inpatient ward, (2) willingness to participate throughout the research process, (3) active employment during the study period with more than four years of service, and (4) consent to participate. Exclusion criteria included: (1) nurses who were not primary nurses, (2) nurses on leave or inactive during the study period, and (3) refusal to participate. Based on these criteria, the final sample consisted of 12 nurses, divided equally into the intervention group ($n = 6$) and the control group ($n = 6$).

The independent variable in this study was the implementation of the Smart Checklist, while the dependent variable was the quality of bedside handovers performed by primary nurses. The quality assessment encompassed five dimensions: completeness of information, clarity of communication, follow-up planning, patient involvement, and timeliness. The intervention involved the structured use of the Smart Checklist during bedside handovers in the intervention group, whereas the control group continued handovers without the checklist. The intervention was conducted over a two-week period (August 11–23, 2025) in the inpatient ward. A pretest was administered prior to checklist implementation, followed by a posttest after two weeks to measure changes in handover quality. Observations were carried out across 12 handover sessions, covering morning, afternoon, and night shift transitions.

Data collection instruments included the Bedside Handover Quality Questionnaire and an observation sheet for checklist implementation. Data analysis comprised univariate analysis for descriptive purposes, followed by bivariate testing. Paired t-tests were used to compare pretest and posttest scores within each group, while independent t-tests were applied to compare differences between groups. A significance level of $p < 0.05$ was set to determine the effect of the Smart Checklist on bedside handover quality. Interpretation was based on mean differences and p-values, as presented in the results table. Ethical approval for this study was obtained under letter number S.25/269/FKES10/2025.

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RESEARCH RESULTS

Table 1. Characteristics of the Participants (N=12)

Variable	Results
Age (Year) (n/%)	
(Mean±SD)	(32.92±5.053)
25–30	4/33.3
31–35	5/41.7
>35	3/25.0
Gender (n/%)	
Male	2/16.7
Female	10/83.3
Length of Service (n/%)	
4–6 years	5/41.7
7–9 years	4/33.3
≥10 years	3/25.0

Table 1 shows the average age of the participants is 32.92 years old with SD ± 5.053 . The majority of participants are aged 31–35 years (41.7%), female (83.3%), and have 4–6 years of work experience (41.7%).

Table 2. Bedside Handover Quality Between Groups

Variable	Mean	SD	SE	p value	N
Treatment Group					
Bedside quality Handover Pretest	5.00	1.907	0.550	0.000	6
Bedside quality Handover Posttest	16.00	2.089	0.603		6
Control Group					
Bedside quality Handover Pretest	9.08	1.311	0.550	0.191	6
Bedside quality Handover Posttest	9.33	1.303	0.603		6

Table 2 illustrates that, within the intervention group, the mean score for bedside handover quality during the pretest was 5.00 (SD = 1.907; SE = 0.550). Following the intervention, the posttest mean increased substantially to 16.00 (SD = 2.089; SE = 0.603). Statistical analysis yielded a p-value of 0.000 ($p < 0.05$), indicating a significant improvement. In contrast, the control group recorded a pretest mean of 9.08 (SD = 1.311), which showed only a slight increase to 9.33 (SD = 1.303) in the posttest. The corresponding p-value was 0.191 ($p > 0.05$), suggesting that the observed difference was not statistically significant.

Table 3. Smart Checklist Implementation Between Groups

Implementation of Smart Checklist	Treatment Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
Noncompliance	6/100	2/32.3	6/100	6/100
Compliance	0/0	4/68.7	0/0	0/0

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Table 3 indicates that, in the intervention group, all participants (100.0%) initially reported during the pretest that the implementation of the Smart Checklist was not appropriate. However, in the posttest, 32.3% of participants stated that the checklist implementation was appropriate. In the control group, all participants (100.0%) likewise reported in the pretest that the checklist implementation was not appropriate.

Table 4. Effect of Smart Checklist Implementation on the Quality of Bedside Patient Handover Between Groups (N=12)

Variable	Mean	SD	SE	p value
Bedside handover quality in the intervention group	2.333	2.387	0.689	0.006
Bedside handover quality in the control group	0.333	0.778	0.225	0.166

Table 4 shows that the average application of the smart checklist on the quality of bedside patient handover by the primary nurse in the intervention group obtained a p-value of 0.006 ($p < 0.05$) and in the control group obtained a p-value of 0.1666 ($p > 0.05$).

DISCUSSION

The respondent characteristics table shows that most nurses are in a phase of professional maturity with good experience and adaptability to system changes and innovations such as the use of Smart Checklists in bedside handovers. The dominance of female nurses reflects the general characteristics of the nursing profession in Indonesia, which is known for its excellence in empathy, communication, and accuracy—important factors in patient handovers. Additionally, more than four years of work experience strengthens nurses' ability to understand communication flows, responsibilities, and clinical decision-making. Overall, the productive, experienced, and communicative characteristics of the participants are important assets in supporting the successful implementation of the Smart Checklist to improve the quality of bedside handover.

Based on the findings presented in Table 2, a significant difference was identified in the quality of bedside handover in the treatment group before (pretest) and after (posttest) implementation of the Smart checklist. Prior to the intervention, the mean handover quality score was 5.00 (SD = 1.907; SE = 0.550), indicating that the bedside handover conducted by the Head Nurse (primary nurse) had not yet achieved an optimal standard.

Following the implementation of the Smart checklist, the mean score increased markedly to 16.00 (SD = 2.089; SE = 0.603). The statistical analysis demonstrated a p-value of 0.000 ($p < 0.05$), confirming that the observed improvement was statistically significant. These results indicate that the Smart checklist exerted a substantial and measurable effect on enhancing the quality of bedside handovers in the treatment group. The magnitude of change suggests that structured tools such as checklists contribute to improved accuracy, completeness of information, and a more systematic communication flow during patient handover at the bedside.

These findings are consistent with previous research demonstrating a significant effect of bedside handover implementation on interprofessional communication at Cut Meutia General Hospital ($p = 0.001 < 0.05$) (Hidayah, Syam, & Nurmaini, 2022). Similarly, another study reported a p-value of 0.000 in the treatment group, indicating a significant increase in nurse satisfaction following the implementation of bedside handover, whereas the control group showed no significant change ($p = 0.082$) when handover was conducted at the nurse station (Barus, Nurhidayah, & Purba, 2024). From a theoretical perspective, these results align with patient safety principles, which emphasize effective communication during handover as a critical strategy to prevent errors and ensure continuity of nursing care (Serafin et al., 2025). Within the patient safety framework, communication represents a foundational pillar for reducing adverse events and strengthening care coordination. The use of structured instruments such as the Smart checklist

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addresses common communication challenges by providing a clear framework, reducing subjectivity, and ensuring that essential patient information is conveyed comprehensively (Yu, Raphael, Mackay, Smith, & Fernandez, 2025).

Accordingly, the implementation of the Smart checklist not only yields significant improvements in bedside handover quality but also carries important practical implications for patient safety, service quality, and nurse satisfaction. Integrating this intervention into standard operating procedures for patient handover is therefore recommended to promote sustainability and maintain consistent improvements in healthcare delivery.

In contrast, the control group results revealed no statistically significant difference between pretest and posttest measurements. The mean pretest score was 9.08 (SD = 1.311), increasing marginally to 9.33 (SD = 1.303) at posttest. However, the p-value of 0.191 ($p > 0.05$) indicates that this difference was not statistically significant. These findings suggest that without the structured intervention of the Smart checklist, the quality of bedside handover tends to remain stable without meaningful improvement. Consequently, substantial enhancement appears to require deliberate, structured efforts such as checklist implementation.

This pattern underscores that improvements in bedside handover quality cannot be achieved solely through routine practice. Instead, a structured mechanism is necessary to guide nurses in delivering patient information in a complete, systematic, and consistent manner. The absence of significant change in the control group further suggests that factors such as time, routine exposure, or work experience alone are insufficient to improve handover quality without supportive instruments. In this context, the Smart checklist functions as a standardizing tool that minimizes communication variability and promotes consistency among nurses.

These findings are further supported by evidence indicating that meaningful improvements in bedside handover quality are more likely to occur through structured, instrument-based interventions (Osmancevic, Steiner, Großschädl, Lohrmann, & Schoberer, 2025). Without the Smart checklist, handover quality remained largely unchanged despite slight fluctuations in mean scores. Thus, the present study provides empirical support for considering the

Smart checklist not merely as a supplementary tool, but as an essential component in strengthening communication quality and patient safety within bedside handover processes.

The descriptive analysis in Table 3 demonstrates that, in the treatment group, prior to the intervention, all participants (100%) categorized the implementation of the Smart checklist as “noncompliance.” Following the intervention, however, 68.7% of participants reported that its implementation was compliance, while 32.3% continued to perceive it as noncompliance. This shift indicates that successful adoption of the Smart checklist requires processes of adaptation, training, and familiarization. Although not all nurses immediately achieved optimal utilization, the majority demonstrated the capacity to adapt effectively, suggesting that the checklist serves as a practical guide to ensure that critical elements of handover are not omitted. In contrast, in the control group, perceptions remained unchanged at both pretest and posttest, with 100% of participants categorizing the implementation as “not suitable.” This is consistent with the absence of the intervention in the control group and confirms that without structured implementation efforts, no perceptible change in handover practice occurs.

Theoretically, this phenomenon aligns with principles of change management in nursing administration, which posit that the introduction of innovations requires gradual adaptation before full integration into routine practice. The Smart checklist functions not only as a procedural aid but also as a transitional instrument that facilitates behavioral change, enhances information continuity, and reduces the likelihood of omitted critical data during bedside handovers.

Overall, these findings reinforce the positive contribution of the Smart checklist to improving bedside handover quality. Nevertheless, optimal implementation requires supportive strategies, including ongoing supervision, habituation, and competency development, to ensure consistent and sustained use among all nursing staff.

The bivariate analysis presented in Table 4 further confirms the effectiveness of the intervention. In the treatment group, the mean difference was 2.333 with a p-value of 0.006 ($p < 0.05$), indicating a statistically significant improvement following implementation of

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the Smart checklist. Conversely, the control group demonstrated a mean difference of 0.333 with a p-value of 0.166 ($p > 0.05$), reflecting no significant change in handover quality without the intervention. These results corroborate previous findings by Hidayah et al. (2022), who reported a significant effect of bedside handover on interprofessional communication ($p = 0.001 < 0.05$), and by Barus et al. (2024), who observed increased nurse satisfaction in the treatment group ($p = 0.000$) but not in the control group ($p = 0.082$). Additionally, Maurisa and Yuswardi (2019) reported that bedside handover implementation in Banda Aceh Hospital contributed to more accurate patient care decisions.

Collectively, this study provides robust empirical evidence that the Smart checklist functions not only as a technical instrument but also as an effective managerial strategy for enhancing the quality of nursing care. Its broader adoption as a standardized handover procedure across healthcare institutions is therefore recommended to support the continuity of safe, effective, and patient-centered services.

CONCLUSION

This study demonstrated that the implementation of a smart checklist significantly improved the quality of bedside handovers among primary nurses in the intervention group, while no meaningful changes were observed in the control group. The smart checklist was applied appropriately in the intervention group, but not in the control group, underscoring its role as a structured tool to enhance communication, information completeness, and patient safety. Overall, the findings confirm that smart checklist utilization has a positive effect on bedside handover quality. Continuous integration of this checklist into routine nursing practice is recommended to standardize handover procedures and strengthen the quality of inpatient care.

RECOMMENDATION

Future research should investigate the integration of digital-based smart checklists as standardized guidelines for bedside handovers led by primary nurses. Employing qualitative approaches is also encouraged to capture nurses' perceptions and experiences, thereby providing deeper insights into the practical challenges and contextual factors influencing bedside handover implementation. Such

studies would contribute to a more comprehensive understanding of how structured tools can strengthen communication, patient involvement, and safety in hospital nursing services.

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