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The Effect of E-Learning-Based Communication Training on Patient Experience: A Quasi-Experimental Study at RSUD Aek Kanopan

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ABSTRACT

E-learning is a flexible and effective training tool in healthcare, particularly essential for nurses and general practitioners, as it enhances their communication skills and clinical knowledge, ultimately influencing patient satisfaction. The objective of this study is to examine the effects of e-learning communication training for nurses on patient experience at RSUD Aek Kanopan, Indonesia. A quasi-experimental pretest-posttest design was utilized, involving 461 inpatients who completed specific HCAHPS survey items prior to and following the structured communication training of nurses through the E-Gov Labura platform. Chi-square analysis was employed to compare five communication indicators across groups. Results indicated statistically significant enhancements in all patients experience metrics following the intervention. Significant improvements were observed in nurses' listening skills (OR=35.011), procedural guidance (OR=33.701), and adherence to scheduled care (OR=35.134), demonstrating a marked enhancement in communication practices after the e-learning program. While findings were significant across all indicators, the study is limited by its quasi-experimental single-site design and reliance on self-reported patient experience measures, which may restrict generalizability. The findings underscore the significance of mobile-based e-learning in enhancing patient-provider communication and improving the quality of hospital services. The incorporation of structured e-learning modules into clinical training represents a cost-effective and scalable approach to enhancing patient satisfaction and care outcomes.

INTRODUCTION

E-learning is acknowledged as a flexible and effective training tool commonly employed in the healthcare field to bridge skill gaps among experts. Asynchronous e-learning offers ease and demonstrates potential in enhancing the knowledge and abilities of healthcare practitioners. This training is essential for nurses and general practitioners, who interact directly with patients and can impact patient satisfaction through their communication abilities (Kimura et al., 2023). Rouleau et al. (2019) confirmed that elevated self-efficacy and performance metrics were consistently noted among healthcare providers employing e-learning treatments for motivational interviewing and other communication approaches.

The dynamics of communication training via e-learning have garnered attention, with research demonstrating a positive association between enhanced communication skills and patient outcomes. Włodarczyk et al. (2019) conducted a study indicating that healthcare personnel derive advantageous results from e-learning in relation to their communication skills, which are crucial for engaging patients, particularly the elderly. Westendorp et al. (2024) highlighted the increasing recognition of communication's significance in healthcare, suggesting that e-learning platforms enhance engagement among healthcare providers, so enabling them to give excellent person-centered care. This method not only improves patient interactions but also elevates the overall healthcare experience as experienced by patients, hence significantly influencing HCAHPS scores.

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Given the changing healthcare environment, the incorporation of novel e-learning strategies can meet the varied educational requirements of healthcare workers. This suggests that blended learning methods, including online and in-person components, can substantially enhance clinical competence in health profession students. Healthcare practitioners gain information via conventional education and technology-enhanced platforms, facilitating flexible learning possibilities and the practical application of communication skills in clinical contexts (Liu et al., 2016).

Research underscores the significance of ongoing education in sustaining successful communication methods among healthcare practitioners. Eom et al. (2020) highlighted the benefits of simulation-based learning in conjunction with e-learning as a method to equip healthcare personnel for authentic communication issues in clinical environments. This concept was reiterated by additional research highlighting the imperative of adaptive communication tactics to accommodate diverse patient demographics for enhanced therapeutic interactions (Rzadkiewicz & Chylińska, 2023; Schaik et al., 2023). Although international studies highlight the effectiveness of e-learning in enhancing healthcare communication, evidence from Indonesian district hospitals remains scarce. In particular, RSUD Aek Kanopan, as a regional public hospital serving diverse patient populations, faces challenges of limited training resources and inconsistent communication practices. Addressing this gap, our study provides context-specific evidence on the role of e-learning in improving patient experiences.

This research was carried out at RSUD Aek Kanopan, a public hospital located in North Labuhanbatu Regency, North Sumatra, Indonesia, where an e-learning initiative was executed to educate inpatient nurse in effective communication through a structured, mobile-based module. This study aims to evaluate the effect of e-learning communication training on patient experience by comparing specific HCAHPS indicators pre- and post-intervention.

RESEARCH METHODS

This study applied a quantitative quasi-experimental design with a pretest-posttest approach involving two independent groups. The aim was to assess the impact of e-learning-based communication training for nurses on patient experience at RSUD Aek Kanopan, Kabupaten Labuhanbatu Utara, North Sumatra. The study was conducted from October 2023 to October 2024.

The e-learning program was developed collaboratively by RSUD Aek Kanopan and the Communication and Information Technology Agency (Dinas Kominfo) of Labuhanbatu Utara. The learning materials and modules were designed by the hospital's e-learning development team and delivered through the E-Gov Labura Android-based application for all government employees in North Labuhanbatu Regency, North Sumatra. Nurses were required to achieve a posttest score of 90-100 before being considered to have successfully completed the e-learning program. Only nurses who met this requirement provided direct care to patients during the post-intervention period.

Patient experience was measured using a selected of HCAHPS survey conducted by trained peer surveyors. The survey included five key questions: (1) whether the nurse introduced themselves during the first encounter; (2) how well the nurse listened to the patient's questions and concerns; (3) the overall quality of medical care received during the visit; (4) how well the patient was guided through medical procedures; and (5) how well medical care was delivered according to the scheduled plan.

The inclusion criteria were: (1) patients aged 18 years or older; (2) patients hospitalized for at least 24 hours; (3) patients able to complete the HCAHPS survey independently or with minimal assistance; and (4) patients who received care from nurses participating in the e-learning program during the post-intervention period. The exclusion criteria were: (1) patients who refused or failed to provide informed consent; (2) patients with cognitive or sensory impairments preventing valid survey responses; and (3) patients with incomplete survey data.

To minimize confounding, only nurses who completed the e-learning program with a minimum passing score were included in the post-intervention group, ensuring consistency in exposure. Patient inclusion criteria were standardized to reduce variability in demographic and

clinical characteristics. Although randomization was not feasible, comparable baseline characteristics between groups were checked using descriptive statistics.

Sample size was estimated using the formula for comparing two independent proportions (Chi-square test), assuming a 15% expected improvement in the proportion of positive responses, 80% power, and a 95% confidence level. The minimum required sample was 94 patients per group.

Descriptive statistics were used to summarize frequency distributions and percentages for each HCAHPS question. Differences in the proportion of positive responses between pre- and post-intervention groups were analyzed using the Chi-square test. All statistical analyses were performed using SPSS version 30.0, with statistical significance set at $p < 0.05$.

RESULTS AND DISCUSSION

Completion of Effective Communication Training in E-Learning

A total of 157 nurses working in the inpatient services unit of RSUD Aek Kanopan participated in the e-learning-based communication training during the study period. The training was delivered through the E-Gov Labura Android-based platform and consisted of two structured modules: Introduction to Effective Communication in Healthcare Services and START With Heart (Figure 1).

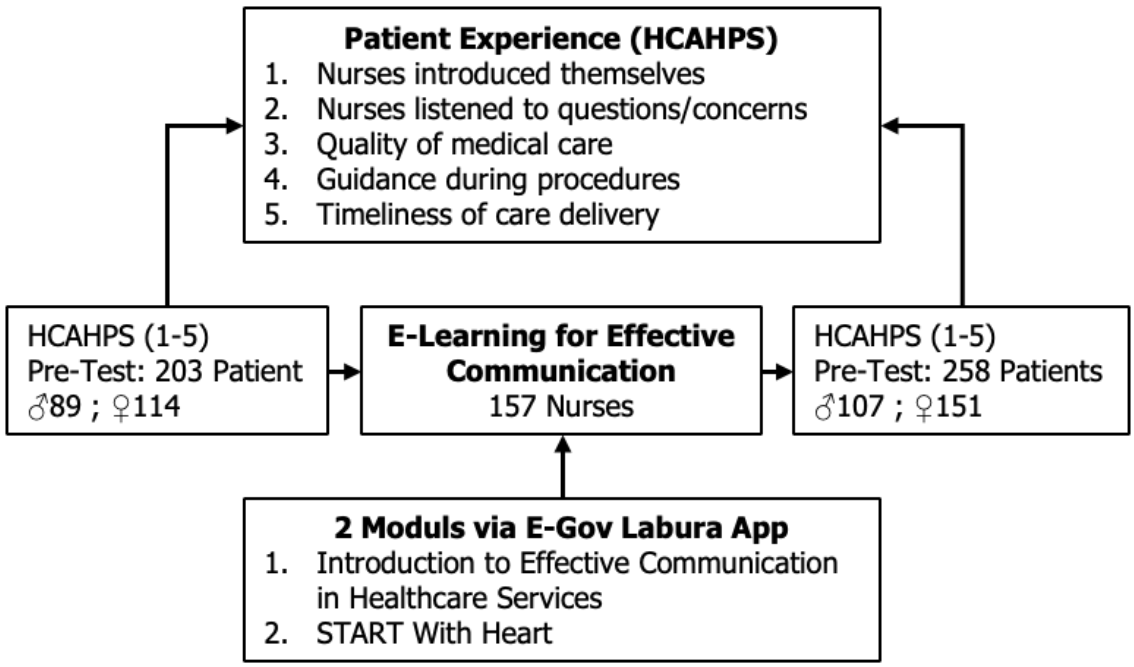

Figure 1. Research Framework: The Effect of E-Learning-Based Communication Training on Inpatient HCAHPS Scores

Figure 1 illustrates the conceptual framework of the study, depicting how structured e-learning modules were designed to enhance nurse–patient communication and subsequently improve patient-reported experiences. The framework highlights the pathway from training intervention to changes in clinical communication behaviours (such as self-introduction, active listening, and procedural guidance), which are then measured through validated HCAHPS indicators. This visual overview underscores the central hypothesis that technology-enabled training translates into tangible improvements in patient satisfaction and trust in care delivery.

Beyond demonstrating the research design, the framework emphasizes that patient experience is not an isolated outcome but directly linked to modifiable communication behaviours of nurses. By focusing on self-introduction and active listening, the framework situates these seemingly small

behaviours as clinically meaningful, as they form the foundation of therapeutic relationships and patient adherence to treatment plans.

All participants were required to complete a post-test, and by the end of the program, every participant achieved a score between 90 and 100, indicating a high level of comprehension and engagement with the training materials (Figure 2).

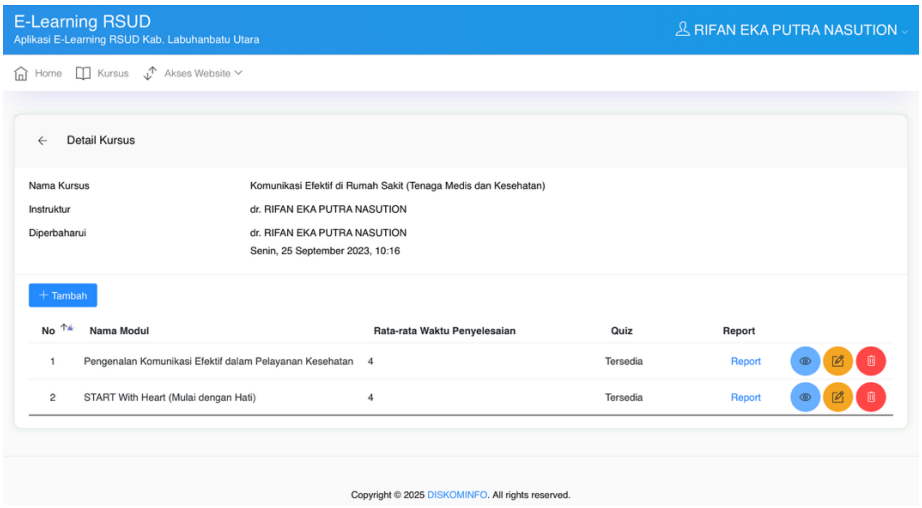

Figure 2. Effective Communication E-Learning Display in the E-Gov Labura application

Patient-Reported Outcomes on Nurse Communication Indicators

A total of 461 patient respondents were included in the survey assessing nurse communication before and after the implementation of the e-learning program. Of these, 203 respondents were surveyed during the pre-e-learning period, and 258 respondents during the post-e-learning period. The gender distribution across the entire sample consisted of 196 males and 265 females. The age of respondents ranged from 18 to 60 years, with a mean age of 38.91 ± 12.49 years.

Comparison of Patient Experience Before and After Nurse E-Learning Intervention

This respondent pool formed the basis for measuring patient-reported outcomes on several nurse communication indicators within the HCAHPS framework, including whether nurses introduced themselves, listened attentively, and provided guidance regarding procedures. Subsequent analysis compared these indicators between pre- and post-intervention groups to assess the impact of the e-learning-based communication training.

To evaluate the impact of the e-learning communication training, selected HCAHPS indicators related to nurse–patient communication were compared between the pre-intervention and post-intervention groups. Five key questions were analyzed: whether nurses introduced themselves, how well they listened to patients, the overall quality of medical care, the clarity of procedural guidance, and the timeliness of care delivery.

Table 1 summarizes patient responses to these communication-related questions across two groups: 203 patients prior to the implementation of e-learning, and 258 patients after its implementation. Statistically significant improvements were observed across all five indicators.

Table 1. Patient-Reported Experience on Selected Nurse Communication Items Before and After Training

HCAHPS Question	Patient Response	Pre-E-Learning	Post-E-Learning	P-Value	Odds Ratio

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		(203 Patients)	(258 Patients)		
(1) whether the nurse introduced themselves during the first encounter	No	125	81	<0.001*	3.502 (2.380-5.152)
	Yes	78	177		
(2) how well the nurse listened to the patient's questions and concerns	Well	177	42	<0.001*	35.011 (20.651-59.358)
	Very Well	26	216		
(3) the overall quality of medical care received during the visit	Well	180	116	<0.001*	9.580 (5.819-15.772)
	Very Well	23	142		
(4) how well the patient was guided through medical procedures	Well	178	45	<0.001*	33.701 (19.879-57-134)
	Very Well	25	213		
(5) how well medical care was delivered according to the scheduled plan	Well	180	47	<0.001*	35.134 (20.537-60.106)
	Very Well	23	211		

**Pearson Chi-Square Test*

For the item assessing whether the nurse introduced themselves during the first encounter, the proportion of patients responding "Yes" increased from 38.4% pre-intervention to 68.6% post-intervention ($p < 0.001$), with an odds ratio (OR) of 3.502 (95% CI: 2.380–5.152). Similarly, for the question assessing how well the nurse listened to the patient's questions and concerns, "Very Well" responses increased dramatically from 12.8% to 83.7%, yielding an OR of 35.011 (95% CI: 20.651–59.358). A similar trend was observed for the perceived quality of care: the proportion of "Very Well" responses rose from 11.3% to 55.0% ($p < 0.001$), with an OR of 9.580 (95% CI: 5.819–15.772).

The same pattern was evident in how well patients were guided through procedures, with "Very Well" responses increasing from 12.3% to 82.6% (OR = 33.701, 95% CI: 19.879–57.134), and in perceptions of whether medical care was delivered according to the scheduled plan, where "Very Well" responses rose from 11.3% to 81.8% ($p < 0.001$), with an OR of 35.134 (95% CI: 20.537–60.106).

Beyond statistical significance, the observed increases. Such as an over six-fold rise in patients rating nurses' listening skills as 'very well' reflect clinically meaningful improvements in patient trust, comfort, and engagement, which are essential for adherence to treatment and overall satisfaction.

Discussion

The integration of e-learning in healthcare environments, especially in nursing education and patient care, has generated considerable interest owing to its capacity to improve communication and overall patient satisfaction. This discourse emphasizes the influence of e-learning on patient reactions about care and engagement with nursing personnel, highlighting the statistically substantial enhancements noted in relevant communication metrics.

The results indicates that the implementation of e-learning significantly enhanced patients' impressions of nurse interactions. The proportion of patients who reported that nurses introduced themselves rose from 38.4% to 68.6% ($p < 0.001$) following the intervention. The improvement in

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communication quality may be ascribed to advanced training approaches integrated into nursing education through e-learning initiatives. Chang et al., (2023) observed a substantial correlation between e-learning quality and student happiness, which may be associated with enhanced communication skills among nurses educated via effective e-learning platforms. Effective self-presentation in nursing practice is vital, as it establishes the foundation for trust and rapport between patients and nurses, which are critical components of optimal healthcare delivery (Suprajitno et al., 2020).

Furthermore, the enhancement in patients' evaluations of nurses' listening skills from 12.8% to 83.7% as "very well" substantiates the assertion that e-learning proficiently prepares nursing practitioners with essential communication skills. This data aligns with findings indicating that communication satisfaction greatly affects patient treatment outcomes (Rawat et al., 2024). Enhancing their listening abilities enables nurses to deliver more targeted and empathetic care, directly addressing patient problems and fostering a more reassuring healthcare atmosphere.

In addition, the perceived quality of treatment exhibited a substantial enhancement following e-learning, with the percentage of replies indicating "very well" increasing from 11.3% to 55.0%. This link indicates that e-learning enhances nurses' technical knowledge and strengthens their capacity for empathic patient engagement. Multiple studies underscore the significance of excellent communication in nursing, as it cultivates a trust-based connection (Apriana & Ratnasari, 2021). Increased patient satisfaction found in numerous research suggests that the approaches utilized in e-learning programs foster a more patient-centered approach to nursing care (Innab et al., 2022).

The significant rise in patient ratings on procedural guidance, increasing from 12.3% to 82.6%, underscores the effectiveness of e-learning. This suggests that when nurses utilize e-learning tools, they are likely implementing more effective, standardized protocols, hence improving patient understanding and comfort (Ranjbar et al., 2024). Research demonstrates a favorable correlation between educational quality and patient navigation of their care. Effective advice positively influences patient outcomes, demonstrating that information acquired through e-learning enhances practitioner confidence and markedly improves patient experiences (Chang et al., 2023).

The substantial rise in patients reporting that medical care was administered as scheduled—from 11.3% to 81.8%—is notable and indicates a strong correlation between e-learning initiatives and operational efficiency in healthcare environments. Like how e-learning fosters uniformity in nursing education (Kunjukunju et al., 2020), this resulting consistency in patient care can enhance trust in healthcare systems. These associations have been recorded, demonstrating the beneficial effects of e-learning on multiple facets of patient care and satisfaction (Alqahtani et al., 2020).

More importantly, it is essential to examine the significance of self-efficacy within the e-learning environment for nursing students, as articulated by Wahyuningrum et al., (2021). A strong confidence in utilizing e-learning approaches can enhance caregiver-patient interactions. Nursing students who enhance their skills through e-learning are likely to enter clinical environments more equipped to provide high-quality patient care. Therefore, connecting theoretical knowledge with practical application via e-learning is essential for developing a proficient nursing workforce.

It is essential to consider the context of COVID-19, which has profoundly transformed educational pathways in healthcare. The pandemic accelerated the swift integration of e-learning, necessitating immediate adaptation by students and professionals to novel delivery methods (Ahmed, 2022). This change has elicited varied responses, with some assessments indicating high satisfaction levels while others underscore obstacles (Farsi et al., 2022).

E-learning in healthcare enhances professional development by providing accessible, flexible, and interactive educational opportunities (Walsh, 2014; Walsh et al., 2019). The integration of technology, such as simulation and adaptive learning, is crucial for its effectiveness. Factors like user engagement, internet accessibility, and blended learning approaches significantly influence the success of e-learning initiatives (Haanes et al., 2024). Overall, e-learning demonstrates comparable effectiveness to traditional methods while addressing barriers in healthcare education delivery. This

perspective reinforces the findings of our study, which similarly showed significant improvements in nurse–patient communication following structured e-learning (Mahdavi Ardestani et al., 2023).

However, while our study focused primarily on short-term patient experience indicators, other research emphasizes the long-term value of simulation and blended learning in sustaining skill retention. In comparison, our results highlight immediate clinical benefits such as improved listening skills and procedural guidance, whereas broader literature suggests that success is strongly moderated by contextual factors including institutional readiness and digital infrastructure. This indicates that while our findings support the effectiveness of e-learning, future work should expand beyond short-term outcomes to evaluate durability, scalability, and integration with hybrid training approaches.

Taken together, the findings demonstrate that e-learning has strong potential to enhance patient perceptions of care, particularly in communication-related domains. Nonetheless, the results should be interpreted with caution: the quasi-experimental design, potential Hawthorne effect, and reliance on self-reported measures limit internal validity. A critical comparison with existing literature indicates that while many studies confirm similar benefits (Chang et al., 2023; Ranjbar et al., 2024; Rawat et al., 2024), other evidence underscores variability in outcomes depending on context and implementation (Farsi et al., 2022). Therefore, future studies should explore longitudinal impacts, triangulate patient-reported outcomes with objective assessments, and evaluate scalability across multiple healthcare institutions through randomized controlled trials.

Limitation of Study

This study was performed in a single public hospital characterized by organizational structures and local governmental collaboration, which may restrict its generalizability to other institutions with varying operational contexts. The implementation of a non-randomized quasi-experimental design may lead to selection bias, particularly as the post-intervention group comprises only those nurses who achieved high scores in the e-learning module. Moreover, although the HCAHPS tool offers standardized insights into patient experience, its dependence on self-reported data may introduce response bias. The study did not evaluate the long-term retention of communication skills or their enduring effects on patient outcomes beyond the immediate post-training phase.

CONCLUSION

This study demonstrates that structured e-learning communication training for nurses significantly enhances patient-reported experiences in key areas such as self-introduction, active listening, procedural guidance, perceived care quality, and timeliness of care. These improvements highlight the potential of mobile-based digital platforms as scalable and cost-effective strategies for strengthening patient-centred care, particularly in resource-limited healthcare settings such as district hospitals in Indonesia.

Despite these promising outcomes, the quasi-experimental single-site design and reliance on self-reported data limit generalizability. Future multi-centre randomized trials and longitudinal evaluations are needed to confirm the durability of skill acquisition and explore integration with blended or simulation-based approaches. At the policy level, embedding e-learning into continuous professional development frameworks, supported by digital infrastructure and performance monitoring, can help institutionalize sustainable improvements in communication and elevate global standards of patient care.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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