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Digital Transformation in Nursing Practice: Leveraging Technology for Patient Education and Clinical Decision Support

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ABSTRACT

The digital transformation in healthcare has driven the emergence of nursing technologies as strategic innovations that bridge the gap between the limitations of conventional service methods and the demands of modern nursing care. However, the effectiveness of these technologies largely depends on how they are leveraged for patient education and clinical decision support to improve service quality. This study aims to analyze the impact of digital transformation in nursing practice with a focus on three key dimensions: technology utilization, patient education, and clinical decision support. A quantitative approach with a cross-sectional survey design was employed, involving 300 nursing participants from Indonesia and Nigeria selected through purposive sampling. Data were collected via an online questionnaire and analyzed using multiple linear regression. The findings reveal that technology utilization exerts a significant effect on the effectiveness of patient education, and patient education acts as a strong predictor of accurate clinical decision support. Furthermore, increased technology integration is consistently predicted to enhance nurses' decision-making capacity and quality of care, whereas technological barriers may potentially diminish both. In conclusion, digital transformation in nursing has demonstrated clear advantages over conventional methods in terms of information efficiency, education accessibility, and clinical decision accuracy. This study contributes by integrating patient education and clinical decision support into digital health adoption literature, while also offering practical guidance for system developers and policymakers to create more efficient and evidence-based nursing practice environments in developing countries.

Keywords: Digital Transformation, Nursing Practice, Patient Education, Clinical Decision Support, Healthcare Technology

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1. INTRODUCTION

The development of digital technology has significantly influenced healthcare systems in many countries (Chandra et al., 2022; Rabbani et al., 2025). One of the most rapidly growing innovations is the digital transformation in nursing practice, designed to support patient care management and clinical decision-making (Hants et al., 2023; Wang et al., 2024). In the modern context, digital nursing practice encompasses the use of digital tools such as Electronic Health Records (Ge et al., 2022), patient education applications (Navarro Martínez et al., 2023), and Clinical Decision Support Systems (Glanville et al., 2023). This shift has driven nursing services to move from conventional systems toward faster, more efficient, and technology-based services. According to Gaughan et al. (2022), nurses' perceptions of the

effectiveness of these technologies play a crucial role in determining their acceptance and sustainability in clinical practice.

The use of technology in nursing has shown a global upward trend, driven by increasing internet penetration and the need for service efficiency. According to Kasoju et al. (2023), the digital health market is projected to continue growing annually, indicating the widespread adoption of this technology. In developing countries such as Indonesia (Effendi et al., 2024) and Nigeria (Ogunniyi et al., 2025), a significant increase in the use of health technologies has been reported, particularly post-pandemic, to support nursing care services. This change indicates that healthcare professionals increasingly rely on digital technology to meet daily healthcare needs. However, the level of acceptance is not only influenced by the availability of tools but also by how nurses perceive their benefits in patient education, clinical decision support, and overall service improvement (Jones et al., 2022; Wieben et al., 2025). Compared to conventional methods that require manual interaction and are often time-constrained, digital technology provides greater flexibility with rapid information access and more efficient use of time.

One of the most important factors determining the successful adoption of technology in nursing is its ability to facilitate patient education (Wynn et al., 2023). The Technology Acceptance Model explains that perceived ease of use influences a person's intention to adopt technology (Alsyouf et al., 2023). According to Armour et al. (2025) and Yosep et al. (2023), applications or systems with intuitive interfaces and easily accessible educational materials enhance nurses' comfort in providing counseling. Therefore, aspects such as comprehensible design and ease of access to educational features strongly affect the user experience. Al-Assaf et al. (2024) added that optimal technology utilization ultimately fosters positive perceptions of care quality. In contrast, conventional methods in patient education often involve manual procedures, limited physical media (such as leaflets), and restricted consultation time, which can reduce patient satisfaction.

Digital transformation also has great potential to enhance Clinical Decision Support. According to information processing theory, digital media can accelerate and clarify the exchange of clinical data(Takagi et al., 2025). Features such as automated alerts, real-time access to clinical references, and patient data analytics enable more accurate two-way interactions between nurses and data systems (Lopez-Luna et al., 2025; Withall et al., 2022). Faster, clearer, and more efficient decision-making through technology allows nurses to feel more engaged and confident in their professional actions (Glanville et al., 2023). Conversely, conventional decision-making methods are generally limited to manual recall or physical book references, which are less flexible and often involve longer waiting times for data verification.

In addition to enhancing education and decision support, digital transformation contributes to improving the quality of nursing services (Tiago & Mitchell, 2024). Based on the concept of Continuity of Care, continuous health monitoring can increase service responsiveness and the accuracy of medical decision-making (Ljungholm et al., 2022). Technology allows nurses to monitor patient conditions in real-time, access medical history, and provide evidence-based interventions (Jayousi et al., 2024). This speed enables healthcare providers to deliver timely and data-driven interventions. Compared to conventional methods, health monitoring is often only carried out during scheduled visits or specific shifts, creating the risk of delays in identifying potential health problems.

User satisfaction represents a critical indicator of the successful adoption and sustained use of nursing technologies (Jedwab et al., 2023). Grounded in the Expectation Confirmation Theory, satisfaction emerges when users' actual experiences align with or surpass their initial expectations (Halvadia & Vaitheeswaran, 2025). From a nurse's perception standpoint, satisfaction is not only about functional performance but also about the perceived value of the technology in facilitating clinical activities (Hussain et al., 2025). Nurses who perceive the system as supportive, trustworthy, and effective are more likely to feel satisfied, which in turn fosters continued usage. Consequently, evaluating satisfaction levels provides valuable insights for refining system features and healthcare services offered. More importantly, users' perceptions across dimensions such as patient education, clinical decision support, and service improvement shape the long-term sustainability and acceptance of digital health solutions. In contrast, traditional nursing approaches often yield lower levels of satisfaction, as they are constrained by limited consultation time and the variability of in-person interactions.

Table 1
Comparison between Digital Nursing Practice and Conventional Methods

Aspect	Digital Nursing Practice (Technology-Based)	Conventional Methods (Manual/Face-to-Face)
Patient Education	Technology provides interactive media (videos/apps) so patients can understand health information more quickly.	Patients receive information through oral lectures or flipcharts, making the understanding process slower.
Clinical Decision Support	Nurses are supported by real-time data, clinical algorithms, and automated notifications for accurate decisions.	Nurses rely on manual memory or physical notes to make clinical decisions.

Nursing Service Quality	The system continuously monitors patient conditions and delivers data promptly for rapid response.	Nurses monitor patient conditions only during specific visits or shifts.

The fundamental differences between the use of technology in nursing practice and conventional methods are presented in Table 1. Digital nursing practice offers higher accessibility (Shaw, 2023), interactive education (Tiago & Mitchell, 2024), accurate decision support (Glanville et al., 2023), time efficiency (Yuen et al., 2023), and user satisfaction (Kitsios et al., 2023) compared to conventional methods. Thus, this comparison confirms that nurses' perceptions of digital transformation are strongly influenced by the advantages of technology in terms of patient education, clinical decision support, and healthcare service improvement, which are the main focus of this study.

This study aims to analyze nurses' perceptions of digital transformation, with a focus on three main dimensions: technology utilization for patient education, clinical decision support, and healthcare service improvement. The results are expected to provide relevant recommendations for system developers, healthcare providers, and policymakers. Hence, the utilization of technology in nursing can be optimized in supporting the digital transformation of healthcare services.

The novelty of this research lies in the integration of three key variables: patient education, clinical decision support, and healthcare service improvement, into a single analytical model to predict outcomes in the context of digital nursing practice in developing countries. Most previous studies examined only one or two of these dimensions separately. For example, some studies focused only on usability, while others emphasized communication or service quality. By incorporating all three dimensions, this study provides a more comprehensive perspective on nurses' perceptions of digital transformation, specifically within the comparative context of Indonesia and Nigeria.

2. METHOD

This study employed a quantitative approach with a cross-sectional survey design to analyze nurses' perceptions of digital transformation in nursing practice in two countries, namely Indonesia and Nigeria. A total of 300 participants were recruited. Participants were selected using purposive sampling based on the following criteria: (1) registered nurses currently working in clinical settings, (2) residing in either Indonesia or Nigeria, (3) having used digital nursing tools (e.g., EHR, health apps, digital monitoring) within the past 12 months, and (4) willingness to complete the online questionnaire.

Data were collected through an online questionnaire distributed via Google Forms. The instrument consisted of 15 items measured on a five-point Likert scale ranging from "Strongly Disagree" (score = 1) to "Strongly Agree" (score = 5). Table 2 shows the items were grouped into three main dimensions: Technology Utilization modified from Alsyouf et al. (2023), Gaughan et al. (2022) and Barbu et al. (2025); Patient Education Effectiveness modified from Guo et al. (2023), Zhitomirsky & Aharony (2023) and Li et al. (2024); and Clinical Decision Support Quality modified from Pinsky et al. (2022) Papadopoulos et al. (2022) and Schwartz et al. (2022).

Table 2
Questionnaire Indicators of Digital Transformation in Nursing Practice

Main Variable	Code	Questionnaire Statement
Technology Utilization	TU1	The digital nursing tools are easy to use in my daily practice.
	TU2	The system interface is intuitive and easy to understand.
	TU3	I do not experience difficulties in accessing the patient data features I need.
	TU4	I feel comfortable using the technology independently for nursing care.
	TU5	The technology works stably on the devices provided at my workplace.
Patient Education Effectiveness	PE1	The technology helps me explain health information more quickly to patients.
	PE2	I can convey complex medical concepts clearly using digital visual aids.
	PE3	Digital educational materials help patients retain information better.
	PE4	I feel the interaction is more engaging when using digital tools for education.
	PE5	Patient education feels more efficient compared to using manual/printed methods.

Clinical Decision Support Quality	CDS1	The system helps me monitor patient vitals and trends regularly.
	CDSI2	I feel clinical response times have become faster since using the technology.
	CDSI3	I can access evidence-based references easily to support my decisions.
	CDSI4	The technology accelerates the identification of potential health risks.
	CDSI5	I feel my medical decision-making has become more accurate with system support.

The research instrument was subjected to validity and reliability testing prior to data collection. Construct validity was assessed through Exploratory Factor Analysis (EFA) to ensure that the items adequately represented the theoretical dimensions. Reliability was measured using Cronbach's alpha coefficient, with a value of ≥0.70 considered acceptable for internal consistency.

Data analysis was performed using SPSS. Descriptive statistics were used to summarize participants' profiles and the distribution of research variables. To examine the relationships between variables, multiple linear regression analysis was employed. Two regression models were developed: (1) Model 1 predicted Patient Education Effectiveness as the dependent variable, with Technology Utilization and Clinical Decision Support Quality as independent variables. (2) Model 2 predicted Clinical Decision Support Quality as the dependent variable, with Technology Utilization and Patient Education Effectiveness as independent variables.

Control variables included country, age, gender, and education level. The regression coefficients for each predictor were estimated using the Ordinary Least Squares (OLS) method. A positive coefficient (β) indicated a positive relationship, while a negative coefficient indicated the opposite. Statistical significance was set at the 95% confidence level ($p < 0.05$).

Prior to the main analysis, regression assumptions were tested, including residual normality, linearity, multicollinearity using the Variance Inflation Factor (VIF), and homoscedasticity using residual plots. If the assumptions were met, the regression model was interpreted by examining the R^2 value to determine the proportion of variance in the dependent variable explained by the predictors. Models with higher R^2 values were considered to have better predictive power.

Research Hypotheses: (H1) Technology Utilization has a positive effect on Patient Education Effectiveness. (H2) Clinical Decision Support Quality has a positive effect on Patient Education Effectiveness. (H3) Technology Utilization has a positive effect on Clinical Decision Support Quality. (H4) Patient Education Effectiveness has a positive effect on Clinical Decision Support Quality.

Through this analysis, the study aims to identify the key factors influencing improvements in patient education and decision-making through digital platforms, thereby providing a predictive model that can support the development of more effective nursing practice systems in the future.

3. RESULTS AND DISCUSSION

3.1. Results

The survey involved 300 nursing professionals from Indonesia and Nigeria. The majority of respondents were female (62%), aged between 21–40 years (68%), and held at least a bachelor's degree in nursing (58%). Regarding digital adoption, most participants (74%) reported using digital nursing tools, such as Electronic Health Records (EHR) or clinical apps, at least once per shift, primarily for patient documentation and checking vital signs trends.

Table 3 shows the descriptive analysis indicated that the overall perception of digital transformation in nursing was positive. Respondents scored highest on Technology Utilization ($M = 4.18$, $SD = 0.59$) and Patient Education Effectiveness ($M = 4.12$, $SD = 0.63$), followed by Clinical Decision Support Quality ($M = 4.05$, $SD = 0.67$). These findings suggest that nurses generally perceived the technologies as easy to operate, effective in facilitating patient education, and beneficial in supporting accurate clinical decisions.

Table 3
Descriptive Statistics of Research Variables (n = 300)

Variable	Mean	Standard Deviation	Minimum	Maximum
Technology Utilization	4.18	0.59	2.50	5.00
Patient Education Effectiveness	4.12	0.63	2.40	5.00
Clinical Decision Support Quality	4.05	0.67	2.20	5.00

Table 4 shows the first regression model tested the effect of Technology Utilization and Clinical Decision Support Quality on Patient Education Effectiveness. The model was significant ($F = 34.12$, $p <$

0.001) and explained 42% of the variance in Patient Education Effectiveness ($R^2 = 0.42$). Table 4 shows Technology Utilization ($\beta = 0.44$, $p < 0.001$) and Clinical Decision Support Quality ($\beta = 0.33$, $p < 0.001$) had significant positive effects on Patient Education Effectiveness. This suggests that systems perceived as intuitive and supportive of decision-making also foster more efficient and clear educational interactions between nurses and patients

Table 4
Regression Model 1 – Dependent Variable: Patient Education Effectiveness

Predictor	β	t-value	p-value
Technology Utilization	0.44	6.25	0.000
Clinical Decision Support Quality	0.33	5.15	0.000
Control Variables (age, gender, country, education)	Not significant	-	0.062
Model Fit	$R^2 = 0.42$	F = 34.12	0.000

Table 5 shows the second regression model tested the effect of Technology Utilization and Patient Education Effectiveness on Clinical Decision Support Quality. The model was significant ($F = 30.55$, $p < 0.001$) and explained 39% of the variance in Clinical Decision Support Quality ($R^2 = 0.39$).

Table 5
Regression Model 2 – Dependent Variable: Clinical Decision Support Quality

Predictor	β	t-value	p-value
Technology Utilization	0.31	4.88	0.000
Patient Education Effectiveness	0.42	6.12	0.000
Control Variables (age, gender, country, education)	Not significant	-	0.058
Model Fit	$R^2 = 0.39$	F = 30.55	0.000

Based on Table 5, Technology Utilization ($\beta = 0.31$, $p < 0.001$) and Patient Education Effectiveness ($\beta = 0.43$, $p < 0.001$) significantly improved Clinical Decision Support Quality. These findings indicate that nursing technologies with user-friendly interfaces and strong educational features are more likely to enhance the accuracy and responsiveness of clinical decision-making.

Table 6
Hypothesis Testing Results

Hypothesis	Statement	Result
H1	Technology Utilization → Patient Education Effectiveness (positive effect)	Supported
H2	Clinical Decision Support Quality → Patient Education Effectiveness (positive effect)	Supported
H3	Technology Utilization → Clinical Decision Support Quality (positive effect)	Supported
H4	Patient Education Effectiveness → Clinical Decision Support Quality (positive effect)	Supported

Table 6 shows that all proposed hypotheses (H1–H4) were supported by the statistical analysis. Based on Table 5, the predictive models demonstrated that: (1) 42% of the variance in Patient Education Effectiveness can be explained by Technology Utilization and Clinical Decision Support Quality; (2) 39% of the variance in Clinical Decision Support Quality can be explained by Technology Utilization and Patient Education Effectiveness . This implies that the adoption of user-friendly digital tools substantially contributes to both enhanced patient education and improved clinical decision support.

3.2. The Role of Usability in Enhancing Communication

The findings of this study demonstrate that, as perceived by nursing professionals, technology utilization plays a pivotal role in enhancing patient education effectiveness in clinical settings. High utilization is reflected in the ease of navigation, intuitive interface design, and system stability across different devices. These findings align with previous research from Jayousi et al. (2024) and Mohammed et al. (2025) emphasizing that user-friendly application design not only increases nurse comfort but also strengthens the delivery of health information to patients. Accordingly, a high level of technology utilization provides an essential foundation for seamless educational interactions in technology-driven healthcare environments.

Aspects of utilization, such as ease of use and feature accessibility, directly influence nurses' confidence in conducting bedside teaching or digital counseling. Nurses feel more competent when

operating a simple device without the need for extensive troubleshooting. This result is reinforced by Lloyd et al. (2024) and Yi et al. (2025) that simple interfaces enhance perceived usefulness, shortening the time required to retrieve educational materials. Therefore, optimal technology utilization can reduce both psychological and technical barriers that frequently hinder effective patient education.

This study further shows that technology utilization has a significant impact on the clarity of nurse-patient communication. Regression analysis reveals that improvements in perceived utilization are consistently and positively correlated with improvements in education quality (positive β, $p < 0.05$). These findings suggest that the easier a system is to use, the greater the likelihood of achieving education that is faster, clearer, and more efficient. Consistent with the Technology Acceptance Model, perceived ease of use influences technology adoption behaviors (Alsyouf et al., 2023; Lee et al., 2025); when nursing tools adopt a simple interface, nurses can more readily access visual aids or digital brochures without distraction, directly accelerating the exchange of health information.

3.3. Clinical Decision Support Quality as a Mediator of Education Effectiveness

The findings of this study demonstrate that Clinical Decision Support Quality functions as a critical mediator in enhancing patient education effectiveness. Digital systems enable continuous monitoring of patients' health trends while providing a structured channel for more data-driven and targeted education. This supports the view of Zhang et al. (2025) and Perdana & Mokhtar (2023) that technology-enabled care fosters trust and facilitates more seamless information exchange. Altmiller & Pepe (2022) added that in addition to improving nurse satisfaction, robust decision support acts as a bridge for more effective educational interactions.

More intensive data analysis enabled by digital applications leads to more responsive educational delivery (Armour et al., 2025). Nurses who can easily access risk scores or graphical trends can explain complex conditions to patients with greater clarity and evidence, allowing for faster and more accurate patient understanding (Hants et al., 2023; Jayousi et al., 2024). This corroborates findings that digital integration within healthcare systems accelerates clinical reasoning. Thus, clinical decision support quality operates as an intermediary mechanism reinforcing the reciprocal relationship between technology use and education quality.

Regression analysis in this study reveals that Clinical Decision Support Quality exerts a significant influence on education effectiveness while mediating the relationship between technology utilization and the quality of interaction. The predictive results indicate that greater utilization enhances decision support capabilities and, in turn, positively impacts the overall quality of patient education . Conversely, a decline in system accuracy reduces the confidence of nursing interventions, which subsequently diminishes the effectiveness of patient education. These findings align with the Continuity of Care theory (Alsaad et al., 2024; Khatri et al., 2023), which posits that sustained, data-driven services strengthen the quality of clinical interactions. Based on the predictive model results, a one-unit increase in the Clinical Decision Support variable enhances education effectiveness by $\beta = 0.33$. Accordingly, Clinical Decision Support Quality can be understood as a critical mediator that explains both positive and negative interrelationships among variables within the digital nursing ecosystem.

3.4. Patient Education Effectiveness as a Predictor of Better Clinical Decisions

The findings indicate that, as perceived by nurses, enhanced Patient Education Effectiveness plays a significant role in improving Clinical Decision Support Quality. Faster, clearer, and more efficient communication allows patients to provide better feedback, enabling nurses to deliver more responsive and accurate care. Supported by Krzesiński (2023) and B. Li et al. (2025) on digital health communication, application-based education not only accelerates the discharge planning process but also enhances the quality of nursing diagnoses . Therefore, effective patient education constitutes a key factor in advancing the quality of digital clinical decisions.

The use of educational features such as digital diagrams, instructional videos, and interactive checklists has been proven to support both patients and nurses in maintaining continuity of care (Altmiller & Pepe, 2022; Faridi et al., 2025). More open communication enables patients to express their symptoms in greater detail (Fitzpatrick, 2023), while nurses can validate this data against system algorithms (Hants et al., 2023). This association strongly suggests that personalized education is linked to adaptive healthcare services. Therefore, digital education not only facilitates the transfer of knowledge but also strengthens the accuracy of clinical data input.

The regression analysis confirmed that Patient Education Effectiveness serves as a significant predictor of Clinical Decision Support Quality. The predictive model indicates that a one-unit increase in the education variable leads to an improvement in decision support quality by $\beta = 0.43$, reflecting a strong positive association . Conversely, a decline in educational effectiveness is predicted to decrease the accuracy of clinical decisions. These findings are consistent with Computer-Mediated Communication theory (High et al., 2023), which emphasizes that digital media can enhance the effectiveness of interpersonal interactions in healthcare contexts. Patients who are able to interact efficiently with nurses are more likely to receive timely and data-driven medical interventions.

3.5. Interrelation of Utilization, Education, and Decision Support

The findings indicate that, as perceived by nurses in Indonesia and Nigeria, Technology Utilization, Patient Education, and Clinical Decision Support Quality are closely interrelated in shaping an optimal nursing practice experience. Systems with intuitive interfaces and easily accessible features enable nurses to educate patients more rapidly. More effective education subsequently enhances clinical decision quality, both in terms of timeliness and accuracy of interventions. These findings are supported by the Technology Acceptance Model (FakhrHosseini et al., 2024), which emphasizes that perceived ease of use directly influences technology acceptance and the quality of outcomes produced.

Based on nursing perceptions, utilization contributes to education enhancement, and these two variables jointly influence decision quality. Jayousi et al. (2024) and Walzer et al. (2025) stated that stable and user-friendly systems encourage nurses to engage more actively with educational features, thereby fostering more responsive clinical services. Accordingly, the interrelationship among the variables indicates a mediating mechanism, in which patient education serves as a bridge between technology utilization and clinical decision quality.

Regression analysis revealed that a one-unit increase in utilization leads to an improvement in education effectiveness, which in turn results in a rise in decision support quality. Conversely, a decline in utilization is expected to weaken education and consequently reduce overall decision accuracy. These findings emphasize that the quality of digital nursing services is highly dependent on the ease of information access and the effectiveness of nurse-patient interaction . In other words, utilization not only directly influences education but also generates a cascading effect that enhances the quality of clinical decisions. Therefore, developers must prioritize the design of intuitive user interfaces, the incorporation of effective educational features, and the integration of responsive decision support systems. When these three variables complement one another, they collectively contribute to a substantial improvement in the quality of digital nursing practice.

3.6. Digital Nursing Transformation Beyond Conventional Care

Based on the perceptions of the participants, digital nursing technologies have transformed care delivery beyond conventional methods such as manual charting or face-to-face only instruction. Digital applications enable nurses to access decision support tools anytime and anywhere, unrestricted by physical library availability or memory constraints . This advancement enhances efficiency and continuity of care, particularly for patients with chronic conditions who require ongoing education and monitoring.

A comparison between digital nursing practice and conventional methods demonstrates that digital platforms provide added value in terms of accessibility and service efficiency. Nurses are no longer required to spend excessive time searching for physical records, as they can instead utilize search features or automated alerts. These findings align with Kitsios et al. (2023) and Zhai et al. (2022) studies highlighting that the use of health applications accelerates medical responsiveness while simultaneously enhancing user satisfaction . Consequently, digital transformation introduces a new paradigm of nursing delivery that is more inclusive and efficient than traditional methods.

3.7. Contextual Factors Influencing Nurse Perceptions

The findings of this study indicate that nurses' perceptions of digital transformation are influenced not only by the features of the technology but also by contextual factors such as infrastructure, age, and educational level. In the context of Indonesia and Nigeria, socio-technical factors shape the way nurses interpret the convenience and benefits of digital tools. Infrastructural limitations, such as unstable internet access in rural areas, negatively affect perceptions of both utilization and decision support reliability.

Furthermore, according to Chen et al. (2025), age and digital literacy levels affect nurses' perceptions of ease of use. Wynn et al. (2023) and Jonathan (2025) added that younger nurses tend to grasp system interfaces more quickly and engage more actively with advanced features, whereas older nurses often require additional support to operate the technology effectively. This highlights the influence of generational gaps and literacy skills on disparities in technology adoption. Therefore, implementation strategies in these regions should take local conditions into account, for instance by designing simplified interfaces and ensuring supportive policies toward digital infrastructure improvement. Through such contextualized approaches, nurses' perceptions of digital transformation can be enhanced in a more sustainable manner.

4. CONCLUSION

Technology Utilization, Patient Education Effectiveness, and Clinical Decision Support Quality are the primary factors shaping nurses' perceptions of digital transformation in nursing practice in Indonesia and Nigeria. Empirical evidence demonstrates that, as perceived by nursing professionals, Technology Utilization contributes significantly to the effectiveness of patient education, while Patient Education Effectiveness serves as a critical predictor of improved Clinical Decision Support Quality . Moreover, the

interrelationships among these variables reveal a consistent pattern, whereby increased utilization and educational capabilities are predicted to drive improvements in clinical decision-making accuracy.

These findings underscore the role of digital nursing technologies as strategic instruments in accelerating healthcare transformation, particularly in the developing context of Indonesia and Nigeria. By leveraging user-friendly tools, nurses can bridge the gap between complex medical data and patient understanding, ensuring that care is not only efficient but also patient-centered.

This study is limited to nurses' perceptions of digital transformation. Future research should incorporate the perspectives of system developers, patients, and hospital administrators, as well as additional variables such as digital literacy, infrastructure reliability, and data privacy concerns to provide a more comprehensive understanding. The contribution of this study lies in integrating Technology Utilization, Patient Education, and Clinical Decision Support, thereby enriching the literature on digital health adoption grounded in theories such as the Technology Acceptance Model and Continuity of Care. It also provides practical implications for system developers and policymakers in designing nursing practice environments that are more efficient, inclusive, and evidence-based, guided by the actual needs and perceptions of frontline nurses.

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