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Beyond Basic Skills – Exploring the Informatics Competency of Clinical Nurses in Vietnam: A Single-Center Study

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Abstract

Background: Informatics competency is essential for nurses in the digital health era. However, there is limited evidence regarding the informatics skills of Vietnamese clinical nurses. As healthcare systems increasingly adopt electronic health records and data-driven decision-making, it is expected that nurses will integrate informatics into their daily practice. Understanding current competency levels is critical to guide educations, training, and policy development.

Objectives: To assess the self-perceived informatics competency of clinical nurses and identify associated demographic and experiential factors.

Methods: A cross-sectional survey was conducted using the Canadian Nurse Informatics Competency Assessment Scale. The instrument evaluates 4 domains: basic information and communications technology (ICT) skills, information and knowledge management, ICT use in patient care delivery, and professional and regulatory accountability. The scale has demonstrated good validity and reliability in previous studies, and the Vietnamese version showed excellent internal consistency in pilot testing. Data were analyzed using descriptive statistics and ordinal logistic regression.

Results: A total of 175 clinical nurses participated in this study. The overall mean (SD) informatics competency score was 2.43 (0.49), indicating a moderate level of competency. The highest subscale score was in professional and regulatory accountability (mean 2.51), and the lowest score was in information and knowledge management (mean 2.36). Age, formal informatics education, frequency of social media use, and computer experience were significantly associated with competency level ($P < .05$).

Conclusions: Vietnamese clinical nurses demonstrated moderate informatics competency, with key influencing factors identified. Targeted training and integration of informatics education into nursing curricula and professional development are recommended to enhance digital readiness in healthcare settings.

Keywords: Nursing informatics, Informatics competency, Health information technology, Digital health, Clinical nurses

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Introduction

Globally, the rapid digital transformation of healthcare systems globally has reshaped how services are delivered, managed, and documented. Digital health, as defined by the World Health Organization (WHO), referred to the field of knowledge and practice associated with the development and use of digital technologies to improve health. Its implementation encompasses a wide range of technological applications, such as electronic health records,

telemedicine platforms, clinical decision support systems, and health information exchanges, all of which improve accessibility, continuity of care, and the quality of health data management.[1]

Within the scope of digital health, health informatics plays a crucial role in enabling effective data driven decision making. It involves the systematic use of digital tools for collecting, organizing, analyzing, and sharing health information to support clinical and administrative processes. In nursing practice, this technology integration has given rise to the specialized domain of nursing informatics, which is defined as the synthesis of nursing, computer, informatics, and cognitive sciences to manage and communicate healthcare data and knowledge. Nursing informatics enhances the efficiency of nursing workflows, supports safe medication management, improves communication among interdisciplinary teams, and contributes to positive patient outcomes.[2]

Nurses, the largest group of healthcare professionals and frontline care providers, play a pivotal role in digital health implementation.[3] Their ability to interact with digital systems affects the quality and safety of care and reflects the readiness of healthcare institutions to embrace digital innovations. The WHO has emphasized that nursing services are among the pillars of any national healthcare system.[4] Hence, equipping nurses with the necessary informatics competency is essential for ensuring that digital health tools are safely and effectively applied in clinical environments.

Nursing informatics competency comprises the knowledge, skills, and attitudes required to use digital technologies in clinical care.[5] The benefits of digital systems such as real-time access to patient information, improved communication, and enhanced continuity of care are only realized when nurses have sufficient competency to use these technologies appropriately.[6] International studies have attempted to measure and understand nursing informatics competency. In Canada, a nationwide study using the Canadian Nurse Informatics Competency Assessment Scale (C-NICAS) found that nurses rated themselves highest in basic computer skills and legal and professional responsibilities, but reported lower confidence in areas related to clinical information use and knowledge management.[7] Similarly, Raghunathan et al[8] conducted a study in Australia using the same scale and reported moderate competency levels, with the highest scores in communication-related digital skills and the lowest scores in knowledge management. In Palestine, Batran et al[9] found low overall competency levels among nurses, particularly in basic computer literacy, and identified a positive correlation between informatics competency and clinical decision-making.

Efforts to integrate digital health and informatics content into nursing education have expanded steadily since the 1970s, with the International Medical Informatics Association advancing global curriculum recommendations in 2010 to support standardized training.[10] Within this evolving landscape, several factors have been identified as influencing informatics competency in nursing populations. These include demographic characteristics (such as age and gender), academic background, prior exposure to informatics training, frequency of using digital technologies, and the clinical context in which nurses operate.[11] Younger nurses often report greater digital confidence owing to earlier and more consistent exposure to technology, whereas nurses working in resource-limited or rural settings may have fewer opportunities to use and refine digital skills.[12]

The healthcare system in Vietnam is undergoing gradual digitalization, with increasing investments in e-health systems, data integration, and artificial intelligence. However, the pace of adoption in Vietnam remains slower than that in many other countries.

Although the Ministry of Health has introduced digital health policies and is establishing a national health data platform, the readiness of healthcare professionals to operate effectively in digital environments remains low.[13] In addition, the existing literature in Vietnam shows inconsistent implementation of electronic medical records, limited integration of clinical decision-support systems, and substantial differences in digital readiness between urban and rural hospitals.[13] Studies involving Vietnamese nurses also demonstrate fragmented exposure to digital tools, continued reliance on paper-based documentation, and limited formal training in clinical informatics.[14]

Despite these developments, previous Vietnamese research has neither comprehensively assessed the self-perceived informatics competency of nurses using validated instruments nor examined competency across the 4 standard nursing informatics domains (basic computer skills, information and knowledge management, legal and professional responsibilities, and use of clinical information systems). Although international evidence highlights multiple potential determinants, the relevance of these factors within the Vietnamese clinical nursing context remains unclear.

Given these knowledge gaps, understanding how clinical nurses in Vietnam perceive their informatics competency and identifying the factors that influence it is essential for aligning policy with practical workforce needs. Such insights can inform targeted training programs, institutional policies, and curriculum development to effectively support nurses in transitioning within digital environments. As this is a single-center study, the findings will provide context-specific but important evidence to guide future workforce development. This study aimed to assess the self-perceived informatics competency of clinical nurses in Vietnam using the C-NICAS instrument, and to examine demographic and contextual factors that may be associated with variations in competency levels.

Methods

Participants and Setting

This study employed a descriptive cross-sectional design to assess the informatics competency of clinical nurses and explore related factors. Data were collected at 199 Hospital, a general hospital under the Ministry of Public Security in Da Nang City, Vietnam.

Participants included registered nurses currently working in inpatient departments across both medical and surgical divisions of the hospital. Specifically, nurses were recruited from 16 clinical departments, comprising 10 medical neurology-psychiatry, gastroenterology, cardiology-geriatrics-nephrology-rheumatology, pulmonology-tuberculosis-dermatology, infectious diseases, traditional medicine, intensive care-toxicology, emergency medicine, endocrinology-hematology, and physical therapy-rehabilitation) and 6 surgical (trauma-burn surgery, obstetrics-gynecology unit, general surgery, otorhinolaryngology, anesthesiology, and maxillofacial-ophthalmology) units.

Participants were recruited using a convenience sampling method. All eligible nurses had at least 6 months of clinical experience at the hospital and provided informed consent before enrollment in the study. The 6-month threshold was selected to ensure that nurses had sufficient exposure to clinical workflows and digital systems in their current units, allowing for a more accurate assessment of informatics competency in routine practice. Nurses on probation, administrative nurses, and those on extended leave during the data collection period were excluded.

Sample Size and Sampling Method

The minimum sample size was calculated using the following formula for estimating a population mean: n = $z^2_{1-\alpha/2}$ σ^2/d^2, where n is the minimum required sample size, $z^2_{1-\alpha/2}$ is 1.96 for a 95% CI, σ is 0.58 (SD obtained from a previous study),[7] and d is 0.1 (acceptable absolute margin of error). Based on this formula, the minimum required sample size was calculated to be 129 participants. Accounting for an anticipated 5% nonresponse rate, the adjusted minimum sample size was 135 nurses. A total of 175 clinical nurses participated in the study. Participants were recruited using a convenience sampling approach: all eligible nurses in the selected inpatient departments were approached and invited to participate.

Instruments

Data were collected using a structured, self-administered questionnaire comprising 2 main sections.

Section 1 gathered demographic and contextual information from participants, including age, gender, nursing education background, clinical department, years of clinical experience, job position, history of formal informatics education, frequency of social media use, frequency of computer use, and level of computer experience.

Section 2 assessed the informatics competency of nurses using the C-NICAS, a validated instrument designed to evaluate self-perceived informatics proficiency in nursing practice developed by Kleib et al.[7] The C-NICAS includes 21 items grouped into 4 domains: basic computer skills, information and knowledge management, professional and regulatory accountability, and use of informatics in patient care delivery. Each item is rated on a 4-point Likert scale ranging from 1 (not competent) to 4 (very competent). Because the original C-NICAS study did not specify official cutoff scores, total scores from 21 to 84 were categorized on the basis of percentage ranges: 21-42 (≤ 50%) as not or partially competent, 43-63 (5%-75%) as competent, and 64-84 (≥ 76%) as very competent.[7] This approach aligns with established educational measurement practices and similar scales using percentile-based thresholds. The original C-NICAS demonstrated good internal consistency across the 4 domains, with Cronbach α values ranging from 0.81 to 0.87.[7]

Permission to use and translate the C-NICAS into Vietnamese was obtained from the original developer. The instrument was translated using a forward-backward translation procedure. First, the English version was translated into Vietnamese by bilingual translators with nursing and health sciences backgrounds. A separate bilingual translator, who was not involved in the initial translation and was blinded to the original instrument, performed the back-translation into English. Discrepancies between the original and back-translated versions were discussed and resolved. Content validity, cultural appropriateness, and wording clarity of the Vietnamese version were then reviewed and approved by a panel of nursing and informatics experts.

The internal consistency of the instrument was assessed in a pilot study with 20 participants, yielding an overall Cronbach α of 0.96. The domain-specific reliability coefficients for basic computer skills, information and knowledge management, for professional and regulatory accountability, and the use of informatics in patient care delivery were 0.83, 0.85, 0.89, and 0.93, respectively.

Data Collection

Data were collected between December 2023 and May 2024 using a structured, paper-based questionnaire distributed directly to nurses at their respective clinical departments.

After providing informed consent, the participants completed the questionnaire during work breaks or at the end of their shifts, depending on their availability. Each survey required approximately 15-20 minutes to complete and was returned in sealed envelopes to ensure confidentiality. All completed questionnaires were reviewed for completeness and securely stored for analysis.

Data Analysis

Data were analyzed using SPSS statistics version 26.0 (IBM Corp). Descriptive statistics, including means (SD), frequencies, and percentages, were used to summarize the demographic variables and informatics competency scores.

The Kolmogorov-Smirnov test was used to assess the normality of the informatics competency variable, and the results indicated a nonnormal distribution. Because the primary outcome of interest in the multivariable analysis was whether nurses achieved at least a "competent" level of informatics competency, scores were dichotomized into 2 categories: not or partially competent (total score 21-42) and competent or very competent (total score ≥ 43). Then, binary logistic regression analysis was performed to identify factors associated with being in the competent/very competent group.

Independent variables entered into the regression model included age, gender, education level, years of clinical experience, clinical department type (medical vs surgical), job position, history of formal informatics education, frequency of computer use, frequency of social media use, and self-rated computer experience. Before running the regression, multicollinearity was assessed using variance inflation factors, all of which were below the commonly accepted threshold, indicating no serious multicollinearity. Model fit was evaluated using the Hosmer-Lemeshow goodness-of-fit test and classification accuracy. A $P < .05$ was considered statistically significant.

Results

Demographic and Contextual Information

A total of 175 clinical nurses participated in this study. The mean (SD) age was 34.22 (5.87) years, ranging from 22 to 50 years. The majority of participants were female (77.1%), held bachelor's degree or higher (67.4%), and worked in medical units (58.9%). Most nurses (51.4%) had 5-10 years of clinical experience and were primarily involved in direct patient care (78.3%). A high proportion of participants reported having received formal informatics education (73.1%). Frequent social media and computer use was common, with most participants using computers several times a day. The majority of participants rated their computer experience as intermediate (80%) (Table 1).

Table 1. Demographic and Contextual Information

Characteristic	No. (%)
Age, mean (SD),	34.22 (5.87)
Gender	
Male	40 (22.9)
Female	135 (77.1)

Table 1. Demographic and Contextual Information (Continued)	
Characteristic	**No. (%)**
Nursing education background	
Diploma	57 (32.6)
Bachelor's degree or higher	118 (67.4)
Clinical departments	
Medical units	103 (58.9)
Surgical units	72 (41.1)
Clinical experience, y	
< 5	34 (19.4)
5-10	90 (51.4)
> 10	51 (29.1)
Job position	
Direct patient care	137 (78.3)
Administrative duties	38 (21.7)
History of formal informatics education	
Yes	128 (73.1)
No	47 (26.9)
Frequency of social media use	
Sometimes	16 (9.1)
Often	159 (90.9)
Frequency of computer use	
Several times a day	158 (90.3)
Several times a week	17 (9.7)
Level of computer experience	
Beginner	24 (13.7)
Intermediate	140 (80.0)
Advanced	11 (6.3)

Self-Perceived Informatics Competency Among Nurses

Self-perceived informatics competency among nurses was assessed using the C-NICAS. The overall mean (SD) score was 2.43 (0.49) on a 4-point Likert scale, ranging from 1 to 3. Among the 4 subdomains, the highest mean score was reported in professional and regulatory accountability (mean [SD], 2.51 [0.50]), followed by basic information and communications technology (ICT) skills (mean [SD], 2.42 [0.61]), ICT use in patient care delivery (mean [SD], 2.41 [0.55]), and information and knowledge management (mean [SD], 2.36 [0.53]) (Table 2).

Based on total C-NICAS scores, the majority of participants (66.9%) were classified as competent, whereas 28.6% were categorized as not or partially competent. Only 4.6% were identified as very competent.

In the basic ICT skills subscale, the highest mean score was recorded for the ability to use information and communication devices (mean [SD], 2.49 [0.63]), followed by the use of informatics applications (mean [SD], 2.39 [0.63]) and the ability to search and evaluate online resources (mean [SD], 2.39 [0.71]).

Within the information and knowledge management domain, nurses reported the highest competency in supporting access to, reviewing, and evaluating information

(mean [SD], 2.43 [0.63]) and evaluating data from multiple sources (mean [SD], 2.42 [0.62]). The lowest score in this domain was observed for understanding the importance of information standards (mean [SD], 2.19 [0.85]).

In the professional and regulatory accountability domain, respondents scored highest for compliance with organizational requirements (mean [SD] 2.57 [0.65]) and supporting the use of informatics to enhance care (mean [SD] 2.57 [0.61]). The ability to identify and report system function issues had the lowest score (mean [SD], 2.42 [0.64]).

For ICT use in patient care delivery, the ability to determine appropriate uses of ICT tools had the highest mean score (mean [SD], 2.53 [0.61]), whereas the use of decision-support tools to assist clinical diagnosis was rated the lowest (mean [SD], 2.29 [0.77]).

Factors Predicting Informatics Competency Among Nurses

Ordinal logistic regression analysis was performed to identify factors associated with the self-perceived informatics competency of nurses. Several predictors were statistically significant ($P < .05$). Age was significantly associated with competency level ($P = .02$), indicating a decrease in the odds of higher competency with increasing age. Nurses who had received formal informatics training had higher odds of greater competency ($P = .01$). Frequent social media use was also a significant predictor ($P = .02$). Regarding computer experience, both beginner-level ($P < .001$) and intermediate-level ($P = < .01$) users were less likely to report higher competency than those with advanced computer experience. No statistically significant associations were found for gender, department, nursing education background, years of clinical experience, or frequency of computer use (Table 3).

Table 2. Self-Perceived Informatics Competency Among Nurses

Informatics Competency	Mean (SD)	Min-Max
Professional and regulatory accountability	2.51 (0.50)	2.42-2.57
Basic ICT skills	2.42 (0.61)	2.39-2.49
ICT use in patient care delivery	2.41 (0.55)	2.29-2.53
Information and knowledge management	2.36 (0.53)	2.19-2.43
C-NICAS	2.43 (0.49)	1.00-3.00

Abbreviations: ICT, information and communications technology; C-NICAS, Canadian Nurse Informatics Competency Assessment Scale.

Table 3. Factors Predicting Informatics Competency Among Nurses

Predictor	Regression Coefficient	SE	95% CI	*P* Value
Age	-0.10	0.04	-0.19 to -0.02	.02
Gender (male vs female)	-0.08	0.45	-0.97 to 0.81	.86
Department (medical vs surgical)	-0.15	0.39	-0.90 to 0.64	.73
Education (diploma vs bachelor' s or higher)	-0.30	0.40	-1.09 to 0.48	.45
Experience (< 5 y vs > 10 y)	0.44	0.70	-0.94 to 1.81	.53
Experience (5-10 y vs > 10 y)	0.31	0.50	-0.66 to 1.28	.53
Job position (direct care vs administrative)	0.91	0.52	-0.10 to 1.93	.08
Informatics training (yes vs no)	1.19	0.48	0.26 to 2.12	.01
Social media use (often vs sometimes)	2.17	0.89	0.43 to 3.91	.02

Table 3. Factors Predicting Informatics Competency Among Nurses (Continued)

Predictor	Regression Coefficient	SE	95% CI	*P* Value
Frequency of computer use (daily vs weekly)	0.14	0.75	-1.32 to 1.60	.85
Computer experience (beginner vs advanced)	-3.69	0.99	-5.63 to -1.75	< .01
Computer experience (intermediate vs advanced)	-2.69	0.83	-4.31 to -1.08	< .01

Abbreviation: SE, standard error.

Discussion

This study demonstrated that clinical nurses rated their overall informatics competency at a moderate level of self-perceived informatics competency. Among the 4 subdomains, professional and regulatory accountability received the highest average score, followed by basic ICT skills, ICT use in patient care delivery, and information and knowledge management, which received the lowest score. This pattern aligns with findings from the cross-sectional study of Kleib et al[7] in Canada, where practicing nurses reported slightly above-competent levels overall but higher self-perceived competency in ethical and professional responsibilities and lower scores in information and knowledge management. A study in China among palliative care nurses similarly reported moderate informatics competency, with the highest scores in accountability and the lowest scores in data-related competencies.[15] Collectively, these studies indicate that nurses across different countries tend to feel more confident in tasks related to regulation and system compliance than in managing complex digital information, indicating a cross-contextual pattern of moderate perceived informatics competency with domain-specific weaknesses.

The relatively high score in professional and regulatory accountability may reflect the emphasis of Vietnamese healthcare facilities on compliance and ethical standards in documentation and digital system usage. Regular in-service training on documentation protocols and increasing awareness about digital confidentiality may contribute to this trend. Conversely, a low score in information and knowledge management indicates a potential gap in data-related competencies. These skills often require structured training, embedded informatics curricula, and regular engagement with advanced health information technologies, which remain variable across Vietnamese nursing programs and healthcare environments.[16]

Competency in basic ICT skills and ICT use in patient care delivery fell between these 2 extremes, indicating that Vietnamese nurses possess general computer literacy and are reasonably familiar with routine ICT-supported workflows but may have insufficient exposure to the more integrated or complex digital systems used in high-resource settings. Countries with mature electronic health record implementation typically report higher confidence in these domains.[7] The modest scores observed in this study align with the broader context of Vietnam's emerging digital health infrastructure, where electronic systems are expanding but not yet uniformly embedded across all levels of care.

The competency level pattern observed in this study is consistent with a broader trend identified in the literature. According to Wu et al[17] nurses in Asia often report moderate overall informatics competencies, with specific weaknesses in areas requiring critical analysis and synthesis of digital information. This trend underscores the need for a curriculum that goes beyond basic IT skills to include higher-order informatics competencies, such as data interpretation, knowledge management, and informatics-

supported clinical decision-making. Additionally, a systematic review has called for the integration of informatics competencies into nursing education and continuing professional development.[18] Emphasis is placed not only on the technical use of digital tools but also on understanding their clinical implications, ethical use, and the ability to contribute meaningfully to interdisciplinary digital communication.

Although this study applied the C-NICAS, which is grounded in the 4-domain nursing informatics framework, findings can also be interpreted in relation to other informatics competency instruments, such as the Nursing Informatics Competency Assessment for the Nurse Leader, Technology Informatics Guiding Education Reform based self-assessment tools, or regional scales focused on digital literacy. Across these frameworks, competencies consistently cluster into foundational ICT skills, information management, and applied clinical informatics — patterns that closely resemble the domain distribution observed in C-NICAS. The alignment between these tools reinforces the validity of the present findings and highlights underscores the recurring challenges associated with data-centric competencies in nursing practice.

Regression analyses further clarified the determinants of competency. Age, formal informatics education, frequency of social media use, and computer experience significantly predicted competency levels. The negative association between age and competency echoes previous research indicating that younger nurses benefit from earlier exposure to digital technologies and greater familiarity with ICT-based environments.[19-21] Conversely, older nurses may not have had the same access to ICT training early in their careers and might experience more difficulty adapting to new digital systems. However, Pimmer et al[22] suggested that generational gaps can be mitigated through well-structured, accessible informatics training tailored to different age groups, focusing on both foundational ICT skills and clinical application.

Formal informatics education emerged as a strong positive predictor of higher competency, which is consistent with the findings in Canada,[7] Korea,[23] and 6 western countries.[24] Nurses who received structured informatics training scored considerably higher across most domains, indicating that formal education enhances confidence and functional competence. The limited integration of informatics content in Vietnamese nursing curricula, and the infrequent provision of in-service informatics training, may explain the moderate competency levels observed in this study. As indicated by Topaz et al[1] embedding informatics in undergraduate and postgraduate programs is essential for producing digitally fluent professionals.

Interestingly, frequent social media use also correlated positively with higher informatics competency. Although not directly associated with clinical informatics, social media engagement can foster digital literacy, interface navigation skills, and confidence in using ICT platforms.[21] Similar findings have been reported elsewhere, where habitual use of digital technologies outside clinical settings enhances comfort with digital tools used in healthcare.[21, 25, 26] These insights may be particularly useful when designing informal training or orientation sessions that bridge common digital experiences with clinical ICT applications.

In terms of computer usage, frequency and self-rated experience levels were significantly associated with higher informatics competency. Nurses who used computers several times a day or rated themselves as intermediate or advanced users performed better across subdomains, particularly in basic ICT skills and ICT use in patient care. These findings support earlier studies in Portugal, Indonesia, and the United States,

which noted that consistent exposure and applied practice are crucial in building and maintaining ICT proficiency in clinical environments.[27-29]

Conversely, several variables showed no statistically significant association with informatics competency. Gender did not predict competency in this study. This finding aligns with that of Yang et al,[30] who found diminishing gender gaps in digital skill acquisition among healthcare workers, although it contrasts with earlier findings of gender disparities in ICT use.[2] The narrowing of this gap may reflect changing societal norms and more equitable access to digital technologies.

Similarly, academic qualification and years of clinical experience did not influence competency scores. Kleib et al[31] posited that these factors may be less relevant in the digital era, where hands-on experience with ICT tools and institutional support for digital transformation play a more central role than formal education levels or tenure. This emphasizes the importance of practical engagement and continuous learning in maintaining informatics competency.

Department type (medical vs surgical) and job position (administrative vs direct care) also lacked a remarkable association. Although some previous studies such as Sharikh et al[32] indicated that exposure to high-technology environments could influence informatics skills, the uniformity of digital tool implementation across departments in the hospital under study may explain this neutrality. In facilities where digital health technologies are equally distributed, interdepartmental differences in competency may be minimal.

Overall, these results suggest that informatics competency is influenced more by personal engagement with digital tools and opportunities for formal training than by static demographic or job-related variables. This perspective is reinforced by Alshammari et al[33] who highlighted the role of digital self-efficacy and environmental support in shaping informatics competence. From a policy and practice standpoint, nursing managers and educators should prioritize integrating informatics training into professional development initiatives, ensuring accessible delivery formats for different age groups and experience levels, and fostering a digital learning culture in which nurses are encouraged and supported to confidently and meaningfully use ICT tools in daily clinical tasks.

The findings of this study have several practical implications. Nursing leaders and educators in Vietnam should prioritize curriculum enhancement and structured professional development focused on advanced digital skills, particularly in information and knowledge management, where competency gaps are most pronounced. As Vietnam continues to transition toward comprehensive digital health systems, strengthening the informatics competency of nurses is critical for ensuring safe, efficient, and high-quality care.

This study has several limitations. Firstly, the use of a cross-sectional design limits the ability to infer causality between associated factors and informatics competency. Longitudinal studies are needed to examine how these competencies evolve over time and in response to targeted interventions. Second, this study relied on self-reported data obtained through the C-NICAS instrument, which may be subject to response or social desirability bias, potentially leading participants to overestimate or underestimate their actual skills. Although the C-NICAS is a validated tool, it captures perceived competencies rather than objectively measured competencies.

Third, the sample was drawn from a single hospital in central Vietnam using convenience sampling, which may limit the generalizability of the findings to other settings, such as rural hospitals or private healthcare facilities. Contextual factors unique to the selected hospital such as available digital infrastructure or in-service training policies may have

influenced the results. Finally, although this study included a range of demographic and experiential variables, other potentially influential factors such as institutional support, digital infrastructure, and organizational culture were not explored and should be considered in future research.

Conclusions

This study provides empirical evidence on the self-perceived informatics competency of clinical nurses in Vietnam, revealing a moderate overall competency level, with strengths in professional accountability and weaknesses in information and knowledge management. Several factors were found to be significantly associated with competency, including age, formal informatics education, frequency of social media use, and level of computer experience. These findings highlight the need for targeted informatics training tailored to diverse digital backgrounds. Institutional policies should support continuous digital learning that builds foundational ICT skills and more advanced informatics capabilities.

Because the study was conducted in a single hospital, the findings reflect a local context rather than national representativeness; however, they point to areas where nursing education and in-service training could be strengthened, particularly in data-related skills and advanced informatics applications. Future research should include multisite samples (urban, rural, public, and private settings), examine institutional factors such as digital readiness and infrastructure, and incorporate objective assessments of informatics skills. Longitudinal designs are also needed to track the evolution of competency as Vietnam advances its digital health initiatives.

Additional Information

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Ethics Approval: This study was approved by the Biomedical Ethics Committee of Da Nang University of Medical Technology and Pharmacy (No. 79/BB-HDDD on 30 October 2023. Participation in the study was entirely voluntary. Participants had the right to withdraw from the study at any time and to refuse to provide any information. All data were anonymized and encoded to ensure that individual participants were not identified. The collected information was used solely for research. All data and findings presented in this report are accurate and truthful and have not been published in any previous reports.

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