

Knowledge and Perception of Nursing Informatics among Staff Nurses at Rumailah Hospital, Doha, Qatar: A Cross-Sectional Study

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Abstract

Introduction: Global healthcare digitalisation requires nurses to embrace nursing informatics (NI). This study assessed NI knowledge and perceptions among staff nurses at Rumailah Hospital, Doha, Qatar.

Methods: A descriptive cross-sectional study was conducted using convenience sampling. A modified Nurses' Attitudes towards Computerisation (NATC) questionnaire captured demographics, NI knowledge, and perceptions. Chi-square tests (with Cramér's V effect sizes) examined associations ($\alpha = 0.05$). Data were collected in 2016-2017.

Results: Of 572 nurses (82.8% female, 75.4% aged 20-30 years), 50% held a basic nursing certificate. Positive perceptions were high: 96.5% agreed NI improved care decisions; 100% agreed NI enhanced research implementation and consistent data recording. However, 38.3% noted NI was not used for student training. Significant associations with perception ($p < 0.001$) were found for gender ($\chi^2 = 28.73$, $V = 0.23$), academic qualification ($\chi^2 = 102.31$, $V = 0.30$), years of experience ($\chi^2 = 177.17$, $V = 0.33$), and ease of use understanding ($\chi^2 = 30.18$, $V = 0.23$).

Conclusion: Nurses demonstrated strong positive NI knowledge and perceptions. Despite the age of the dataset, findings highlight enduring needs: targeted education for less-qualified and more experienced nurses, and integration of NI into student training. These insights remain relevant for digital health transformation in Global South contexts.

Keywords: Nursing informatics, Health knowledge, Attitudes, Practice, Cross-sectional studies, Qatar, Nurses

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Introduction

The global healthcare landscape is undergoing rapid digital transformation. Healthcare organisations worldwide are implementing information technology (IT) for diagnostics, care delivery, and long-term management (1). Nursing, as the largest healthcare workforce, is at the forefront of this shift. Information, communication, and technology (ICT) empower nurses to enhance patient safety, deliver evidence-based care, and improve clinical decision-making (2, 3). A user's attitude toward ICT critically determines technology acceptance and the success of paperless systems (4). Therefore, understanding nurses' existing knowledge and attitudes is a prerequisite for developing competency-building programmes (5).

Nursing informatics (NI) integrates nursing science with information management and analytical sciences to manage data, information, knowledge, and wisdom in nursing

practice (6). NI supports nurses, patients, and inter-professional teams across all settings. Although technology use in nursing is decades old, NI formalisation accelerated in the 1980s, encompassing electronic patient records, decision support, telenursing, and e-learning (7, 8). The fundamental goal of NI is to improve population and individual health through optimal information management (9).

However, introducing computers in clinical settings can evoke diverse feelings, from enthusiastic support to outright rejection (10). Factors influencing nurses' perceptions include age, education, clinical experience, and prior computer use (11, 12). In the Gulf region, including Qatar, rapid healthcare expansion and a multinational nursing workforce create unique implementation challenges. Studies from neighbouring countries (e.g., Kuwait (13)) show that higher education and computer skills predict positive



From the South, for the South, with the World

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attitudes, but local data are sparse. This study, conducted at Rumailah Hospital (a major facility of Hamad Medical Corporation, HMC), aimed to: (1) assess knowledge and perceptions of NI among staff nurses, (2) identify associated demographic factors, and (3) explore the relationship between understanding and use of IT.

Methods

Study Design and Setting

A descriptive, cross-sectional design was employed. The study was conducted at Rumailah Hospital, Doha, Qatar, a multi-speciality hospital within HMC. At the time of data collection (2016-2017), the hospital operated across seven sites with 605 beds and approximately 2,848 employees, providing medical, surgical, long-term care, and specialised services (14).

Sample Size and Sampling

The target population comprised approximately 1,000 staff nurses. A convenience sample of 572 nurses was recruited. Post-hoc sample size justification using the Cochran formula for finite populations (95% confidence, 5% margin of error, assumed 50% proportion) gave a minimum of 278 participants; our sample of 572 was therefore adequate. Nurses were approached during different shifts, and those available and willing to participate completed the questionnaire. All 572 distributed questionnaires were returned (100% return rate). However, this rate should be interpreted with caution; it may reflect selective distribution rather than universal response.

Data Collection Instrument

A modified version of the standardised Nurses’ Attitudes towards Computerisation (NATC) questionnaire was used. The instrument had three sections: Section A (Demographics): Age, gender, academic qualification, professional designation, and years of clinical experience. Section B (Knowledge of NI): Eight items assessing awareness of NI concepts (note: some items reflect attitudes; this was a limitation). Section C (Perception of NI): Seven Likert-scale items (Strongly Agree, Agree, Disagree, Strongly Disagree)

evaluating attitudes toward NI’s impact on patient care, communication, teamwork, and potential drawbacks. The NATC has been previously validated in other settings. For this study, content validity was assumed based on prior literature. No pilot testing or reliability analysis (e.g., Cronbach’s alpha) was conducted, a major limitation.

Data Collection Procedure

Paper questionnaires were distributed to nurses across all units. The study purpose was explained, and written informed consent was obtained. Completed questionnaires were collected anonymously.

Data Analysis

Data were entered into SPSS. Descriptive statistics (frequencies, percentages) summarised demographics and responses. Chi-square (χ^2) tests examined associations at $\alpha=0.05$. Where original degrees of freedom were misreported, we corrected them: gender (df=1), academic qualification (df=2), years of experience (df=3), and ease of use understanding (df=1). Effect sizes were calculated as Cramér’s V (small=0.10, medium=0.30, large=0.50). Missing data were handled by complete-case analysis per variable; overall missingness was <7%.

Ethical Considerations

Ethical approval was obtained from Texila American University’s IRB and Hamad Medical Corporation’s research ethics committee (approval reference: HMC-RP-2016-089). Written informed consent was obtained from all participants.

Results

Demographic Characteristics

A total of 572 nurses participated, with slight variations in N per item due to missing responses (overall missing <6.6%). Table 1 shows the demographic profile. Most nurses were young (75.4% aged 20-30 years) and female (82.8%). Half (50.0%) held a Basic Nursing certificate, 35.9% a bachelor’s degree (B.N.Sc.), and 14.1% a Master’s (M.Sc.N.). Nursing Officer I was the most common designation (34.7%). Clinical experience: 33.5% had <5 years, 33.0% had 5-10 years, 22.1% had 11-15 years, and 11.4% had 16-20 years.

Table 1: Demographic Characteristics of Respondents (N = 534–572)

Variable	Category	n (%)
Age (years) (n=552)	20–30	416 (75.4)
	31–40	116 (21.0)
	≥41	20 (3.6)
Gender (n=552)	Male	95 (17.2)
	Female	457 (82.8)
Academic qualification (n=552)	Basic Nursing Certificate	276 (50.0)
	B.N.Sc.	198 (35.9)
	M.Sc.N.	78 (14.1)
Designation (n=553)	Nursing Officer I	192 (34.7)

	Nursing Officer II	122 (22.1)
	Senior Nursing Officer	158 (28.6)
	Principal Nursing Officer	41 (7.4)
	Assistant Chief Nursing Officer	40 (7.2)
Years of experience (n=534)	<5 years	179 (33.5)
	5–10 years	176 (33.0)
	11–15 years	118 (22.1)
	16–20 years	61 (11.4)

Note: Missing responses for age (n=20), experience (n=38), and other variables as indicated

Knowledge and Perception of NI

High levels of positive perception were recorded (Tables 2 and 3). Importantly, 96.5% agreed that NI improves patient care decisions, and 100% agreed that IT enhances research implementation and promotes consistent data recording. However, 38.3% stated that NI had not been used for student training. All respondents who answered the perception items

(n=536) agreed that the system is easy to operate and keeps patient information confidential. Positive perceptions also included improved patient-nurse communication (83.2% agree/strongly agree), promoting the patient’s plan of care (96.3%), and enhancing teamwork (89.9%). However, 75% agreed that the cost of care increases due to computers, and 75% agreed that lawsuits may become more frequent.

Table 2: Nurses’ Knowledge of NI (N=572)

Knowledge Item	Yes n (%)	No n (%)
IT is a new concept in nursing care	511 (89.3)	61 (10.7)
NI improves the ability to make patient care decisions	552 (96.5)	20 (3.5)
IT enhances the implementation of research findings	572 (100)	0 (0)
NI promotes consistent recording of care data	572 (100)	0 (0)
Computers make nursing jobs easier	533 (93.2)	39 (6.8)
NI has been used for the training of nursing students	353 (61.7)	219 (38.3)

Table 3: Nurses’ Perceptions of NI (N=536–572)

Perception Item	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)
Easy to operate (n=536)	215 (40.1)	321 (59.9)	0 (0)	0 (0)
Keeps patient information confidential (n=536)	373 (69.6)	163 (30.4)	0 (0)	0 (0)
Improves patient-nurse communication (n=572)	235 (41.1)	241 (42.1)	76 (13.3)	20 (3.5)
Promotes patient’s plan of care (n=572)	296 (51.7)	255 (44.6)	21 (3.7)	0 (0)
Decreased hospital long stay (n=572)	194 (33.9)	238 (41.6)	79 (13.8)	61 (10.7)
Enhances teamwork (n=572)	256 (44.8)	258 (45.1)	18 (3.1)	40 (7.0)
Lawsuits may become frequent (n=572)	193 (33.7)	236 (41.3)	61 (10.7)	82 (14.3)
Cost of care increases (n=572)	174 (30.4)	235 (41.1)	20 (3.5)	143 (25.0)

Hypothesis Testing and Associations

Chi-square tests (Table 4) revealed significant associations (p<0.001) between perception and all examined factors. Effect sizes (Cramér’s V) were small to moderate.

Table 4: Association between Perception and Demographic/Usage Factors

Hypothesis	Comparison	χ^2 (df)	p-value	Cramér’s V	Interpretation
1	Gender (keeping patient info confidential)	28.73 (1)	<0.001	0.23	Small association; female nurses are more positive
2	Academic qualification (enhancing teamwork)	102.31 (2)	<0.001	0.3	Moderate association; higher qualifications are associated with more positive perceptions

3	Years of experience (promoting the patient's plan)	177.17 (3)	<0.001	0.33	Moderate association; experience level influences perception
4	Perceived ease of use & understanding of NI	30.18 (1)	<0.001	0.23	Small association; those who found computers easy had better NI understanding

Original degrees of freedom were corrected (academic qualification from 6 to 2, experience from 6 to 3)

Discussion

This study provides important insights into NI knowledge and perceptions among staff nurses at a large Qatari hospital, despite the data being collected in 2016-2017. The overwhelmingly positive perceptions (96-100% agreement on several benefits) align with studies from Kenya (10) and Korea (15) that reported favourable attitudes toward computerisation. However, the 100% agreement on three items is unusually high and likely reflects social desirability bias, acquiescence bias, or the absence of a neutral response option, a limitation we acknowledge.

The finding that 93.2% agreed computers make nursing jobs easier, and 100% found the system easy to operate, contrasts with some earlier studies (16), where nurses reported difficulty. This discrepancy may be due to the maturity of HMC's informatics systems or the relatively young, digitally comfortable workforce in Qatar. The Technology Acceptance Model (17) posits that perceived ease of use and usefulness drive technology adoption; our results support this.

A concerning finding was that 38.3% of nurses believed NI had not been used for student training. Early exposure to NI during undergraduate education is vital for developing future competencies (18). This perception gap suggests poor integration between hospital NI systems and academic curricula, a problem likely still relevant today.

Significant associations were found between perception and gender, academic qualification, years of experience, and understanding of ease of use. Higher academic qualifications correlated with more positive perceptions, consistent with studies from Kuwait (13) and elsewhere. This underscores the value of advanced nursing education in fostering appreciation for technology. Years of experience also influenced perception; although we cannot determine direction, other research suggests that moderately experienced nurses may be most adaptable, while very new or very experienced nurses may face different barriers (11).

Study limitations

Several limitations must be considered. First, the data are nearly a decade old (collected 2016-2017). Healthcare technology has advanced rapidly, and current systems at Rumailah Hospital may have changed. Nevertheless, the findings remain relevant as a historical benchmark and because many Global South settings are still at similar stages of NI adoption. Second, convenience sampling and the implausibly high response rate (100%) introduce selection bias; results may not be generalisable even within Qatar. Third, no formal instrument validation (e.g., Cronbach's

alpha) or pilot testing was conducted. Fourth, the "knowledge" section contained attitudinal items, blurring conceptual boundaries. Fifth, only bivariate analyses were performed; multivariable regression was not possible without raw data access. Sixth, the 100% agreement on some items suggests possible bias. Finally, missing data were handled by complete-case analysis, which may have introduced bias if missingness was not random.

Conclusion

Despite these limitations, this study demonstrates that nurses at Rumailah Hospital (in 2016-2017) held strong positive knowledge and perceptions of nursing informatics. They recognised NI's benefits for decision-making, evidence-based practice, documentation, communication, and teamwork. However, educational qualifications and years of experience significantly influenced perceptions, and a notable gap existed regarding NI use in student training.

For healthcare administrators and educators in Qatar and similar Global South contexts, the following recommendations emerge: (1) implement continuous, competency-based NI training tailored for nurses with lower academic qualifications or longer clinical experience; (2) establish academic-practice partnerships to integrate hospital NI systems into nursing curricula; (3) use simulation-based training to bridge the student training perception gap. By addressing these areas, institutions can leverage nurses' positive attitudes to achieve safe, efficient, patient-centred care in the digital era.

Abbreviations

ANA: American Nurses Association
 HER: Electronic Health Record
 GCC: Gulf Cooperation Council
 HMC: Hamad Medical Corporation
 ICT: Information Communication and Technology
 IMIA: International Medical Informatics Association
 IRB: Institutional Review Board
 IT: Information Technology
 NATC: Nurses' Attitudes towards Computerisation
 NI: Nursing Informatics
 SPSS: Statistical Package for the Social Sciences
 TAM: Technology Acceptance Model

Declarations

Ethics Approval and Consent to Participate: Ethical approval was granted by the Institutional Review Board of Texila American University and the research ethics committee of Hamad Medical Corporation (HMC), Doha,

Qatar (Approval Reference: HMC-RP-2016-089). Written informed consent was obtained from all individual participants included in the study.

Data Availability: The datasets generated and analysed during the current study are available from the corresponding author on reasonable request, subject to HMC's data governance policies.

Competing Interests: The authors declare that they have no competing interests.

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