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Nursing Informatics in Iran Nurses' Knowledge, Perspectives, and Barriers

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ABSTRACT

Aims Despite the widespread use of information technology in healthcare, nurses' awareness and understanding of nursing informatics as a distinct field remain limited. This study evaluated nurses' knowledge of nursing informatics and their views on establishing it as an independent discipline.

Instrument & Methods This cross-sectional qualitative study was conducted in two phases. First, interviews with hospital supervisors affiliated with medical sciences universities in Mashhad explored nursing informatics and its applications. In the second phase, based on these interviews and a literature review, a questionnaire was developed and electronically distributed to 1,440 nurses in Iran. Content validity was confirmed by four medical informatics experts, and reliability was high (Cronbach's alpha=0.94).

Findings Nurses' knowledge level regarding nursing informatics was measured at 43.32%, while their significant relationship toward nursing informatics amounted to 74.82%. There was no significant relationship between perspective and demographic factors, as well as between awareness level and gender ($p>0.05$). However, a significant relationship was observed among age, educational attainment, organizational position, employment status, and employment history parameters with the awareness level of nursing informatics ($p<0.05$).

Conclusion Half of the nurses in Iran believe in the feasibility of establishing a nursing informatics field.

Keywords Nursing Informatics; Knowledge; Awareness; Iran

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Introduction

Health information technologies and systems are rapidly advancing, with increasing implementation and widespread usage observed in clinical settings worldwide [1]. Over the past 50 years, the evolution of health information technology has significantly impacted nurses, who constitute the largest group of healthcare professionals [2, 3]. To fully harness the advantages of health information technology, nurses are urged to actively engage in selecting, implementing, and optimizing health information systems, given their importance in nursing activities [4]. By enhancing their informatics skills, nurses can play a crucial role in these processes [5]. Utilizing health information technologies to collect, store, process, and modify nursing care data can streamline nursing services and enable efficient management of care and resources [6].

Considering the significant role of information technology in enhancing nursing care through improved decision-making, reduced errors and repetitive tasks, and decreased documentation time, nurses can effectively incorporate various clinical technologies in care settings and use health products to enhance efficiency [7, 8]. Nevertheless, the digitalization of healthcare services necessitates that nurses acquire new skills [9]. However, not all nurses are adequately prepared to leverage technology and informatics tools to fulfill their responsibilities [10].

Nurses are estimated to dedicate approximately 50% of their time to collecting, coordinating, and documenting information, which underscores the significance of nursing informatics [11]. This emerging field, relatively novel compared to other nursing specialties, aims to create innovative solutions for displaying, recording, managing, organizing, and processing healthcare information [12]. Nursing informatics now emphasizes the crucial role of information and its management in the nursing profession. It seeks to harness data to generate valuable insights and enhance nursing knowledge, ultimately improving patient care [13]. Moreover, this discipline is pivotal in integrating data, information, and knowledge to empower patients, nurses, and other healthcare providers to make informed decisions [14].

In addition to nursing education and computer-based learning, nursing informatics aims to facilitate distance learning and accurately document patients' conditions and medical records [15]. Furthermore, this field is essential in supporting decision-making for nurses, patients, healthcare providers, and participants across all roles and organizations by utilizing information structures, processes, and technologies [16]. Consequently, nursing informatics holds immense potential to shape the future of healthcare by establishing connections between nurses and information technology, as well as the knowledge gained within these domains [17].

Numerous studies have highlighted the benefits and impact of nursing informatics in managing nursing information and enhancing nursing services. For instance, research conducted by Daniel & Oyetunde demonstrates the positive influence of nursing informatics on the nursing profession, including the prevention of medication errors through computer information systems, improved collaboration and sharing of patient information among healthcare providers, and enhanced efficiency and accuracy in nurses' tasks [18]. Other studies have also indicated various advantages, such as increased accessibility to resources for nursing informatics specialists, improved continuity of care, and enhanced speed, timeliness, and accuracy of information recorded in patients' medical records, leading to increased efficiency and safety [19-21].

Recognizing the immense significance of nursing informatics, the National Advisory Council on Nurse Education and Performance in the United States emphasizes its indispensable role in improving nurses' overall performance and training [21]. Not only has the United States embraced this field, but countries such as England, Australia, Finland, Great Britain, the Netherlands, Canada, Brazil, and New Zealand have also actively incorporated information technology into their nursing curricula [22, 23]. Harerimana *et al.* confirme that integrating nursing informatics into master's programs has resulted in a discernible enhancement in the quality of nursing clinical care [24].

In Iran, significant efforts have been made to advance the field of nursing informatics. The study conducted by Elahi *et al.* focuses on developing a master's curriculum in nursing informatics [25]. This research assesses enhance the educational opportunities available to aspiring nursing informatics professionals. Furthermore, a team of medical informatics and nursing experts collaborates to design a comprehensive virtual nursing informatics course tailored to individuals at different proficiency levels, ranging from introductory to intermediate and advanced. Upon completing this course, participants are awarded a nursing informatics qualification certificate. This initiative has played a pivotal role in promoting the integration of informatics into nursing practice.

Sadeghi & Yaghmayi highlight the importance of establishing a dedicated nursing informatics field in Iran. With the expansion and specialization of the nursing profession, it has become imperative to leverage the expertise of nursing informatics specialists. By doing so, the quality of services provided by nurses in various areas, including education, research, clinical practice, and management, can be significantly enhanced [26]. Overall, these efforts underline the commitment of Iranian professionals to improve the field of nursing informatics. By investing in education, research, and

specialized courses, Iran aims to empower nurses with the necessary knowledge and skills to deliver high-quality healthcare services in the digital era.

With the increasing application of nursing informatics in healthcare, education, and research, it has become imperative to recognize its significance in enhancing patient safety, improving care efficiency, and facilitating nursing management decision-making [27]. Furthermore, it is crucial to acknowledge that nurses comprise the largest group of health information technology users. Therefore, their informatics knowledge and skills, coupled with positive attitudes, play a pivotal role in the effectiveness of healthcare systems [28]. Consequently, exploring nurses' perspectives on nursing informatics is essential for creating and developing nurse training programs, while also aiding policymakers and healthcare planners.

Despite the global growth in nursing informatics, its position in Iran remains unclear, as no prior studies have delved into this matter. Although there has been an increasing adoption of health information technologies, little is known about how nurses in Iran understand or engage with nursing informatics. Previous studies have mainly focused on curriculum development rather than assessing nurses' readiness or perceptions. This study, therefore, addressed this gap by systematically evaluating both knowledge and attitudes among Iranian nurses at a national level.

Instrument and Methods

Study design and participants

This cross-sectional qualitative study, conducted in 2022, was conducted in two phases to assess nurses' knowledge of nursing informatics and their perspectives on its establishment as a distinct discipline in Iran.

The first phase aimed to identify challenges and opportunities related to the implementation of nursing informatics in Iran. A total of 13 participants were included based on the principle of data saturation, whereby interviews continued until no new themes emerged. Purposive sampling was used to ensure representation from different hospital units and supervisory roles. Participants were selected according to the following inclusion criteria: a minimum educational qualification of a bachelor's degree in nursing and at least one year of work experience in a hospital setting. Four hospitals in Mashhad were randomly selected, and the interviews were conducted over two weeks. The interview questions were developed based on a literature review and expert consultation. If permitted by the participants, interviews were audio-recorded; otherwise, detailed notes were taken. The qualitative data were then transcribed and analyzed using a thematic analysis approach to extract key themes regarding the perceived importance, challenges, and benefits of nursing informatics.

The second phase involved a nationwide cross-sectional survey to evaluate nurses' knowledge of nursing informatics and their perspectives on its establishment.

The study population included 1,440 nurses working in hospitals affiliated with medical science universities across Iran.

A convenience sampling approach was used to recruit participants. To maximize coverage and ensure broad participation, we disseminated the questionnaire through multiple dedicated nursing groups on virtual platforms widely used by Iranian nurses, including ETA, WhatsApp, and Telegram. These platforms were chosen because they host professional forums where a significant proportion of nurses engage in discussions and professional development.

Instrument

The questionnaire was developed systematically through a rigorous multi-stage process to ensure its validity and reliability. The development followed four main stages:

1) Item generation: Initial items were extracted from the qualitative findings obtained in phase one (interviews) and supported by a comprehensive review of national and international literature related to nursing informatics.

2) Expert review: The preliminary pool of items was reviewed by a panel of four medical informatics specialists to assess the clarity, relevance, and representativeness of each item. Based on expert feedback, items were revised, merged, or eliminated to enhance content validity.

3) Pilot testing: A pilot study was conducted with 165 nurses (excluded from the final sample) to evaluate the comprehensibility, wording, and time required to complete the questionnaire. Feedback from participants was used to refine ambiguous statements and remove redundant questions.

4) Psychometric evaluation: The internal consistency of the questionnaire was assessed using Cronbach's alpha (α=0.94), confirming high reliability.

The final version of the questionnaire consisted of three sections. Demographic information included gender, age, education level, hospital affiliation, city of service, organizational position, employment status, and years of work experience; knowledge of nursing informatics included six items measuring nurses' awareness and familiarity with nursing informatics concepts; and perspectives on nursing informatics contained 33 items examining attitudes toward the importance, implementation, and feasibility of establishing nursing informatics as an independent field.

This structured and evidence-based development process ensured that the final instrument possessed strong content validity, conceptual clarity, and internal reliability, making it suitable for assessing nurses' knowledge and perspectives on nursing informatics at the national level.

Procedure

To minimize response bias, the questionnaire was distributed anonymously, and participants were assured that their responses would remain strictly confidential. Additionally, a pilot study involving 165 nurses was conducted to ensure the clarity and validity of the survey questions. To reduce social desirability bias, the questions were designed in a way that did not pressure respondents to provide socially expected answers. Furthermore, some questions incorporated reverse coding to assess response consistency and minimize acquiescence bias.

Given that the survey was distributed via online platforms, we acknowledge the potential for selection bias, as nurses active in virtual professional groups may have greater exposure to informatics-related topics. This limitation should be considered when interpreting the results, and future studies should aim for broader sampling approaches, including nurses who are not engaged in online communities.

This study received ethical approval from Mashhad University of Medical Sciences. Informed consent was obtained from all participants prior to their involvement. For the qualitative phase, both verbal and written consent were obtained before conducting interviews. In the survey phase, participation was voluntary and anonymous, with respondents explicitly consenting before completing the questionnaire.

Data analysis

The normality of data distribution was assessed using the Kolmogorov-Smirnov test. If the data followed a normal distribution, independent t-tests and one-way analysis of variance (ANOVA) were conducted for group comparisons. Conversely, if the data were not normally distributed, non-parametric tests, including the Mann-Whitney U test and the Kruskal-Wallis test, were applied.

To examine the association between awareness levels and demographic parameters, either parametric or non-parametric tests were employed based on the results of the normality assessment. All analyses were performed using SPSS version 27, with a significance level set at 0.05.

Findings

Interviews were conducted with 13 supervisors. Among them, four supervisors lacked knowledge of nursing informatics, while eleven acknowledged the importance of this field and its practical applications in healthcare. The challenges were classified into ten categories, while the opportunities were grouped into three categories. The most critical challenge identified was the insufficient availability of financial resources. Additionally, supervisors noted that nursing informatics could substantially benefit from the adoption of electronic health records and the increased use of information technology in nursing and medical practices (Table 1).

Table 1. Challenges and opportunities in establishing nursing informatics in Iran

Parameter	Frequency (%)
Challenges	
The need for sufficient infrastructure and equipment to establish nursing informatics	6 (46)
Lack of funding	8 (61.5)
The importance of training nurses and stakeholders before establishing a new field	2 (15.4)
Insufficient human resources and a shortage of educated professionals in the realm of nursing informatics	6 (46)
The challenge of persuading the authorities	4 (30.8)
Before establishing a new academic field, it becomes challenging to assess the capacity of universities accurately	1 (7.7)
It takes a lot of time for this field to reach the right place	6 (46)
Insufficient knowledge regarding this field and its applications	2 (15.4)
Uncertainty looms over the prospects of this field, including the job market and employment opportunities within it	7 (54)
Facing challenges in embracing this field due to its recent establishment	1 (7.7)
Opportunities	
Given the shift towards electronic health records and the increasing reliance on information technology in nursing, the field is now regarded as a necessity	9 (69.2)
Given the newness of this field, the lack of saturation presents a promising job market potential	2 (15.4)
Undergraduate nursing programs offer a valuable opportunity for nurses to gain familiarity with this field, enabling them to pursue further studies in postgraduate courses with enhanced expertise in this area	2 (15.4)

The supervisors in Iran considered several key benefits of implementing nursing informatics. These benefits included improved support for nursing documentation and record-keeping, assistance in managerial and statistical processes, and a notable reduction in nursing errors. However, the supervisors identified a significant drawback associated with the introduction of nursing informatics: the additional workload that accompanied its implementation (Table 2).

This study involved 1,440 nurses from across the country. Of these participants, 684 (47.5%) were women, while the remaining were men. Furthermore, most of the respondents were between the ages of 26 and 30 (Table 3).

Nurses demonstrated a moderate level of awareness of nursing informatics, with an average knowledge score of 43.42%.

In terms of attitudes, the average favorability score toward nursing informatics was 74.82%, indicating a generally positive perception. However, this did not necessarily translate into widespread acceptance, as some nurses supported the idea in principle but remained uncertain about its practical implications.

Table 2. Positive and negative points of setting up nursing informatics in Iran

Points	Frequency (%)
Positive	
Help with management-related problems	5 (38.46)
Assisting in the compilation and analysis of health statistics	5 (38.46)
Extracting a lot of information from the data in the system	1 (7.69)
Assist in nursing documentation and records	6 (46.15)
Improve patient education	2 (15.38)
Facilitating nursing tasks	1 (7.69)
Save the nurse's time	3 (23.07)
Improving human resource management	2 (15.38)
Reducing nursing errors	5 (38.46)
Assisting in patient follow-up and home care	3 (23.07)
Improving information technology skills in nurses	2 (15.38)
Accelerating nursing work	1 (7.69)
Increasing the nurse's accuracy	1 (7.69)
Improving paraclinical performance	1 (7.69)
More attendance at the patient's bedside	3 (23.07)
Negative	
No mention of the negative	3 (23.07)
Parallel to the existing work with the arrival of this field	4 (30.77)
The lack of application of the field and the increase of the nurse's workload	1 (7.69)
The time-consuming nature of this field for nurses	3 (23.07)
An opinion on its negative points cannot be provided until this field is established	3 (23.07)
Less communication with the patient	1 (7.69)

When categorizing knowledge levels, 54% of nurses had a high level of knowledge, suggesting they were well-informed about nursing informatics. Conversely, 30% had a low level of knowledge, highlighting a significant gap in informatics education. Additionally, 16% of participants were undecided, which might indicate a lack of exposure to nursing informatics concepts.

Table 3. Demographic information of the participants

Parameter	Frequency (%)
Gender	
Female	684 (47.50)
Male	756 (52.50)
Age (year)	
≤25	462 (32.00)
26-30	619 (42.98)
31-35	183 (12.80)
36-40	86 (5.97)
≥41	90 (6.25)
Academic level	
BSc	1284 (89.17)
MSc	146 (10.14)
PhD	10 (0.69)
Organizational position	
Nurse	1350 (93.75)
Head nurse	49 (3.40)
Supervisor	41 (2.85)
Work experience (year)	
<5	952 (66.14)
5-15	349 (24.24)
16-20	67 (4.62)
>20	72 (5.00)

Regarding challenges in establishing nursing informatics as a formal field, responses varied; 45% of nurses demonstrated a high level of awareness of these challenges. However, 34% had a low level of knowledge about these challenges. Furthermore, 21% of respondents did not express an opinion, possibly due to limited familiarity with the topic.

There was no significant correlation between nurses' level of education and their overall perception of nursing informatics ($p=0.24$). However, a significant association was observed between educational attainment and knowledge of nursing informatics, with higher education levels corresponding to greater knowledge ($p\leq0.001$). Additionally, while no significant relationship was found between nurses' organizational position and their perspective on nursing informatics ($p=0.69$), a significant correlation was noted between organizational position and awareness level. Specifically, supervisors demonstrated a higher level of awareness compared to nurses, and supervisors exhibited greater awareness than managers ($p=0.005$).

Moreover, no significant association was identified between nurses' employment status ($p=0.4$) or years of work experience ($p=0.2$) and their perspective on nursing informatics. However, a strong correlation was found between work experience and knowledge level. Nurses with over 20 years of experience exhibited the highest level of knowledge, whereas those with 16-20 years of experience reported the lowest awareness levels ($p=0.001$; Table 4).

In general, 17% of nurses supported the impact of nursing informatics on improving the quality of services provided to patients, while 42% opposed it. Additionally, 41% of participants did not express an opinion on this matter.

Only 12% of nurses agreed with the positive effects brought about by nursing informatics in their daily workflow. A significant portion, 34%, voiced their disagreement, while an overwhelming majority of 54% expressed no definite stance.

Most nurses in Iran (54%) supported the potential establishment of nursing informatics. However, a notable percentage (24%) held an opposing view. Additionally, a significant portion (22%) of surveyed nurses did not provide a stated opinion.

Table 4. Correlation of demographic information with the mean level of awareness and views of nurses about the field of nursing informatics

Parameter	Awareness	95% confidence interval	Point of view	95% confidence interval
Academic level				
BSc.	42.65±20.48	41.53-43.77	74.62±14.06	73.85-75.39
MSc.	48.82±23.24	45.02-52.63	76.27±14.30	73.93-78.61
P.hD.	62.91±20.73	48.08-77.75	78.78±9.90	71.63-85.94
Organizational position				
Nurse	42.99±20.47	41.88-44.10	74.76±20.91	74.01-75.52
Head nurse	50.25±21.50	44.07-56.43	76.37±10.53	73.34-79.40
Supervisor	49.28±23.78	41.78-56.79	74.66±13.27	70.47-77.85
Age (year)				
≤25	41.43±20.35	43.29-39.57	74.75±14.48	73.08-43.76
26-30	43.95±21.41	42.26-45.64	75.02±14.29	73.89-76.14
31-35	44.60±20.69	41.58-46.62	73.81±13.43	71.85-75.77
36-40	42.19±20.87	37.72-46.67	75.60±12.29	72.97-78.24
≥41	48.75±19.88	44.58-52.91	75.07±13.37	72.27-77.87
Work experience (year)				
<5	42.03±20.76	40.71-43.35	74.68±14.31	73.77-75.59
5-15	46.22±20.81	44.03-48.41	75.74±13.63	74.30-77.17
16-20	39.92±20.72	34.87-44.97	73.15±13.57	69.84-76.46
>20	51.38±20.62	46.54-56.23	73.67±13.38	70.52-76.72

Discussion

This study evaluated nurses' knowledge of nursing informatics and their views on establishing it as an independent discipline. The most significant obstacle to establishing nursing informatics in Iran was the insufficient availability of financial resources. The shift toward electronic health records (EHRs) was identified as a key opportunity for advancing nursing informatics.

Insufficient funding posed a notable impediment to nursing informatics, as it restricted access to crucial resources, infrastructure, and support for nurses and other healthcare providers. This scarcity of funding adversely affected the quality and functionality of health information systems and compromised data maintenance and security [10]. Therefore, supporting adequate funding and resource allocation for nursing informatics initiatives was deemed essential.

The obstacles and challenges of setting up and adopting information technology varied greatly among different types of organizations and countries. They were influenced by cultural, social, organizational, infrastructural, and budgetary factors [13]. Compared with findings from international studies, such as those by Honey *et al.* [22], our identified barriers appeared to be more structural than attitudinal. This indicates that while Iranian nurses conceptually acknowledge the importance of nursing informatics, their ability to implement it in practice is constrained by organizational limitations, insufficient institutional support, and the absence of clear national policies promoting digital transformation in nursing.

The transition to EHRs marked a significant milestone in nursing informatics, as it streamlined the integration and exchange of data and information across diverse healthcare facilities and providers. EHRs empowered clinical decision-making, evidence-based practice, and standardized documentation, thereby fostering enhanced patient care and outcomes [29]. Furthermore, EHRs served as a valuable data repository for nursing research, innovation, and quality improvement initiatives. Consequently, fostering the adoption and successful implementation of EHRs within healthcare organizations was deemed imperative [30].

Our findings highlighted the significant advantages of establishing the field of nursing informatics, particularly in enhancing nursing documentation, records management, statistical functions, and reducing nursing errors. These perceived benefits are consistent with international findings [8, 22], yet their realization depends heavily on nurses' informatics literacy and institutional support. In the Iranian context, where standardized informatics education is largely absent, the translation of these potential advantages into routine clinical practice remains limited. This observation aligns with Farokhzadian *et al.* [13], who similarly report that nurses view informatics as a tool for improving documentation and reducing errors. However, in contrast to their study, our participants expressed lower confidence in informatics' impact on workflow, highlighting persistent barriers to its practical implementation.

Certain information systems can prolong the time required for nursing documentation. This may be attributed to increased time spent searching for relevant information in electronic systems, inefficient formatting and grouping of reports, or the parallel use of paper files [31, 32].

Health information systems were not always effectively designed or implemented to support nursing workflow and efficiency. Therefore, it was recommended that nurses participate actively in the development and evaluation of these systems to ensure that their needs and preferences are properly addressed [33]. Additionally, challenges arose due to security concerns, limited access to electronic systems caused by technical issues or power disruptions, and the need to adhere to legal

requirements and regulations within healthcare institutions [34]. To address these issues, establishing standards and protocols was suggested to enhance system performance, ensure information security, and provide backup power sources in case of technical difficulties or outages.

Nurses had below-average knowledge of nursing informatics. A similar study by Honey *et al.* [22] highlighte the lack of awareness and skills among nurses in informatics and suggest that obtaining nursing informatics qualifications can enhance their knowledge and competencies. Similarly, Toromanovic *et al.* [35] emphasize the importance of nurses' health and treatment information management skills. Another study underscores the challenges posed by the complexity of healthcare needs and the insufficient knowledge, skills, and competencies of nurses in utilizing advanced technologies to provide safe and high-quality care [36].

It is also important to interpret these findings within the broader Iranian healthcare context. Unlike countries where nursing informatics is integrated into national health strategies, Iran currently lacks a unified framework for developing digital competencies in nursing education. This contextual gap may explain the moderate awareness and limited engagement observed among participants.

Despite the prevalence of information systems in hospitals and the existence of medical informatics and health information technology programs, most participants opposed establishing nursing informatics as an independent field of study. Instead, they believed that nursing informatics should be incorporated as a module within the Bachelor of Nursing curriculum. The study conducted by Bickford [19] underscores the significance of informatics skills and stressed the necessity of integrating nursing informatics into both undergraduate and graduate nursing curricula. Additionally, it advocates for including this course within the undergraduate curriculum to ensure that all nurses possess essential informatics skills.

In general, nurses' perspectives on establishing a nursing informatics field varied depending on their knowledge, experience, interest, and exposure to information technology in practice [37]. Furthermore, the study revealed that approximately half of the surveyed nurses do not express a definite opinion regarding the influence of nursing informatics on their work processes, and fewer than half agree on its impact in enhancing the quality of services provided to patients. Nevertheless, nursing informatics plays a crucial role in advancing nurses' work processes by granting them access to evidence-based resources, enabling interprofessional collaboration, enhancing patient safety, and improving the overall quality of care [38].

Nurses' perspectives on the impact of nursing informatics on their workflow and on improving the quality of patient care were hindered by limited knowledge and understanding of the field. It was strongly recommended that proactive measures be taken before implementing this field, such as introducing educational initiatives for the nursing community. Several initiatives have been conducted to enhance nurses' knowledge and skills in nursing informatics. These initiatives included workshops and training programs aimed at fostering nurses' engagement in research and innovation related to nursing informatics. Supporting this, an interventional study conducted by Jouparinejad *et al.* [39] demonstrates the effectiveness of training programs in improving nursing informatics abilities among nurses working in specialized care units.

A significant relationship was observed between nurses' knowledge of nursing informatics and their work experience. Specifically, nurses with over 20 years of work experience exhibited the highest level of knowledge among their peers. This pattern likely reflects cumulative exposure to various information systems over time rather than formal informatics training. Therefore, experiential learning appears to play a critical role in shaping informatics awareness among Iranian nurses.

Additionally, there was a significant correlation between nurses' knowledge level and their employment status. Formal nurses demonstrated a higher level of knowledge compared to contract nurses. Furthermore, there was a significant relationship between nurses' knowledge of nursing informatics and their organizational position. Notably, supervisors displayed higher awareness than their subordinates, while supervisors exhibited greater knowledge than staff nurses. Thus, nurses' awareness and perspectives on nursing informatics increase as they gain more experience in the work environment. To enhance nurses' knowledge and perspectives regarding information technologies, it is recommended that they be involved in executive activities and the development of electronic systems.

Half of the nurses believed in the feasibility of establishing a nursing informatics field in Iran. Elahi *et al.* [25] emphasize the essentiality of integrating nursing informatics in Iran and propose a curriculum specifically tailored for this purpose.

Collectively, these insights suggest that while nurses recognize the importance of informatics, systemic barriers, such as insufficient funding, a lack of structured training, and weak institutional support continue to hinder its full integration. Addressing these factors through targeted policy initiatives and educational reforms is essential for the sustainable advancement of nursing informatics in Iran.

Our study encountered two limitations. First, the instrument used in this study was developed based solely on interviews with supervisors from hospitals affiliated with one university of medical sciences. However, given the inclusion of a literature review alongside these interviews and the comparable educational backgrounds of supervisors across the

country, it is likely that conducting interviews with supervisors from other Iranian universities would have yielded similar results. Second, due to the geographical dispersion of respondents across the country, collecting questionnaire data posed challenges. An online questionnaire was distributed within the virtual group associated with the study participants to address this issue. The present study represents the first national-level investigation into nurses' awareness and views regarding nursing informatics. Given the crucial role and potential for innovation in nursing informatics—such as early diagnosis, remote monitoring of patients with chronic diseases, and access to decision-making, comparison, and evaluation based on reliable information [40]—healthcare service providers must expand their knowledge of this field. Consequently, nurses need to be adequately prepared to navigate the health information technology environment, thereby increasing their awareness and motivation to establish a nursing informatics field. Nursing associations can play a pivotal role in developing effective strategies to educate and prepare nurses accordingly. Approximately half of the participating nurses supported the establishment of a nursing informatics discipline in Iran. This positive perspective was primarily influenced by the growing use of digital technologies in healthcare and nurses' increasing exposure to information systems in clinical practice. Nevertheless, the study revealed that nurses' overall knowledge of the infrastructural requirements and potential challenges of implementing such a field remained moderate to low. These results point to a significant gap between nurses' awareness of nursing informatics and their readiness to engage with it practically. Therefore, prior to initiating an independent academic discipline, it is essential to focus on enhancing nurses' informatics competencies through targeted training programs, continuing education initiatives, and the gradual integration of informatics-related content into existing nursing curricula. Rather than immediately creating a stand-alone program, a phased and evidence-based approach, beginning with embedding nursing informatics courses within current undergraduate and postgraduate programs, would offer a more contextually appropriate and sustainable pathway for developing informatics capacity among Iranian nurses.

Ultimately, improving nurses' understanding of the role, benefits, and applications of nursing informatics can facilitate more effective adoption of technology in patient care, enhance evidence-based practice, and contribute to the overall quality, safety, and efficiency of healthcare services across Iran.

Conclusion

Half of the nurses in Iran believe in the feasibility of establishing a nursing informatics field.

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