

Perceptions of Health Personnel Regarding the Utilization of Health Information Systems

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Abstract

Introduction: The deployment of health information systems has been a global response to healthcare's transformation and digitalization. The need and potential of these systems within healthcare have been tremendously driven by the global instability that has affected several interrelated sectors, highlighting the urgency and importance of this research.[1]

Health information systems (HIS) are critical systems deployed to help organizations and all stakeholders within the healthcare arena eradicate disjointed information and modernize health processes by integrating different health functions and departments across the healthcare arena for better healthcare delivery.[2]

This study aims to underscore the invaluable insights of the Shkodra Regional Hospital's healthcare staff regarding Hospital Information Systems. We aim to identify potential problems that may arise before their implementation, such as resistance to change, lack of training, and system compatibility issues, emphasizing the crucial role of healthcare staff in this process.

Material and Methods: 168 participants were involved in this study, representing 42.96% of the total nurses. Data were collected through a 47-item self-administered questionnaire, which included sections on demographics, current system usage, perceived benefits and challenges, and readiness for system adoption. The questionnaire was designed based on the 'Acceptance Model of a Hospital Information System' developed by Handayani et al. [3]

Results: Encouragingly, 88-92% of the study participants expressed their strong readiness and enthusiasm to embrace HIS as part of their work. This overwhelmingly positive attitude bodes exceptionally well for the system's potential success.

Conclusions: The study's findings underscore the significant potential for successfully implementing HIS at Shkodra Regional Hospital. Despite the challenges nurses may anticipate when using HIS, the study revealed a remarkable willingness to adapt. Approximately 90% of the participants expressed their readiness to accept HIS, demonstrating their commendable adaptability and the potential for a smooth transition to the new system.

Keywords: hospital, HIS, acceptance of HIS, perceptions of HIS, nurse.

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Introduction

Health information system deployment has been driven by healthcare transformation and digitalization. The need for and potential for these systems within healthcare have been tremendously driven by global instability that has affected several interrelated sectors. [1]

Health information systems (HIS) are critical systems deployed to help organizations and all stakeholders within the healthcare arena eradicate disjointed information and modernize health processes by integrating different health functions and departments across the healthcare arena for better healthcare delivery.[2]

An information system is a set of unified components that collect, retrieve, process, store, and distribute information to facilitate organizational planning, control, coordination, and decision-making.[4]

An information system combines information technology, information itself, people, and management [5].

An information system can only be considered successful if all its components are successful, and according to the socio-technical approach, a successful information system consists of technical and social components [6].

Successful implementation of information systems is closely related to correctly analyzing the users' requirements, understanding the work culture, and avoiding obstacles at the hierarchical level[7]. The work system of information systems is efficient when all these components are present and work in parallel, with a proper balance between them [6].

An information system must have four components to function correctly: structure, people, technology, and processes [5].

The health sector would only have information systems based on information technology and related applications for collecting and exchanging clinical information [8].

However, implementing hospital information systems is a complex task [9].

Meanwhile, some difficulties are encountered during the implementation of hospital information systems, and only some successful systems may emerge during or after implementation [10].

Culture dominates employee attitudes toward job satisfaction and talent or willingness to adapt and perform better [11]. Studies often report nurses' resistance to using health information systems, but nurses' intentions to use them are encouraging [12].

Even though we live in the age of technology, people have problems with its use. However, nurses must be ready to use information technology to improve client care by eliminating the need to put data on paper[13].

Implementing hospital information systems in hospitals with the correct change process can achieve this success. Therefore, the change process is essential in any organization's diffusion of new information systems [14].

The most common factors that control the success of the implementation are the managerial skills to direct the change and the communication during this change.[15]. Two factors are more involved in implementing information systems through the change process: social and technical factors [16].

The human factor is significant in implementing health information systems. Therefore, the purpose of this study is to identify the perceptions of the nursing staff of the Shkodra Regional Hospital regarding the hospital information systems, making it possible to identify problems that may occur before implementation.

Material and Methods:

Study Design: This is a cross-sectional study, and a descriptive design was used. The data were collected by nurses at the Shkodra Regional Hospital.

Sample – Shkodra Regional Hospital has 391 nurses and provides 15 services. One hundred sixty-eight participants participated in this study, representing 42.96% of the total nurses.

Inclusion/exclusion criteria - The study was open to any nurse employed at Shkodra Regional Hospital during this period.

Data collection—Between October 29 and November 30, 2023, Data was collected using an online questionnaire in Microsoft Forms.

Data were collected using a 47-item self-administered questionnaire consisting of a four-part form.

Section I consisted of three parts:

- *Perceived usefulness and performance expectations in using the HIS:* The questionnaire consisted of four items, and respondents rated each item by choosing the answer yes, no, or no.
- *Perceived ease of use and expected effort in using the HIS:* consisted of 4 items, and respondents rated each item by choosing the alternative of (5) Not at all easy, (4) Easy, (3) Moderately easy, (2) Above average easy and (1) Very easy.
- *Acceptance of HIS* consisted of 4 items, and respondents rated each item by choosing yes or no.

Section II consisted of three parts:

- *Human factors:* It consisted of 12 items, and the respondents rated each item by choosing the alternative of (1) Not at all, (2) A bit, (3) Averagely, (4) Above the average, and (5) Completely.
- *Technological factors:* It consisted of 7 identical items, and the scoring was the same as in the single factor.
- *Organizational factors* comprised eight items, and respondents rated each by choosing yes or no.

Section III consisted of 7 items: demographic data such as age, gender, profession, education, years of experience, and service.

The questionnaire was based on the “Acceptance Model of a Hospital Information System” developed by Handayani et al. [3].

Statistical analysis - The data collected were entered into SPSS version 22. Descriptive demographic statistics regarding frequencies and percentages were performed and tabulated in (Table 1).

Ethical considerations—This paper respects data protection as it is anonymous. Participants were informed about the questionnaire during the meetings, and their consent was implied when they completed it. The data were collected and stored electronically.

Results

General characteristics		No.	%
Gender	Male	35	20.8
	Female	133	79.2
Age	Up to 25	33	19.6
	26-30	19	11.3
	31-35	21	12.5
	36-40	25	14.9
	41-45	17	10.1
	46-50	17	10.1
	51-55	22	13.1
	over 55	14	8.3
Profession	Nurse	168	100.0
Education	Bachelor	72	42.9
	Master	96	57.1
Years of experience	6-10 years	132	78.6
	11-15 years	36	21.4
Service	Emergency	15	8.9
	Surgery	23	13.7
	Pediatrics	14	8.3
	Neurology	14	8.3
	Pathology	31	18.5
	Obstetric - Gynecology	20	11.9
	Specials	8	4.8
Total	other	43	25.6
		168	100.0

Tabela 1. General characteristics

Table 1 shows that 79.2% of the participants were female, and 20.8% were male. Regarding age, 41.6% are over 40, and 58.4% are up to 40. Regarding education, 42.9% had a bachelor's degree, and 57.1% had a master's degree. Participants with 6-10 years of work experience accounted for 78.6%, and 21.4% had 11-15 years of work experience. 8.9% of the participants were employees of the admission ambulance, 13.7% were employees of the surgery ward, 8.3% were employees of the pediatric service, 8.3% of the neurology service, 18.5% of the pathology service, 11.9% of the obstetrics and gynecology service, 4.8 in specialties and 25.6% of other services.

Table 2 shows that 95.2% of the study participants expressed that using HIS would increase effectiveness at work and improve the quality of work. 89.3% of the participants stated that using HIS would significantly improve performance at work, and 88.1% of the study participants stated that using HIS would improve productivity at work.

Table 3 shows that the participants in the study express that they feel moderately ready and find it easy to acquire the use of HIS, which varies from 38-54% of the participants. While 15.28% find it very easy to use HIS.

Table 4 shows that 8.9% of the participants think that the use of HIS would not change anything in the way of working, 28.6% think that it would bring average changes, and 28.6% think that it would bring a total change in the way of working. 19% of the participants in the study think that the use of HIS would not bring any change in the way they prefer to work, 26.8% of the participants think that their way of working would change on average, and only 16.1% of the participants think that the way they prefer to work would change completely.

1.8% of the participants in the study think that the use of the HIS would not be adapted to the needs of the services they provide, 37.5% think that the use of the HIS would have an average effect on the completion of the services they provide, and only 29.8% think that the use of the HIS would be adapted to the services they provide.

In Table 5, it is indicated that 42.3% of the respondents fully agree that the data in the HIS is valid and secure, while 44.8% fully agree that the HIS prevents third parties from accessing the data. Additionally, 28.6% of the respondents fully agree that the system can prevent or reduce errors at work, and 35.7% fully agree that it protects data.

Table 6 shows that, on average, most of the study participants express the efficiency they could have if they used HIS in their work, regardless of their experience or training in using HIS.

Table 7 shows that about 29% of the study participants believe that important people or colleagues can moderately influence them to use HIS. On the other hand, 34.5% are entirely convinced that their colleagues are the driving force behind the use of HIS.

Table 8 shows that about 36% of the study participants feel entirely confident that the information from the HIS is

Perceived usefulness and performance expectations	Yes	No	No answer
Using HIS would increase my effectiveness in my work.	160 (95.2)	3 (1.8)	5 (3.0)
I find HIS helpful in my work.	160 (95.2)	4 (2.4)	4 (2.4)
Using HIS would improve my performance at my work.	150 (89.3)	8 (4.8)	10 (6.0)
Using HIS at work would improve my productivity.	148 (88.1)	6 (3.6)	14 (8.3)

Tabela 2 Perceived usefulness and performance expectations

<i>Perceived ease of use and expected effort</i>	<i>Very easy</i>	<i>Above average easy</i>	<i>Moderately easy</i>	<i>Easy</i>	<i>Not at all easy</i>
Is HIS easy to use?	31 (18.5)	15 (8.9)	91 (54.2)	25 (14.9)	6 (3.6)
Would it be easy for you to use HIS to replace the actual work you do?	25 (14.9)	22 (13.1)	75 (44.6)	28 (16.7)	18 (10.7)
Would it be easy for you to become proficient in using HIS?	48 (28.6)	30 (17.9)	66 (39.3)	18 (10.7)	6 (3.6)
Would it be easy for you to learn to operate with HIS?	46 (27.4)	31 (18.5)	65 (38.7)	20 (11.9)	6 (3.6)

Tabela 3. Perceived ease of use and expected effort

<i>Human Dimension</i>	<i>Not at all</i>	<i>A bit</i>	<i>Averagely</i>	<i>Above the average</i>	<i>Completely</i>
Does using HIS change the way you work?	15 (8.9)	30 (17.9)	48 (28.6)	27 (16.1)	48 (28.6)
Does using HIS change your practice preferences?	32 (19.0)	30 (17.9)	45 (26.8)	34 (20.2)	27 (16.1)
Can the services offered by HIS be used to meet the needs of your services?	3 (1.8)	25 (14.9)	63 (37.5)	27 (16.1)	50 (29.8)

Tabela 4. Human Dimension

<i>Information Security Expectation</i>	<i>Not at all</i>	<i>A bit</i>	<i>Averagely</i>	<i>Above the average</i>	<i>Completely</i>
Are confidentiality, availability, consistency, or data validity important features of HIS?	2 (1.2)	14 (8.3)	54 (32.1)	27 (16.1)	71 (42.3)
Do you think your HIS has features to prevent unauthorized access to data in the HIS?	5 (3.0)	21 (12.5)	35 (20.8)	32 (19.0)	75 (44.6)
Does the HIS have features that can prevent or reduce user error in preventing medication errors?	14 (8.3)	24 (14.3)	48 (28.6)	34 (20.2)	48 (28.6)
Does the HIS provide features to prevent unauthorized encryption by an unauthorized person to protect the data so that it remains stable or valid?	10 (6.0)	17 (10.1)	50 (29.8)	31 (18.5)	60 (35.7)

Tabela 5. Information Security Expectation

Self-efficacy	Not at all	A bit	Averagely	Above the average	Completely
Can you work with HIS even if you have never used such a system?	5 (3.0)	20 (11.9)	58 (34.5)	33 (19.6)	52 (31.0)
Can you get the job done with HIS if you used a similar system to do the same job?	7 (4.2)	18 (10.7)	66 (39.3)	31 (18.5)	46 (27.4)
Can you use HIS if you have achieved the training objectives related to information technology or HIS?	3 (1.8)	16 (9.5)	56 (33.3)	38 (22.6)	55 (32.7)

Tabela 6. Self-efficacy

Social impact	Not at all	A bit	Averagely	Above the average	Completely
How much influence do you have when people who are important to you suggest using HIS?	12 (7.1)	24 (14.3)	53 (31.5)	43 (25.6)	36 (21.4)
Are you a HIS user because your colleagues are?	36 (21.4)	29 (17.3)	45 (26.8)	22 (13.1)	36 (21.4)
Do your colleagues think that you should be using HIS?	11 (6.5)	20 (11.9)	53 (31.5)	26 (15.5)	58 (34.5)

Table 7. Social Impact

Technological factors	Not at all	A bit	Averagely	Above the average	Completely
How clear and easy to read do you find HIS information?	(0.0)	16 (9.5)	55 (32.7)	37 (22.0)	60 (35.7)
How well can the HIS provide accurate and consistent information?	(0.0)	9 (5.4)	55 (32.7)	41 (24.4)	63 (37.5)
How well do you think the information provided in the HIS meets your work needs?	(0.0)	11 (6.5)	62 (36.9)	39 (23.2)	56 (33.3)
How well does the HIS provide results in a format that is easy to understand?	2 (1.2)	17 (10.1)	60 (35.7)	35 (20.8)	54 (32.1)

Table 8. Technological factors

System Quality	Not at all	A bit	Averagely	Above the average	Completely
Does HIS offer you features to help you work?	1 (.6)	8 (4.8)	64 (38.1)	43 (25.6)	52 (31.0)
Do you think he is quick to respond?	1 (.6)	8 (4.8)	67 (39.9)	46 (27.4)	46 (27.4)
Does he provide services 24 hours a day or whenever you need them?	2 (1.2)	6 (3.6)	63 (37.5)	35 (20.8)	62 (36.9)

Table 9. System Quality

Management Support and Leadership	Yes	No
Does the institution guide on using the HIS?	63 (37.5)	105 (62.5)
Does the institution offer a reasonable period to transition from the old system to the new one?	83 (49.4)	85 (50.6)
Does the institution provide you with a suitable working environment, e.g., a pleasant workplace, sufficient computers, and a suitable workload?	64 (38.1)	104 (61.9)
Does your institution support innovation through the use of HIS?	73 (43.5)	95 (56.5)

Table 10. Management Support and Leadership

Participation of users in the HIS implementation process	Yes	No
Do you receive training related to HIS?	46 (27.4)	122 (72.6)
Have you been involved in the communication process to socialize with HIS?	56 (33.3)	112 (66.7)
Were you involved in the design of HIS?	32 (19.0)	136 (81.0)
Have you been involved in the implementation of the HIS?	45 (26.8)	123 (73.2)

Table 11. Participation of users in the HIS implementation process

Acceptance of HIS	Yes	No
Will you use HIS in your work?	150 (89.3)	18 (10.7)
Do you intend to use HIS in your work as often as possible?	148 (88.1)	20 (11.9)
Would you invite colleagues to use HIS?	154 (91.7)	14 (8.3)
Do you see many opportunities to use HIS in your work?	148 (88.1)	20 (11.9)

Table 12: Acceptance of HIS

clear, legible, accurate, and stable. Similarly, about 36% of the participants state that they are moderately confident that the HIS meets their work needs and that the system format is easy to understand.

Table 9 shows that, on average, the study participants say that using HIS would positively affect their well-being at work. In addition, 27-37% of the participants are fully convinced that the system's quality is directly related to their work.

Table 10 shows that 51% and 63% of respondents say that the institution does not support them in the possibility of more accessible adaptation to the use of the HIS.

Table 11 shows that 67-81% of the participants in the study indicated that they had difficulties or had not been involved in training or obtaining opinions on HIS.

Table 12 shows that 88-92% of the study participants are willing to accept using HIS in their work.

Discussion

The perceived usefulness of using HIS is a subjective thought that affects work performance in healthcare institutions [17]. From the data obtained, about 90% of the participants in the study expressed that he would bring benefits to their work. These results are similar to the studies conducted by Handayani et al. [3] and Alipour et al. [17].

The work performance of HIS users is directly related to the perceived usefulness factor [18]. Similar to the results of Barchielli et al. [19] and Alipour et al. [17], nurses expect HIS to impact their performance positively. Hospitals use new information systems to improve the quality of services by Wang et al. [20] and Hosseini et al. [21], and our study showed that 89.3% of nurses believe in this quality improvement.

The study also showed that nurses believe that using HIS would increase productivity in their work, which is similar to the findings of Alipour et al. [17].

In the study conducted by AlQudah et al. [18], perceived usefulness and ease of use were the two most important factors for adopting HIS. In the study conducted by Sıkakyüz et al. [22], these two factors affected the resistance to accepting the use of HIS.

Perceived ease of use and expectation of effort are directly related to nurses' expectation of HIS use being easy without effort (Handayani et al., [3]; Alipour et al., [17]).

Our study found that the participants expressed feeling moderately ready and finding it easy to use HIS. This aligns with the findings of AlQudah et al. [18] and Alipour et al. [17]. A result average indicated the users' willingness to accept using HIS regarding perceived ease.

People are considered the second element in the functioning of information systems [23]. Human capital is the critical point for an organization, and the adaptation of professionals ensures the success of a system Alipour et al., [17]. However, the compatibility of human capacity with perceived usefulness is related to the compatibility of HIS with users' work habits and needs, as stated by Handayani et al. [3].

Our study showed that 8.9% of the study participants did not think HIS would change their work, and more than 40% thought above average and completely that using HIS would bring positive changes in their daily work. This is similar to the study of Alipour et al. [17], where HIS users were relatively satisfied.

From the data obtained from the participants in the study, over 50% perceived the use of HIS as safe, confidential, valid, and able to prevent or reduce human errors. As in the study by Kemp et al. [23], users of health information systems perceive data as safe, especially in small places where people know each other. In addition, these systems are protected and cannot be interfered with by others [23]. Patient safety is increased by integrating the information system into the health care system, rapid data retrieval, immediate result availability, and reduced treatment errors.

Self-efficacy is the individual's confidence and appreciation of his abilities, which allow him to perform a task [24]. From the results obtained from the study participants, we can see that about 50% have confidence and appreciate their abilities to be efficient in using HIS.

Social influence is the measure by which people influence HIS users Alipour et al., [17], and the data obtained from the participants in the study shows that nurses are influenced by colleagues, supervisors, or significant others. Interestingly, nurses are less influenced when other colleagues use HIS, suggesting that some do not have ambitions but are influenced by their superiors or a significant other. This phenomenon is also observed in the study by Lulin et al. [12], where nurses accept technology except for behavior, i.e., social impact. Therefore, the relationships and dynamics with colleagues should be studied to adapt policies in technology acceptance by Lulin et al. [12].

Regarding the technological factor and the quality of the system, the nurses who participated in the study expressed above average and entirely, with about 60%, that the HIS is easy to read, accurate and stable, meets the needs of the work, easy to understand, gets the job done, quick turnaround time and 24/7 service.

This result is similar to the study by Alipour et al. [17], which showed users' relative desirability of HIS use.

The organizational factor is a critical factor that affects the acceptance of the successful use of HIS Alipour et al., [17]. Regarding the support from the institution, the nurses participating in the study said that the institution supports them with HIS user guides by 37.5% and with technical equipment by 38.1%. Similarly, in the study conducted by Moumouni et al. (2022), about 65% of the health workers used personal computers. Therefore, hospitals must take measures to enable them to be equipped with software and computers by Moumouni et al. [25]. Also, nurses trained in ICT are more willing to use and adopt HIS [12].

Only 19% of nurses reported being asked about their involvement in the design process, and only 26.8% were involved in implementing the HIS. User involvement in the design and implementation of the HIS significantly impacts perceived ease of use [3].

Although health workers are reluctant to use HIS or see its use as threatening Alohalı et al., [26], our study showed that about 90% of nurses were willing to use HIS, similar to the study by Barchielli et al. [19].

Conclusions

The study showed that despite the difficulties or threats that nurses may claim when using HIS, they are willing to accept it with about 90%. However, hospital managers should involve nurses in the design and implementation of HIS so that nurses have easier acceptance and use of HIS and participate in training related to the use of HIS, as training of nurses makes it easier to accept the use of HIS.

Restrictions

This study does not represent the views of all Shkodra Regional Hospital nurses or nurses at a national or regional level. However, it provides some nurses' attitudes towards using HIS and what hospital managers should consider a successful use of HIS.

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Author Contributions

Study conception, EF, JK; design, EF, JK, MM; Data extraction, EF, JK, MM; analysis, EF; led the drafting of the manuscript, with the contribution of JK and EF. All authors revised the manuscript and approved the final version before submission.

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