Evaluation of Nurses' Informatics Competencies in the Pandemic

Pandemide Hemşirelerin Bilişim Yeterliklerinin Değerlendirilmesi

Araştırma Research

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Abstract

Purpose: This study aims to determine the informatics competence of nurses in the pandemic through computer literacy, information literacy and information management.

Materials and Methods: The population of this study consists of nurses working in the hospital. The informatics competency questionnaire for nurses was applied to 373 nurses and 322 nurses answered. The response rate of the questionnaire was 86.0%.

Findings: In the study, the information literacy and information management levels of the participants in the 18-29, 30-39 and 40-49 age groups were found to be higher than the participants aged 50 and over, and the computer literacy levels of the participants with postgraduate education were higher than the participants aged 50 and over. The informatics proficiency levels of participants with postgraduate education are generally higher than participants with undergraduate and high school degrees. Married participants' IT literacy and IT proficiency levels are higher than single participants. There is a very high and positive correlation between computer literacy (r: 0.850), informatics competence (r: 0.807) and information management (r: 0.930) and informatics competencies.

Result: Computer literacy was determined as 3.03±0.92, informatics literacy was determined 3.04±0.94 and information management was determined as 3.13±1.00. The study concluded that nurses' informatics competencies vary according to educational level, age and systems used.

Keywords: nursing, pandemic; informatics; competence; clinical; information management; computer literacy

Özet

Amaç: Bu çalışma, pandemide hemşirelerin bilgisayar okuryazarlığı, bilgi okuryazarlığı ve bilgi yönetimi yoluyla bilişim yeterliliğini belirlemeyi amaçlamaktadır.

Materyal ve Metod: Bu çalışmanın evreni hastanede görev yapan hemşireler oluşturmaktadır. Hemşirelere yönelik bilişim yeterlilik anketi 373 hemşireye uygulanmış ve 322 hemşire anketi yanıtlamıştır. Anketin yanıtlanma oranı %86,0 olmuştur.

Bulgular: Çalışmada,18-29, 30-39 ve 40-49 yaş grubundaki katılımcıların bilgi okuryazarlığı ve bilgi yönetimi düzeyleri 50 yaş ve üzeri katılımcılardan, lisansüstü eğitime sahip katılımcıların bilgisayar okuryazarlığı düzeyleri ise 50 yaş ve üzeri katılımcılardan daha yüksek tespit edilmiştir. Lisansüstü eğitime sahip katılımcıların bilişim yeterlilik düzeyleri genel olarak lisans ve lise mezunu katılımcılara göre daha yüksektir. Evli katılımcıların bilişim okuryazarlığı ve bilişim yeterlilik düzeyleri bekar katılımcılara göre daha yüksektir. Bilgisayar okuryazarlığı ile (r: 0,850), bilişim yeterliliği (r: 0,807) ve bilgi yönetimi (r: 0,930) ile bilişim yeterlilikleri arasında çok yüksek ve pozitif bir korelasyon vardır.

Sonuç: Bilgisayar okuryazarlığının 3,03±0,92, bilişim okuryazarlığının 3,04±0,94 ve bilişim yönetiminin 3,13±1,00 olarak belirlenmiştir. Araştırmada hemşirelerin bilişim yeterliklerinin eğitim durumuna, yaşa ve kullanılan sistemlere göre farklılık gösterdiği sonucuna varılmıştır.

Anahtar Sözcükler: hemşirelik; pandemik; bilişim; yeterlik; klinik; bilişim yönetimi; bilgisayar okuryazarlığı

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Introduction

As COVID-19 continues to threaten people's health and the global economy, governments are urgently looking for new tools to make policy and deal with the crisis. The trends reveal policies such as tracking the COVID-19 pandemic, alerting vulnerable populations, social distancing adaptation and staying home (1).

In the presentation and education of nursing services, informatics is used to provide information and data in an accurate, sufficient, and fast manner, and to make daily applications such as care applications and communication serially. The rapid entry and spread of information technology in the field of nursing causes the formation of nursing informatics due to the knowledge specific to the field of nursing (2). In this context, it is thought that the study is necessary for the nursing profession, examining the informatics competency levels of nurses and examining the factors affecting the informatics competency levels of nurses (3).

- Do the informatics competency levels of nurses differ according to their demographic characteristics?
- What is the status of computer literacy of nurses in the pandemic?
- What is the status of information literacy of nurses in the pandemic?
- What is the status of information management skills of nurses in the pandemic?
- What is the relationship between nurses' computer literacy, information literacy, and information management in the pandemic?

Information Technology in the Pandemic

The digitalization process in health, which started in the 2000s, has gained great momentum today. The main reason for digital technologies to come to the fore is that the pandemic creates a ball of problems in many areas. Large-scale natural or biological disasters confront health systems with the necessity of coping with many problems in a short time. Some of the problems caused by COVID-19 around the world can be summarized as follows (4):

- In coordination between fragmented or dispersed decision-making mechanisms,
- Lack of communication between health decision-making institutions and facilities,
- Insufficient integration between local and national emergency management systems,
- Insufficient and fragmented data on the patient's location and condition,
- Medical human resources and material stock insufficiency,
- Lack of instant information about the occupancy rate of the intensive capacity,
- Inability to monitor the movements of infected people,
- Insufficient sharing of information between health professionals and decision-makers.

In the provision of treatment services, the specialization of health institutions and their personnel, the effective use of medical technologies, the integration of health institutions at different stages with each other expected to provide health services (5). The purpose of using information technologies in the field of health is to benefit from advanced technology and experience while providing treatment services in accordance with the needs of patients, not to compromise on quality, to determine not only the treatment of diseases, but also their causes (6).

Nursing Informatics

Nursing informatics has been defined as "the combined use of computers, information and nursing science in all areas of nursing care, from planning to evaluation". Thanks to the systems, the processing, and management of information become easier. Thus, evaluation of the patient, monitoring, preparation of care plans, etc. It helps to make nursing operations easier and faster (7). Organizing, providing, and recording health services are provided electronically by information systems. Thanks to information systems, nurses plan the procedures to be applied to the patients, and stock control of the materials and drugs to be used in these processes. Both diseases are clearly identified and wrong treatment practices are prevented (8). Information systems are used in three areas in nursing (9):

- In clinical applications,
- In management services,
- In education and training programs.

Computer Literacy

The computer is defined as a versatile tool that offers unique opportunities in terms of teaching and learning, unlike other teaching tools. The

importance of the computer in education and the most basic feature that distinguishes the computer from other tools stems from its use as a production, management, presentation, teaching, and communication tool (10). To learn basic computer knowledge; accessing information, increasing the quality of life with computers in daily life or using them for entertainment; to be able to follow, discuss and comment on the innovations related to computers; It can be said that people who have access to skills such as comparing and appreciating information technologies at a certain level are computer literate. It is very important to give computer literacy in integrity that starts in the last year of the first level of basic education and continues with secondary education. In university years, this situation requires the development of previously acquired computer knowledge and skills for research and problem-solving (11).

Information Technology Literacy

The "new" literacies are important in terms of the expectations of individuals from their current and future private and professional lives, as they include the evolution in digital and media technologies. This "new" literacy, namely information literacy; includes features such as innovative text formats (such as multimedia or hybrid texts), new reader expectations and new activities (12). With digitalization, media gained features such as interactivity, virtuality, and modularity, and thanks to these features, media consumers switched from passive to active roles. The internet environment, in which media consumers are actively involved, continues to develop as an international social network that is open, transparent, easily accessible, and easily created, away from concepts such as space and time, and most importantly, enabling virtual identities. With the rapid introduction of the internet into the lives of individuals, many transformations and changes have taken place in the lives of individuals. In particular, traditional communication understanding and practices have started to take place in the virtual environment, and in this context, users have become both producers and consumers of information (13).

Information Management

Information systems have a role in helping businesses perceive changes in their environment and act accordingly. Information systems are key tools in assisting managers in scanning the environment and detecting external changes that may require organizational action. The systems that ensure that the information used in the management of an organization is processed and transmitted to the necessary places in a timely and accurate manner (14). It is stated that management information systems are computer-based systems that provide management with various tools to organize, evaluate and effectively manage parts of an organization. On the other hand, stated that any system consisting of hardware and software developed to meet the needs of the management from the upper level to the lower level, considering the objectives of the enterprise, is a management information system (15). Managers make decisions by evaluating the information they have. Having wrong or incomplete information often leads to wrong decisions, even if the manager is highly qualified. Because the ability to make the right decision alone is not enough to make the right decisions. It is necessary to nurture this skill with the necessary knowledge (16).

Information Competence

Competence is the ability to meet complex demands for a specific task using psychosocial resources such as skills, attitudes, personality, creativity, cognitive skills, motivation. Competence is also conceptualized as a basic feature that enables superior and average performances of a task to emerge (17). In the light of the concept of competence and academic definitions, three main lines that makeup competence can be mentioned. These lines are; it is expressed as Knowledge, Skill, and Attitude. It should be said that competence is revealed when these dimensions are combined (18).

Knowledge: It is possible to explain it as a product obtained in the light of science, processed with the intellectual powers of individuals, and integrated with the objects or symbols of a language. The sum of knowledge can be gained through experience gained over time, or it can be gained through education. In this respect, it is necessary to know the ways and methods to be followed in the reservation and to use the necessary tools at the same time (19).

Skill: It is possible to explain skill as the ability to perform a predefined or determined job that is believed to be difficult and requires

professionalism. In order to have a skill in a subject, it is necessary to have talent in that subject first. The share of experience in acquired skills is observed at a very high level. While knowledge is generally acquired through education, skill can be acquired by living or by experience. Thus, skill can occur as a result of transferring and teaching experiences in the relationship of master-apprentice, subordinate-superior, supervisor-officer. In this respect, the skill is formed gradually (20).

Attitude: It is a systematic belief and thought system that individuals form in their minds towards a certain person, institution, organization, or object. The attitude of individuals on a particular issue is an important factor that shapes the behavior on that issue or directs the totality of actions. Therefore, the attitude and perspective of the employee about teamwork come to the fore. If the employee thinks that the cooperation will benefit the business and himself, he will have a positive attitude about teamwork (21). The organizational culture is at a very important point in the formation of attitudes. If the teamwork spirit has become the organizational culture and its importance is understood by all human resources, individuals will display an attitude that teamwork is an important issue within the organization (22).

Methods

Study universe

The study was carried out using the quantitative research method. The research was carried out with the survey method, one of the quantitative research techniques. The Nursing Informatics Competency Evaluation Questionnaire was applied to the 373 nurses working in City Hospitals. The informatics competency questionnaire was answered by 322 nurse. The response rate of the questionnaire was 86.0%. The permission was given with the Ethics Committee decision dated 12/24/2020 and numbered 2020/76.

Data collection

The Nursing Informatics Competency Evaluation Questionnaire, which was used in the study by Rahman (2015), was used as a data collection tool in the research by permission of the researcher with e-mail (23). The questionnaire was a 5-point Likert-type scale consisting of 30 questions. The questionnaire consisted of three sub-dimensions: "Information Literacy" (10 Items), "Computer Literacy" (13 Items), and "Information Management" (7 Items).

Statistial analysis

While evaluating the findings obtained in the study, SPSS 25.0 Statistics package program was used. While evaluating the study data, descriptive statistical methods (Frequency, Percentage, Mean, Standard deviation) method were used. In the case of two groups in the comparison of quantitative data, independent samples t test in the comparison of the parameters with normal distribution between groups, in the case of more than two groups in the comparison of quantitative data, One-way Anova test in the comparison of the parameters with normal distribution between groups, and the One-way Anova test in the comparison of the parameters that cause difference Tukey test was used to determine the group. The results were evaluated at the 95% confidence interval, at the $p<0.05$ significance level.

Results

Demographic Information

The characteristics of the participants participating in the research were discussed from a demographic perspective. The demographic information of the participants was obtained and shown in Table 1.

Analysis

The relationships between the demographic characteristics of the participants and their informatics competence are shown in Table 2.

The participants' informatics competency levels according to their genders was examined with the Independent T-Test. As a result of the analysis, it was determined that the informatics competency levels of the participants did not differ according to their gender ($p>0.05$).

The participants' informatics competency levels according to their ages was examined with the One-Way ANOVA Test. As a result of the analyzes, it was determined that the informatics competence levels of the participants differ according to their ages ($p<0.05$). As a result of the Post-hoc (Tukey test) analysis carried out to determine the said differences, the general informatics competence levels and the informatics literacy and informatics management sub-dimensions of the participants aged 18-29, 30-39 and 40-49 were statistically

Table 1. Demographic Information of Participants Participating in the Research (n= 322)			
		Number (f)	**Percent (%)**
Gender	Female	260	80.7
	Male	62	19.3
Age	18-29	142	44.1
	30-39	105	32.6
	40-49	58	18.0
	50 and over	17	5.3
Educational Status	High school	32	9.9
	Associate degree	45	14.0
	Licence	194	60.2
	Graduate	51	15.8
Marital status	Single	123	38.2
	Married	199	61.8
Seniority (years)	0-5	120	37.3
	6-10	80	24.8
	11-15	36	11.2
	16-20	35	10.9
	21 and above	51	15.8
Ipad Usage	Yes	89	27.6
	No	233	72.4
Tablet Usage	Yes	176	54.7
	No	146	45.3
Smartphone Usage	Yes	319	99.1
	No	3	0.9
Laptop Usage	Yes	267	82.9
	No	55	17.1
Smart Watch Usage	Yes	108	33.5
	No	214	66.5
Non-Smart Cell Phone Usage	Yes	27	8.4
	No	295	91.6

higher than the participants aged 50 and over was found to be high.

The informatics competence of the participants according to their educational status was examined with the One-Way ANOVA Test. As a result of the Post-hoc (Tukey test) analysis carried out to determine that the informatics competency as computer literacy, informatics literacy and information management of the graduates are statistically higher than all the other participants ($p<0.05$)

The informatics competence levels according to their marital status was examined with the Independent T-Test. As a result of the analysis, it was determined that the information literacy levels and general informatics competence levels of the married participants were statistically higher than the single participants ($p<0.05$).

The informatics competency levels of the participants according to their seniority in nursing was examined with the One-Way ANOVA Test. The analyzes revealed that the informatics competency levels did not differ according to their seniority in nursing ($p>0.05$).

The informatics competency levels of the participants according to their Ipad usage status was examined with the Independent T-Test. As a result of the analyzes, it was determined

Table 2. Competency with demographics					
Demographic	**Feature**	**N**	**Mean**	**T**	**p**
Gender	Woman	260	3.0638	0.006	0.995
	Male	62	3.1355		
Age	18-29	142	3.0573	3.505	0.016
	30-39	105	3.1616		
	40-49	58	3.0948		
	50 and above	17	2.4059		
Educational background	High school	32	2.8750	4.016	0.008
	Associate Degree	45	3.0052		
	Licence	194	3.0064		
	Postgraduate	51	3.4516		
Marital status	Single	123	2.9122	-2.452	0.015
	Married	199	3.1573		
Seniority (Years)	0-5	120	3.1881	0.181	0.948
	6-10	80	3.1304		
	11-15	36	3.1310		
	16-20	35	3.0490		
	21 and over	51	3.0840		
iPad Usage	Yes	89	3.5315	5.140	0.001
	No	233	2.8850		

that the computer literacy, information literacy, information management and general information competence levels of the participants using Ipad, laptop, smartwatches, smartphone and tablets were statistically higher than the participants who did not use Ipad ($p<0.05$).

The relationship between IT competency levels and computer literacy, IT literacy and IT management was examined with the Pearson Correlation coefficient. As a result of the analysis, in Table 3 it was determined that there was a very high level and positive relationship between computer literacy, information literacy, information management and information competencies.

When the informatics competency levels of the participants were examined, it was determined that the computer literacy level was 3.03±0.92, the information literacy level was 3.04±0.94,

Table 3. The Relationship Between Informatics Competence Levels					
		Computer Literacy	**IT Literacy**	**IT Management**	**Informatics Competence**
Computer Literacy	r	1			
	p				
IT Literacy	r	0.850 **	1		
	p	<0.001			
IT Management	r	0.807 **	0.924 **	1	
	p	<0.001	<0.001		
Informatics Competence	r	0.930 **	0.977 **	0.948 **	1
	p	<0.001	<0.001	<0.001	

Table 4. Informatics Competence Levels of Participants			
	N	Mean	Std. Deviation
Computer Literacy	322	3.0379	0.92105
IT Literacy	322	3.0447	0.94141
IT Management	322	3.1358	1.00083
Informatics Competence	322	3.0637	0.90549

and the information management level was 3.13±1.0, and the general information competency level was 3.06±0.90. Within the framework of these results, it is necessary to increase the computer literacy and informatics literacy levels of nurses as shown in Table 4.

Discussion

The informatics competency levels of nurses were examined in three dimensions. It was observed that nurses' information management levels were high and their computer literacy levels were low. Following analysis, it was found that there was no gender difference in the participants' levels of informatics competency. The results of the analyses showed that the informatics skill levels were not influenced by the nurses' seniority.

It was seen that married participants had greater levels of general informatics competence and information literacy than single participants. The graduates' informatics competency as measured by computer literacy, informatics literacy, and information management was shown to be higher than that of the other participants.

The analysis revealed that the participants who used iPads, laptops, smartwatches, smartphones, and tablets had greater levels of computer literacy, information literacy, information management, and general information competence than the participants who did not use iPads.

In the study, the socio-demographic characteristics of the nurses' informatics competency levels were examined and the first difference was that the nurses' informatics competency levels differ according to their ages. Thus, it has been determined that the general informatics competence levels and the informatics literacy and informatics management sub-dimensions of the participants aged 18-29, 30-39 and 40-49 years old are at a higher level than the participants aged 50 and over. Within the framework of the studies carried out in the literature on the subject of the study, Takak (2019) found that the levels of informatics competence differ according to age in his research, and it is seen that this finding is in parallel with the finding obtained in this study (24). Mazak (2018) also found in his study that the readiness for information technologies was lower among nurses and higher among those who were older (25).

Information management, computer literacy, information literacy, and information skills were found to be positively correlated and at a very high level. Finally, it was seen that information competence levels of the Turkish nurses were found to be higher than in the study carried out by Sarıbaş (2020) and applied to nurses in Afghanistan (26).

Conclusion

In the study, it was determined that the informatics competency levels of the nurses differed according to their marital status. Another result obtained as a result of the analyzes is that the use of technological devices by nurses makes a difference on their informatics competency levels. According to this, the computer literacy, information literacy, information management and general information competency levels of the participants who use Ipad, laptop, mobile phones, tablets and smart watches are higher than the participants who do not use them. IT competenc as computer literacy, information literacy and computer literacy have high relations information management. According to the study's conclusion, nurses' informatics competencies differ depending on their age, educational background, and the systems they utilize.

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