

Original Article

Use of Health Technologies by Nurses and Their Thoughts on Technology

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Abstract

Introduction: Information technologies which are highly significant for improving the healthcare quality and used in health sector are referred to as health information technologies. These systems are used in diagnosis, care and treatment, practice and assessment of health problems of individuals. It is seen that, beside computer use, the integration of health technologies into nursing has become essential.

Aim: This study was conducted to explore the use of health technologies by nurses and their thoughts on technology.

Materials and Methods: The sample of this descriptive and cross-sectional study consists of 200 nurses agreeing to participate in the study out of 867 nurses working in a university hospital. In data collection of this study conducted from July 2018 to August 2018, a personal information form prepared by the researcher in line with the relevant resources and aimed at detecting individual and occupational characteristics of participants, and a questionnaire form composed of a total of 31 questions intended to assess the participants' use of health technologies and thoughts on technology were used. In data assessment; number, percent, mean, standard deviation, chi-square test, Kruskal Wallis and Mann Whitney-U tests were utilized and statistical significance was accepted as $p < 0.05$.

Results: The average age of participants was 32.97 ± 6.52 (min: 20, max: 60), 78% of them were female, 76.5% of them had graduate degrees, 27.5% of them had 1-4 years of experience and 74% of them worked in service departments. It was found that only 17% of the nurses participated in a technology-related training program, 34.5% of them thought that technological devices were used sufficiently in nursing practices, 69.5% of them believed that nurses were not qualified at all/enough to use technological devices properly and accurately. Furthermore, it was detected that factors such as gender, educational level, years of experience and age impacted the use of health technologies by nurses and their thoughts on technology.

Conclusion: It is observed that nurses exhibit a positive attitude toward using health technologies. It is clearly seen that the subjects of technology and informatics must be integrated into nursing curricula in order to enable the nursing occupation to meet the requirements of modern world.

Keywords: Nursing, health technology, use of technology

Introduction

Health technology is organizational and support systems offering medical devices, drugs, medical and surgical procedures and services used in preventive health services, diagnosis, treatment and rehabilitation as well as the know-how related with these systems. Healthcare technology, on the other hand, is defined as the coordinated integration of preventive, diagnostic, therapeutic,

nursing and rehabilitative methods and practices applied in health improvement and maintenance and individuals using such methods and practices (Isabet & Sengoz, 2018) Health services are highly complex structures using both human resources and technology and consisting of intensive labor and technological structures. Due to such reasons as the widespread use of medical technology in health services in recent years, the desire to meet

the standards of developed countries in health sector, the concept of patient safety gaining importance, quality and accreditation activities, the concepts of maintenance, repair and calibration must also be put on more stress now (Ozgules, Aksay, & Orhan, 2015). Rapidly advancing information technologies in today's world make significant contributions to health technology (Bilgiç & Sendir, 2014).

Computers and computer-assisted systems bring extraordinary dimensions to diagnosis and treatment in modern medicine, provide great convenience, accelerate the process of healthcare provision, reduce costs and enable the retrieval of data of healthy individuals / patients within a short time. In addition, they enable fast, safe and accurate interpretation of several complicated and highly similar cases (Softa, Akduran, & Akyazi, 2014).

Information technologies which are highly significant for improving the healthcare quality and used in health sector are referred to as health information technologies. These systems are used in diagnosis, care and treatment, practice and assessment of health problems of individuals (Basar, Delice, Iihan, Ergün, & Soncul, 2008; Bilgiç & Sendir, 2014).

As the largest group of the healthcare workforce, nursing is at a pivotal junction of patient care, implementing the nursing practice and identifying, incorporating and applying information technology (Austria, 2017). Therefore, it has become increasingly important for nurses to closely follow technological developments in addition to their occupational knowledge and nursing practices. By using health technologies, nurses can provide individualized nursing care specific to each patient and perform functions such as training and consulting in a more healthy manner (Bilgiç & Sendir, 2014).

An exploration of literature shows that there are a limited number of studies investigating the use of health technologies by nurses and their thoughts on technology (Aktas, Koras & Karabulut, 2017; Kardas-Ozdemir & Karakaya, 2017; Crocker & Timmons, 2009). It is observed that studies in nursing field are focused on computer and computer-assisted technologies in particular (Kardas-Ozdemir & Karakaya, 2017; Basar,

Delice, Lihan, Ergun & Soncul, 2008). As with other sectors, advancing technologies increase the opportunity to provide effective and efficient services in health sector and are thus highly important. It is seen that, beside computer use, the integration of health technologies into nursing has become essential. In this regard, the present study was conducted to determine the use of health information technologies by nurses and their thoughts on technology.

Materials and Methods

The sample of this descriptive and cross-sectional study consists of 200 nurses agreeing to participate in the study out of 867 nurses working in a university hospital. The sample size was calculated by using a sampling method with a known universe and data were collected by using random sampling method which is one of the non-probability sampling methods. In data collection of this study conducted from July 2018 to August 2018, a personal information form prepared by the researcher in line with the relevant resources and aimed at detecting individual and occupational characteristics of participants, and a questionnaire form composed of a total of 31 questions intended to assess the participants' use of health technologies and thoughts on technology were used. In the questionnaire form, participants were asked to answer yes or no to the technology-related questions. While implementing the data collection tools, researchers visited each and every clinic and collected the data within an average time of 5-10 minutes by using face-to-face interview technique when nurses were available and not busy with treatment or patient care.

In order to perform the study, a written consent was received from the University hospital where the study was conducted and an ethics committee approval was received from Non-interventional Clinical Studies Ethics Committee of Munzur University (Resolution No: 2018-5/2). Moreover, researchers informed the nurses on the study, explaining that their personal information would be protected and they could withdraw from the study whenever they wished, and included voluntary nurses in the study. In data assessment; number, percent, mean, standard deviation, chi-square test, Kruskal Wallis and Mann Whitney-U tests were

utilized and statistical significance was accepted as $p < 0.05$.

Results

It was detected that the average age of participants was 32.97 ± 6.52 (min: 20, max: 60), 78% of them were female, 76.5% of them had graduate degrees, 27.5% of them had working experience of 1 to 4 years and a great majority of nurses (74%) worked in service departments (Table 1). Distribution of Nurses by Their Use of Health Technologies and Thoughts on Technology are presented in Table 2.

Table 3 presents the relationship between descriptive characteristics of nurses and some technology-related statements. A statistically significant difference was detected between participants' genders and the statement "the devices used in my department are too complicated." There was a statistically significant difference between educational level and the statements "Have you ever participated in a technology-related training program?", I think that use of technology increases the roles/burden of nurses, I think that nurses

specialized in the use of technological devices are needed, I would not want to work in departments where technological devices are intensively used, and I think that the department I work in has sufficient technological equipment." Also, the study revealed a statistically significant difference between years of experience and the statements "Have you ever participated in a technology-related training program? and I think that technological devices are used sufficiently in nursing practices." A statistically significant difference was also found between age and the statements "Have you ever participated in a technology-related training program?, I think that technological devices are used sufficiently in nursing practices, I would prefer to do measurements myself rather than rely on some devices and I avoid using technology, I think that use of technological devices provides convenience, I think that technology will decrease patient/nurse interaction and I find myself too old to keep up with technological developments" (Table 3).

Table 1. Distribution of Nurses According to Their Personal and Occupational Characteristics

| | N | % |
|-------------------------------|-----|------|
| Age | | |
| 20-25 | 22 | 11 |
| 26-31 | 73 | 36.5 |
| 32-37 | 58 | 29 |
| 38 and above | 47 | 23.5 |
| Gender | | |
| Male | 44 | 22 |
| Female | 156 | 78 |
| Education | | |
| High-school | 2 | 1 |
| Associate's degree | 30 | 15 |
| Graduate degree | 153 | 76.5 |
| Postgraduate degree and above | 15 | 7.5 |
| Years worked | | |
| 1-4 | 55 | 27.5 |
| 5-9 | 52 | 26 |
| 10-14 | 46 | 23 |
| 15-19 | 19 | 9.5 |
| 20 years and above | 28 | 14 |
| Unit | | |
| Emergency room | 8 | 4 |
| Intensive care | 43 | 21.5 |
| Service department | 149 | 74.5 |

Table 2. Distribution of Nurses by Their Use of Health Technologies and Thoughts on Technology

| Thoughts of Participants on Technology | Yes (%) |
|--|----------|
| Have you ever participated in a technology-related training program? | 17 |
| I think that I am qualified enough to use technological devices. | 69 |
| I think that technological devices are used sufficiently in nursing practices. | 34.5 |
| I think that technology heightens the quality of care provided to patients. | 95 |
| I think that use of technology increases the roles/burden of nurses. | 36 |
| I think that nurses providing care to patients treated with technological devices must take the necessary precautions to protect themselves from the harmful side effects of such devices. | 97 |
| I think that technological devices do more harm than good to the patients due to their potential side effects. | 6 |
| I think that nurses specialized in the use of technological devices are needed. | 85 |
| I trust technological products. | 83.5 |
| I think that devices used in our units do not produce accurate results. | 17 |
| I would prefer to do measurements myself rather than rely on some devices. I avoid using technology. | 10.5 |
| I think that it is unnecessary and a waste of time to use/learn using technology. | 4 |
| I think that technological devices will diminish my role as a caregiver. | 21 |
| I believe that technology will bring benefits to the nursing process. | 92 |
| I think that use of technological devices provides convenience. | 94.5 |
| I believe in the fact that technology is under our control. | 77.5 |
| I like getting information from / talking with my colleagues about technological developments. | 61.5 |
| I think that technology will decrease patient/nurse interaction. | 27.5 |
| I think that there should be technology training programs. | 80 |
| I think that technology will replace nurses. | 16 |
| I find myself too old to keep up with technological developments. | 11 |
| I would not want to work in units where technological devices are intensively used. | 33 |
| I am afraid of developing an addiction to technology. | 28.5 |
| The devices used in my department are too complicated. | 20 |
| I think that the department I work in has sufficient technological equipment. | 39 |
| I think that nurses cannot use / are not qualified enough to use the technological devices properly and accurately. | 69.5 |

Table 3. Relationship of descriptive characteristics with some technological statements

| | | Yes | No | Significance |
|---|-------------------------|-----|-----|---------------------|
| Gender - The devices used in my department are too complicated. | Female | 3 | 41 | x=6.126 p=0.013 |
| | Male | 37 | 119 | |
| Educational Level - I think that nurses specialized in the use of technological devices are needed. | High school | 0 | 2 | x=13.057 p=0.005 |
| | Associate's degree | 28 | 2 | |
| | Graduate degree | 129 | 24 | |
| | Post graduate and above | 13 | 2 | |
| Educational Level - I would not want to work in departments where technological devices are intensively used. | High school | 0 | 2 | x=11.365 p=0.010 |
| | Associate's degree | 16 | 14 | |
| | Graduate degree | 49 | 104 | |
| | Post graduate and above | 1 | 14 | |
| Educational Level - I think that the department I work in has sufficient technological equipment. | High school | 0 | 2 | x=8.026 p=0.045 |
| | Associate's degree | 16 | 14 | |

| | | | | |
|---|-------------------------|-----|-----|----------|
| | Graduate degree | 60 | 93 | |
| | Post graduate and above | 2 | 13 | |
| Educational Level - Have you ever participated in a technology-related training program? | High school | 1 | 1 | x=9.096 |
| | Associate's degree | 10 | 20 | p=0.028 |
| | Graduate degree | 22 | 131 | |
| | Post graduate and above | 1 | 14 | |
| Educational Level - I think that use of technology increases the roles/burden of nurses. | High school | 0 | 2 | x=9.641 |
| | Associate's degree | 8 | 22 | p=0.022 |
| | Graduate degree | 63 | 90 | |
| | Post graduate and above | 1 | 14 | |
| Years of experience - I think that technological devices are used sufficiently in nursing practices. | 1-4 | 12 | 43 | x=11.981 |
| | 5-9 | 16 | 36 | p=0.017 |
| | 10-14 | 16 | 30 | |
| | 15-19 | 9 | 10 | |
| | 20 years and above | 16 | 12 | |
| Years of experience - Have you ever participated in a technology-related training program? | 1-4 | 4 | 51 | x=19.401 |
| | 5-9 | 5 | 47 | p=0.001 |
| | 10-14 | 9 | 37 | |
| | 15-19 | 4 | 15 | |
| | 20 years and above | 12 | 16 | |
| Age - I think that technological devices are used sufficiently in nursing practices. | 20-25 | 4 | 18 | |
| | 26-31 | 22 | 51 | x=15.386 |
| | 32-37 | 16 | 42 | p=0.002 |
| | 38 years and above | 27 | 20 | |
| Age - Have you ever participated in a technology-related training program? | 20-25 | 1 | 21 | x=17.592 |
| | 26-31 | 7 | 66 | p=0.001 |
| | 32-37 | 9 | 49 | |
| | 38 years and above | 17 | 30 | |
| Unit - I would prefer to do measurements myself rather than rely on some devices. I avoid using technology. | Emergency room | 3 | 5 | x=7.780 |
| | Intensive care | 2 | 41 | p=0.020 |
| | Sci | 16 | 133 | |
| Unit - I think that use of technological devices provides convenience. | Emergency room | 6 | 2 | x=6.691 |
| | Intensive care | 42 | 1 | p=0.035 |
| | Sci | 141 | 8 | |
| Unit - I think that technology will decrease patient/nurse interaction. | Emergency room | 5 | 3 | x=6.657 |
| | Intensive care | 8 | 35 | p=0.036 |
| | Sci | 42 | 107 | |
| Unit - I find myself too old to keep up with technological developments. | Emergency room | 0 | 8 | x=8.461 |
| | Intensive care | 0 | 43 | p=0.015 |
| | Sci | 22 | 127 | |

Discussion

In the present study conducted to determine the use of health technologies by nurses and their thoughts on technology, it was detected that nurses had a positive attitude toward technology. Furthermore, an examination of literature studies showed that the number of studies investigating the use of health technologies by nurses and their thoughts on technology was insufficient, and there were only study results indicating the positive attitudes of nurses and nursing students toward information

and communication technologies, internet and computer use (Gundogdu, Erol, Tanrikulu, Filiz, Kuzgun & Dikmen, 2018; Zaim).

A systematic approach is provided for effective use of technologies and management of patient data by nurses during practices. Thanks to the retrieval of patient data within a short time, care needs are identified faster and decision-making and care planning stages are facilitated. Moreover, basing nursing practices on humanistic and holistic philosophical approach revealed the need of nurses

to follow technological developments closely and use them in their practices effectively. In fact, Isik and Kaya (2011) report that nursing organizations accept technology as the basis of nursing practices and required qualifications for nurses must include effective use of technology and possessing the knowledge, skills and attitudes needed for technology. Therefore, since nursing is an important part of healthcare teams, it becomes essential for students to recognize and use information and communication technologies starting from university education.

Literature studies demonstrate that healthcare institutions are making more investments in technology to provide earlier diagnosis and treatment and reduce medical errors, complications, mortality and medical costs. Thus, technology use is regarded as an opportunity to reduce medication errors that result in serious problems in healthcare institutions (Avci, 2014). In this study, it has been detected that nearly all of the nurses trust technological devices, think that devices produce accurate results in medical measurements and would prefer to use devices rather than do manual measurements.

In a study by Erdemir et al. investigating the use of computers and internet by nurses and their thoughts on the value of computer use in nursing, nurses' thoughts on computer use in nursing were examined and a great majority of participants thought that technological devices had positive impacts on the improvement of nursing care, process and practice standards. 55.5% of the nurses reported that use of technological devices would not reduce their occupational autonomy (Erdemir, Hanoglua & Akman, 2015). Similarly, a great majority of nurses participating in our study stated that use of technological devices did not diminish their role as caregivers and it provided benefits to the nursing process.

In the present study, 39% of nurses found the technological equipment in their departments insufficient, 27.5% of them did not think that technology would reduce the patient/nurse interaction, 95% of them thought that technology increased the quality of care and only 16% of them thought that technology would replace nurses. Similarly, in a study by Aktas et al., 58% of participants found the technological equipment in

intensive care units insufficient, 94.2% of them reported that technology affected the empathetic relationship between nurses and patients in a positive way and all of the nurses stated that technology increased the quality of patient care. They also reported in the study that the lowest score in the scale of attitude toward technology was in the subscale "technophobia" and participants were indecisive about whether technology reduced interpersonal interaction and alienated people (Aktas, Koras & Karabulut, 2017).

In another study, 26% of nurses answered "I disagree" to the statement "Use of computers by nurses results in anti-humanitarian care." and this result was concluded to be satisfactory. It is stated in the literature that computers gather a large amount information regarding healthy individuals / patients and facilitate the care and treatment process, however, they reduce the communication with healthy individuals and patients and provide an anti-humanitarian care since they do not have ethical responsibility and judgment characteristics (Softa, Akduran & Akyazi, 2014)

In the study by Aktas et al., it was found that the average total scores from the scale of attitudes toward technology did not vary depending on gender, educational level and years of experience of nurses and there was no statistically significant difference between the scores and variables (Aktas, Koras & Karabulut, 2017). In another study by Kısa and Kaya, however, a significant difference was detected between the attitudes of nurses toward technology and age (Kısa & Kaya, 2006).

In our study, differently from the literature, it was found that gender, educational level, age, years of experience and unit were correlated with certain technology-related statements. It is observed that nurses' awareness rises as their educational level increases. The study also shows that male participants agreed more to the statement "the devices used in my department are too complicated."

Conclusion and Recommendations

Technology has an increasing and developing fundamental role in maintenance of services and recording, storing, sharing and managing information. When used accurately and effectively, technology which is now a part of our daily and

business lives gives the opportunity to provide effective and efficient services in healthcare and education sectors. In this regard, technology is regarded as a building block of nursing practices and effective use of technology is considered as an important qualification in nursing (Aktas, Koras & Karabulut, 2017). In parallel with rapidly growing technology in modern age, it is essential for nurses to closely follow and practice information and technology. Effective use of knowledge, communication and information systems in nursing will result in higher quality treatment and care services offered to individuals (Gundogdu, Erol, Tanrikulu, Filiz, Kuzgun & Dikmen, 2018).

As a result, in order to decrease malpractices, improve clinical decision-making skills, meet increasing expectations of patients and heighten the quality of care, technology-related training programs should be organized as part of in-house continuing education activities and it can be suggested to integrate technology into nursing curricula for all nurse clinicians/instructors and to increase the technological equipment of health institutions (Gundogdu, Erol, Tanrikulu, Filiz, Kuzgun & Dikmen, 2018; Kısa & Kaya, 2006). It must be known that, as a professional nurse, being aware of the new trends that might affect nursing, taking them into consideration and seeking ways to benefit from them will play an important role in constructing the future of nursing education starting from today (Acaroglu, 2014; Bodur & Kaya, 2015).

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