

FEATURE

ARTICLE

Factors Affecting Nurses' Attitudes Toward Computers in Healthcare

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Adapting to technological innovations represents a key process for improving and restructuring healthcare. Technological developments have, in addition to many existing assignments, exposed nursing personnel to new tasks and responsibilities in many areas of practice including home-care, clinic settings, schools, and hospitals.¹⁻⁴

Although the introduction of computers, representing a significant facet of technologic developments, to both daily and professional lives of nurses has been rapid, the literature indicates a resistance by nurses to use of computers in healthcare. Nurses argue that use of computers in healthcare is not in accordance with holistic and humanistic approaches, which represent the main philosophy of nursing, and that computers are complex devices to work with, to justify their resistance to use computers in healthcare.⁵⁻¹² However, it is being increasingly acknowledged in recent years that technology and therefore computerization will contribute to the decision-making capabilities and skills of nurses, improve the quality of healthcare, and reduce the costs of services.^{5,13}

Because of the accelerated development of technology, hospitals have expanded the use of computers to many areas. Initially, areas such as human resources, financial, and logistics systems were computerized. Later on, these systems expanded to include clinical communications and storage of patients' historical data, such as physicians' orders, laboratory results, and computerized nursing care plans. The growth of hospital information systems has also had significant impacts on nursing practice. Integration of computers in the work performed by nurses is an innovation that requires nurses to change their working methods and even their function

INTERNATIONAL

The purpose of the study was to determine factors affecting nurses' attitudes toward computers in healthcare. This cross-sectional study was carried out with nurses employed at one state and one university hospital. The sample of the study included 890 nurses who were selected via a purposive sampling method. Data were collected by using a questionnaire for demographic information and Pretest for Attitudes Toward Computers in Healthcare Assessment Scale v.2. The nurses, in general, had positive attitudes toward computers. Findings of the present study showed a significant difference in attitudes for different categories of age ($P < .001$), marital status ($P < .05$), education ($P < .001$), type of facility ($P < .01$), job title ($P < .001$), computer science education ($P < .01$), computer experience ($P < .001$), duration of computer use ($P < .001$), and place of use of computer ($P < .001$). The results of the present study could be used during planning and implementation of computer training programs for nurses in Turkey and could be utilized in improving the participation of Turkish nurses in initiatives to develop hospital information systems and, above all, in developing computerized patient care planning.

KEY WORDS

Attitudes • Attitude toward computers • Computers • Nursing

in the department. The successful implementation of computer systems in nursing practice is likely to be directly related to users' attitudes toward computerization. Thus, the attitudes nurses have toward the use of computers are very important, and use of computers in healthcare requires that objective and comparative information on how nurses view the use of computers and the factors affecting these attitudes is available. If

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attitudes of nurses are adequately assessed, then implementation strategies can be developed to support nurses who are less willing to accept computerization.^{1,4,14-16}

The study of nurses' attitudes toward computers began in the late 1960s. Numerous studies have examined the importance of nurses' attitudes toward how successfully computers are introduced into a nursing unit. Study designs ranged from one-time descriptive studies examining demographic variables influencing computer acceptance, to studies comparing users with nonusers, and measurement of attitudes before and after computerization. Descriptive studies attempted to correlate nurse attitudes with such variables as age, educational level, and previous computer experience.¹⁶

Summers¹⁷ reviewed more than 11 studies about the attitudes and anxiety of nurses toward hospital computer systems and, based on these studies, reported that nurses expressed fears that computerization may contribute to loss of jobs and/or loss of data and that nurses also expressed fears that more time would be spent with computers and less time with patients.

On the other hand, there are many studies in the literature emphasizing the importance of health informatics.^{2,9,16,18-20} These studies, on this basis, point out a requirement for revision in both the education of nurse candidates and continuous education programs of nurses to include health informatics. Possession of computer skills is a key prerequisite for nurses and nurse candidates to be able to utilize health informatics. In this sense, negative attitudes toward computers represent a potential barrier to computerization of medical records.²¹ In fact, some investigators have reported that nurses experienced difficulties regarding information technology. According to Darbyshire, "Clinicians were finding the everyday use of computerized patient information systems and computer technology far more troublesome and problematic than manufacturers, software developers, and information technology advocates may appreciate."^{22(p94)} However, successful implementation of information technologies would be a significant acquisition for nurses. Pabst et al^{23(p25)} had reported that "nurses who used computerized documentation were able to decrease time spent in documentation activities, and they were able to increase time spent in direct patient care." Johnson et al²⁴ investigated the differences in three areas (nursing time distribution, nurse attitudes toward computerization, and compliance with charting standards) before and after implementation of computerized charting. They found that implementation of computerized charting made up positive changes in these areas.²⁴

Turkish nurses, currently, cannot fully utilize computer technology in their practices, and their use of computerized systems is, in general, limited to some certain functions including recording of nursing practices such as vital signs measurements, keeping records of health-

care products and materials used, supplying these products and materials, implementing nursing management functions, obtaining therapeutic information, recording laboratory function requests and physician requests, and supplying drugs from pharmacies.²⁵ On the other hand, major changes are taking place in healthcare policies in Turkey, and information technology is becoming increasingly involved in the healthcare domain. Nurses in Turkey are required to adapt to this evolution. To achieve this, nursing practices should be integrated to computerized patient information systems in accordance with the nursing process. As a critical step in this process, nurses' attitudes toward computers in healthcare and potential influential factors should be determined. Strategies to enable nurses to use computers in healthcare may be developed in light of the analysis presented herein.

Many nurses use computers in their personal lives as well as during professional practice to collect data, access information, implement actions, and record responses. Nursing educators, leaders, and nurses believe that computer competencies are now essential for nurses. Therefore, attitudes of nurses as members of the healthcare team toward computers should be investigated. Several studies have been conducted worldwide to examine nurses' attitudes toward use of computers and factors affecting their attitudes.^{4-7,9-12,14,15,26-32} However, the number of such studies in Turkey is limited.^{25,33} Therefore, the present study was performed with the purpose of identifying the attitudes of Turkish nurses toward the utilization of computers in healthcare and factors affecting their attitudes.

PURPOSE AND RESEARCH QUESTIONS

The purpose of the present study was to determine factors affecting nurses' attitudes toward computers in healthcare. The research was carried out using a cross-sectional design. Research questions were the following:

- (1) What are nurses' attitudes toward computers in healthcare?
- (2) Are nurses' attitudes related to demographic factors such as sex, age, marital status, education, years of nursing experience, type of facility, job title (nursing director/assistant director/instructor, head nurse of unit, nurse), shift worked (days, nights, or rotation), computer science education, computer experience, duration of computer use, and place of use of computer?

METHODS

Population and Sample

The population of the study included nurses employed at one state and one university hospital. The total number

of nurses employed at these two hospitals at the time of study was 1085: 320 nurses in the state hospital and 765 nurses in the university hospital. The sample included 890 nurses in total (82.03% of all nurses employed at the two hospitals): 268 nurses from the state hospital (83.75% of nurses employed at the state hospital) and 622 nurses from the university hospital (81.31% of nurses employed at the university hospital) chosen among those who were willing to participate via purposive sampling. The paper-based survey was distributed by the nursing director of the university hospital and by the education nurse of the state hospital directly to the nurses in all units. Participants were requested to complete the survey within 24 hours of receipt. Completed surveys were collected back by the nursing director and the education nurse.

Instruments

A questionnaire made up of two parts was used in the study:

Part 1

A structured questionnaire for examining demographic details (sex, age, marital status), professional background (education, years of nursing experience, type of facility, job title, shifts mainly worked), and computer use (computer science education, computer experience, duration of computer use, place of use of computer) was used. The questionnaire was developed by the researcher in light of the literature.^{4-6,9,11,15,27-29}

Part 2

The Pretest for Attitudes Toward Computers in Healthcare Assessment Scale v.2 (PATCH Assessment Scale v.2) was used for examining the nurses' attitudes toward computers in healthcare. The PATCH Assessment Scale

was developed by Kaminski³⁴ in 1996, and its second version was published in 2007. The second version was used in the present study. The scale measures nurses' perceptions and attitudes toward use of computers in healthcare settings. The 40-item, 5-point Likert scale questionnaire consists of positive and negative worded statements. Data on attitude statements were scored as 1 point for "agree strongly," 0.5 point for "agree," 0 point for "not certain," -0.5 point for "disagree," and -1 point for "disagree strongly" (items 1, 2, 4, 6, 7, 8, 11, 12, 16, 17, 18, 19, 21, 24, 29, 31, 33, 34, 36, and 37 of the PATCH Assessment Scale) for positive statements and reverse for the negative statements: -1 point for "agree strongly," -0.5 point for "agree," 0 point for "not certain," 0.5 point for "disagree," and 1 point for "disagree strongly" (items 3, 5, 9, 10, 13, 14, 15, 20, 22, 23, 25, 26, 27, 28, 30, 32, 35, 38, 39, and 40 of the PATCH Assessment Scale). The scores for each statement were added to give an attitude score for each subject. The score range of the PATCH Assessment Scale is -40 to 40, and high scores are indicators of favorable attitudes toward computers in healthcare. Continuous scores were also used to categorize the participants by their attitudes toward computers in healthcare. Each participant was appointed to one of the groups listed in Table 1, based on his/her score from the scale.³⁴

INSTRUMENT VALIDITY AND RELIABILITY

The validity and reliability of the Turkish version of the PATCH Assessment Scale were established by Kaya and Aşti.³⁵ The adaptation of the scale to Turkish language was performed via back-translation, and the translated scale was submitted for expert review to determine the content validity. Its reliability was examined with test-retest reliability and internal consistency, while its validity was examined with criterion-related validity

Table 1

PATCH Assessment Scale Score Interpretations



Points	Interpretations
-40 to -28 Points (group 1)	Positive indication of cyberphobia. Beginner stage in experience with computer basics or applications. Ambivalence or anxiety may occur, related to the use of computers in healthcare. May appreciate help in learning basic computer skills
-27 to -15 Points (group 2)	Indicates some uneasiness about using computers. Very basic knowledge of computer basics and applications. Unsure of usefulness of computers in healthcare
-14 to -4 Points (group 3)	Moderate comfort in using computers. Has basic knowledge of computers and applications. Limited awareness of applications of computer technology in healthcare
-3 to 12 Points (group 4)	Feels comfortable using user-friendly computer applications. Aware of the usefulness of computers in a variety of settings. Has a realistic view of current computer capabilities in healthcare
13 to 26 Points (group 5)	Confident of ability to use a variety of computer programs. Sees computers as beneficial in the development of society. Enthusiastic view of the potential of computer use in healthcare
27 to 40 Points (group 6)	Very confident that they can learn to use a computer to boost creativity and perform routine functions. Recognizes the unique value of using information technology in society. Idealistic, positive view related to computer applications in healthcare

(concurrent validity). The test-retest reliability of items of the PATCH Assessment Scale was 0.20 to 0.77, and 0.85 for the total scale. For internal consistency, the scale's corrected item-total correlation was 0.06 to 0.68, and Cronbach α was .92. Concurrent validity was examined with correlation between Attitudes Toward Computers Scale and PATCH Assessment Scale scores, and there was positively significant correlation ($r = 0.66$, $P < .01$). The findings concerning the reliability and validity of the Turkish version of the PATCH Assessment Scale indicate that this instrument can be used in the studies conducted in Turkey. In this study, Cronbach α values were determined to be 0.92 for PATCH Assessment Scale. In another evaluation that was directed toward the internal consistency of the scale, PATCH Assessment Scale's corrected item-total correlation was found to be 0.05 to 0.60. The data of this study showed parallelism to the study by Kaya and Aşti.³⁵ Therefore, the PATCH Assessment Scale data obtained from the sampling group in the present study were concluded to be reliable.

Ethical Considerations

Approval for using the PATCH Assessment Scale was received from Kaminski. A written approval for the execution of the research was received from the ethics committee of the hospitals where the research data were gathered. The participants were assured that there were no correct or wrong answers, and they were asked to be as genuine as possible. The participants were also told that their responses would be anonymous and that the data were to be used for scientific purposes only.

Data Analysis

The obtained data were analyzed using SPSS version 11.0 (SPSS Inc, Chicago, IL) for Windows. Cronbach α analysis and corrected item-total correlation were used in determining the internal consistency of the scale. Ordinal data were evaluated by means of arithmetic average, SD, and minimum and maximum values, while nominal data were evaluated by frequency and percentage measurements. Differences in proportions between groups were calculated using analysis of variance (ANOVA) models for continuous data.

RESULTS

Nurses' Demographic Data, Professional Characteristics, and Computer Use Background

Ninety-nine percent ($n = 881$) of the participants were female, and the mean age was 34.24 (SD, 7.77) years

(range, 19–59 years). Of the participants, 12.5% ($n = 111$) were graduates of an occupational high school of health, 50.2% ($n = 447$) had an associate's degree, 30.1% ($n = 268$) had a bachelor's degree from a university with 4-year education, and 7.2% ($n = 64$) of the participants had a master's degree or higher. The mean duration of nursing experience was 13.39 (SD, 8.11) years (range, 3 months to 40 years). Of the participants, 81.3% ($n = 724$) were nurses, and 16.1% ($n = 143$) were head nurses of a unit; 77.9% ($n = 693$) indicated that they had an experience of using computers. The variables "duration of computer use" and "place of use of computer" were studied in nurses who had a previous experience of computer use ($N = 693$). Among the nurses who had a previous experience of working with computers ($N = 693$), the mean duration of computer use was 4.45 (SD, 2.77) years (range, 1 month to 12 years). Of the nurses who had an experience with computers ($N = 693$), 32.8% ($N = 227$) had access to computer at home only, while the majority (52.5%; $n = 364$) had access to computers at both work and home (Table 2).

Nurses' Attitudes Toward Computers in Healthcare

The average score the nurses received from the PATCH Assessment Scale was 12.94 from a potential score range of -40 to 40 of the scale (SD, 10.03; range, -19.50 to 40.00) (Table 2). The nurses were categorized into groups shown in Table 1 according to scores they received from the PATCH Assessment Scale, and the distribution demonstrated in Figure 1 was obtained. None of the nurses were assigned to group 1. Most of the nurses were allocated to group 4 (38.2%; $n = 340$) and group 5 (47.2%; $n = 420$), while very few to group 2 (0.4%; $n = 4$). The percentage of nurses in group 3 was 5.7% ($n = 51$). Of the nurses, 8.4% ($n = 75$) were in group 6, which represents the group with the most positive attitude toward computers in healthcare.

Effects of Nurses' Demographic, Professional, and Computer Use Characteristics on Attitudes Toward Computers in Healthcare

Table 2 gives descriptive statistics and ANOVA of the PATCH Assessment Scale total scores by demographic, professional, and computer use characteristics of the nurses; ANOVA showed a significant difference of attitudes for different categories of age ($P < .001$), marital status ($P < .05$), education ($P < .001$), type of facility ($P < .01$), job title ($P < .001$), computer science education ($P < .01$), computer experience ($P < .001$) and

Table 2



Descriptive Statistics and ANOVA of Total Attitude by Nurses' Background Characteristics (n = 890)

Characteristics	No. (%)	Total Score ^a Mean (SD)	ANOVA	
			F/t	P
Sex			-1.220	.223
Female	881 (99.0)	12.90 (10.04)		
Male	9 (1.0)	17.00 (8.41)		
Age, y			7.577	.000
≤25	80 (9.0)	14.07 (10.07)		
26-33	377 (42.4)	14.16 (9.75)		
34-41	311 (34.9)	12.58 (10.51)		
≥42	122 (13.7)	9.39 (8.75)		
Age, mean (SD)		34.24 (7.77) (range, 19-59)	r = -0.178	.000
Marital status			-2.172	.030
Married	504 (56.6)	12.31 (10.42)		
Single	386 (43.4)	13.77 (9.45)		
Education			33.360	.000
High school	111 (12.5)	10.28 (9.88)		
2-y Degree	447 (50.2)	11.03 (9.63)		
Bachelor's degree	268 (30.1)	15.03 (9.44)		
Master's or higher	64 (7.2)	22.21 (8.46)		
Years of nursing experience			0.850	.494
≤5	173 (19.4)	13.99 (9.50)		
6-11	263 (29.6)	12.99 (10.71)		
12-17	131 (14.7)	11.91 (10.47)		
18-23	245 (27.5)	12.83 (9.40)		
≥24	78 (8.8)	12.58 (10.02)		
Years of nursing experience, mean (SD)		13.39 (8.11) (range, 3 mo to 40 y)	r = -0.035	.295
Type of facility			2.632	.009
University hospital	622 (69.9)	13.52 (10.07)		
Public hospital	268 (30.1)	11.60 (9.83)		
Job title			10.575	.000
Nursing director/assistant director/instructor	23 (2.6)	20.23 (6.02)		
Head nurse of unit	143 (16.1)	14.96 (8.77)		
Nurse	724 (81.3)	12.32 (10.23)		
Shifts mainly worked			0.511	.600
Days	412 (46.3)	12.76 (10.36)		
Nights	44 (4.9)	11.84 (14.34)		
Rotation	434 (48.8)	13.23 (9.18)		
Computer science education			3.139	.002
Yes	362 (40.7)	14.21 (9.91)		
No	528 (59.3)	12.07 (10.04)		
Computer experience			4.260	.000
Yes	693 (77.9)	13.70 (9.70)		
No	197 (22.1)	10.28 (10.73)		
Duration of computer use, ^c y			23.668	.000
<1	101 (14.6)	9.63 (10.12)		
1-3	191 (27.6)	10.84 (9.53)		
3-5	196 (28.2)	14.87 (8.51)		
>5	205 (29.6)	17.25 (9.25)		
Duration of computer use, ^c mean (SD)		4.45 (2.77) (range, 1 mo to 12 y)	r = 0.314	.000
Place of use of computer ^{b,c}			22.395	.000
At work only	102 (14.7)	14.62 (10.97)		
At home only	227 (32.8)	10.30 (9.30)		
Both home and at work	364 (52.5)	15.56 (9.01)		
Overall score	890 (100)	12.94 (10.03) (range, -19.50 to 40.00)		

^aTotal score indicates summarized score of all items (higher score represents more positive attitudes toward computers; average total score, 12.94, average score for the 40-item part of the questionnaire).

^bMultiple choices were possible.

^cNurses who use computer answered (N = 693).

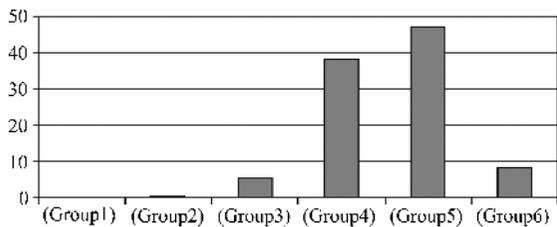


FIGURE 1. Nurses' attitudes toward computers in healthcare.

duration of computer use ($P < .001$), and place of use of computer ($P < .001$).

Effects of nurses' age on PATCH Assessment Scale points were examined with the secondary multiple comparison analysis (Tukey least significant difference) and showed statistically significant differences between the age groups 25 years or younger (≤ 25) and 42 years or older (≥ 42) ($P = .006$), 26 to 33 and ≥ 42 years ($P = .000$), and 34–41 and ≥ 42 years ($P = .014$). The highest attitude score was in the 26- to 33-year age group, followed by ≤ 25 -year, 34- to 41-year, and ≥ 42 -year age groups, respectively. In addition, an assessment of correlation between PATCH Assessment Scale scores and nurses' ages revealed reduced PATCH Assessment Scale scores with increasing age ($r = -0.178$, $P = .000$), indicating a negative effect of age on attitudes toward computers in healthcare (Table 2).

When the effects of nurses' nursing education variable on PATCH Assessment Scale points were examined with the secondary multiple comparison analysis (Tukey least significant difference), the differences between high school and bachelor's degree groups ($P = .000$), high school and master's degree or higher level of education groups ($P = .000$), 2-year degree and bachelor's degree groups ($P = .000$), 2-year degree and master's or higher groups ($P = .000$), and bachelor's degree and master's degree or higher groups ($P = .000$) were determined to be statistically significant. The highest mean PATCH Assessment Scale score was in the master's degree or higher level of education group, followed by bachelor's degree, 2-year degree and high school groups, respectively (Table 2).

An analysis of the effects of nurses' job title on PATCH Assessment Scale points using the secondary multiple comparison analysis (Tukey least significant difference) demonstrated significant differences between nursing director/assistant director/instructor and head nurse ($P = .048$), nursing director/assistant director/instructor and nurse ($P = .000$), and head nurse and nurse ($P = .010$) groups. The mean PATCH Assessment Scale score was found to be the highest in the nursing directors/assistant directors/instructors group, followed by head nurses and nurses groups, respectively (Table 2).

When the effects of nurses' duration of computer use variable on PATCH Assessment Scale points were examined with the secondary multiple comparison analysis

(Tukey least significant difference), the differences between the groups with < 1 and 3–5 years ($P = .000$), < 1 and < 5 years ($P = .000$), 1–3 and 3–5 years ($P = .000$), 1–3 and < 5 years ($P = .000$), and 3–5 and < 5 years ($P = .049$) were noted to be statistically significant. The highest mean PATCH Assessment Scale score was obtained by nurses with 5 or more years of computer experience, and the mean PATCH Assessment Scale scores declined with decreasing duration of experience with computers. In addition, an evaluation of correlation between PATCH Assessment Scale scores and duration of computer use showed higher PATCH Assessment Scale scores with increasing duration of computer use ($r = -0.314$, $P = .000$), indicating a positive effect of experience with computers on the attitudes toward computers in healthcare (Table 2).

The effects of nurses' place of use of computer variable on PATCH Assessment Scale points were examined with the secondary multiple comparison analysis (Tukey least significant difference), and statistically significant differences between at work only and at home only ($P = .000$), at home only and both home and at work ($P = .000$) groups were determined. The highest PATCH Assessment Scale score was obtained by nurses using computers both at home and at work, followed by those using computers at work only and at home only (Table 2).

DISCUSSION

Nurses' attitudes toward computers may potentially affect their utilization of nursing informatics.^{2–5,8–10,16–20,36,37} Attitudes of Turkish nurses toward computers and factors that affect their attitudes have been investigated in the present study.

The nurses in the present study displayed a positive attitude toward use of computers in healthcare as assessed by the scores they obtained from the PATCH Assessment Scale. The categorization of nurses into groups based on their PATCH Assessment Scale scores distributed the majority of the nurses to groups 4 and 5. Nurses in group 4 feel comfortable using user-friendly computer applications, are aware of the usefulness of computers in a variety of settings, and have a realistic view of current computer capabilities in healthcare. Nurses in group 5, on the other hand, are confident of their ability to use a variety of computer programs, see computers as beneficial in the development of society, and have an enthusiastic view of the potential of computer use in healthcare.

Simpson and Kenrick⁹ expressed that nurses' computer-related attitudes generally were positive. McLane³⁰ reported that staff held generally positive perceptions about the use of computers in healthcare. Shoham and Gonen¹⁵ found that the attitudes of the nurses toward use of computers were positive, in both the general attitude index and in the specific attitude index for nursing. There are

more such findings reported in the literature. In accordance with the result of the present study, studies in the literature mostly indicate that nurses have a positive attitude toward use of computers in healthcare.

When ANOVA was applied to data, significant differences among the different age groups were observed. This finding was consistent with the findings of Brodt and Stronge.³⁸ The findings of the present study contradict those of Sultana,³² who found in their studies that age was not influential in attitudes toward computer in healthcare. Similarly, Bongartz³⁶ found that nurses' attitudes toward computers and their age were not significantly correlated. Simpson and Kenrick⁹ reported significant differences in relation to age, length of service as a trained nurse, job title, type of nursing unit, and length of service at the study hospital.

No findings regarding the effect of nurses' marital status on their attitude toward use of computers in healthcare were identified in the literature. In the present study, single nurses' attitude toward computers in healthcare was noted to be significantly more positive when compared with married nurses' attitudes. This finding was associated with single nurses' opportunity to spare more time for using computers also outside their working environment. As a matter of fact, the most positive attitudes toward use of computers were noted for nurses who were able to use computers both at home and work in the present study.

Research on nursing attitudes has consistently demonstrated that education is related to attitudes about computers. Most studies agree that the more education a healthcare worker has, the more receptive they are to computers.^{7,29} Similarly, in the present study, more positive attitudes were determined for nurses with higher level of nursing education.

An analysis of the effects of nursing experience in years on nurses' attitudes toward computers in healthcare did not demonstrate a significant difference among groups with different years of experience in nursing. Similarly, subjects were grouped according to nursing experience as <5, 6 to 10, 11 to 15, 16 to 20, and 21 years and above in Sultana's³² study, and there were no significant differences between nursing experience years and attitude score toward computers. Unlike the findings of the present study, a significant difference was found in the study of Brodt and Stronge,³⁸ who found that those who had worked longer in nursing had a more positive attitude toward computers. While some studies supported the idea that those employed in healthcare less than 1 year and more than 10 years had less positive attitudes than their midrange counterparts, some studies demonstrated that the longer the employment in healthcare, the more positive is the attitude toward computers.^{7,37}

Findings of the present study showed a significant difference in the attitudes of nurses with different levels of

computer science education. Ball et al²⁶ surveyed nurses as to their attitudes toward hospital computers and found that attitudes toward or reactions to computers can be changed with information. On the other hand, Merrow³¹ performed a study to describe the knowledge of and attitudes toward computers of graduate nursing students before and after an elective course of Computers in Nursing. Merrow³¹ found in this study that self-rated knowledge of computer terminology scores was significantly higher at the conclusion of the course, and students' attitudes were positive prior to the course and did not change significantly during the course.

Nurses' attitudes based on computer experience were also found to be significantly different in the present study. Bongartz³⁶ reported that nurses who worked in hospitals without computers had higher mean scores, indicating a more favorable attitude toward computers; they had a greater concern that computers were a threat to their job security, anticipated that computers might provide more time for patient care, and thought that computers could speed the process of information handling, as compared with nurses who used computer systems. Shoham and Gonen¹⁵ found that nurses experienced with use of computers have more positive attitudes toward the use of computers than those of the inexperienced ones. The present study's result is consistent with the findings of Bongartz³⁶ and Shoham and Gonen,¹⁵ who found that nurses exposed to computers showed more positive attitudes toward computers. Contrary to the present study, Sultana³² found no significant differences in terms of attitudes toward computers among subjects categorized into different groups by their present computer experience, that is, less than 1, 1, 2, 3, 4, and 5 years.

Turkish nurses are required to familiarize themselves with computerized health information systems to adapt to changes being implemented in the health policies of Turkey. To facilitate this, further studies on the attitudes of nurses toward use of computers in healthcare and other factors that may be associated with negative attitudes are indicated.

Limitations

The research was conducted in only two hospitals in Turkey. The results of the study can be generalized to the nurses in the hospitals where the research was conducted and are not representative of all nurses in Turkey. Additional studies should be carried out at other hospitals.

CONCLUSION

The nurses in the present study demonstrated a positive attitude toward use of computers in healthcare. The findings of the present study suggest that age, marital

status, nursing education, type of facility, job title, computer science education, computer experience, duration of computer use, and place of use of computer are important parameters that substantially contribute to the development of positive attitudes toward computers.

Significance of the Study

Nurses' attitudes toward computers play a significant role in successful implementation of information technologies in healthcare. Today, health informatics has a widespread use and has become an undeniable fact of our age. Nurses, as members of healthcare teams, should use health informatics. If nurses do not use health informatics and computer technologies, health informatics may not include nursing informatics. Besides, nurses not utilizing health informatics will not be able to view the entries of other healthcare professionals, which may result in communication issues within the team. Nurses' positive attitudes toward computers in healthcare will ensure effective use of computers in this domain and will include nursing care in health informatics, which, in turn, will contribute to improving the quality of nursing care. Although nurses' positive attitudes toward computers in healthcare alone will not guarantee successful implementation, developing favorable attitudes in nurses toward this technology is an essential step toward successful implementation of nursing informatics. The present study is a pilot research looking into the attitudes of Turkish nurses toward computers. The results of the present study are believed to provide guidance in planning and implementation of computer training programs for nurses in Turkey, in improving the participation of Turkish nurses in initiatives to develop hospital information systems and, most importantly, in developing computerized patient care planning.

Nurses' positive attitude toward computers in healthcare is a prerequisite for implementing computerized care planning. The findings of the present study are similar to many other studies from several countries worldwide. On the other hand, there should also be a continuous organizational work in place to improve nurses' attitudes that will result in adoption and proper use. Factors affecting nurses' attitudes toward computers in healthcare should be taken into consideration in attempts to develop positive attitude in nurses toward use of computers in nursing care. It is thought that the results of the present study will be helpful in determining these factors. Therefore, it is concluded that all nurses can benefit from the present study's results.

In other words, although the findings of the present study cannot be directly applied to all nurses everywhere, it can certainly set a focus for all nurses to consider the implementation of computers in healthcare.

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