ORIGINAL PAPER

The Belief and Opinions of Nurses on the Electronic Patient Record System

Fatma Ay, PhD
Assistant Professor, İstanbul University, Faculty of Health Science, Bakırköy, Istanbul, Turkey

Şehrinaz Polat, PhD
İstanbul University, School of Medicine, Manager of School of Medicine' Hospital Nursing Department, Çapa, Istanbul, Turkey

Corespondence: Fatma Ay, Assistant Professor, İstanbul University, Faculty of Health Science, Demirkapı Caddesi, Karabal Sokak, Ruh ve Sinir Hastalıkları Hastanesi Bahçeiçi, 34740 Bakırköy Istanbul, Turkey. e-mail: fatmaay@yahoo.com

Abstract

Objective: This study was conducted in order to determine the usage of the electronic patient record system, the reasons and limitations behind the system not being used, the opinions and beliefs of the nurses about the system.

Materials-Methods: A questionnaire prepared by the authors was used as an instrument of data collection. The data obtained from the questionnaires was evaluated in a computer medium. Frequency presentation was used for the descriptive statistics of the data, while the Anova test was used for comparisons between groups.

Results: A majority of the nurses who participated in the study were female, between 20-30 years of age, have a bachelor's degree. While the nurses reported using the medicine requisition screen on the system the most, they pointed out the automation system and the insufficient number of computers as the greatest problems. Most of the nurses thought that the system was insufficient and had to be changed and improved. While nurses between the ages of 31 and 40 mostly thought that electronic records reduced the orderliness in nursing applications and patient care, those who have been working for between 1 and 5 years thought otherwise.

Conclusion: While the nurses have positive inclinations about the electronic patient record system, they think that the current system is not appropriate for recording their professional applications and should be changed and improved. According to the findings of our study, especially age and the duration for which they have worked in this occupation affect their opinions and beliefs on the usage of electronic records.

Key Words: Nursing Informatics, Electronic Medical Record, Health Information Technology, Nursing, Medical Informatics

Introductıon

The use of computers in the health care industry is becoming the Standard (Jha et al., 2009; Poissant, pereira, Tamblyn, Kawasumi, 2005). The formation and improvement of Electronic Patient Records (EPR) is very important in increasing the quality of health care services and developing effectiveness in the field. For this reason, there has been a significant increase in the usage of electronic patient and medical records in hospitals (Mekhijian et al., 2002; Fung et al., 2004; Pizzi et al., 2005; Ömürbek, 2009).

As computers become more commonly implemented in health care services, their impact on the health care sector increases. The implementation of computers has an impact of qualitative conversion on nursing services. In the future, computers will continue to affect the health care environment, individuals and the profession of nursing (Ay, 2009). The Electronic Patient Record (EPR) system significantly supports and helps the daily duties of nurses through electronic data processes (Burkle et al., 2001; Likourezos et al., 2004).

Nurses are the largest health care crew group who provide direct care to the patient, determine their needs, and decide which materials will be used where and when, also making them the primary users of the computerized system (Hovenga, Gadre & Heard, 2005; Park, Cho &

Byeun, 2007). In the 1980s there was dramatic growth in development of computerized documentation systems intended to assist nurses (Burnie, 2010). In recent years, information systems have been started to be seen as a necessity for the planning, recording and transfer of nursing services in an electronic medium (Erdemir, Hanoğlu & Akman, 2005). However, although nursing applications form a significant part of health care services, those applications aren't fully included in hospital information systems and electronic record systems (Erdemir, Hanoğlu & Akman, 2005).

According to Lee (2004), nurses represent the largest technology user group in health care organizations. It is important to evaluate nurses' perceptions of use of EMR in order to determine and decrease barriers to acceptance of this information technology. Nurses are focused on patient care, and the integration of computers as documentation tools has proven challenging (Lee, 2004). Organizational issues may include lack of end user input, design issues, educational, hardware, and software concerns (Darbyshire, 2004; Lee, 2006; Lee, 2008). Behavioral issues may be attributed to attitude, perception, and satisfaction toward information technology, specifically computerized documentation systems (Burkle et al., 2001; Darbyshire, 2004; Moody, Slocumb, Berg & Jackson, 2004; Darbyshire, 2004; Moody et al., 2004; Lee et al., 2005; McLane, 2005; Smith et al., 2005).

Even though nurses use electronic patient records heavily in hospitals, there has been very little research on the opinion and assessments of nurses on the EMR system in our country and the world in general. In this study, the opinions of the nurses on the electronic patient record system were evaluated in the context of purpose of usage, status of usage, shortcomings and advantages-disadvantages.

Materials and Methods

This descriptive study was conducted in order to determine if the electronic record system, which helps the nurses and provides time and monitoring benefits, was used, why it wasn't used, its shortcomings and the opinions of nurses on the system.

Data Collection: A questionnaire prepared by the authors and a 5 answer Likert type form prepared by referring to the results of similar studies were used in the study.

Data Analysis: The data obtained from the questionnaires was evaluated in a computer medium. Frequency presentation was used for the descriptive statistics of the data, while the Anova test was used for comparisons between groups. The post-hoc statistics were used to determine the source of differences for the differences between groups in the result found to be statistically meaningful by the Anova test. The value $p \leq 0.05$ was interpreted as "statistically meaningful".

Ethical Considerations: An Ethical Board approval was taken from the Istanbul School of Medicine in the Istanbul University, and legal permissions were taken from the Nursing Services Head Office and the Medical School Dean's Office of the same institution.

Sample Selection: The universe of the study was formed of 1100 nurses working in various divisions of the Istanbul School of Medicine in the University of Istanbul. Nurses who didn't wish to participate and those that couldn't be reached for reasons such as leaves of absence were excluded, and 632 (54.64%) nurses were given questionnaires. 601 nurses who completed the questionnaire formed the sample of the study.

Results

The majority of the participating nurses were female, 50.25% were between 20-30 years of age, 51.91% had a bachelor's degree, 45.92% had worked for 1-5 years and 89.02% served as clinical nurses (Table 1).

A 46.26% of the nurses found their skill in computer use sufficient, and 83.44% stated that they used computers both at work and home. While the nurses reported using the medicine requisition screen on the system the most, they pointed out the automation system and the insufficient number of computers as the greatest problems (Table 2). According to Table 3, while nurses state that they can use their current electronic patient record system effectively, a majority thinks that the system is

Table 1. The characteristics of nurses (n=601)

		n	%
Gender	Female	566	94.18
	Male	35	5.82
Age	20-30	302	50.25
	31-40	161	26.79
	41 years and over	138	22.96
Marital status	Married	277	46.09
	Single	324	53.91
Training	High school	44	7.32
	Associate degree	199	33.11
	Bachelor's degree	312	51.91
	Graduate	46	7.65
Total run time	1-5	276	45.92
	6-10	58	9.65
	11-15	85	14.14
	16-20	56	9.32
	21-25	75	12.48
	26 years and over	45	7.49
	Unanswered	6	1.00
Task	Clinical nurse	535	89.02
	Nurse in charge	46	7.65
	Nursing Services Officer	10	1.66
	Other	10	1.67

Table 2. The characteristics of nurses regarding computer use

Computer use	Statements	n	%
How would you rate your competency in computer use?	Very competent	68	11.31
	competent	278	46.26
	Moderately competent	218	36.27
	Not competent /	33	5.49
	Not competent at all	4	0.67
How would you define your frequency of computer use?	I use it only at work	62	10.16
	Gerek duydukça hem işte hem evde kullanıyorum	509	83.44
	I use it only at home	35	5.74
	Other	4	0.66
How would you define your purpose in computer use?*	I use it for communication	459	75.25
	I use it for reading newspapers	353	57.87
	I use it for work	540	88.52
	I use it for helping my child's homework	108	17.70
	I use it for browsing the Internet	492	80.66
	I use it for watching movies	275	45.08
	I use it for playing computer games	186	30.49

	I use it for bank services	177	29.02
	Other	4	0.66
Which applications do you use on the computer at work?*	Writing a report	138	22.62
	Searching the literature	202	33.11
	Reading about daily news or accessing various information via the Internet	180	29.51
	Entering patient information	277	45.41
	Accessing patients' background information	101	16.56
	Planning and screening prescriptions	159	26.07
	Recording and providing information about the patients' care and treatment	207	33.93
	Entering information about incoming material	434	71.15
	Controlling laboratory results	105	17.21
	Recording the physicist's requests	126	20.66
	Providing medicine and medical products	382	62.62
	Writing task schedules	51	8.36
	Other	7	1.15
What are the difficulties you face during computer use at work?*	Work load	357	58.52
	Being incompetent in computer use	61	10.00
	Problems about the hospital automation system	281	46.07
	Not having enough computers	233	38.20
	The absence of training or information regarding the hospital automation system	79	12.95
	The hospital automation system is not suitable for recording nursing functions	152	24.92
Which process screen do you use the most in the hospital automation system?*	The check-out of medical products	280	45.90
	Medicine request approvals	400	65.57
	The check-out of medicine from the mini storage	405	66.39
	Cancellation of medicine-consumable use records	134	21.97
	Returning the medicine/consumables to the pharmacy	94	15.41
	Entering laboratory requests	60	9.84
	Patients epicrisis page	12	1.97
	Investigating hospital archieves	87	14.26
	Patient food-ration record screen	103	16.89
	Patient companion records	24	3.93
	Medical procedure records	342	56.07
	Other	4	0.66

***More than one answer was given.**

Table 3. Nurses' opinions about the electronic record system they use (n=601)

Statements	Yes		No		No response	
	n	%	n	%	n	%
Can you use the electronic record system effectively?	373	62.06	192	31.95	35	5.82
Do you think the electronic record system you use enables you to record all of the applications you perform?	202	33.61	352	58.57	47	7.82
Do you find the electronic record system you use competent?	143	23.79	381	63.39	77	12.81
Do you think that the electronic record system you use should be changed?	344	57.24	192	31.95	65	10.82
Do you think that the electronic record system you use should be upgraded?	464	77.20	77	12.81	60	9.98
Do you think that the electronic record system you use adds an extra burden to your work load?	320	53.24	227	37.77	54	8.99
Do you think that the electronic record system you use facilitates your work?	237	39.43	302	50.25	62	10.32
Did the information technologies division ask for your opinions about the electronic record system you use?	51	8.49	500	83.19	50	8.32
If your answer is "no". would you like to report your opinion?	454	75.54	67	11.15	80	13.31
Did you report the problems and your suggestions regarding the electronic record system to the information technologies division or your manager?	265	44.09	270	44.93	66	10.98
If your answer is "yes", was the system modified?	98	16.31	238	39.60	265	44.09
Does the information technologies division solve the problems you experience with the electronic record system?	258	42.93	239	39.77	104	17.30
Are you satisfied with the electronic record system you use?	206	34.28	308	51.25	87	14.48
Do you think that the electronic record system you use should be changed completely?	233	38.77	280	46.59	88	14.64
Did you think that you needed to receive training about the electronic record system you use while you were performing your tasks?	295	49.08	252	41.93	54	8.99
Was a training program provided for you about using the hospital automation system?	389	64.73	155	25.79	57	9.48

Table 4. Nurses' opinions regarding the effects of the electronic record system on nursing applications and the comparison of demographic characteristics*

Statements	Nurses' opinions										The comparison*					
	I disagree		I slightly disagree		I am uncertain		I slightly agree		I agree		Training		Age		Total run time	
	n	%	n	%	n	%	n	%	n	%	F	Sig.	F	Sig.	F	Sig.
It facilitated developing effective management systems in the field of nursing.	109	18.14	56	9.32	105	17.47	180	29.95	129	21.46	0.40	0.75	1.12	0.33	3.13	0.01
It facilitated creating a patient care database.	129	21.46	63	10.48	89	14.81	162	26.96	134	22.30	0.23	0.88	2.40	0.09	1.15	0.33
It expedited the patient care database access.	135	22.46	59	9.82	84	13.98	147	24.46	155	25.79	0.03	0.99	1.71	0.18	1.03	0.40
The quality of patient care increased.	166	27.62	80	13.31	113	18.80	146	24.29	86	14.31	0.91	0.44	1.99	0.14	2.40	0.04
It facilitated monitoring nurses' performance.	138	22.96	57	9.48	91	15.14	175	29.12	120	19.97	1.78	0.15	7.03	0.00	3.70	0.00
It increased the efficacy of nurses' performance.	174	28.95	64	10.65	133	22.13	128	21.30	76	12.65	1.06	0.37	2.16	0.12	3.91	0.00
It facilitated determining nurses' bonuses according to their performance.	214	35.61	37	6.16	142	23.63	102	16.97	84	13.98	0.13	0.94	5.00	0.01	3.34	0.01
It facilitated monitoring tasks and work.	142	23.63	64	10.65	69	11.48	177	29.45	133	22.13	0.66	0.58	2.13	0.12	1.99	0.08
It facilitated the recording of procedures.	77	12.81	50	8.32	66	10.98	180	29.95	216	35.94	0.21	0.89	4.99	0.01	4.42	0.00
It organized procedure records.	67	11.15	45	7.49	76	12.65	183	30.45	215	35.77	0.56	0.64	4.36	0.01	2.98	0.01
It facilitated the access to patient records.	59	9.82	46	7.65	66	10.98	205	34.11	215	35.77	1.11	0.34	3.87	0.02	1.79	0.11
The nursing services became more organized and effective.	132	21.96	55	9.15	118	19.63	181	30.12	97	16.14	0.35	0.79	5.38	0.00	5.31	0.00
The amount of tasks such as delivering records and test results decreased.	155	25.79	65	10.82	116	19.30	143	23.79	108	17.97	0.36	0.78	5.05	0.01	3.21	0.01
It expedited the access to product and inventory records.	61	10.15	51	8.49	92	15.31	179	29.78	206	34.28	0.55	0.65	2.23	0.11	1.31	0.26
It expedited the determination and provision of needs and statistics regarding consumables.	53	8.82	49	8.15	92	15.31	181	30.12	219	36.44	0.33	0.80	0.70	0.50	0.86	0.51
It facilitated conducting and monitoring procedures regarding the employees' vacations.	78	12.98	41	6.82	170	28.29	152	25.29	146	24.29	1.49	0.22	5.38	0.00	2.17	0.06
Statistical information can be calculated reliably and fast.	79	13.14	34	5.66	153	25.46	173	28.79	144	23.96	2.42	0.07	7.02	0.00	4.04	0.00

It expedited the database access.	65	10.82	53	8.82	113	18.80	190	31.61	153	25.46	0.35	0.79	3.69	0.03	1.78	0.11
It organized patient care.	129	21.46	81	13.48	116	19.30	171	28.45	87	14.48	1.37	0.25	4.30	0.01	4.55	0.00
It increased the time spared for patient care.	188	31.28	56	9.32	140	23.29	122	20.30	76	12.65	0.24	0.87	3.86	0.02	2.31	0.04
It expedited access to patients' test results.	79	13.14	54	8.99	78	12.98	188	31.28	185	30.78	0.74	0.53	2.50	0.08	3.27	0.01
It expedited access to patient information in case of readmissions.	43	7.15	46	7.65	75	12.48	178	29.62	250	41.60	3.50	0.02	5.81	0.00	2.83	0.02
It facilitated procedures regarding hospitalization and discharge.	45	7.49	45	7.49	103	17.14	171	28.45	222	36.94	0.83	0.48	7.65	0.00	3.31	0.01
The tests, the investigations, and the treatments became more organized and effective.	66	10.98	49	8.15	92	15.31	202	33.61	179	29.78	0.85	0.47	5.46	0.00	1.74	0.12
It enabled nurses to perform their genuine tasks pertaining to their profession.	174	28.95	57	9.48	126	20.97	151	25.12	74	12.31	0.58	0.63	2.84	0.06	1.52	0.18
It enabled instant access to test and investigation results.	80	13.31	54	8.99	77	12.81	176	29.28	199	33.11	1.23	0.30	4.82	0.01	2.63	0.02
It enabled conducting treatment without errors.	153	25.46	64	10.65	136	22.63	160	26.62	70	11.65	0.28	0.84	4.44	0.01	3.09	0.01
It enabled regular monitoring of treatment.	129	21.46	71	11.81	105	17.47	177	29.45	105	17.47	0.32	0.81	4.71	0.01	2.99	0.01
Nurses can spare more time for patient care and treatment since care and treatment are now more organized.	152	25.29	75	12.48	140	23.29	141	23.46	77	12.81	0.11	0.95	4.80	0.01	4.55	0.00
It facilitated calculating hospital receipts.	56	9.32	29	4.83	178	29.62	144	23.96	173	28.79	0.26	0.85	3.68	0.03	2.36	0.04
It facilitated making requests for the medical procedures.	66	10.98	50	8.32	95	15.81	190	31.61	188	31.28	0.54	0.65	4.01	0.02	2.33	0.04
It increased hospital costs.	56	9.32	83	13.81	294	48.92	55	9.15	87	14.48	2.35	0.07	3.24	0.04	2.67	0.02

*Statements which were significantly correlated are presented in the table. Level of significance was assigned as $p < .05$.

insufficient and should be changed and improved.

More than 50% of the nurses stated that the system caused an extra workload and didn't help at all. Of the participants, 83.19% stated that they weren't asked about the electronic record system they were using, 75.54% stated that they would like to have a say in the matter, and 51.25% stated that they weren't happy with the record system they were using.

When Table 4 is examined, it can be seen that nurses think that the electronic record system doesn't increase patient care quality or improve the time requirements for care, that it doesn't provide workplace efficiency, that the records aren't used in performance based compensation, and that it doesn't prevent errors and deficiencies in treatment. In contrast to these negative opinions, many of the nurses think that the electronic record system speeds up database access, helps recording procedures, makes the records more organized, makes accessing patient information and test-inspection results easier and faster, and makes accessing inventory records easier.

The ANOVA was used to determine if the statements about the usage of ERS showed difference in accordance with the demographic variables of the nurses. The post-hoc statistics were used to determine the source of differences for the differences between groups in the result found to be statistically meaningful by the ANOVA. However, when Post-Hoc tests were applied to all of the statements which were found to be statistically meaningful by the ANOVA, a meaningful difference couldn't be found. Only the source group for the differences in the statements showing meaningful differences between the groups was stated below.

The Education Variable: When an evaluation of whether the statements about the use of ERS in the hospital varied according to the education variable, it was found that the nurses with associate degrees believed that " ERS made accessing patient information instantly when a patient returns to the hospital possible" more than those with bachelor's degrees (F=3.50, p. $p \leq 0.05$) (Table 4).

The Age Variable: As a result of the statistical analysis according to age groups, the nurses in the 20-30 age group believe more that the ERS helps in automatically determining bonuses according to performance and raises hospital costs, while they believe less that it helps in employee related processes like recording and monitoring leaves of absence, speeds up access to the database, provides instant patient information access for returning patients and makes the calculation of bills easier (Table 4, $p \leq 0.05$).

Compared to other age groups, less of the nurses in the 31-40 age group believe that the ERS makes recording procedures easier, that it increases order and effectiveness in nursing applications, provides order in patient care, increases the time allotted for patient care, provides order in care and treatment, provides more time for the care and treatment of the patient, and makes requisitions for procedures easier (Table 4, $p \leq 0.05$).

Compared to other age groups, more of the nurses over the age of 41 believe that the ERS helps monitor the working of the nurses, provides order in procedure records, makes accessing patient information easier, reduces workloads such as the distribution of records and test results, forms instant and complete statistical information, makes patient entry and discharge easier, makes the tests-inspections and treatment of patients more organized and efficient, provides instant access to test-inspection results, helps complete and correct treatments to be provided to patients, and provides organized monitoring for treatments (Table 4, $p \leq 0.05$).

The Total Duration of Occupation Variable: Compared to other groups, more of the nurses with a total duration of occupation between 1-5 years believe that ERS increases organization and efficiency in nursing applications, while less believe that it provides instant and complete statistical information. Less of the nurses with a total duration of occupation between 6-10 years believe that ERS makes developing effective management systems in nursing easier and increases workplace efficiency for nurses. Less of the nurses with a total duration of occupation between 11-15 years believe that ERS makes the recording of procedures easier, provides order in patient care and treatment and increases the time allotted for the treatment of patients.

More of the nurses with a total duration of occupation between 16-20 years believe that ERS provides order in patient monitoring and

increases access speed to the required tests/inspections (Table 4, $p \leq 0.05$).

Duration working in the current division: When an evaluation of whether the statements about the use of ERS in the hospital varied according to the variable of the duration working in the current division, it was found that only the belief pertaining to the increase it provided in the time allotted to patient care differed. However no meaningful difference was found after a Post-Hoc test.

Discussion

Nurses' had have positive perceptions regarding decreased work load and improved quality of documentation, in contrast, nurses also reported environmental and system barriers (Moody et al., 2004). In our study, 58.57% of the nurses stated that the system they used wasn't appropriate for recording the applications they performed, and 63.39% stated that the system wasn't sufficient for such recording. Of the participants, 83.19% stated that they weren't asked about the electronic record system they were using, 75.54% stated that they would like to have a say in the matter (Table 2).

In the literatüre, perception of confidence was studied in relation to nurses and computer acceptance. While the confidence perceptions of the nurses on computer use are high, their confidence perceptions on software applications are low (Ammenwerth, Mansmann, Iller & Eichstadter, 2003; Eley et al, 2008). Our study found high computer use rates among nurses as well (Table 2). This result is similar to the findings of Köse (2012). According to those results, it can be stated that nurses are proficient computer users.

According to Ammenwerth et al. (2003) study, previous computer knowledge and acceptance of nursing process also influenced acceptance of computerized nursing documentation systems (Ammenwerth et al., 2003). Only 22.62% of the nurses stated that they used computers to write their reports in our study (Table 2). Since there are no records pertaining to nursing processes in the current ERS, nurses only use the system in records concerning reports. However, in the results of the study, the rates of computer use for report writing are very low.

Generally, nurses think that electronic record systems make their daily jobs easier, speed up the recording of procedures and provide time, increase workplace efficiency, and speed up data entry and access (Likourezos et al., 2004; Lee et al., 2005). Contrary to all those positive opinions, nurses think that electronic patient records don't positively affect health care quality (Lee et al., 2005). These findings are parallel to our study. This is thought to be caused by the ERS being complicated and not user friendly.

Nurses perceive an inability to capture the essence of nursing with computerized documentation and found dissatisfaction with hardware, software, and interpersonal relationships (Darbyshire, 2004; Lee, 2006; Lee 2008). According to the results of our study, more than 55% of the nurses think that their current electronic patient record system should be changed and improved (Table 3). Increasing quality, electronically preserving patient records, accessing information quickly and cheaply, and increasing efficiency are important goals in the use of information technologies (Ömürbek, 2009). According to our results, nurses think that electronic patient records provide faster access to databases, test and inspection requisitions or results and the medical records of patients (Table 4). Electronic patient records provide faster and better access to the data that health care personnel need to provide health care, better quality data, and multifaceted data presentation (Ömürbek, 2009). Parallel to the literature, the nurses in our study think that electronic patient records speed up database access and make a patient care database possible (Table 4). According to those results, it can be stated that although nurses have positive views about the ERS, they have problems about the system they are currently using.

In our study, when the demographic properties of the nurses and their opinion and beliefs about electronic records were evaluated, higher age and duration of occupation were found to have an effect. In the literature, demographic variables were no effect positive attitude toward computers (Moody et al., 2004; Lee et al., 2005; Smith, et al., 2005; Ammenwerth et al., 2003; Eley et al., 2008). Nurses over the age of 41 in our study believe in the benefits of ERS such as monitoring, recording, access to results and

provide order in records better. This difference may be caused by the nurses over 41 having used the manual recording system longer than the younger nurses, thus knowing its difficulties. According to a study by Köse (2012), there is statistically meaningful relationship between the occupation durations and computer use experience of nurses (Köse, 2012). According to our results, while nurses over 41 believe that statistical information can be completely and instantly accessed through electronic records, nurses who have worked for between 1-5 years believe less so. While less nurses between the ages of 31-40 believe that electronic records provide organization for nursing applications and patient care, more of the nurses who have worked for between 1-5 years believe so. This difference was interpreted as younger nurses thinking that the electronic record system was appropriate for implementing patient care plans.

Conclusion

Generally, nurses have no difficulties operating a computer. While the nurses have positive inclinations about the electronic patient record system, they think that the current system is not appropriate for recording their professional applications and should be changed and improved. According to the findings of our study, especially age and the duration for which they have worked in this occupation affect their opinions and beliefs on the usage of electronic records. As a result of these findings, it can be stated that nurses believe in the benefits of electronic patient record systems and can actively use them. Additionally, because of the differences in the opinion and beliefs of the nurses according to the age and duration of occupation variables, it can be suggested that nurses should be supported and educated on the use of electronic patient record systems, and that internal education programs should be formed. It can also be suggested that the suggestions of nurses should be considered during the formation of the software program for the nursing applications of the institution, actively involving nurses in the formation of the software if possible.

References

Jha AK., DesRoches C.M., Campbell E.G., Donelan K., Rao S.R., Ferrisc T.G., Shields A. Rosenbaum S. & Blumenthal D. (2009). Use of electronic health records in the U.S. hospitals. The New England Journal of Medicine, 360(16):1628-38.

Poissant L., Pereira J., Tamblyn R. & Kawasumi Y. (2005). The impact of electronic health records on time efficiency of physicians and nurses: a systemic review. Journal of the American Medical Informatics Association, 12(5):505-516.

Mekhijian H.S., Kumar R.R., Kuehn L., Bentley T.D., Teater P., Payne B. & Ahmad A. (2002). Immediate benefits realized following implementation of physician order entry at an academic centre. Journal of the American Medical Informatics Association, 9(5):529–539.

Fung C.H., Woods J.N., Asch S.M., Glassman P., Glassman P. & Doebeling B.N. (2004). Variation in implementation and use of computerized clinical reminders in an integrated healthcare system. The American Journal of Managed Care, 10(2):878–885.

Pizzi L.T, Suh D.C., Barone J. & Nash D.B. (2005). Factors related to physicians' adoption of electronic prescribing: results from a national survey. American Journal of Medical Qualit, 20(1);22–32.

Ömürbek N. (2009). A Study On Healthcare Information Systems Use In Hospitals: The Case Of İzmir. SDÜ Fen Edebiyat Fakültesi Sosyal Bilimler Dergisi, 19:211-232. (in Turkish)

Ay F. (2009). International electronic patient record systems and relationship between nursing practices and computer. Gulhane Medical Journal, 51(2):131-136. (in Turkish)

Burkle T., Ammenwerth E., Prokosch H.U. & Dudeck J. (2001). Evaluation of clinical information systems. What can be evaluated and what cannot? Journal of Evaluation in Clinical Practice, 7(**4**):373– 85.

Likourezos A., Chalfin D.B., Murphy D.G., Sommer B., Darcy K. & Davidson S.J. (2004). Physician And Nurse Satisfaction With An Electronic Medical Record System. Journal of Experimental Medicine, 27(4): 419–424.

Hovenga E., Gadre S. & Heard S. (2005). Nursing Constraint Models For Electronic Health Records: A Vision For Domain Knowledge Governance. International Journal of Medical Informatics, 74(11): 886-898.

Park H.A., Cho I. & Byeun N. (2007). Modeling a terminology-based electronic nursing record system: an object-oriented approach. International Journal of Medical Informatics, 76(10):735-746.

Burnie J. (2010). Electronıc health records documentation in nursing: Nurses' perceptions, attitudes and preferences.. Ball State University, Muncie, Indiana. [Masters of Science Thesis]

Erdemir F., Hanoğlu Z. & Akman A. (2005). Computer and internet use of nurses, and their opinion about the value of use of computers in

nursing. 2nd National Medical Information Conference Summary Book, p: 78-84. (in Turkish)

Lee T.T. (2004). Nurses' adoption of technology: application of Rogers' innovation-diffusion model. Applied Nursing Research, 17(4):231-238.

Darbyshire P. (2004). 'Rage against the machine?': Nurses' and midwives' experiences of using computerized patient information systems for clinical information. Journal of Clinical Nursing, 13(1):17-25.

Lee T.T. (2006). Nurses' perceptions of their documentation experiences in a computerized nursing care planning system. Journal of Clinical Nursing, 15(11):1376-1382.

Lee T.T. (2008). Nursing information: Users' experiences of a system in Taiwan one year after its implementation. Journal of Clinical Nursing, 17(6):763-771.

Moody L.E., Slocumb E., Berg B. & Jackson D. (2004). Electronic health records documentation in nursing. Computers Informatics Nursing, 22(6):337-344.

Lee T.T., Lee T.Y., Lin K.C. & Chang P.C. (2005). Factors affecting the use of nursing information systems in Taiwan. Journal of Advanced Nursing, 50(2):170-178.

McLane S. (2005). Designing an emr planning process based on staff attitudes toward and opinions about computers in healthcare. Computers Informatics Nursing, 23(2):85-92.

Smith K., Smith V., Krugman M, & Oman K. (2005). Evaluating the impact of computerized clinical documentation. Computers Informatics Nursing, 23(3):132-138.

Ammenwerth E., Mansmann U., Iller C. & Eichstadter R. (2003). Factors affecting and affected by user acceptance of computer-based nursing documentation: Results of a two year study. Journal of the American Medical Informatics Association, 10(1): 69-84.

Eley R., Fallon T., Soar J., Buikstra E. & Hegney D. (2008). Nurses' confidence and experience in using information technology. Australıan Journal Of Advanced Nursıng, 25(3):23-35.

Köse A. (2012). An Empirical Study for Specifying Computer Use Levels of the Nurses-The Case of Trabzon. Bilişim Teknolojileri Dergisi, 5(1):37-43 (in Turkish).