Hospital Information Systems: Measuring End-User Satisfaction

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Abstract. As problems with health workers' acceptance and satisfaction are now regarded among the most significant barriers to the diffusion of IS within health settings, the purpose of this paper is to examine which factors affect the level of satisfaction of medical and nursing staff with the use of information systems in the 424 Military Hospital in Northern Greece and especially the impact of gender and age on users' satisfaction. A total of 257 questionnaires were collected from 3 clinics. Results show that the participants in the survey are satisfied with the usefulness of the Information System as well as the ease of use of the Information System to a large extent. However, the respondents expressed little satisfaction with the provision of the necessary instructions for the execution of the work, but a better level of satisfaction with the ability of the technical support staff to provide quality services.

Keywords: Hospital information systems · User satisfaction · Nursing · Acceptance · Health

1 Introduction

Nowadays, the health sector experiences different challenges and fundamental changes. Demands are placed on nursing institutions around the world to reconsider their core functions and find new ways to reorganize their business to offer efficient and effective services, reduce their operating costs and become more competitive while providing more and high-quality patient care services [38].

The modern challenges faced by nursing homes are numerous, which include the problem of managing the huge volume of health information produced and circulated and the need to find new methods - techniques to reorganize and improve their business activities. They also have the problem of reducing excessive costs in order to manage their finance rationally and also the problem of providing better quality and personalized health services that are based on evident practice [13, 31, 37].

The use of traditional information systems in sharing the sheer volume and variety of health information has caused problems in providing patient care. The progressive development of informatics has made the managers of hospitals recognize information

M. Themistocleous et al. (Eds.): EMCIS 2020, LNBIP 402, pp. 463–479, 2020.
https://doi.org/10.1007/978-3-030-63396-7_31

technology as a powerful tool that can enhance their productivity. Many hospitals around the world are in the process of applying electronic health information to support patient care [1].

In addition, the information society has changed the doctor-patient model from the medical-central era to the patient-central one, through e-health. E-health does not only provide patients with high-quality health services but also helps to streamline the resources of health systems [13]. Health information systems are those that allow the collection, storage, management, analysis and exchange of information and data of patients in the context of clinical practice [20].

Nursing staff is important when it comes to using health information systems because they are the key providers of patient care, which includes carrying out medical evaluation, diagnosis and intervention. Nurses need to quickly process information about different patients and interpret them directly to design quality care. Therefore, it is imperative to design information systems that can aid the nurses in their duties for better coordination of patient care activities [1].

The two most important areas reported by nursing staff in the use of information systems are the development of real-time feedback systems for nurses and the impact of the information system on nursing care and patients' outcomes [9]. Several studies have shown that in most cases the internal environment of hospitals is the main factor that negatively affects the effort of nursing institutions to introduce new information systems that can be used to modernize their business processes. This could be as a result of most health professionals not having (e.g. doctors, nurses, executives, IT staff, etc.) the basic knowledge or skills of IT, their inability to understand the basic capabilities and limitations of technology, and their inability to understand how these new systems are harmonized in the hospital's work environment [34].

Users' satisfaction of any Hospital Information System development and implementation project is an important research topic which can be explained by the response of healthcare professionals to the use of Information Systems in healthcare. Current research [32, 33] concluded that more satisfied users are have been associated with deeper levels of engagement with a system's functionality, which is significant to achieving higher-order benefits from Information Systems implementations. In healthcare, nurses and medical staff comprise the largest group of workers. Therefore, it is important to interact frequently with Hospital Information Systems in order to handle the appropriate information [2, 10, 14, 39]. Unfortunately, health workers have numerous concerns about IS usage and its implications for their work. Problems with health workers' acceptance and satisfaction are now regarded among the most significant barriers to the diffusion of IS within health settings [10].

Thus, the purpose of this paper is to examine which factors affect the level of satisfaction of medical and nursing staff with the use of information systems in the 424 Military Hospital in Northern Greece and especially the impact of gender and age on users' satisfaction. A total of 257 questionnaires were collected from 3 clinics at the 424 Military Hospital in Northern Greece.

The layout of this paper is as follows sections: The next section, after a brief introduction to this area, is the theoretical background in respect of the satisfaction in healthcare systems. Section 3 explains the methodology, while Sect. 4 shows survey findings. Finally, conclusions are presented in Sect. 5 and the paper ends.

2 Theoretical Background

An information system is designed not only to support the access and collaboration of health professionals with a variety of patients' information but also to promote the quality of health care through coordinated information exchange. Today, the main goal of any health information system is to manage information from all activities related to health care, including planning, monitoring, coordination and decision making. Information systems are mainly used in hospitals to make patients' files readily available, to aid easy access to patient care information, to reduce the time spent waiting for diagnostic information, such as laboratory results, and to improve certification procedures and test results [21, 22, 36]. They are very necessary to meet the growing demands of health care and related diagnostic, therapeutic and administrative burdens, to support better patient care planning and to make better clinical or administrative decisions. Real-time access, exchange and retrieval of clinical data from the information system have helped to improve clinical documentation, reduce the overlap of care services and support decision-making on patient care [1].

Since the advent of information systems development, many health department managers and healthcare designers have tried to identify factors that affect the quality of patient care. Many believe that the quality of health care is enhanced through the information collected and managed through information systems. The quality of information and information systems are linked to effective, timely and appropriate care services provide, low health risks, effective normalization of clinical and administrative tasks, such as communication with patients, their families and other professionals, monitoring of patients by health professionals, and achieving the objectives of community health planning and health management [1, 30].

The value of the information comes from the changes it makes in making decisions, so the quality of information is defined as the data that are suitable for the use of respective users. Healthcare environments are increasingly dependent on information; the volume of data collected, stored and used has increased significantly, as well as health care workers' dependence on computers. Health care information and related data have been growing rapidly over the past decade. Today's health information has become more functional and complex than previous information. However, larger and more complex data are not necessarily better data. The most important issue in this area is the use of high-quality information to improve patient care. Thus, health information can be more effective when the data are of high quality [1, 7, 28].

A good health information system collects data from all relevant partners to ensure that information users have access to reliable, valid, useful, understandable and comparable data. Therefore, an information system is not only considered good due to its ability to provide accessible, reliable and valid information but also due to its ability to present information in a useful and understandable way [6, 26]. In many cases, the data quality problem is not addressed immediately. Unless the burdens and incentives around data collection are addressed, data quality will remain poor, and also concentrating on a data warehouse will not improve the quality of data. Technology can help improve data quality, but data quality is not primarily a technological problem. Investing in advanced electronic storage is of limited value if poor data quality is

largely a function of the weight of existing data collection processes and the lack of incentives for accurate reporting. Research by [16] found that nursing staff in Iranian hospitals are moderately satisfied with the quality provided by the information system. At the same time, it was found that the quality of user interfaces also led to moderate satisfaction of the nursing staff. Therefore, the ease in using an information system and the way the system interacts with the users are determinants of users' satisfaction, i.e. nursing staff.

[24] in a survey, found that perceived ease of use determined the satisfaction of nurses with the use of an information system. It was found that the factors that significantly affect the satisfaction of the nurses included perceived usefulness in aligning the quality of the system, perceived usefulness in aligning the quality of information, perceived ease of use in aligning the quality of the system and perceived ease of use in aligning the quality of information. However, the perceived usefulness in aligning the quality of services did not have a significant effect on the satisfaction of the nurses [8, 11].

[1] in their research, show that an important determinant of nurses' satisfaction with an information system is their views about the use of such a system in patient care, based on the evaluation of both information and system quality. So far, the most important issue for the successful implementation of an information system is the acceptance and use of technology by end-users. The research findings suggest that nurses have widely accepted the use of an information system as a necessary element of their daily practice in providing patient care. The results of this study suggest that the first condition for quality patient care is accurate and accessible information. In hospitals, the information system provides an electronic health record that becomes a repository of data and information collected about patient care. This often forces nurses to have the ability to use information systems to document their activities and to recognize these systems as powerful tools for obtaining more complete and accurate information for better patient care. The results of the study showed that the quality of information regarding accuracy and completeness is an important predictor of the use of information in the process of patient care. Therefore, the quality of information should be a priority of organizational control in terms of improving patients' performance and patient care. Certain system features, such as timeliness and reliability, are associated with the use of a system in providing good patient care. Access to real-time access, exchange and retrieval of clinical data reduce the overlap of care services and improve the quality of patient care, especially through the longer time they leave nurses for care-related work rather than bureaucratic procedures [3, 17].

In the research of [4, 16] the results show that the coexistence of the perception of nurses about the performance of information systems and their technological ability to succeed in nursing care has a positive impact on nurses' satisfaction with the use of information systems. As a result, the satisfaction of nurses will increase with the improvement of nursing care performance. The performance of nursing care in measuring organizational benefits has two-component structures: the quality of clinical care and patient safety. The performance of nursing care refers to the assessment of nurses' belief that the use of an information system affects the quality of clinical care and patient safety. The quality of clinical care refers to the evaluation of nurses in providing high-quality care in terms of accurate prediction of patients' outcomes, and objective assessments of patient care quality. Patient safety refers to the evaluation of nursing

care that does not adversely affect the health of patients, which is assessed as a whole by the outcomes of patients [27].

It should be noted that the demographic characteristics of health professionals are an important determinant of their satisfaction with the use of an information system. For example, research by [19] found that age and years of experience had a significant effect on the acceptance of an information system. In the study younger and less experienced people had lower levels of satisfaction, as they believed that the system was too slow, not user-friendly or difficult to use, provided inadequate, inaccurate and sometimes uninformed information, increased the time patients spent in the hospital and did not improve the quality of patient care, and that the educational materials did not help.

Similarly, [18] reported that young nursing staff with few years of experience was less satisfied with an information system. In contrast, [5] found in his research that the determinants of satisfaction with an information system were the study staff's ability to use computers and their level of education, not their gender and age.

3 Methodology

To assess the satisfaction of medical and nursing staff with the use of information systems, a questionnaire was drafted. A total of 257 questionnaires were collected from medical staff working at 3 clinics (Clinics of the Pathology Department, Surgery Clinics and Special Closed Departments) at the 424 Military Hospital in Northern Greece. The instrument used 5-point Likert-scales to operationalize the following constructs: perceived ease of use, perceived usefulness, user experience, system quality, service quality and satisfaction. The perceived ease of use construct measured the extent to which user easily uses the functions of the system, and the extent to which user easily learns and with clear operation description. Another indicator is the perceived usefulness construct which measures how useful the hospital information system is considered to be by the users. The user experience construct measures the users' experience of computers use, and how this can have an influence on their intention of reusing it in the future. Characteristics such as information system efficiency, response time, speed of providing services and system security and effectiveness are measured as well. Service quality is evaluated by the users' perspective on handling information and managing capability of hospital information systems problems. The items were derived from [2, 8, 10, 12, 23]. Much of the bias in the standard deviation is in fact removed by the use of the degrees of freedom. Analysis of the data was carried out using Mann-Whitney and Kruskal-Wallis tests.

4 Results and Discussion

A correlation analysis is performed to determine whether the views of the study participants about information systems are influenced either by their demographic profile or by their computer skills. The effect of gender on the respondents' views about

information systems was initially tested using the Mann-Whitney test. Then, the Kruskal-Wallis test was used to examine the effect of age on the respondents' views about information systems. Tables 1 and 2 present the results of the analysis.

Table 1. Correlation between gender and satisfaction.

	Gender	N	MeanRank	p-value
The Information System allows you to quickly get the information you need	Male	95	134.78	0.271
	Female	161	124.80	
	Total	256		
The Information System improves the efficiency and effectiveness of your work	Male	95	127.09	0.743
	Female	162	130.12	
	Total	257		
Overall, how satisfied are you with the usefulness of the Information System	Male	95	126.54	0.734
	Female	161	129.66	
	Total	256		
Learning to use the Information System is easy	Male	95	139.83	0.036
	Female	161	121.81	
	Total	256		
Skills required for the use of the Information System	Male	95	146.04	0.002
	Female	161	118.15	
	Total	256		
Overall, how satisfied are you with the ease of use of the Information System	Male	95	135.77	0.193
	Female	161	124.21	
	Total	256		
The Information System is reliable	Male	95	120.16	0.142
	Female	161	133.42	
	Total	256		
Someone can trust the Information System	Male	95	133.51	0.369
	Female	161	125.54	
	Total	256		
The Information System contains Information Technology which helps in data sharing	Male	95	126.35	0.708
	Female	161	129.77	
	Total	256		
Overall, how satisfied are you with the level of confidentiality of the Information System	Male	95	132.42	0.485
	Female	161	126.19	
	Total	256		
Overall, how satisfied are you with the performance of the Information System	Male	95	132.65	0.466
	Female	161	126.05	
	Total	256		
You have direct access to the Information System	Male	95	137.96	0.123
	Female	162	123.74	
	Total	257		

(*continued*)

Table 1. (*continued*)

	Gender	N	MeanRank	p-value
The Information System includes the necessary transactions which can be completed online	Male	95	138.11	0.119
	Female	162	123.66	
	Total	257		
The Information System is properly organized	Male	95	131.38	0.675
	Female	162	127.60	
	Total	257		
Overall, how satisfied are you with providing the necessary instructions to perform your tasks	Male	95	126.75	0.826
	Female	160	128.74	
	Total	255		
You find all the information you need	Male	95	132.78	0.452
	Female	161	125.97	
	Total	256		
You have access to the information you need	Male	95	138.23	0.112
	Female	162	123.59	
	Total	257		
The information is constantly updated	Male	95	137.06	0.143
	Female	162	124.27	
	Total	257		
The information including in the Information System is presented clearly	Male	95	133.59	0.418
	Female	162	126.31	
	Total	257		
The Information System provides high quality information	Male	95	128.81	0.973
	Female	162	129.11	
	Total	257		
The information provided by the Information System is understandable and easy to read	Male	95	142.09	0.019
	Female	162	121.32	
	Total	257		
Overall, how satisfied are you with the quality of the information provided	Male	95	129.64	0.840
	Female	161	127.83	
	Total	256		
The technical support staff is always kind with the users	Male	95	131.97	0.537
	Female	161	126.45	
	Total	256		
The technical support staff understands users' needs	Male	95	132.72	0.445
	Female	161	126.01	
	Total	256		
Overall, how satisfied are you with the quality of service provided by the technical support staff	Male	94	129.40	0.801
	Female	161	127.18	
	Total	255		
Only users who should have access to the Information System have access to it	Male	95	136.54	0.169
	Female	161	123.76	
	Total	256		
Access to the Information System is limited	Male	95	146.21	0.002
	Female	161	118.05	
	Total	256		

(*continued*)

Table 1. (*continued*)

	Gender	N	MeanRank	p-value
The Information System is protected from unauthorized access	Male	95	144.15	0.006
	Female	161	119.27	
	Total	256		
Overall, how satisfied are you with the level of security of the Information System	Male	95	145.36	0.002
	Female	160	117.69	
	Total	255		
Overall, how satisfied are you with the technological capabilities required for the Information System	Male	94	139.48	0.031
	Female	160	120.46	
	Total	254		
The Information System is effectively aligned with the needs of nurses, doctors and management	Male	95	132.40	0.552
	Female	162	127.01	
	Total	257		
The Information System is efficiently aligned with the needs of nurses, doctors and management	Male	95	137.31	0.144
	Female	162	124.13	
	Total	257		
Overall, how satisfied are you with the Information System	Male	95	133.40	0.439
	Female	162	126.42	
	Total	257		
Using the Information System, you can offer treatment and medicines to patients at the right time	Male	95	141.17	0.038
	Female	162	121.86	
	Total	257		
Using the Information System, you can offer accurate and competent care services to patients	Male	95	133.93	0.397
	Female	162	126.11	
	Total	257		
Using the Information System, you can offer with respect hospital services	Male	95	135.46	0.228
	Female	161	124.39	
	Total	256		
Using the Information System, you can help relieve patients	Male	95	124.42	0.531
	Female	160	130.13	
	Total	255		
You can achieve accurate patient identification	Male	95	131.66	0.650
	Female	162	127.44	
	Total	257		
Using the Information System, you can accurately identify and respond to changes in the condition of patients	Male	95	137.57	0.143
	Female	162	123.97	
	Total	257		
Overall, how satisfied are you with the performance of the nursing care you provide through the use of the Information System	Male	95	134.78	0.271
	Female	161	124.80	
	Total	256		

Table 2. Correlation between age and satisfaction.

	Age	N	MeanRank	p-value
The Information System allows you to quickly get the information you need	21–30	68	134.57	0.643
	31–40	115	122.60	
	41–50	71	130.94	
	>=51	1	93.00	
	Total	255		
The Information System improves the efficiency and effectiveness of your work	21–30	68	136.07	0.153
	31–40	116	119.03	
	41–50	71	135.39	
	>=51	1	223.00	
	Total	256		
Overall, how satisfied are you with the usefulness of the Information System	21–30	68	127.46	0.007
	31–40	115	115.07	
	41–50	71	147.85	
	>=51	1	242.00	
	Total	255		
Learning to use the Information System is easy	21–30	68	144.85	0.023
	31–40	115	122.73	
	41–50	71	118.80	
	>=51	1	242.50	
	Total	255		
Skills required for the use of the Information System	21–30	68	157.99	0.000
	31–40	115	119.75	
	41–50	71	111.00	
	>=51	1	245.00	
	Total	255		
Overall, how satisfied are you with the ease of use of the Information System	21–30	68	140.90	0.078
	31–40	115	124.76	
	41–50	71	119.23	
	>=51	1	245.50	
	Total	255		
The Information System is reliable	21–30	68	118.12	0.250
	31–40	115	125.82	
	41–50	71	141.21	
	>=51	1	113.00	
	Total	255		
Someone can trust the Information System	21–30	68	135.32	0.365
	31–40	115	121.38	
	41–50	71	130.65	
	>=51	1	203.00	
	Total	255		
The Information System contains Information Technology which helps in data sharing	21–30	68	138.78	0.332
	31–40	115	124.83	
	41–50	71	123.97	
	>=51	1	46.00	
	Total	255		

(*continued*)

Table 2. (*continued*)

	Age	N	MeanRank	p-value
Overall, how satisfied are you with the level of confidentiality of the Information System	21–30	68	146.36	0.033
	31–40	115	125.21	
	41–50	71	116.14	
	>=51	1	42.00	
	Total	255		
Overall, how satisfied are you with the performance of the Information System	21–30	68	145.59	0.030
	31–40	115	117.29	
	41–50	71	129.84	
	>=51	1	33.50	
	Total	255		
You have direct access to the Information System	21–30	68	140.15	0.186
	31–40	116	121.62	
	41–50	71	129.95	
	>=51	1	31.50	
	Total	256		
The Information System includes the necessary transactions which can be completed online	21–30	68	132.23	0.132
	31–40	116	120.60	
	41–50	71	139.38	
	>=51	1	19.00	
	Total	256		
The Information System is properly organized	21–30	68	132.10	0.136
	31–40	116	121.54	
	41–50	71	138.07	
	>=51	1	11.50	
	Total	256		
Overall, how satisfied are you with providing the necessary instructions to perform your tasks	21–30	67	138.19	0.186
	31–40	116	123.59	
	41–50	70	125.41	
	>=51	1	11.00	
	Total	254		
You find all the information you need	21–30	68	130.13	0.306
	31–40	115	122.13	
	41–50	71	136.71	
	>=51	1	39.00	
	Total	255		
You have access to the information you need	21–30	68	140.01	0.059
	31–40	116	118.56	
	41–50	71	135.37	
	>=51	1	11.50	
	Total	256		
The information is constantly updated	21–30	68	139.12	0.110
	31–40	116	121.69	
	41–50	71	131.11	
	>=51	1	11.50	
	Total	256		

(*continued*)

Table 2. (*continued*)

	Age	N	MeanRank	p-value
The information including in the Information System is presented clearly	21–30	68	146.46	0.007
	31–40	116	115.58	
	41–50	71	134.09	
	>=51	1	9.00	
	Total	256		
The Information System provides high quality information	21–30	68	140.33	0.014
	31–40	116	114.94	
	41–50	71	140.63	
	>=51	1	35.00	
	Total	256		
The information provided by the Information System is understandable and easy to read	21–30	68	151.13	0.011
	31–40	116	124.03	
	41–50	71	114.56	
	>=51	1	98.50	
	Total	256		
Overall, how satisfied are you with the quality of the information provided	21–30	67	146.49	0.022
	31–40	116	118.87	
	41–50	71	127.13	
	>=51	1	10.50	
	Total	255		
The technical support staff is always kind with the users	21–30	68	134.06	0.726
	31–40	115	126.58	
	41–50	71	123.83	
	>=51	1	175.50	
	Total	255		
The technical support staff understands users' needs	21–30	68	127.03	0.135
	31–40	115	137.53	
	41–50	71	113.94	
	>=51	1	96.50	
	Total	255		
Overall, how satisfied are you with the quality of service provided by the technical support staff	21–30	68	134.61	0.343
	31–40	114	119.80	
	41–50	71	132.22	
	>=51	1	186.50	
	Total	254		
Only users who should have access to the Information System have access to it	21–30	68	151.01	0.003
	31–40	115	114.20	
	41–50	71	129.91	
	>=51	1	15.50	
	Total	255		
Access to the Information System is limited	21–30	68	139.15	0.169
	31–40	115	122.37	
	41–50	71	124.85	
	>=51	1	241.50	
	Total	255		

(*continued*)

Table 2. (*continued*)

	Age	N	MeanRank	p-value
The Information System is protected from unauthorized access	21–30	68	143.71	0.007
	31–40	115	112.25	
	41–50	71	137.25	
	>=51	1	214.00	
	Total	255		
Overall, how satisfied are you with the level of security of the Information System	21–30	68	136.72	0.100
	31–40	114	116.75	
	41–50	71	134.72	
	>=51	1	213.50	
	Total	254		
Overall, how satisfied are you with the technological capabilities required for the Information System	21–30	67	130.90	0.747
	31–40	114	121.81	
	41–50	71	131.57	
	>=51	1	133.00	
	Total	253		
The Information System effectively is aligned with the needs of nurses, doctors and management	21–30	68	127.42	0.339
	31–40	116	132.91	
	41–50	71	123.92	
	>=51	1	16.50	
	Total	256		
The Information System is efficiently aligned with the needs of nurses, doctors and management	21–30	68	130.22	0.326
	31–40	116	131.86	
	41–50	71	122.97	
	>=51	1	14.50	
	Total	256		
Overall, how satisfied are you with the Information System	21–30	68	127.50	0.348
	31–40	116	132.29	
	41–50	71	124.88	
	>=51	1	13.50	
	Total	256		
Using the Information System, you can offer treatment and medicines to patients at the right time	21–30	68	148.73	0.031
	31–40	116	122.34	
	41–50	71	120.51	
	>=51	1	34.50	
	Total	256		
Using the Information System, you can offer security in the use of medicines	21–30	68	127.73	0.094
	31–40	116	120.58	
	41–50	71	143.51	
	>=51	1	34.00	
	Total	256		
Using the Information System, you can offer accurate and competent care services to patients	21–30	68	122.67	0,225
	31–40	116	125.35	
	41–50	71	140.52	
	>=51	1	36.50	
	Total	256		

(*continued*)

Table 2. (*continued*)

	Age	N	MeanRank	p-value
Using the Information System, you can offer with respect hospital services	21–30	68	141.58	0.130
	31–40	115	120.59	
	41–50	71	128.36	
	>=51	1	31.50	
	Total	255		
Using the Information System, you can help relieve patients	21–30	68	121.25	0.357
	31–40	114	126.24	
	41–50	71	136.70	
	>=51	1	43.50	
	Total	254		
You can achieve accurate patient identification	21–30	68	131.38	0.333
	31–40	116	123.55	
	41–50	71	135.30	
	>=51	1	24.50	
	Total	256		
Using the Information System, you can accurately identify and respond to changes in the condition of patients	21–30	68	136.24	0.404
	31–40	116	125.60	
	41–50	71	127.22	
	>=51	1	29.50	
	Total	256		
Overall, how satisfied are you with the performance of the nursing care you provide through the use of the Information System	21–30	68	134.57	0.643
	31–40	115	122.60	
	41–50	71	130.94	
	>=51	1	93.00	
	Total	255		

The results of the analysis show that the participants in the research are satisfied with the usefulness of the Information System, and also with the ease of use of the Information System. Ease of use and utility of an information system has been found by other surveys [15, 18, 24, 25, 29, 35] as important determinants of user satisfaction.

However, the respondents expressed little satisfaction with the provision of the necessary instructions for the execution of their work, but are fully satisfied with the training given to health workers by the technical support staff to provide quality services. The provision of quality services by health workers based on the training they receive is an important determining factor of the satisfaction of users of health information systems as well as health professionals [10].

Also, a small degree of satisfaction was expressed with the quality of information provided, the degree of security of the Information System and the technological capabilities of the Information System. However, a significant number of studies [1, 10] have demonstrated the importance of the quality of the information provided by an information system, in terms of validity, reliability, security and timely information, which are presented and easy to manage. Data protection is also an important part of an information system.

In addition to the above, a small degree of satisfaction was found with the nursing care provided through the use of the Information System. However, the quality of an information system is linked to the support of effective, timely and appropriate care services [1]. Some studies [1, 4, 9, 25] has also focused on reconciling the performance of information systems and their technological capabilities in terms of nursing outcomes.

The lowest level of satisfaction was found in the case of the nursing care provided through the use of the information system and the training given to health staff by technical support staff to provide quality services. These results mean, first and foremost, that health professionals need to understand the importance and benefits of using an information system, that there should be programs to help them develop the skills to use this system, and that they should improve the information system, especially in terms of the quality of the information provided by the system.

Another finding of this study is that gender, age, years of experience, position, and computer skills affect the level of satisfaction of the respondents with the information system. These findings are consistent with the findings of [18, 19], which revealed that age and years of service are determinants of the satisfaction of health professionals with the use of an information system. Also, Bahnassy's (2015) research [5] revealed that the ability and availability of computer and computer skills, in general, affect users' level of satisfaction with information systems. However, the findings of this study are in contrast with the results of Bahnassy's (2015) study [5], which showed that gender and age are factors that affect the level of health professionals' satisfaction with the use of an information system.

5 Conclusion

Thus, the purpose of this paper was to examine which factors affect the level of satisfaction of medical and nursing staff with the use of information systems in the 424 Military Hospital in Northern Greece and especially the impact of gender and age on users' satisfaction.

This paper provides important implications for theory and practice. The contribution of this paper is that it helps healthcare professionals to understand the significant dimensions of satisfaction in order to improve the quality of Hospital Information Systems. The health worker's perception of the service and system quality plays significant role in achieving healthcare professionals' satisfaction and the causal relationship between the service quality and satisfaction has been an important topic of discussion. Accordingly the satisfaction resulting from the whole process of using Hospital Information Systems can be considered as overall satisfaction. This overall satisfaction combines various components of system quality such as technical, functional, infrastructural, interpersonal and environmental. Thus, training of health workers is needed to enhance positive attitudes about Hospital Information Systems and take advantage of these systems. Once critical variables were identified, teaching strategies could be designed for specific nursing populations to achieve maximum outcomes.

Finally, by extending these results with an importance-performance analysis, future researchers can also examine which specific system attributes should be in highest priorities, which attributes must be maintained, and which are of lower priority. This could be investigated because different outcomes are probably associated with different system attributes.

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