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The Evaluation of the Health Information Systems by the Health Information System Managers Within the Research and Teaching Hospitals Affiliated with the University of Health Sciences

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ABSTRACT

The purpose of this study is to reveal the levels of knowledge of Health Information System managers who work at hospitals regarding Health Information Systems and Hospital Information Management Systems, their evaluations regarding information processes, and their perspectives on collaboration with the Ministry. The population of the research was determined as 58 Training and Research Hospitals in 16 separate provinces affiliated with the University of Health Sciences and reached 55 of them. The average number of health information systems managers was 5 in each hospital and 277 in total. Questions, which were made by examining the questionnaires in the literature, were applied by questionnaire method. The highlights of the research can be summarized as follows: while the status of managers having received training on the topic of health science was 72.9% and the status of awareness of Ministry studies regarding health information systems was 70%, their levels of direct participation in studies relating to health information was reported as 27.8%. This shows that training and being aware

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of the studies are not enough to participate in the related studies. It was determined when the status of managers not being aware of health information studies from the Ministry of Health according to their positions at their institutions that those who are most unaware (with 41%) are information processing personnel. According to their positions at the institutions, whether managers had received training on the topic of health information, the awareness levels of Ministry studies in the field of health information, their assignment status in the installation phase of HIMSS, and their levels of knowing the Ministry standards for HIMSS were studied. And no meaningful difference was found in the statistical analyses apart from assignment status during the installation of HIMSS.

Keywords: Hospital Information Management Systems, Health Information Systems, Health Information Management

INTRODUCTION

Health information is defined as "the branch of sciences that includes any and all methods of medical study (diagnosis and treatment), communication, training and data collection, processing collected data, management, making medical decisions, and scientific interpretation presented through the use of information technologies" (Mendi, 2012). According to another definition, it is expressed as the development of new ways and techniques supported by information technologies of preventive, therapeutic and rehabilitative health services (Öner, 2014). The fact that it is vital to reach the information needed during the provision of health services in a fast, sufficient and reliable manner at any time makes the health informatics extremely valuable (Mendi, 2012). Also, based on the increase in the interest and need for a regular and systematic processing of data and for evidence-based medical practices, the popularization of clinical and administrative decision support systems has made health information important in diagnosis, treatment, and monitoring processes (Mendi, 2012).

The collective hardware, directives, software, and methods created for the production, processing, and effective use of any and all information that is the foundation of health services regarding the management and presentation of preventive and treatment-based health services is known as health information systems (HIS). More simply, HIS is the implementation of information systems to the field of health (Taşdemir, 2005).

The rapid and effective use, as needed, of the developing technology of health information systems (HIS) is quite important in terms of the creation of quality standards and gaining continuity for health policies. All data used in the field of health should be in accordance with certain standards in terms of validity and accuracy. There is a need for the harmonization and processing of the acquired information and its distribution in accordance with the principles of privacy and readiness (Öner, 2014).

Hospital Information Management Systems (HIMSS) are defined as "information systems that produce results of consolidation of medical data with administrative data at hospitals, that facilitate the presentation of health services, and that increase quality." HIMSS are complex structures used in clinical operations and processes offered to patients such as services for diagnosis and treatment, clinical decision support, pharmaceutical and medical material tracking, nursing care, and laboratory and radiology operations as well as managerial functions such as personnel management, financing and accounting, planning, office automation, and material management (Alpkoçak, 2010).

Electronic patient records are a repository of information about the health services that individuals receive. It is important that electronic service providers and individuals themselves have an access to electronic patient records wherever and whenever they are needed (SBSGM, 2018).

In countries where they first started using HIS's, separate information systems integrated with one another (pharmacies, laboratories, imaging, electronic health records, e-

Orders, etc.) have become a more common situation. Integrated HIMS's that cover various modules are used in Turkey.

Despite all the benefits of HIS and HIMS, research conducted in various countries indicates various problems faced in the effective use of data and information in health systems (de Kadt, 1989; Duncan, 1994; Lwanga & Sapirie, 1995; S, H, P, & S, 1987; Sandiford,Annett, & Cibulskis, 1992; Smith, Hansen, & Karim, 1989; T.C. Sağlık Bakanlığı (T.C. Sağlık Bakanlığı. (1993). Sağlık Enformasyon Sistemi Planlama Çalışması); Sağlık Enformasyon Sistemi Planlama Çalışması, 1993). Similarly, the World Health Organization (WHO) stresses that "struggles are constantly faced in countries in the collection, analysis, summarization, reporting, transmission, and especially use in the management of programs and services of health data and information (WHO, 1998).

The four basic functions of contemporary management sciences are known as planning, decision-making, organization and supervision. The correct and accurate HIS that health directors possess plays an important role in duly fulfilling these functions. For this reason, directors and personnel who contribute to management (health administrators, system analysts, biostatistical experts, and managers at all levels), addition to a knowledge of health information, must grasp the four basic functions of managerial sciences as well as the importance of HIS's in being able to fulfill these functions (Alakuş, 2007).

The purpose of this study is to measure the health information experiences of HIS directors who serve at Training and Research Hospitals connected to the Ministry of Health and which have with affiliation (and use) protocols with the University of Health Sciences (UHS) and are located in 16 separate provinces.

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METHODOLOGY

The population of this cross-sectional and definitive research comprises of HIS directors who work at 58 Training and Research Hospitals located in 16 separate provinces in different regions of Turkey, affiliated with the UHS since 2018. No sampling was selected for the research, and all HIS directors from educational and research hospitals and chief physicians to information system personnel.

The research data were collected by questionnaire method. The questionnaire was created in an original way by taking the expert opinions and the examples in the literature. The questionnaire consists of 21 questions. The survey questions evaluate the demographic and educational characteristics, knowledge levels regarding HIS and HIMS, evaluations regarding information processes, and collaborative capacities with the Ministry of Health of personnel responsible for HIS.

Necessary correspondences were made with the SBU regarding the implementation of the questionnaire and permissions were obtained. In addition, approval was obtained from the ethics committees of some hospitals. The questionnaires were delivered to the hospitals by e-mail, fax and mails between 11.01.2017 and 28.02.2017. The collected data were evaluated with the same program after creating the database in SPSS 18 data analysis program.

RESULTS

Fifty-eight hospital administrations, specified as the population of the research, were contacted, and responses from only three of these hospitals (Ankara Atatürk Pulmonary Medicine and Surgery Training and Research Hospital [TRH], Ankara Pediatric Health and Diseases Hematology Oncology TRH, and Istanbul Bakırköy Dr. Sadi Konuk TRH) could not be received. For this reason, a total of 277 HIS directors and personnel from 55 hospitals in 16

provinces participated in the research. The survey questionnaire was filled by an average of 5 people from each hospital. The distribution of the research group by provinces is given in Figure 1. The highest number of participants was from Istanbul (48%), then Ankara (20.6%) and Izmir (7.2%).

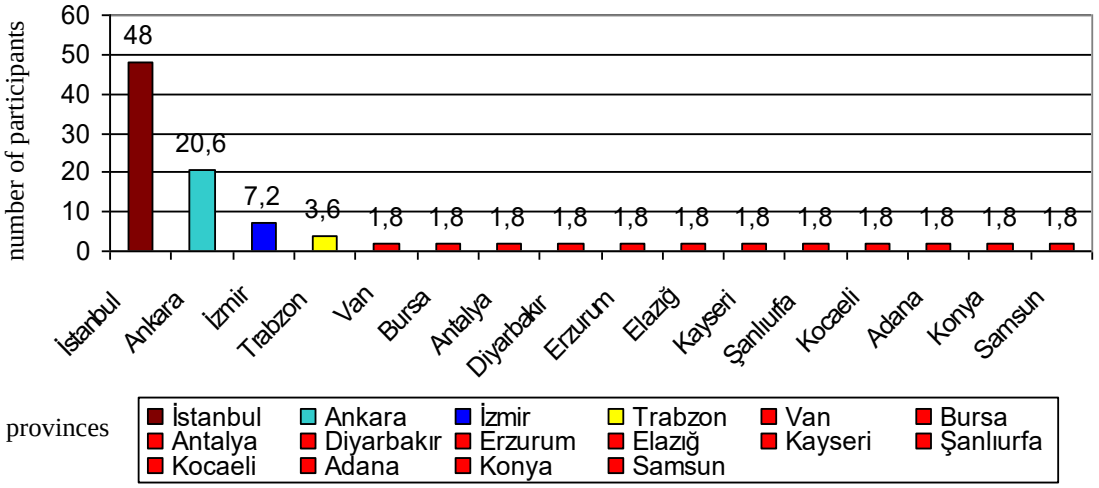

Figure 1: The distribution of the participants by province

The distribution of the participants according to their demographic and occupational characteristics is presented in Table 1. Accordingly, the mean age of the participants was 37.64 ± 8.20 years (minimum 20 years; maximum 57 years). It was seen that more than half of the participants were male (67.5%), a significant portion (71.5%) were college graduates, 28.5% served as hospital managers, more than half (55.6%) had 15 years or less of experience, and 55.2% had served in the current unit longer than four years.

In the study, it was found that the average duration of work in the profession was 14,32 ± 8,33 (minimum 1; maximum 34) years and the average duration of work in the unit was 4,89 ± 5,07 (minimum 1; maximum 27) years.

Table 1: The demographic and professional characteristics of the participants (n=277)

Characteristics	**Number (n)**	**Percentage (%)**
Age		
37 or younger	141	50.9
Older than 37	136	49.1
Gender		
Female	90	32.5
Male	187	67.5
Educational Status		
Graduate School	44	15.9
Undergraduate	198	71.5
Associate's Degree	13	4.7
High School	22	7.9
Status		
Chief Physician/Hospital Director	10	3.6
Deputy Chief Physician	55	19.9
Hospital Manager	27	9.7
Deputy Hospital Manager	79	28.5
Information Processing Official	29	10.5
Information Processing Personnel	77	27.8

Table 1 (contunied): The demographic and professional characteristics of the participants (n=277)

Length of Employment in Profession (years)		
15 years or less	154	55.6
More than 15 years	123	44.4
Length of Employment in Unit (years)		
4 years or less	153	55.2
More than 4 years	124	44.8

When reviewing the distribution of participants according to the training they received regarding HIS (Table 2), it is understood that a majority (72.9%) have received training on at least one topic. It was specified that of those who had received training, most on the issue of HIMS (69.3%) and least on the issue of data security (49%), 46.5% had received training on information in health, 30.2% had received training on electronic health records, a lower rate (17.8%) had received training on usability, 13.4% on health information law, and 15.3% had received training on coding standards in health.

Table 2: The distribution of the participants by training received on HIS* (n=277)

Received Education	Number (n)	Percentage (%)
Health Information	202	72.9
Information in Health	94	46.5
Usability	36	17.8
HIMS	140	69.3
Health Information Law	27	13.4
Health Coding Standards	31	15.3
Electronic Health Records	61	30.2
Data Security and Privacy	99	49.0

When reviewing the distributions of the participants based on the type of training they received regarding HIMS (Table 3), it is seen that the largest number (66.4%) received training within service, followed by 62.9% who received basic training, 39.3% who attended seminars, 30% who attended conferences, 20% who attended certificate programs, and 17.9% who attended courses.

Table 3: The distribution of the participants by the type of training received on HBYS* (n=140)

Characteristics	Number (n)	Percentage (%)
Basic Education Program Attendance		
Yes	88	62.9
No	52	37.1
Seminar Attendance		
Yes	55	39.3
No	85	60.7
Course Attendance		
Yes	25	17.9
No	115	82.1
Certificate Program Attendance		
Yes	28	20.0
No	112	80.0
In-Service Training Attendance		
Yes	93	66.4
No	47	33.6
Conference Attendance		
Yes	42	30.0
No	98	70.0

When participants' levels of knowledge on computers and HIMS subjects were examined (Table 4), it was determined that 32.1% of participants considered themselves sufficiently knowledgeable on computer hardware, 32.9% considered their knowledge levels inadequate regarding computer programs, 32.5% had adequate knowledge levels regarding computer operating systems, 39% had adequate knowledge levels regarding office programs, 32.9% of participants had moderate levels of knowledge regarding databases and computer networks, 39% had adequate levels of knowledge regarding electronic patient records, 38.3% had adequate levels of knowledge regarding HIMS, 31% had moderate knowledge levels regarding data and network security, and 33.2% had moderate levels of knowledge regarding usability.

Table 4: The distribution of the participants by status of adequately feeling the information levels on HIMS (n=277)

CHARACTERISTICS	INFORMATION LEVEL									
	Very Inadequate		Inadequate		Middle		Sufficient		Very Sufficient	
	N	%	n	%	n	%	n	%	n	%
Computer Hardware	4	1.4	27	9.7	86	31	89	32.1	71	25.6
Computer Programs	20	7.2	91	32.9	76	27.4	65	23.5	25	9
Computer Information Systems	6	2.2	38	13.7	73	26.4	90	32.5	70	25.3
Office Programs	1	0.4	19	6.9	52	18.8	108	39	97	35
Databases	38	13.7	74	26.7	91	32.9	44	15.9	30	10.8
Computer Networks	21	7.6	54	19.4	91	32.9	71	25.6	40	14.4
Electronic Patient Records	15	5.4	29	10.5	81	29.2	94	33.9	58	20.9
HIMS	8	2.9	26	9.4	65	23.5	106	38.3	72	26
Data and Network Security	22	7.9	53	19.1	86	31	76	27.4	40	14.4
Usability	17	6.1	41	14.8	92	33.2	72	26	55	19.9

When reviewing the status of participants in HIS- and HIMS-related studies (Table 5), 70% state that they are aware of HIS-related studies but 72.2% said that they did not participate in studies regarding this topic and 53.4% do not work in the installation of HIMS, 93.6% said they received technical support from outside the institution where they work in the installation of health information systems, and 66.4% said that they knew about the standards for installation to which they are bound regarding HIMS.

It was determined that the number of private firms that received technical support in the establishment of health information systems in the institution where the participants worked was 1.58 ± 1.20 (minimum 1; maximum 7).

Table 5: The distribution of participants by statuses of attendance in work regarding HIS and HIMS (n=277)

Characteristics	**Number (n)**	**Percentage (%)**
Awareness of SBS-related studies		
Yes	194	70.0
No	83	30.0
Participation Status of SBS		
Yes	77	27.8
No	200	72.2
Being Assigned in Installing an HIMS		
Yes	129	46.6
No	148	53.4
Receiving External Technical Support in the Installation of Health Information Systems		
Yes	260	93.6
No	17	6.1
Knowing Institution Standards Regarding HIMS		
Yes	184	66.4
No	93	33.6

When reviewing the distributions of participants by status of utilizing standards created for HIMS at their institutions (Table 6), it was reported that 44.8% utilized minimum health data sets (MHDS), 43.2% utilized national health data glossaries (NHDG), and 42.7% utilized standards like the health coding reference server (HCRS).

Table 6: The distribution of participants based on status of utilizing standards created regarding HIMS's at Their Institutions (n=192)

	MHDS		**NHDD**		**SKRS**	
	n	**%**	**n**	**%**	**n**	**%**
Little	53	127.6	57	29.7	54	28.1
Middle	86	44.8	83	43.2	82	42.7
Many	53	127.6	52	27.1	56	29.2
Total	**192**	**100.0**	**192**	**100.0**	**192**	**100.0**

When reviewing the distributions of views by importance regarding the installation of hospital information systems where they work (Table 7), participants stated that the installation of HIMS's at their institutions was important because they primarily ensured fast and easy access to information and the presentation of effective medical services, prevented financial leaks and losses of time, increased quality, and reduced material costs. On the other hand, it was reported to a great extent that HIMS are not deemed important in providing effective communication among employees or in providing the objective measurement of the performance of employees.

Table 7: Distribution of participants' views on the use of hospital information systems in organizations

	Order of Importance							
Subjects	1 %	2 %	3 %	4 %	5 %	6 %	7 %	8 %
Prevention of Material Leaks (n = 262)	29.0	9.5	14.1	11.1	10.3	11.8	8.0	6.1
Prevention of Time Loss (n = 265)	26.0	15.5	17.0	17.4	10.6	7.2	3.8	2.6
Cost Reduction (n = 257)	14.8	11.3	14.0	14.4	20.2	14.0	5.8	5.4
Effective Medical Service (n = 259)	34.0	15.4	12.4	12.4	10.8	10.8	2.7	1.5
Increasing Quality (n=264)	25.4	17.0	13.3	11.7	14.4	11.7	4.2	2.3
Quick and Easy Access to Information (n = 265)	42.3	19.6	10.2	8.7	6.4	10.2	1.9	0.8
Effective Communication (n = 255)	11.4	2.7	5.9	6.3	5.9	10.2	38.4	19.2
Objective Performance Measurement (n = 252)	9.9	2.0	5.2	4.0	6.0	7.5	19.8	45.0

When the participants were asked about their views regarding the role of the Ministry regarding HIMS (Table 8), it was most determined (35.51%) that their standards had a determinant role. Less than half of the participants (25%) stated that the Ministry had a role of determining standards, designing systems, and founding systems; 15.22% said that the Ministry

only assumed a system-founding role; and 10.14% said that the Ministry had both standards-determining and system-designing roles.

Table 8: Distribution of participants' views on the role of the ministry of health in the establishment of HIS to the institution (n = 277)

Ministry Role	**Number (n)**	**Percentage (%)**
Standard Determinant	98	35.51
System Designer	17	6.16
System Creator	42	15.22
Standard Determinant and System Designer	28	10.14
Standard Determinant and System Creator	23	7.97
Standard Determinant, System Designer, and System Creator	69	25.0
Total	**277**	**100.0**

Almost all of the participants stated that the HISs they use were formed in a modular structure. Participants stated that there were financial management information system modules at the institutions where they worked and that patient record-admission-consultation, laboratory, money management and circulating capital, invoicing, and accounting modules that facilitate financial transactions are mostly available. Polyclinic and pharmacy modules were reported to be present at the highest rate (98.9%) (Table 9).

When reviewing the opinions to suit the purpose of the modules used at hospitals and their active use (Table 9), it was determined that, while the patient records/admittance module (98.2%) and polyclinic module (97.5%) were used actively and in accordance with the

purpose, the rates of active and purposeful use of the oral and dental health and hemodialysis module were at the lowest level.

Table 9: Modules used at hospitals and status of purposeful use (n=277)

Modules	**Module Is**	**Used Purposefully**
	%	**%**
1. Patient records/Admittance module	98.2	98.2
2. Polyclinic module	98.9	97.5
3. Patient intake, admitted patient follow-up, and patient discharge processes module	98.6	94.6
4. Cash point module	96.0	84.5
5. Pharmacy module	98.9	93.5
6. Laboratory module	97.8	94.2
7. Stock type, purchase, and appliance operations module	96.4	84.5
8. Turnover capital, invoice, and financing processes module	96.8	86.6
9. Personnel operations module	96.0	84.2
10. Information management, statistical and reporting processes module	94.9	87.4
11. Nurse observation and initiative module	87.0	75.8
12. Operating room module	87.7	77.6
13. Oral and dental health module	65.3	56.0
14. Hemodialysis module	66.1	56.7
15. Health council module	88.1	81.9

16. File and archive module	87.0	75.5
17. Blood center module	88.1	80.9
18. Diet module	79.1	65.3
19. Device monitoring module	79.1	65.7
20. Sterilization module	65.3	58.1
21. Consulting module	70.4	63.9

Table 10 presents the status of the participants to receive training in health informatics according to their duties in their institutions. It is seen that the percentage of receiving health informatics education is highest in the IT officers (93.1%), followed by hospital assistant managers (79.7%) and IT personnel (74.0%). It is understood that 72.9% of all participants received IT training.

Table 10: Distribution of educational status of health informatics according to participants' responsibilities in institutions (n = 202)

Position at the Institution	**Received Information Training**		**Did Not Receive Information Training**		**Test value/significance level**
	Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**	
Chief Physician/Hospital Director (n=10)	3	30.0	7	70.0	
Deputy Chief Physician (n=55)	32	58.2	23	41.8	χ^2=7,163

Manager (n-27)	20	74.1	7	25.9	p=0.209
Deputy Manager (n=79)	63	79.7	16	20.3	
Information Processing Official (n=29)	27	93.1	2	6.9	
Information Processing Personnel (n=77)	57	74.0	20	26.0	
Total (n=277)	202	72.9	75	27.1	

When reviewing the distribution of the status of participants' assignment in the installation of the HIMS at hospitals according to their positions at their institutions (Table 11), it was determined that information processing officials were found at the highest rate (72.4%).

Table 11: Distribution of participation status of hospitals in the establishment stage of hospitals according to the duties of the participants in their institutions (n = 277)

Position at the Institution	**Being Included in the Creation of an HIMS**		**In HIMS Creation Not Included**		**Test value/ Significance level**
	n	**%**	**n**	**%**	
Chief Physician/Hospital Director (n=10)	3	30.0	7	70.0	
Deputy Chief Physician (n=55)	15	27.3	40	72.7	
Manager (n-27)	15	55.6	12	44.4	χ^2=18,137

Deputy Manager (n=79)	38	48.1	41	51.9	
Information Processing Official (n=29)	21	72.4	8	27.6	**p=0.000**
Information Processing Personnel (n=77)	37	48.1	40	51.9	
Total (n=277)	129	46.6	148	53.4	

It was found that 38.7% of the participants who were aware of the HIS studies of the Ministry of Health and only 2.4% of those who were not aware could participate in the studies (Table 12).

Table 12: Distribution of participation levels of participants according to the level of awareness of his project of ministry of health (n = 277)

Characteristics	**Participated in HIS Studies**		**Did Not Participate in HIS Studies**		**Total**	**Test value/ Significance level**
	N	**%**	**n**	**%**	**N %**	
Is Aware of the HIS Studies of the Ministry of Health	75	38.7	119	61.3	**194** 100.0	**x^2=38.059**
Is Not Aware of the HIS Studies of the Ministry of Health	2	2.4	81	97.6	83 100.0	**p=0.001**
Total	77	27.8	200	72.2	277 100.0	

When the distribution of participants' levels of knowledge on the topics of MHDS, NHDG, and HCRS based on their status of having attended the HIS studies of the Ministry of Health (Table 13), no meaningful difference was determined in terms of the HCRS levels of knowledge, while a meaningful difference was determined in terms of MHDS and NHDG knowledge levels among the participants of Ministry HIS studies ($p<0.05$). In the advanced chi-square analysis, it was determined that those who participated in HIS studies of the Ministry had less knowledge about MHDS and NHDD.

Table 13: The distribution of the knowledge levels regarding MHDS, NHDG, and HCRS based on the participation of managers in ministry of health HIS studies (n=192)

Characteristics	**Little**		**Middle**		**Many**		**Test value/ Significance level**
	n	**%**	**n**	**%**	**N**	**%**	
Knowledge Levels Regarding MHDS							
Participated in Ministry of Health HIS Studies	9	17	37	43	22	41.5	χ^2=11,824
Participated in Ministry of Health HIS Studies Unincorporated	44	83	49	57	31	58.5	**p=0.003**
Knowledge Levels Regarding the National Health Data Glossary							
Participated in Ministry of Health HIS Studies	10	17.5	35	42.2	23	44.2	χ^2=11,381

Participated in Ministry of Health HIS Studies Unincorporated	47	82.5	48	57.8	29	55.8	**p=0.003**
Knowledge Levels Regarding HCRS							
Participated in Ministry of Health HIS Studies	12	22.2	32	39	24	42.9	χ^2=5,932
Participated in Ministry of Health HIS Studies Unincorporated	42	77.8	50	61	32	57.1	p=0.052

When reviewing the distributions of participants' levels of knowledge on the issues of MHDS, NHDG, and HCRS based on assignment status in HIMS at their institutions, a statistically meaningful difference was detected in terms of the levels of MHDS, NHDG, and HCRS knowledge between the statuses being at HIMS installations at their institutions ($p<0.05$). It was determined in the advanced chi-square analysis that those who are not included in the installation of HIMS's had lower levels of knowledge regarding MHDS's, NHDG's, and HCRS's.

Table 14: The minimum health data sets and distribution of the levels of knowledge regarding MHDS, NHDG, and HCRS based on the assignment status of managers at hospitals in the founding stage of HIMS's (n=192)

Characteristics	**Knowledge Levels Regarding MHDS**						**Test value/ Significance level**
	Little		**Middle**		**Many**		
	n	**%**	**n**	**%**	**N**	**%**	
Included in	23	19.3	57	47.9	39	32.8	
HIMS Establishment (n=119)							χ^2=11.47 1 **p=0.003**
Not Included in HIMS Establishment (n=73)	30	41.1	29	39.7	14	19.2	
Knowledge Levels Regarding the National Health Data Glossary							
Included in HIMS Establishment (n=119)	24	20.2	56	47.0	39	32.8	χ^2=14.35 7 **p=0.001**
Not Included in HIMS Establishment (n=73)	33	45.2	27	37.0	13	17.8	

Knowledge Levels Regarding HCRS							
Included in HIMS Establishment (n=119)	26	21.8	51	42.9	42	35.3	χ^2=8.414 **p=0.015**
Not Included in HIMS	28	38.4	81	37.8	14	25.0	
Establishment (n=73)							

DISCUSSIONS AND CONCLUSIONS

In this study, the experience of SBS managers working in the Training and Research Hospitals affiliated to the Ministry of Health in our country on health information was measured. The study reviewed the levels of knowledge on the topic of HIS and HIMS for information systems managers and processers, the evaluations regarding information processes, and the perspectives regarding collaboration with the ministry. At the end of the study, the following results were obtained.

When the age characteristics of the participants were examined, it was found that they were minimum 20 and maximum 57 years old and the mean age was 37.64 (Table 1). Assuming sufficient experience and innovative, open-minded perspective that can be regarded as a characteristic of the middle age group, this situation is considered positive for institutions.

It was determined that HIS managers from the training and research hospitals that were researched were generally structured in the form of medical (chief physician / deputy chief physician), administrative (manager / deputy manager), and technical personnel (information process official / personnel) (Table 1).

When the working time of the managers in the most recent units was examined (Table 1), it was found that 55.2% of them had been in these positions for less than 4 years. This result shows that the SES managers have a short term.

When it was examined whether the managers received training in health informatics (Table 2), it was found that the majority (72.9%) received training. This situation indicates that, while HIS managers are determined in hospital management, training taken regarding health management (courses, seminars, in-service training, etc.) was noticed or that the relevant training was later given to HIS managers.

Despite this training, it was determined that approximately half of the managers view themselves as moderate, inadequate, or very inadequate in terms of their levels of knowledge on computers and the HIMS (Table 4). This finding shows that health informatics trainings cannot make the participants feel sufficient.

It was seen that 70% of the research group were aware of the studies related to SBS. This rate may be considered high, but when reviewing the status of the same managers having participated in studies regarding HIS, the level of participation remaining at 27.8% is important in terms of demonstrating that being aware of events is not adequate for participation in the studies. Similarly, it was determined that the rate of managers being assigned during the installation of HIMS's, the space where healthy information systems are effectively used, at hospitals was 46.6%. This is important in terms of showing why the rate of receiving external technical support in the establishment of health information systems is so high (93.6%). Considered from a different perspective, it can be said that heightened technical support from outside the institution during the installation of health information systems was effective in low levels of participation in HIS-related studies and in low levels of assignment in HIMS installation for managers.

When reviewing the degrees of importance for managers views on the use of HIMS at the institutions where they work (Table 7) the following list is acquired when we rank them based on deemed priority:

1. Quick and easy access to information,
2. Effective medical services,
3. Preventing financial leaks,
4. Preventing the loss of time,
5. Increasing quality,
6. Reducing costs,
7. Effective communication between employees, and
8. Objectively measuring employee performance.

It was discussed that the property of "ease and speed of access to information" for HIMS was first, and when evaluated with the expectation of "preventing loss of time", which was fourth, it is seen that the opinion that HIMS accelerate the work of health employees was dominant. On the other hand, although the property of "effective medical services" was second in terms of priority, the inclusion of "increasing quality" in fifth place is understood to be evaluated as HIMS's contributed relatively least to service quality, despite increasing effectiveness. On the other hand, with third being the feature of "preventing financial leaks" and sixth being "reducing costs", falling behind effect medical service characteristics with fast and effective access to information is important in terms of demonstrating that the purpose of use regarding HIMS's shifts from administrative and financial topics to operational and clinical fields. Similarly, the ranking of seventh for the use of HIMS for "effective communication" revealed that the other characteristics are more prioritized in terms of the purpose of use. It is also noteworthy that the use of HIS is not considered as a priority for "objective performance evaluation". While 9.9% of the participants considered this as the most important feature of HIS, 21.1% of the participants chose the top four.

When reviewing the views of managers regarding the role of the Ministry of Health in installing HIMS's for affiliated institutions (Table 8), determinant ministry standards ranks the first with 35.51%, and system designs ranks last with 6.16%. When all the results are considered, it is seen that the standard determining role of the ministry is evaluated as dominant. On the other hand, it is thought-provoking that 25% of the managers expect all work (standard setting, system designer and system builder) to be done by the ministry.

Table 2 shows that most of the participants received SBS training. Table 10 shows the distribution of HIS managers who receive training according to their duties in their institutions. According to this, it is observed that assistant principals receive the highest training with 79.7%, while the highest rate (30.01%) is observed among the non-trained chief physicians. However, there was no statistically significant difference between the groups.

When reviewing the status of managers' assignment in the installation of the HIMS at hospitals according to their positions at their institutions (Table 11), it was determined that information processing officials were found at the highest with 72.4%. A statistically significant difference was found between the tasks of the participants in terms of their participation in HIS.

When the level of awareness of managers from the SES studies of the Ministry of Health and their participation in these studies were examined (Table 12), it was found that 38.7% of the informed persons participated in these studies. When analyzed statistically, it was found that the awareness rate of the participants was significantly higher than those who did not participate in SES studies.

When managers' levels of knowledge on the topics of MHDS, NHDG, and HCRS based on their status of having attended the HIS studies of the Ministry of Health (Table 13), a meaningful difference was determined in terms of the HCRS levels of knowledge, while no meaningful difference was determined in terms MHDS and NHDG knowledge levels among participants. However, it was found out that they had less information about MHDS and NHDD.

When reviewing the levels of knowledge regarding MHDS, NHDG, and HCRS based on the assignment status of managers at the founding stage of the HIMS (Table 14), the a statistically meaningful difference was determined in terms of the levels of knowledge. It was determined in the advanced chi-square analysis that those who are not assigned in the installation of HIMS's had lower levels of knowledge on topics of MHDS's, NHDG's, and HCRS's. It can be concluded from this that the standards of the Ministry play an important role in the installation work of HIMS and create awareness in assignments in the installation phase.

When the responses of the managers about the modules in the hospitals were examined (Table 9), it was found that almost all of the HISs were modular. It was found that modules facilitating financial transactions and polyclinic and pharmacy modules were present in almost all hospitals (98.9%).

This research was conducted with 277 managers at 55 Training and Research Hospitals from 16 separate provinces affiliated with the University of Health Sciences and developed the following recommendations based on the conclusions acquired through the evaluation of the findings.

SBS are living, constantly developing and changing systems. It is inevitable that at every stage there will be various demands for change or problems may arise. For this reason, it is very important to employ personnel with sufficient knowledge in this field. This service can be provided through external private sector companies or by training personnel with corporate belonging. One of the most striking results of the study is that although SBS managers participated in many trainings, they did not consider themselves competent in this field.

The research has tried to reach all HIS managers and personnel working in hospitals as the sample of the universe and reached a minimum of 2 and a maximum of 11 managers on a hospital basis. This shows that there is no hospital-based standard for HIS managers and staff. With the standardization studies to be carried out, the number of HIS managers and staff should be reviewed and planned by prioritizing criteria such as size, capacity and transaction volumes

of hospitals.

Regarding the SIS, considering that the rates of "receiving technical support from outside the institution" (93.6%) were very high and that HIS managers did not consider themselves adequately competent, it can be evaluated that a series of improvements must be made regarding external dependence and the creation of internal capacity.

Another attractive point is the determination that HIS managers at hospitals are aware of Ministry studies relating to HIS's but that information processing personnel are largely (41%) unaware of these studies. This indicates that there is insufficient communication between the HIS managers in the hospital and the IT staff.

When the information levels of HIS managers about computer and HIS were examined, it was determined that managers did not consider themselves sufficient in all of the characteristics questioned. For these reasons, considering the hospital models with different operations such as urban hospitals and that hospitals are large, complex structures, it is assessed that the numbers of HIS directors should be increased and absolutely should be selected from relevant areas of expertise (computer engineering, industrial engineering, software engineering, etc.).

When the educational status of health informatics was examined according to the duties of the managers in their institutions, it was found that the assistant managers received the highest rate of training. As a probable outcome of this, when we separated HIS managers working in hospitals medically, administratively, and technically, when considering their jobs at their institutions and the levels of interest and knowledge in health information systems in this scope, it was seen that administrative personnel had a greater command over and interest in the processes. However, when the organizational charts of the hospitals are examined, it is known that the deputy principals who are active in the field of HIS are in the 3rd place in the hierarchy and there are at least two other managers on them. Therefore, in order to increase corporate success in the health informatics field, it is very important to be positioned with a

direct responsibility of information systems and taking account of authority-responsibility balance.

Considering that the HIMS managers working in the installation of HIMS had greatly divergent levels of knowledge regarding Ministry standards and that HIMS's are not frequently changed, it is seen that the Ministry must urgently arrange training for personnel lacking knowledge of the standards.

When reviewing the degrees of importance for participants' views regarding the functions of HIMS's, the last ranking of the expectations of "objectively measuring employee performance" could originate from a distrust of the records in the HIMS. Understanding the real cause of this situation will be a separate research topic.

Systems that should be open to innovation, development and change must also be closed against all kinds of threats and cyber attacks. In this context, when reviewing the training statuses of managers on the topics of "electronic health records" and "data security and privacy", the rates of those who had received training on electronic health records and on data security and privacy were around 30% and below 50%, respectively. In such an important issue, the inadequacy of the training received by the managers poses a risk for both employee and patient safety and privacy.

The HIMS Acquisition Guide published by the Ministry of Health to determine past HIMS acquisition standards was republished as the Health Information Management System Acquisition Guide (HIMS-AG) in March 2018. Seeing the inadequacy of setting HIS acquisition standards alone, the Ministry has merged 27 documents on all information systems used in the field of health in this document. In this study, it has been determined that it is necessary to raise awareness about these standards, to employ more competent HIS managers and to increase communication between HIS employees in the hospital. Also, it was seen that HIMS's play an important role in more effective use of administrative and financial processes as well as health services for HIS managers.

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