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The Impact of Computerized Health Information System on Medical & Administrative Decisions, Sana'a Hospitals, Yemen (2017-2020)

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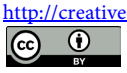

Abstract

Background: Health information systems (HIS) play a major role in decision-making. The aim is to identify the components of computerized HIS and their relationship to administrative decisions at the main referral hospitals for Sana'a city. **Method:** This applied research is a descriptive, cross-sectional study in which the HIS of 7 hospitals affiliated with Sana'a city hospitals during "2017-2020", was evaluated based on Self-administered questionnaires. Data were collected by using Self-administered questionnaires and analyzed in SPSS 16 by using descriptive statistics. **Results:** A total of 626 users (95.7%) had responded. 73%, 75%, 69%, 70%, 71% of users mentioned that resources were available, for physical, software, human, organizational, and decision computerized HIS, respectively. The study showed a strong relationship between computerized information systems with their physical, software, human and organizational components, and medical and administrative decisions. While the study showed the absence of a relationship between demographic factors and computerized information systems with their hardware, software, human and organizational components, medical and administrative decisions, except for gender with organizational components, age, qualification with hardware and software components, and years of experience with all study variables. **Conclusion:** The application of HIS at hospitals in decision-making has several challenges, including the lack of updating of hardware and software components Furthermore, the absence of specific, focusing on developing their technical staffs, and mobilizing financial resources to

achieve implementation properly. Therefore, establishing the technical management with clear roles and tasks with multi-disciplinary, and increasing the support of the administrative leadership in the process of implementing HIS are recommended.

Keywords

Health Information Systems, Decision-Making, Hospital, Yemen

1. Introduction

Medical information has a great role in improving health services, as it works to store and recover information in a timely manner for all administrative levels [1]. The accurate data of patients, their medical condition and medical examinations, and all administrative processes will help the technicians and administrators to make appropriate decisions [2]. According to many researchers, HIS defines as a system consisting of physical, technical, human and organizational components that work together in data processing, and then broadcast and retrieve information [3] [4] [5] [6] [7].

Decision-making is a rational behavior that requires the good use of information, which means that information is valuable because it increases the level of rationality of decision-making through the quality of the information used, which means that information is of great importance to the decision-making process, as it represents the basic input of that process, and is an important factor in choosing the optimal alternative among the number of alternatives available to decision makers, allowing focus on the most appropriate alternatives [3] [8].

Globally, the information system reaches to telemedicine by the role of new technology in the wide world and mention louse in updated research. HIS in Mexico provides 20% of information that can improve 80% of decision in medical care services by Barito principle [9] [10].

Beyond that through the internet, whose potential has prompted millions of sick users to rely on it as a source of medical information search [11]. In the medical field, because of its importance and sensitivity to human health, where medical services are the core of development and production, and medical care is the core of the health system and its basis in many countries of the world for many considerations [12].

Several studies, including the Asia Lahool showed the effectiveness of computerized health information systems in making and rationalizing administrative and medical decisions [6] [13]-[17].

In the Middle East (ME), the countries have widely used HISs since the 1980s. HIS use and development vary to a certain extent. Since the middle of the first decade of the 21st century [18], Ministry of Health officials of the ME have considered the importance of HIS's integration and created an Electronic Health Record where Oman, Bahrain and UAE are among the leading countries [18].

Diverse health systems within the ME continue to experience a high degree of variability with regards to accessibility, capacity, and the quality of care provided within each individual country [19].

Yemen is one of the countries seeking to implement computerized information systems and has adopted as part of the national health strategy for 2010-2025, and recommended the need for planning programs to introduce medical and administrative information systems and the use of technology in health care. It has a head start in the application of these systems [20].

To our knowledge, this is the first study that tries to determine the impact of computerized health information systems on administrative decision-making in public and private hospitals in Sana'a city, Yemen.

2. Methodology

Cross sectional study was conducted at Sana'a city hospitals during 2017-2020.

Study setting

Public and private hospitals in Sana'a city which represent referral and implement of health information system were included. It carried out at Al-Jomhorry-48 Hospital-AL Thawra-Kuwait and Al Sabeen hospitals. In addition to the private hospitals (Science and Technology Hospital and Saudi German Hospital).

Study population and sampling

All employees (n = 650) who used computerized HIS and worked in the selected hospitals were included.

Data collection

The questionnaire was distributed to the health workers CHIS users in Yemeni hospitals. The number of the questionnaire distributed was 650, 24 of them missed while the responses was 626 copies, 4 copies were canceled because they were not validated and remaining 622 copies of the questionnaire responses were validated and suitable for analysis as seen in Table 1. The researcher considered this number of questionnaires sufficient to complete the research study.

Self-administered questionnaire was used which consists of two sections [17]

Table 1. Name of hospitals.

Name of hospitals	Types	Frequency	Percentage
Al-Jomhwri	Public	89	0.137
48 Hospital	Public	107	0.165
Science & Technology	Private	96	0.148
Saudi German	Private	156	0.24
Al-Thawra	Public	84	0.129
Al-Kuwait	Public	44	0.068
Al-Sabeen	Public	46	0.071

[21]: Section one contains demographic data which include, gender, age, profession, professions, job type, years of experience. The second section contains 28 questions about data on CHIS and their dimensions as the following:

First part: the hardware potential, and it consists of 7 paragraphs.

The second part: the software potential, and it consists of 8 paragraphs.

The third part: human potential, and it consists of 7 paragraphs.

The fourth part: the organizational potential, and it consists of 6 paragraphs.

The Third part section consist of the following:

The fifth part: Administrative decision-making, and it consists of 7 paragraphs.

The total number of all dimensions was 35 paragraphs.

Study Scale:

This paper use Likert scale which has a measure range from 1 - 5 as 5 represent strongly agree and 1 represent strongly disagree was used in this study.

Quality assurance of tools

Test of validity and reliability of the tool:

The researcher used an internal validity tool and the Pearson correlation coefficient to ensure the relevance of the paragraphs and the extent to which each statement of the axis phrase relates to the degree of the axis, and the correlation of each statement with the overall score of the tool. Regarding the stability of the tool *i.e.*, questionnaire, Alpha Cronbach's test was performed as showed in Table 2 It is evident from the below table that the value of the reliability coefficient for the study tool (the resolution) in general came (0.902), which means that the questionnaire has a very high stability, and the reliability of the sample members came (0.950). This means that the degree of reliability of the answers is also very high, and this suggests that the sample they are homogeneous in response to the questionnaire and the results can be relied upon in generalizing them to the research community to a large extent.

Analysis and data management

Researcher relied on the Statistical Package for Social Sciences (SPSS) program in the process of data analysis and hypothesis testing, and the researcher used the following statistical methods:

Table 2. Cronbach's Alpha.

Series	Dimensions of coefficient	Stability factor	Degree credibility $\sqrt{\text{stability}}$
1	potential material	0.931	0.965
2	Technical capabilities	0.921	0.960
3	Human capabilities	0.929	0.964
4	Organizational capabilities	0.929	0.964
5	Administrative decision-making	0.927	0.963
6	Total score of the tool	0.902	0.950

1) Pearson's Correlation 'Person: to find out the extent of a relationship of the type of correlation between the study parts and its paragraphs, and the researcher used it to measure the internal consistency of the questionnaire statements and constructive validity.

2) Alpha 'Cronbach's test: to ensure the reliability of the research instrument and the reliability of the sample's opinions.

3) Frequencies and percentages: to describe the demographic variables of the research sample, and the responses of the research sample individuals to the questionnaire statements.

4) The arithmetic mean, standard deviation, and approval percentage: to know the average opinions of the research sample and the extent of the deviation of the sample's answers from the default mean (3 marks) and to prove the approval or disagreement of the research sample on the part.

5) Chi-Square test: To test the statistical significance of the research hypotheses at the level of significance (0.05) by comparing the resulting value with the tabular value to ensure the validity of the research hypotheses.

6) Simple linear regression test to ensure the correctness of the hypothesis as a whole and to judge whether or not it is accepted, and to know the proportion of the effect of independent variables on the dependent variable.

7) A test (T-test) for two independent variables to test the differences between the mean of the responses of the study sample with respect to the variable of gender (male, female).

8) A test (one away anova) for more than two independent variables to test the differences between the averages of the responses of the study sample with respect to the variable of age, and a variable, the level Education, variable years of experience, and job title.

9) Least Significant Differences Test (LSD) to find out in favor of the differences between the averages of the study sample responses about the instrument parts resulting from the one away anova test, P-value < 0.05 is considered statistically significant cut off point.

Ethical considerations

Approval was taken from ministry of public health and population and managers of study hospitals and participants, where the researcher relied on submitting a request for prior approval from each respondent, and then the questionnaire is distributed to the conciliators only.

3. Results

The questionnaire was distributed to a number of Yemeni hospitals in the capital Sana'a consisting of five public hospitals and two private hospitals as shown in Table 1.

Reliability

Reliability of a research instrument concerns the extent to which the instrument yields the same results on repeated trials. Although unreliability is always

present to a certain extent, there will generally be a good deal of consistency in the results of a quality instrument gathered at different times. The tendency toward consistency found in repeated measurements is referred to as reliability. To determine the reliability and credibility of the data collection tool and the credibility of answers, the questionnaire was tested using Cronbach's Alpha to ascertain. the extent of the stability of the questionnaire and the sincerity of the views of a sample. Table 2 shows the results of Cronbach's Alpha test to all the questions of the questionnaire.

As stated in Table 2 the value of the reliability coefficient for the data collection tool (questionnaire) came up 90% and this means that the stability is very good.

The first part of the questionnaire is the demographic variables, which contain personal information related to the respondents. To obtained Demographic variable we used the Descriptive Analysis.

To achieve the answers of the study variables, we used the Descriptive Statistics of the main five variables (Hardware, Software, human, and organization, administrative and medical decisions),

Descriptive analysis includes the mean and the standard deviation for the dependent (administrative and medical decisions) and independent variables (Hardware, Software, human, and organization) for each statements and for all part (dimension), the result of each paragraphs and dimension compared with medium mean, if more that means there are approval of respondents while if less that means that means there are no approval from respondents as seen in Table 3.

Demographic variables

A total of 650 participants were recruited in the study; 260 from private hospitals and 290 from public hospitals with a response rate of 622 (95.7%). Table 4 shows the demographic characteristics of respondents which revealed about more than half of the respondents were male 377 (60. 61%). One-third of them were 30 to 35 years of age 233/622 (37.46%). Half of participants 280/622 (45.02%) had a bachelor's degree and one-third of them 171/622 (27.5%) had a nursing profession. More than 224/622 (36.01%) had administrative job beside technical tasks and 213/622 (34.24%) had less than 5 years of experience.

The respondents in the research sample were divided into two genders (male

Table 3. Interpreting the level of consents.

Mean-value	Percent-value	Level of approval	Level of approval
4.20 - 5	84% - 100%	strong agree	Very high
3.40 - <4.19	68% - <84%	agree	high
2.60 - <3.39	52% - <68%	neutral	moderate
1.80 - <2.59	36% - <52%	disagree	low
<1.80	<36%	strong disagree	Very low

Table 4. Statics of demographics variables. (n = 622).

Attribute	Distribution	Frequency	Percentage
Sex	Male	377	60.6%
	Female	245	39.4%
Age	<30 years	199	31.99%
	30 - <35 years	233	37.46%
	35 - <40 years	99	15.92%
	40 - <45	36	5.79%
	45 - <50 years	37	5.79%
	>50 years	18	2.89%
Qualification	PhD	22	3.54%
	Master	61	9.81%
	Bachelor	280	45.02%
	Higher diploma	137	22.03%
	Intermediate diploma	122	19.61%
Type of hospitals	Public	370	0.59
	private	252	0.41
Type of profession	doctor	86	13.83%
	nurse	171	27.49%
	technical	119	19.13%
	pharmacist	58	9.32%
	other	188	30.23%
Type of jobs	Director of Department	36	5.79%
	Deputy of Department Director	22	3.54%
	Head of Department	112	18.01%
	Deputy of Department Head	54	8.68%
	Other job	398	63.99%
Experience	< 5 years	213	34.24%
	5 - <10 years	197	31.67%
	10 - <15 years	115	18.49%
	>15 years	97	15.59%

and female). As shown in Table 4, the number of male respondents was 377, and the female was 245. The percentage of two genders was 60% and 40% respectively. So that the most of the study sample are males the researcher attributes this to the increase in the number of males to females, as workers in the health sector are still predominantly male.

The age variable in the questionnaire was divided into six sections as shown in the following below, the number of 30 - <35 year's respondents was the highest with a percentage of 37.46%, followed by age group < 30 years with percentage of 31.99% and the proportion gradually decreases from age groups. 35 - <40 years was 15.92%, after that the category 40 - <45 years & 45 - <50 was equal with 5.79%, finally, more than 50 years was 2.89%.

The qualification variable in this part shows the results of the study were divided into five levels (PhD, master, bachelor,, higher diploma, intermediate diploma). From above we can observe the distribution details in the educational levels between the sample of the research where the highest educational rate was bachelor degree with 280 after that higher diploma was 137, then intermediate diploma was 122, Master degree 61, and finally PhD with 22 respondents.

Two types of hospitals were used in research (government, private). Table 4 shows the distribution data in each hospital. We note that the percentage of government hospitals and private hospitals is relatively close to each other. The number of governmental hospitals was 370 respondents and the private hospital was 252 respondents. It can be explained by the result that hospitals in the public suffer from accumulation of non-active employees while private sector in Yemen are an important factor for therapeutic services almost half the human cadres.

The type of work targeted three categories of respondents by nature as shown in Table 4. The number of Nurses was 171 and it was the highest percentage among the respondents, we can explain that the work of the nurse requires permanent presence in the workplace and this is what appeared in the results of the search where the highest proportion among respondent 27.49%, unlike doctors and their role only for diagnosis and follow up only in the workplace, making them the lowest rate, doctor was 86, and technical was 119 while pharmacist was 58, help jobs was 188 respondents.

The period of experience for respondents was divided into five periods as shown in the following Table 4, the number of respondents with <5 years' experience was 213, after that 5 - <10 year was 197, and 10 - <15 years was 115, and >15 years for category 97 respondents. We note from Table 5 that the percentages of respondents who have years of experience more are the lowest proportion when compared to the rest of the experience either respondent who has little experience periods are the largest proportion.

Descriptive Statistics of the main five variables:

Descriptive analysis includes the mean and the standard deviation for the dependent and independent variables explained in the following sub-sections;

In the second part of the questionnaire, the CHI systems dimensions on health care administrative and medical decisions is explained and divided into four independent variables (Hardware, Software, human, and organization). Each section below contains paragraphs related to it. It has been formulated to be answered by the respondents from the same sample. Each paragraph analyzed and discussed as the following:

Table 5. Descriptive statistics of all dimensions.

S	Dimensions	Mean	*SD	%	level	Rank
1	Hardware axis	3.66	0.99	73.12%	High	2
2	Software axis	3.75	0.84	74.96%	High	1
3	Human resource axis	3.45	0.76	69.03%	High	5
4	Organization axis	3.49	0.81	69.77%	High	4
5	Decision axis	3.55	0.81	70.97%	High	3

SD = Standard deviation.

Study variables (Hardware, software, human, organization, decisions)

Table 5 shows that software 2 got the first rank with a mean 3.75, and standard deviation of 0.84. The highest percentage 74.96%of respondents agree. Paragraph 3 ranked last with a mean of 3.45 and a standard deviation of 0.76, The lowest percentage 69.03% which represent the human, then paragraph 1, 5, 4 came in between respectively that represent hardware, decisions, organization parts.

The overall approval for the all-study variables the software came the highest consent level with (74.96%), hardware was (73.12%), Decision (70.97%), organization was (69.77%), finally human axis phrases were (69.03%) these reflect the situation of human resources in health sectors that lack of concentration from leaderships.

Testing hypotheses of the study

The researcher used to test the hypotheses statements the Chi-Square test to find out the significance of the differences in the responses of the study sample individuals to each of the research hypotheses statements. If the chi-square computed is greater than the tabular chi-square value at a degree of freedom and the level of statistical significance was (<0.05), which means there were significant differences.

To accept or reject we used linear regression analysis to ascertain the effect of independent variables on dependent variables and determined the relationship and degree of influence as according to the rule of thumb proposed by Muijs (2004).

Correlation Analysis

According to Sekaran, in doing any study project which has several variables, further than knowing the means and standard derivation of the variables, the researcher would often like to recognize how one variable is related to another. Inter-correlation analysis indicates the nature, direction, and significance of the bivariate relationship of the variables used in the study.

This study concludes examines the nature of the relationship that exists between independent and dependent variables. To determine the relationship between the variables, person correlation was run between the variables, and a perfect positive correlation was found between two variables, which is represented

by 1.0 (plus 1), or a perfect negative correlation which would −1.0 (Minus 1) as shown under Figure 1. Whereas, the correlation might range between −1.0 and +1.0, the researcher conducted this study to know if any correlation found between two variables is significant or not (*i.e.*; if it has occurred solely by chance or if there is a high probability of its actual existence). As for the information, a significance of p = 0.05 is the generally accepted conventional level in social sciences research.

Davis (1997) projected the rules of thumb that need to be used in interpreting the R-value obtained from intercorrelation analysis as shown in Table 6.

Table 7 illustrates the correlation matrix between the major variables. The relationship between variables was tested using Pearson's correlation coefficient.

The dependent and independent variables were discussed separately, in addition to the statistical analysis of all the sample of the research. Thus, the CHI system (software, hardware, human and organization), positively affects administrative and medical decisions.

The researcher deals here with the interpretation of the hypotheses of the field study, through the information obtained by the tables of statistical data analysis as well as the results of the statistical analysis to test the hypotheses, and the researcher will interpret the result of each statement separately in order to judge its correctness or lack thereof based on the statistical analysis General, and then test the validity of each hypothesis separately in order to accept or reject that hypothesis using simple linear regression.

The researcher used to test the hypotheses statements the Chi-Square test to find out the significance of the differences in the responses of the study sample individuals to each of the research hypotheses statements. The following is a

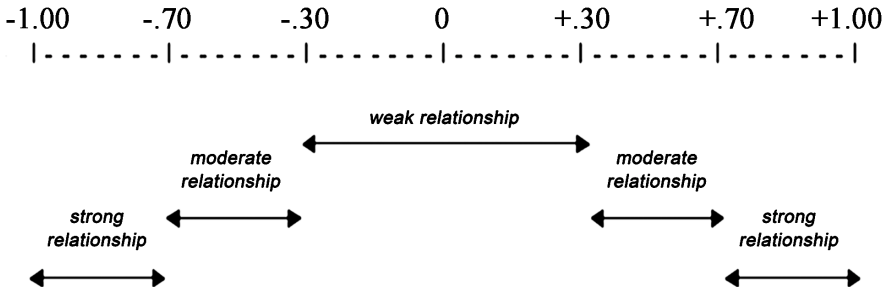

Figure 1. Interpreting correlation data.

Table 6. Interpreting the R-value for inter correlations.

R-value	Relationship
Above 0.70	Very strong relationship
0.50 - 0.69	Strong relationship
0.30 - 0.49	Moderate relationship
0.10 - 0.29	Low relationship
0.01 - 0.09	Very low relationship

Table 7. Correlation analysis. adoption level pearson correlation.

		Hardware	Software	Human	organization	Decisions
Hardware	Adoption level Pearson Correlation	1	0.817**	0.607**	0.564**	0.581**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	622	622	622	622	622
Software	Pearson Correlation	0.817**	1	0.618**	0.640**	0.640**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	622	622	622	622	622
Human	Pearson Correlation	0.607**	0.618**	1	0.695**	0.644**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
	N	622	622	622	622	622
organization	Pearson Correlation	0.564**	0.640**	0.695**	1	0.752**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
	N	622	622	622	622	622
Decisions	Pearson Correlation	0.581**	0.640**	0.644**	0.752**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	N	622	622	622	622	622

**Correlation is significant at the 0.01 level (2-tailed).

discussion and testing of the study hypotheses:

Hypothesis: H01a

"There is no statistically significant relationship to the effect of (hardware potentials) For health information systems to make administrative and medical decisions in the health sector".

Hypothesis: H01b

"There is no statistically significant relationship to the effect of (software potentials) For health information systems to make administrative and medical decisions in the health sector"

Hypothesis: H01c

"There is no statistically significant relationship to the effect of (human potentials) For health information systems to make administrative and medical decisions in the health sector"

Hypothesis: H01d

"There is no statistically significant relationship to the effect of (organization potentials) For health information systems to make administrative and medical decisions in the health sector"

To prove this hypothesis, the Chi-Square test was used to test the presence of

statistically significant differences between the numbers of agreeing, neutral and disagreeing with the previous results on each of the above hypothesis statements, and the results were as shown in the following Table 8.

Table 8 showed that the value of the chi-square computed to indicate the differences between the numbers of strongly agreeing answers, agreeing, neutral, disagreeing and disagreeing at all for all all—hypothesis statements that the value of the chi-square amounted to (414.810 - 455.026 - 414.540 - 503.482), which is greater than the tabular chi-square value (40.113 - 43.773 - 40.113 - 36.415) at a degree of freedom (27 - 30 - 27 - 24) And the level of statistical significance (0.00). Depending on it; This indicates that there are statistically significant differences at the less level of (0.05) between the answers and in favor of the corresponding answers.

To ensure acceptance or rejection of the hypothesis, the researcher used linear regression analysis to ascertain the effect of (hardware, software, human, organization) of health information systems on administrative and medical decision-making in the health sector.

Table 9 that appear the impact of the all axis (hardware, software, human, organization capabilities) on administrative and medical decision-making in the health sector, and the existence of a statistically significant effect of this dimension in making administrative and medical decisions in the health sector, as the correlation coefficient reached (R = 0.581 - 0.640 - 0.644 - 0.752) It is a positive, large, statistically significant direct relationship, where the level of significance was (0.000), while the coefficient of determination (R^2 = 0.337 - 0.410 - 0.415 -

Table 8. Kai² Test for the independent variables of CHI systems with dependent variable decisions.

Independent variables	*X^2	**DF	***T-V	****P-Value	result
Hardware × decision	414.810	27	40.113	0.000	supported
Software × decision	455.026	30	43.773	0.000	supported
Human × Decision	414.540	27	40.113	0.000	supported
Organization × Decision	503.482	24	36.415	0.000	supported

*X^2 = Chi square Value, **DF = Degree Freedom, ***T-Value = Tubular Value, ****P-Value = prevalence of significance.

Table 9. Independent variables of CHI systems potential on dependent variable decision.

H01a-d	R	R^2	β	T-Test	P-value	conclusion
hardware potential × administrative and medical decision-making	0.581	0.337	0.476	17.763	0.000	Impact
software potential × administrative and medical decision-making	0.640	0.410	0.617	20.748	0.000	Impact
human potential × administrative and medical decision-making	0.644	0.415	0.687	20.983	0.000	Impact
Organization potential × administrative and medical decision-making	0.752	0.565	0.751	28.381	0.000	Impact

*R = Coloration, **R^2 = Factor Determination coefficient, ***β = Beta: degree of influence, ****P-Value=probability value at α < 0.01.

0.565) that is, 33.7%, 41%, 41.5%, 56.5% of the dependent variable is mainly due to the independent variable (hardware, software, human, organization potentials As for the rest (60.3%,59%. 58.5%, 42.5%), it is based on other variables, and the degree of influence or tendency reached (B = 0.476, 0.617, 0.687, 0.751), which means that (hardware software, human, organization capabilities) in one degree results in an improvement in administrative and medical decision-making in the health sector by 47.6%, 61.7%, 68.7%, 75.1% respectively. according to the rule of thumb proposed by Muijs (2004).

The significance of this effect also confirms by the calculated T value, reaching (17.763 - 20.748 - 20.983 - 28.381), with a level of significance (0.000), which is less than the level of significance (0.05).

Result

Through the above potential value of Chi square and value probability of T-test and correlation coefficient between two variables and coefficient determination, therefore all null hypothesis were rejected, and accept alternative hypothesis which states that:

"There is a statistically significant relationship to the effect of (hardware components) of health information systems on administrative and medical decision-making in the health sector, and to the level of significant impact".
"There is a statistically significant relationship to the effect of (software components) of health information systems on administrative and medical decision-making in the health sector, and to the level of significant impact".
"There is a statistically significant relationship to the effect of (human components) of health information systems on administrative and medical decision-making in the health sector, and to the level of significant impact".
"There is a statistically significant relationship to the effect of (organization components) of health information systems on administrative and medical decision-making in the health sector, and to the level of significant impact".

Hypothesis

H02: There are no statistically significant differences at the level of significance (0.05) between the averages of the study sample's scores on the effect of computerized information systems in the health sector on administrative decision-making due to demographic variables (gender, age, academic degree, profession, job, experience).

In order to test the validity of the hypothesis, it requires studying the responses of the study individuals on the impact of computerized information systems in the health sector on administrative and medical decision-making in the hospitals of the Capital Sana'a-Yemen for each variable separately, as follows:

For this purpose the researcher use a T-test for two independent tests", and (one away a nova) for more than two independent variables were used to analysis and represent the results. Least Significant Differences Test (LSDT) was used to find out the favor of the differences between the averages of the study sample

responses about the instrument diminutions resulting for any one of them from the one way a nova test. P-value < 0.05 is considered statistically significant cut off point.

Result

Table 10 Showed that There are no statistically significant differences at the level of significance (0.05) for Demographical Variables and study diminutions

Table 10. The correlations between demographical variables and study diminutions.

Axis's	Demography	hardware		software		Human		organization		Decision-Making	
		Means	P-Value	Means	P-Value	Means	P-Value	Means	P-Value	Means	P-Value
Gender	Male	3.68	0.473	3.79	0.148	3.48	0.297	3.54	0.04	3.58	0.272
	Female	3.62		3.69		3.41		3.41		3.5	
Age in Years	<30	3.58,	0.012	3.68	0.037	3.54	0.119	3.54	0.223	3.56	0.764
	30 - <35	3.73		3.79		3.45		3.49		3.54	
	35 - <40	3.64		3.81		3.43		3.55		3.61	
	40 - <45	3.2		3.4		3.35		3.27		3.36	
	45 - <50	3.95		3.97		3.17		3.26		3.56	
	>50	3.87		3.9		3.41		3.52		3.57	
Qualification	diploma	3.47	0.001	3.62	0.001	3.49	966.425	3.55	0.406	3.57	0.092
	BA	3.74		3.85		3.42		3.46		3.55	
	High Diploma	3.55		3.59		3.49		3.5		3.5	
	Master	3.62		3.71		3.35		3.37		3.46	
	PhD	4.35		4.19		3.66		3.71		3.99	
Profession	Physician	4.08	0.054	4.06	0.102	3.55	0.332	3.59	0.476	3.74	0.021
	Nurse	3.62		3.62		3.46		3.44		3.51	
	Technician	3.6		3.73		3.5		3.56		3.62	
	Pharmacist	3.87		3.98		3.46		3.49		3.62	
	Other health professions	3.47		3.66		3.36		3.44		3.42	
Job	Department Manager	3.42	0.117	3.64	0.239	3.58	0.294	3.54	0.706	3.38	0.113
	Deputy Department Manager	3.55		3.81		3.45		3.62		3.69	
	Head of Section	3.59		3.68		3.32		3.4		3.45	
	Deputy Head of section	3.94		3.98		3.43		3.52		3.76	
	Other Jobs	3.66		3.74		3.48		3.5		3.55	
Experience (Years)	<5	3.77	0.026	3.87	0.017	3.61	0.0001	3.62	0.005	3.73	0.0001
	05 - <10	3.62		3.71		3.42		3.48		3.52	
	10 - <15	3.72		3.76		3.49		3.43		3.44	
	>15	3.41		3.55		3.12		3.28		3.34	

(hardware, software, humeral, organizational and Decision-Making components) due to gender variable except with organizational where p-value less than (0.05) in favor of males mean = 3.68 (P-Value = 0.04), with age there are statistically significant differences with hardware and software in favor of those who have aged 45 - <50 and >50 years means = 3.95 - 3.87 respectively, also the same with qualification in favor of those who have Ph.D. and Bachelor means = 4.35 - 4.0887 respectively, profession there are statistically significant differences only with Decision-making, finally there were no relation with job while there were relation with experience which are statistically significant differences at the level of significance (0.05) with all dimension (hardware, software, humeral, organizational and Decision-Making components).

4. Discussion

The application of computerized systems in Sana'a city hospitals and their use in administrative and medical decision-making remains one of the main problems that suffer from them. Adoption for its application and increased user satisfaction is one of the challenges facing strengthening and developing the process of expanding the application of computerized health systems in Yemen.

In our study, the majority of participants (60.61%) were males, aged 30 - 35 years were (37.46%). less than 5 years of experience (34.24%). Similar rates were reported from studies in Palestine bachelor qualifications which were found (62.7%) (60.9%) [16] [22]. However, lower rates were reported from other countries including Palestine 30 - 40 years (32.0 %) [22], less than 5 years of experience (18.5%) (27.9%) [16] [23]. The difference could be the change of cultural and religious customs and traditions of societies and countries and the extent of commitment and preservation, which considers Yemen as one of these conservative societies.

Furthermore, all of those can be explained that the health community in Yemen were younger and productive and enjoyed a good qualification rate and few years of experience may be due to the high turnover of replacement for the staff.

The main limitation is our study that it was conducted at Sana'a city hospital, Yemen. Therefore; findings cannot be generalized outside the study area and the staff who are included in this study didn't work in all hospital's departments.

Our findings revealed high availability of hardware components (73.12%) of CHIS. Similar results were reported from studies in Palestine for equipment and equipment used (60.79%) and material components (72.00%) [22]. However, lower rates were reported from other countries including (43.9%) [24] [25]. This may be attributed to available enough number of computers that were sufficient to complete required work, also enough input and output accessories to enter and exit information from computers, in added to the speed of the devices and network were suitable for work, besides the devices updated regularly and the network was connected with all departments in the hospitals.

In addition, the findings of this study showed high availability of software

components (74.96%) of the hospital's information system. Similar rates were reported from studies in Saudi Arabia (73.00%) [6] and in Palestinian (75.2%) [25]. However, lower rates were reported from other countries including Sudan [24]. These results show the ability of these systems and their enjoyment of protection, flexibility and enabling their users to exchange data at the same time and prevent duplication.

Also, the findings showed the high availability of humeral components (69.03%) of the hospitals information system. This finding is consistent with previous reports from Saudi Arabia (73%) [6] and Palestinian (70.2%) [25]. However, lower rates were reported from other countries including Sudan [24]. Those findings mean the available of human resources in the technical support department are recruited in a scientific way and with high qualifications as well as sufficient skills and various specialties. In addition, this team rapidly respond for all staff questions in 24/7 time and they had participated the employees in the development of their systems.

Besides, our findings presented with high availability of organizational components (69.77%) of the hospitals information system, which is similar to previous results reported from studies in Saudi Arabia (73.00%) [6] and Palestinian (73.00%) [25]. However, lower rates were reported from other countries including Sudan [24]. Those findings mean there was a regulatory structure that allowed easy flow of information, with a clear information system plan, leaders supporting updating and funding, and following the works and providing training programs for staff working in this system.

This study showed a high reality of decision components (70.97%) of the hospital's administrative and medical decision management. Similar rates were reported from studies in Yemen which appeared the relation between adaptation of information technology in Sana'a capital hospital with quality health services in time, efficiency, cost, safety of health services [7] [26] and in Saudi Arabia (73.00%) [6] and in Palestinian (75.2%) [25]. However, lower rates were reported from other countries including Sudan [24]. Those findings that computerized systems provide information to develop strategy and decision-making, which depend on this information in a scientific way, where the problem is studied before making decisions and identify the needs and risks facing the hospital with the help of these systems and the staff are involved.

The hypotheses of this study were tested, we reject the null hypothesis and accept the alternative hypothesis that confirms the presence of statistically significant differences in the administrative decision-making which is attributed to the axis of health information system components. In addition, there is a significant impact between the decision-making and HIS (physical, software, human and organizational) with percentage of (hardware = 33.7%%, software = 41.0%, human = 41.5% and organizational = 56.5%) of the overall impact effect of CHIS on decision-making with a whole percentage (43.18%).

Showed that there are no statistically significant differences at the level of sig-

nificance (0.05) for Demographical Variables and study diminutions (hardware, software, humeral, organizational and Decision-Making components) due to gender variable except with organizational where p-value less than (0.05) in favor of males mean = 3.68 (P-Value = 0.04), with age there are statistically significant differences with hardware and software in favor of those who have aged 45 - <50 and >50 years means = 3.95 - 3.87 respectively, also the same with qualification in favor of those who have Ph.D. and Bachelor means = 4.35 - 4.0887 respectively, profession there are statistically significant differences only with Decision-making, finally there were no relation with job while there were relation with experience which are statistically significant differences at the level of significance (0.05) with all dimension (hardware, software, humeral, organizational and Decision-Making components) used in the Sana'a hospitals are a good and sophisticated, and it is used in planning and determining the needs and solution of problems and administrative decisions.

These results are similar to previous studies done in Yemen, Kuwait and Palestinian which found a significant effect during the application of computerized health information on the field of medical and supportive jobs [7] [22] [27] and other study in Palestinian that showed a positive impact for administrative and medical decision for favors of an administrative decision [23]. Furthermore, study in ten countries: Australia, Canada, France, Germany, Holland, Norway, Switzerland, the UK, and the USA, referred the effective role of the computerized health information networks and their effect on the general performance [28] and other previous study showed the community owned their health and aimed to improve it and community health workers to champion on health and development issues to bring about change and the effect of retrieval and accessibility of HIS own decision making of administrative and operational of medical nature [29] [30]. The effect of the quality information system on decision-making as a whole explained was (21.16%) and the MIS was adequately used in decision-making during crises [31] [32].

Our finding revealed the males more than females. Similar results were reported from studies in Palestine [22]. However, lower rates were reported from other countries including Al-Kuwait, this agreement and difference may be due to the change of cultural and religious customs and traditions of societies and countries and the extent of commitment and preservation, which considers Yemen as one of these conservative societies.

5. Conclusion

HIS at Sana'a city hospitals continue to suffer from poor physical modernization, weak software modernization, weak technical support team, lack of clear information tasks and lack of financial and administrative support for its application process. Therefore, raising awareness among hospital leaders of the importance and necessity of enforcing and applying information systems in their hospitals are needed. In addition, establishing a technical team with specific and

clear tasks, providing advanced training programs, updating and developing the material and software components are recommended.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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