# Design, Implementation And Evaluation Of A Digital Healthcare Management System:
## A Pilot Study In Pediatrics Department Of A Hospital

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**Abstract**

**Background:** Information is the foundation for policymaking, planning, programming, and accountability. Health informatics is the intersection of information science, computer science, and health care. It deals with the resources, devices, and methods optimizing the acquisition, storage, retrieval, and use of information in health and biomedicine. Most professionally run hospitals and clinics now rely on Hospital "or Healthcare" Information Management Systems (HIMS) that help them manage all their medical and administrative information.

**Objective:** to execute and test the design, implementation and evaluation of a HIMS and testing the application in a Heliopolis, Cairo- based hospital.

**Methodology:** Data for this study were collected by the use of different tools to address five key areas: 1. An analysis of the need for a HIMS. 2. Benefits of HIMS 3. Analysis of data of hospital health workers perceptions towards implementation of HIMS 4. Testing and application of HIMS in pediatrics- related departments 5. Suggestions for selecting and improvement of HIMS.

**Results:** Although they want more training on the use of the system, more computers and timely information, health workers perceptions indicate their satisfaction with the ease of use of HIMS and that it is important in many ways for the smooth running of the hospital.

**Conclusion:** HIMS has significant direct and indirect benefit to patient service quality and the development of organizational capabilities for linking strategy formulation and implementation, process improvement, decision- making, medical, and epidemiological research/reporting and performance feedback. Although problems can be identified during the process of using HIMS, the benefits outweigh the difficulties, thereby justifying their use.

**Keywords:** Hospital information management systems, Electronic medical record, Electronic health record.

تصميم وتطبيق وتقييم نظام إدارة رقمى للتسجيل والرعاية الصحية: دراسة استطلاعية بقسم طب الأطفال بأحد المستشفيات.

**الخلفية:** المعلومات هى أساس رسم السياسات والتخطيط والبرمجة والمساءلة. المعلوماتية الصحية هى تقاطع علوم المعلومات وعلوم الكمبيوتر والرعاية الصحية والذى يتعامل مع الموارد والأجهزة والطرق لتحسين الحصول على المعلومات وتخزينها واسترجاعها واستخدامها فى الصحة والطب الحيوي. وتعتمد معظم المستشفيات والعيادات التى يتم إدارتها بشكل احترافى الآن على أنظمة إدارة معلومات المستشفيات (أو الرعاية الصحية) التى تساعدهم على إدارة جميع معلوماتهم الطبية والإدارية.

**الهدف:** تنفيذ واختبار تصميم وتنفيذ وتقييم نظام لإدارة المعلومات الصحية واختبار التطبيق فى مستشفى فى مصر الجديدة بالقاهرة.

**المنهجية:** تم جمع البيانات لهذه الدراسة باستخدام أدوات مختلفة لمعالجة خمسة مجالات رئيسية: تحليل الحاجة إلى نظام إدارة المعلومات الصحية. فوائد نظام إدارة المعلومات الصحية، وتحليل بيانات تصورات العاملين الصحيين فى المستشفيات نحو تنفيذ نظام إدارة المعلومات الصحية اختبار وتطبيق نظام إدارة المعلومات الصحية فى الأقسام المتعلقة بطب الأطفال، واقتراحات اختيار وتحسين نظام إدارة المعلومات الصحية.

**النتائج:** على الرغم من الحاجة للمزيد من التدريب على استخدام النظام، والمزيد من أجهزة الكمبيوتر والمعلومات فى الوقت المناسب، إلا أن تصورات العاملين الصحيين تشير إلى رضاهم عن سهولة استخدام نظام إدارة المعلومات الصحية، وأنه مهم من نواح عديدة للتشغيل السلس للمستشفى.

**الاستنتاج:** نظام إدارة المعلومات الصحية له فائدة مباشرة كبيرة مثل جودة الرعاية الصحية المحسنة المقدمة للمرضى. كما أن لها قيمة إيجابية غير مباشرة تنتشر عن طريق تحفيز تطوير القدرات التنظيمية لربط صياغة الاستراتيجية، وتنفيذها، وتحسين العمليات، وصنع القرار، والبحوث الطبية والوبائية/ إعداد التقارير وملاحظات الأداء. وعلى الرغم من أنه يمكن تحديد المشاكل أثناء عملية استخدام نظام إدارة المعلومات الصحية، إلا أن الفوائد تفوق الصعوبات، وبالتالى تبرر استخدامها.

**الكلمات المفتاحية:** أنظمة إدارة معلومات المستشفيات، السجل الطبى الإلكترونى، سجل الصحة.

## Introduction

A Hospital Information Management System (HIMS) includes an electronic medical record (EMR) or an electronic health record (EHR) which is a systematic collection of electronic health information about individual patients or populations.[1] It is a record in digital format that is theoretically capable of being shared across different healthcare settings. In some cases, this sharing can occur by way of network- connected, enterprise- wide information systems and other information networks or exchanges.[2] EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal statistics like age and weight, and billing information.[3]

"These premises lead to the formulation of the following hypothesis: although problems can be identified during the process of using electronic healthcare information systems, the benefits outweigh the difficulties, thereby justifying their use". In the course of this study, the researcher attempted to present and describe the design of the modular technical infrastructure, implementation of the digital knowledge management capabilities, and the evaluation of the application of decision support architecture of a healthcare information management system in a Cairo-located Egyptian hospital.

## Aim Of The Study:

1. To design and implement a digital healthcare management system.

2. To evaluate the impact of the system.

## Review Of Literature:

Computerization is a factor in increasing the efficiency and effectiveness of the various administrative activities as they store and exchange useful, accurate and timely information through improved information management by automatizing processes to reduce clerical errors and administrative workload as well as improving clinical[4] and managerial[5] decision- making.[6] Financially, it saves time and money.[7] Clinically, they reduce duplication of diagnostic testing, imaging and history taking,[8] improve ability to offer healthcare high quality services at reasonable cost,[9] render better medication management[10] and increase adoption of screening programs and preventive health measures.[11] This has made management information systems in the various healthcare organizations particularly important, helping organizations to perform their functions successfully and efficiently.[12]

In pediatric practice, the challenge now is to make the PHR also function as a customized health information system that facilitates information sharing, thereby empowering children, families, and physicians.[13] Other secondary HIMSs that are used in relation to children healthcare services are Public Healthcare Information Systems,[14] Emergency Medical Services (EMS)[15] and School Health Information Systems.[16] Several specific data elements only occur within neonatal care.

## Methodology:

¤ Study Design: This study is a conducted using a pilot descriptive research design approach.

¤ Place of the Study: Al Kholafaa Al Rashideen Specialized Hospital (KRSH) is a private non- governmental hospital belonging to an NGO charity organization whose services cover the districts of Heliopolis, Al Zeitun and entire East Cairo Region.

¤ Setting and Target Group (Population): The study was concerned with examining the use of the hospital information management system in the pediatrics- related departments of the hospital that changed from a manual paper- based to a computerized digital healthcare information management system through qualitative and quantitative research methods to explore and understand people's perceptions, beliefs, attitude, behavior and interaction (Qualitative) and to give systematic empirical investigation of the social phenomena using statistical or numerical data or computation techniques (quantitative).

¤ Inclusion& Exclusion Criteria: For the impact of the system implementation, included were all hospital employees working in relation to the pediatric patients group (doctors, dentists, nurses, technicians, health records officers, laboratory, IT personnel and other ancillary staff). Excluded health workers were those who were on leave during the study period.

¤ Sample Size& Sampling Technique: The target population of 232 healthcare workers in the hospital yielded 70 respondents for the study sampling by Stratified Purposive Sampling technique.

¤ Duration and Timetable of the Study:

1. Phase I: System modular design.

2. Phase II: System implementation in the hospital departments.

3. Phase III: System evaluation and study of its uses, benefits and implications of its application on medical workflow.

¤ Data Collection Tools: Many tools were used of which were questionnaires. The main questionnaire was administered after the implementation and was divided into sections of which the first part sought to gather demographic information of the respondents and the other sections aided in responding to the specific research objectives and questions of the study and to collect relevant information.

¤ Data Analysis and Presentation: Data was scrutinized for completeness and consistency, coded to enable the responses be grouped into various strata and, then, the classified data was tabulated using frequency and percentage among other statistical tools. Since the study was qualitative and quantitative, data was summarized and presented by use of Statistical Package for Social Science (SPSS, Inc., Chicago, Ill) version 25.0 in accordance to the objectives of the study. The findings in this study were presented using tables and charts (to summarize responses for further analysis and to facilitate comparison), percentages, tabulations, means and other measures of central tendency and variance.

## Results:

¤ Use of the Hospital Management System: The respondents were asked to indicate the various ways the hospital management system is used in their respective department and the kind of data generated as shown

in Table (1) below.                                                Use of the System in the Hospital.

Table (1) Summary Descriptive Statistics to the Use of the System in the Hospital.

| Responses / Questions | | System Manages Financial Imperatives | System has become easier or harder to use | System enables excellent use and access of in/out patient information | System has improved quality of service | System has improved on patient information security | System provides more functionality for accessing services | System Provides Disease Notification Data | System Provides Epidemiological Data |
|---|---|---|---|---|---|---|---|---|---|
| Strongly Agree | Frequency | 46 | 47 | 44 | 39 | 32 | 38 | 19 | 15 |
| | Percentage | 65.71 | 67.14 | 62.86 | 55.71 | 45.71 | 54.29 | 27.14 | 21.43 |
| Agree | Frequency | 16 | 13 | 10 | 11 | 23 | 15 | 24 | 24 |
| | Percentage | 22.86 | 18.57 | 14.29 | 15.71 | 32.86 | 21.43 | 34.29 | 34.29 |
| Neutral | Frequency | 8 | 8 | 13 | 16 | 10 | 7 | 26 | 22 |
| | Percentage | 11.43 | 11.43 | 18.57 | 22.86 | 14.29 | 10 | 37.14 | 31.43 |
| Disagree | Frequency | 0 | 1 | 2 | 4 | 2 | 6 | 0 | 1 |
| | Percentage | 0 | 1.43 | 2.86 | 5.71 | 2.86 | 8.57 | 0 | 1.43 |
| Strongly Disagree | Frequency | 0 | 1 | 1 | 0 | 3 | 4 | 0 | 1 |
| | Percentage | 0 | 1.43 | 1.43 | 0 | 4.29 | 5.71 | 0 | 1.43 |
| No Response | Frequency | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 |
| | Percentage | 0 | 0 | 0 | 0 | 0 | 0 | 1.43 | 10 |
| Totals | Frequency | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| | Percentage | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Minimum | | 3 | 1 | 1 | 2 | 1 | 1 | 0 | 0 |
| Maximum | | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Mean | | 4.54 | 4.49 | 4.34 | 4.21 | 4.13 | 4.1 | 3.84 | 3.43 |
| Std. Deviation | | 0.695 | 0.864 | 0.976 | 0.991 | 1.048 | 1.229 | 0.927 | 1.42 |

⌖ Strengths of Hospital Information Management System: Three check (0= Unchecked, 1= Checked) questions were asked to evaluate the respondents' perception to the strength points of the system in the hospital which gave the frequencies shown in Figure (1) below.
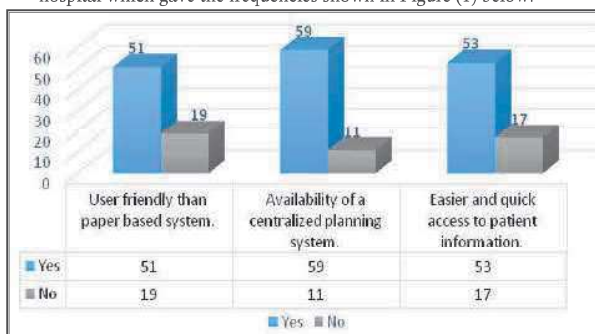


| | User friendly than paper based system. | Availability of a centralized planning system. | Easier and quick access to patient information. |
|---|---|---|---|
| Yes | 51 | 59 | 53 |
| No | 19 | 11 | 17 |

Figure (1) Respondents' positive and negative responses to strength points of HIMS.



Figure (2) Relevance and Accuracy of Patient Information provided by System.

⌖ Relevance and Accuracy of Patient Information provided by System: Two questions responses (0= Unchecked, 1= Checked) indicated that Hospital Management System provides more functions for the users than the manual system. The findings are a shown in the figure below.
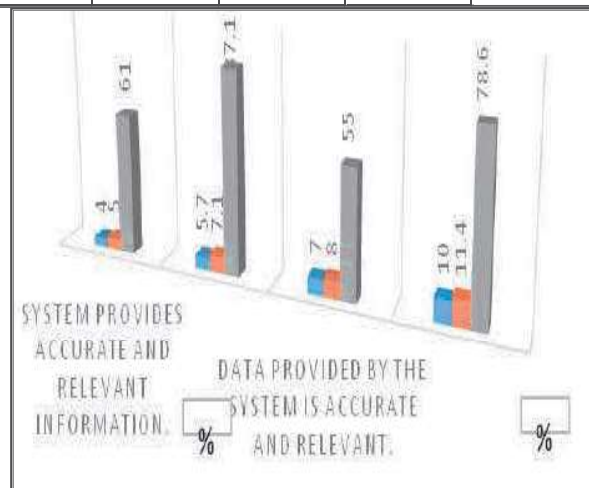
⌖ Perceptions of Healthcare Workers on Information Transactions: The study sought to find out the perceptions of healthcare workers towards information transactions on 5- Point Likert- Scale five questions with 0= No Response.

Table (2) Perception of the Healthcare Workers on Information Transaction Collection.

| Response | Collecting information which is not used for decision making discourages me | Collecting information makes me feel bored | Collecting information is meaningful and makes work easier | Collecting information gives me the feeling that data is needed for monitoring facility performance | Collecting information is appreciated by co- workers and superiors |
|---|---|---|---|---|---|
| Strongly Agree | 6% | 16% | 63% | 64% | 63% |
| Agree | 7% | 4% | 31% | 24% | 11% |
| Neutral | 16% | 0% | 4% | 9% | 10% |
| Disagree | 21% | 23% | 1% | 0% | 11% |
| Strongly Disagree | 50% | 56% | 0% | 0% | 4% |
| No Response | 0% | 1% | 0% | 3% | 0% |
| Total | 100% | 100% | 100% | 100% | 100% |
| Mean | 1.97 | 1.97 | 4.56 | 4.44 | 4.17 |
| Std. Deviation | 1.215 | 1.494 | 0.651 | 1.002 | 1.251 |

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¤ Healthcare Workers Training Perceptions: Again, the study sought to find out healthcare workers training perception on 5- Point Likert- Scale five questions. This was important as it helped establish the competence of healthcare worker on the use of the new system.

Table (3) Healthcare Workers Training Perceptions

| Question | Statistics | No | Yes |
|---|---|---|---|
| Competent On System Use | Frequency | 29 | 41 |
| | Percent | 41.43% | 58.57% |
| | Mean | 0.59 | |
| | St. Dev. | 0.496 | |
| Hospital System Is Easy To Use | Frequency | 23 | 47 |
| | Percent | 32.86% | 67.14% |
| | Mean | 0.67 | |
| | St. Dev. | 0.473 | |
| You Encounter Problem When Using The System | Frequency | 45 | 25 |
| | Percent | 64.29% | 35.71% |
| | Mean | 0.36 | |
| | St. Dev. | 0.483 | |
| Training Was Conducted On How To Use The System | Frequency | 19 | 51 |
| | Percent | 27.14% | 72.86% |
| | Mean | 0.73 | |
| | St. Dev. | 0.448 | |
| You Feel You Need More Training To Adequately Use The System | Frequency | 32 | 38 |
| | Percent | 45.71% | 54.29% |
| | Mean | 0.54 | |
| | St. Dev. | 0.502 | |

¤ Challenges Encountered in the Use of Hospital Information Management System: The respondents were asked to respond to various challenges they may have encountered using the hospital information management system through answering fifteen questions on a 5- Point Likert- Scale.

Table (4) Challenges Faced Using Hospital Management System

| Questions / Responses | Frequency | | | Percent | | | Mean | St. Deviation |
|---|---|---|---|---|---|---|---|---|
| | Agreement | Neutral | Disagreement | Agreement | Neutral | Disagreement | | |
| Few IT Staff To Assist When Needed | 45 | 4 | 20 | 64% | 6% | 29% | 3.41 | 1.527 |
| Lack Of Training Of Users | 28 | 4 | 35 | 40% | 6% | 50% | 2.80 | 1.575 |
| Lack Of System Testing | 26 | 8 | 27 | 37% | 11% | 39% | 2.59 | 1.765 |
| Computers Not Enough For Users | 20 | 1 | 46 | 29% | 1% | 66% | 2.20 | 1.292 |
| Users' Needs Not Fully Captured By The System | 16 | 9 | 42 | 23% | 13% | 60% | 2.13 | 1.512 |
| Not Fully Knowledgeable With The System | 14 | 6 | 49 | 20% | 9% | 70% | 2.07 | 1.653 |
| System Keeps Going On And Off | 12 | 17 | 40 | 17% | 24% | 57% | 2.03 | 1.383 |
| Incompatibility Between The New Digital And Old Manual Operation System | 11 | 5 | 49 | 16% | 7% | 70% | 2.01 | 1.148 |
| Incorrect Information | 10 | 3 | 54 | 14% | 4% | 77% | 1.96 | 1.279 |
| Not User Friendly | 9 | 9 | 46 | 13% | 13% | 66% | 1.79 | 1.250 |
| Employees Have Negative Attitudes Towards Changes | 9 | 7 | 46 | 13% | 10% | 66% | 1.79 | 1.284 |
| System Is Slow | 8 | 10 | 52 | 11% | 14% | 74% | 1.77 | 1.287 |
| Lack Of Comprehensive Coverage Of The System | 4 | 7 | 58 | 6% | 10% | 83% | 1.64 | 0.993 |
| Poor Changeover Between The New And Old Filing Method | 4 | 5 | 58 | 6% | 7% | 83% | 1.54 | 0.912 |
| Inadequate Software Coverage For The Whole Hospital | 0 | 2 | 66 | 0% | 3% | 94% | 1.40 | 0.600 |

¤ Recommendations On Improving The System: The respondents were further asked to give recommendation on improving the existing hospital management system. Three check questions were asked and the fourth was an open- ended question. As for the last question, four responses were given in answer to other unasked points.

Table (5) Respondents' Recommendations on Improving the System.

| Statements | Mean | Std. Deviation | Frequency | | Percent | |
|---|---|---|---|---|---|---|
| | | | No | Yes | No | Yes |
| Acquire More Computers | 0.41 | 0.496 | 41 | 29 | 59% | 41% |
| Development Of Specific Functional Tools With Minor Reforms To The Existing Structure | 0.39 | 0.490 | 43 | 27 | 61% | 39% |
| Facilitate More Staff Training | 0.33 | 0.473 | 47 | 23 | 67% | 33% |
| Employ More It Staff | 0.26 | 0.440 | 52 | 18 | 74% | 26% |
| Improve On The System Speed | 0.20 | 0.403 | 56 | 14 | 80% | 20% |
| Development Of A Framework Based On Hospital Requirements. | 0.19 | 0.392 | 57 | 13 | 81% | 19% |
| Complete Overhaul Of The System. | 0.03 | 0.168 | 68 | 2 | 97% | 3% |

## Statistical Analysis Of Responses.

After cleaning the data, the assumptions of ANOVA to each section of the major seven sections of the main questionnaire were tested and the F-ratio and the associated probability value (p- value) were calculated. Post-

hoc tests were then used to tell the researcher which groups were different from another. This was done on the respondents' groups according to their background information variations.

Table (6) Statistical Analysis Of Significance Between Groups According To: Professional Expertise, Education Level And Working Experience By One- Way ANOVA And Tukey Post-Hoc Tests.

| Working Experience* | Education Level | Professional Expertise | Statistical Significances Between Groups |
|---|---|---|---|
| None: F= 2.647, p= 0.056>0.05 | None: F= 1.778, p= 0.160>0.05 | None: F= 1.023, p= 0.388>0.05 | Use of System In the Hospital |
| None: F= 1.454, p= 0.235>0.05 | None: F= 2.387, p= 0.077>0.05 | None: F= 0.681, p= 0.568>0.05 | Strengths Of Hims |
| None: F= 0.165, p= 0.920>0.05 | None: F= 1.757, p= 0.164>0.05 | Yes: F= 5.638, p= 0.002< 0.05. Between technicians and other employees (means diff. =-0.5 21-, p= 0.001< 0.05). | Relevance& Accuracy of HIMS Information |
| None: F= 5.943, p= 0.001< 0.05 | Yes: F= 13.388, p= 0.000< 0.05. Between PhD and bachelor (means diff. =1.044; p= 0.000<0.05), between PhD and school diploma (means diff. =1.068; p= 0.000<0.05), between Masters and bachelor (means diff. =0.625, p=0.003< 0.05) and between Masters and school diploma (means diff. =0. 648, p= 0.0 16< 0.05). | Yes: F= 10.644, p= 0.000< 0.05. Between doctors and technicians (means diff. =0.820, p= 0.000< 0.05) and between doctors and others (means diff. = 0.743, p= 0.000< 0.05). | Perception To Information Collection |
| None: F= 2.995, p= 0.037< 0.05 | Yes: F= 10.686, p= 0.000<0.05. Between bachelor and school diploma (means diff. =-0.3 82-; p= 0.014< 0.05). | Yes: F= 8.278, p= 0.000< 0.05. Between doctors and nurses (means diff. = -0.292-, p= 0.020< 0.05), between doctors and technicians (means diff. = -0.192-, p= 0.017< 0.05) and between doctors and others (means diff. = -0.283-, p= 0.000< 0.05) | Perception of Staff to Training on System |
| None: F= 1.955, p= 0.129> 0.05 | Yes: F= 5.275, p= 0.003< 0.050. Between PhD and bachelor (means diff. = -0.213-; p= 0.030<0.05), between Masters and PhD (means diff. = -0.336-; p= 0.000< 0.05), between Masters and bachelor (means diff. =0.625, p= 0.003< 0.05), between Masters and school diploma (means diff. =0.648, p= 0.000< 0.05), between bachelor and school diploma (means diff. =0.179, p= 0.027< 0.05). | None: F= 2.745, p= 0.050 | Challenges Of Hims In Hospital |
| None: F= 0.468, p= 0.706> 0.05 | None: F= 2.295, p= 0.086>0.05 | None: F= 1.886, p= 0.141> 0.05 | Staff Recommendations For Hims |

Statistical significance as determined by one- way ANOVA (F'3.66') and Tukey post hoc Tests for Professional Expertise and Education Level.
* Post hoc tests were not performed for major axes as regards Working Experience because at least one group has fewer than two cases.

## Discussion:

The results imply overall workers find the system in use easy for them to use, provides more functions for the users than the manual system, provides more integrated access to in- and outpatient's information, has improved quality of service, provides disease notification data but a higher percentage of respondents not sure whether the system can provide epidemiological data. Over and above, results show a very high percentage of those who agree to the benefit of the financial and administrative aspect of the system and patients' information is secured by the system (Generally, in this part of the questionnaire, there was NO statistically significant difference between groups of hospital workers in their responses in relation to their professional expertise, level of education or working experience).

The study sought to find out the strength of the new HIMS in the hospital. Staff agreed that the system is more user- friendly than the paper system, it offers a centralized planning system for the hospital by the system and that the system offers easier and quicker access to patient's

information.

As to the accuracy and relevance of the data and information provided by the system, most respondents agreed that the system provides accurate and relevant information and that the data provided by the system is accurate and relevant. On this part of the questionnaire, there was NO statistically significant difference between groups of hospital workers in their responses in relation to their level of education or working experience. However, according to their professional expertise, there was a statistically significant difference between technicians and other employees in their responses; a post hoc test showed that technicians agreed more.

The study sought to find out the perceptions of healthcare workers towards information transactions. The results reveal that respondents in the hospital, generally, disagreed on the perception of information not used for decision- making and that collecting information makes them bored. But, they agreed on the perception that the system provides meaningful information and makes work easier, the system provides data

and information needed for user performance and that monitoring and evaluation, collected information is appreciated by co- workers and superiors. On this part of the questionnaire, there was NO statistically significant difference between groups of hospital workers in their responses as regards working experience, but, in relation to their professional expertise and level of education, there was statistically significant differences in the responses. The differences were between doctors and technicians and between doctors and other administrative employees (doctors agreed more than both technicians and other employees). In addition, there were differences between doctorate and bachelor degree holders, between doctorate and school diploma holders (doctorate holders agreed more than bachelor and diploma holders); between Masters and bachelor and between Masters and school diploma holders (Masters agreed more).

The study sought to find out subjective healthcare workers training perception as it helped establish the competence of healthcare worker on the use of the system. The findings indicate that respondents agree on competent on the system use, it was easy to use, respondents were encountering problems using the system and that training was conducted on how to use the system, but, the there is need for more training on system use in the hospital. On this part of the questionnaire, there was statistically significant differences between groups of hospital workers in their responses in relation to their working expertise and level of education. According to work expertise, the differences were between doctors and nurses, between doctors and technicians and between doctors and other staff employees (doctors agreed less on all occasions). According to their education level, the differences were between bachelor and school diploma holders (the latter agreed more). According to working experience, in general, results show NO statistically significant difference between groups in their responses.

On challenges met by healthcare workers, the findings indicate the main challenges encountered in the hospital as: few IT staff to assist when needed (64%), lack of training of users (40%), lack of system testing (37%), few computers for use (29%), inadequate software coverage and system yet to be implemented in some areas (23%), lack of adequate knowledge of system by users (20%), system keeps going on and off (17%), incompatibility between the old and the new system (16%), system producing inaccurate information (14%), system is not user- friendly (13%), employees dissatisfaction and negative attitude to using the system (13%), system is slow (11%), patients and other clients do not get all information needed from the system (6%), and poor changeover between the new and old filing system (6%). On this part of the questionnaire, there was a statistically significant difference between groups of hospital workers in their responses in relation to their level of education. Doctorate degree holders expressed less challenges than Masters and bachelor while Masters holders expressed more challenges than bachelor and less than school diploma holders. Bachelor expressed more challenges than school diploma holders. According to professional expertise and work

experience, results show NO statistically significant differences between groups in their responses.

Finally, the respondents were asked to give recommendations on improving the existing version of the system. In general, a few respondents wanted complete overhaul of the system (3%) but most respondents wanted more computers (41%) and development of specific tools to the current structure (39%). Many respondents would want more training on the use of the system (33%), providing more IT staff (26%), improve on system speed (20%) and development of electronic resource planning system for the hospital (19%). Other organizations and researchers corroorated the same recommendations of which were.[17]&[18] On this part of the questionnaire, there was NO statistically significant differences between groups of hospital workers in their responses.

**Conclusion:**

Despite these benefits, certain problems were found, such as few IT staff to assist when needed, lack of training of users, lack of system testing, few computers for use, inadequate software coverage and system yet to be implemented in some areas, lack of adequate knowledge of system by users and incompatibility between the old and the new system, which indicated plausibility for the formulated hypothesis: ("Although some problems may be identified during the process of using the hospital information management system, the benefits outweigh the difficulties, thereby justifying the system's use").

**Recommendations:**

From the study findings, the following recommendations are made:

1. Further research can explore ways of effectively identifying appropriate HIMSs to suit the users' needs and on how well to prepare and train users on the utilization of hospital information management systems. More training would also improve in the hospital service delivery and tapping of the placid data stores for research, EBM and continuous learning purposes.

2. National coordination of efforts is essential and should proceed through a public- private sector collaboration rather than through government dominance with development of a health information exchange (HIE) or regional health information organization (RHIO) as in the new Egyptian Healthcare Services Organization. Short- term investment is extensive, and strategies to cover both initial capital costs and sustainability need to consider short- term and long- term value.

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