Internship Training

At

Moolchand Medcity

# A STUDY ON HOSPITAL INFORMATION SYSTEM (HIS) ACCEPTANCE AND SATISFACTION BY END USERS

By

Dr. Apurva S Sorte

Enroll No. PG/15/015

Under the guidance of

Prof. Divya Aggarwal

Post Graduate Diploma in Hospital and Health Management

2015-17


**International Institute of Health Management Research**

**New Delhi**

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# ABSTRACT

Nowadays the adoption of hospital information systems plays critical role in advanced health care delivery, reduction of medical error and promoted patient care. Hospital Information Systems (HIS) play a significant role in providing quality healthcare services. However, HIS lag behind their industrial counterparts in providing quality (i.e., timely, accurate, complete) information and have been the target of many criticisms for alleged shortcomings. Evaluation of hospital information systems is mandatory for its successful adoption. In the hospital environment the evaluation of hospital information systems is difficult due to the several factors that are involved. One of these factors, of special importance, is user satisfaction. The aim of this research is to evaluate the level of satisfaction of users in Moolchand Medcity Hospital, New Delhi, where the new HIS infrastructure is in early stages. To this end, a questionnaire was designed to assess the level of acceptance and satisfaction of different HIS users. The study population included operation staff of the hospital. Users scored the existing information system as fairly Usable. However, they felt the need of minor changes in the software as well as the support system to make it more user friendly.

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Words are inadequate to offer my thanks to all the respected staff at Moolchand Medcity Hospital for their able guidance and support throughout the dissertation period.

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I genuinely thank my parents, family and friends for their blessings and support.

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The certificate is awarded to
**Dr. Apurva S Sorte**

in recognition of having successfully completed her
Internship in the department of

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and has successfully completed her Project on

A STUDY ON HOSPITAL INFORMATION SYSTEM (HIS) ACCEPTANCE AND

SATISFACTION BY END USERS

**Date 13th May, 2017**

**Organization: Moolchand Medcity, New Delhi**

She comes across as a committed, sincere & diligent person who has
a strong drive & zeal for learning

We wish him/her all the best for future endeavours

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# TO WHOMSOEVER IT MAY CONCERN

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The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all his future endeavors.

Dr. A.K. Agarwal
Dean, Academics and Student Affairs
IIHMR, New Delhi

Mentor: Prof. Divya Aggarwal
IIHMR, New Delhi



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# Certificate of Approval

The following dissertation titled **"A STUDY ON HOSPITAL INFORMATION SYSTEM (HIS) ACCEPTANCE AND SATISFACTION BY END USERS"** at **"Moolchand Medcity"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

| Name | Signature |
|---|---|
| Dr. A. K. Agarwal | |
| Dr. Pankaj Talreja | |
| Dr. Shyamal Nagarjun | |



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## Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Apurva S Sorte,** a graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. She is submitting this dissertation titled "A STUDY ON HOSPITAL INFORMATION SYSTEM (HIS) ACCEPTANCE AND SATISFACTION BY END USERS" at "MOOLCHAND MEDCITY" in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management.**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Institute Mentor Name: Prof. Divya Aggarwal
Designation: Professor
Organization: IIHMR, New Delhi

Organization Mentor Name: Anuj Khanna
Organization Moolchand Medcity



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# INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

## CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "A STUDY ON HOSPITAL INFORMATION SYSTEM (HIS) ACCEPTANCE AND SATISFACTION BY END USERS" submitted by **Dr. Apurva S Sorte** Enrollment No PG/15/015 under the supervision of **Prof. Divya Aggarwal** for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from **13th Feb, 2017** to **13th May, 2017** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Apurvasorte

Signature

(DR. APURVA S SORTE)

# FEEDBACK FORM

Name of the Student: Apurva.

Dissertation organization: Moolchand Medcity, Delhi

Area of Dissertation: Operations.

Attendance: Regular.

Objectives Achieved: yes.

Deliverables: HIS implementation & support smooth rollout. for physicians.

Strength: Takes initiative for resolving patient issues; Hardworking.

Suggestion for Improvement: Needs to take more part in process improvements to take leadership role in future.

Suggestion for Institute(course curriculum, Industry Interaction, placement, alumni ):

Signature of the Officer-In-Charge/ Organization Mentor

Date: 20/5/2017

Place: Delhi

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# ABBREVIATIONS

| | |
|---|---|
| HIS | Hospital Information System |
| IS | Information System |
| SPSS | Statistical Package for Social Science |

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# 1. INTRODUCTION

Hospitals are extremely complex institutions with large departments and units that coordinate care for patients. There is no doubt that paper-based records and written documentation can no longer follow the needs of the modern health care and their use reaches its limits. This has led to rapid penetration of Information technology into the healthcare sector and it has been proved that it can lead to better decision support, organizational support and even influence the quality of the services offered to patients. Information systems applications have contributed to better health service management and delivery of care by creating an environment conducive to increased access and quality of patient care and by supporting the knowledge base required for clinical and administrative decision making.

There has been a major paradigm shift in healthcare information processing, corresponding to changes in the goals of the organization. Initially, hospital information systems incorporated financial and partial patient care systems. Later, many hospitals stated adopting specialized systems in other areas, such as laboratory, pharmacy and medical records, with more emphasis to patient interest. Modern hospital information systems (HIS) are comprehensive, integrated and specialized information systems designed to manage the administrative, financial and clinical aspects of hospitals and healthcare facilities. They are considered one of the most important focal points on which the delivery of healthcare within hospitals and different types of medical institutions depend. The importance of these systems emerges from the importance of their role in keeping all types of patient data and information including key data about the patient and other comprehensive medical data; recording all medical services that have been provided to the patient such as investigations, diagnoses, treatments, follow up reports and important medical decisions. Hospital information systems have the potential to improve the health of individuals and the performance of healthcare providers, yielding improved quality, cost savings, and greater engagement by patients in their own healthcare.

Despite evidence of these benefits, physicians and hospitals utilization of HIS and electronic health records is still low. The response of healthcare professionals to the use of hospital information systems is an important research topic that can explain the success or failure of any HIS development and implementation project.

`

## 1.1 PROBLEM STATEMENT

Given the background, the present study will be conducted with an aim to explore Hospital Information System (HIS) acceptance and satisfaction by end users and investigate the influential factors that might increase or decrease acceptance and satisfaction levels among different hospital staff.

## 1.2 GENERAL OBJECTIVE

To access Hospital Information System (HIS) acceptance and satisfaction by end users.

## 1.3 SPECIFIC OBJECTIVE

- To determine if availability of computers is a factor influencing the acceptance of HIS.
- To determine if the general features of HIS has any effect on the satisfaction level of the end users.
- To assess the influence of HIS on patient care from the perspective of hospital staff.
- To assess the overall satisfaction of the end users with HIS.
- To determine the satisfaction of staff with the support provided for HIS.

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# 2. LITERETURE REVIEW

Hospital Information Systems (HISs) contribute to an efficient patient care with high quality (Heeks, 2005a) and comprise data transfer with the associated hospital employees, at the right place and time, promoting interoperability among them (Winter et al., 2003). In other words, HIS is principally focused on the patient, as well as on medical and nursing care, and the administrative and management issues needed to support these kinds of care (Heeks, 2005a). The HIS offers indisputably significant opportunity for the development of the efficacy and the efficiency of the health care (Jaspers et al., 2004a) through their frequent application in Medical Informatics (Pietka, 2003). The implementation of HIS affects the structures, the processes and the outcomes in the health care environment (Despont-Gros, Mueller and Lovis, 2005). The introduction of methods and tools in order to support homogeneity and accountability of healthcare decisions and actions is important (Kalogeropoulos, Carson and Collinson, 2003). However, the increasing adoption of information technology (IT) in patient care necessitates the establishment of reliable evaluation of information systems (Lee, 2004). Nevertheless, the first issue in any evaluation is, the key questions to cover all relevant perspectives (Wyatt and Wyatt, 2003). Furthermore, for the successful installation and adoption of HIS, structured assembling of user's needs and system requirements is essential (Staccini et al., 2005). Therefore, user's opinion and satisfaction is fundamental for the successful adoption of HIS (Wu and Wang, 2005).

A HIS is the socio-technical subsystem of a hospital (Brigl et al., 2005), using a database applied system based on the modularised structure of Browse/Server (Chang et al., 2003). Heeks (2005a) describe health information systems, as systems for processing data, information and knowledge in health care environments and HISs are just one category of health information systems, with a hospital as health care environment.

The three aspects of an innovative Health Information System are the patient data management (through an Electronic Patient Record), the medical decision support (through a Guideline Management System) and the organizational support (through a Workflow Management System) (Ciccarese et al., 2005). However, its successful maturity and application demands working within an information partnership to maximize coordination, collaboration and cooperation (Maybloom and Champion, 2003).

`

The benefits, pending from the application of a Hospital Information System are several, such as facilitation of the information sharing (knowledge management) (Kalogeropoulos, Carson and Collinson, 2003), compatibility, mass archives, security, high reliability, simple operation and support of medical information formats of images, figures and texts (Chang et al., 2003). The technology-enabled clinical management also contributes to cost controlling, quality of care acquirement and the rapid translation of biomedical research into patient care (Ball, 2003). On the other hand, Hospital Information Systems are recommended to support the scientific homogeneity and accountability of healthcare decisions and actions; to contribute to overall reduction in cost, improved quality of care and patient satisfaction (Kalogeropoulos et al., 2003). Finally, via Hospital Information Systems, and their applications, the taken clinical decisions are more appropriate and medical errors are avoided (Johnson et al., 2004).

`

# 3. METHODOLOGY

**Study Design**: Descriptive Study

**Setting:** Moolchand Hospital, New Delhi.

**Sampling Technique:** Purposive sampling technique

**Period of Study:** February 13, 2017 to May 13, 2017.

**Study Population:** Staff of Operations Department.

**Total Questionnaire: 30**

**Sample Selection:**
Inclusion Criteria: End users of Hospital Information System (HIS).
Exclusion Criteria: Other staff not in direct contact with HIS.

## 3.1 Study Tool

- Self-administered reliable and validated paper based HIS questionnaire, including 23 questions distributed in various sections.

## 3.2 Mode of Data Collection:

A questionnaire was developed and validated by the Hospital In-charge to collect objective quantitative data from different types of the HIS users. The questionnaire contained five sections of questions; the first is a demographic user information section, which included name, age, gender, job type, total healthcare experience, earlier HIS usage and total work experience in using HIS, the second section included three statements regarding accessibility and availability of computer terminals in the hospital. The third section included five statements regarding general HIS assessment, the fourth section included three statements regarding the HIS and the patient care and the fifth section included six statements regarding the user's satisfaction with the HIS.

The questionnaire sections from two to five used the classic five Likert scale format; strongly agree, agree, neutral (neither agree nor disagree), disagree and strongly disagree.

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The target hospital population for the study was 30 staff members, which including end users who directly interact with the HIS, with four main job types; Billing, Administrator and Technicians, Ward nurse. Questionnaire Paper forms were also used to enhance the response of the participants and assisted in completing the questionnaire.

## 3.3 Implementation and Evaluation Plan with a Timeline

Implementation of the project will be conducted over a two-month period starting in the first week of March 2017.

- March 1st – 6th 2017: The study tool will be developed (Questionnaire) with the guidance of the college mentor and the hospital guide. Approval will be taken for the project.
- March 7th- 31st 2017: Distribution of the questionnaire to various departments.
- April 1st – 15th 2017: Collection of the Questionnaire and consolidation of the data from the same.
- April 17th- 27th 2017: Analysis of the data and draw conclusion.
- April 28th- 3rd May 2017: Report writing.
- May 4th- 8th 2017: Review of report by the college mentor and hospital guide. Making corrections according to the suggestions given by them.

`

# 4. RESULTS

The research methodology used is SPSS Statistics which is a software package used for statistical analysis.

The total number of valid responses was 30 participants, showing a response rate with a gender distribution that is almost one to one (male to female ratio). Around half of the participants were Billing Desk employees and the remaining half comprised of Administrator, Nurse and Technicians together. Table 1 shows the distribution and percentages of HIS users sorted by their job type.

The survey conducted showed most of the participants were between 25 and 50 years of age.

| HIS Users Job Type | Count | % |
|---|---|---|
| Billing | 11 | 36% |
| Administrator | 8 | 27% |
| Technicians | 6 | 20% |
| Nurse | 5 | 17% |
| **Total** | **30** | **100%** |

*Table 1 HIS User distribution basis of Job Type*

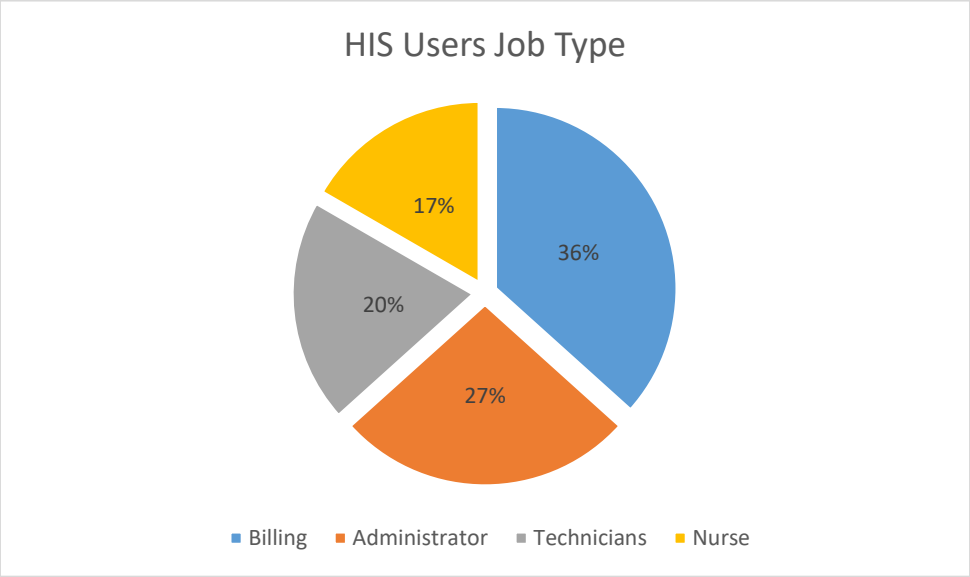


*Figure 1 Pie Chart for Users Job Type*

Table 2 shows the distribution and percentages of Healthcare experienced users, where 27% had over 5 years of Healthcare experience, 37% had between 2 and 5 years of Healthcare

`

experience and the remaining 36% had less than 2 years Healthcare experience. Majority of the users had experience between 2 and 5 years.

| Total Healthcare Experience | Count | % |
|---|---|---|
| Less than 6 months | 3 | 10% |
| 6 months - 1 year | 3 | 10% |
| 1 - 2 years | 5 | 17% |
| 2 – 5 years | 11 | 37% |
| Over 5 years | 8 | 27% |
| **Total** | **30** | **100%** |

*Table 2 Healthcare experience of users*

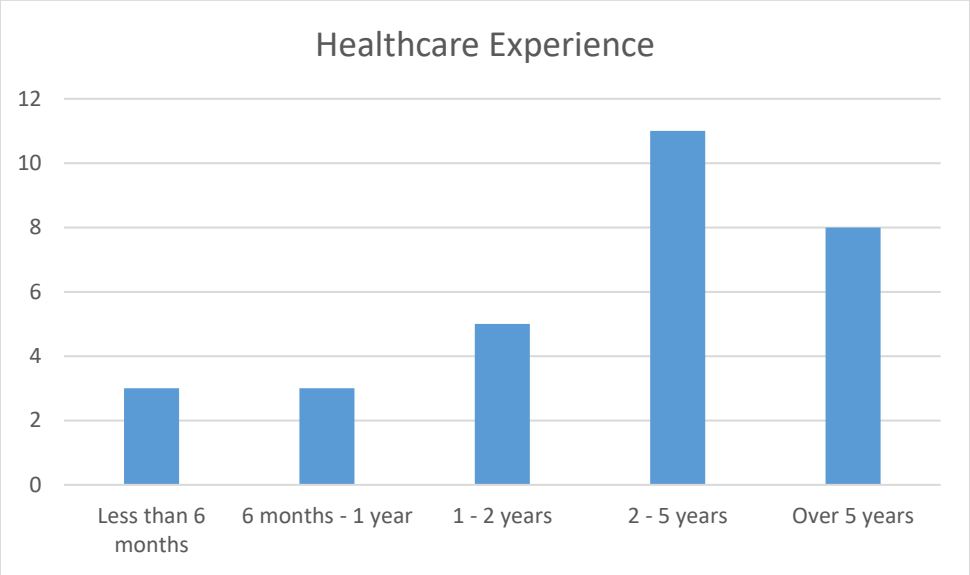


*Figure 2 Bar graph for Users Healthcare Experience*

Table 3 shows the distribution and percentages of HIS users sorted by their HIS experience, where very few (3%) had over 5 years of HIS experience and the remaining 97% had less than 5 years of HIS experience.

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| HIS Users Experience | Count | % |
|---|---|---|
| Less than 6 months | 6 | 20% |
| 6 months - 1 year | 4 | 13% |
| 1 - 2 years | 11 | 37% |
| 2 – 5 years | 8 | 27% |
| Over 5 years | 1 | 3% |
| **Total** | 30 | 100% |

*Table 3 HIS Users Distribution and Percentages – Bases on Their Experience*

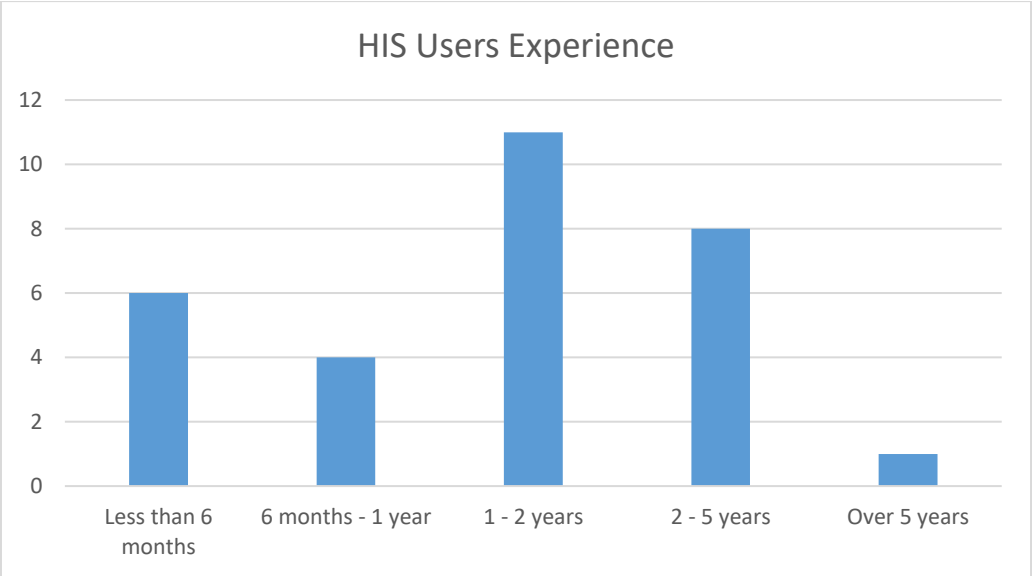


*Figure 3 HIS User Experience Bar Graph*

The below table 4 shows HIS users acceptance and satisfaction factors.

| HIS User Acceptance & Satisfaction Statements | Score | Answer |
|---|---|---|
| Availability of Computers in the Hospital Overall Score | 3.3 | Neutral |
| HIS General Assessment Overall Score | 3.7 | Agree |
| Patient Care & HIS Overall Score | 3.3 | Neutral |
| Users' Satisfaction Overall Score | 2.3 | Disagree |
| **Grand Total Score** | **3.2** | **Neutral** |

*Table 4 HIS User Acceptance & Satisfaction Factors*

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| HIS User Acceptance & Satisfaction Statements | Score | Answer |
|---|---|---|
| Availability of Laptops/Computers | 4 | Agree |
| Availability of Computer on wheels like Mobile, Tabs, Ipad, etc. | 2.4 | Disagree |
| Computers are always available when I need them for HIS use | 3.6 | Agree |
| **Availability of Computers in the Hospital Overall Score** | **3.3** | **Neutral** |

*Table 5 Availability of Computers in Hospitals Overall Score*

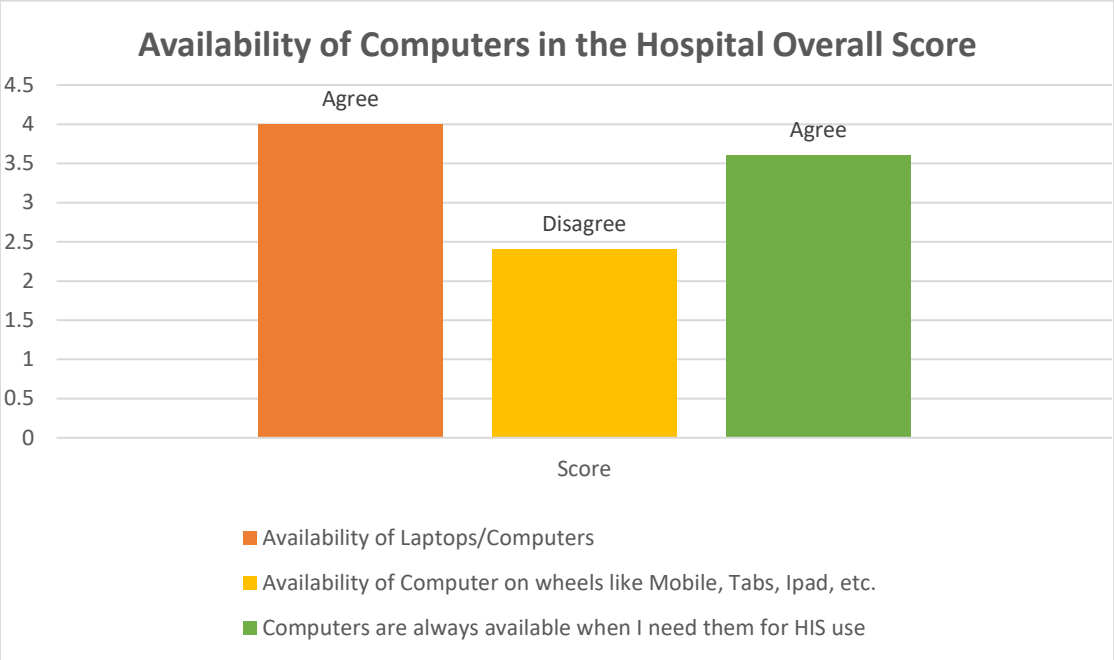


*Figure 4 Bar Graph for Availability for Computers in Hospital*

| HIS User Acceptance & Satisfaction Statements | Score | Answer |
|---|---|---|
| HIS performance speed is satisfactory (Process speed) | 3.3 | Neutral |
| HIS is user friendly and easy to use | 3.2 | Neutral |
| HIS provides sufficient information about Patient | 3.3 | Neutral |
| HIS screens layouts, fonts and characters are appropriate | 4.1 | Agree |
| HIS improves access to patient information | 4.6 | Strongly Agree |
| **HIS General Assessment Overall Score** | **3.7** | **Agree** |

*Table 6 HIS General Assessment Overall Score*

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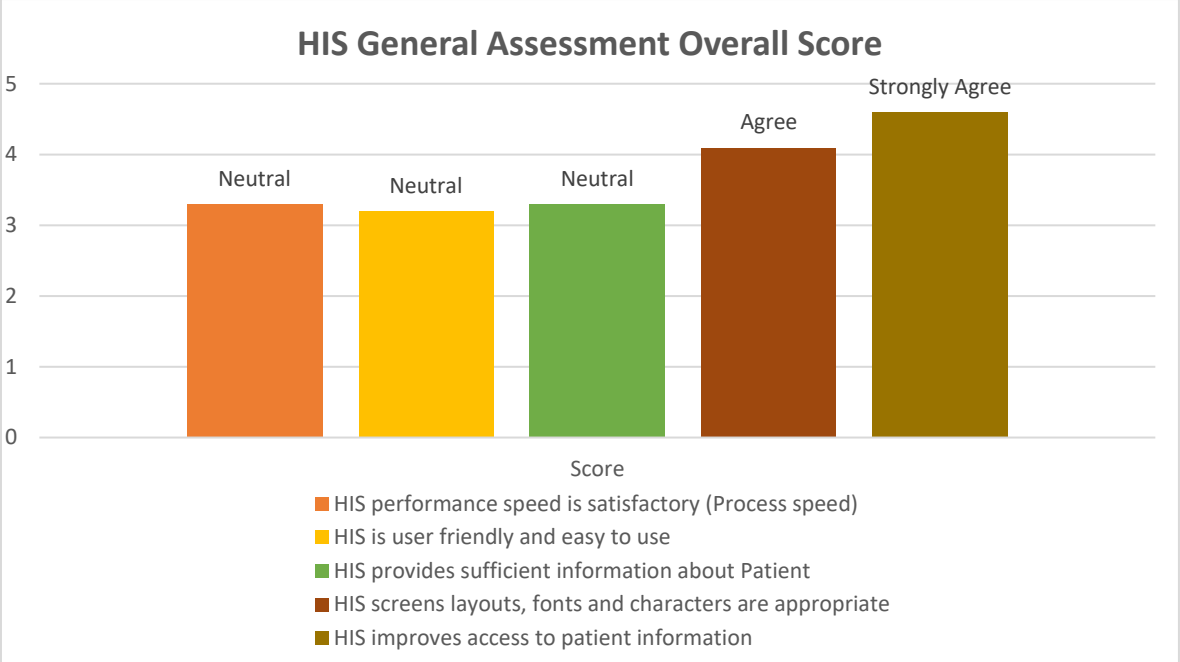


*Figure 5 Bar Graph for HIS General Assessment Overall Score*

| HIS User Acceptance & Satisfaction Statements | Score | Answer |
|---|---|---|
| Using HIS decreases time spent by patients inside hospital | 3.2 | Neutral |
| HIS improves the quality of patient care process | 3.3 | Neutral |
| HIS improves the quality of patient data entry and retrieval | 3.5 | Agree |
| **Patient Care & HIS Overall Score** | **3.3** | **Neutral** |

*Table 7 Patient Care and HIS Overall Score*

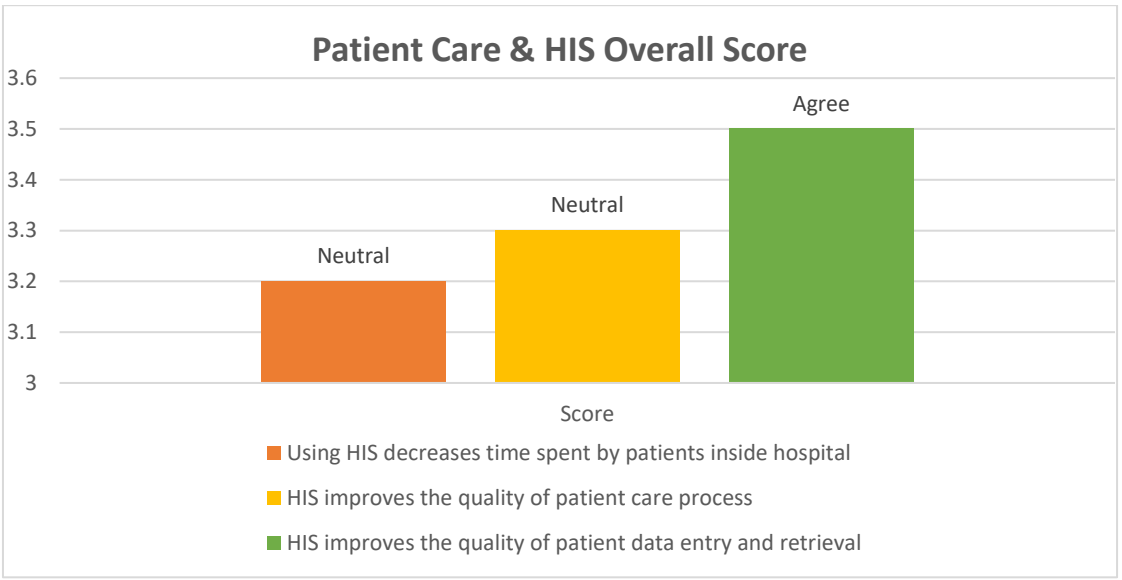


*Figure 6 Bar Graph for Patient Care and HIS Overall Score*

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| HIS User Acceptance & Satisfaction Statements | Score | Answer |
|---|---|---|
| I am prepared for HIS downtime | 2.5 | Neutral |
| HIS downtime procedure is clear and comprehensive | 2.5 | Neutral |
| Current HIS training materials are helpful | 2.0 | Disagree |
| I am satisfied with the support provided to HIS users | 2.3 | Disagree |
| Overall, I am satisfied with HIS | 2.5 | Neutral |
| I received enough training on HIS | 2.3 | Disagree |
| **Users' Satisfaction Overall Score** | **2.3** | **Disagree** |

*Table 8 User Satisfaction Overall Score*


*Figure 7 Bar Graph for User Satisfaction Overall Score*

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# 5. DISCUSSION

The availability of computers/Laptops in the hospital was one of the most acceptable and satisfying group of factors, which facilitate the direct and immediate data entry and information retrieval processes when healthcare professionals are at the point of care. Yet the unavailability of mobile and tabs (computers on wheels) was a hindrance in this process. Study details and highlights the influence of computers availability on the success or failure of hospital information systems adoption and implementation.

Screen designs need to be enhanced with more focus on the sequence and logic of functions, some software features need to be more user friendly or user adjusted when possible.

Users highlighted that using the HIS might frequently slow down the process of care delivery and increase the time spent by patients inside hospital. This is typically reported, through many studies, in the form of decreased efficiency and increased patient waiting time at the many hospital services, mainly in the outpatient settings and during the process of registration and admission especially at the beginning of the HIS implementation or at the transitional phases of updating or upgrading HIS. Users agreed that the performance of the HIS is slow overall and that this unexpected slowness is not acceptable and might lead to more slowness in the process of care delivery and might increase the time spent by patients inside hospital even more. The implementation of HIS has proved to be a path ridden with many challenges.

Users were not satisfied with the downtime procedure and they highlighted that they are not prepared for it; to switch to an alternative manual system in case the electronic system failed could not be continued as it was not a concrete solution. As per users HIS downtime procedure is no clear and not comprehensive and that the HIS training materials along with the training provided are not helpful. This is consistent with other studies which highlighted that minimal and clearly understood downtime can spare a lot of the unintended consequences or HIS related medical errors.

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# 6. CONCLUSION

From the above data collection and the results obtained from the study we can say that

- The availability of computers is a factor influencing the acceptance of HIS.
- The general features of HIS has effect on the satisfaction level of the end users.
- The HIS has influence on patient care delivery.
- The end users are partially satisfied with HIS.
- The staff is relatively unsatisfied with the support provided for HIS.

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# 7. RECOMMENDATION

Healthcare information systems promises to increase legibility, reduce medical errors, shrink costs and boost the overall quality of healthcare. Hospitals investments in healthcare technology are both significant and purposeful in achieving desired outcomes. Nevertheless, there are many challenges resulting from the technology, end-users and environment that continue to undermine these efforts. The research explored the opportunities and challenges that lie in health information systems. Future implementation need to focus on the integration of all stakeholders and technology while remaining mindful of the sociocultural organizational environment and also exploiting recent advances in cloud technologies and information exchanges.

The first area which is improving the performance and availability of the system is very crucial for its acceptance, satisfaction and overall success. The HIS needs enhancements in the form of improving the software speed, responsiveness and increasing availability of computers, laptops and computers on wheels. Screen designs need to be enhanced with more focus on the sequence and logic of functions, some software features need to be more user friendly or user adjusted when possible, such as font size.

There are some specific software changes that are required:

- In the section of service selection quantity change option should be activated.
- There are two separate boxes for service provider and consulting doctor which have the same options.
- Inability of the software to initiate a separate bill till the current bill is saved (This application particularly increases the waiting time of the patient in a queue.
- Multiple commands are required to print a bill.

The second area which includes improving the organizational support of users, through providing more training to new and old users, more dedicated and protected time during working hours for users to learn and practice on the system after implementation or upgrade and providing better user manuals and materials for training and also as reference for users when they have problems. More technical support is needed from the vendor.

The third area is providing better and more reliable channels of communication and feedback, since many users expressed that their feedback should be taken and accordingly the changes

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should be made. Unavailability of reliable feedback mechanisms decreased their chance of successful contribution to HIS improvement.

It is obvious that the design of HIS, such as good and adequate user interface; and HIS performance, such as response times, will increase its chances of being accepted by users and implemented successfully.

Most users were very enthusiastic about conducting this study and survey and they all recommended that it should be done on a regular basis to monitor and improve the level of HIS acceptance and satisfaction among users and focus on critical issues and high priority challenges.

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# 8. INSTRUMENTATION

Below is the questionnaire used for the study purpose.

## A Study on Hospital Information System (HIS) acceptance and satisfaction by End Users

Purpose: This is the questionnaire that deals with Hospital Information System acceptance and satisfaction by End Users in Hospital. Please take a few minutes to express your opinions about the availability and quality of HIS in your Hospital. Your answers are important to the success of this study.

Instruction: Please put a tick next to the answer of your choice

***Section A: Demographic Information***

1. Age -
2. Gender - Male / Female
3. Job Type - Billing / Administrator / Technicians / Nurse
4. Total Healthcare Experience –

   Less than 6 months / 6 months - 1 year / 1 - 2 years / 2 – 5 year / Over 5 years
5. Hospital Information System (HIS) used earlier – Yes / No
6. Work Experience in using Hospital Information System (HIS) –

   Less than 6 months / 6 months - 1 year / 1 - 2 years / 2 – 5 years / Over 5 years

***Section B: Availability of Computers in Hospitals***

1. Laptop / Desktop computers available -

   Yes / No
2. Computer on wheels like Mobile, Tabs, Ipad, etc. available –

   Yes / No

`

3. Computers are always available when I need them for Hospital Information System (HIS)-

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

***Section C: Hospital Information System(HIS) General Assessment***

1. Hospital Information System (HIS) performance speed is satisfactory (Process speed) –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

2. Hospital Information System (HIS) is user friendly and easy to use –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

3. Hospital Information System (HIS) provides sufficient information about Patient –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

4. Hospital Information System (HIS) screens layouts, fonts and characters are appropriate –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

5. Hospital Information System (HIS) improves access to patient information –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

***Section D: Patient Care & Hospital Information System (HIS)***

1. Using Hospital Information System (HIS) decreases time spent by patients inside hospital–

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

2. Hospital Information System (HIS) improves the quality of patient care process –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

3. Hospital Information System (HIS) improves the quality of patient data entry and retrieval–

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

***Section E: User's Satisfaction in using Hospital Information System (HIS)***

1. I am prepared for Hospital Information System (HIS) downtime –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

2. Hospital Information System (HIS) downtime procedure is clear and comprehensive –

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Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

3. Current Hospital Information System (HIS) training materials are helpful –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

4. I am satisfied with the support provided to Hospital Information System (HIS) users –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

5. Overall, I am satisfied with Hospital Information System (HIS) –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

6. I received enough training on Hospital Information System (HIS) –

Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

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# 9. BIBLIOGRAPHY


*Davenport, T. H. (1993). Process innovation: reengineering work through information technology. Boston: Harvard Business Press.*

*Goldzweig, C. L., Towfigh, A., Maglione, M., & Shekelle, P. G. (2009). Costs and benefits of health information technology: new trends from the literature. Health Affairs, 28(2), w282–w293. doi:10.1377/hlthaff.28.2.w282*

*Ketikidis, P., Dimitrovski, T., Lazuras, L., & Bath, P. A. (2012). Acceptance of health information technology in health professionals: an application of the revised technology acceptance model. Health informatics journal, 18(2), 124-134.*

*Morton, M. E., & Wiedenbeck, S. (2010). EHR acceptance factors in ambulatory care: a survey of physician perceptions. Perspectives in Health Information Management/AHIMA, American Health Information Management Association, 7(Winter).*

*Ochieng, O. G., & Hosoi, R. (2006). Factors influencing diffusion of electronic medical records: a case study in three healthcare institutions in Japan. HIM J, 34(4), 120-129.*

*Khalifa, M. (2013). Barriers to health information systems and electronic medical records implementation. A field study of Saudi Arabian hospitals. Procedia Computer Science, 21, 335-342.*

*Nahm, E.S., Vaydia, V., Ho, D., Scharf, B. and Seagull, J. (2007), "Outcomes assessment of clinical information system implementation: A practical guide", Nursing Outlook, Vol. 55, No. 6, pp. 282-288*

*Jha A.K., Doolan D., Grandt D., Scott T. and Bates D.W., (2008), "The use of health information technology in seven nations", International Journal of Medical Informatics, vol. 74, pp.848-854*

*Bakker A.R., (2007), "The need to know the history of the use of digital patient data, in particular the HER", International Journal of Medical Informatics, Vol. 76, pp. 438-441*

*Lorenzi, N. M., Kouroubali, A., Detmer, D. E., & Bloomrosen, M. (2009). How to successfully select and implement electronic health records (EHR) in small ambulatory practice settings. BMC medical informatics and decision making, 9(1), 15.*

`

*Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management science, 46(2), 186-204.*

*Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS quarterly, 319-340.*

*Pai, F. Y., & Huang, K. I. (2011). Applying the Technology Acceptance Model to the introduction of healthcare information systems. Technological Forecasting and Social Change, 78(4), 650-660.*

*Bokhari, R.H. (2005), "The relationship between system usage and user satisfaction: a metaanalysis", The Journal of Enterprise Information Management, Vol. 18, No. 2, pp. 211-234*

*Au, N., Ngai, E.W.T. and Cheng, T.C.E. (2002), "A critical review of end-user information system satisfaction research and a new research framework", The International Journal of Management Science, Vol. 30, pp. 451-478*

*DeLone, W.H., and McLean, E.R. (1992), "Information systems success: the request for the dependent variable", Information Systems Research, Vol. 3, No. 1, pp. 60-95*

*DeLone, W.H. and McLean, E.R. (2003), "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update", Journal of Management Information Systems, Vol. 19, No. 4, pp. 9-30*

*Berg, M. (2001). Implementing information systems in health care organizations: myths and challenges. International journal of medicalinformatics, 64(2), 143-156.*

*Ash, J. S., Berg, M., & Coiera, E. (2004). Some unintended consequences of information technology in health care: the nature of patient care information system-related errors. Journal of the American Medical Informatics Association, 11(2), 104-112.*

*Chaudhry, B., Wang, J., Wu, S., Maglione, M., Mojica, W., Roth, E. & Shekelle, P. G. (2006). Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. Annals of internal medicine, 144(10), 742-752.*