

# Penetration of Hospital Information System among Hospital Staff in General Ward of a Teaching Hospital

Dr. A. Giriya<sup>1</sup>, K. Naga Chetana<sup>2</sup>

<sup>1</sup>Associate Professor, Apollo Institute of Hospital Administration, Hyderabad, Telangana State, India

<sup>2</sup>Management Intern, Apollo Institute of Hospital Administration, Hyderabad, Telangana State, India

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## ABSTRACT

The study investigated the level of penetration and awareness of Hospital Information Systems (HIS) among hospital staff in general wards of a teaching hospital. HIS is a crucial component of health informatics that facilitates the management of administrative, financial, and clinical aspects of patient care. It enables healthcare professionals to access patient health information and visit history, enhancing care coordination within the hospital environment. Data for the study were collected using convenience sampling, and questionnaires were distributed among hospital staff. The collected data were analyzed using percentages and chi-square tests to assess the relationship between variables. The study highlighted the significance of user interest and awareness of HIS for user satisfaction. A strong emphasis was placed on the importance of end-user training for the successful implementation and utilization of HIS. Proper training was shown to be essential to prevent system failure and ensure effective usage.

**Key Words:** General Ward, Hospital Information Systems (HIS), Penetration, Teaching Hospital, User friendliness

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## INTRODUCTION

A Hospital Information System (HIS) is a digital solution designed to address the various needs of healthcare organizations, including hospitals. It plays a significant role in streamlining operations, enhancing patient care, and improving overall efficiency. A HIS should integrate and manage various aspects of hospital operations, including patient records, appointments, medical histories, billing and financial data, inventory management, and more. This integration helps eliminate redundant data entry, reduces errors, and ensures accurate and up-to-date information.

Developing a Hospital Information System is a complex and multifaceted task that requires careful planning, collaboration with healthcare professionals, adherence to industry standards, and robust software development practices. It's important to keep the evolving needs of healthcare organizations and patients in mind while designing and implementing such a system.

The penetration of Hospital Information Systems (HIS) into general wards of healthcare institutions has ushered in a new era of enhanced patient care and streamlined medical processes. These digital solutions bring about a range of benefits that positively impact both patients and healthcare professionals.

HIS implementation in general wards enables seamless integration of patient data, medication records, and treatment plans. This leads to improved accuracy in diagnosing and treating patients, reducing the chances of errors due to miscommunication or misplaced paperwork. Nurses and doctors can access real-time information, facilitating quicker decision-making and better coordination of care. Furthermore, HIS helps in optimizing resource allocation and task management. Hospital staff can efficiently allocate beds, manage patient flow, and monitor inventory levels of essential supplies. This leads to better utilization of resources and enhanced operational efficiency.

The integration of Hospital Information Systems (HIS) into general wards presents a host of benefits, yet it is crucial to confront potential hurdles like safeguarding data, providing adequate staff training, and harmonizing the symbiotic

relationship between technology and the personal element of care giving. When executed with careful consideration, HIS has the capacity to greatly enhance the caliber of healthcare delivered in general wards, establishing a more efficient, knowledgeable, and patient-focused medical milieu.

### **OBJECTIVES OF RESEARCH**

- To study the existing Hospital Information System in the teaching hospital.
- To study the user- friendliness of Hospital Information System in the teaching hospital.
- To study the extent of penetration of Hospital Information System among hospital staff in the teaching hospital.
- To recommend measures to improve user friendliness of Hospital Information System in the teaching hospital.

### **METHODS**

This study employs an observational and cross-sectional approach to evaluate the existing awareness and utilization of Health Information Systems (HIS) among the general ward staff. The research focuses on a sample of 100 conveniently selected staff members actively engaged in general ward duties. The primary data collection method involves the administration of questionnaires. The gathered data is subsequently analyzed employing straightforward percentage calculations and the chi-square test. This methodical analysis aims to provide valuable insights into the current state of HIS awareness and utilization within the general ward staff.

### **DATA ANALYSIS & FINDINGS**

**Percentage analysis of the collected primary data showed the following results:**

- Of the total responses, 35% are from nurses, 29% from medical students, 16% from doctors, 12% from nursing students, 6% from physiotherapists and 2% from lab technicians.
- Among the total respondents, 63% constituted females and 37% constituted males. 27% of males and 38% of females responded that HIS is user friendly.
- It is also observed that, of the total respondents, 54% of them belong to 20-25 age group, 37% of the respondents belong to 25-30 age group, 4% of the respondents belong to 30-35 age group, 1% of the respondents belong to 40-45 age group and 1% of the respondents belong to 50-55 age group.
- Among 20-30 age group, 59% responded that HIS is user friendly and 32% responded HIS is not user friendly. In 30-40 age group, 5% responded that HIS is user friendly and 2% responded HIS is not user friendly. Among 40-55 age group, 1% responded that HIS is user friendly and 1% responded HIS is not user friendly.
- When it comes to educational background of respondents, a major chunk of respondents were below graduates, and graduates constituting to 43% and 47% respectively. Only 10% were found to have completed their post graduation.
- Of the total respondents, 66% were aware of Hospital Information System & 34% were not aware of Hospital Information System.
- It was found that 61% of the total respondents were currently using system and 39% were currently not using system.
- Of the total respondents 86% responded that they are interested in Hospital Information System usage and 14% responded that they are not interested in Hospital Information System usage.
- Analysis shows 66% found it easy to send and receive the information from different departments through HIS.
- Results indicate 65% of general ward staff felt that training period was reasonable enough for improving user friendliness with the system and 35% felt that the hospital information system is not user friendly.
- When asked for computer data entry, 82% responded that it is easier than manual data entry and 18% felt computer data entry is not easier than manual data entry.
- Of the total responses 84% responded that computer data maintenance is easier than manual data entry and 16% responded that computer data maintenance is not easier than manual data maintenance.
- For 61% of the staff, data entry is easy while navigating through screens, whereas 39% felt difficult as they have to navigate through lot of screens. When enquired on the ease of navigation between screens, 66% felt it is easy and 34% felt it as a difficult task.
- From the total responses, 84% responded that speed of Hospital Information System is satisfactory and 16% responded that speed of Hospital Information System is not satisfactory.

**Chi-square analysis:** Chi-square test is performed to understand the association between different variables as discussed below:

**1. Chi-square analysis of gender and user friendliness** - The following hypothesis framed to test the association of user friendliness and gender of user:

$H_0$ : User friendliness is independent of the gender of the end user.

$H_a$ : User friendliness is dependent on the gender of the end user.

**Table 1: Chi-square analysis of gender and user friendliness**

	Male	Female	Marginal row totals
User friendly	27 (24.05)	38 (40.95)	65
Not user friendly	10 (12.95)	25 (22.05)	35
<b>Marginal column totals</b>	37	63	100(Grand Total)

For the data available in table 1, chi-square statistic value is 1.641. The p-value is found to be 0.200182 which is more than 0.05. Hence null hypothesis accepted and alternate hypothesis rejected. Therefore it can be concluded that user friendliness is independent of the gender of the end user or we can also say there is no significant relationship between gender & user friendliness of hospital information system.

**2. Chi-square Analysis of age and user friendliness** - To test the relationship between user friendliness and age, the following hypothesis framed:

$H_0$ : User friendliness is independent of the age of the end user.

$H_a$ : User friendliness is dependent on the age of the end user.

**Table 2: Chi-square analysis of age and user friendliness**

Age group	User friendly	Not user friendly	Row totals
20-30	59 (59.15)	32 (31.85)	91
30-40	5 (4.55)	2 (2.45)	7
40-55	1 (1.30)	1 (0.70)	2
<b>Column totals</b>	65	35	100 (Grand Total)

Chi square analysis of table 2 data resulted in a test statistic value of 0.326. The p-value is found to be 0.849571 which is more than 0.05. So null hypothesis accepted and alternate hypothesis rejected. Therefore the conclusion is user friendliness is independent of the age of the end user.

**3. Chi-square Analysis between Professional background of end user and ease of computer data entry** - To test the significant relationship of professional background of end user and ease of computer data entry, the flowing hypothesis framed:

$H_0$ : Profession of end user is independent on the ease of computer data entry of the end user.

$H_a$ : Profession of end user is dependent on the ease of computer data entry of the end user.

**Table 3: Chi-square analysis between profession of end user and ease of computer data entry**

Profession	Computer data entry is easy	Computer data entry is not easy	Row totals
Nurses	30 (28.35)	5 (6.65)	35
Medical & Nursing students	33 (33.21)	8 (7.79)	41
Doctor	12 (12.96)	4 (3.04)	16
Physiotherapists	5 (4.86)	1 (1.14)	6
Lab technicians	1 (1.62)	1 (0.38)	2
<b>Column totals</b>	81	19	100 (Grand Total)

The chi-square test statistic for table 3 is 2.1568. The p-value is 0.70695 which is more than

0.05. Thus null hypothesis accepted and alternate hypothesis rejected. Hence we can conclude that profession of end user is independent on the ease of computer data Entry of the end user.

**4. Chi-square analysis of awareness of HIS and ease of computer data maintenance** - To test if awareness of HIS has any impact on the computer data maintenance, the following hypothesis tested:

$H_0$ : Computer data maintenance of end user is independent of the awareness of HIS by the user.

$H_a$ : Computer data maintenance of end user is dependent on the awareness of HIS by the user.

**Table 4: Chi-square analysis of awareness of HIS and ease of computer data maintenance**

	<b>Computer data maintenance is easy</b>	<b>Computer data maintenance is not easy</b>	<b>Marginal row totals</b>
<b>Aware of HIS</b>	60 (55.44)	6 (10.56)	66
<b>Not aware of HIS</b>	24 (28.56)	10 (5.44)	34
<b>Marginal column totals</b>	84	16	100 (Grand Total)

The chi-square statistic for table 4 is 6.8946. The p-value is .008646 which is less than 0.05. Henceforth  $H_0$  rejected and  $H_a$  accepted. Thus it can be concluded that computer data maintenance of end user is dependent on the awareness of HIS by the user.

**5. Chi-square analysis of interest in HIS usage and satisfaction with speed of HIS** – Hypothesis is:

$H_0$ : End user satisfaction with HIS speed is independent of the interest in HIS usage.

$H_a$ : End user satisfaction with HIS speed is dependent on the interest in HIS usage.

**Table 5: Chi-square analysis of interest in HIS usage and satisfaction with HIS speed**

	<b>Satisfied with HIS speed</b>	<b>Not satisfied with HIS speed</b>	<b>Marginal row totals</b>
<b>Interested in HIS</b>	78 (72.24)	8 (13.76)	86
<b>Not interested in HIS</b>	6 (11.76)	8 (2.24)	14
<b>Marginal column totals</b>	84	16	100 (Grand Total)

The chi-square statistic of table 5 is 20.5031. The p-value is 0.000006 which is less than 0.05. So  $H_0$  rejected and  $H_a$  accepted. It can be concluded that end user satisfaction of HIS speed is dependent on the interest in HIS usage.

**6. Chi-square analysis of ease of navigation between screens and end user satisfaction** – The following hypothesis framed to test the ease of navigation between screens and end user interest in HIS usage:

$H_0$ : Ease of Navigation between screens is independent on the end user interest in HIS usage.

$H_a$ : Ease of Navigation between screens is dependent on the end user interest in HIS usage.

**Table 6: Chi-square analysis of ease of navigation between screens and end user satisfaction**

	<b>Satisfied with HIS speed (user satisfaction)</b>	<b>Not satisfied with HIS speed</b>	<b>Marginal row totals</b>
<b>Navigation between screen is easy</b>	62 (55.44)	4 (10.56)	66
<b>Navigation between screen is not easy</b>	22 (28.56)	12 (5.44)	34
<b>Marginal column totals</b>	84	16	100 (Grand Total)

For the data of table 6, chi-square statistic is 14.2687. The p-value is 0.000158 which is less than 0.05. Therefore null hypothesis is rejected and alternate hypothesis is accepted. Henceforth the conclusion is end user satisfaction is dependent on the interest in HIS usage.

### CONCLUSION

The study, focusing on the adoption and usability of the Hospital Information System (HIS) among hospital staff at a teaching hospital, emphasized the significance of user interest and awareness in ensuring user satisfaction. Understanding

the extent of penetration of Hospital Information System among the staff helps in smooth running of clinical as well as managerial operations and focuses on mapping training needs of employees regarding Hospital Information System.

From the study it is evident that user-friendliness is independent of the staff gender, age and their profession. Ease of navigation between screens and user satisfaction are dependent on end user interest in HIS usage. Also computer data maintenance of end user is dependent on the awareness of HIS by the user. The findings underscored the vital role of end user interest in implementing successful HIS. Comprehensive end-user training helps in achieving the success of HIS implementation. The study provides valuable insights into the penetration of a hospital information system in a general ward, shedding light on its impact on operations and staff training needs. By understanding these factors, the hospital can make informed decisions to enhance the HIS implementation and utilization for improved patient care and operational efficiency.

The success of any hospital information system hinges on the complete engagement of its users. Therefore, the design process must inherently account for human and social elements. Often, these factors can be effectively managed by offering comprehensive training and educational resources about the system. By prioritizing user involvement and addressing their needs, a hospital information system can truly achieve its intended success.

### **RECOMMENDATIONS**

The following suggestions are made to the organization for further improvement of the penetration of Hospital information system.

- As per the study, 34 percent of respondents are not aware of HIS, so suggestion is given to conduct awareness campaign or training relating to usage of HIS among the staff of general wards.
- Provision of secure & safe mobile access of HIS to the staff in general wards improves the usability of HIS.
- Making availability of digital data for physiotherapy & other cross referrals in each ward helps in their smooth functioning.
- Standardization of HIS help in the exchange of medical information between various professionals.

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