

Original Research Article

Based on the Shortcomings in Selected Areas of Hospital Information System [HIS] among Hospital Staff Useful In Preparation of a Leaflet Related Tips and Strategies for its Reduction

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ABSTRACT

Hospital information system has become a major technological innovation to which all the health care sectors make sure to get adapted to improve their health care delivery in three most important categories; manpower, money and material. An exploratory study was conducted to assess shortcomings of HIS with a dual sample of nine selected hospital events, namely four emergency and insurance based admissions, two LAMA cases (leaving against medical advice), two normal discharges and one normal death event attached with 100 hospital staff by using observation checklist and Questionnaire respectively. The study revealed that there was an association between certain areas like operation theater, Medical records department and out-patient department and hospital staff's demographic variables but no such association between admission and discharge information system, hospital wards, laboratory, radiology department, safety and prevention areas were found out. The findings also highlighted the factors affecting the HIS namely a lack of awareness, lack of feedback & follow up i.e. 100% shortcoming, and delay in procedures, workload, lack of advanced entry procedures in relation to investigations done in external laboratories i.e. above 50% shortcomings. The analysis also revealed that the successful usage of HIS were significantly influential to hospital staffs' year of experience, knowledge, training related HIS and their recent designation in the health sector. As on identification, need-based leaflet including rationale had been prepared and introduced to reduce the percentage of shortcomings.

Keywords: Hospital Information System (HIS), shortcomings, leaflet, hospital events.

INTRODUCTION

In the present scenario, we find most of the health care system using the advanced technologies to improve their efficient delivery of high quality care for the consumers. Hospital Information System has turned out to be an emerging technology that improves the efficiency and staff potency and increasing the legal security of patient documents. ^[1] Beneficence in timeliness, reliability, data completeness and accuracy of Information was been satisfactorily mentioned by 87.9% of nurses

in relation to HIS usage. ^[2] There have been improved storage and retrieval of patient data in emergency circumstances for immediate delivery of health care. ^[3]

But despite all the identified advantages, HIS faces many challenges that affect the smooth functioning of various health care departments and respective personnel, resulting in a lack of satisfaction in the delivery of quality care and therefore a need for better implementation of the system. ^[4] In-order to primarily identify the challenges, a study was conducted to

explore the shortcomings of HIS among selected departments and respective personnel. The main objectives were to assess the shortcoming of HIS of selected areas of a hospital and accordingly prepare a leaflet related tips and strategies to reduce those shortcomings. The result supported many studies showing a need for modifications and improvement for efficient performance and effective patient care, [5] especially, the newly joined staff in case of staff shortage (which is another upcoming issue), takes the lot time to get used to new tools and to exploit the new possibilities. Time constraints and workload prevent them from learning the effectiveness of technologies and as a result get demotivated which would, in turn, affect the patient care. [6]

Hospital Information System [HIS] is an element of health informatics on which the process of care delivery in hospitals and different types of health care organizations are depended. [7] In a study related to Clinical Information System (CIS), the researcher found that the staffs were finding no change in charting- completeness and quality, charting time and medication errors and therefore the workflow was also additionally affected as they had to maintain both hard paper copy and system records in their hospital. [8] Many challenges such as; slowness of system and hardware and software recurrent maintenance problems, lack of knowledge, motivation and training of healthcare professionals irrespective of their experience and profession, are identified in many hospitals through their audits and research. [9]

MATERIALS AND METHODS

A descriptive survey design was adapted to assess the shortcoming of Hospital Information System among hospital staff of selected areas of the hospital. The synopsis was accepted by the Ethical clearance Authority and CTRI registration was done. The target population was Professionals and Non-professional health workers [office assistants and clerks]

who were frequent users of HIS. By signing the informed consent, the subjects were selected through purposive sampling considering the inclusion criteria i.e they were involved in HIS and excluding those who were freshly appointed and involved in HIS with < 1yr of experience and also those Hospital staff from administrative offices. The tools used were, Demographic proforma, Questionnaire on Shortcoming of HIS and Observation checklist on Shortcoming of HIS. Expert opinion on a formulation of tool and methodology was taken by conducting a detailed review of the literature on important areas to be assessed while analyzing the successful implementation of HIS. A pilot study was conducted for the purpose of validity and reliability of the tool and found feasible and valid to be used for the study. The reliability of the questionnaire was established using Split Half Method by administering the questionnaire to 10 hospital staff from selected areas of the hospital and the Sparmann Brown's value was found to be 0.963 which showed that the Questionnaire had internal consistency. Observation Checklist was established using Inter-Rated Reliability test by assigning two raters to observe the areas for a shortcoming. Both the operation theaters observed the selected settings i.e admission and discharge information system, hospital wards, laboratory, radiology department, safety and prevention areas, for shortcoming on the same day and timing. The investigator accompanied to assure the quality of rating to avoid any malpractice. The percentage obtained for Inter-Rated Reliability test was 85.71% and therefore the tool was considered to be reliable for the study.

Baseline Proforma consisted of 5 items obtaining information regarding the age, gender, designation, year of experience in hospital, whether trained in HIS and year of experience in using HIS. The questionnaire consisted of 46 items (assessing different items based on organization and administration, computer processing, communication process, time

taken and implementation of procedures and measures undertaken for feedback). It was a 2 point rating scale with options NO and YES (scores 2,1 respectively) which was administered to 100 hospital staff who came under the inclusion criteria; having more than 1-year experience in usage of HIS and those excluding staff from administrative offices. Subjects consisted of nurses [day staff and night staff] from selected wards and ICUs, doctors [interns] from specialties such as surgery, medicine, cardiology, oncology, Obstetrics and gynecology, neurology, psychiatry and endocrinology and clerks and office assistants of operation theatre, emergency, laboratory, billing section, radiology, pharmacy and medical record departments. For more accuracy and consistency based on selected nine hospital events [four admissions (2 insurance & 2 emergencies), 2 LAMA cases, 2 normal discharges and 1 death case], Observation checklist was used simultaneously by the investigator to assess the shortcoming of 42 areas including hospital wards i.e. one each of all specialties [surgery, medicine, cardiology, orthopedics, oncology, Obstetrics and gynecology, neurology and psychiatry], ICUs, operation theatre, emergency ward, laboratory, billing section, radiology, pharmacy and medical record departments.

Statistical Analysis: Data obtained were analyzed on the basis of objectives and hypothesis where; Baseline Proforma containing sample characteristics was

analyzed using frequency and percentage; analysis of shortcoming of selected areas of hospital assessment using mean and standard deviation of the Questionnaire and Observation checklist and Association between shortcomings of HIS in selected areas and the demographic variables using Chi Square Test.

RESULT

Baseline Characteristics

Table 1: Frequency and Percentage distribution of baseline variables of hospital

| Variables | Frequency [f] | [%] | Mean |
|--|---------------|-----|------|
| Age | | | |
| >25yrs | 75 | 75. | 25 |
| 26-35yrs | 16 | 16 | 26 |
| 36-45yrs | 7 | 7 | 41 |
| 46-60yrs | 2 | 2 | 52 |
| (Total) Mean age : | | | 27 |
| Gender | | | |
| male | 17 | 17 | |
| female | 83 | 83 | |
| Designation | | | |
| doctor [intern] | 21 | 21 | |
| nurse | 61 | 61 | |
| pharmacist | 3 | 3 | |
| MRD technician | 9 | 9 | |
| Lab Technologist | 3 | 3 | |
| Radiology technologist | 3 | 3 | |
| Year of experience in hospital | | | |
| 1-3yrs | 71 | 71 | 1.3 |
| 3-5yrs | 17 | 17 | 4.17 |
| 5-7yrs | 6 | 6 | 6.16 |
| >8yrs | 6 | 6 | 8 |
| Trained in HIS system | | | |
| Yes | 96 | 96 | |
| No | 4 | 4 | |
| Year of experience using HIS system | | | |
| 1-3yrs | 88 | 88 | 1.18 |
| 3-5yrs | 5 | 5 | 4.6 |
| 5-7yrs | 5 | 5 | 6.4 |
| >8yrs | 2 | 2 | 8 |

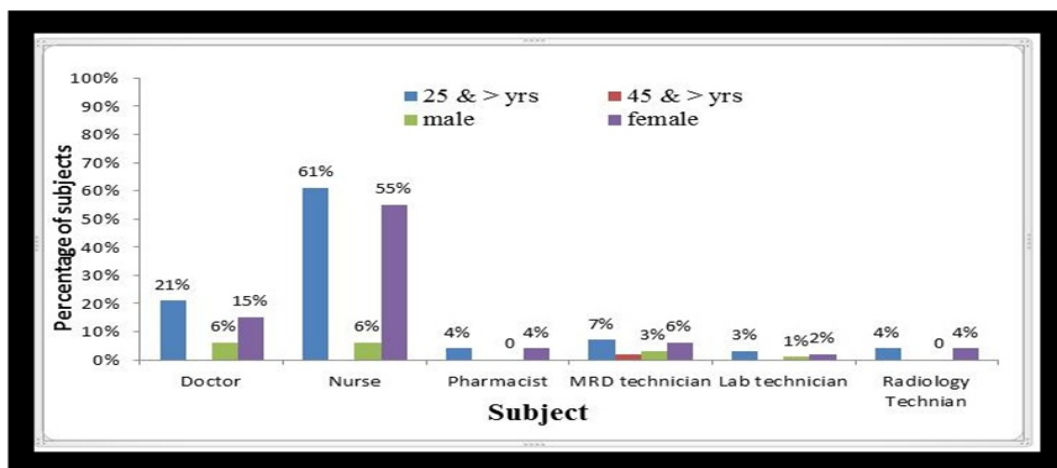


Figure 1: Percentage distribution of categories of hospital staff according to their Gender and Age

Table 2: Combination of Highest and lowest shortcomings of selected areas of HIS based on Observation checklist and Questionnaire (self reported) on Shortcoming of HIS

| Selected areas | Item no Observation checklist | Highest shortcoming | Item no questionnaire | Lowest shortcoming |
|---|-------------------------------|--|-----------------------|--|
| Admission and discharge Information system | 8 [questionnaire] | Lack of manpower quality [68%] | 1 [observation] | Regular HIS training for all hospital staff [16%] |
| Hospital Information System | 4 | No Telephone script of in-patient status for emergency situations [100%] | 1 | System's design - user friendly [3%] |
| Pharmacy Information system | 3 | Outside campus drug deliveries not added in in-patient files. [100%] | 2 | Effective control over dangerous drugs and devices [3%] |
| Laboratory Information System | 3 | Outside campus investigations not added in in-patient files. [100%] | 1 | Safety of individuals-admitted due to HIV/AIDS [1%] |
| Radiology Information System | 3 2 | - Outside campus investigations not added in in-patient files. [100%] - Inadequate Scheduling of out-patient and in-patients for procedures [100%] | 4 | Lack of knowledge for hospital staff regarding access to outside selected radiology department [12%] |
| Operation Room Information system | 2 [questionnaire] | Delay in recording surgical procedures in patient's file [30%] | 4 | Delay in Surgical emergencies [3%] |
| Medical Records Information System | 1 | delay in retrieval of patient files in emergency [54%] | 4 [observation] | HIS Training program for medical record department personnel [1%] |
| Out-patient Information system | 3 | Lack of Guidance to patients for further investigations [47%] | 1 | Out patient records maintenance [3%] |
| Safety and Prevention | 3 7 | - No display of employees' rights and responsibilities [100%] - Posting signs at entrances [instructions to patients with symptoms of respiratory infection to cover their mouths/noses when coughing or sneezing, perform hand hygiene after contact with respiratory secretions in all areas [100%] | 3 | Disposal and management of laundry [7%] |
| *lack of proper feedback system [100%] in all the selected areas. | | | | |

Table 3: Association between Shortcoming of HIS mean scores in selected areas and the selected demographic [designation of hospital staff] variable of the subjects

| Selected areas | Chi Square value | P value |
|------------------------------------|------------------|---------------|
| Operation Room Information System | 20.346 | 0.000* |
| Medical Records Information System | 22.042 | 0.000* |
| Out patient Information System | 15.559 | 0.004* |
| Safety & Prevention | 4.172 | 0.788* |

*level of significance

Table 4: Distribution of Leaflet contained items related to tips and strategies to reduce the identified shortcomings of HIS in selected areas of HIS

| Shortcoming | Example | Tips And Strategies | Rationale |
|--|--|---|---|
| Ward | | | |
| Printed telephone script for communicating patient's condition during emergency situation. | When a patient gets collapsed, ward staff may check only blood pressure and GRBS and may inform, where the physician needs more information | Necessary information on patient's condition during specific emergency conditions that need to be assessed prior to phone call eg: ABG analysis, SPO ₂ | To provide physician, sufficient information in one call, helping them to take immediate action in less time. |
| Medication prescription in small and unclear letters. Unable to read | Physician would have written Inj. Cefazone 1.5mg, but nurse reads it as Inj. Cefazone 1mg and starts with the test doze | Provide awareness on compulsory prescribing of medications in capital and clear letters in patient files and to write one's name as sign. | To prevent misinterpreting and wrong administration of drug that can cause adverse effect to patients. |
| Frequent training on HIS [system usage] to all staff especially newly joined | After training class on HIS for a new staff, she may not be practicing it in wards, as senior staff uses system to avoid delay in carrying out procedure | Weekly training and motivating the hospital staff especially newly joined, and ensure that they get adequate chance to use the system while carrying out procedures | Helps in complete acceptance and improved outcome of HIS usage by all the hospital staff leading to improved standards of quality care in less time |

| <i>Continued table no. 4.....</i> | | | |
|--|---|---|---|
| Shortcoming | Example | Tips And Strategies | Rationale |
| Inadequate number of staff in each department, leading to work load and decreased quality care | In a general ward with 50 beds, due to lack of nurses, the nurse in the ward have to provide care to patient of more than two cubic and also maintain the records and reports in the system which she/he cannot attain. | Adequate recruitment of either hospital staff or special staff or expertized in system usage, for maintaining the records and appointments of patients in the system | Helps the nurse to focus more on delivering quality care for patients and prevent existing staff turn-over due to work load. |
| Medical Records Department | | | |
| Lack of clear instructions for insurance policies/ health card facilities during admission of the patient | A got admitted to a ward and immediately started with treatments. Later patient comes to know from other patients about health card and argues with ward staff for not informing them about such a facility patient. | MRD staff/private doctors should direct patients to admission counselor prior to completing admission procedure, to get adequate awareness on availability of insurance and health-care policies and its procedures. | Helps patient and relatives to take proper decision on attaining policies, getting discount in treatment and prevent any hindrance during discharge process |
| Delay in admission procedures and retrieval of patient files, especially during emergency situation | A patient with head injury came to hospital, and the relatives had to wait for an hour for retrieval of patient file and therefore delayed with all treatments | Prioritize and maintain a special counter for emergency cases and continue with daily cases in absence of emergency causes but without forming a queue in front of special counter | Helps in carrying out emergency procedures without making the patient to wait for files or formalities |
| Lack of proper guidance for visitors or patients after admission procedure, to carry out the following treatment, in spite of giving the number of a department that they need | Most of the patient relatives after their formalities at MRD section, come and ask others for guidance to the particular number provided and they lose time unnecessarily. | Department numbers and the floors listed posters can be displayed near visit counters or near staircases. | Help patients and relatives to reach the respective departments for investigations without delay and difficulty. |
| Laboratory Department | | | |
| Lack of facility to add patients outside laboratory investigation conducted during stay in the hospital, into their files. | Biopsy investigated in the outside laboratory. But, the reports come under our hospital name without any evidence in patient file, that report is from other laboratory | Develop online access to selected outside laboratories where investigation for our patients are conducted and can add their reports with lab address, directly or through central system of our hospital, into patients' system files | Helps in analyzing the report in case of any clarification or errors, to identify the source and prevent any legal issues against our hospital and immediate treatment plan for patient's health. |

NOTE: Also in case of radiology and pharmacy departments, develop similar online access to selected outside departments which helps in analyzing the report of investigations in case of any clarification or errors and even the drugs bought from outside which might have caused any adverse effects, in-order to identify the source and present any legal issues against our hospital and immediate treatment plan for patient's health.

| Shortcoming | Example | Tips And Strategies | Rationale |
|---|---|--|--|
| Laboratory Department | | | |
| Delay in investigation and generation of reports | After investigation, due to lack of manpower, it takes longer time for the printed report to be produced after investigation | Adequate staff is to be assigned to prevent taking double responsibility by them. | Prevents delay in taking immediate action for patient care, based on investigation reports |
| Pharmacy department | | | |
| Delay in delivery of drugs | In wards, when patient is under private consultation, the prescribed drugs may be delayed in its delivery, causing delay in starting of treatment | Prioritize the patients according to the emergency needs and adequate manpower to deliver the drugs to the wards taking lesser time. | To prevent any delay in delivery of drugs during emergency situations. |
| Safety and Prevention | | | |
| Employee's rights are not displayed | During discharge, patients may argue with nurses for delay in discharge process. They point on to patient's rights displayed to overpower the hospital staff | To prepare and display employee's rights, same as patient rights and according to departmental functioning. | It provides awareness to the patients and relatives about hospital staff's rights and responsibilities. Prevents unnecessary arguments or legal issues against the hospital staff. |
| Display of health care signs and posters for outsiders related to prevention of common air-borne diseases [usage of handkerchief during cough, sneeze, washing hands, etc] | Many illiterate patients do come to hospital for treatment and may not use preventive measures when they cough, sneeze or have any skin diseases and spread illness to the surroundings also. | Signs on preventive measures of common and easily spreading diseases [Tuberculosis, cough, skin diseases, allergies, eye infections, etc] | To prevent all the out-patients and in-patients from hospital acquired infections and keep all people free from air-borne diseases from hospital. |

| Shortcoming | Example | Tips And Strategies | Rationale |
|---|--|---|--|
| Feedback | | | |
| Lack of regular feedback system and delay in action | One of the discharged patient had complain on service provided in hospital and he informed it to others members outside, after leaving hospital. | Regular and compulsory feedback system for both patients during discharge and employees to be maintained and taken adequate action. | Helps to identify the strengths and weakness of the HIS and can improve the functioning, delivering of quality care and maintaining the standards of hospital. |

DISCUSSION

The study showed that there was 100% inadequacy in feedback system carried out in the areas such as medical records, laboratory, radiology, pharmacy departments and all the specialty wards which were included in the study. It showed that there was a greater need to focus on this area in order to bring satisfaction to both hospital staff and patients approaching the hospital for quality care. This finding was congruent to the study which highlighted the need for improvement of reliable channels of communication and feedback for both patients and employees taking into consideration the suggested ideas and solutions for problems that hindered the successful functioning of HIS. [10]

When there is adequate feedback system with proper follow-up and action implementation, the users of HIS can bring out productivity in all the areas of functioning without any dissatisfaction. Even though, compared to the previous scenario before HIS implementation, there is the tremendous change in patient's waiting time; producing of reports, placing appointments, and storage of patient medical data. Still, some of the areas need to have more improvements with better planning and implementation, supported by many similar studies.

Other studies do support the finding that during busy schedule especially for night duty staff, they find time-consuming, and the nature of staff's work hinders the extensive use of systems present in the working areas and thus workload increases. [11] As the workload increases, automatically they show dissatisfaction towards HIS. It also hinders the quality care provided to the patients leading to the incompleteness of the assigned work or even malpractices and negligence. As the finding also highlights

the lack of adequate staff for the emergency situation, it can increase further shortcoming in their work schedule.

In spite of training the hospital staff, when a change occurs in the system functioning or addition of more facilities, they require more time to get adapted to the changes which can also obstruct the smooth flow of quality care. At the same time, when staff is over dependent the system for many procedures, for example; in a case of emergency care, when the system is not functioning instantly, the patient further investigations and procedures are delayed which can even be a threat to the patient health. [12] Therefore, adequate assurance needs to be made that the improvements or changes in the working pattern of HIS do not cause lag in any procedures commonly occurring in the hospital.

It also found that in spite of repeated instructions; the medications were not prescribed in capital letters that would lead to recording and delivery of wrong drugs through the system. Other studies also found out that such documentation resistance was due to extrinsic or environmental factors, including lack of time and pressure from higher authorities causing incompleteness of the appropriate documentation. [13]

Compared to the previous scenario, in spite of certain shortcomings, presently most of the hospital staff do mention about the qualities of HIS implementation such as reduction of medication error, fraud detection, maintaining confidentiality, easy accessibility of patient data at any place in a hospital for immediate action plan, etc. [14]

Limitation

1. The study was confined to small and balanced sample including all the designated hospital staff according to the selected areas for research

2. Male subjects were less as sample for the study
3. Many of the subjects answered the questionnaire together/ blindly due to busy schedule, so there was a chance of bias

Recommendations

This study cannot be generalized as the subjects were been selected balancing the number of hospital staff from selected areas and it may vary according to each hospital setting. Further related study can be conducted on various areas such as; staff satisfaction with the usage of HIS, improvement in quality care in HIS implemented hospital, or select specified participants in-order to reduce any bias and to conduct research focusing each area in the hospital where HIS is been used.

CONCLUSION

As the Health care sector has to go along with the advancing technologies for quality care and practice, HIS functioning need to be frequently assessed improving The study showed that there was 100% inadequacy in feedback system carried out in the areas such as medical records, laboratory, radiology, pharmacy departments and all the specialty wards which were included in the study. It showed that there was a greater need to focus on this area in order to bring satisfaction to both hospital staff and patients approaching the hospital for quality care.

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