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IMPLEMENTATION OF HOSPITAL INFORMATION SYSTEM (HIS) IN MEDICAL EQUIPMENT MANAGEMENT SYSTEM (MEMS) – CASE STUDY

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ABSTRACT

In multispecialty hospital, medical equipment management system (MEMS) is necessary tool for patient compliance with integration of hospital information system (HIS) to strengthen the hospital management. This system is an online system and equipped with Electronic – Hospital management system (E – HMS).

Method – We enrolled 50 staff (consultant, resident doctors, paramedical staff and E - HMS staff / Technical Team Department) during 25 December 2015 to 31 December 2015.

Result - There is a huge deficit of communication system between E - HMS staff / Technical Team Department and other hospital department (36%), expired parts (18%), equipment identification (16%). These issues emerge due to absence of proper communication system.

Discussion – With the hospital information system (HIS), we can comfortably manage medical equipments in all department at various levels in hospital. Hospital information system (HIS) motivates E – HMS staff / Technical team Department to handle information system in appreciable manner.

KEYWORDS Medical Equipment Management (MEMS), Hospital Information System (HIS), E - HMS staff , Technical Team Department

INTRODUCTION

Medical services are greatly depending on different types of medical equipment to diagnosis and treatment of medical procedures in respect of patient compliance. Although in the condition like competitive environment and strict healthcare instructions, the hospital must provide extra care in response to referenced situation. Apart from the cost management in operational procedures of medical equipments like their purchase, contract, repair and calibration, their hygiene and maintenance is most important factor to be maintained [1 - 3]. For the maintenance and control of these tasks, E – HMS staff / Technical team Department is managing the purchase assessment, safety installation, warranty assurance, correcting repair, contrast monitoring, preventive maintenance and identifying non-functional equipment to ensure safe, effective, and economical services towards patient and community. The entire management of above and improved operating performance, hospital requires typical systematic managing strategy[4-6].

Medical Equipment Management System (MEMS)

The Medical Equipment Management System (MEMS) is designed for information collection and management of existing equipments. It deals about the equipment inventory, work sequence system, maintenance procedures, contract management and record maintenance. Also, it works as a management tool to track equipment, initiation of procedures, receiving of performance signals, eradicate cause of failure, training requirement, and printing of reports. With this method, we will show implementation of MEMS from system network architecture to the relationships between each sub-system model which results in advanced module framework of Hospital Information System (HIS).

Health Management Information System (HMIS)

The Health Management Information System (HMIS) has been designed for smooth monitoring of the hospitals activates with the help of support indicators and improved performance of the doctors and medical staff regarding health services of hospitals with benefits of fast work completion, paper less work, record keeping facility and integrated update system of procedure completion during treatment[7]. Nurses and paramedical staff speak about patient date improvement of 60-70%, which is a clear indication of rich association among the management information system and patients record keeping. It has been further evaluated that HMIS is indicating actual impact in terms of benefits of Patients and overall improved and smooth functioning of hospitals. It indicates that the final outcome can only be resulted by considering series of successful individual events delivered in each department which is further adjoined collectively to ensure huge impact over the outcomes expected.

Hospital information system (HIS)

It indicated that the results of the study which can be assessed at the level of each and every staff member (like matrons, superintendent and nurses) reported in the purview of this paper later. Hospital information system (HIS) designed in-house doesn't demand for high cost to develop but definitely expect expertise and technically sound components to operate the system[8]. The objective beyond installation of these systems is not competition but the essence of social service to provide improved quality of patient care at their best. The victory of the HIS component stands on a number of critical factors[9].

- The determination of management to frim and clear targets with outcome of crucial success of the business.
- Timely integration of the patient information system is difficult because the resultant of delays on benefits realization is monetary.
- Policies implementation demands doctors and reception staff to manage all hospital discharges and procedures precisely.
- Changes must be integrated to incorporate and redesign the system's process.

Some examples are illustrated on management analysis by the MEMS (such as failure trends, specific device malfunction analysis) which will be shown in results.

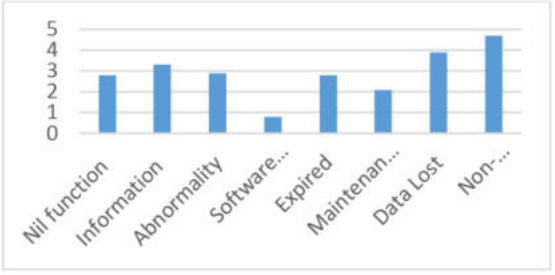
Method & data collection

Detailed survey with data collection conducted at Kailash Hospital, Noida during 25 to 31 December 2015 between complete strength of technical staff (800), consultant (350) and E – HMS staff / Technical team Department (20) in the Kailash Hospital. These data analysis reports were received from the conducting a survey at Kailash Hospital, Noida in December 2015. Kailash

Hospital is a multispecialty Hospital Industry (Having more than 25 branches at different Locations) with 500 beds (386 running), 75 modular ICU (68 running) and care about more than 25,000 pieces of medical equipments. Out of 270 Sample, 100 units of sample will be taken only from the study population (random sampling) and convincing method. The sampling would be conducted from each and every department of the prevalent in the hospital. Among sampling, 60 sample conducted of technical staff (10% of total), 30 samples conducted of consultant (8% of total) and 10 sample conducted of E – HMS staff / Technical team Department (50% of total). Lager amount of sampling is conducted of technical staff and E – HMS staff / Technical team Department staff as they all are directly involved in the implementation and maintenance of medical equipments.

RESULT

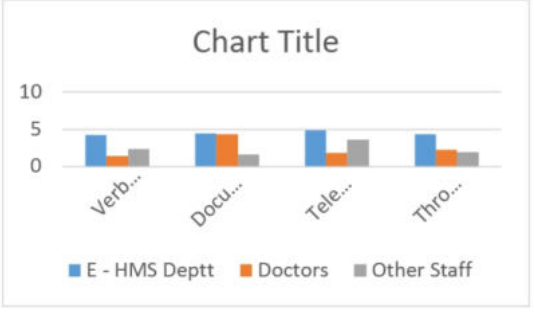
In compiling survey data, we not only notice the casual reason of the malfunction but also try to rule out the causes disturbed behavior of every type of specific types of equipment.



(Fig. 1. Statistic presentation for medical equipment case at Kailash Hospital in 2015)

Fig 1 shows that These nine types of error code and the statistic graph for the failure items of medical equipment repair cases. Statistical data was obtained from the MEMS in Kailash Hospital around 50 in quantity. Out of them the number 8 (Improper communication between departments) bears the largest amount. These Nine types of error codes mentioned in Fig 1 are: -

1. Nil function onsite check
2. Lack of proper information about equipment
3. Abnormality of user manual/ AMC schedule
4. Mistake in machine location identification
5. Software error due to problem in integration
6. Expired parts details
7. Lacking of maintenance or calibration of equipment
8. Data lost due to improper handling of records
9. Non-coordination in proper communication among departments



(Fig. 2. Method of complaint for maintenance or Malfunctioning of equipments)

Fig 2 clearly indicates that there is great problem occurring most commonly of data lost during complaints of equipment, Improper communication between E – HMS staff / Technical team Department and other hospital staff while complaining about malfunctioning or maintenance issue of equipment. However, the specified type of equipment failure statistics could be obtained from visualizing old maintenance and calibration records.

There is no separate method for complaints so there are chances of data lost because of complaint not received by E – HMS staff / Technical team Department in requested time limit or even late response by E – HMS staff / Technical team Department. Application of HIS/MEMS in E – HMS staff / Technical team Department, equipped us easily about scheduling of periodic maintenance of equipments by installing popup or alarm system in HIS, description of complaint, warranty period, mode of complaint and comparison among time taken in initiation of complaint and solution of complain for better use of equipments.

DISCUSSION

The results described the benefits of Statistics analysis for maintenance of records with MEMS. It is mere the small outcome of the MEMS in all operating department of E – HMS staff / Technical team. Fig. 1 shows The statistic graphical presentation for the failure items of medical equipment repair cases come from Kailash Hospital in 2015. It resulted that the Improper communication among department, improper statistics record maintenance of equipments and existing equipments were outdated.

Fig. 2 shows method of complaint for maintenance or malfunctioning of equipments. These outcomes give details for management Techniques for medical equipment through HIS/MEMS. For example, in fig. 2 we mention that majority of issues are nil or less compliant reaching at E – HMS staff / Technical team department in the cases of failure of devices working. To prevent the issue, if we use HIS with timely generated complaint from the any department / staff for any error devices problem automatically reflected in HIS system of hospital and noticed by head of E – HMS staff / Technical team department and we also plan storage of these equipments to be decreased for the breakdown time during maintenance. In most of the cases E – HMS staff / Technical team department is planned to work according to three approaches:

1. Internal approach,
2. External approach
3. Combination of internal and external approach.

The initial design for implanting the management system, it is needed to consider the actual existence of E – HMS staff / Technical team department. In the sub-system, the service delivery time and the finished process quality are the two important monitoring items.

CONCLUSION

Medical equipment bears great value in Hospital Industry and are considered as an important component of health services. But their management is particularly weak in the Kailash hospital. The development in rule and regulations to organize the management of medical equipment has been appeared lagging behind on comparison with the rate of deployment of equipments. Along with traditional operation procedure, patient safety compliance, operation performance in cost / efficient analysis and risk associated with control are critical factors of discussion in hospitals [10 – 11]. A layout of medical equipment management system (MEMS) has been recommended in this paper for helping in-house E – HMS staff / Technical team department to manage existing more efficiently with reduction in potential risk.

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