

Need for Deployment of RFID Technology in Indian Hospitals

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Abstract - The Radio Frequency Identification is an automatic identification system. RFID uses RF to identify “Tagged” items. RFID Technology has been available for more than fifty years. However it has only been recently that the price of RFID have been fallen to the point that it can be used effectively and efficiently. RFID has seen increasing adoption rates in application that range from supply chain management, asset tracking, medical/health care applications, warehouses, people tracking and retail. Of this Health care industry is considered one of the most vital sectors in almost all countries. Despite importance of health care in societies, unfortunately, statistics reveal that the quality of services is far beyond the desired level. This article aims to analyze the existing condition in hospitals without RFID, the current benefits and barriers of implementing RFID, its application in various areas of health care and its effect on improving the quality of services provided for the patients, optimal use of facilities and equipments in healthcare centers, as well as reducing costs related to the inefficient use of available resources.

Keywords: RFID, Indian Hospitals, Present condition, Application, Benefits, Drawbacks.

1. Introduction

Radio Frequency Identification (RFID) Technology uses Radio- Frequency waves to identify people or objects. It is composed of three elements: a tag formed by a chip connected with an antenna, a reader that emits radio signals and receives in return answers from the tag and finally a middleware. RFID is automatic and fast and is replacing the barcode system. The big difference between RFID and Barcode is the line of sight technology. RFID has seen increasing adoption rates in application that range from supply chain management, asset tracking, medical/health care applications, warehouses, people tracking and retail. Of this Health care industry is considered one of the most vital sectors in almost all countries. Health care has been considered as one of the most important industries because it deals with people’s lives and well-being. Therefore having good management and quality in health care services is of utmost importance as any delay or flaw can put patients’ life at stake.

Life in India, with a population of 1.21 billion out of which 26.1% is below poverty line [1], lives with many challenges- high income disparity, lack of basic infrastructure and the incidence of diseases. As a result delivery of quality affordable healthcare is an enormous challenge. Improvements in the use of technology, equipments and drugs, delivery system of healthcare and proper , build a better and more collaborative environment between different departments, to bring down the healthcare cost and improve patient safety have been undertaken in order to improve the basic indicators of healthcare.

India’s GDP was \$2.1 trillion in 2014 [2]. Considering the fact of health expenditure in India, it has increased significantly over the years. Also, the government plans to increase it even further nearly by 2.55 of the GDP in the 21th five year plan. The amount of public fund that India invests in Healthcare is very small compared to the emerging economies. With 6% of GDP expenditure on Healthcare, India ranks among the bottom five countries with the lowest public health spending globally [3].

Krishna Giri (MD) Health Public Services, Accenture India said “ Our report identifies the importance of shifting from ‘infrastructure focus’ to ‘productivity focus’ to generate corresponding improvements in India’s healthcare access. This can only be achieved if larger fund allocation for healthcare is accompanied by effective and innovative interventions to improve the existing healthcare ecosystem in order to achieve global standards” [4].

Health Information Technology (HIT) are now being considered as a potential means to reduce hospital costs and improve clinical performance. The goal of this paper is to show the existing scenario of Indian hospitals and how RFID can contribute towards the development of hospitals by improving supply chain management effectiveness, increasing the ability to track and locate equipments, minimizing the errors, and enhancing patient safety.

2. Existing Scenario of Indian Hospitals without RFID Technology

In India only few of the hospitals are equipped with the modern technology i.e., the RFID Technology. Hospitals without RFID are confronted with many problems, whether it is assets related rates, increased expenses or improper patient outcomes.

Today the cost of material management has exceeded 45% of the hospital’s operating budget, with nearly 30-35% attributable to supply cost alone [5]. Recent activities shows that the significant portion of the cost associated with supply chains in the health care sector can be reduced by implementing effective supply chains. This can be done with the use of RFID.

The National Institute of Medicine estimates that 100,000 patients die each year due to medical errors, including mislabeled pharmaceuticals or blood types [6].

Indian healthcare establishments have pitiable operational strategies, absence of documented waste management and disposal policy, very poor budgetary support in the government run hospitals. Due to irregular monitoring of waste disposal and improper management of waste generated in healthcare facilities causes a direct health impact on the community, the health care workers and on the environment.

In HealthCare industry, there is no limit on the data collected; it ranges from the patients’ history and medication to hospital facilities, infrastructure, and the like. The nurses spend large amount of time updating information at the bedside of the patients, which is not very accurate as it is hand written. In many cases wrong information is fed about the patient resulting in incorrect identification of patients leading to improper dosage of medication to patients. It also involves large bundle of files containing record of the patients’ entry and discharge from the hospital.

3. Hospitals using RFID Technology

Apollo Hospital Chennai, India’s largest health-care facility, implemented an RTLS to reduce the time patients spend waiting and allow the hospital to care for more patients each day. The hospital serves a community of some 3.5 million people and typically sees 250 patients a day, who undergo a series of up to 26 diagnostic procedures as part of their annual health care. Often, patients used to go to the wrong departments, resulting in delays and bottlenecks. Now, when patients register at the hospital for services, they receive lanyards with Ekahau tags, each containing a unique ID number, linked to back-end software. Hospital managers can view a map showing where each patient is located in. This makes tracking of patients easy [7].

4. Potential benefits

Radio-frequency identification (RFID), a wireless system utilizing radio-frequency electromagnetic fields to obtain data for tracking and identifying items .RFID Technology can help resolve most of the challenges in following ways:

- With the use of RFID it becomes easy to track movable equipment, expensive medical devices and other high- value items both to provide ready access when needed and to reduce losses.
- It can help in the tracking of pharmaceuticals from the manufacture, distributor and pharmacy to the point of administering medication to the patient.
- RFID tags enable scanning of an item or device so that its contents, location, manufacture date, order numbers, and shipping data can be transmitted to the correct person for use within the company.
- It helps in ensuring the proper identification of laboratory specimens, including biopsy samples and containers of blood or urine to reduce medical errors,
- Proper waste management can be achieved by the usage of RFID. RFID tags being applied on each bin will help in proper collection of the waste as soon as bin gets filled.
- It helps in identification of caregivers in hospitals and other institutions to ensure the most efficient assignment in response to emergencies.
- In one of the major surveys in the U.S. on benefits of the RFID technology in healthcare, 70% cited the patient safety as the major factor to implement RFID. Using RFID active RFID wristband tags like the ones provided by Orizin, a patient can be easily tracked across hospital and their movement can be controlled to un-wanted places.[8]

Many Hospitals outside India are using RFID. Main Reasons for Adopting RFID is depicted in Figure1

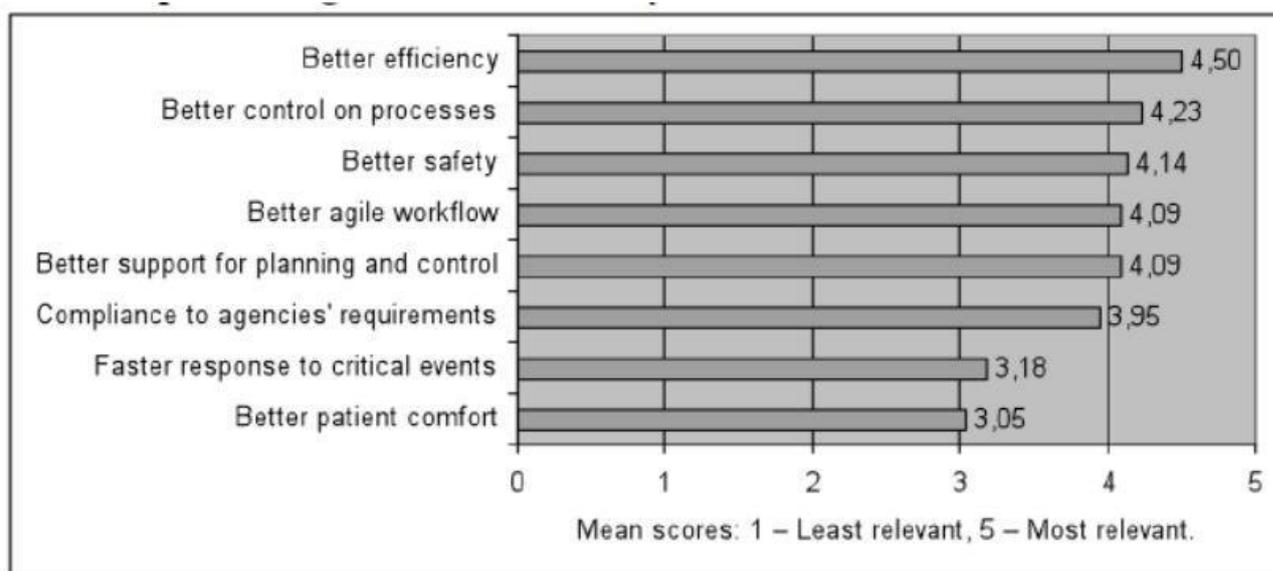


Figure 1 - Main Reasons of Adopting RFID (Mogre et al., 2009) [9].

5. Drawbacks

Compared to benefits received drawbacks are very less. This gives the green signal of using RFID Technology. However some of the drawbacks of using this Technology are:

- The RFID tags tend to fall off of the equipment to which they are attached. Employees often pick them up and put them in a pile instead of notifying the proper personnel.
- Each tag has a built in battery which dies periodically, but the entire tag must be replaced when the battery fails. This is done at the same charge of \$150 per tag [10].
- Use of RFID requires Ethernet and power connectivity and a hospital may need to upgrade the facilities

6. Conclusion

HealthCare is an important sector that can increase its efficiency by the use of RFID Technology. This paper highlights the area where RFID Tags can be used. It also emphasis on their potential benefits and challenges which are summarized in the table1 [11]

Healthcare Challenge/Need	Potential of HIS based on RFID
<p>Healthcare systems' becoming more secure.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Preventing medical errors. <input type="checkbox"/> Decreasing human intervention and related mistakes. <input type="checkbox"/> Improving patient safety. <input type="checkbox"/> Improving better service delivery. <input type="checkbox"/> Problem of time shortage. <input type="checkbox"/> Problem of lack of information. <input type="checkbox"/> Problem of inefficiency and waste. <input type="checkbox"/> Problem of poor management. <input type="checkbox"/> Problem of medical equipment theft. <input type="checkbox"/> Problem of patient misidentification. <input type="checkbox"/> Problem of drug counterfeited 	<p>Eliminate or decrease human intervention</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prevent human related mistakes <input type="checkbox"/> Eliminate patient misidentification problem <input type="checkbox"/> Solve problem of drug counterfeited <p>By having real-time and précised gathered information it has a potential to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Save time and overcome time shortage problem <input type="checkbox"/> Have integrated and comprehensive information <input type="checkbox"/> Improve management and efficiency <input type="checkbox"/> Decrease or eliminate waste and theft

Table 1 – Healthcare Challenges/Needs and Potential of HIS based on RFID

If we recall past years, barcodes were visible only on products like garments and that too mostly on imported ones. Today it is in the main stream and noticeable everywhere whether one buys a coke or gets a routine check-up at a hospital. We feel,

as we go along, RFID would be more ubiquitous than barcode as it makes lots of applications possible. We cannot track patient and assets in real-time using barcode but it's very much possible with active RFID technology.

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