1. Introduction

The healthcare industry is an integral part of the society. A well-equipped hospitals and personnel are required for the appropriate diagnosis, treatment and management of various types of ailments and diseases.

The healthcare industry is divided into several areas to meet the requirements of individuals and the population at large. Healthcare systems are complex and there are various aspects regarding the types of hospital systems, patients and procedures. The provision of healthcare is a team effort, where each team member is assigned a special role. Providing high-quality and affordable healthcare services is an increasingly difficult challenge.

The quality of service has become a key strategic variable in the organizational efforts to satisfy and retain the existing customers and also to attract new customers. However, the provision of services may not be possible at all times, resulting in customer dissatisfaction. In such cases, adequate remedial measures are required to regain the customers’ confidence .Dissatisfied customers may either continue with the existing healthcare providers or switch to others. Further, the customers who experience a service failure may complain to the healthcare service providers and render them an opportunity to rectify the problems.

However, if customers choose not to complain, then they may either continue or exit. In order to balance the need for a defect-free service and the inevitability of failures, the healthcare organizations must anticipate the likely areas of failures and be pro-active in the recovery process.

A Poka-Yoke device is a mechanism that either prevents mistakes or defects from occurring or makes them obvious. Poka-Yoke is a way to help people do things in the right way at the first instance. One cannot prevent all mistakes, but Poka-Yoke can make the job execution easier. Poka-Yoke is an old concept and has been used in the safety field for many years.

“Poka-Yoke” is a Japanese term meaning “Mistake-Proofing”. It is a highly effective quality control mechanism, which is based on the belief that committing mistakes is a part of being human. A Poka-Yoke device removes or reduces the human tendencies to make mistakes. It can enable a smooth execution of a process, reduce defect rates, decrease the execution time and improve the quality of life.

* 1. Although the term Poka-Yoke was initially applied in the manufacturing unit of Toyota Production System, various examples can be observed across all sectors and aspects of human lives. The advantage of a Poka-Yoke device is that it instills a better moral and improves the work atmosphere between employees and managers, achieved by removing the blame culture. Poka-Yoke distinguishes between defects and mistakes. A defect is an error in a process that continues through until it reaches the customer. A mistake, on the other hand, can be detected and corrected immediately. Poka-Yoke refers to a technique that eliminates the probabilities of mistakes. This technique can eliminate defects out of the processing of products and substantially improve the quality and reliability. Poka-Yoke can be implemented in electrical, mechanical, procedural, visual, human or any other activity or field wherein the chances of incorrect task execution exist. Concept of Poka-Yoke

Poka-yoke (poh-kah yoh-keh) was coined in Japan during the 1960s by Shigeo Shingo, who was one of the industrial engineers at Toyota. Shigeo Shingo is also credited with creating and formalizing a concept called Zero Quality Control, wherein Poka-Yoke techniques prevent the possible defects or correct the existing ones-by inspecting the source.

The term that was initially used was Baka-Yoke, which means ‘fool-proofing’. In 1963, a worker at Arakawa Body Company refused to use Baka-Yoke mechanisms, because of the term’s dishonorable and offensive connotation. Hence, the term was changed to Poka-Yoke, which means ‘mistake-proofing’ or more literally avoiding (Yokeru) inadvertent errors (Poka). Ideally, Poka-Yokes ensure that ideal conditions exist before the actual execution of a process step, preventing defects from occurring in the first place. However, in certain cases, Poka-Yokes detect and eliminate the defects as early as possible.

**Poka-Yoke can be used in different sectors by different means, such as:**

1. Identify the operation or process, on the basis of a Pareto principle.
2. Analyze the five whys and understand the ways a process can fail.
3. Decide the right Poka-Yoke approach, such as
   1. Using a shut-out type (preventing an error being made) or an attention type (highlighting that an error has been made).
4. A Poka-Yoke can be electrical, mechanical, procedural, visual, human or any other form that prevents the incorrect execution of a process step.Determine the
5. Contact - use of shape, size or other physical attributes.
6. Constant number - error triggered if a certain number of actions are not made.
7. Sequence Method- use of a checklist to ensure the completion of all tasks.
8. The method’s trial and ascertain its functioning.
9. Literature Survey
   1. Review of Literature and Significance of the Study

Most of the research works are on human resource management (HRM) and the HR policies and practices in public sector undertakings. Although a considerable thought is devoted by academicians and practitioners to HR and the related aspects, a few studies on behavioral aspects and areas of employees’ well-being have been conducted. The literature on Poka-Yoke implementation in hospital administration, especially in the service sector, is reviewed in the present section.

The literature is reviewed to build a theoretical framework to support the data collection and results. The review of literature helps in understanding the research areas that are already undertaken and throwing light on the areas that are yet to be covered. Keeping this in mind, an attempt has been made for a brief survey of the work undertaken in the field of services rendered to patients and the associated procedures. Many studies have highlighted the errors in the procedure, handling of customers and rendering of service quality.

* 1. Poka-Yoke in Different Sectors

1. Hotel Industry: Poka-Yoke is implemented in four stages of the hotel industry process: a) customers’ action, (b) employees’ onstage action, (c) contacts’ backstage action, and (d) backstage processes. In addition to the implementation, a service blue print is created, the process execution is briefly described, and the mistakes are prevented by Poka-yoke. It enablesa smooth workflow, beginning from the reservation of a room and endingwiththe check-out of a customer.
2. According to Ramdri, Pouya and Pejman Poka-Yoke helps to avoid in advertent errors in the construction industry, helps the workers to be error-free, and stops the flow of defective products to the next process. Construction defects are always the key concern for the construction industry. The organizational mindset is influenced by the implementation of Poka-Yoke, which enables a lot of changes that can help workers to work effectively and economically.
3. Brito,Cerqueira, Dornelez and Trabasso(2009) analyzed the implementation of Poka-Yoke in the assembly and development of a new product. New products must be designed from the manufacturing point of view. The procedure and the service failure must be analyzed to improve the system to avoid its reoccurrence. Poka-Yoke helps to synergize the method and improve the design process and final product quality. The error rate could be decreased through Poka-Yoke training.
4. Canossa analyzed that a serious implementation of Poka-Yoke can render the organizational outcomes to be effective, as it is simple, less expensive and easy to apply.
   1. Poka-Yoke in the Service Sector
5. Simmons highlighted that human errors are inevitable in the service sector. The researcher cited the example of medical tubing connectors and stated that misconnections can result in serious injury or death, if a proper procedure is not followed. Thus, the Poka-Yoke environment was created by the Association for the Advancement of Medical Instrumentation (AAMI) to enhance the safety measures. Poka-Yoke is an easy and simple procedure that helps prevent several organizational errors.
6. Kashmer reported that a change in system must enable the right execution of work and eliminate the occurrence of mistakes. Simple techniques like pop-up messages can be used for filling forms correctly through Poka-Yoke, which creates a user-friendly environment. The system must be reinvented as and when required by implementing the simple techniques.
7. Ahmad, Rashid, Wong and Iqbal (2017) analyzed that safety and healthy work environment are important aspects. Poka-Yoke is considered as one of the important concepts in the engineering level. The easy implementation of Poka-Yoke helps to reduce risks, resulting in an increase of productivity and an improvisation of the product quality. A number of Poka-Yoke practices have been introduced and applied in various industries to reduce the errors. Errors can happen in workplaces through various sources like human errors, infrastructural shortcomings, and technical snags. The implementation of Poka-Yoke reduces the chances of errors in the organization. The design of the Poka-Yoke tool can improve safety at the workplace and simplify the work process.
8. According to Shahin and Ghasemaghaei (2010),service quality is an important factor for satisfying, retaining and attracting the customers. Failure in service quality may result in customers refusing to accept services from the provider. They can either complain or give a chance to the service provider for improvisation. Poka-Yoke technique is used to reduce the service failure. It helps in the implementation of simple steps and can be used before the occurrence of service failure. It can prevent service failure and reduce the errors.
9. According to Foster (2001), Poka-Yoke is a fail-safe method designed such that specific errors cannot occur. Poka-Yoke is more meritorious in the service sector. The customer plays an important role in every field, whether in manufacturing sector or in service sector. Rendering error-free services and maintaining customer relationship for a long time is a big challenge. The perceived values about the process are required for identifying the errors and improving the quality of services. Customer perception and customer participation are required and it is important to render quality services.
10. Poksinka analyzed that healthcare is one of the major sectors where continuous improvement is required. The author states that customers play an important role and their interventions must be checked before and after their implementation. Healthcare employees must be educated and aware of the various work processes.
11. De Souza(2009) analyzed that the implementation of Poka-Yoke was mainly responsible for the increase in demand for healthcare services. Patients anticipated high-quality services and efficient healthcare facilities. Service quality is the most important organizational factor. The customers’ perspective must be considered to improve the existing service quality and set new standards in accordance with the customers’ expectations.
12. Rao analyzed that healthcare is being reformed globally, good healthcare always pays and poor healthcare costs. People are moving from fee-for-service to pay-for-performance. This culture is adopted by the developed nations. Their aim is to encourage healthcare providers and to provide better quality care by linking reimbursement to clinical and performance outcomes. This is applicable to any medical errors, adverse outcomes and excessive diagnostic and treatment costs. Under this pay for performance model, providers of healthcare systems are penalized if they cause adverse clinical errors and recommend unnecessary tests and procedures. Thus, through the implementation of Poka-Yoke and order sets, evidence-based healthcare is possible and organization scan be positioned for sustainable success in the society.
13. Miralles, Holt, Marin-Garcia and Canos-Daros (2011) reported that Poka-Yoke is implemented for physically disabled people for improving the work procedure. Some techniques are used to count and weigh and certain procedures like boards are used, which will be helpful. Poka-Yoke is one of the potential tools used in the universal design, which has helped employees.
14. Turley(2010) posited that Poka-Yoke plays an important role on the service providers and customers. The service provider must be keen about the tasks, the performance and the treatments, which must all be tangible so that the rendered services are effective. Such quality services increase the customers’ satisfaction. Service providers must interact with customers and update their service delivery systems as and when required. The entire process becomes effective through such endeavors.
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35. Objectives of the Study

The objectives of the present study are:

1. To identify the most commonly occurring errors in hospital administration systems with respect to OPD services, prescriptions, dispensing, medication and follow-ups.

Human errors are inevitable and they occur in hospitals during routine administrative activities like maintenance of files, fixing appointments, and communication between doctors and patients. Thus, the first objective is to identify the mistakes, followed by their reduction and elimination by implementing simple Poka-Yoke procedures. This objective can be achieved through primary data collected from the respondents.

2. To design a Poka-Yoke system for avoiding miscommunication between doctors and patients.

The relationship between doctors and patients is crucial and if there is a communication gap between them, then their relationship can get complicated. In order to avoid such a situation, the doctors must devote their time in conversing with patients and understanding their needs. Such efforts help them to build a good rapport with their patients, while respecting their dignity and privacy at all times. Miscommunication between doctors and patients can be reduced through written prescriptions.

3. To enable a smooth flow of patient follow-ups

Patient follow-up is important in healthcare systems and the hospital administration must plan check-ups with the appropriate date and time. Poke-Yoke software can be used to set appointments, remind patients through telephonic calls, and enable the doctors and the administrative staff members to prepare themselves accordingly.

1. Work Carried So Far

Continuous research is required for the proposed topic of the present study. The work carried so far includes:

1. Continuous work on literature survey
2. Revised research methodology
3. Scope of study
   1. Continuous Work on Literature Survey

The existing literature is surveyed and reviewed continuously through various online and offline sources like journals, articles and websites.

* 1. Research Methodology

The earlier studies on Poka-Yoke were mostly concentrated on the automobile industry, textile industry, assembly line, and electronic goods manufacturing. However, the present study on Poka-Yoke is focused on the service sector of hospital management and administration, as the need to explore the healthcare industry is felt by the researcher.

A hospital is a healthcare institution that treats patients with the help of specialized staff and equipment. The safety of patients is dependent on the doctors, nurses and hospital administration. Thus, it is necessary for the doctors and the staff members to be knowledgeable. Patients must provide the relevant information to enable the healthcare professionals to render appropriate care and advice.

In order to gain in-depth and detailed information on the implementation of Poka-Yoke in hospital administration, the required data for the study was collected from both primary as well as secondary sources. The gathered information helped to explore the dual aspects of customer satisfaction and process improvement in hospitals.

* + 1. Primary data

Primary data is the information collected for a specific purpose. Primary data is the collection of highly accurate information pertaining to a specific topic. The primary data can be collected through various instruments like interviews, surveys, and questionnaires.

The questionnaire method is proposed for the present study to gain an insight and knowledge to understand different factors that determine the implementation of Poka-Yoke. The primary data for the proposed study will be collected through questionnaires. The essential information will be collected from doctors, patients, and departmental heads.

* + 1. Secondary data

Secondary data refers to the information that is already collected. Secondary data is readily available when compared to the primary data. The secondary data can be collected from newspapers, journals, and articles published by research institutions and university libraries. Such publications can also be accessed online.

* + 1. Sampling design

Sampling design is the conceptual basis and the practical means through which the required data are collected such that the uniqueness of a population can be inferred with acceptable levels of error.

Survey is conducted by using a non-probability sampling technique, wherein convenience sampling method is implemented to select the respondents.

Convenience sampling method is used for the following reasons:

a. Respondents’ availability

b. Timely reachable

c. Rapid collection of information

* + 1. Selection of the sampling area

The present study covers a detailed examination on the “Implementation of Poka-Yoke in Hospital Administration at various Multi-Specialty Hospitals at Belagavi”.

* + 1. Testing of hypothesis

Hypothesis is an important part of research.

1. There is a positive correlation between the administrative procedure and the performance of employees in hospitals.
2. Most of the errors or lapses in hospital administration are due to the lack of knowledge in implementing the appropriate procedure.
3. Miscommunication can occur between doctor and patient due to lack of time.
4. Errors can occur due to the improper maintenance of patient details.
5. There can be a positive correlation between doctors and patients on the basis of belief and good rapport.
6. Errors can cause stress to patients.
   * 1. Non-parametric chi-square analysis

Chi-square test is a non-parametric test used to establish an association between two categorical variables. The frequency dumping in each cell of the cross-tabulation allows the identification of the association between two types of heterogeneous groups and also the nature of cases in that particular cell.

* + 1. Sample size

The size of the present study was 100 respondents from different multi-specialty hospitals in Belagavi.

* 1. Scope of the Study

The proposed study covers a detailed examination of the Implementation of Poka-Yoke in the Hospital Administration at multi-specialty hospitals in Belagavi. The study mainly focuses on the information about how employees struggle to understand the administrative procedure and how healthcare organizations help customers to improve the service rendered to them.

As of now, there are no studies that have focused on the implementation of Poka-Yoke in hospital administration in Belagavi. The present study will be conducted in various Multispecialty hospitals in Belagavi.

Therefore, it is presumed that the outcomes of the present research will be of a greater value for organizations, patients and the society at large. The present study would also help the hospital management to implement and strengthen the relationship between healthcare organizations and patients.

1. Expected Outcome

The expected outcome of the proposed study would be as follows:

1. There can be a reduction in errors.
2. There can bean increase in the quality of services rendered to patients.
3. The satisfaction levels of patients towards doctors and healthcare administration can be enhanced.
4. The brand image of doctors and hospitals can be upgraded.
5. The beliefs about new systems and procedures can be boosted.

7. Further Work

The following work needs to be completed for the topic proposed in the present study:

1. Preparation of Questionnaire
2. Data Collection
3. Pilot Testing
4. Final Questionnaire Survey
5. Analysis and Interpretation

8. Limitations of the Study

The study may have the following limitations:

1. The study is totally based on the information provided by the respondents, since the primary data is collected through questionnaires.
2. The techniques used to collect the information from different respondents are based on various parameters like gender, age and time.

Papers/ Publications out of the Research Work

1. “Application of Poka-Yoke Tool in Hospital Industry”.IOSR Journal of Business and Management (IOSR-JBM), e- ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 19, Issue 12. Ver.VI (December,2017),pp 29-31. www.iosrjournals.org
2. “Job Satisfaction in Hospital Employees : A Review of Literature”.International Journal of Engineering Technology Science and Research (IJETSR),ISSN 2394–3386. Volume 4, Issue 2 (February, 2017), pp 27-30.www.ijetsr.com

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