



Implementing Six Sigma Methodologies to Enhance Quality in Healthcare Sector

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Abstract. This article explores a study on enhancing the quality of healthcare services in both urban and rural areas. It focuses on effective and efficient management strategies to foster a positive internal climate within hospital administrations. The study also seeks to discover what additional features and services can be incorporated into the health centre to enhance its profitability, employing the tools of Six Sigma. Through the identification of inefficiencies and the resolution of performance barriers within the hospital industry, a comprehensive report was meticulously crafted. It also resolves any areas of discontent to assist management in achieving greater efficiency. From the data, conclusions were derived and recommendations were presented to the hospital management's administrative team in order to rectify service deficiencies. Elaborate recommendations were also put forth to enhance the operational efficiency of the hospital industry.

Keywords: Health care system, inefficiency, Six sigma, defects, hospital management

1 Introduction

The healthcare system faces challenges when the traditional hospital becomes an advanced hospital [1]. During this transformation the hospital faces challenges in terms of cost and quality [2]. Introducing quality and reducing waste has been an integral activity. Improving quality and eliminating waste has been linked to a technique called 5S. 5S has been one of the best methods available in the modern world to improve the efficiency of any industry, especially the healthcare system [3]. To provide a basis for a safe environment and to make the workplace a better workplace. 5S always expresses its effectiveness in case of performance improvement to attain continuous improvement with a greater achievement [4]. The healthcare industries all over the world like Sri Lanka, Tanzania and Senegal have also applied 5S technology to enhance the quality of the healthcare system [5]. The five S namely Sort, Set in order, Shine, Standardize and Sustain were systematically implemented in various sector in health care towards improvement of the quality [6-8].

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M. Rani Nimmagadda et al. (eds.), *Proceedings of the 3rd International Conference on Reinventing Business Practices, Start-ups and Sustainability (ICRBSS 2023)*, Advances in Economics, Business and Management Research 277,

https://doi.org/10.2991/978-94-6463-374-0_53

This paper provides suitable guidelines so as to study the healthcare system by integrating both 5S and DMAIC (Define, Measure, Analyze, Improve, and Control) towards enhancing the performance of the hospitals. Italian hospitals adopted six sigma and found that the length of the preoperative stay was reduced [9]. Sundar et al.[10] reported in their research about the improvement of the patients satisfaction when six sigma was adopted in the hospital. Now a days , it is highly required to give great attention over the patients health associated with their affordability. This cost cutting and sustainability can be achieved through the utilization of six sigma approach [11-13]. This paper focuses on the implementation of 5S and six sigma for the well being of health care industry and emphasis the importance of the application of quality tools in the hospitals both in the urban and rural areas.

2.0 Six Sigma DMAIC approach

DMAIC methodology was applied to study the functioning of hospitals and it is implemented through five stages.

2.1 Definition of the problem.

Six sigma identifies the important factors affecting the quality and suggestions can be made through the standard procedure for the improvement of quality in the health care system.

2.2 Measurement stage:

The measurement process was carried out based on the statistical report and they were discussed in the brainstorming session. The performance report was prepared based on the statistical report in various stages with valid reasons.

2.3 Analysis stage.

After the performance report about the problematic area and defective unit, analysis of the root causes were carried out through scientific tools like the cause and effect diagram shown in Fig.1.

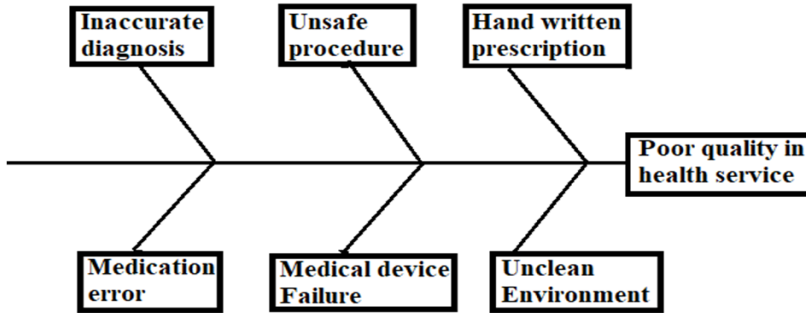


Fig.1. Cause and effect diagram

2.4 Improve stage

In order to improve the process scientific tools like 5Ys were used so as to uncover the root cause of the problem. They are shown in Table.1

Table 1. Why: Poor quality in hospital

	Why	Answer
Why#1	Why is poor quality in hospital	1.Unclean environment 2.Expired medicine 3.No standard procedure
Why#2	Why no preventive measures against the poor quality.	Not having enough standard procedure and lack of technique.
Why#3	Why is expired medicine supplied	Due to non-inspection of medicine
Why#4	Why new medicines mixed with old stock	During peak time medicines were purchased and stored in a storage place along with the old stock.
Why#5	Why the quality tools were not used	Unaware of the benefit of quality tools and not attending the training and hence faced the losses.

Source: Authors

Brainstorming sessions were conducted to understand the poor quality of the health care system. It was found that the medicines were procured from the unapproved places and it was stored with the old stocks. Also it was identified that unclean places carried airborne diseases resulting more health hazards. Through brainstorming sessions more solutions were provided like implementation of 5S technique and recommended for rigorous training to implement the 5S methodology for the stakeholders.

3.0 Improvement Phase

In the improvement phase, In order to rectify the root causes of the problem, the following ideas are recommended for the betterment of functioning of the hospitals both in urban and rural areas.·

- Establishment of reliable maintenance management software.
- Implementation of Optimization of Process of preventive maintenance.
- Establish a maintenance schedule in production planning.
- Procurement of modern tools and latest instruments
- Organize Training of personal towards quality (5S)
- To prepare the quality manual for the entire unit in the hospital.
- Creating awareness among the middle management, workers and checkers.

3.1 Control phase

In the control stage, different supervisory initiatives were to be assigned to all personnel's through quality steps. Top management commitment and compulsory training for stakeholders are very important in this stage. Comparisons of before and after implementing the quality process are to be recorded so as to verify the progress and profit using the six sigma process.

4.0 Results and Discussion

Challenges in the health care system are cost reduction and quality improvement. Quality of the service is essential as far as hospital management is concerned. The first and foremost important factor of achievement of quality is to remove the wastes in the hospitals. The 5S method was introduced to improve the working environment. By implementing the 5S the quality and productivity can be ensured in the health care system through the following ways.

4.1 Sort-(Seperation)

The following actions are to be carried out in SORT

- Identifying the equipment's and Medical Supplies and resources related to work in particular areas
- Removing the unnecessary stuff from the workplace.
- Conducting a big sorting day so as to engage all the stakeholders and identify the unwanted items which are then segregated for disposal. They are mainly segregated with concepts such as reduce, reuse and recycle. Lessons learnt from this activity are recorded and discussed for further improvement.

4.2 Set in Order

Set in order is orderly arrangement of everything. The main goal is to keep everything in its place neatly and arrange the workplace for the maximum productivity with efficient usage. Selecting the areas by break down in to small sections with a clear

label citing the purpose of usage. This activity should be extended for other sections of area. As far as possible, need to use the visualized intimation about the purpose of the uses.

4.3 Shine

All the areas must be cleaned and for this activity all the stakeholders irrespective of position and places are to be participated. In order to maintain the cleanliness in all areas, all the employees in hospital need to involve in mass cleaning activities and they have to make it as habit .All the medical equipment's and environments should be clean and neat. Warning signs be kept showing severe action against the activities of ugliness. Hospital waste management system be created for the regular follow up action.

4.4 Standardise

Standard activities must be developed for the first three S (SORT, SET IN ORDER, and SHINE) and it must be brought to the notice of all the stakeholders. Hospital management need to make 3S as culture and mission and vision be created accordingly.

4.4 Sustain

A high level of self-discipline is required to sustain the above all 4S and a change in mind-set of the workers in hospital is required towards self-discipline. Different orientation programmes be conducted towards achieving the quality through different scientific tools like six sigma, 5S etc. A culture of continuous improvement needs to be created to maintain the quality. Six Sigma DMAIC methodologies and 5S were used in this study to enhance the efficiency and betterment of the working environment. Standard set of procedures have been laid out in view of the health care system in a systematic manner.

5.0 Conclusion:

It is very important to improve the quality of the health care system as it involves the life of innocent people. This paper describes the importance of team work and proper engagement among employees from all levels. The methodology suggested gives them a sense of ownership and empower them simultaneously efficiency improved. Wasteful activities are minimized and unwanted items are removed from the workstations and only necessary items are placed at the required place. Through visualization, work is completed with simplicity. By removing the waste, expired medicines can be removed and hence no danger to the human beings. Cost cut can be carried out by using both six sigma and 5S. Also difficult terminologies and concepts were not required for the effective implementation of the quality tools. However rigorous training is required for the clear understanding of the quality policy to achieve excellence in the functioning of the hospital. It has to incorporate all the resources and services in the

most effective manner and be sustained until continuous improvement is inculcated in the workforce. The following items are to eliminate wastes and improve the quality of product after and 5S in the Healthcare industry.

- To establish well planned storage places for storing the medicines and remove all the expired medicines.
- To initiate the quality training for the stakeholders at all levels.
- To implement 5s methodology in the healthcare industry in order to reduce the wastes and change the environment towards a better utility area with cleanliness.

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