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# Quality Management in Health Care System in Bangladesh

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**Keywords:** survey, system analysis, redesign, talent management, 5S.

## I. INTRODUCTION

A healthcare system referred that it is the organization of people, institutions, and resources that deliver healthcare services to meet the health needs of target population. A good healthcare system will be able to provide a good healthcare policy for the people as well as for the country. Health care is rich in evidence-based innovations, yet even when such innovations are implemented successfully in one location, they often disseminate slowly—if at all. Diffusion of innovations is a major challenge in all industries including health care. But it is true that the healthcare system in Bangladesh is poor enough than the healthcare system in the developed country. The delivery of safe and high-quality health care has become a crisis in this country in terms of personal loss due to preventable errors, as well as economic loss. Therefore in this research, the aim is to find out the problems exists in the healthcare system in Bangladesh and then by analysis these problems a better strategic solution or recommendation has been provided. The ultimate goal

is to best approach to reduce waste, as well as reducing wait times and unnecessary travel, while building quality, speed, and flexibility in the healthcare organization. A natural impulse to address these challenges is to introduce technology to mitigate risks due to human error and communication. For survey purpose, various regional areas are selected for examining the existing healthcare services and also collected some additional data from other regions in this regard. As a number of healthcare organizations have been surveyed, the collected data are so much complicated and it is difficult to find out the exact defective portion of the existing healthcare system. For this purpose, some set of questioners are used which are based on patient satisfaction and the employee satisfaction. From this survey some problems related with the healthcare system are extracted and possible solution techniques are proposed in this regard.

## II. LITERATURE REVIEW

Healthcare management is a growing profession with increasing opportunities in both direct care and non-direct care settings. As defined by Bookbinder and Thompson (2010, pp. 33-34), direct care settings are “those organizations that provide care directly to a patient resident or client who seeks services from the organization”. Non-direct care settings are not directly involved in providing care to persons needing health services but rather support the care of individuals through products and services made available to direct care settings [1-2].

In 2005, the National Academy of Engineering (NAE) and the Institute of Medicine (IOM) 2 highlighted the need for a systems approach to the health care system and the application of systems engineering tools to improve health care [3]. In 2003, the Institute of Medicine’s (IOM) report “Crossing the Quality Chasm” recommended the use of systems and industrial engineering techniques to systematically examine and redesign clinical processes. A subsequent National Academy of Engineering report made the same recommendations. Lean is a QI methodology based on systems and industrial engineering techniques. Lean techniques have been empirically documented as highly effective for systems redesign within manufacturing environments. Moreover, ample evidence suggests that appropriately developed and optimized Lean techniques are effective within health care settings [1]. Since 2004,

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faculty from the Purdue University College of Technology, Indiana University-Purdue University Indianapolis (IUPUI)'s School of Engineering and Technology, Purdue University-Calumet College of Technology, the Regenstrief Center for Healthcare Engineering (RCHE), and the Indiana University Center for Health Services and Outcomes Research at the Regenstrief Institute, Inc. have partnered with several Indiana hospitals and hospital systems to create Lean and Six Sigma® health care programs[1]. In 1994 Quality in Australian Health Care Study (QAHCS) was commissioned by the Commonwealth Department of Human Services and Health to determine the proportion of admissions associated with an AE in Australian hospitals [4]. Modern management in the company is not only the quality management system based on the ISO series 9000:2000 standards, but pursuit to the continuous improvement, so this is the philosophy of the Total Quality Management [5]. In the frames of implementation of the Total Quality Management on the operating level more and more popular becomes the idea of so called 5S. The 5S method begins each program of improvement. It is the tool for helping the analysis of processes running on the workplace. The 5S is the methodology of creation and maintaining well organized, clean, high effective and high quality workplace. Its result is the effective organization of the workplace, reduction of work's environment, elimination of losses connected with failures and breaks, improvement of the quality and safety of work [6-8]. Lean Manufacturing is the hymn of survival and success of any organization through minimizing the wastage of resources and moving towards implementation of lean manufacturing has become one of the key strategies to achieve cost cutting. The goal of lean manufacturing is to minimize all types of waste or non-value added activity through incorporating less human effort, less inventory, less time to develop product and less space to become highly responsive to customer demand, while at the same time producing good quality products in the most efficient and economical manner. 5S is Lean manufacturing tool for cleaning, sorting, organizing and providing necessary ground work for work place improvement. 5S is already selected using Analytic Hierarchy Process (AHP), a Multi Criteria Decision Making (MCDM) tool by considering different criteria for case company. AHP is a problem solving framework based on the innate human ability to make sound judgment about small problem. It is a quantitative technique use to facilitate decision that involves multiple competing criteria [9].

### III. METHODOLOGY

#### a) Investigation of voice of patients and personnel

This research work was based on two public and two private hospitals. Total 80 patients and 20

personnel have been contributed dividing 20 patients and 5 personnel for each hospital. A survey questionnaire has been created based on the issue of patient satisfaction and employee satisfaction. The questionnaire for the patient also divided into three categories focused on treatment, doctor /nurse and employee. The questionnaire for the personnel is all about management related. From this investigation, a lot of problems have been generated but it is too difficult to solve all of them in Bangladesh at this moment rather than finding the major problems to solve.

#### b) Detecting root cause through the problem screening table

As the problems are too many to describe, a screening process has been done for finding the most significant problems and evaluating their importance based on patient problems and employee problems.

#### c) Arrangement of major problems on the basis of industrial engineering tool

For any types of industry i.e. healthcare, manufacturing etc., 5M philosophy (manpower, management, machine, material, and measurement) is well known trend for improving productivity and service. After detecting most significant problems, the significant problems have been classified into manpower and management through the relationship diagram.

#### d) Building up technique for reducing manpower problems

In the process approaching, a tool has been selected for controlling manpower related problems and then Talent selection and Management has become a key to solution in this regard. This method does not encourage recruiting new personnel but it emphasizes on the training system on existing manpower.

#### e) A case study for management problems based on 5S philosophy

In this case study, the most adaptable quality tool 5S has been implemented in respect of health care industries of Bangladesh. 5S is used to calculate the overall efficiency for different hospitals. The problem parameter has been set up based on the survey report for both patient satisfaction and employee satisfaction. The main reason of this case study is to anticipate the management situation and setting a target goal to improve efficiency of the management based on the result. Here a message has been indicated that continuous improvement can be ensured by maintaining 5S on these hospitals if these organizations are agreed to maintain effectively.

#### IV. SURVEY ANALYSIS AND DATA INTERPRETATION

##### a) Problem screening matrix

Based on survey analysis, problem screening matrixes have been constructed by following criteria: A relative score of “better than” (+), “same as”(0), or “worse than”(-) is placed in each cell of the matrix to represent how each problem rates in comparison to the

reference problem relative the particular criterion. It is generally advisable to rate every problem on one criterion before moving to the next criteria. However with a large number of problems, it is faster to use the opposite-to rate each problem completely before moving on to next problem. Problem screening matrix for Patient problems and employee problems are shown in Table 1. and 2 respectively.

Table 1: Problem screening matrix for Patient problems

Selection Criteria	Problems						
	A Appointment	B Doctor availability & skill	C Diagnosis & Checkup	D Emergency	E Percentage of Cure	F Financial condition	G Overall Satisfaction
Ease to communicate	+	+	+	+	0	0	+
Ease of comfort	+	+	+	+	-	0	+
Easy to render	+	+	+	+	+	-	+
Ease of safety	-	+	+	+	-	0	+
Ease of maintain	+	+	+	+	-	+	-
Sum '+'s	4	5	5	5	1	1	4
Sum '0's	0	0	0	0	1	3	0
Sum '-'s	1	0	0	0	3	1	1
Net score	3	5	5	5	-2	0	3
Rank	2	1	1	1	4	3	2
Continue?	Combine	YES	YES	YES	No	Combine	Combine

Table 2: Problem screening matrix for Employee problems

Selection Criteria	Problems						
	A Initial training	B Operation planning	C Team working & Leadership	D Up to date communication	E Quality of service	F Economic support	G Knowledge of Technology
Ease to communicate	+	+	+	+	0	0	+
Ease of comfort	+	+	+	+	-	0	+
Easy to render	+	+	+	+	+	-	+
Ease of safety	-	+	+	+	-	0	+
Ease of maintain	+	+	+	+	-	+	-
Sum '+'s	4	5	5	5	1	1	4
Sum '0's	0	0	0	0	1	3	0
Sum '-'s	1	0	0	0	3	1	1
Net score	3	5	5	5	-2	0	3
Rank	2	1	1	1	4	3	2
Continue?	Combine	YES	YES	YES	No	Combine	Combine

b) *Constructing Typical Relationship diagram*

Based on the problem screening matrix six major problems have been identified as high ranked which indicate these problems should be highly focused to improve for better output in the health care system. Moreover, based on the extensive research two critical

points are emerged due to system malfunctioning and should be improved by further tools so that overall problems can be resolved or minimized. Relationship diagram for manpower and management are shown in figure 1 and 2 respectively.

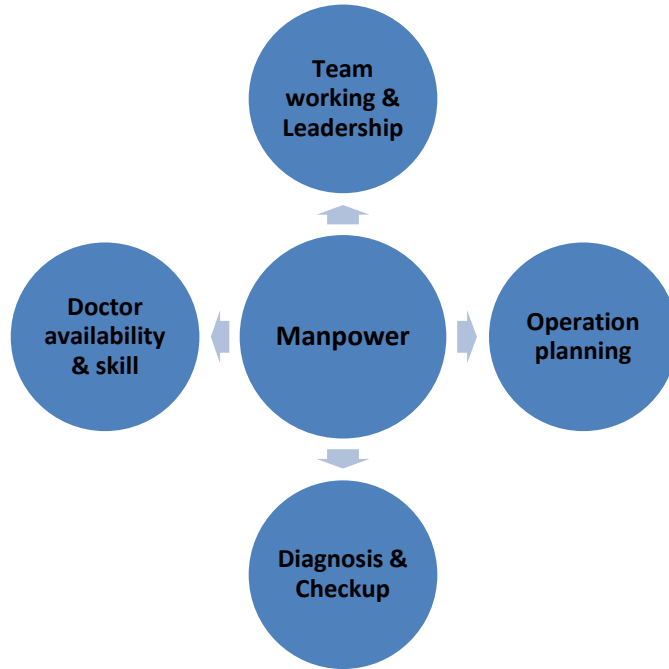


Fig. 1: Relationship diagram for manpower



Fig. 2: Relationship diagram for management



- c) Several recent techniques redesigning manpower allocation:
- i. PDSA, which was in current use by the workforce, would continue to be used because the workforce

had extensive experience and familiarity with this approach.

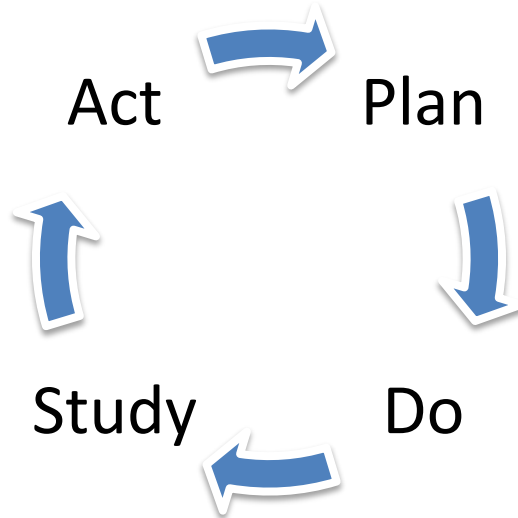


Fig. 3: PDSA continuous cycle

- ii. *Lean* was chosen as the principal tool set for process redesign as it appeared to best address the major issues observed in the current processes. Its focus on waste afforded on the healthcare industries as the most opportunity to reduce expenses—a step that was clearly necessary in order to survive in face of growing numbers of uninsured and decreasing revenues. Its focus on value from the customer perspective fit the customer service need. It also fit the organization in that it appeared to require a great deal of presence on the "floor" with observation, substantial intuitiveness, rapid-cycle improvement, and broad-based employee involvement and empowerment.

The challenges faced in the process of implementing and sustain lean is a tedious job as the concept relates to time, cost, interest, and involvement, the concepts that together support the new change for development in an firm [10].

- iii. *Talent selection and Management* was selected as a valuable asset in matching employees with roles. This is particularly significant in health care, an industry that is experiencing shortages and high turnover rates in some health care professions. This method does not encourage recruiting new personnel but it emphasizes the training system on existing manpower. It helps to improve the quality of the existing manpower of healthcare system.

- d) *Proposed technique in the recent perspective of Bangladesh*

In Bangladesh, all the techniques described earlier can be implemented. But by doing extensive research, the proposed applicable technique for

Bangladesh is Talent selection and Management. It is deeply emphasized because of no addition of manpower in the system rather than increase their performance by following guidelines.

Any healthcare organization looking to jump-start a talent initiative should keep a few things front of mind:

*Building with an eye toward integration-* E-learning may be a natural starting point for healthcare organizations implementing new talent initiatives, but onboarding, performance management and succession initiatives all benefit from strong tie-ins to a Learning Management System (LMS). For example, performance assessments can automatically generate development plans where deficiencies are identified. It should not be overlooked targeted & formal development programs for employee supervisors. Extra training will prepare them to mentor and coach employees and maximize the value of your investment.

*Automation of job descriptions with a foundation of competencies-* Establishing the competencies – the knowledge, skills and behaviors that are used to develop people in your healthcare organization – is a critical step for success of any talent management initiative. In the healthcare setting, it's a requirement because compliance demands it. Maintaining one set of job descriptions and competencies is one way to integrate multiple locations common in large healthcare systems into a single culture and to build job profiles that will guide career development, training and performance improvement across your organization.

*Building internal talent pools-* Every healthcare organization needs to fill positions in critical roles such



as nursing, IT and senior management. Yet, suitable candidates are hard to find. Most healthcare employers understand that the only solution is to “grow their own” talent. Implementing appropriate talent management and learning tools and processes makes identification of high-potential employees and development of critical skills far easier to accomplish.

*Collaboration to build a comprehensive succession strategy*– Majority of healthcare organizations have a

critical need to develop their next generation of leadership. The current senior leaders must understand the critical need to address this gap. HR can – and must – play a crucial role in facilitating this conversation, and technology can provide a key assist to identify the gaps and assign development plans for designated successors [11]

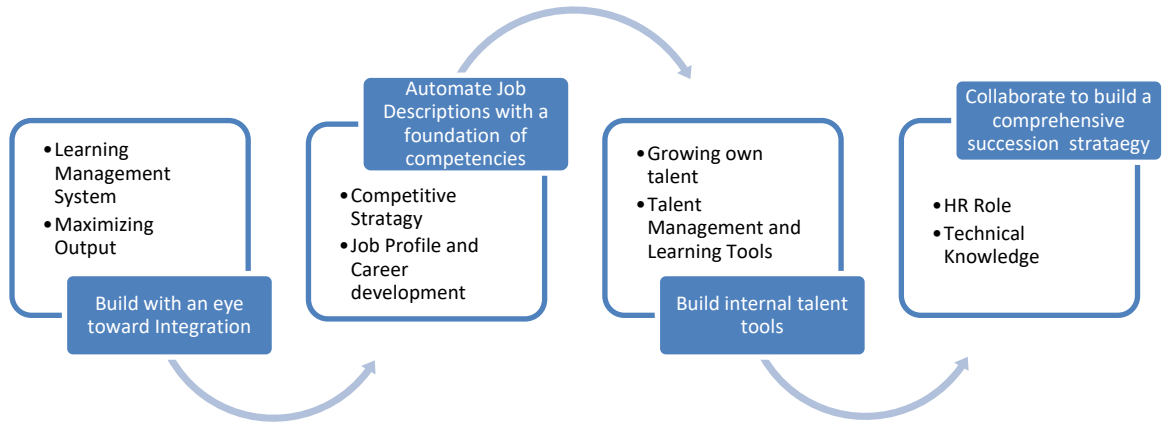


Fig. 4: A systematic approaches on Talent Management

e) *Performance measurement through 5S quality tool*  
 S1 Seiri (Sort)

Seiri is the first S in 5S system, which is basically deal with the available facilities and process of Healthcare organization management. For calculation of Seiri rating, 5 criterion regions have been chosen for seiri arrangement, and decided that the sub system should be achieved rating (Based on voice of patients) out of 5. The shorting initiative data is shown in Table 3. Following are the Seiri rating criterion.

- 1) Emergency Readiness: Giving 1 mark if emergency treatment facility is fully available or giving 0 marks if emergency treatment facility is not fully available.
- 2) Diagnostic Readiness: Giving 1 mark if diagnostic resources are fully available or giving 0 marks if diagnostic resources are not fully available.
- 3) Dispensary Inventory: Each of the observation is shown the ratings for dispensary inventory based on patient satisfaction survey report where X is the

amount of participation (Total 20 patients) for each healthcare organization and Y is the amount of dissatisfied patients. The fraction of consistency for dispensary inventory is  $[1-\{Y/X\}]$ .

- 4) Waste Disposal: Each of the observation is shown the ratings for waste disposal based on patient satisfaction survey report where N is the amount of participation (Total 20 patients) for each healthcare organization and M is the amount of dissatisfied patients. The fraction of consistency for waste disposal is  $[1-\{M/N\}]$ .
- 5) Relative Information: Each of the observation is shown the ratings for relative Information based on patient satisfaction survey report where A is the amount of participation (Total 20 patients) for each healthcare organization and B is the amount of dissatisfied patients. The fraction of consistency for relative information is  $[1-\{B/A\}]$

Table 3: Sorting Initiative

Hospital	Emergency Readiness	Diagnostic Readiness	Dispensary Inventory	Waste Disposal	Relative Information	Total Rating
	0 or 1	0 or 1	$[1-\{Y/X\}]$	$[1-\{M/N\}]$	$[1-\{B/A\}]$	
Observation 1	1	1	0.65	0.40	0.70	3.75
Observation 2	1	1	0.55	0.30	0.55	3.4
Observation 3	1	1	0.70	0.55	0.75	4.00
Observation 4	1	1	0.75	0.55	0.65	3.95

**S2 Seiton (straighten / set in order)**

Seiton is second S of 5S system which deals with the proper arrangement of equipment and availability of service for each sections in the particular organization. The main objectives of Seiton are forming a regular workplace, avoiding time loss while servicing or delivering the treatment or medic. Set in order Initiative data is shown in Table 4. Following are the Seiton rating criterion:

- 1) Doctor's Availability: Giving 1 mark if the facility is fully available or giving 0marks if the facility is not fully available.
- 2) Personnel Availability: Giving 1 mark if the facility is fully available or giving 0 marks if the facility is not fully available.
- 3) Efficient Accommodation: Each of the observation is shown the ratings for efficient accommodation based on patient satisfaction survey report where C is the amount of participation (Total 20 patients) for

each healthcare organization and D is the amount of dissatisfied patients. The fraction of consistency for efficient accommodation is  $[1-\{D/C\}]$

- 4) Treatment Evaluation Process: Each of the observation is shown the ratings for treatment evaluation process based on patient satisfaction survey report where Q is the amount of participation (Total 20 patients) for each healthcare organization and P is the amount of dissatisfied patients. The fraction of consistency for treatment evaluation processes  $[1-\{P/Q\}]$
- 5) Supporting Facilities (food, electricity, transportation documentation etc.): Each of the observation is shown the ratings supporting facilities based on patient satisfaction survey report where V is the amount of participation (Total 20 patients) for each healthcare organization and U is the amount of dissatisfied patients. The fraction of consistency for supporting facilities is  $[1-\{U/V\}]$

Table 4: Set in order Initiative

Hospital	Doctor's Availability	Personnel Availability	Efficient Accommodation	Treatment Evaluation Process	Supporting Facilities (food, electricity, transportation documentation etc.)	Total Rating
	0 or 1	0 or 1	$[1-\{D/C\}]$	$[1-\{P/Q\}]$	$[1-\{U/V\}]$	
Observation 1	1	1	0.10	0.55	0.15	2.8
Observation 2	1	1	0.10	0.50	0.10	2.7
Observation 3	1	1	0.70	0.65	0.75	4.1
Observation 4	1	1	0.65	0.70	0.65	4.0

**S3 Seiso (Shine / Clean)**

In order to realize effective tasks, it is essential to create a clean and regular working and living environment. This is because dust, dirt and wastes are the source of untidiness, indiscipline, inefficiency, faulty service in workplace. Shine Initiative is shown in Table 5. It is the process of renovation which contains the following criteria:

- 1) Servicing Environment: Each of the observation is shown the ratings for servicing environment based on patient satisfaction survey report where J is the amount of participation (Total 20 patients) for each healthcare organization and I is the amount of dissatisfied patients. The fraction of consistency for servicing environment is  $[1-\{I/J\}]$ .
- 2) Equipment Cleanliness & Sterilization: Each of the observation is shown the ratings for this facility based on patient satisfaction survey report where E is the amount of participation (Total 20 patients) for each healthcare organization and F is the amount of dissatisfied patients. The fraction of consistency for this facility is  $[1-\{F/E\}]$ .
- 3) Hygienic Environment: Hygienic environment include the ergonomics and healthful or clinically

soundness of the total servicing environment like up to date technologies, innovative pathology research (Radiotherapy, Engiocardiogram, X-ray etc. ), adaptive ICU and so on make the healthcare organization continuously fresh and ready and making no errors during operation. Let K will be total aspect (Total 20 patients) for favorable condition derived from patient's opinion and K be the no. of dissatisfied patients. Fraction of environment:  $[1-\{L/K\}]$ .

- 4) Safety Rating: Each of the observation is shown the ratings for this facility based on patient satisfaction survey report where H is the amount of participation (Total 20 patients) for each healthcare organization and G is the amount of dissatisfied patients. The fraction of consistency for this facility is  $[1-\{G/H\}]$ .
- 5) Overall Cleaning Consistency: Each of the observation is shown the ratings for this facility based on patient satisfaction survey report where S is the amount of participation (Total 20 patients) for each healthcare organization and R is the amount of dissatisfied patients. The fraction of consistency for this facility is  $[1-\{R/S\}]$ .



Table 5: Shine Initiative

Hospital	Servicing Environment	Equipment Cleanliness & Sterile	Hygienic Environment	Safety Rating	Overall Cleaning Consistency	Total Rating
	[1- $\{I/J\}$ ]	[1- $\{F/E\}$ ]	[1- $\{L/K\}$ ]	[1- $\{G/H\}$ ]	[1- $\{R/S\}$ ]	
Observation 1	0.30	0.60	0.40	0.50	0.3	2.1
Observation 2	0.40	0.40	0.35	0.35	0.4	1.9
Observation 3	0.70	0.70	0.60	0.65	0.65	3.3
Observation 4	0.65	0.80	0.70	0.75	0.70	3.6

S4 Seiketsu (Standardize)

Seiketsu is generally means for make a peak standard which should be achieved by the normal healthcare management process practice. Standard should be communicative and easy to understand.

Seiketsu rating will be found by calculating the average of previous three S, because standard of any system will rise and fall by mean rate depending factors. Standardize/Systematize Initiative data is shown in Table 6.

$$SeiketsuStandarizerating = (Sierirating + Seiatonrating + Seisorating) / 3$$

Table 6: Standardize/Systematize Initiative

Hospital	Sorting S1	Set In Order S2	Shine S3	Total Rating = (S1+S2+S3) /3
Observation 1	3.75	2.8	2.1	2.88
Observation 2	3.4	2.7	1.9	2.67
Observation 3	4.00	4.1	3.3	3.8
Observation 4	3.95	4.0	3.6	3.85

S5 Shitsuke (Sustain)

Shitsuke (Sustain) is the last S of the 5S system which is deal with the regularity of maintaining the standard of the organization for the particular process, which is only done by regular practices and by following the proper instruction of system operating. By doing regular following of accurate of instruction it can be maintained the working condition at its peak level, which may help for better service and stay away from breakdown.

- 3) Providing the performance of protective activities.
- 4) Granting the responsibility of the treatment of service to the patient
- 5) Formation of a disciplined environment.

Shitsuke rating will be depending on the previous four S because without that the regularity will not maintain. Therefore Shitsuke rate will be the average of previous four S ratings. Sustain initiative data is shown in Table 7.

- 1) Removing small faults through the aid of cleaning.
- 2) Providing the execution of visual control.

Table 7: Sustain Initiative data

Hospital	(S1+S2+S3+S4)/4
Observation 1	2.88
Observation 2	2.67
Observation 3	3.8
Observation 4	3.85

After the calculation of this rating of 5S, the efficiency has been calculated for every observation and this evaluation simplifies the service & quality differences between public and private healthcare organizations. Also a graphical representation has been made which will represent the real condition of the system and can find the improvement required region. The calculated efficiency is shown in Table 8 and figure 5.

Table 8: The efficiency calculation table

Hospital	$(S1+S2+S3+S4)*100 / 25$	Efficiency
Observation 1	$(3.75+2.8+2.1+2.88+2.88)*100/25$	57.64%
Observation 2	$(3.4+2.7+1.9+2.67+2.67) *100/25$	53.36%
Observation 3	$(4.0+4.1+3.3+3.8+3.8) *100/25$	76%
Observation 4	$(3.95+4.0+3.6+3.85+3.85) *100/25$	77%

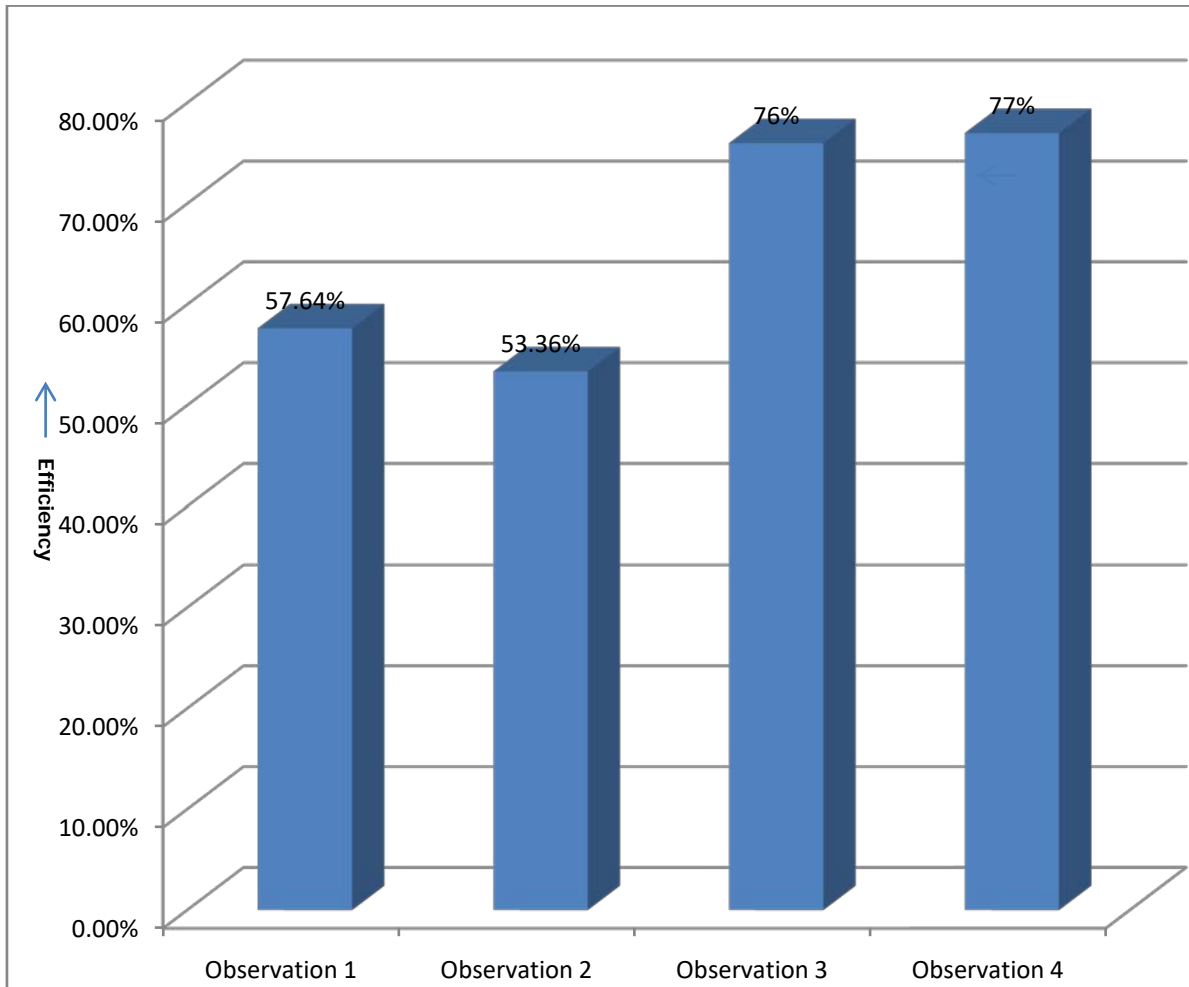


Fig. 5: Graphical representation of comparative performance efficiency

## V. FINAL ANALYSIS AND DISCUSSION

This research work deals with problem analysis and modification of design for maximizing output of healthcare system in Bangladesh. A perfect survey report is a must to go through the process of our study. The whole process is all about patient satisfaction & employee satisfaction and the total questionnaire has been created based on improving manpower and management. Patients are randomly chosen for the survey and their opinions haven't been modified. Again, the continuously repeated claims of patient's opinions are prioritized for classifying, comparing and selecting the significant problems for further assessment. In

addition to it, more issues for analysis can be changed for different countries. For solving a problem or redesigning an existence system, the authority has to be concerned about economic feasibility and resource scarcity in a developing country like Bangladesh. In that case, A complete illustration of Talent selection and Management & 5S Philosophy have been sketched here for implementing it properly in manpower and management system respectively. In the observation, the estimated efficiency for private hospitals is 76% & 77% and for public hospitals the efficiency results are 57.64% and 53.46%. The differences were already predicted as per survey analysis & performance ratings. From the survey, it seems that a hospital should

maintain a minimum 80% efficiency or a rating 4 out of 5 for a sound and good healthcare system. For research perspective, total 80 patients & 20 personnel may not sufficient to measure the overall rating accurately. Implementing 5S in healthcare industries in Bangladesh is really tough job as the personnel cannot maintain perfect rules & regulation and they always intend to do work easily. To establish 5S in a company, it is crying need to create awareness in the personnel about 5S and train them to habituate with 5S implementation. Lastly, proper implementation of talent management and 5S philosophy can make a new era or revolution in the healthcare management system for competitive improvement.

## VI. CONCLUSIONS

A survey work sometimes represents data redundancy and improper answers as all the patients and personnel were not communicative and failed to understand the particular question's importance. However, this research work has been accomplished by screening patient's opinions and their notions. Moreover, competitive benchmarking and strategic view of modern hospital were critically examined to build up the proposed system in the research work. The process is completely compatible and applicable for the existing healthcare management system in Bangladesh. After the 5S rating, the estimated efficiency for private hospitals is 76% & 77% and for public hospitals the efficiency results are 57.64% and 53.46% is found. This research work is a primary solution for improving quality and reliability of healthcare service. As healthcare service sector is very wide so it is need to be improve the entire department which are related with the healthcare sector. The improvement of the healthcare service sector is a continuous process. The future attempt is to concern more strategically with this associated sector and try to find out more strategic solution for these problems.

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