**Original Article**

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# ANALYSIS OF KEY PERFORMANCE INDICATORS AND QUALITY OBJECTIVES OF A TERTIARY CARDIAC CENTER

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## ABSTRACT

***Objective:*** To analyze the contribution of departments of a tertiary cardiac center before and after the training intervention and to assess the impact of key performance indicators and quality objectives on the quality improvement drive.

***Study Design:*** Retrospective study.

***Place and Duration of Study:*** This study was conducted at AFIC / NIHD Rawalpindi from Jan 2013 to Dec 2014.

***Methods:*** Data was collected from twelve clinical and support departments of AFIC&NIHD, Pakistan after conducting series of knowledge / training sessions on formation of Quality objectives and Key performance indicators. Parameters for the years 2013 & 2014 were entered in Microsoft Excel 2010 and data was analyzed through descriptive statistics.

***Results:*** The results revealed that nine out of nineteen (47%), selected departments responded with KPIs after one month whereas eight depts. (42%) made quality objectives and twelve depts. (63%) presented quality metrics for the year 2014. This practice contributed effectively towards quality improvement drive as last year there were no KPIs (0%), four quality objectives (21%) and only eight (42%) depts. provided quality metrics for the year 2013.

***Conclusion:*** The study concluded that involvement of departments in quality activities and collection of useful quality data contributes towards quality improvement drive. KPIs help in benchmarking processes and improving the clinical and administrative performance. Quality objectives aligned with KPIs provide thrust to improve quality over a longer period. The KPIs, quality objective and quality metrics are important ingredients in the quality improvement drive which lead to successful implementation of quality management system.

**Keywords:** Key performance indicator, Organizational goal, Performance, Quality objective.

## INTRODUCTION

Use of reliable indicators of quality is one of the main components of total quality management (TQM) in healthcare in addition to process-oriented involvement of healthcare workers and leadership commitment[1]. Process, outcome and structure related indicators are used in healthcare for performance measurement. Structural KPIs are inclusive of various constituents of a healthcare service like healthcare worker competencies and hospital facilities. They measure quality indirectly and are not directly related to outcomes in patient care[2]. Process oriented KPIs are direct measures of patient care provided inclusive of the practice of evidence based practices and compliance with medical protocols[3]. Key performance indicators are tools that should be specific, quantifiable, process oriented, pertinent and timely[4]. Evaluating performance can allow hospital management to recognize areas for improvement. Dashboard metrics are a means for evaluation of healthcare servicesboth in the clinical and administrative domains. Key performance indicators (KPIs) are the main tools used for this purpose[5].

Key performance indicators in healthcare form the basic premise of Quality improvement based on a continuous study and improvement of processes, systems, and organization as a whole[6].

Outcome based KPIs determine the consequences of clinical interventions and their impact on patients' health in terms of their effectiveness[7]. Clinical outcome based KPIs require standardized definitions and risk adjustment[8,9].

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Performance management in healthcare is dependent on theeffectiveness and efficiency of the healthcare service. There is a need to guarantee reliability and decrease variations in clinical practice. KPIs should be process oriented and easy to interpret for clinicians and hospital management to form the basis of quality objectives reflecting the organizational goals[10].

This study was carried out to compare the involvement and results of the quality improvement drive among various departments of the hospital and to assess the relationship of the KPIs with the respective quality objectives for continual improvement in the relevant clinical and administrative domains.

## METHODS

The Key performance indicators were analyzed based on the criteria of being quantifiable, reflecting critical success factors, showing progress towards (or, away from) organizational goals, and being able to evaluate performance. The quality objectives were analyzed based on being specific, measurable, achievable, relevant and time-bound and whether or not linked with a valid KPI.

Nineteen departmental quality assurance representatives were recruited to attend knowledge sessions to identify the relevant KPIs and frame quality objectives.Out of nineteen, fourteen were clinical and five were administrative departments. After knowledge sessions, one-month timeline wasgivento the departments to form KPIs & quality objective and to collect quality metrics. The data wasanalyzed using Excel 2010 software and content validity was based on the following criteria:

- being quantifiable
- reflecting critical success factors
- showing progress towards (or, away from) organizational goals, and being able to evaluate performance over a designated time period,

## MATERIAL AND METHODS

A retrospective study from Jan 2013 to December 2014 at AFIC&NIHD Rawalpindi.

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## RESULTS

Quality assurance representatives and HODs of nineteen departments were sensitized through training sessions to participate in quality improvement activities. Twelve departments showed interest and responded with varied level of response. Nine out of nineteen (47.36%) depts reported with KPIs after one month, eight depts. (42.10%) made quality objectives whereas twelve depts. (63.15%) presented quality metrics.

There was a marked improvement in terms of involvement of departments in quality activities; as last year there were no KPIs (0%), four quality objectives (21%) were formed and only eight (42%) depts. provided quality metrics for the year 2013 as shown in Figure 1.

Marked improvement is evident in the year 2014 due to sensitization and training sessions conducted for quality improvement drive. This also resulted in getting meaningful quality data for process mapping, benchmarking and improvement purpose.

**Table-1: Comparative responses of clinical and administrative departments.**

| Department | 2013 | | | 2014 | | |
|---|---|---|---|---|---|---|
| | Quality Metrics | KPIs | Quality Objective | Quality Metrics | KPIs | Quality Objective |
| Cardiac Surgery | √ | | √ | √ | √ | √ |
| Pediatric ICU | √ | | √ | √ | √ | √ |
| Pediatric Cardiology | √ | | | √ | √ | |
| Echocardiography | | | | √ | √ | √ |
| Radiology | √ | | | √ | √ | √ |
| Pathology | √ | | √ | √ | √ | √ |
| Emergency Dept | | | | √ | | |
| Medical Store | √ | | √ | √ | √ | |
| Matron Office | | | | √ | | √ |
| Biomedical Dept | √ | | | √ | √ | √ |
| Accounts Dept | √ | | | √ | | √ |
| IT Department | | | | √ | √ | |

Nineteen departments engaged in the quality improvement activity during 2014, twelve departments participated with varied level of response and among those eight were clinical and four were administrative departments. There was minimal response in 2013 as only four quality objectives and eight quality metrics were defined.

Department - wise response on KPIs, Quality objectives and quality metrics for 2013 and 2014 is presented in Table-1. The improved results of 2014 are due to sensitization and training of HODs and QARs on quality management.

## DISCUSSION

Key Performance Indicators (KPIs) relate to improving healthcare quality and may be confused with general metrics. A KPI reflects how far a metric is above or below a pre-determined target over a specific time period[5]. Suitable benchmarks are needed to gauge the hospital performance against its own anticipated goals and in comparison with other hospitals[11]. Quality objectives help to achieve strategic milestones towards quality improvement drive. KPIs aligned with quality objectives provide basis for setting targets, long term monitoring and achieving continual improvement. There was a lack of clarity regarding how indicators can be usedfor process improvement. There is an assumption that performance may differ due to varied response of the departments towards quality drive. Possible limiting factors towards quality improvement are over emphasis on data collection, plans and reports, whereas focus shall be on feedback from the patients and staff. There was an issue of quality of data that was primarily related to collection technique, limited use of electronic record system (HMIS), time consuming, manual entries and under-reporting. Other limitations were different data source, lack of a coordinated approach to collection, lack of shared system, lack of orientation and training of staff on HMIS.

Determining the healthcare service response to few high-risk clinical conditions known as “tracer conditions” can identify performance in terms of patient outcomes[12,13]. Such conditions include cardiac emergencies which may be associated with morbidity, mortality and increased hospital costs[14,15]. A shift towards “Whole System Measures” defined by the Institute for Healthcare Improvement (IHI) as “balanced set of system

level measures which are aligned with the Institute of Medicine's (IOM's) six dimensions of quality and are not disease or condition specific" can help overcome some of the challenges of evaluating quality[16]. Patient satisfaction, rate of adverse events, incidence of occupational injuries and illnesses, and healthcare cost per capita are some examples of these whole systems measures.

This study highlights the importance of meaningful data collection and its efficient use towards quality improvement. This is certainly possible by identifying correct and relevant data set, use of quality tools and utilization of hospital management information system (HMIS). The results explain that more departments contribute in quality activities when they have orientation and understanding of this drive because quality culture cannot be imposed, it can be promoted by involvement, motivation and commitment of staff. Moreover, the heads of departments (HODs) and departmental quality assurance representatives (QARs) are main driving agents of the quality improvement program. That is why we focused and conducted training sessions to engage them in quality improvement activities.

The commitment and support from top management is one of the important aspects of successful quality drive as no change or program can be implemented without interest and active involvement of top management, in this case the Commandant & Executive Director and QMR of the institute supported the whole process and backed quality team to carry out this exercise.

The role of training and professional development activities is also considerable in introducing any change or implementing any program in organizations. A similar impact of our training sessions towards quality improvement drive is evident from the quality outcomes of 2014 in terms of KPIs and quality objectives. Once the top hierarchy and staff are clear about the purpose and outcomes of quality activity and understand their role, it is much easier to implement the intervention[17].

The formation of KPIs, quality objectives and meaningful quality metrics contributed towards the quality improvement and enhanced organizational performance. The

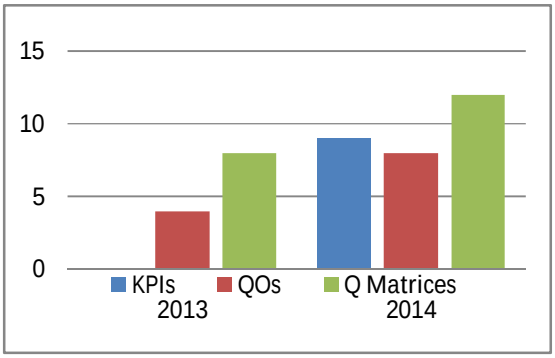


**Figure-1: Year wise comparison of KPIs, QOs and Quality metrics.**

departments became aware of their critical processes e.g. infection control committee assessed that the surgical site infection (SSI) rate in the institute was relatively higher. This process was assessed, data was collected, benchmarking done and then quality initiative was taken to reduce the SSI. This whole process resulted in reduction of surgical site infections. There was an observation of prolonged stay of cardiac surgery patients in high dependency unit (HDU). This issue was investigated and found out various reasons of prolonged stay, cardiac surgery department decided to monitor results, benchmarked the process and made a quality objective to reduce the HDU stay from average 96 hours to 24 hours in one year. QAR of the departments established a mechanism to monitor the patient stay data, checked trends, and addressed the causes of prolonged stay. This process resulted in reduction of SSI rate and achievement of quality objective within time. These were examples of quality improvement effort from clinical side.

There is another example of support department; Biomedical Engineering department which is considered vital in any healthcare organization for guaranteeing state of the art treatment by ensuring availability of biomedical equipment. Biomedical Engineering department of AFIC formulated various KPIs e.g. operational availability and mean time to repair (MTTR) and delineated quality objective to increase the operational availability of biomedical equipment. There was no such

precedence in department to monitor, analyze and benchmark the processes and to check for continual improvement in 2013.

AFIC was the first institute in army medical institutions of Pakistan to achieve ISO 9001 certification in 2001. The present scenario favors the ongoing development in the institute. There have been various other quality improvement initiatives launched for quality and performance improvement e.g. clinical governance to improve clinical efficiency through clinical auditing, paving the way towards JCI accreditation to improve overall quality perspective and HACCP certification to improve quality and safety of food services.

## CONCLUSION

The study concluded that there are various benefits of using KPIs and quality objectives in healthcare institute e.g. they help in identifying critical control points, process mapping, identifying key improvement areas, benchmarking and continual improvement efforts.

There was slump in the quality journey of AFIC&NIHD in 2013 when departments lacked interest in quality activities. The top management decided to improve the situation and nominated Quality assurance representative in each department, and held QAR along with respective HOD responsible to actively participate in quality improvement activities.

Next step was to sensitize and involve departments in quality activities, for this purpose training and knowledge sessions were held for QARs and HODs. These sessions helped to acclimatize them with fundamentals of quality and to draw their attention towards the importance of KPIs, quality objective and quality metrics. This activity resulted in improved response of departments in 2014 as more departments participated in framing KPI and quality objectives.

Departments also focused on collection of useful quality data to monitor their performance and assessed trends, which contributed towards quality improvement drive. There is further room for improvement to engage all medical and non-medical staff in trainings and to motivate them towards quality improvement drive. Future research dimensions may include assessing patient satisfaction level after intervention and to gauge improvement by using quality tools.

### Conflict of Interest

This study has no conflict of interest to declare by any author.

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