A performance improvement programme at a public hospital in Sri Lanka: an introduction

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Abstract Five-S, a simple tool was utilized as the initial step towards total quality management activities at a public hospital in Sri Lanka. This paper introduces the system improvement activities at the hospital which won several awards for quality of service at national level. Though there are multiple reasons for the significant improvement of performance at the hospital, the study team observes that Five-S has contributed heavily towards the success. The unique feature observed was that Five-S activity reorganizes the system radically compared to most of the continuous quality improvement (CQI) approaches which depend on problem solving. In the hospitals of developing countries, in which the basic processes are unsatisfactory, Five-S approach may be suited for the initiation of the CQI process. Further research is needed to evaluate the quality improvement activity based on standardized criteria and to assess the factors which influenced the process.

Introduction

Developing countries are initiating various system improvement projects in health institutions based on the continuous quality improvement (CQI) and total quality assurance (TQA) programmes (Counte and Meurer, 2001). Hospitals of developing countries have significant limitation of resources. Shortage of funds, lack of priority setting on quality of service, inadequacy of training on hospital management and low public awareness on quality of hospital service are the obstacles to performance improvement of the public health sector (Ovretveit, 2002). The productivity of the hospitals is, therefore, not satisfactory and the implementation of performance improvement programmes often encounters resistance from the management and employees, including labour unions, which remain conservative in attitude to any changes to the existing system. (Wijesinha, 2003).

Sri Lanka has achieved a demographic transition from a situation of high mortality and fertility rates to a low mortality and low fertility situation (Department of Health Services, 2002). However, the total national health expenditure is maintained at a level of less than US$8 per capita per annum. This was considerably below the estimated US$13 per capita that it would cost to provide the World Bank’s cost effective package of basic preventive and curative health service (Hsiao, 2000). Government health
expenditure is estimated to be only 1.1-1.2 per cent of GDP from 2000 to the current year 2003 (Pacific Consultants International et al., 2003). It provides finances for 50 per cent of national health expenditure (Health Development and Research Programme, 2002).

Thus, Sri Lanka’s health sector is at a position where the financing of government hospitals is stagnant or declining relative to the number of patients seeking treatment. In addition, public approval for user fees only ranges from 12 to 20 per cent, depending on what the fees were to be charged for. Public disapproval of fees is greatest in the case of inpatient treatment (Rannan-Eliya, 1996).

Master plan study for strengthening health system in Sri Lanka, interim report October 2002, proposes among other things to lay down standards and criteria for hospital infrastructure and have them regularly reviewed by an expert committee and more emphasis and resources be given to health manpower development, including training and quality assurance monitoring, to meet the increasing technical and managerial demands of the public health system (Pacific Consultants International et al., 2002).

Shortage of financial resources was indicated as the most serious constraint to improve performance by 90 per cent of hospital managers in Sri Lankan government sector health service delivery system, according to a survey by Institute of Policy Study of Sri Lanka (Somanathan et al., 2000). It was also highlighted by this report that suitable systematic management training can be one effective solution, which is feasible under the given circumstances to improve the efficiency in a climate of resource constraints (Somanathan et al., 2000).

Considering the resource constraints, the Sri Lanka Government declared 1996 as the productivity year and declared 1996-2005 a productivity decade. With an objective of improving employee motivation, performance and productivity in the health sector, productivity programmes were introduced to a selected group of hospitals. The hospital management was given significant autonomy to design and implement these programmes.

In 2000 the productivity improvement programme was initiated at the Castle Street Hospital for Women. Five-S was used as the fundamental management tool to initiate productivity improvement. The hospital won a merit award in the large scale service sector category in the Year 2002 National Quality Awards of Sri Lanka (granted by Sri Lanka Standards Institution) in addition to Taiki Akimoto Five-S Award (granted by Japan-Sri Lanka Technical & Cultural Association) for the best Five-S implementation in service sector in 2001, National Productivity Award for productivity excellence company of the year (service sector) in 2001, and Kaizen runner-up award for best implementation of Japanese management practices in 2002.

A study is conducted to evaluate the performance improvement programme and identify the factors which affected the implementation process, with a view of developing guidelines for public hospitals of Sri Lanka on implementing total quality management (TQM). This paper explores the implementation process and compares the post-implementation healthcare results with the pre-implementation levels.

Five-S is a management tool, which originated in the Japanese manufacturing sector. It is used as a basic, fundamental, systematic approach for productivity, quality and safety improvement in all types of organizations. Five Ss, abbreviated from the Japanese words Seiri, Seiton, Seiso, Seiketsu, and Shitsuke, are simple but effective methods to organize the workplace (Hirano and Talbot, 1995).
This management tool which consists of five components of action can be defined as follows:

1. **Seiri**: (organization) – classify all items around you in your working place, separate what is wanted from what is not wanted; reduce clutter.

2. **Seiton**: (orderliness) – organize everything needed in proper places for easy location of operation; fix a permanent place for everything and keep them in their respective place.

3. **Seiso**: (cleanliness) – maintain high standards of cleanliness.

4. **Seiketsu**: (standardization) – standardize all the above procedures

5. **Shitsuke**: (discipline) – train and maintain discipline of the personnel engaged.

Five-S is driven by employee participation and empowerment. Initiative and leadership of the senior management is imperative for successful implementation (Hirano and Talbot, 1995).

**Research target**

This management instrument was used as an entry point and also as a fundamental system of TQM, by the Castle Street Hospital for Women from the year 2000 onwards. This is a governmental hospital and is one of the teaching hospitals for post-graduate and under-graduate training in obstetrics, gynaecology and neonatology with an urban setting. There are five obstetrics and gynaecology units and one neonatology unit in the hospital with 450 beds for in-patient care and served by over 800 staff members. Approximately 15,000-18,000 deliveries and about 1,500 major gynaecological surgeries are performed each year in this institution. The clinical staff is comprised of ten consultants, 66 medical officers, 250 nursing officers, 90 midwives and 30 middle level technical grade staff.

**Methodology**

As the initial step, a review of available internal documents was conducted. All administrative and other documents including minutes of meetings, internal circulars, evaluation guidelines of the hospital and documents monitoring post-implementation results were assessed. To strengthen objectivity, the first author (who was not involved in the implementation process) carried out the assessment.

Interview of senior management officers (including the director of the hospital) was carried out to identify the implementation process and to obtain detailed information of the implementation conditions. Interviews were in the form of discussions based on open-ended questions. The first and the third authors (who were not involved in the implementation process) carried out the interviews.

Service quality indicators were used to assess the pre- and post-implementation performance results related to healthcare service. Objective indicators were used for the evaluation i.e. maternal mortality rate, still-birth rate, post LSCS infection rate, neonatal infection rate and the number of training programmes conducted. For this purpose, internal data was analysed. Chi-square test was used to measure the statistical significance.

This initial assessment procedure was initiated in March 2003 and was completed in June 2003.
Our methodology enabled a clear picture of the implementation activities carried out at the hospital to be gained. Evaluation of the healthcare results provides an objective comparison of pre- and post-implementation levels. As noted earlier, this methodology was adopted initially to provide a broad overview of the programme. However, this methodology does not provide a comprehensive evaluation as it is not based on a set of criteria covering all aspects of the performance. Ideally the performance assessment should be based on accepted criteria. For example, Baldrige Criteria for Health Care, with its origins in the USA evaluates results of a health care organization on health care results; patient focus; financial and market performance; staff and work system performance; operations effectiveness; and governance and social responsibility.

Results

Implementation process

To initiate a TQM programme, Five-S system was implemented throughout the organization. Eight work improvement teams (multi-disciplinary quality circles) were established at every unit of the hospital to manage improvement process. Competitions were held to praise good practice with non-monetary rewards. Five Ss were implemented stepwise one by one in sequential order. The sequence of implementation is as follows:

(1) *Seiri* (organization). Unwanted and slow-moving things were identified and red tagged. All red tagged items were disposed on a planned programme in line with the regulations the hospital was subjected to. This was organized by the hospital management. Stationery, documents, stocks, equipment/instruments, fittings and other materials were cleaned up accordingly. A central store for unserviceable items was established. Waste was segregated, colour coded and disposed of systematically. Unwanted trees, buildings and structures, which were obstructing ventilation and waterlines were identified and removed. Rules were set for regular disposal.

(2) *Seiton* (orderliness). A sign board system was used from the entrance to the hospital so that any location could be found easily both by the staff and the clients. A grid system was implemented i.e. each building, room and location was named and labeled. Each asset, including medical equipment and instruments, was given an inventory number and was labeled discretely. “Home”, where a specific item should be, was marked and registered on every tool, device and equipment including trolleys used at various places in the hospital. Visual control using colour coding was applied to distinguish locations and items. In addition, a danger marking system was strictly in place where needed. Activities on detecting abnormalities, seeing current situations and problems were also put into practice as routine periodical action of the personnel of every corner of the hospital based on the labeling system. Every item was aligned physically along \( X \) axis and \( Y \) axis. In addition to medical equipment, furniture, vehicles and even items on table tops were subjected to this. Files of clinical notes (bed head tickets) were redesigned and set accordingly. During the above activities, the objective was to reduce search time of items in various clinical and administrative routine works.

The process of *seiton* stimulated innovation and implementation of new processes. Central storage of surgical gloves, central sterile supplies and central
linen supplies division were established with better function. A system to monitor and evaluate performance was also initiated by the hospital director’s office.

(3) *Seiso* (cleanliness). This phase of the activities contributed to create a culture of continuing practice of cleaning and strict infection control in the hospital. Cleaning responsibility maps and schedules were formulated by respective divisions in the hospital and put into practice, setting up appropriate cleaning tools and materials after standardization of the methods among different areas of the hospital. Garbage was properly classified and was collected in separate garbage bins, which were allocated to every corner of the hospital, in accordance with common colour coding system. It is noted that every employee participated in this cleaning process regardless of the rank and categories of the cadre.

(4) *Seiketsu* (standardization). Standards and objective setting were set and calibrated among all top and middle management posts for each activity and procedure of the above three Ss, particularly with the emphasis on disposal of unwanted items, colour coding, organizing necessary items in the best condition and detailed procedures of cleaning. Check lists were developed and used for self-assessment of the achievements. The target areas were first set for physical facilities and work venues, but later covered software matters related to health care processes, such as emergency tray maintenance, patient assessment before and after a major surgery and before discharge from the hospital.

These processes, followed in the hospital, were scrutinized by the clinical team of concern. Essential processes were identified, standardized and monitored to reduce the cycle time and improve the quality of service. The processes for antenatal care (first visit and follow up visit), in-patient care, procedures at central supply and sterilization department (CSSD) were given special emphasis both by the clinical team and hospital management team. Drug-charts, with a view of saving nursing hours and laboratory investigation stickers aimed at reducing the waiting time of the patients, were introduced. Repair of unserviceable items and acquisition of goods and services were also targeted for the process management in the same manner as the clinical issues.

Screening of antenatal mothers was particularly highlighted as a newly standardized procedure. Consequently the hospital developed an educational programme for antenatal mothers, which was regularly conducted by nursing and midwifery staff with the guidance of specialists of obstetrics and gynecology.

(5) *Shitsuke* (discipline). The above Four-S-activities were further cultivated to be a matured culture of the hospital with awareness campaigns, training, inter-unit competitions, non-monetary rewarding of good practices and continuous monitoring.

A total of 15 indicators and standards were developed to assess the progress of implementation. The areas of concern were functioning of work improvement teams, organizational aspects of patient care, cleanliness, disposal of unserviceable items, availability of human resources, record keeping, infection control, antenatal care, post-natal care, health education (particularly on breastfeeding) and reception and discharge of patients. A work improvement team of each division carried out monthly evaluation visits and identified the areas which needed attention and further
improvement. Monthly meetings of all teams and hospital management were conducted, with the initiative of the hospital director’s office, to assess the performance of the entire hospital and decide on measures for further improvement. The collected data was analyzed periodically every month and provided evidences for the actions being carried out to rectify poorly performing areas. The analytical outcome was sent back to the units utilising proper communication among the administrative and clinical staff.

Post-implementation service quality
A significant improvement of organizational performance was achieved through the implementation of Five-S.

The central supply department of the hospital before (Plate 1) and after (Plate 2) the implementation of 5S activities. Note the difference of the organizational aspects of medical materials.

Post-Caesarean section (LSCS) infection rate reduced by 52 per cent from the first half of 2000 to first half of 2002 (statistically significant according to chi-square test: 0.1 per cent < \( p \) < 1 per cent) Neo-natal infection rate (NNIR) decreased by 58 per cent.
during the same period (statistically significant according to chi-square test: $p < 0.1$ per cent) (see Tables I and II).

Figure 1 summarizes the trend of infection rates related to post-LSCS and neo-natal care. Note that the two indicators demonstrate improvement chronologically in accordance with the advancement of Five-S activities started in 2000.

The still-birth rate has dropped from 10.3 per 1,000 live births in the first half of year 2000 to 8.2 in the first half 2001 and to 6.9 in the first half year 2002 (decreased by 33 per cent from year 2000 to 2002 statistically significant according to chi-square test: 1 per cent $< p < 5$ per cent). Maternal mortality rate has reduced from 1.09 per 1,000 live births in the year 2000 to 0.24 in the first half of year 2002 period (decreased by 78 percent statistically significant according to chi-square test: 1 per cent $< p < 5$ per cent).

Ten management training programmes were arranged by hospital director’s office and conducted for middle level management staff of the hospital during the year 2001. Training focused on quality assurance aspects.

**Discussion**

Five-S activities were applied for the improvement of service quality and work environment by the collaboration of administrative and clinical staff of the hospital. A participatory approach was practiced by the hospital director, while providing leadership and coordination.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Year 2000 first half</th>
<th>Year 2001 first half</th>
<th>Year 2002 first half</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post LSCS infection rate/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 sections</td>
<td>1.8</td>
<td>1.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Total number of Caesarean</td>
<td>2,085</td>
<td>2,177</td>
<td>2,451</td>
</tr>
<tr>
<td>Section</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table I. Trend of post Caesarean section infection rates in 2000-2002

<table>
<thead>
<tr>
<th>Activity</th>
<th>Year 2000 first half</th>
<th>Year 2001 first half</th>
<th>Year 2002 first half</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal infection rate/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 live births</td>
<td>6.3</td>
<td>5.3</td>
<td>2.7</td>
</tr>
<tr>
<td>Total live births</td>
<td>7,466</td>
<td>8,097</td>
<td>8,362</td>
</tr>
</tbody>
</table>

Table II. Trend of neonatal infection rate in 2000-2002

![Graph showing infection rates](image)
A breakthrough is created in the environment, where various constraints existed as obstacles to the smooth and effective operation of the hospital. Self-reliant continuing TQM activities were planned by the core group which comprised the hospital director and representatives of administrative, clinical and technical staff of the hospital.

The phases of *seiri* (sort) and *seiton* (set) were highlighted as the key phases, by which the success of the rest of the phases was determined. Mentality of cleaning contributed towards adherence to sterile procedures and minimizing of hospital acquired infections. *Seiton* (set) reduces search time and cycle time. Processes are streamlined. Through visual control, the current situation, problems and abnormalities are identified early and improvement activities are carried out promptly. Since the Five-S is a series of actions, that have to be sequentially practiced in a participatory manner by staff of all categories, the initial two phases were specifically elaborated by the hospital director’s office to motivate all section chiefs of the hospital to ensure their aggressive participation and leadership.

In the initial stage, there was some resistance from the staff, who were not supportive of changing the existing condition and work formula. It changed after recognizing the value of the Five-S, influenced by the achievement of so-called “minor staff” in charge of cleaning and sweeping of the hospital. Actually, this group of workers, who had most serious inconvenience in work efficiency, was targeted by the hospital director’s office for improvement.

Responding to the employees’ wishes, a small place for resting and dining was provided with neat and clean space. The attendance of the management authority to the most vulnerable group of the workforce is necessary to generate bottom-up movement and encourage other categories of staff to fight against the constraints. Implementation was affected by financial constraints, i.e. adequate additional funds were not released by the Ministry of Health for this purpose. The hospital director overcame those by organizing sponsorships from commercial organizations.

Team spirit and focus on performance were instilled. Senior and middle management focused on staff. Organizational learning culture evolved. Innovation was rewarded and several programmes developed by the employees were implemented. Middle management leadership developed as an increasing degree of authority and responsibility was transferred regarding management of their respective units and processes. Through monthly analysis of results, corrective and improvement measures were taken. To further the quality of service, patients’ suggestions were incorporated into the decision-making process. This process has ensured continuous improvement of the system.

The above results were achieved within a short period of two years. Five-S has provided an entry point and a foundation for TQM. As the above programme was implemented with minimal financial input, it is relevant for hospitals of developing countries. Further, as the approach is one of radical change rather than an error detection and rectification, it could be used to initiate performance improvement programmes, as existing systems with negative attributes are reengineered rapidly.

Implementation of Five-S needs participation from all categories staff and in turn leads to lessening of demarcations between occupational classes within the organization. However, it is imperative that the cultural setting should be well considered in the planning and initial implementation of Five-S. The planner of Five-S should be careful not to rush to initiate and implement activities, which are thought to
be “inferior” for a particular category staff, but should be aggressive to motivate the people to change their working conditions and habits to improve team culture.

Further research is needed to assess the performance improvement comprehensively, assess management tools used and factors which influenced the process. Positive factors and negative factors have to be identified to assist future implementation of this system at other comparable settings.

References


