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Improving performance in Central Sterile Supply Department (CSSD) management through performance measurements utilizing user satisfaction surveys and intervention.

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ABSTRACT

Surgical procedures leading to surgical site infections, and medical procedures associated with iatrogenic infections can be made negligible with sterilization and decontamination of instruments and medical devices. The Central Sterile Services Department (CSSD) is the hub in the hospital working to provide sterile instruments and packs to all areas of the hospital. The quality of services provided by the CSSD Department in AIIMS Bibinagar regarding the processing as well as the service was to be assessed by all the user departments. The questionnaire was devised after discussion and distributed to the end-user personnel. There were 19 questions addressing the timing, etiquette, equipment, damages, delays, validation as well as feedback regarding improvement. There were a total of 107 respondents of whom 87 were nursing officers and 25 were doctors from medical, surgical, obstetric, orthopedic, ENT, and ophthalmological specialties. The data collected was collated in Microsoft Excel and descriptive analysis was done. The results showed that more than 90% were satisfied with the validation process, the packing of items, the etiquette of the personnel, and the cleanliness of the equipment. Critical responses to consider for intervention included a lack of awareness regarding the indicators and the validation of the sterilization process, nearly 68% lacked knowledge of this. Further, there was dissatisfaction regarding updates and any recent innovations in the system. Only 62% were overall satisfied with the CSSD service, with 11% not sure as to what can be improved. Interventions to improve the services to address the issues raised from the feedback were created utilizing the available resources.

Key words: Central Sterile Services Department, quality of services, feedback, questionnaire, user satisfaction

I. INTRODUCTION

Central Sterile Supply Department (CSSD) is one of the important supportive services in the hospital which ensures infection free atmosphere. It receives, stores, sterilizes and distributes, instruments and equipment to all departments within the hospital.⁽¹⁾ The risk of transferring infection from instruments and equipment is dependent on the presence of microorganisms, the number and virulence of these organisms, type of procedure that is going to be performed (invasive or non invasive), body site where the instrument or equipment will be used (penetrating the mucosal or skin tissue or used on intact skin). Hence any instrument or equipment entering into a sterile part of the body must be sterilized.

According to World Health Organization, the most basic work to prevent hospital infections is usually sterilizing surgical instruments, bandages and sterilization of other equipment. The Spaulding system classifies a medical device and also establishes the level of germicidal activity required for the utilisation of these medical devices in appropriate manner to reduce and nullify the risks which could be caused due to infection.^(2,3,4) If instruments are microbially contaminated, this leads to an increased likelihood of contamination and subsequent infection of the surgical wound. Therefore, appropriate sterilization of surgical instruments is recommended as one of the fundamental and proven measures against surgical site infection (SSI).

The equipment in the CSSD are arranged as per the designated areas, which include the dirty utility, the clean area, the sterile area and the store or area for distribution. The dirty area should be physically separated from the clean and sterile areas. Proper functioning and coordination between four zones i.e. the dirty area also known as the washing area, packing or the assembly area, sterile area and finally storing area for the sterile goods. The work described in the CSSD includes cleaning and rinsing of all equipment, packing the items, steam sterilization, checking the validation process, storing the items and distribution. Disruption in the process of sterility can lead to infection with bacterial and viral pathogens leading to increase in the morbidity and mortality in the hospital associated procedures and surgeries. Expensive medical devices may need reprocessing and maintenance of stringent quality control is imperative for preventing hospital-acquired infections. Besides the necessary infrastructure for sterilisation and disinfection optimal management of CSSD includes protocols and high quality of services.

As per the definition of sterilization, which is “the complete destruction or removal of microorganisms, including bacterial spores”, the process to achieve this involves strict adherence to protocol, as well as maintenance and monitoring of the equipment. The machines and manpower are monitored by recording the data, rigorously at each cycle. The use of indicators both chemical and biological is critical to validate the sterilization cycle. The Bowie Dicks test is done to check the sterility of the air in the autoclave (Steam sterilizer). Type 4 and type 5 indicators are used in each pack to validate that adequate temperature and pressure are reached in the autoclave to destroy the biological material evidenced by a change in color.

II. ESSENTIAL PRE-REQUISITES

There are a number of essential pre-requisites that should be observed before attempting to sterilize.⁵

- A. All items should be cleaned and dried which will ensure that the minimum number of organisms is present on the item prior to processing
- B. The packaging must be appropriate for the process and not obstruct the passage of the steam for even distribution of temperature in all parts of the autoclave while undergoing the sterilization process
- C. The parameters to be reached in terms of temperature, pressure and time have to be clearly defined
- D. The maintenance and logging of process and engineering work on the machinery is essential

QUALITY MONITORING

The sterilisation process validity is considered based on the following points:

- a. Direct monitoring of the display screen of the autoclave.
- b. Chemical monitoring with chemical indicators
- c. Efficacy testing with biological indicators
- d. Operations testing of the autoclave

III. MATERIAL AND METHODS

The efficiency of CSSD is critical in secondary and tertiary level hospital in reducing HAIs, which in turn affect the morbidity and mortality of preventable infections in the healthcare settings. The quality of services provided by the CSSD Department in AIIMS Bibinagar regarding the processing as well as the service was to be assessed by all the user departments. Lean based approach and continuous quality improvement are the core values of Kaizen which have been incorporated by several companies as a management policy. Kaizen principles lie at the core of lean management, a practice that aims to reduce waste, improve efficiency and quality. Kaizen is implemented by using practices that encourage staff to suggest improvement ideas and solve problems through, for example, ‘Kaizen events’ or employee suggestion campaigns.

IV. STUDY TYPE

The research design was a prospective qualitative questionnaire-based study. It included collection of information and opinion directly from the subject of the study through the comprehensive questions created by a team. This study was undertaken to estimate the problems encountered by the end users of the processed CSSD material and their knowledge on the processes in CSSD.

OBJECTIVES OF THE STUDY

1. To study the function of CSSD Department
2. Assess the quality of service
3. Identify areas for improvement and introduce modifiable change.

V. NEED FOR THE STUDY

Every health service has, among other characteristics, the mission to ensure proper and safe health care. Moreover, avoiding health care associated infections is an important part of this mission. The Central Sterile Supply Department (CSSD), which exclusively focuses at avoiding the transmission of infections within health services, does it through the sterilization process.

After the development of medical technology and increase in the complexity of care provided in health services, the use of clean and uninfected or sterilized equipment became a need. The use of invasive equipment has multiplied and it is already being used in different areas of the hospital. Moreover, the CSSD is responsible for supporting the prevention of infections like pneumonia or urinary tract infections. The importance of CSSD has been established and ensures that the surgical processes are sterile and safe for patients. The lack of these good practices has been associated with outbreaks of infections and diseases to patients.⁶ Their implementation, based on evidence, is enough to avoid the occurrence of these situations, therefore ensuring quality and safety of the provided care.

VII. SOURCE OF DATA

A questionnaire was designed to assess the quality of service being provided by the CSSD to the user departments namely the operation Theatres , the outpatient departments , the inpatient departments . The questionnaire was developed in English by a multidisciplinary process improvement team of service users, CSSD staff, and other stakeholders that included doctors, nurses and administrators.

Method of collection of data:

The nursing officers and the doctors utilizing the CSSD services were given a questionnaire with 19 questions and asked to complete it .

Inclusion criteria and Exclusion criteria

1. Management staff, doctors and nursing staff of CSSD & OT having one or more years of experience and patient will be included.
2. Staff with less than 6 months of experience will be excluded

Data analysis and interpretation

Total of 107 participants were given the questionnaire (Table 1), 82 were nursing officers and 25 doctors. The 19 questions were given and answered individually and anonymously. The data was collated in Microsoft Excel and each question was assessed and the percentages were calculated.

The consolidated responses of 107 individuals have been represented in the Figure 1, which included both the doctors and nursing staff. The NA response represents responses which were recorded as 'not sure' which were received for the questions 1,2 ,7 and 11 in the following percentages 1(6.1%), 2(6 %),7(3.9%) and 11(3.1%) 15(11%)

S.No.	Question	Yes %	No %	NA %
1	I am comfortable with collection time of unsterile items by the CSSD attendees	88.8%	5.1%	6.1%
2	I am comfortable with the delivery time of sterile items from CSSD	83%	11%	6%
3	The trolley that delivers sterile items is clean	25.7%	74.3%	0%
4	Items delivered by CSSD have any damage?	19.8%	80.2%	0%
5	Items delivered by CSSD are completely sterile?	91%	9%	0%
6	Items delivered by CSSD are in working condition?	98.1%	1.9%	0%
7	Are you satisfied with quality of wrapping linen?	73.8%	22.3%	3.9%
8	Expiry dates are available in all CSSD items	90.7%	9.3%	0%
9	External Indicators are available in all Autoclaved items	91.5%	8.5%	0%
10	CSSD attendees are polite and approachable	99.1%	0.9%	0%
11	Office staff in CSSD respond to queries promptly	96.2%	3.8%	0%
12	CSSD is innovative and updates to latest technologies/techniques	43.3%	53.6%	3.1%
13	CSSD provides regular updates on handling items, pre cleaning, etc.	64.4%	35.6%	0%
14	I am aware of CSSD practices that are being followed in AIIMS	73.8%	26.2%	0%

15	I am fully satisfied with the service provided by CSSD	62.2%	10%	11.1%
16	Any suggestions for further improvement	47.7%	52.3%	0%
17	If yes, what is it?	0%	0%	0%
18	Are you aware of any validation process to confirm sterilization	31.8%	68.2%	0%
19	If yes, what is it?	0%	0%	0%

Table 1: Findings to the survey of the questionnaire.

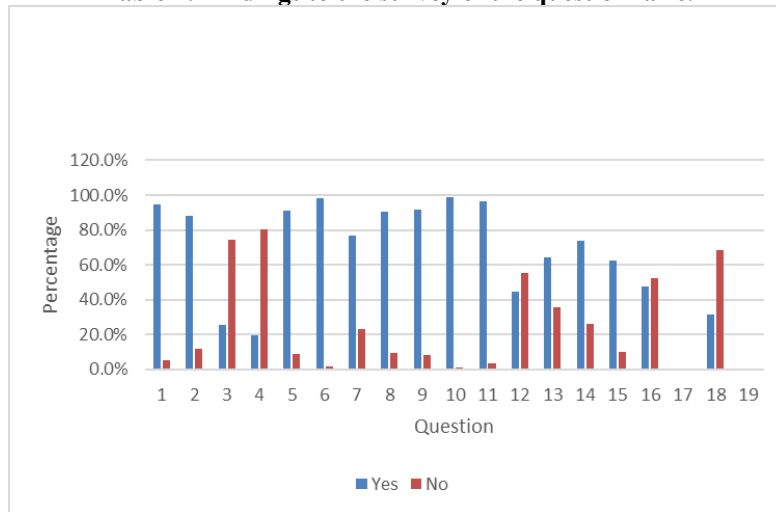


Figure 1. Graphical representation of the Answers YES/ NO to the questionnaire

As per Kaizens principle, steady continuous improvement is possible by incorporating small changes toward the ultimate goal of a near-perfect system.⁷ This process can be achieved by with the active involvement of employees, studying the system, identifying the small problems that can be solved by the employees themselves and then incorporating changes to improve the system.

With this system in mind, the CSSD was identified for the study, the team in place troubleshoot and identified the process and the whole manpower in this ecosystem participated in the questionnaire. The key findings in this questionnaire would be further assessed to make policy to improve the system. It was decided to accept 80% and above, and find solutions where the feedback assessed the system to be < than 80% as a performance target.

In the 9 questions the service was rated as adequate by more than 80% of the responders, these included regarding the timing of the delivered items, collected items , the quality of cleaning , regarding missing items in the trays . Confidence in the system regarding the sterility , presence of indicators , presence of expiry dates , which further validated the sterility of the items was more than 90%.98% agreed that the personnel were invariably polite and there were no damages to the instruments, further reflecting efficiency and the quality of the system.

However questions 3, 7, and 14 scored around 75%, regarding the sterility of trolleys delivering the sterile packs, the quality of the linen used for packing of the items as well as the knowledge of the procedures being followed in the CSSD.Amongst the suggestions for improvement, there were suggestions to increase the working hours of the CSSD, and for procurement of ETO and plasma steriliser.

Critical responses to consider for intervention included a lack of awareness regarding the indicators and the validation of the sterilization process, nearly 68% lacked knowledge of this. Further, there was dissatisfaction regarding updates and any recent innovations in the system. Only 62% were overall satisfied with the CSSD service, with 11% not sure as to what can be improved. Only 47.7% gave suggestions for improvement and only 31.8% were aware of the systems for validation of sterility. There was a strong opinion that there was little feedback from the CSSD regarding precleaning and updates regarding the products utilized for cleaning and validation.

Since validation of sterilization just needs a quick visual check for a change in color, it was consensually decided to conduct a workshop to improve the information and knowledge of Indicators in CSSD. This would as a measure improve the quality of service as the end users will have adequate information to assess the quality of the sterilization process. This in turn would reflect in improvement in infection control and a reduction in surgical site infections.

Some suggestions for improvement included procurement of more advanced autoclave systems which has been considered and a request for upgradation will be worked for future advancement.

Utilization of Kaizens principles in healthcare have previously been found very useful when applied in several busy emergency rooms in Massachusetts there was a decrease in hospital stay of 3 days despite the increase in the number of admissions and they concluded that lean principles adapted to the local culture of care delivery can lead to behavioural changes and sustainable improvements in quality of care metrics in the ED.⁽⁸⁾

The need to combine improvement and novel practices with the Kaizens principles, especially in healthcare facilities might be helpful in addressing complex problems and resolve issues and produce positive growth at the individual and institutional levels.⁽⁹⁾ Incorporation of management principles with academic and scientific processes is important, especially in the medical field where lean practices are required to reduce spiraling healthcare costs.^(10,11) Motivating the manpower our most important resource to provide innovative solutions by identifying problems that can be immediately corrected is empowering, besides strengthens the system.

VIII. CONCLUSION

The CSSD was identified for a study to identify small problems and incorporate changes to improve the system. A questionnaire was conducted to assess the performance of the system, with 98% agreeing that the personnel were polite and there were no damages to the instruments. However, questions 3, 7, and 14 scored 75% regarding the sterility of trolleys, the quality of linen used for packing, and the knowledge of the procedures being followed in the CSSD. The most important lacunae were the lack of awareness of indicators and validation of the sterilization process, dissatisfaction with updates and innovations, and little feedback from CSSD regarding precleaning and updates.

It was decided to conduct a workshop to improve the information and knowledge of indicators in CSSD, which would improve the quality of service and reduce surgical site infections. The working hours of the staff have been staggered to increase the working hours. Documentation of the cleanliness has been started incorporating a register with assigned signature dates and the batch numbers of the packs.

The questionnaire helped identify lacunae that could be corrected at the employee level and also created a long-term goal for further progress. The long-term goal is to pursue procurement of more equipment and design a more work-efficient space.

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