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Study of Organisation and Work Management of Central Sterile Supply Department of a Tertiary Care Hospital in Punjab

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Abstract **Original Research Article**

Background*:** Healthcare associated infections continue to remain a major challenge in all healthcare settings. Central sterile supply department (CSSD) plays a key role in combating these infections by providing optimum level of sterilization and disinfection. The objective of our study was to study the workflow management of CSSD of a tertiary care institution. ***Methods: This observational study was carried out from October 2021 to December 2021. Prior permission was obtained from appropriate authority before conducting the study. ***Results*:** CSSD of the institution is located in the basement area within the hospital premises with adequate staff. Linen, OT instruments, dressings and trays are sterilized in the CSSD. The CSSD is well equipped with autoclaves, ETO machines and washer disinfector. Being a NABH certified hospital, physical, chemical and biological indicators are used during sterilization process. ***Conclusion*:** Quality of standards of CSSD procedures are well maintained and CSSD has immense contribution in maintaining the standards of sterilization in the hospital.

Keywords: CSSD, indicators, autoclave, sterilization, equipments.

INTRODUCTION

Healthcare-associated infections (HAIs) continue to pose a major challenge to healthcare professionals in all healthcare settings [1]. The impact of hospital-acquired infections is seen not just at an individual patient level, but also at the community level as they have been linked to multidrug-resistant infections [2]. Healthcare-associated infections (HAIs) not only threaten the patients' health and life but also bring additional economic burden to the patients and healthcare system including direct economic loss and prolonged hospitalization. Total hospital length of stay (LOS) is known to be prolonged by the occurrence of HAI [1].

In most healthcare facilities, the central sterile supply department (CSSD) plays a key role in providing the items required to deliver quality patient care. To combat the HAIs, hospitals need effective methods of disinfection and sterilization and CSSD is the centralized department to provide these services. In India, one of the earliest CSSDs was established by Safdarjung hospital, Delhi and CMC, Vellore during 1957-60 [3]. It comprises that service within the hospital in which medical/surgical supplies and equipment, both sterile and nonsterile are cleaned, prepared, processed, stored, and issued for patient care. The central sterile supply department/ sterile supply department (CSSD/ SSD) serves all hospital areas, including the OT. It has a major role in patient care and patient safety [4].

ORGANIZATION

CSSD is an independent department with facilities to receive, clean, pack, disinfect , sterilize, store and distribute instruments, as per protocols and SOPs [3]. Additionally, the CSSD department works in sync with hospital infection control (HIC) department to ensure timely and safe availability of reliably sterilized articles.

The location of CSSD should be convenient to its primary consumers. There should be a minimum of 7 square feet on a per bed basis that is considered essential for planning a CSSD [5]. It should be located in a delineated area where there is less or no external traffic movement [6]. Well demarcated zones of CSSD include Collection zone, decontamination zone, packing zone, sterilization zone, storage and dispatch zone. Also, the zones must lead to unidirectional movement of personnel and supplies [6].

To ensure the high quality assurance of services, physical (mechanical) monitoring along with biological and chemical indicators are used:

1. Mechanical monitoring- Records time, temperature, humidity and pressure during the cycle.
2. Chemical- Set of various indicators to monitor one or more parameters of sterilization cycle.
3. Biological- it depends on live nonpathogenic bacterial spores and stringent sterilization requirements. A failure of microorganism growth indicates sterilization adequacy.

CSSD has a primary role in prevention of cross infection in hospitals and is essential component of every health institution. This study was conducted to understand the organization and operational management of CSSD.

AIM AND OBJECTIVES

To study organizational and workflow management of CSSD of a tertiary care hospital of Punjab.

METHODS

The observational study was conducted in CSSD of a 200 bedded tertiary care hospital of Punjab over a period of three months (October 2021 to December 2021). An observational checklist based on CSSD standard as prescribed by NABH requirements and WHO was used for data collection. The purpose of the study has been explained to the concerned authority before carrying it out. The investigator visited the CSSD, observed and collected the data regarding the layout, organization and workflow management of our CSSD department. The confidentiality of information was maintained.

OBSERVATION

The CSSD of the hospital is located in the basement area and the access is convenient to all the patient areas and operation theatre complex. There is a mandatory restricted entry rule and separate shoe covers have to be worn before entering the CSSD.

Timings-
The CSSD operates from 8 am to 8 pm every day including Sundays and holidays.

Areas-
Receiving area
Cleaning area
Packing area
Sterilization area
Storage area
Administrative area.

Changing room, hand washing facility, fire safety arrangements and other basic amenities are available.

ZONES

Soiled zone- A bell has been provided at the receiving window which opens only when it rings. Once the soiled items are received, they are segregated and brought to the washing area as per their specifications. In the washing area, the equipments for cleaning and washing are located.

Clean zone- here the washed and dried items are packed. Post packing, the process of sterilization and disinfection is undertaken here. Afterwards, the sterilized items are sent to the sterile store.

Sterile zone- here, the sterilized items are stored till they are distributed. Another bell is located near the dispatch window which is pressed when a personnel comes to collect the required items!

Cleaning of CSSD is done on daily basis with sodium hypochlorite solution while bacillol spray is used for rapid disinfection of surface and eligible equipment. Weekly samples are sent to microbiology lab for the culture and sterility check.

WORKFLOW MANAGEMENT

1. Receiving items- Soiled items are received through the receiving window. A bell is provided for the same. Issue slips are provided and records are maintained. Articles, once received are segregated and afterwards sent for cleaning.
2. Cleaning/washing- As recommended per the standards, instruments are once pre cleaned at the point of use to remove any visible organic matter.
3. Once sorted out in CSSD, they are now washed again in available equipments. The washed linen that is received from laundry is sent for further processing.
4. Drying- either the articles are automatically dried or air dried.
5. Packing- The instruments are packed in trays while the linen is folded and packed. SPS paper is used for the eligible items before sterilization.
6. Sterilization- either ETO machine or autoclave machine are used for the sterilization depending upon the type of articles.
7. Storage- the sterile items are now stored in a separate room under maintained sterile conditions. The records and log are maintained for the same.
8. Dispatch- the window opens only when the concerned personnel comes to pick the items. The dispatch is duly signed and the register is maintained.

Different trolleys have been assigned for the purpose of transporting cleaned as well as sterile items. The personnel is adequately trained to ensure the avoidance of mixing them.

STAFFING PATTERN

The CSSD department has a CSSD in charge, CSSD supervisor, sterilization technicians and support staff. The department is NABH certified and the personnel wears proper uniform during working. All of them are properly trained and are well versed with their duties. Also, the regular trainings are conducted in-house.

OPERATING POLICY

Standard operating procedures (SOPs) are well maintained for various procedures and a manual is available in the department for reference. Regular in house audits and the NABH audit ensure the updates. Random mock drills are also conducted for random checking.

EQUIPMENTS AVAILABLE

1. Autoclaves-2
2. EO sterilizer-1
3. Work benches- available
4. Packing table- 2
5. Linen folding table-2
6. Storage cupboards and racks
7. Soaking sink-1
8. Trolleys-4
9. Washer disinfector-2
10. Ultrasonic cleaner-1

CSSD receives all the articles and items from the areas that require to be sterilized and disinfected. A separate lift is assigned for the transport.

BIOMEDICAL WASTE MANAGEMENT

The generated BMW is disposed appropriately at the point of segregation in the bags that are color-coded according to latest state guidelines. Color coded bins are available in the CSSD.

EQUIPMENT MAINTENANCE

The maintenance and repair of CSSD equipment is well attended by the in house biomedical engineering department.

QUALITY CONTROL

High level of quality control is ensured by the collective usage of mechanical, chemical and biological indicators.

Bowie-dick test is run every day foe equipment monitoring while chemical indicators are used for load monitoring. The biological indicators (Bacillus atrophaeus and Geobacillus stearothermophilus) are sent routinely for reporting to microbiology lab.

DISCUSSION

As per CDC, *Sterilization* describes a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods. The European standard defines that a medical device determined to be sterile should reach a sterile assurance level (SAL) of 10^{-6} CFU when it undergoes a validation process [7]. *Disinfection* describes a process that eliminates many or all pathogenic microorganisms, except bacterial spores, on inanimate objects. In health-care settings, objects usually are disinfected by liquid chemicals or wet pasteurization.

The CSSD of this tertiary care hospital has a very convenient access and has the restricted entry. According to WHO, there are no strict regulations regarding space measurements [5].

The space estimate might be based on the following [3]:

- Institution's size
- Number of beds depending on CSSD's supply
- Average number of daily surgical procedures

According to Indian health facility guidelines for CSSD, there is no major restriction of timings for receipt and dispatch of articles [3]. Similar protocol is observed in our CSSD department. Basic amenities for staff are available. At present, there is a single changing room and is convenient for the working staff.

Our CSSD staff is well trained and highly skilled due to their regular trainings and experience. The SOP manual is well in place and regularly updated. Internal and NABH audits are conducted as per the schedule.

The investigator noted that the used instruments are first washed once at the point of use (OT/ward) and then are sent to CSSD for sterilization. This practice is definitely advantageous as it removes the organic matter.

Sakharkar states that the main equipment in CSSD is the autoclave. At least one additional autoclave other than the main one should be provided in case the latter fails [8]. Our CSSD meets this requirement and handles the extra load satisfactorily. The equipments are cleaned and undergo quality control check as per the recommended SOPs.

In case of return of unutilized packs, they undergo a repeat process of decontamination and sterilization hence maintaining the high quality standards.

In our CSSD department, gloves are not recycled because here disposable gloves are used. This

practice ensures the better infection control as well as safety of healthcare workers.

Also, the recall procedure is included in SOP of CSSD. Though there hasn't been a single case of recall reported so far, the mock drill for the same has been conducted time to time.

CONCLUSION

In today's era, CSSD is no less than the heart of a health care setting as it not only reduces the chances of Hospital acquired infections but also improves patient outcomes and indirectly builds up hospital's reputation. The CSSD of this tertiary care hospital is contributing adequately in reaching hospital's aim of minimum nosocomial infections. It deserves a mention for high quality workflow and appreciable quality of standards of sterilization and disinfections. Internal and external audits play a major role in achieving the standards.

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Conflict of Interest: None declared

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