

**“A Cross-sectional Study Survey design to evaluate the Knowledge, Attitude and Practice regarding Medical Instrumentation Sterilization and Disinfection among Health care workers in a Quarternary care hospital”.**

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**Abstract:**

**Background:** A good Central sterile supply department set-up and competent operational health care workers with adequate knowledge, right attitude and excellent practice in techniques of medical instruments sterilization and disinfection are vital for a hospital to discharge its duty effectively in safeguarding human lives and to eliminate the remote possibility of hospital acquired infections. Few reports on the possibility of Blood borne Hepatitis viruses spread through surgical instrument contamination is known hence stringent strategies are to be followed for prevention of infection.

**Aim:** The main objective of this study was to assess the knowledge, attitude, and practice regarding medical instrumentation sterilization and disinfection amongst health-care workers of a quaternary care institute.

**Methods and Results :** The study is a pre and post education observational design . This study was done in a corporate hospital. It was approved by the Institutional Ethical Committee. The study was done through an on-line portal survey using Formsapp between June 2021–July 2021. About 73 health care workers (CSSD staff, Infection control nurses. Operating theatre staff, endoscopy staff, Doctors) participated in the Pre-test questionnaire . This was followed by educative material share circulated online and post – test was conducted . Data analysis was statistically interpreted using software, Statistical Package for Social Science software version 21 and results were statistically significant after the re-inforce education.

**Conclusion:**

Health care workers have adequate knowledge, right attitude and are always practicing correct sterilization and disinfection strategies in the institute. It is highly recommended to conduct such studies on a regular basis amongst all Healthcare facilities to reinforce and practice high standard of care for patients.

**Keywords:**

Sterilization, Disinfection , Knowledge, Attitude, Practice.

**Introduction:**

An article, surface or medium is free of all living micro-organisms in both vegetative or spore state is Sterilisation<sup>1</sup>. Disinfection is the killing of all pathogenic micro-organisms but will not necessarily destroy their spore forms<sup>2</sup>. The origin of nosocomial infections can be exogenous or endogenous. One possible cause of exogenous infections is failure of disinfection or sterilization of instruments<sup>3</sup>. Blood borne Viruses can get transmitted through instruments<sup>4</sup> which are not properly sterilized .Hence efficient sterilization procedures in all the hospitals are mandatory for providing safe patient care as well as in reducing hospital acquired infections and safeguarding human life<sup>5</sup>.

The Central sterile supply department (CSSD) plays a major role in ensuring that sterilized and expensive medical instruments are delivered to various end users in the hospital in a quality-assured environment<sup>6</sup>. The departmental activities includes several steps that includes cleaning of the instruments, assemble , packaging, sterilize and distribute the sterilized materials and equipment to respective departments ensuring safe sterilization practice with accurate technical supervision in a minimal cost<sup>7</sup>.

All the sterilization procedures are centralized under a trained professional in Central Sterile Supply Department. CSSD setting saves time and ensures the effective controlling of sterilization process throughout the institute<sup>8</sup>. CSSD plays a vital role in providing quality care to the hospital patients<sup>9</sup> and ensures best availability of sterilized medical instruments<sup>10</sup>.

**METHODOLOGY:**

This is a cross-sectional descriptive study carried out in a corporate quaternary care centre after obtaining Institutional ethics committee clearance. Study was done as an on-line survey between June 2021–July 2021. The health care workers (HCWs) participated in the online pretest questionnaire through Formsapp. About 73 HCWs (CSSD staff, Infection control nurses, Operating theatre staff, endoscopy staff, doctors) of the hospital . This was followed by a share of educative material through online and a post –test was conducted to meet the objectives of the study.

**SURVEY INSTRUMENT:**

A questionnaire was done using CDC ,APSID , WHO guidelines<sup>11-15</sup> on Disinfection and Sterilization in Healthcare Facilities. It included about each 10 separate questions with respect to knowledge, attitude and practice regarding medical instrument sterilization.

**SURVEY ANALYSIS:**

Survey data was statistically analyzed using the software, Statistical Package for Social Science SPSS software version 21.

**RESULTS:**

Results were presented in three separate tables for which statistical analysis was done using Paired t-test, which showed a significant P value <0.05 with respect to question wise score on Knowledge, Attitude and Practice.

**Table 1:****Question wise percentage of Knowledge on Sterilisation and Disinfection of Medical Instrumentation:**

S.no.	Questions	Correct Pre-test score among the 73 participants (%)	Correct Post-test score among the 73 participants (%)
1	Sterilization is defined as?	64 (87.7)	73(100)
2	What is the purpose of CSSD?	63 (86.3)	67 (91.8)
3	Which machine uses the temperature and pressure of the steam for Sterilization?	73 (100)	73(100)
4	Which of the following cannot be autoclaved?	56 (76.7)	71(97.3)
5	Heat labile instruments for use in a surgical procedure can be best sterilized by?	70 (95.9)	73(100)
6	ETO gas can be used in sterilization of all except?	14 (19.2)	53(72.6)

7	Which of the following is used as a control during plasma sterilization?	60 (82.2)	70(95.9)
8	Flash sterilization is not a routine practice for turnover instruments??	62 (84.9)	71(97.3)
9	In which of following condition Recall of CSSD items should be done?	58 (79.5)	67(91.8)
10	What is the other name for bowie-dick test??	64 (87.7)	69(94.5)

**Table 2:****Question wise percentage of Expected Attitude on Sterilisation and Disinfection of Medical Instrumentation:**

S.no.	Questions	Correct Pre-test score among the 73 participants (%)	Correct Post-test score among the 73 participants (%)
11	Sterilization is not effective in killing prions even with increase in temperature??	15 (20.5)	42 (57.5)
12	Regular training program is recommended for all staffs in CSSD?	71(97.3)	71(97.3)
13	Record maintenance is not essential if sterilization process is ensured?	65(89)	73(100)
14	Frequency of equipment check should be done as per manufacturer's instructions?	60(82.2)	72(98.6)

15	Biological indicators are one of the ways that should be used to ensure	70(95.9)	71(97.3)
	proper sterilization of articles?		
16	Labelling of material should include department of use?	67(91.8)	73(100)
17	Placing of packed materials especially sterilized by ETO should be paper to paper or plastic to plastic?	17(23.3)	68(93.2)
18	If one or both biological indicators are positive, do one or more of the following until problem is resolved? Except??	40(54.8)	69(94.5)
19	Unacceptable packing material requirements?	18(24.7)	49(67.1)
20	Factors affecting efficacy of sterilization and disinfection includes?	61(83.6)	71(97.3)

**Table 3:**

**Question wise percentage on Right Practices on Sterilisation and Disinfection of Medical Instrumentation:**

S.No.	Questions	Correct Pre-test score among the 73 participants (%)	Correct Post-test score among the 73 participants (%)
21	Staff maintaining aseptic techniques?	73 (100)	71(97.3)
22	Glutaraldehyde reuse for disinfection of endoscopes should be every?	59(80.9)	71(97.3)
23	Water noticed in a sterile dressing tray which is just opened and received from CSSD? What should you do?	70(95.9)	71(97.3)
24	Safety measures like handling of instruments as per protocol and appropriate personal protective equipment usage in CSSD are?	73 (100)	72(98.6)
25	In absence of 2% glutaraldehyde which other disinfectants can be used for	58 (79.5)	66(90.4)

	reprocessing of endoscopes?		
26	How frequently does testing chemical strips (Potency) for determining minimum effective concentration of glutaraldehyde be done?	61(83.6)	70(95.9)
27	After obtaining informed consent from patient explaining potential risks and advantages of dialyzer reuse how many times can dialyzer be reused?	9(12.3)	44(60.3)
28	What is the temperature and relative humidity to be monitored in CSSD?	62(84.9)	70(95.9)
29	Decontamination area in CSSD should have a minimum of?	45 (61.6)	67(91.8)
30	In which of following sterilization methods are eye goggles not recommended?	59(80.8)	69(94.5)

### **Statistical Analysis:**

Responses to study questions for the three categories of Knowledge , Attitude and Practice summarized with Paired –T-test as in Table 4.

**TABLE-4: Paired T-test of the scores of Pretest and Post test**

Descriptive Statistics	Percentage score of knowledge		Percentage score of attitude		Percentage score of Practice	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Mean	58.4	68.7	48.4	65.9	56.9	67.1
Std. Deviation	16.413	5.964	23.543	10.989	18.794	8.333
Minimum	14	53	15	42	9	44
Maximum	73	73	71	73	73	72
P-value	0.007		0.005		0.012	

The mean score of knowledge with respect to pre-test is 58 and mean score of post-test is 69.

The mean score of attitude with respect to pre-tests is 48 and mean score of post-tests is 66. The mean score of practice with respect to pre-tests is 57 and mean score of post-tests is 67. There is a significant mean difference between Pre-test assessment and Post-test assessment of

Knowledge, Attitude and Practice score with respect to P-value <0.05, which is statistically significant.

### **DISCUSSION:**

Sterilization and disinfection in the hospitals plays a vital role in the prevention of health care associated infections. All healthcare personnel are quite aware of transmission of the infectious disease if adequate aseptic precautions are not taken<sup>8</sup>.

There are very few studies (Sunita Suklecha et al) similar to this present study done in India emphasizing the vital role of Sterile Supply Department in infection prevention and control.

A study conducted by Basu et al, regarding the CSSD operation in an oncology center in the eastern part of India has acknowledged the significance of sterile supply department in control of nosocomial infections<sup>5</sup>. As per the present study findings and results, there is significant mean difference between pre-test and post-test of Knowledge, attitude and practice score with p-value <0.05 which proves the study is statistically significant. Also the healthcare workers compared to pre-test have significant improvement in their post-test except for four questions (one question in knowledge, two questions in attitude and one question in practice).

One knowledge question on ETO use was a new question to staff not a part of CSSD who were not aware of the kind of things not to be used for ETO Sterilization; the post test response after share of study material was good emphasizing the need for education alone. All CSSD Staff were aware of the same prior to education.

Two questions with respect to Attitude were found to be less understood in their pretest as compared to post test. Even in posttest too, it was observed that these questions were not directly related to their routine and hence less understood. Here again, Scores were less in Non CSSD staff only. The CSSD Staff scored 100% in their pretest.

Few questions in practice about Reuse Dialyzer reuse have definitely scored high after posttest. The reason for 60% even after post test as it is specialty specific question. and not all HCWs find the need to know for the same, The Reuse Dialyser numbers are unique to each institute and not a published/ recommended consensus.

The health care workers in the hospital are well trained and they are quite aware of scientific rationale behind concepts of sterilization and disinfection. The study institute organizes training classes regularly to update the knowledge among healthcare workers on the topics of medical instrumentation sterilization and disinfection thus constantly reinforcing them to adhere to the best practices.

### **STUDY LIMITATIONS:**

The present study augments the understanding of health care workers' Knowledge, Attitude and Practice related to medical instrument Sterilization and Disinfection , but there are few limitations. The online portal pretest and posttest design provided data regarding how Knowledge, Attitude and Practice (KAP) may change with imparting training. But there were limited chances of adequate discussion in person to ascertain the level of understanding. Along with these a diverse group of health care personnel were part of the study, from infection control nurses, Operating theatre technicians, central sterile supply department and endoscopy technicians to doctors. The majority (41%) of participants were Operating theatre technicians and central sterile supply department technicians (8%), however, endoscopy technicians and infection control nurses participation was around (9%); thus, this population had reasonably extraordinary levels of training, and the findings should be reviewed in this context. Out of 100 randomly approached staff , only 73 participated , thus the response rate was 73 % and we were unable to determine in those non-respondents whether those who did not respond differed significantly from those who did.

One of the limitations of this study may be in evaluating the HCWs practice; we trusted their personal statements, which might be different from their real practice.

### **CONCLUSION:**

The health care workers showed a statistically significant improvement with respect to Knowledge, Attitude and Practice regarding medical instrument sterilization and disinfection on training .On comparing the pretest with posttest after online health education regarding medical instrument sterilization Disinfection ,it is found that they have gained excellent knowledge with highly comprehensive positive attitude and are always adhering to proper methods of sterilization disinfection, which will pave a great way in the reduction of hospital acquired and lethal blood borne infections . To ensure proper sterilization every other institute must strictly adhere to their sterilization protocols and also make sure that these are followed regularly.Competencies(knowledge,attitude,and practice) improvement among healthcare professionals should be carried out periodically to deliver higher quality services with knowledge updation which will benefit Patients. We also would suggest that every other healthcare institutions to periodically conduct such studies regularly to have an insight of their health care workers knowledge ,attitude and practice with respect to medical instrument sterilization techniques onregular basis to reinforce and educate periodically to prevent nosocomial infections effectively.

**Ethical committee approval code – ECR/1276/Inst /TN/2019/087.**

### **Conflicts of interest:**

Nil



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Nil

**Author contribution:**

Study conception and design by Dr.Subha.S, Data collection and analyses by Dr.M.Nishanthy interpretation of results by both authors and drafting of manuscript by Dr.Nishanthy.M. Both authors have reviewed the results and approved the final version of manuscript.

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**Data availability:**

All data sets generated and analyzed during this study are included in the manuscript.

**Ethics statement:**

**Ethical committee approval code – ECR/1276/Inst /TN/2019/087.**

**Disclosures:**

The authors report no real or perceived vested interests that relate to this article that could be construed as a conflict of interest.

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