Short Coummunication

Knowledge and Awareness Among Healthcare Professionals Regarding Sterilization of Instruments at Shalamar Hospital of Lahore: A Cross Sectional Study

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Abstract

Background: In the medical field, sterilizing instruments is an essential step in any surgical process. Healthcare workers must have a fundamental understanding of how to effectively sterilize and disinfect medical equipment and supplies.

Objective: The goal of the study was to assess healthcare staff's knowledge and awareness regarding the sterilization of instruments.

Methods: The study employed a cross-sectional design, and participants were recruited using a convenience sampling technique. A questionnaire was created to evaluate the knowledge and awareness levels of different healthcare professionals. Participants answered all of the questions and submitted their responses via an online connection. During the six-month study, there were 30 questions included, 15 of which assessed knowledge and the other half assessed awareness. Data were analyzed using descriptive statistics in SPSS.

Results: The study included 65 participants, Of the total, 23 individuals (35.4%) are men, while 42 individuals (64.6%) are women. Participants ranged in age from 19 to 46. The results show that a significant majority of healthcare professionals showed sufficient awareness (71.49%) and knowledge (65.84%) about Instruments sterilization.

Conclusion: This study demonstrates a thorough comprehension of instruments sterilization. On the other hand, continuing education and workshops can help people better grasp sterilization methods, which will improve infection control and increase patient safety in surgical settings.

Received: 16-04-2025 | **1st Revision:** 27-09-2025 | **2nd Revision:** 12-11-2025 | **Accepted:** 31-01-2026

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Keywords | Patient safety, sterilization, medical instruments, medical equipment.

How to cite: Akram MAA, Saqib HM, Iqbal M. Knowledge and Awareness Among Healthcare Professionals Regarding Sterilization of Instruments at Shalamar Hospital of Lahore: A Cross Section Study. Ann King Edw Med Univ.2026;32i1: 109-112.

Introduction

Poorly performed sterilization in hospitals poses a significant risk for the spread of infectious diseases such as Hepatitis B and Human Immunodeficiency Virus (HIV). Sterilization is essential for killing all microorganisms and resistant spores. This is achieved through various methods such as moist heat, dry heat, low-temperature techniques, and radiation.[1] Disinfection removes most harmful microorganisms using heat or chemical agents, but it does not eliminate all, particularly bacterial spores.[2] Disinfection is generally classified into three levels: low, intermediate, and high, which are applied according to the infection risk of instruments and equipment, as categorized by the Spaulding Classification.[3]

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https://doi.org/10.21649/akemu.v32i1.6064

2079-7192/

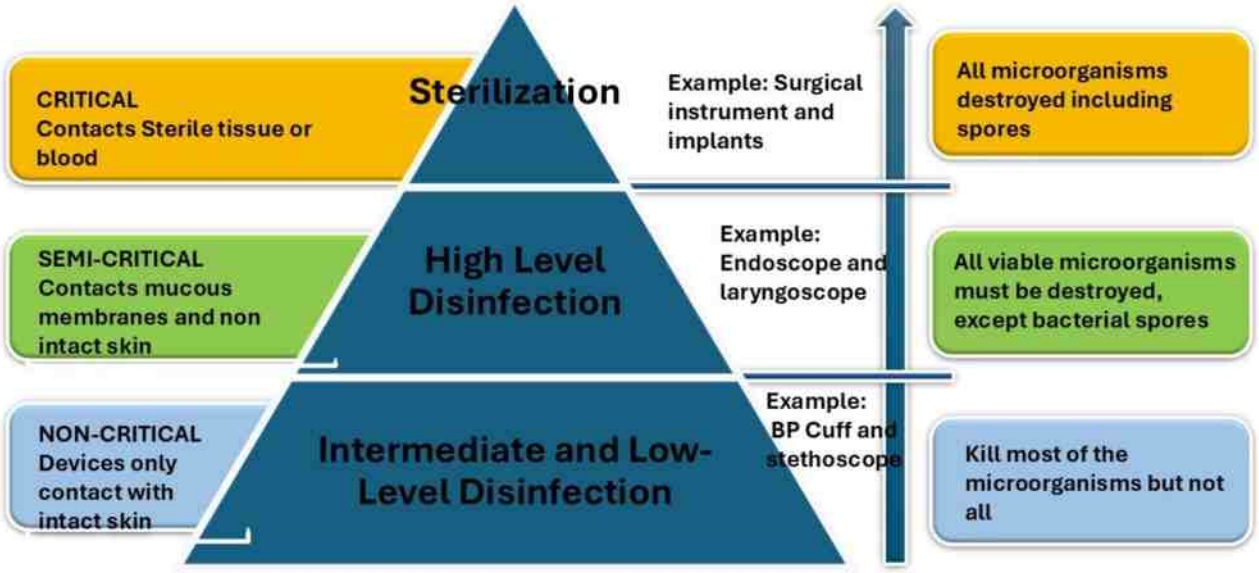

Figure 1: *This image illustrates the Spaulding Classification, which categorizes medical devices into critical, semi-critical, and non-critical items.*

In order to lower the danger of infection, medical devices must be properly sterilized. Based on the infection risk of a device, the Spaulding Classification divides items into three groups as shown in Figure 1.[4] Critical-use items: The items require complete sterilization as they contact sterile body areas and pose a high risk of disease transmission. Semi-critical use items: The items that come into contact with mucous membranes or non-intact skin, require high-level disinfection or sterilization, such as endoscopes. Non-critical use items: The items that come into contact with intact skin require low- to intermediate-level disinfection, such as a pulse oximeter.[5]

Method

The participants of this study were healthcare workers from the Operation Theater department at Shalamar Hospital, Lahore, including doctors, nurses, pharmacists, and technologists, with a minimum of 1 year of professional experience, responsible for examining instrument sterility before use. OT sweepers and those who were not employees of the OT crew were excluded. The ethical committee gave its approval before the study started. A convenience sampling technique was used to recruit participants based on their availability and direct involvement in instrument handling and sterilization practices within the Operation Theater. Data was collected using self- developed questions based on Fuller Volume 1. The study instrument included 15 questions assessing awareness and 15 questions assessing knowledge of instrument sterilization. Participants accessed the proforma via an online link and answered all questions. A total of 65 members of the Operation Theater (OT) team participated in the study. The study design used in this work is cross-sectional. Data analysis was done using descriptive statistics in SPSS.

Results

Of the 65 participants in the study, 23 (35.4%) were men and 42 (64.6%) were women, with age ranging from 19 to 46. The findings demonstrated that a great majority of healthcare workers have enough knowledge (65.84%) and Awareness (71.49%) about the sterilization of medical instruments as shown in Table-1. Healthcare personnel generally possessed sufficient knowledge and awareness, which enhanced infection control and patient safety protocols.

This table represents the adequate percentage of knowledge (65.84%) and awareness (71.49%) among healthcare personnel working in Operation Theater of Shalamar Hospital.

Discussion

The present study evaluates the Knowledge and Awareness among Healthcare professionals regarding the sterilization of instruments. When we compared these results with those of other studies, such as the one by Byin Tewolde et al., it was determined that 63.4% of the general rank of decontamination, cleaning, and sterilization implementation of instruments is rated as sufficient.[6] Another study by Gopal Panta et al., determined that over 70% of healthcare workers demon-

Table 1: *Knowledge and Awareness among Healthcare professionals regarding sterilization of instruments*

SR NO.	KNOWLEDGE-BASED QUESTIONS	FREQUENCY	PERCENTAGE
1	What is ideal temperature of an autoclave?	58	89.2
2	What is ideal time of an autoclave?	55	84.6
3	The three parameters of steam sterilization are?	54	83.1
4	Flash sterilization may be necessary when?	21	60.3
5	For sterilization to occur, steam must be?	27	41.5
6	The absence of all microbes is known as?	47	72.3
7	What fluid is used in an autoclave?	42	64.6
8	Where are soiled instruments received in CSSD?	52	80.0
9	Name a common physical sterilization method?	38	58.5
10	What should be done with rusted instruments?	28	43.1
11	How to pick sterilized items?	52	80.0
12	Surgical dressings are sterilized by?	38	58.5
13	What are the two sterilization methods?	56	86.2
14	Removal of air during the pre-vacuum stage?	38	58.5
15	Sharp instruments should not be sterilized by?	17	27.2
	Total Knowledge Score (%)	65	987.6/1500=**65.84%**
	AWARENESS -BASED QUESTIONS	**FREQUENCY**	**PERCENTAGE**
1	Can boilers sterilize items properly?	38	58.5
2	Know about importance of a UV chamber?	54	83.1
3	Do you sterilize air rotors and dental burs before use?	33	50.8
4	Are sterilized drapes used for each patient?	54	83.1
5	Do pouched instruments need a chemical indicator?	24	45.9
6	Are sterile trolleys used to deliver instruments?	53	81.5
7	Biological indicator use once a week?	48	73.8
8	Autoclave removes microorganisms including spores?	58	89.2
9	Is dry heat used for moisture-sensitive instruments?	52	80.0
10	Autoclave uses steam to sterilize instruments?	57	87.7
11	Is UV faster than moist heat for sterilization?	40	61.5
12	Should reusable instruments be cleaned before sterilizing?	55	84.6
13	Are you aware of sterilization materials?	29	44.6
14	Is boiling effective for sterilizing instruments?	36	55.4
15	Cleaning instrument is necessary before sterilization?	60	92.3
	Total Awareness Score (%)	65	1072.3/1500=**71.49%**

strated adequate knowledge regarding various aspects of medical equipment sterilization and reuse, which is rated as sufficient.[7] The study showed similar outcomes due to good sterilization knowledge and awareness.

Medical instruments or equipment are either sterilized or disinfected prior to usage. Sterilization is the killing of all microbes including spores. The most common is moist heat e.g. sterilization in an autoclave requires 15 minutes at 121°C under 15 psi pressure, while increasing the settings to 134°C and 30 psi reduces the required time to just 3–5 minutes. Conversely, disinfection effectiveness varies with the nature of microorganism and the strength of a disinfectant. Chemical disinfectants are classified based on their effectiveness as high, intermediate, and low levels.[8]

However, the presence of biofilms can hinder the effectiveness of steam sterilization and manual cleaning, increasing the risk of infection transmission. They weaken the effects of steam sterilization and disinfection posing higher risks of infections. Failing to eliminate them promotes the distribution of bacteria such as Clostridium difficile and Hepatitis B. Therefore, cleaning is essential. According to healthcare guidelines, the level of decontamination depends on the device's intended use, as not all require sterilization. But critical item must be sterile to prevent infection.[9]

Conclusion

Healthcare personnel had an impressive level of knowledge and awareness regarding instruments sterilization, according to this study, with 71.49% displaying awareness and 65.84% demonstrating acceptable knowledge. The results demonstrate an acceptable level of understanding. However, further training can enhance sterilization practices, increase patient's safety, and minimize infection risks. Regular training programs and workshops on instrument sterilization should be implemented in hospitals. Standardized protocols and guidelines should be established to ensure consistent practices, and future research should include multi-center studies with larger samples and stratification by professional experience to validate these findings.

Study Limitations

1. The study sample was restricted to Operation Theater staff from a single hospital, which may limit the generalizability of the results to other hospitals or healthcare settings.
2. The relatively small sample size of 65 participants may reduce statistical power and limit the ability to detect differences across subgroups such as gender, age, or professional role.
3. The study did not categorize participants based on their years of professional experience, which may have influenced variations in knowledge and awareness levels.

Ethical Approval: The Institutional Review Board, Shalamar Medical & Dental College, Lahore approved this study vide letter No. SMDC-IRB/ AL/ 2024-064.

Conflict of Interest: The authors declare no conflict of interest.

Funding Source: None

Authors' Contribution

MAAA: Conception & design, acquisition of data, analysis & interpretation of data, drafting of article, critical revision for important intellectual content

HMS: Conception & design, analysis & interpretation of data, drafting of article, critical revision for impor-tant intellectual content

MI: Conception & design, critical revision for important intellectual content

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