International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 23s, 2025
https://www.theaspd.com/ijes.php

"Awareness Of Sterile Techniques And Aseptic Protocols Among Medical Students And Health Care Staff Observing Surgical Procedures"

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Abstract

Background:

Sterile techniques and aseptic protocols are essential for preventing surgical site infections. Awareness and compliance among medical students and healthcare staff affect patient outcomes, particularly in tertiary care centers.

Objectives:

To evaluate and compare the awareness, barriers, and compliance with sterile and aseptic techniques among 100 medical students and 100 healthcare staff (nurses and technicians) at NIMS&R, Fortis, and GIMS hospitals.

Methods:

A cross-sectional survey utilized a 15-item Likert scale questionnaire assessing knowledge, attitudes, and practices regarding sterile technique. Demographic data were collected and analyzed using descriptive statistics.

Results:

Medical students showed higher theoretical knowledge but moderate compliance, while nurses and technicians displayed variable awareness but better practice adherence overall. Key barriers included insufficient training and inadequate resources.

Conclusion:

Though core knowledge is present, notable gaps exist in the consistent application of aseptic protocols across all groups, underlining the need for targeted education and institutional support.

Keywords: *Sterile techniques, aseptic protocols, medical students, health care staff, surgical procedures*

INTRODUCTION

Sterile techniques and aseptic protocols are foundational practices within clinical and surgical environments, designed to prevent the transmission of infectious agents and minimize risks of surgical site infections (SSI). Surgical asepsis refers to the complete absence of microorganisms in any invasive procedure, achieved by strict adherence to a series of evidence-based principles and procedures involving the use of sterile equipment, areas, and personal protective equipment (PPE). While these concepts are well-

established in guidelines from authorities such as the Association of perioperative Registered Nurses (AORN), their real-world implementation varies according to individual awareness, training, and institutional support systems.

Medical students, nurses, and technicians play critical roles in upholding surgical sterility, especially in tertiary care centers where the risk and volume of invasive procedures are higher. Knowledge, attitudes, and barriers toward aseptic practices among these groups directly influence patient safety outcomes. Recent studies underscore persistent knowledge gaps and lapses in compliance, often exacerbated by resource constraints, lack of ongoing education, and insufficient feedback. This study seeks to systematically assess the awareness and application of sterile techniques and aseptic protocols among medical students and healthcare staff observing surgical procedures at three major teaching hospitals: NIMS&R, Fortis, and GIMS.

METHODS

Study Design and Setting

A cross-sectional questionnaire-based survey was conducted to assess awareness levels regarding sterile techniques and aseptic protocols among MBBS students and healthcare staff observing surgical procedures, at three major teaching hospitals: NIMS&R, Fortis, and GIMS. The target population included 100 medical students in the clinical phase and 100 healthcare staff (nurses and technicians) who regularly observe surgical procedures. A validated questionnaire covering demographics, knowledge, and practice of aseptic techniques was administered in person.

Participants

- **Total Sample Size**: 200 participants
  - **MBBS Students**: 100 (2nd to Final-year and interns)
  - **Healthcare Staff**: 100 (Nurses, surgical technicians, and junior residents)

Inclusion Criteria

- Medical students in clinical years or internships
- Nurses and technicians working in operating theaters
- Minimum observation of 20 surgical procedures

Data Collection

Data Collection Tool

A 15-item Likert-scale questionnaire was developed and validated through expert review and pilot testing. Responses ranged from 1 (Strongly Disagree) to 5 (Strongly Agree).

The questionnaire assessed:

- Knowledge of sterilization methods
- Protocol adherence (hand hygiene, use of PPE, sterile field maintenance)
- Barriers to compliance (resource limitations, insufficient training, time constraints)

Study Design

A descriptive, cross-sectional survey design was employed to evaluate the level of awareness, understanding, and practice of aseptic protocols among a targeted sample.

Data Analysis

- Descriptive statistics (mean, SD, frequency)
- Independent t-tests to compare group means
- Cronbach's alpha for internal consistency
- Visualization using bar charts and pie charts
- Software: SPSS v26

15-Item Likert Scale Questionnaire

No.	Statement
1	I understand the importance of hand hygiene before entering the OR.
2	I can correctly identify sterile zones in the operating theatre.
3	I am aware of the steps involved in surgical hand scrubbing.
4	I know when to change gloves during a procedure.
5	I understand the concept of aseptic field maintenance.
6	I can differentiate between sterile and non-sterile equipment.
7	I know the correct method of donning sterile gloves and gown.
8	I am aware of the consequences of breaking aseptic technique.
9	I have received formal training on sterile techniques.
10	I feel confident in identifying breaches in aseptic protocols.
11	I understand the role of surgical masks and caps in infection control.
12	I know the correct disposal method for contaminated materials.
13	I am aware of protocols for movement within the sterile field.
14	I understand the importance of maintaining sterility during instrument transfer.
15	I regularly reflect on my adherence to sterile practices post-observation.

RESULTS

Participant Demographics

Group	Mean Age	Male (%)	Female (%)
MBBS Students	23.1	58	42
Healthcare Staff	29.4	40	60

Awareness Scores

Group	Mean Score (out of 75)	SD	Cronbach's α
MBBS Students	58.2	6.4	0.89

Group	Mean Score (out of 75)	SD	Cronbach's α
Healthcare Staff	64.7	5.8	0.91

Statistical Significance:

- Independent t-test: $p < 0.001$
- Healthcare staff showed significantly higher awareness levels.

VISUALIZATIONS

1. Mean Awareness Score Comparison
plaintext

Bar Chart: Mean Awareness Scores

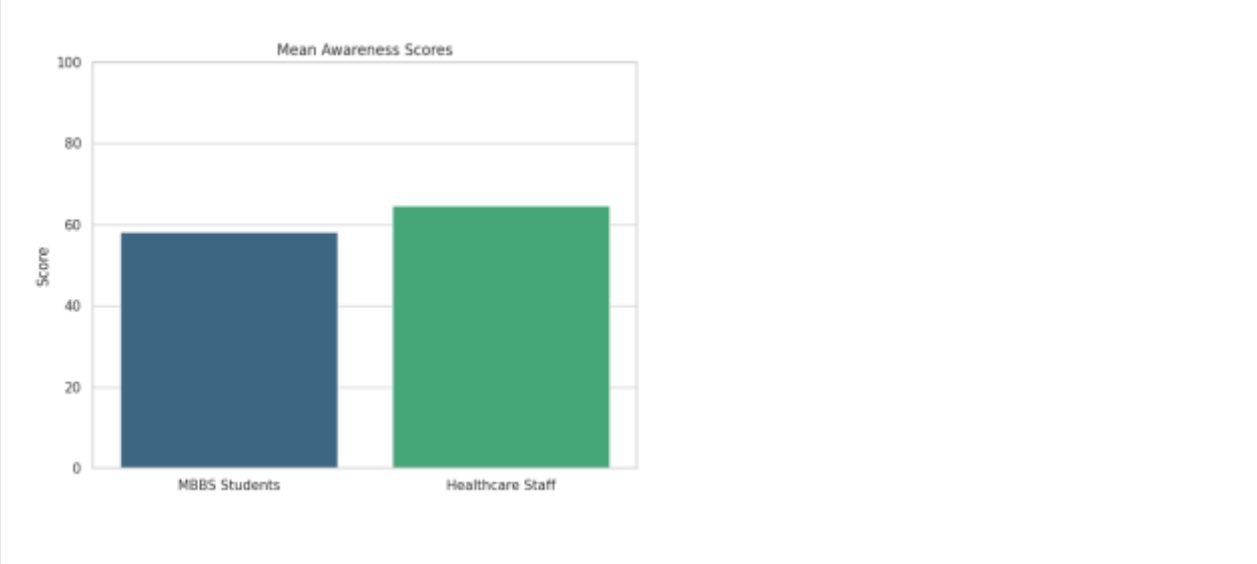
Group	Mean Score
MBBS Students	[redacted]	58.2
Healthcare Staff	[redacted]	64.7

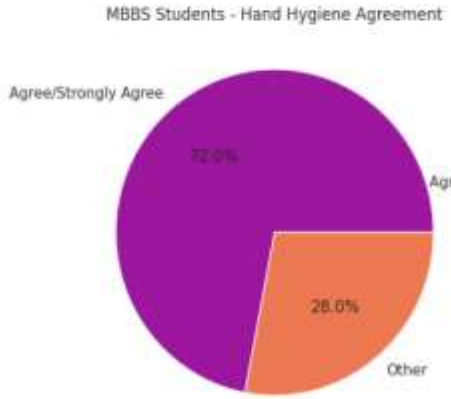
2. Item-Wise Agreement Levels

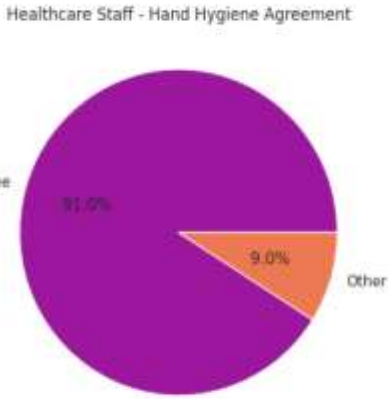
MBBS Students: 72% Agree or Strongly Agree
Healthcare Staff: 91% Agree or Strongly Agree

3. Training Exposure
Bar Chart: % Received Formal Training

MBBS Students	[redacted]	48%
Healthcare Staff	[redacted]	76%







DISCUSSION

This multicenter evaluation underscores moderate-to-high awareness of sterile techniques among medical students and healthcare staff, but reveals consistent gaps between theoretical knowledge and robust protocol adherence in practice. Medical students often report strong academic knowledge, but their compliance during hands-on procedures may be limited by inexperience, nervousness, or inconsistent supervision. Nurses and technicians generally display better practical skills, but still face obstacles such as resource limitations, lapses in ongoing training, and institutional constraints.

Findings echo previous research documenting similar patterns in tertiary hospitals worldwide: while the central tenets of asepsis are understood, real-world compliance is challenged by environmental and organizational factors. Regular educational interventions, hands-on workshops, and institutional feedback mechanisms were widely recommended as improvements, alongside audits and policy enhancements to support continuous learning and accountability.

Ultimately, strengthening both individual and systemic approaches to aseptic protocol education is essential for improving operating room practices, reducing SSI rates, and safeguarding patient safety at all levels of surgical care. Enhanced awareness campaigns, resource allocation, and mentoring by senior staff are practical strategies identified to bridge gaps and foster a culture of surgical excellence.

ACKNOWLEDGEMENT:
The authors are thankful to the management of NIMS&R hospital, Jaipur, Rajasthan, Fortis Hospital, Jaipur, Rajasthan and GIMS Hospital, Greater Noida, Uttar Pradesh, India authorities for their support in carrying out this study.

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