RESEARCH PAPER

A Cross-Sectional Study on the awareness of Aseptic Precautions in the Operation Theatre among undergraduate students in a tertiary care centre .

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Background: Surgical Site Infections (SSIs) have been a challenging and degrading progress in the treatment for the patients as well as treating physician for surgery especially , causing derangement in patient morbidity, mortality, and prolongs hospital stay with increase in cost of hospital expenditure. While the Operation Theatre (OT) is most secular environment for surgery some factors may precipitate infections like deficiency in adherence to aseptic protocols , Human error and technical errors causing exogenous microbial contamination. Undergraduate medical students and surgical trainees are beginner with a choice of passive observation and sometimes actively assisting the surgery due to limited exposure to aseptic precautions. There is a higher chance of spreading infection by not adherent to aseptic protocol in operation theatre .

Objectives: The primary objective of this study was to evaluate the awareness about aseptic protocol in operation theatre among undergraduate students. It is done by active passive teaching approach by assessing the undergraduates using various multiple choice questions as assessment tool to provide us a survey on their knowledge about aseptic protocol thereby creating a new active training approaches can be provided in future with a choice of assessment tools like Mini- cex and other active learning approaches for the learning .

Methods: A cross sectional study conducted between period of june 2025 till june 2026 in department of general surgery in karpaga vinayaga institute of medical sciences and research centre near chengalpattu . study conducted among undergraduate students with ongoing / completed practical session on observing or assisting for surgery
INCLUSION CRITERIA - Undergraduate student completed / ongoing postings in department of general surgery .
EXCLUSION CRITERIA - undergraduate student without any exposure to operation theatre are excluded.

Results: complete survey was done with the help of mcq assessment using passive teaching methods provides us with the new insights. Majority of the age group responded ranges between 22 to 25 years of age . seconded with the age group under 22 years . Lastly responded age group more than 25 years . Total response majorly answered by undergraduate students and minority was interns. 64% students completed their surgery rotation rest 26% yet to attend surgery rotational postings.

Response on the hand washing technique only 44% percent knows the perfect methods.62% have knowledge on the operation theatre donning and doffing methods.55% undergraduate only knows about the maintenance of the sterile environment . Majority 78% knows about theoretical view on aseptic precautions.

55% undergraduate knows about position on the instrument set up in operation theatre.67% knows about painting and draping methods. 62% knows about mask wearing technique in operation theatre. Only 34% agrees on adherence of aseptic protocol even in emergency cases .only 24% agrees on auditing for aseptic protocol in operation theatres. Majority of them answered being neutral on time consumption on aseptic protocol . 52% agrees on discontinuation on aseptic protocol in operation theatres.52% agrees on the fear for negative feedback from seniors.

Keywords - Aseptic precaution , undergraduate

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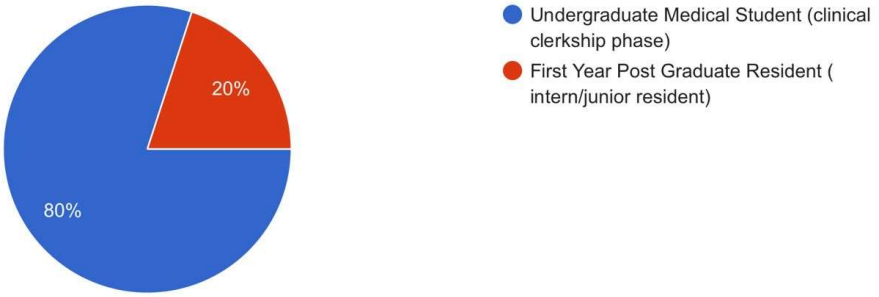
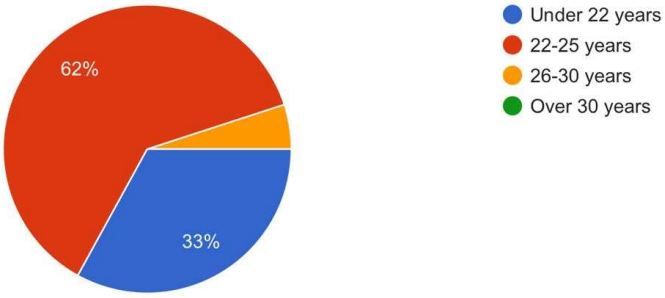
2. Current level of medical training:

100 responses



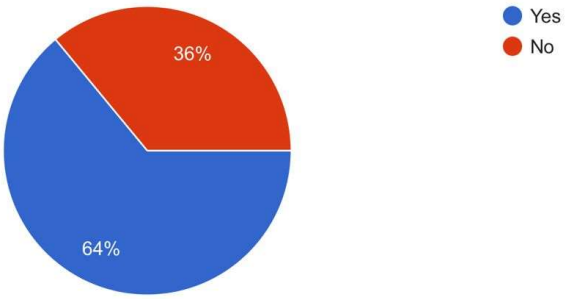
1. What's your age? (Age bracket)

100 responses



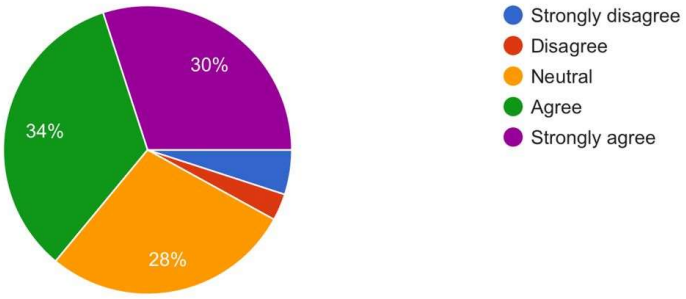
3. Have you completed primary general surgery rotation?

100 responses



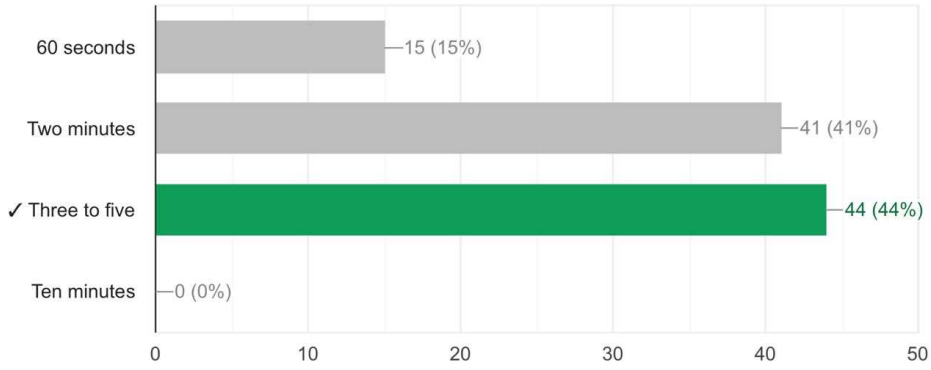
11. Strict adherence to every step of aseptic protocol is necessary even when a surgical case is highly urgent or a life-threatening emergency.

100 responses



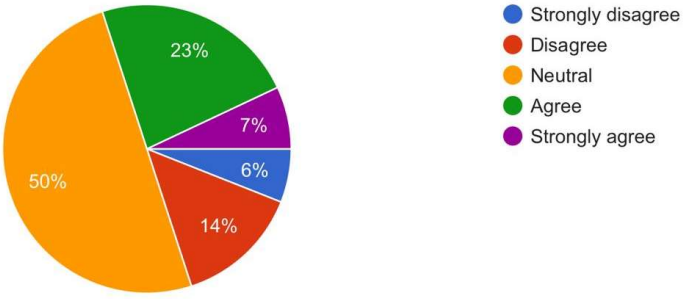
4. What is the required mechanical scrubbing time when performing an antimicrobial scrub for the initial surgical scrub of the day?

44 / 100 correct responses



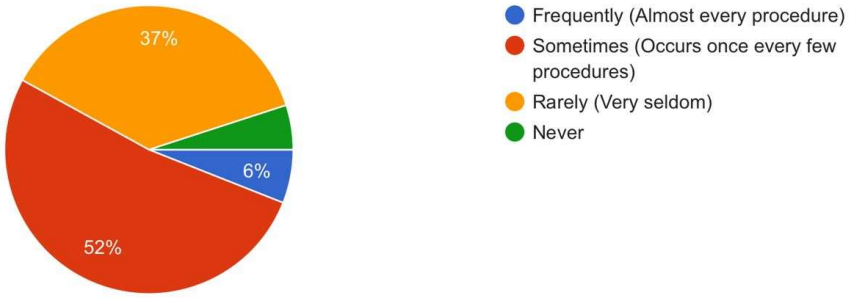
13. Maintaining rigorous aseptic precautions sometimes unnecessarily slows down the turnover time and compromises operational efficiency in high-volume operating theatres.

100 responses



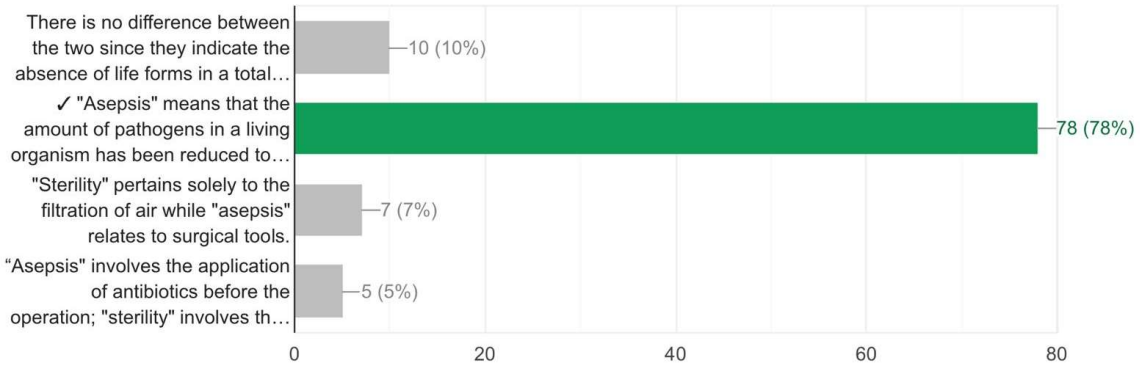
14. In your daily clinical rotations, how frequently do you find yourself inadvertently breaching an aseptic boundary (e.g., touching an unsterile surfac... below the waist) during a single operative case?

100 responses



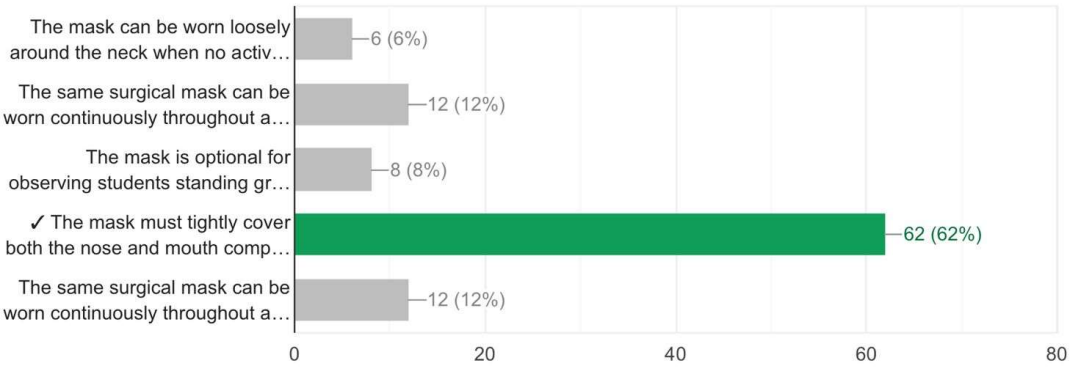
7. Which one of the following statements makes the basic difference between "Asepsis" and "Sterility" from a microbiological perspective in the operating theater?

78 / 100 correct responses



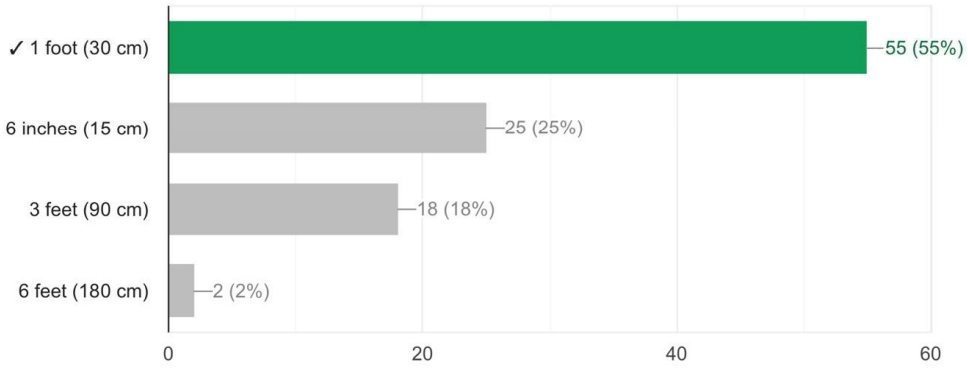
10. What is the correct protocol regarding the use of surgical masks within the operating theatre suite to ensure proper containment of droplet contamination?

62 / 100 correct responses



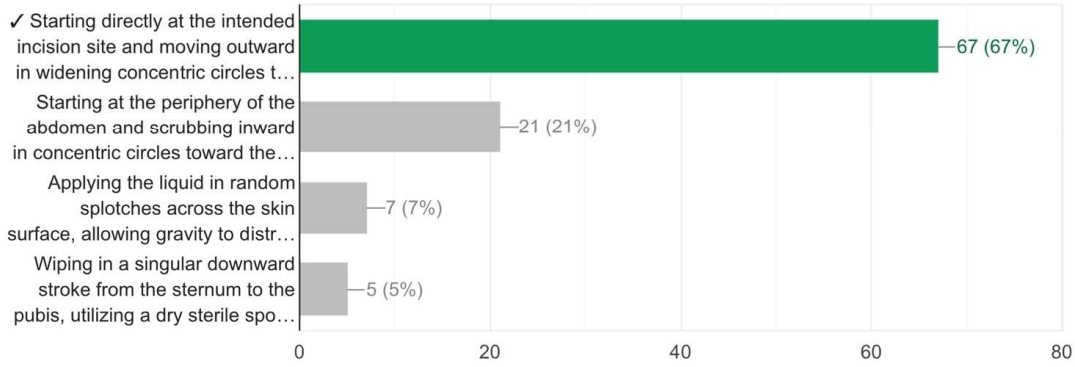
8. While setting up a sterile instrument tray, the scrub person opens a wrapped instrument set. What is the minimum safe spatial clearance that non-scrub...aintain from the perimeter of this sterile field?

55 / 100 correct responses



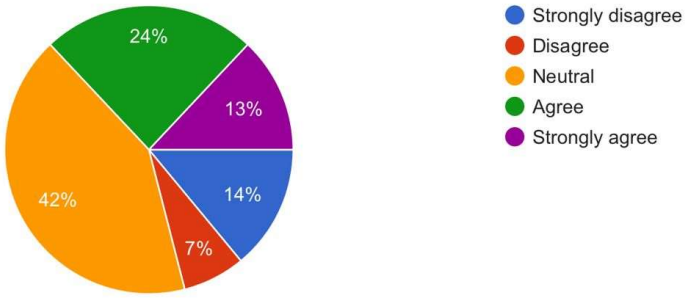
9. When preparing a patient's skin preoperatively using an alcohol-based chlorhexidine gluconate (CHG) solutio...al incision, how should the solution be applied?

67 / 100 correct responses



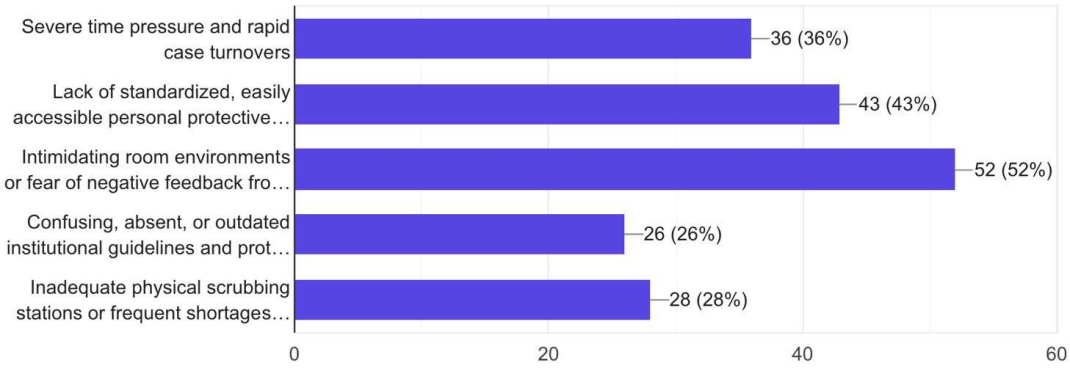
12. Regular monitoring, tracking, and unannounced administrative audits of my aseptic techniques infringe upon my professional autonomy as a future clinician.

100 responses



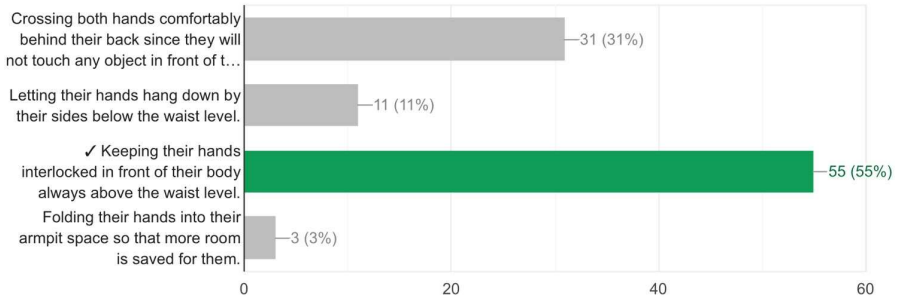
15. Which of the following factors act as significant barriers preventing you from maintaining ideal aseptic practices within your current institutional operating suites? (Select all that apply)

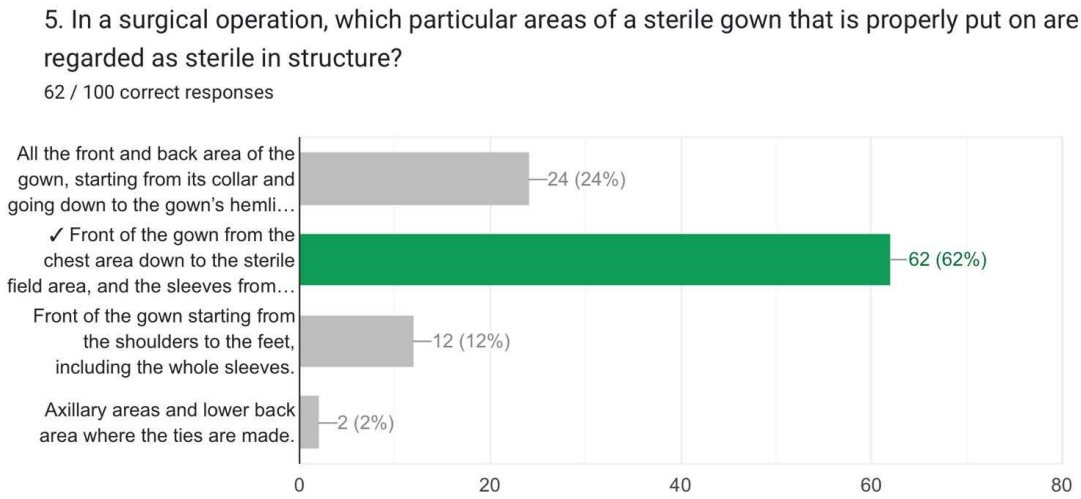
100 responses



6. A student is witnessing an open laparotomy. Which of the following should be done by the student while standing close to the sterile area?

55 / 100 correct responses





conclusion

This study reveals there is misconduct between theoretical knowledge and practical application of knowledge among students in the area of aseptic precaution following in operation theatre. Whereas there is a clear success in the passive approach for the assessment using mcq's among undergraduate students . They laack in basic parctical application skills which including hand washing technique . Furthermore study suggests that the exaaminers should focus on teaching students on showing adherence of aseptic precautions during observation . Even a high theoretical approach among teachers teaching undergraduate need an improvement on more practical based approach for undergraduate in aseptic precaution , There is a clear lag on accountabiltiy on aseptic precautions among students by objecting the audit on aseptic precautions. majority undergraduate admitted fear over the clinical hieracy among the seniors so there should be an improvement in more friendlier approach for the undergraduates with providing enough knowledge , attitude and responsibility in maintaining and following aseptic protocol in operation theatres during observation and assisting for surgery . From this study we conclude that examiner should always have a more simpler , reliable and practical approach on the aseptic precaution and undergraduate should be able to apply their theoretical knowledge into practical aspect in maintaining aseptic precautions.

Introduction

The operating theatre (OT) is one of the most sophisticated mechanical room with better fumigated and germ free environment for the procedure with most modernized equipments for handling surgery with prevention on infective measures and promoting protocol for prevention of infection. Adhering strict maintenance on aseptic precaution provides pivotal defense against the entry of pathogenic microorganisms into surgical wounds, directly reducing the introduction of Surgical Site Infections (SSIs). Despite meticulous controls of infection , Advanced ventilation systems, and established standard protocols in control and prevention of infection, the human factors remains primary error in spreading of the infection Major factors causing infection occurs due to improper adherence of infection protocol during surgery . It occurs due to inadequate knowledge about aseptic protocol. undergraduate medical students entering the operating theatre have very few knowledge about aseptic precaution in operation theatre. undergraduate students have theoretical knowledge about the procedure and technique followed during procedure. They have very little knowledge or lack of awareness about microbiology, hand hygiene, and general universal precautions in the operation theatre but having a theoretical knowledge about prevention of the infection . In this study conducted to create a protocol for transferring classroom knowledge into dynamic proactive adherence of aseptic protocol in high-stress OT environment . Thereby preventing misfit accidents such as accidentally touching against a non-sterile surface, dropping hands below the waistline after wearing sterile gowns, or improperly moving in a sterile zone which are seen predominantly among undergraduate students.

To identify these vulnerabilities, surgeons mostly following an active workplace-based assessment tools such as Direct Observation of Procedural Skills (DOPS), Direct Observation of Aseptic Skills (DOAP), or Mini-Clinical Evaluation Exercises (Mini-CEX) but evaluating the adherence of following and implementing aseptic protocol among the undergraduate is very limited. There is a variation on the learning , observing and performing the aseptic protocol among undergraduate students and are profoundly vulnerable to the Hawthorne Effect in which students temporarily alter their behavior to achieve adherence because an is standing over them.

Similarly, traditional pre-test/post-test interventional designs focus heavily on immediate retention following a single lecture, often failing to diagnose the stable baseline cross-sectional distribution of knowledge among undergraduate

subsequently a clear methodological necessity for large-scale assessment required for passive evaluation hence utilizing of objective Multiple Choice Questions (MCQs) as a tool to assess the knowledge of undergraduate students on the precaution of aseptic protocol following in operation theatre among undergraduates . Anonymous , validation-tested MCQ survey frameworks enumerate and identify the *cognitive understanding* behind clinical actions. This evaluation allow researchers to assess whether an undergraduate students genuinely understands the underlying principle on the aseptic measures , or if they are just following movements without a baseline comprehension of contamination risks. By examining these cognitive ability across undergraduate students , Faculties in department of general surgery can precisely identify structural knowledge gaps, analyze how theoretical approach correlate with factual understanding, and methodically way to protocol fulfillment in aseptic precautions in operation theatre.

This study presents a comprehensive, structured cross-sectional evaluation aimed at assessing the state of knowledge, attitudes, and self-reported adherence to aseptic precautions in the operating theatre among undergraduate medical students . By utilizing a specific, custom-designed MCQ-driven survey — independent of observational metrics or immediate pre/post interventional tracking—this investigation provides a clear diagnostic look at the hidden cognitive unawareness among the undergraduate students .

Methodology

Study Design and Setting

A cross sectional study design was executed over a period of one year from june 2025 through June 2026. The research was set to be conducted across undergraduate medical students posted in department of general surgery during the period. This design was selected to acquire a passive approach of knowing baseline knowledge levels and behavioral dispositions undergraduate students active within standard rotations in department of general surgery, completely removing any immediate educational evaluations or real-time observational testing protocols in operation theatres.

survey method

The primary research tool was an online, self-administered structured mcq questionnaire developed following a comprehensive review of the Guidelines on Hand Hygiene in Health Care, the Association of peri Operative Registered Nurses (AORN) Guidelines for Peri operative Practice, and published clinical validation literature on surgical site infection prevention (Chen et al., 2024; Jarelnape, 2023).

Structure of the Assessment Instrument

The finalized assessment tool was assigned to undergraduate students with 15 mcq based on demographic factors including age , gender and current training level in first three questions. Later seven questions composed on the basis of hand hygiene especially preoperative scrubbing methods , Sterile field adaptation and preservation , patient skin preparation for surgery. post exposure precautions for sterile zone disruption.

Lastly 5 questions based on likert scale ranging from 1- strongly agree to 5 - strongly disagree on training in adherence of aseptic precaution in operation theatre and breach in aseptic precaution in operation theatre.

Discussion

In this cross-sectional survey study provides new and critical view in how aseptic precautions are understood by early-stage medical professionals. Interns demonstrate high scores on protocols following in operation theatre on aseptic precaution. However, they lack knowledge on ster that define the operating theatre environment, such sterile zone boundaries adherence during surgery , the sterile gown maintaining protocol and sterile drape sheet application.

This results highly similar with similar clinical learning literature we referred. In a descriptive study investigating nursing staff across long term aseptic care, researchers noted that while 92% of personnel expressed more confidence in their aseptic technique, qualitative analysis proved that less than half actually understood the underlying scientific principles of maintaining a secure field (Gould et al., 2018)[2]. Similarly, a large-scale evaluation of over 900 operating theatre nurses revealed that more than 43.5% demonstrated low scores in practical exposure knowledge regarding surgical site infection prevention guidelines, in spite of displaying highly positive attitudes toward asepsis protocols (Feng et al., 2022)[3].

This concludes that there is a lag in cognitive ability in adherence to aseptic precautions in operation theatre by undergraduate students but have more theoretical knowledge and confidence on aseptic precaution with little adherence to critical cognitive ability in reality.

ADVANTAGES OF MCQS ASSESMENT

This investigation deliberately avoided active learning with observational tools like DOPS, DOAP, or Mini-CEX, as well as traditional pre-test/post-test tracking. However direct observation is required for assessing physical technique and skills, it has very little knowledge on assessing cognitive behavior in whole medical educational system for undergraduate

First, observational methods have a ability to the move towards Hawthorne Effect. When a student is being actively watched by an examiner using a DOPS checklist, they focus intensely on maintaining perfecting spatial boundaries especially in that particular allocated minutes. This temporary adherence hides their true, unobserved habits and basic understanding about the concept. In contrast, an anonymous, situational MCQ survey isolates the

trainee's *internal reasoning framework* away from the pressurized active assessment tools with proving anonymity. It tests whether the student genuinely understands about the concept of aseptic precautions in operation theatre.

Second, workplace-based assessments like Mini-CEX and DOPS are highly active intensive, require significant time , and are prone for assessor bias across different clinical examiners. These constraint make it difficult to evaluate them efficiently in large volume undergraduate students in medical college . A validated, cross-sectional MCQ assessment tool provides clinical faculties with a highly measurable, easy to assess and limits judgmental bias. This proves instantaneous results on assessing students without any lag This approach allows evaluators to easily identify specific systemic vulnerabilities within a curriculum without any lag of time.

Recommendations

Reforming the Educational Approach to aseptic precaution training in operation theatres

To tackle the cognitive defects and concept understanding errors identified in this study, medical educators must move away from relying solely on classroom theoretical lectures or simple procedural checklists during procedures . Instead, undergraduate medical curriculum should integrate specialized, multi-dimensional training and understanding before students entering into a live operation theatre with aiming on adhering aseptic precaution.

Spatial Simulations and Fluid Visual Tests:

The training needs to incorporate low stakes simulation laboratories where the limits of the sterile field are made apparent via physical training simulators by means of applying fluorescent dye on surfaces using ultraviolet light. Seeing the invisible powder traces transferred from the non-sterile light handle to the sleeve of the surgical gown teaches invaluable lessons on the issue of contamination.

Systematization and Speaking-Up Drills:

Case-based learning along with role-playing simulations need to be incorporated into the core surgical clerkship where the trainees learn about the usage of non-confrontational language when reporting a safety problem using such standardized methods as the "Two Challenge Rule."

Frequent Cognitive Audits:

Regular surveys via multiple-choice questions need to be administered at the department level to all trainees regardless of their current rotation. Such surveys will provide insight into the current levels of retention and allow adjusting the training program for incoming trainees..

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