

Comparative Evaluation of Awareness About Anaesthesia and Local Anaesthetic Toxicity Among 2nd Year MBBS Students and Interns

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ABSTRACT

Background: Anaesthesiology is an integral yet often underappreciated branch of medical science. Understanding its principles, particularly the awareness about anaesthetic techniques and the potentially life-threatening complications of local anaesthetic systemic toxicity (LAST), is essential for all medical practitioners. Undergraduate medical education often leaves gaps in practical anaesthesia knowledge, which may improve through clinical exposure during internships. This study aims to evaluate and compare the awareness of anaesthesia and local anaesthetic toxicity between 2nd year MBBS students and medical interns.

Methods: A cross-sectional comparative study was conducted among 100 medical students, divided into two groups: 50 2nd-year MBBS students and 50 interns. A structured questionnaire consisting of 20 multiple-choice questions (10 on general anaesthesia and 10 on local anaesthetic toxicity) was used. The responses were analyzed for accuracy and compared between the groups using statistical tools such as the Chi-square test.

Results: Interns demonstrated significantly higher awareness in both domains compared to 2nd-year students. The mean score of interns for anaesthesia-related questions was 7.8 ± 1.2 out of 10, compared to 5.4 ± 1.5 among 2nd-year students ($p < 0.01$). For local anaesthetic toxicity-related questions, interns scored 7.2 ± 1.3 while 2nd-year students scored 4.9 ± 1.6 ($p < 0.01$).

Conclusion: Clinical exposure during internship significantly enhances understanding and awareness of anaesthetic practices and associated toxicities. Early integration of anaesthesia teaching in the undergraduate curriculum, including simulation-based modules and hands-on experience, is recommended.

Keywords: Anaesthesia awareness, LAST, MBBS Students, questionnaire

INTRODUCTION

Anaesthesiology is a vital component of perioperative care and critical medicine. Despite its clinical importance, undergraduate medical curricula often underrepresent this subject [1, 6]. While interns regularly encounter anaesthesia-related scenarios during clinical postings, 2nd-year MBBS students typically have minimal exposure. Moreover, awareness of complications such as local anaesthetic systemic toxicity (LAST) is often inadequate at the undergraduate level [4, 5].

Local anaesthetics, especially agents like lidocaine and bupivacaine, are widely used across specialties including surgery, dentistry, and emergency care [12, 13]. LAST is a rare but serious complication involving central nervous system and cardiovascular toxicity that requires prompt recognition and treatment [5, 20]. Awareness and understanding of such complications are crucial, not only for anaesthesiologists but for all healthcare providers who might administer or monitor anaesthetic drugs [14, 19].

As anaesthesiology continues to evolve, the roles of anaesthesiologists have also expanded beyond the operating theatre. Anaesthesiologists today are an essential part of

trauma teams, pain clinics, critical care units, and procedural sedation teams [8, 9]. Given this breadth of responsibility, it is imperative that undergraduate students grasp at least the foundational knowledge of this discipline early in their education [7, 10].

This study investigates and compares the knowledge levels between 2nd-year MBBS students and medical interns. The aim is to highlight knowledge gaps and suggest curriculum modifications to enhance awareness from early undergraduate training stages.

METHODOLOGY

This cross-sectional, questionnaire-based study was conducted in a tertiary care teaching hospital in India over a period of 2 months. Ethical clearance was obtained from the Institutional Ethics Committee. Participation was voluntary and informed consent was taken from all participants.

Participants: Two groups were included:

Group A: 50 2nd-year MBBS students who had completed one year of pre-clinical and para-clinical education.

Group B: 50 medical interns undergoing compulsory rotating internship.

Study Tool: A self-designed structured questionnaire comprising 20 multiple choice questions was used. The questionnaire was divided into two sections:

1. General Awareness of Anaesthesia (10 questions)

2. Knowledge of Local Anaesthetic Toxicity (10 questions)

Each question had four options, with one correct answer. The questionnaire was validated by a panel of three anaesthesiologists.

The areas covered in the general anaesthesia section included basic definitions, types of anaesthesia, roles of anaesthesiologists, preoperative assessment, and common anaesthetic drugs [2, 3]. The local anaesthetic toxicity section included mechanism of toxicity, signs and symptoms, management protocols including intralipid therapy, and safe dosing limits of commonly used agents [4, 5, 14].

Data Collection and Analysis: The questionnaire was distributed as hard copies under supervision to ensure independent and honest responses. Responses were scored with 1 mark per correct answer. Data were analyzed using SPSS version 25. Mean scores, standard deviation, and percentages were calculated. A Chi-square test was used to compare categorical data and a t-test was used for mean score comparison.

RESULTS

Demographics: All 100 students completed the questionnaire. There was an equal distribution in terms of gender, with 60% males and 40% females in both groups. The mean age of 2nd-year students was 19.2 ± 0.6 years, while that of interns was 23.1 ± 0.8 years.

Knowledge Scores:

General Anaesthesia Awareness (Out of 10):

2nd-year students: 5.4 ± 1.5

Interns: 7.8 ± 1.2 ($p < 0.01$)

Local Anaesthetic Toxicity Awareness (Out of 10):

2nd-year students: 4.9 ± 1.6

Interns: 7.2 ± 1.3 ($p < 0.01$)

The most correctly answered questions among both groups pertained to the definition and roles of anaesthesiologists [1, 2]. Poorly answered questions included those about the maximum safe dose of lignocaine with adrenaline and the definitive management of LAST [5, 13].

Interns consistently outperformed 2nd-year students in both domains, indicating a strong correlation between clinical exposure and theoretical knowledge [3, 15]. Among interns, the highest scoring individuals had either done elective anaesthesia postings or expressed an interest in pursuing anaesthesiology as a career [17].

DISCUSSION

This study clearly indicates that clinical exposure during internship significantly enhances awareness of anaesthesia and local anaesthetic toxicity [1, 6, 7]. Several factors can be attributed to this:

1. Increased Clinical Exposure: Interns rotate through surgery, obstetrics, emergency and anaesthesia postings, providing hands-on learning opportunities [9]. These rotations give them the opportunity to observe and participate in airway management, intravenous sedation, and regional anaesthesia techniques [10, 11].

2. **Experience with Patients:** Interns often observe or assist in procedures involving regional anaesthesia, which helps reinforce theoretical knowledge through practice. Observing real-time management of complications such as hypotension or allergic reactions further enhances their learning [8].
3. **Relevance to Practice:** Awareness of LAST is critical when administering local anaesthetics in emergency rooms or minor OT settings, which interns are more likely to be involved in [12, 19]. In contrast, 2nd-year students largely rely on textbooks and may not appreciate the real-world significance of toxicity and its management [4, 14].
4. **Curricular Gaps:** The MBBS curriculum introduces anaesthesia theory in later clinical years. However, early years lack dedicated teaching, simulations, or clinical exposure. The traditional lecture-based approach may not be sufficient to instill confidence or deep understanding in students [6, 7].
5. **Simulation-Based Learning:** Exposure to simulation labs and workshops is often reserved for senior students or interns. Early incorporation of such methods can significantly improve learning outcomes. Simulation-based scenarios that mimic LAST can particularly enhance retention of emergency protocols [10, 14].

Other studies have shown similar findings. A study by Mahajan et al. found that structured anaesthesia modules improved awareness significantly [1]. Similarly, Ranjan et al. demonstrated that simulation-based learning led to a better understanding of drug toxicity [2].

The awareness regarding LAST is particularly concerning. Very few students could identify the use of intralipid therapy for LAST management [5, 14]. While it is expected that 2nd-year students may not yet be exposed to such advanced concepts, the results highlight the importance of at least introducing these topics early, especially given the widespread use of local anaesthetics in clinical settings [13, 20].

In addition to knowledge gaps, attitudinal aspects were also observed. Some students perceived anaesthesia as a less glamorous or secondary branch compared to surgery or medicine. Enhancing the visibility of anaesthesiologists' contributions may also help improve student engagement [17, 18].

Limitations:

The sample size was limited to 100 students from a single institution.
Only theoretical knowledge was assessed, not practical skills.
Longitudinal retention of awareness was not evaluated.
A structured curriculum module was not implemented and reassessed.

Potential bias due to self-reporting and social desirability may exist.

Recommendations:

1. **Early Introduction of Anaesthesia:** Incorporate basic anaesthesia teaching modules during the 2nd year of MBBS [6, 7].
2. **Simulation-Based Teaching:** Use of low- and high-fidelity simulations for topics like airway management and LAST [10, 14].
3. **Interdepartmental Collaboration:** Encourage joint sessions between anaesthesia and surgery departments for integrated teaching [8].
4. **Continuous Assessment:** Periodic quizzes or case discussions to reinforce knowledge [11].
5. **Use of Technology:** Leverage mobile apps and online modules for self-directed learning [16].
6. **Mentorship Programs:** Facilitate exposure through mentorship by anaesthesiologists [17].
7. **Elective Postings:** Encourage elective postings in anaesthesia during internship or final year [15].
8. **Awareness Campaigns:** Conduct awareness programs and seminars during clinical postings [18].

CONCLUSION

The study concludes that awareness about anaesthesia and local anaesthetic toxicity significantly improves with clinical exposure. Interns outperformed 2nd-year students in both domains. There is an urgent need to incorporate anaesthesia teaching early in the medical curriculum. Structured teaching, clinical exposure, and use of innovative teaching methodologies such as simulations can bridge the current knowledge gap. Given the potential life-threatening nature of LAST, all medical students should be familiar with its recognition and management. The importance of anaesthesiology as a discipline should be highlighted more prominently in undergraduate education.

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