Section: General Surgery

Original Research Article

KNOWLEDGE AND ATTITUDE OF MEDICAL STUDENTS TOWARDS MINIMALLY INVASIVE (LAPAROSCOPIC) SURGERY

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ABSTRACT

Background: Minimally invasive surgery (MIS), particularly laparoscopic surgery, has revolutionized surgical practice due to its advantages over traditional open procedures, including reduced postoperative pain, shorter hospital stay, faster recovery, and improved cosmetic outcomes. As these techniques become increasingly integrated into modern surgical practice, it is essential for future surgeons to possess adequate knowledge and a positive attitude toward minimally invasive procedures. Understanding the level of awareness and perception among surgical trainees can help identify educational gaps and guide improvements in surgical training programs. The present study aimed to assess the knowledge and attitudes of postgraduate surgery students toward minimally invasive (laparoscopic) surgery. **Materials and Methods:** A descriptive study was conducted among 50 postgraduate surgery residents (PGY-1, PGY-2, and PGY-3) in a tertiary care teaching institution. Data were collected using a structured questionnaire consisting of 20 multiple-choice questions, including 12 knowledge-based questions and 8 attitude-related questions. Knowledge scores ranged from 0–12 and were categorized as poor (0–4), moderate (5–8), and good (9–12). Attitude responses were grouped as positive or negative perceptions toward laparoscopic surgery. Data were analyzed using descriptive statistics, and results were expressed as frequencies and percentages. **Result:** Among the 50 participants, 34% were PGY-1, 32% were PGY-2, and 34% were PGY-3 residents. Regarding knowledge levels, 12% of students demonstrated poor knowledge, 50% had moderate knowledge, and 38% had good knowledge about laparoscopic surgery. Analysis of attitude responses revealed that 67.5% of responses reflected a positive perception toward minimally invasive surgery, while 32.5% indicated a negative or neutral attitude. **Conclusion:** The study demonstrates that postgraduate surgery students possess adequate knowledge and generally positive attitudes toward minimally invasive surgery. However, the presence of moderate knowledge levels among many trainees highlights the need for enhanced educational exposure, structured training programs, and simulation-based learning to further strengthen competencies in laparoscopic surgical techniques.

INTRODUCTION

Minimally invasive surgery (MIS) has transformed modern surgical practice by enabling procedures to be performed through smaller incisions using specialized instruments and imaging technologies. Among the most widely practiced forms of MIS is laparoscopic surgery, which has gained global acceptance due to its numerous clinical advantages over conventional open surgical approaches. These

advantages include reduced postoperative pain, minimal tissue trauma, shorter hospital stay, faster recovery, improved cosmetic outcomes, and lower risk of postoperative complications.[1,2] Over the past few decades, advances in surgical technology, imaging systems, and instrumentation have significantly expanded the scope of laparoscopic and other minimally invasive procedures across various surgical specialties. Initially introduced for diagnostic purposes, laparoscopic techniques are now widely utilized in both elective and emergency surgical procedures. Common laparoscopic interventions include cholecystectomy, appendectomy, hernia repair, and colorectal surgery, among others.[3] The evolution of minimally invasive techniques has also extended into specialized areas such as oncologic surgery, gynaecology, gastrointestinal surgery, and spine surgery.[4,5] Evidence from multiple studies indicates that minimally invasive approaches can provide comparable or even superior outcomes compared to traditional open surgery in terms of safety, recovery time, and overall patient satisfaction.[2,6] In recent years, further innovations such as robotic-assisted surgery and advanced endoscopic techniques have further refined minimally invasive approaches. Robotic systems allow improved precision, three-dimensional visualization, and enhanced dexterity, which may improve surgical performance in complex procedures.[7] Similarly, minimally invasive approaches have demonstrated significant benefits in complex conditions such as gastric cancer, inflammatory bowel disease, and spinal disorders, highlighting their growing role in contemporary surgical management.[8-10] As surgical practice continues to evolve, the demand for surgeons skilled in minimally invasive techniques continues to increase. Despite its numerous advantages, minimally invasive surgery presents unique challenges. The technique requires specialized training, advanced equipment, and a steep learning curve for surgeons. Mastery of laparoscopic procedures requires skills such as hand–eye coordination, depth perception in a two-dimensional environment, and familiarity with specialized surgical instruments.[1] Consequently, structured training during medical education and residency is essential to ensure that future surgeons are adequately prepared to adopt these techniques. Medical students and surgical trainees represent the future workforce responsible for implementing these advances in clinical practice. Therefore, their knowledge, perception, and attitudes toward minimally invasive surgery are critical factors influencing the adoption and dissemination of these techniques in healthcare systems. Adequate exposure to laparoscopic surgery during medical training can improve students' understanding of surgical innovations and encourage them to pursue further skill development in minimally invasive techniques. Several studies have explored the knowledge and perceptions of medical students regarding laparoscopic surgery. For instance, a study conducted among Nigerian medical students reported moderate awareness and generally positive attitudes toward laparoscopic surgery, although gaps in detailed knowledge were observed.[11] Exposure to modern surgical technologies during medical education influences students' interest in surgical specialties and improves their understanding of emerging techniques. Studies suggest that integrating minimally invasive technologies into medical curricula can enhance students' preparedness for modern surgical practice.[12] Patient awareness and acceptance of minimally invasive procedures have also increased due to benefits such as reduced postoperative pain, smaller incisions, and faster recovery.[13] As a result, surgeons are increasingly expected to be proficient in laparoscopic and other minimally invasive techniques. Despite its growing importance in clinical practice, variability still exists in the level of knowledge and exposure among medical students and surgical trainees. Therefore, this study was conducted to assess the knowledge and attitudes of postgraduate surgery students toward minimally invasive (laparoscopic) surgery and to identify potential gaps in surgical training.

MATERIALS AND METHODS

Study Design and Setting: A cross-sectional descriptive study was conducted to assess the knowledge and attitudes of postgraduate medical students toward minimally invasive (laparoscopic) surgery. The study was carried out among postgraduate residents in the Department of General Surgery at a tertiary care teaching institution.

Study Population: The study included 50 postgraduate surgery residents from three academic levels: first year (PGY-1), second year (PGY-2), and third year (PGY-3). Participants were selected using a convenience sampling method based on availability during the study period.

Ethical Considerations: Formal approval from an Institutional Ethics Committee was not required for this study, as it involved a minimal-risk educational survey conducted among postgraduate medical students. The questionnaire was anonymous, and no personally identifiable information was collected. Participation was entirely voluntary, and participants were informed about the purpose of the study prior to completing the questionnaire. Completion of the questionnaire was considered implied informed consent.

Study Instrument: Data were collected using a structured, self-administered questionnaire designed to evaluate both knowledge and attitudes regarding laparoscopic surgery. The questionnaire consisted of 20 multiple-choice questions, each with four response options.

Scoring Criteria: For the knowledge section, each correct response was awarded one point, while

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incorrect responses received zero points. The total knowledge score ranged from 0 to 12.

Knowledge levels were categorized as:

- Poor knowledge: 0–4
- Moderate knowledge: 5–8
- Good knowledge: 9–12

For the attitude section, responses were grouped as:

- Positive attitude: "Strongly agree" and "Agree"
- Negative attitude: "Neutral" and "Disagree"

Data Analysis: The collected data were entered into Microsoft Excel for analysis. Descriptive statistics were used to summarize the data.

RESULTS

Participant Characteristics: A total of 50 postgraduate surgery residents participated in the study. The distribution of participants according to year of training was as follows [Figure 1].

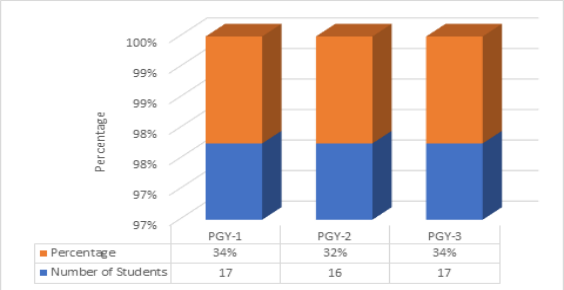

Figure 1: Participant year distribution

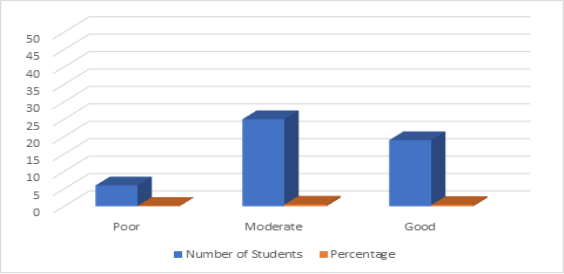

Figure 2: Knowledge level distribution

The study population therefore included nearly equal representation from all three postgraduate levels, allowing a balanced assessment of knowledge and attitudes across different stages of surgical training.

Knowledge Regarding Laparoscopic Surgery: The knowledge scores obtained from the participants were categorized into three levels: poor, moderate, and good knowledge [Figure 2].

Half of the participants (50%) demonstrated moderate knowledge regarding minimally invasive surgery, while 38% exhibited good knowledge. Only a small proportion (12%) had poor knowledge scores. These findings indicate that the majority of postgraduate students possess adequate foundational knowledge of laparoscopic surgical principles.

Attitudes Toward Laparoscopic Surgery: Attitude responses were analyzed by grouping them into positive and negative perceptions toward minimally invasive surgery [Figure 3].

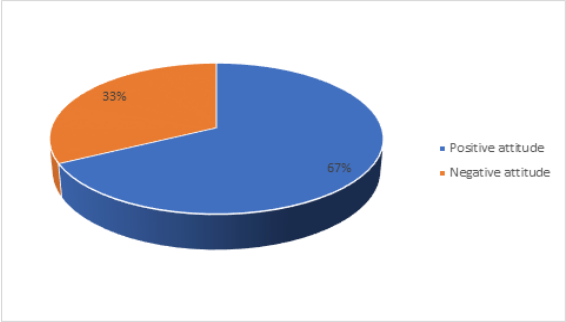

Figure 3: Overall attitude responses

The results demonstrated that more than two-thirds of the responses reflected a positive attitude toward laparoscopic surgery. Most participants agreed that minimally invasive surgery offers advantages such as reduced postoperative pain, shorter hospital stay, faster recovery, and improved patient satisfaction. The findings of the study suggest that postgraduate surgery students generally possess adequate knowledge and favorable attitudes toward minimally invasive surgical techniques. The positive perception among trainees highlights the growing acceptance and importance of laparoscopic surgery in modern surgical practice.

Distribution of Knowledge Levels According to Year of Training: Senior residents (PGY-3) demonstrated comparatively higher knowledge scores, suggesting that clinical exposure and surgical experience improve understanding of laparoscopic techniques [Table 1].

Table 1: Knowledge level by PG year

Year of Training	Poor	Moderate	Good	Total
PGY-1	3	10	4	17
PGY-2	2	8	6	16
PGY-3	1	7	9	17
Total	6	25	19	50

Responses to Selected Attitude Questions Toward Laparoscopic Surgery: Most participants strongly supported formal laparoscopic training and simulation-based learning, indicating recognition of the importance of minimally invasive surgical skills in modern surgical practice [Table 2].

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Table 2: Attitude question analysis

Attitude Statement	Positive Response n (%)	Negative Response n (%)
Laparoscopic surgery improves patient recovery	40 (80%)	10 (20%)
Laparoscopic training should be mandatory in residency	42 (84%)	8 (16%)
MIS reduces postoperative complications	36 (72%)	14 (28%)
Simulation training is important for MIS	44 (88%)	6 (12%)

DISCUSSION

The present study evaluated the knowledge and attitudes of postgraduate surgery students toward minimally invasive (laparoscopic) surgery. The findings indicate that most participants possessed moderate to good knowledge regarding laparoscopic surgical techniques and demonstrated an overall positive attitude toward minimally invasive surgery. These findings highlight the increasing awareness and acceptance of laparoscopic approaches among surgical trainees. In this study, half of the participants demonstrated moderate knowledge, while more than one-third showed good knowledge regarding laparoscopic surgery. This suggests that postgraduate surgical trainees have a reasonable understanding of the principles and benefits of minimally invasive techniques. Similar findings were reported by Shoqi et al. (2025), who observed that medical students generally possess basic awareness of laparoscopic surgery, although the depth of knowledge may vary depending on clinical exposure and educational opportunities.[14] Likewise, Olalere et al,[11] reported moderate knowledge levels among medical students, indicating that although students are familiar with the concept of minimally invasive surgery, further educational reinforcement is often required. The increasing knowledge of laparoscopic surgery among medical trainees may be attributed to the widespread integration of minimally invasive techniques into modern surgical practice. Over the past few decades, laparoscopic surgery has become the preferred approach for several procedures due to its advantages such as reduced postoperative pain, shorter hospital stays, and faster recovery.[1,2] Consequently, surgical trainees are increasingly exposed to these techniques during clinical rotations and residency training. The present study also demonstrated that the majority of participants expressed a positive attitude toward minimally invasive surgery. Most students recognized the clinical benefits of laparoscopic procedures and supported the need for structured training in minimally invasive techniques. These findings are consistent with previous studies that have reported favorable perceptions of laparoscopic surgery among medical students and trainees. For example, Mina et al. (2025) found that Lebanese medical students showed strong interest in minimally invasive surgery and believed that greater exposure to these techniques during training would enhance their clinical competence.[15] Positive attitudes toward minimally invasive surgery among trainees may reflect the growing recognition of its advantages in modern healthcare. Numerous studies have demonstrated that minimally invasive approaches can improve surgical outcomes and patient satisfaction compared to conventional open procedures.[6] Additionally, advancements in surgical technology, including robotic-assisted systems and enhanced imaging techniques, have further expanded the applications of minimally invasive surgery across multiple specialties.[7] Another important factor influencing students' perceptions is the increasing role of advanced technologies in surgical practice. For instance, robotic surgery has gained considerable attention in recent years, and exposure to such innovations during medical education may influence students' interest in adopting minimally invasive techniques.[12] Integrating modern surgical technologies into medical curricula may therefore help prepare future surgeons for rapidly evolving surgical practices.

Despite the positive findings, the presence of a small proportion of students with poor knowledge indicates that gaps in training may still exist. Mastery of laparoscopic techniques requires extensive practice, specialized training, and the development of advanced psychomotor skills.[1,16] Therefore, medical institutions should emphasize structured training programs, simulation-based learning, and hands-on workshops to enhance the competence of surgical trainees in minimally invasive procedures. In addition, exposure to minimally invasive procedures during residency training is essential for building confidence and technical proficiency. Studies have shown that early exposure to laparoscopic surgery can improve surgical skill acquisition and promote interest in advanced surgical techniques.[5] Providing opportunities for simulation training, surgical workshops, and mentorship programs may further strengthen the learning experience of surgical trainees. Overall, the findings of this study suggest that postgraduate surgery students demonstrate adequate knowledge and a favorable attitude toward minimally invasive surgery, reflecting the growing importance of these techniques in contemporary surgical practice. Strengthening educational initiatives and incorporating structured training programs in minimally invasive surgery may further enhance the preparedness of future surgeons and improve the quality of surgical care.

CONCLUSION

Minimally invasive surgery has become an important component of modern surgical practice due to its clinical benefits and growing patient preference. The present study found that postgraduate surgery students generally have moderate to good knowledge and a positive attitude toward laparoscopic surgery,

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indicating awareness of its importance in current healthcare practice. However, the presence of only moderate knowledge among some participants highlights the need for improved educational strategies. Incorporating structured training programs, simulation-based learning, and increased clinical exposure to laparoscopic procedures during residency may enhance trainees' knowledge and technical skills. Strengthening training in minimally invasive surgery during postgraduate education will help prepare future surgeons to effectively adopt advanced surgical technologies and improve patient care outcomes.

CONFLICT OF INTEREST

Not available

FINANCIAL SUPPORT

Not available

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