ANAESTHESIA FOR LAPAROSCOPIC ABDOMINAL SURGERY: A SURVEY ON THE CHOICE OF AIRWAY MANAGEMENT AMONGST ANAESTHESIOLOGISTS

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ANAESTHESIA FOR LAPAROSCOPIC ABDOMINAL SURGERY: A SURVEY ON THE CHOICE OF AIRWAY MANAGEMENT AMONGST ANAESTHESIOLOGISTS.

ABSTRACT

Background

Laparoscopic abdominal surgery is now a widely established minimally invasive surgical technique. Anaesthetic techniques have evolved and been refined to tailor to the anticipated physiological changes associated with laparoscopic abdominal surgery. The cuffed tracheal tube was previously thought to be the gold-standard airway management in laparoscopic abdominal surgeries. This is slowly being replaced by second generation supraglottic airway devices. This survey aims to examine and compare practices in airway management in laparoscopic abdominal surgery.

Methods

This study is a cross-sectional survey involving various government and private hospitals in the Klang Valley and Selangor. The survey questionnaire was distributed via email in Google Form format. The responses were tabulated and analysed, with the chi-square test performed to calculate p-value for sector and experience.

Results

The questionnaire was distributed to a total of 129 anaesthesiologists. Out of those, we received 95 responses but were only able to use 90 after considering inclusion and exclusion criteria. The majority of respondents (67.8%) use only ETT whereas 32.2% use LMA. Cross tabulation revealed significant correlation between work sector and

duration of experience in choice of airway management with p value for each being 0.009 and 0.027 respectively. Most in the LMA group choose low risk patients and maintain certain parameters to minimise risk of aspiration. The ETT-only group mainly cited lack of experience of junior colleagues and support staff, and potential medicolegal repercussions (49.1%, 39.2% and 39.2% respectively) as reasons for their choice.

Conclusion

Junior trainees and anaesthetic support staff should be educated on how to ensure safe usage of LMA in laparoscopic abdominal surgery. At the same time, more evidence needs to be gathered to enable the provision of such a training. A localised protocol could also be created to ensure standard practices can be implemented in the use of LMA in LAS.

ACKNOWLEDGMENTS

Alhamdulillah.

I would first and foremost like to express my deepest gratitude to Dr Jeyaganesh Veerakumaran and Col (R) Dato' Dr Jaseemuddeen Abu Bakar for their wisdom, constant guidance and infinite patience in helping me complete this study.

Thanks is also due to all the anaesthesiologists who participated in this survey.

My parents, Abdul Rahim bin Ibrahim and Balkish bt Mohd Isa, have been an endless source of encouragement and support. Without them, I could never be where I am.

Finally, to my pillar, my rock, my son, Nik Ilhan bin Nik Nazmi, who has unwittingly kept me disciplined and afloat. Always incandescent.

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LIST OF ABBREVIATIONS

LMA	Laryngeal mask airway
LAS	Laparoscopic abdominal surgery
LMA-C	LMA classic
LMA-P	LMA Proseal
LMA-S	LMA Supreme
ETT	Endotracheal tube

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

1.1 Background Information

Laparoscopic surgery is now a widely-established minimally invasive surgical technique. It offers several advantages over open surgery and its benefits have been well-documented. There is a reduction in stress response, postoperative pain, intraoperative bleeding, rate of postoperative wound infection, impairment of respiratory function, and pulmonary complications. Recovery time is shorter and cosmetic appearance is improved [1 – 3].

Procedures that are commonly done laparoscopically include cholecystectomy, adrenalectomy, appendectomy, hernia repair, donor nephrectomy, sleeve gastrectomy, splenectomy, liver resection, and colorectal surgery [4].

Despite these advantages, laparoscopic procedures are physiologically costly due to the cardiopulmonary effects of pneumoperitoneum and specific intra-operative positioning [4, 5]. It is also associated with severe complications such as pulmonary embolism, pneumothorax, pneumomediastinum, haemodynamic instability, haemorrhage and pulmonary aspiration of gastric contents [6 – 8].

As a result, anaesthetic techniques for Laparoscopic surgery have been refined to tailor to these anticipated physiological changes and potential complications [9]. Maintenance of a patent airway remains a major concern for an anaesthesiologist. The cuffed tracheal tube was generally considered as the gold standard for providing a safe glottic seal, especially for laparoscopic procedures under general anaesthesia [10]. It is

however not without disadvantages. Endotracheal intubation can cause noxious autonomic responses, trauma to the oral cavity, injury to the vocal chords and sore throat, amongst others [9 – 11].

An alternative to this would be to use a laryngeal mask airway (LMA). The advantages of using a LMA over tracheal intubation (TI) would be the avoidance of complications associated with TI, easier insertion and placement, less stimulating to the airway, reduced requirement of neuromuscular blockade leading to faster recovery, and lower incidence of postoperative adverse events such as sore throat, hoarse voice and coughing [12, 13].

Having said that, the use of LMA in the context of laparoscopic surgeries remains controversial. Laparoscopy is thought to increase the risk of aspiration as a result of pneumoperitoneum and Trendelenburg positioning, both of which increase intra-abdominal pressure and is accompanied by high peak airway pressures. LMA does not offer definitive airway protection from pulmonary aspiration of regurgitated gastric contents. The other contentious point is the ability of the LMA to provide correct ventilation in patients undergoing laparoscopic procedures [12, 14, 15].

1.2 Aim and Objectives

To date, there has yet to be a survey amongst anaesthesiologists in Malaysia on the method of airway management in laparoscopic abdominal surgeries.

The aim of this survey is to:

1) Evaluate the method of airway management in laparoscopic surgeries amongst anaesthesiologists;
2) To study the factors contributing to the choice of airway management;
3) To compare the differences in practices (if any) between anaesthesiologists working in public and private hospitals.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter acknowledges the researchers whose findings from previous studies have helped in formulating this survey and aided in illustrating current issues faced in choosing a method of airway management in LAS.

2.2 Literature review

Many studies have been conducted to analyse and compare different methods of airway management in various laparoscopic surgeries.

In a study by Maltby et al in the year 2000 [16], 101 adult ASA 1-2 patients scheduled for elective laparoscopic cholecystectomy using LMA-Classic (LMA-C) or ETT, focused on gastric distension and ventilation parameters. They concluded that positive pressure ventilation (PPV) with a correctly placed LMA-C of appropriate size permits adequate pulmonary ventilation; and that gastric distension occurs with equal frequency with both LMA-C and ETT.

The same authors conducted another similar study in 2002 comparing LMA-P with ETT [17]. They included 109 patients stratifying them as non-obese or obese (BMI > 30 kg/m2) and found that the correctly-seated LMA-P provided equally effective ventilation as the ETT without clinically significant gastric distension in all non-obese patients. However, 4 of 16 obese LMA-P patients crossed over to TI because of failed ventilation. They therefore so the recommended that further studies were required to determine the use of the LMA-P for laparoscopic cholecystectomy in obese patients.

Sharma et al [18] evaluated the LMA-P as an airway management device for a wide variety of commonly performed laparoscopic surgeries and concluded that it can

safely be used in well-fasted patients undergoing elective laparoscopic abdominal surgery as it successfully isolated the respiratory from the gastrointestinal tract.

Saraswat et al [19] later on compared the efficacy of LMA-P and ETT in young ASA 1-2 patients who underwent laparoscopic surgeries (cholecystectomy, appendicectomy and nephrectomy). They found that the LMA-P proved to be an equally effective airway tool in laparoscopic surgeries in terms of adequate oxygenation and ventilation with minimal intraoperative and postoperative complications. The haemodynamic stress response was also minimal with LMA-P when compared to ETT. It provided equally effective ventilation despite high airway pressures without significant gastric distention, aspiration, and regurgitation.

Lu et al [20], tested the hypothesis that the LMA-P was a more effective ventilation device than LMA-C for laparoscopic cholecystectomy in 80 ASA 1-2 patients. By analysing the ease of insertion, efficacy of seal, peak airway pressures and oxygenation, these authors concluded that LMA-P was a more effective ventilation device for laparoscopic cholecystectomy than the LMA-C. Although first-time insertion success rates were higher for the LMA-C, oropharyngeal leak pressure (OLP) was higher for the LMA-P. Ventilation was more optimal with the LMA-P under pneumoperitoneum condition. In 3 patients receiving LMA-C, ventilation failed but was subsequently adequately achieved using the LMA-P. They did not recommend the use of the LMA-C for laparoscopic cholecystectomy.

In the same year, Maltby et al [21] compared the LMA-C and LMA-P with the endotracheal tube (ETT) with respect to pulmonary ventilation and gastric distension during gynaecological laparoscopy and found that there was no statistically significant differences in ventilation parameters or stomach size. They concluded that a correctly

placed LMA-C or LMA-P is as effective as an ETT for positive pressure ventilation without clinically important gastric distension.

There were also studies comparing the safety and efficacy of LMA Supreme and LMA-P during laparoscopic cholecystectomy. Hosten et al [22] concluded that both devices can be used safely for laparoscopic cholecystectomies with careful patient selection and by experienced users. Belena et al [23] conducted a prospective randomised single-blinded study testing the LMA-S vs LMA-P and found that the LMA-P has a higher OLP and achieves a higher maximum tidal volume compared to the LMA-S, although the success of the first attempt insertion was higher for the LMA-S.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the methodology of this study. It includes study design, study population, sample size calculation, study procedure, statistical analyses and ethical consideration related to this study.

3.2 Study Design

This is a cross-sectional study. List of eligible participants together with their email addresses were obtained from the respective heads of departments or via websites of selected hospitals across Kuala Lumpur and Selangor. A self-administered survey was distributed to anaesthesiologists at these hospitals. The survey questionnaire together with a participant information sheet was then distributed via email. A completed survey implied consent. Responses were confidential and available only to the primary investigator and supervisors.

3.3 Study Population

Inclusion criteria

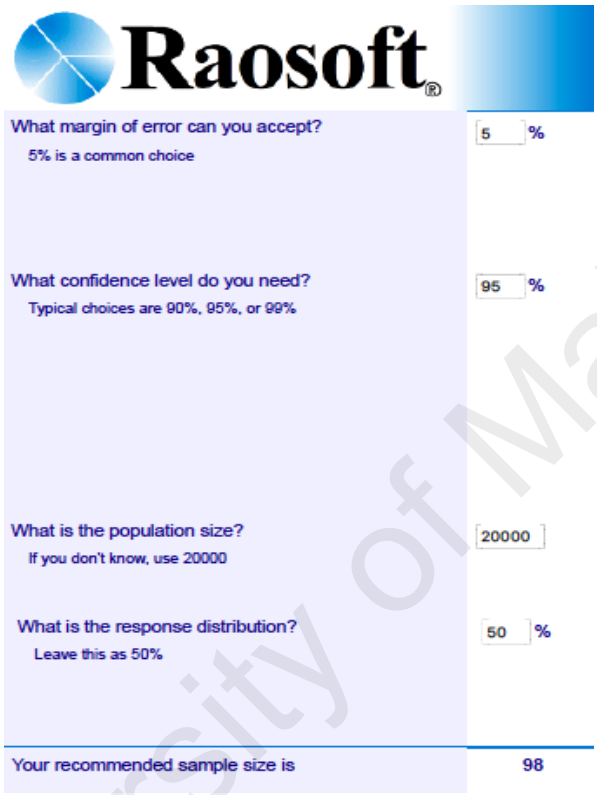
1) Anaesthesiologists registered with the National Specialist Register (NSR).
2) Anaesthesiologists working at hospitals in Kuala Lumpur and Selangor.

Exclusion criteria

1) Anaesthesiologists no longer practicing in the operating theatre.

3.4 Sample Size Calculation

The sample calculation for this study was obtained using the Raosoft sample size calculator application which is available online. We used 5% margin error with 95% confidence interval and the recommended sample size was 98.



3.5 Study Questionnaire

We developed the questionnaire after reviewing relevant literature regarding the use of LMA in laparoscopic abdominal surgery. The questionnaire was revised several times following test-runs to ensure that the questions may be easily understood by the participants. It was then distributed via email in Google Form format.

The questionnaire is divided into 4 main parts, which are as follows:

A) Demographic data – examining participants' work sector (private vs public) and duration of experience.

B) Frequency of anaesthetising patients for laparoscopic abdominal surgery and choice of airway management.

C) LMA group – patient selection, factors against selecting LMA, and parameters maintained throughout surgery

D) ETT-only group – focusing on factors contributing to this selection

A sample of the questionnaire may be reviewed in Appendix A.

3.6 Technical considerations

A patient information sheet containing a brief summary on the objectives of the survey was distributed to the participants together with the questionnaire (Appendix B).

CHAPTER 4: RESULTS

4.1 Demographic Data

During this study, we contacted a total of 130 anaesthesiologists from 6 private hospitals and 7 public hospitals that offer anaesthesiology services. Of those contacted, we received 95 responses, which is an overall response rate of 73.1%. However, 5 of those responses had to be discarded as they did not meet the inclusion criteria. Therefore, the final number of responses analysed were ninety (n=90). Of those, 45 (50%) work only in the public sector, 27 (30%) work only in the private sector, while 18 (20%) work in both the public and private sector (Figure 1).

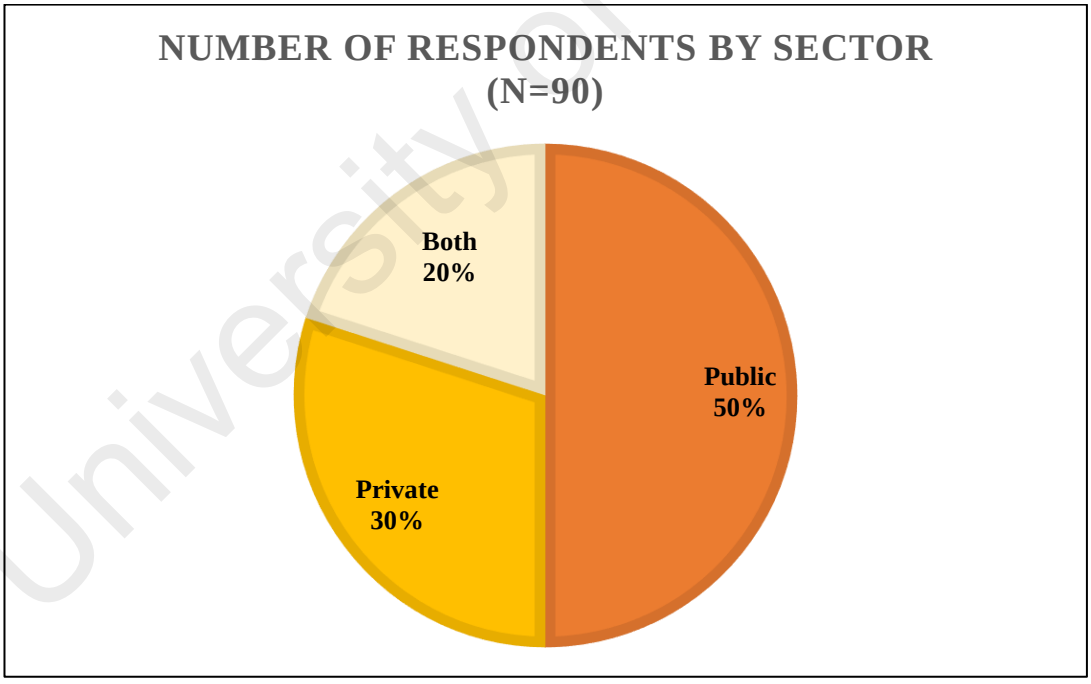


Figure 1: Number of respondents by sector.

The majority of respondents (73.3%) had >10 years of experience in anaesthesiology, followed by 22 (24.4%) respondents having between 5 – 10 years' experience, and only 2 respondents (2.2%) having <5 years' experience (Figure 2).

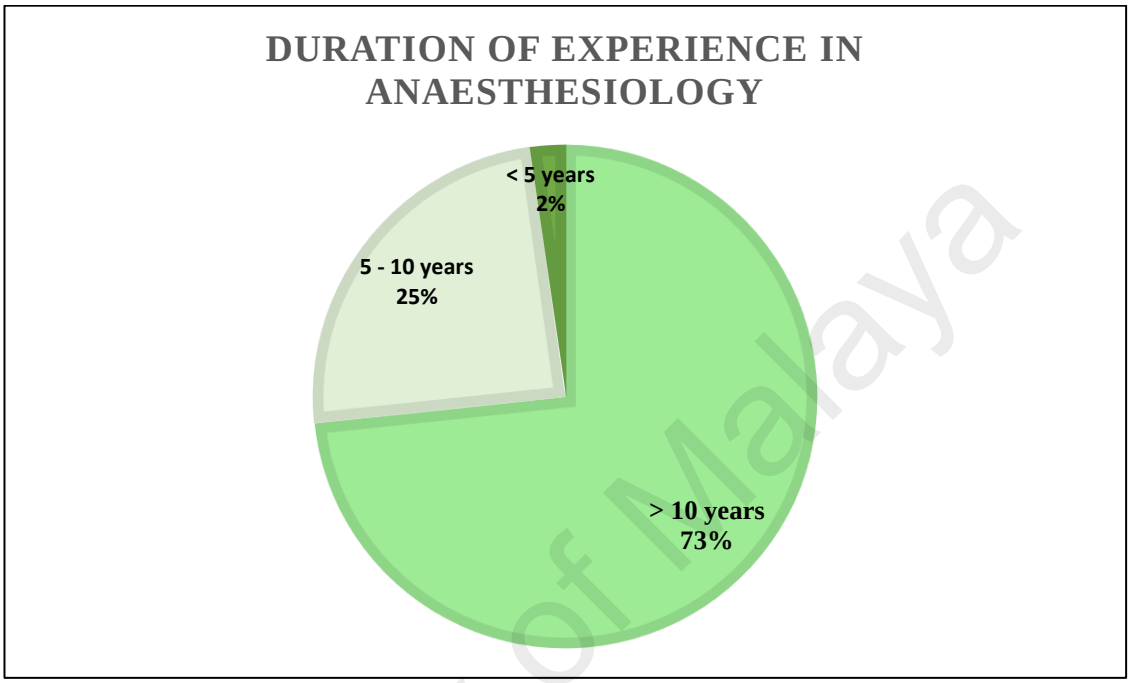


Figure 2: Duration of experience in anaesthesiology

In terms of frequency of anaesthetising patients for laparoscopic abdominal surgery, 45 respondents (50%) report conducting < 5 cases a week, 38 (42.2%) conduct between 5 – 10 cases, and 7 respondents (7.8%) report conducting <5 cases a week (Figure 3).

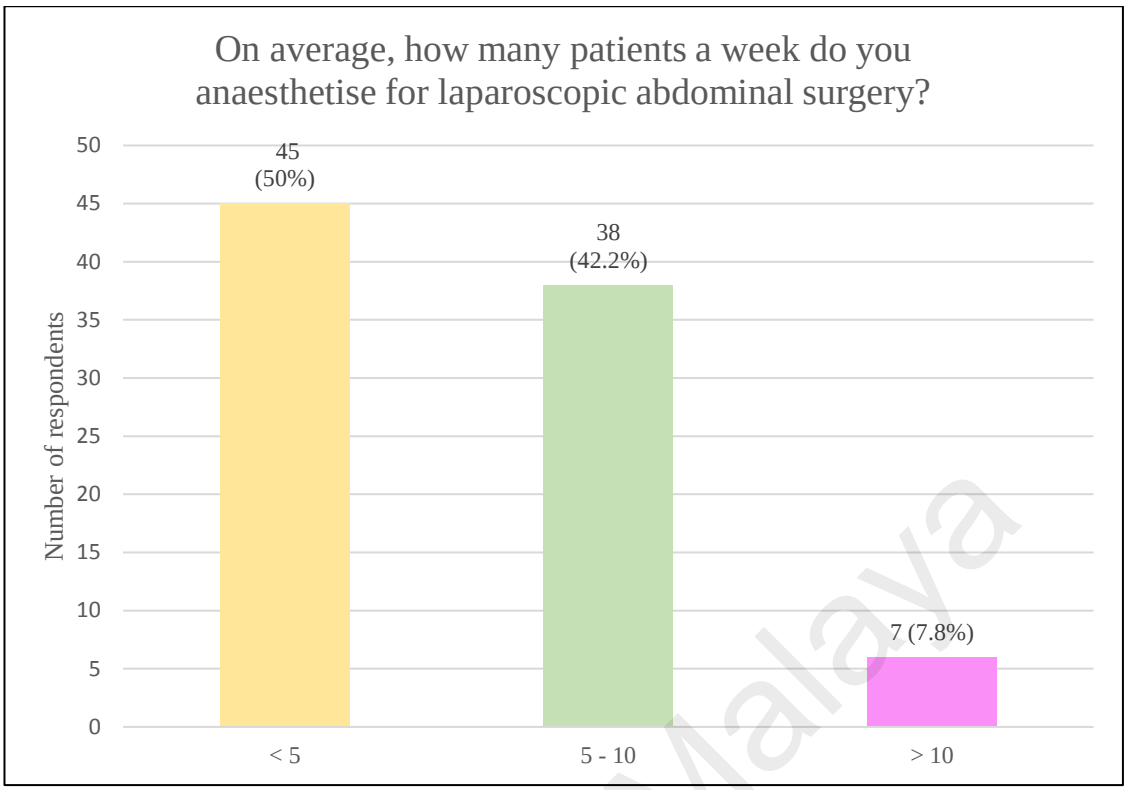


Figure 3: Frequency of anaesthetising patients for LAS.

4.2 Choice of Airway Management

Regarding choice of airway management in laparoscopic abdominal surgery, respondents were given the option of selecting how frequently they used the LMA. The majority of respondents, 67.8%, never used LMA at all (only used ETT), whereas only 2.2% always used LMA. The remainder used LMA occasionally (Figure 4).

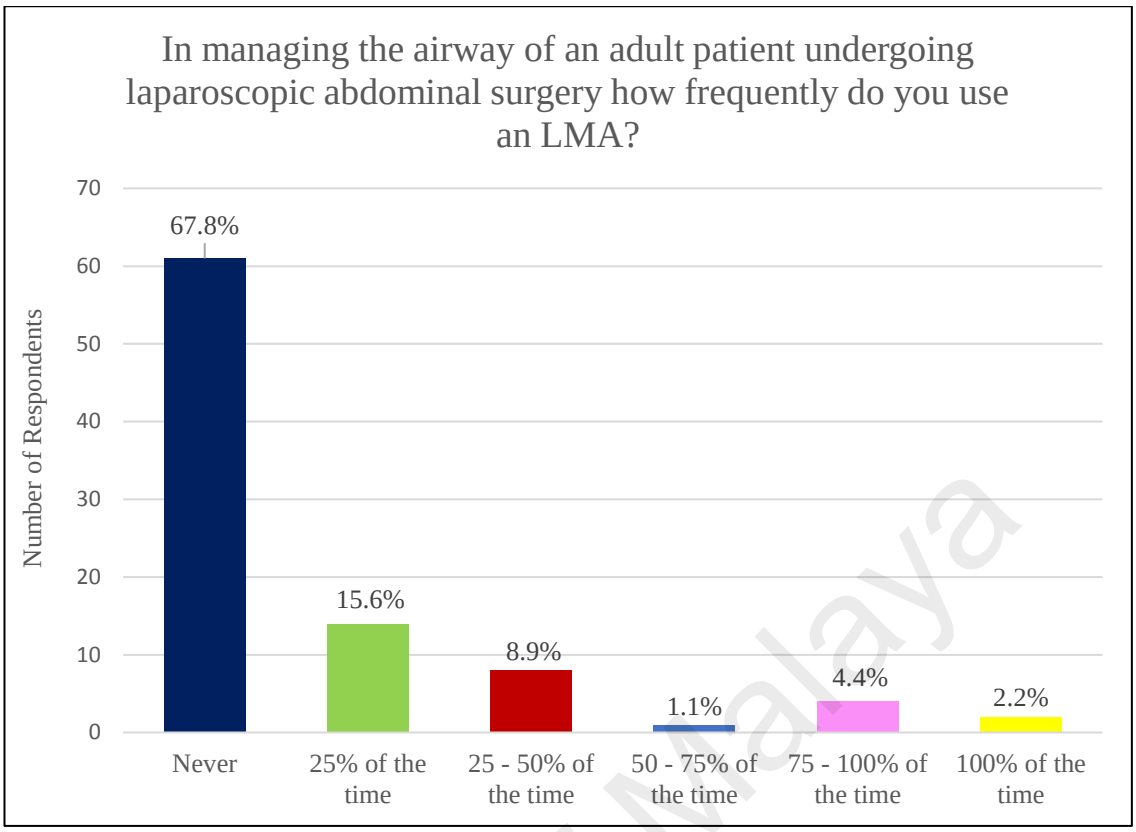


Figure 4: Choice of airway management in LAS

Table 1: Choice of airway management by sector

Sector	Number using only ETT (%)	Number using LMA (%)	Number using only LMA (%)
Public (n=45)	37 (82.2)	8 (17.8)	0 (0.0)
Private (n=27)	13 (48.1)	12 (44.4)	2 (7.4)
Both (n=18)	11 (61.1)	7 (38.9)	0 (0.0)
Total (n=90)	61 (67.8)	27 (30.0)	2 (2.2)

When further cross-tabulated, the vast majority of those who work in the public sector (82.2%) only use ETT, and almost two-thirds (61%) of those who work in both sectors only use ETT. Amongst the ETT group, 60% was from the public sector.

Meanwhile those who work in the private sector are fairly split down the middle in terms of those who only use ETT and occasionally use LMA. Of the entire study population, only 2 respondents (2.2%) use LMA all of the time in laparoscopic abdominal surgery, and both are from the private sector (Table 1) (Figure 5).

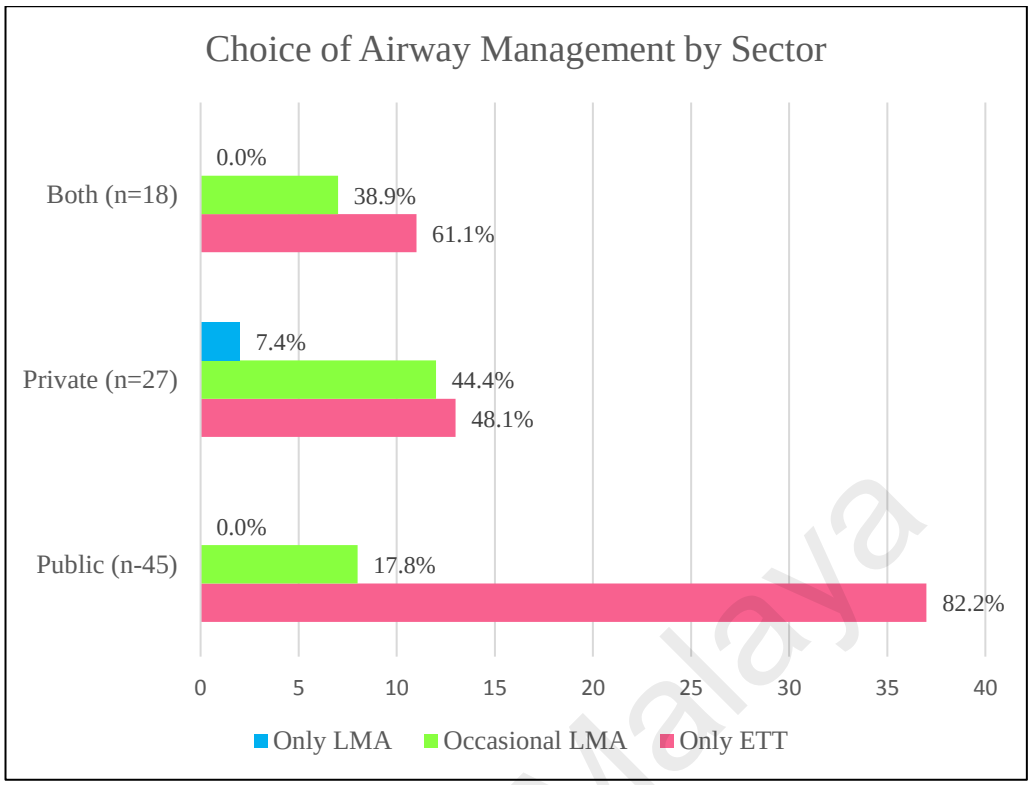


Figure 5: Choice of airway management by sector.

In order to simplify data analysis, choice of airway management is categorised as ETT-only group and LMA group. This data was cross-tabulated with duration of work experience and sector. A Pearson chi-square test was performed and the p value obtained was 0.027 and 0.009 respectively (Table 2).

Table 2: Choice of airway management by sector and duration of work experience.

	ETT only	**LMA**	**Total**	**P value**
Sector				0.009
Public	37 (60.7%)	8 (27.6%)	45 (50.0%)	
Private	13 (21.3%)	14 (48.3%)	27 (30.0%)	
Both	11 (18.0%)	7 (24.1%)	18 (20.0%)	
Total	**61 (100%)**	**29 (100%)**	**90 (100.0%)**	
Work experience				0.027
< 5 years	1 (1.6%)	1 (3.4%)	2 (2.2%)	
5 – 10 years	20 (32.8%	2 (6.9%)	22 (24.4%)	
> 10 years	40 (65.6%)	26 (89.7%)	66 (73.3%)	
Total	**61 (100%)**	**29 (100%)**	**90 (100%)**	

4.3 LMA group

When asked regarding the type of LMA they would choose in securing the airway of patients undergoing laparoscopic abdominal surgery, respondents in the LMA group were given the option to choose ≥1 amongst the following:

1) LMA classic
2) LMA ProSeal
3) LMA Supreme/Ambu
4) Baska Mask

Figure 6 displays the respondents' choice(s). Most choose to use LMA Supreme/Ambu (16), followed by LMA Proseal (3) and Baska Mask (1). 14 respondents picked a combination of choices. Almost all respondents selected 2nd generation LMAs, with only 1 selecting to use LMA Classic.

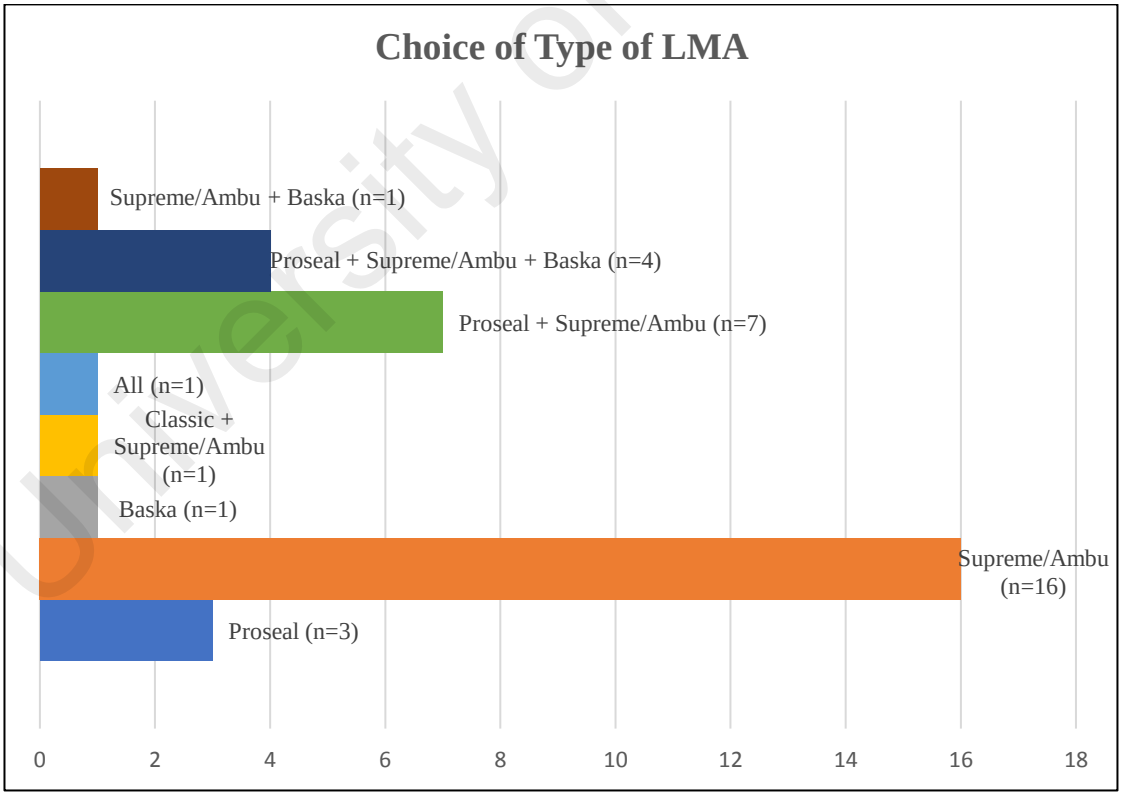


Figure 6: Choice of type of LMA used

Participants were also asked about factors affecting patient selection, which were physical status as well as risk factors for aspiration. Most participants selected patients who are ASA I-II. There were some who included ASA III and IV in their patient selection. However none selected ASA V (moribund) patients.

Almost half the study population (48.6%) only selected patients with BMI < 30 kg/m2. 40% included patients with BMI up to 35 kg/m2 whereas only 11.4% included patients whose BMI exceeded 35 kg/m2.

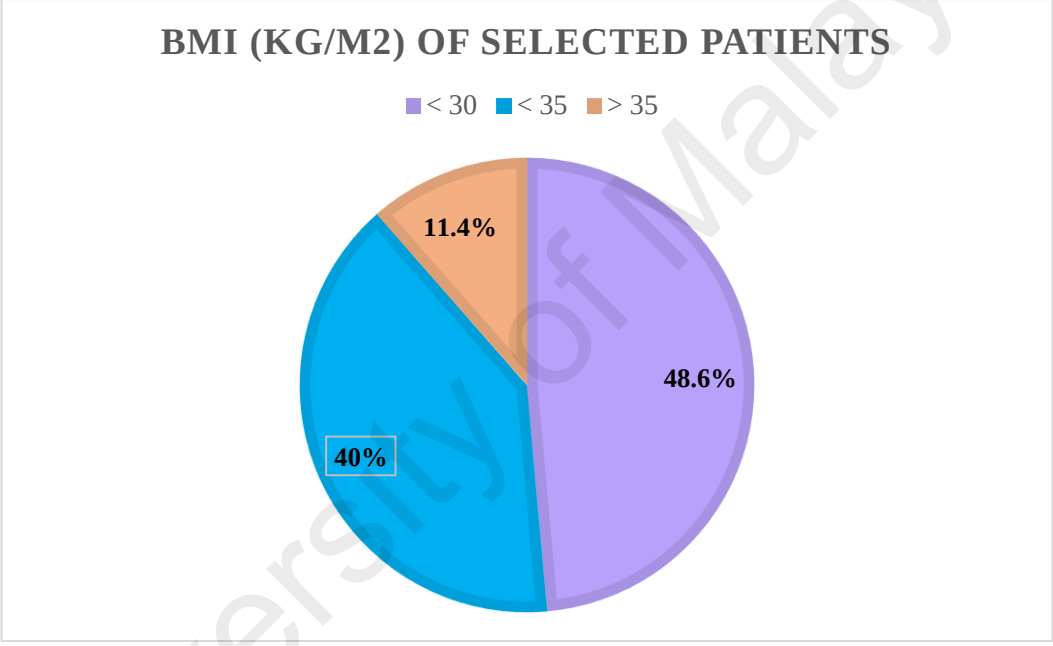


Figure 7: Chart showing average BMI of patients selected

In patients with history of upper GI surgery, history of multiple abdominal surgeries and parturients, the overwhelming majority elected not to use LMA (71.1%, 68.9% and 84.4% respectively). Of the seven (n=7) participants who included parturients in their patient selection, three (42.8%) selected patients who were up to their 2nd trimester, whereas patients in their 1st and up to 3rd trimester comprised 28.6% each.

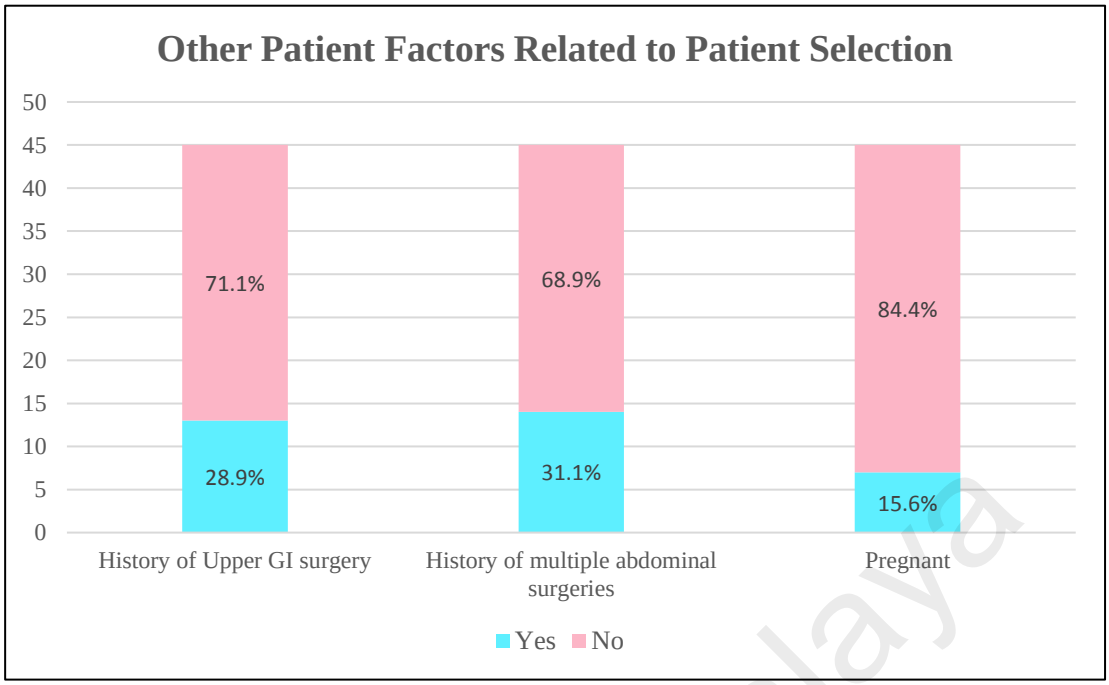


Figure 8: Other patient factors related to patient selection.

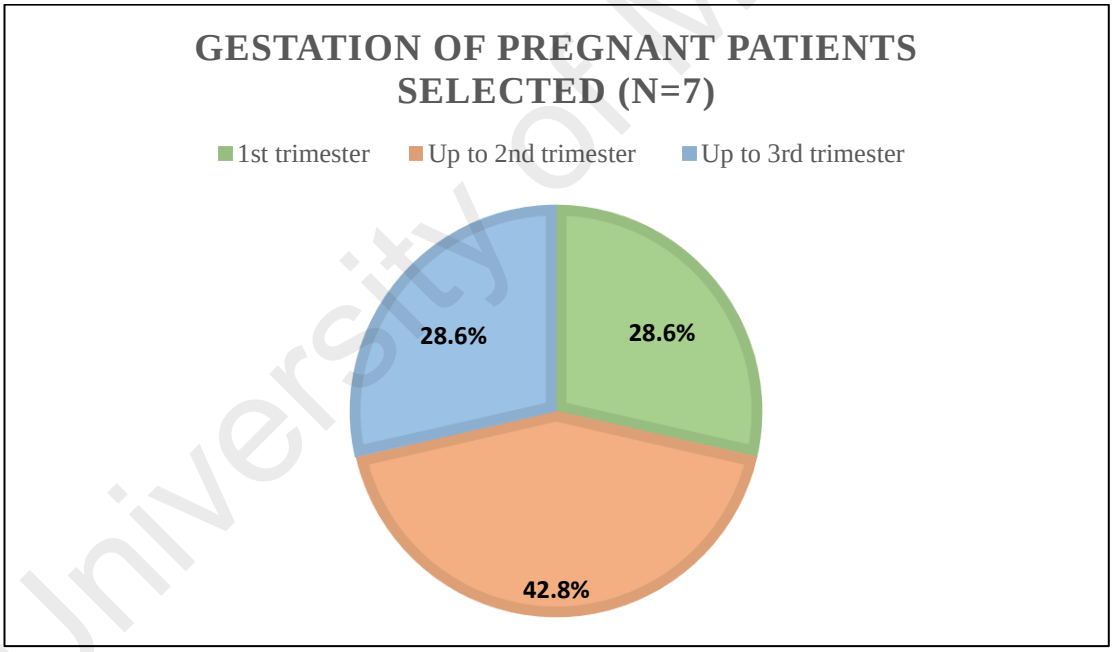


Figure 9: Gestation of pregnant patients selected for LMA use.

We also asked participants to specify the type of laparoscopic abdominal surgery in which they commonly use LMA. The surgery in which LMA was most commonly used was tubal ligation (21.7%), followed closely by hernia repair (19.0%), appendectomy (15.2%), cholecystectomy (14.7%) and ovarian cystectomy (11.4%). Laparoscopic

myomectomy and hysterectomy each scored 8.7% whereas only one participant (0.5%) said they would use LMA in laparoscopic hepatectomy (figure 10).

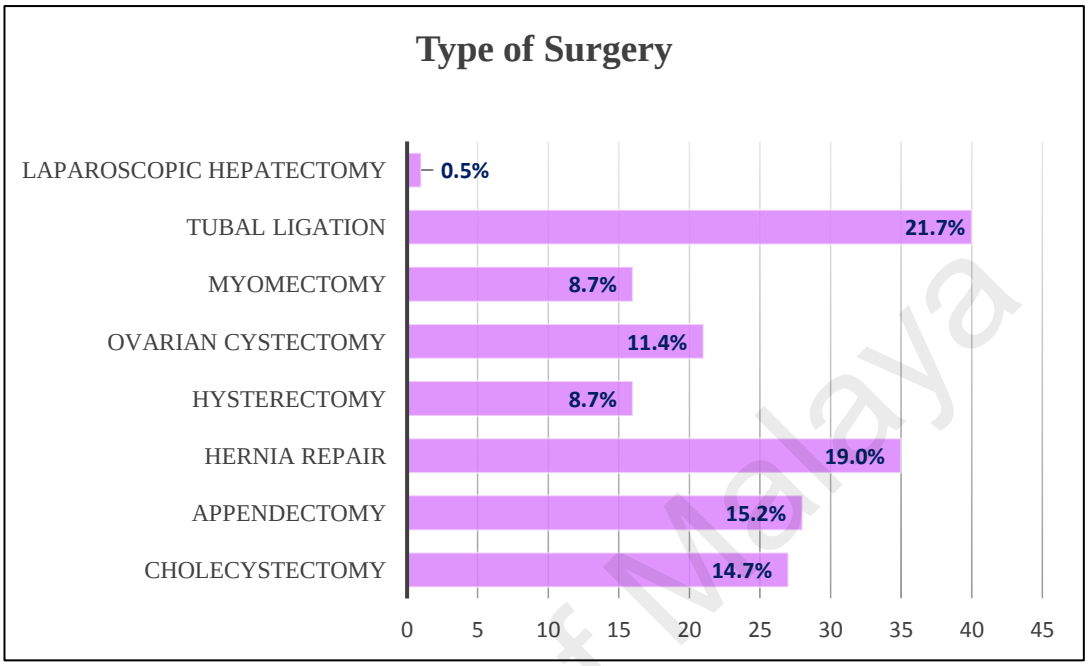


Figure 10: Type of laparoscopic abdominal surgery in which LMA was used

We then proceeded to ask participants regarding practices pertaining to laparoscopic abdominal surgery. These include peritoneal insufflation pressure, average duration of pneumoperitoneum, average Trendelenburg tilt angle, routine gastric decompression and whether they would use LMA to anaesthetise patients undergoing emergency abdominal surgery laparoscopically.

Most report that the usual peritoneal insufflation pressure seen in their practice is between 10–12 mmHg (52%), with a majority of participants (39%) reporting the average duration of pneumoperitoneum being between 1-2 hours (Figures 11, 12). The average Trendelenburg tilt angle observed was largely 15-30° (59.5%) (Figure 13).

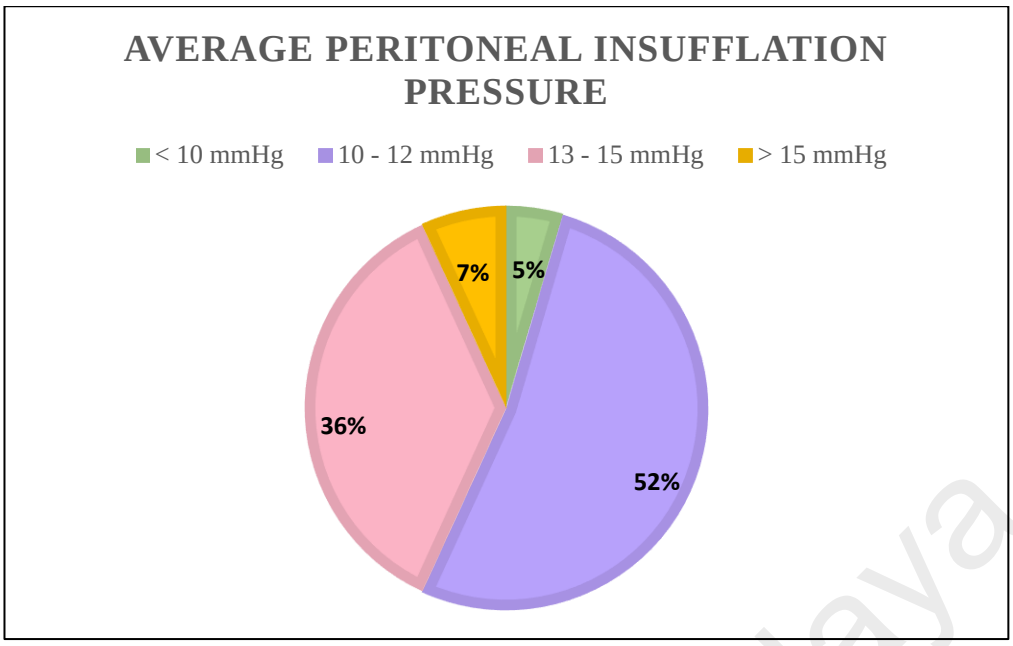


Figure 11: Average peritoneal Insufflation Pressure

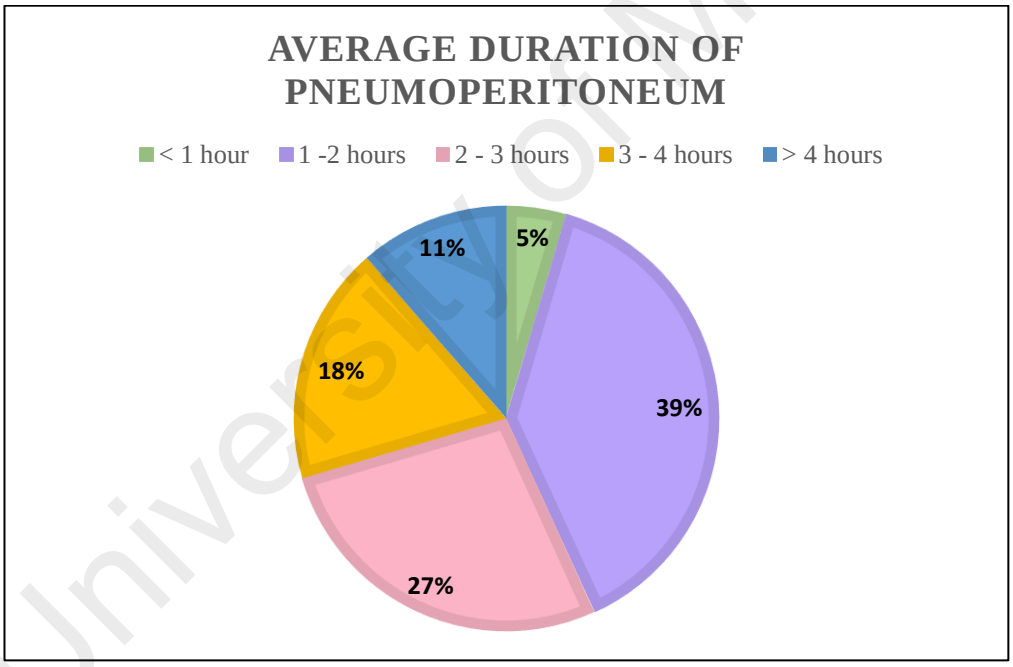


Figure 12: Average duration of pneumoperitoneum

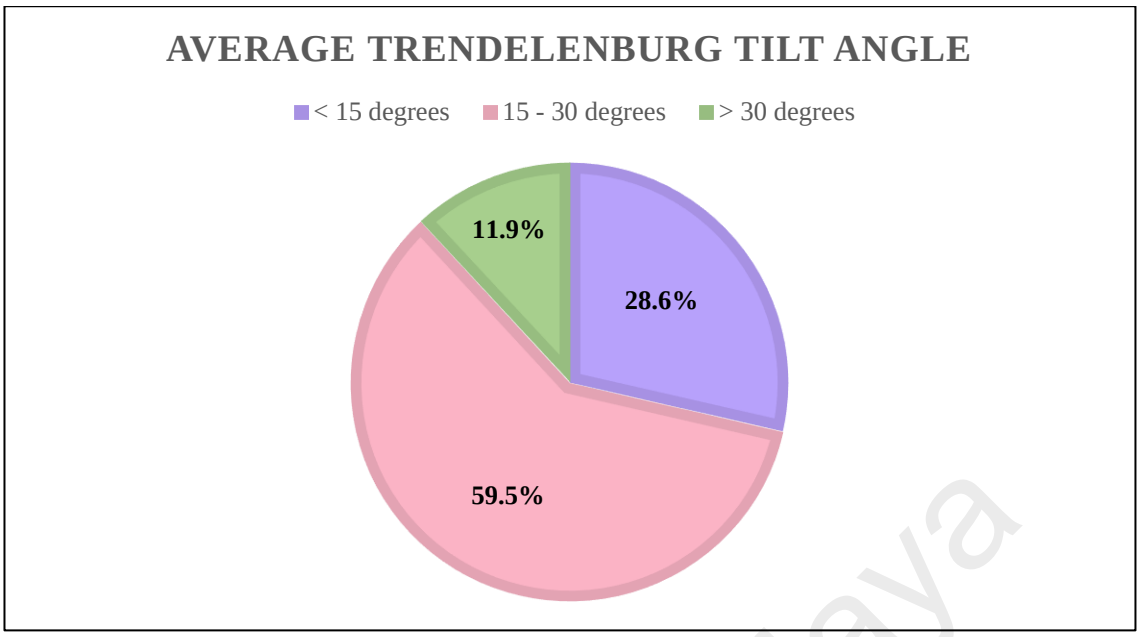


Figure 13: Average Trendelenburg tilt angle

Only 38.6% of participants (n=17) routinely decompress the stomach with the insertion of a gastric tube (Figure 14). Of these, 82.4% will leave the gastric tube in situ during the surgery. The remaining 17.6% practice "in-out" gastric decompression (Figure 15).

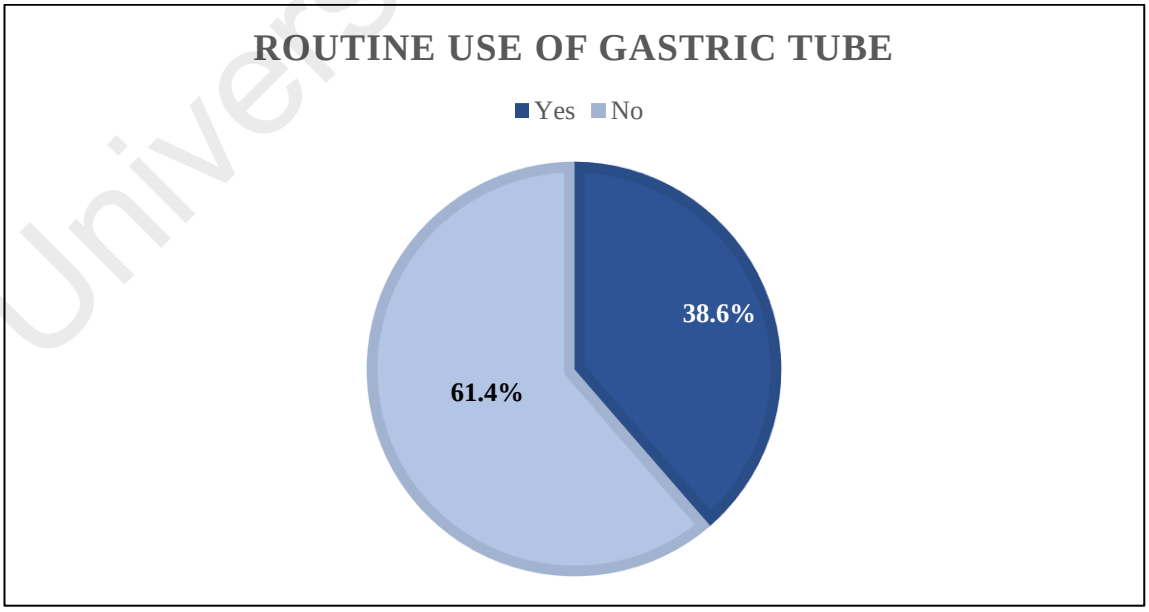


Figure 14: Routine insertion of Gastric tube

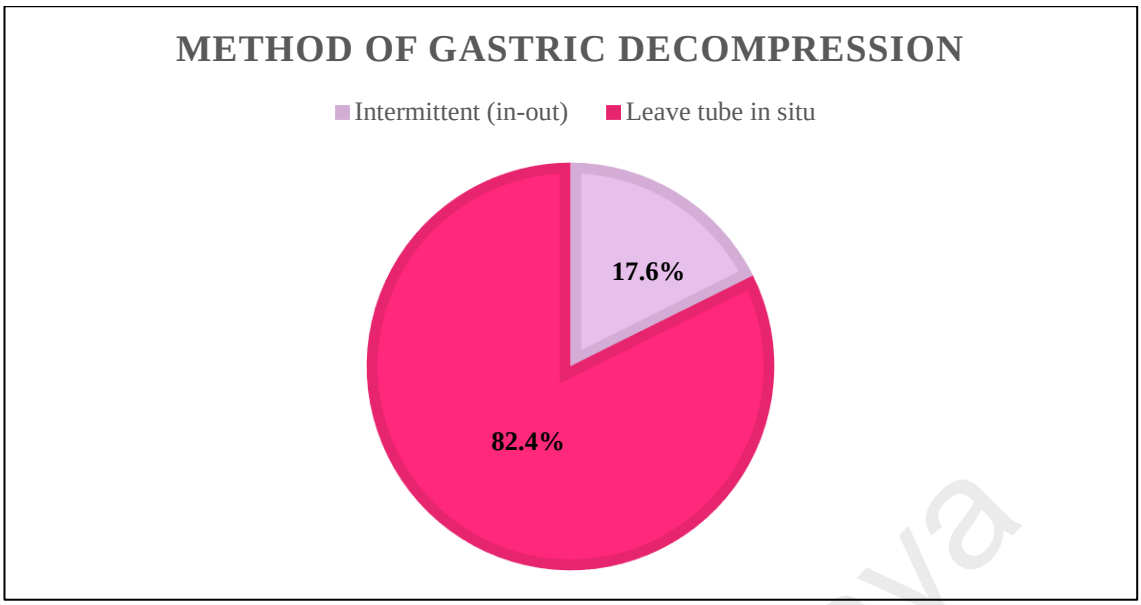


Figure 15: Method of gastric decompression

4.4 ETT-only group

We presented eight potential factors/components for participants who elect to use only ETT when anaesthetising patients for LAS (D1 – D8). The reasons most strongly cited by participants who elect to use only ETT in LAS are as follows:

a) D1: I oversee more than 1 theatre at any one time, rely heavily on trainees/medical officers to run my lists and therefore cannot be sufficiently present to ensure safe usage of LMA in laparoscopic abdominal surgery.

b) D2: My medical support staff aren't familiar with the use of LMA in laparoscopic abdominal surgery.

c) D7: I am not comfortable with using the LMA in laparoscopic abdominal surgeries.

d) D8: I am worried about the potential medicolegal repercussions.

The response to each component is represented by Figures 16 – 23 below.

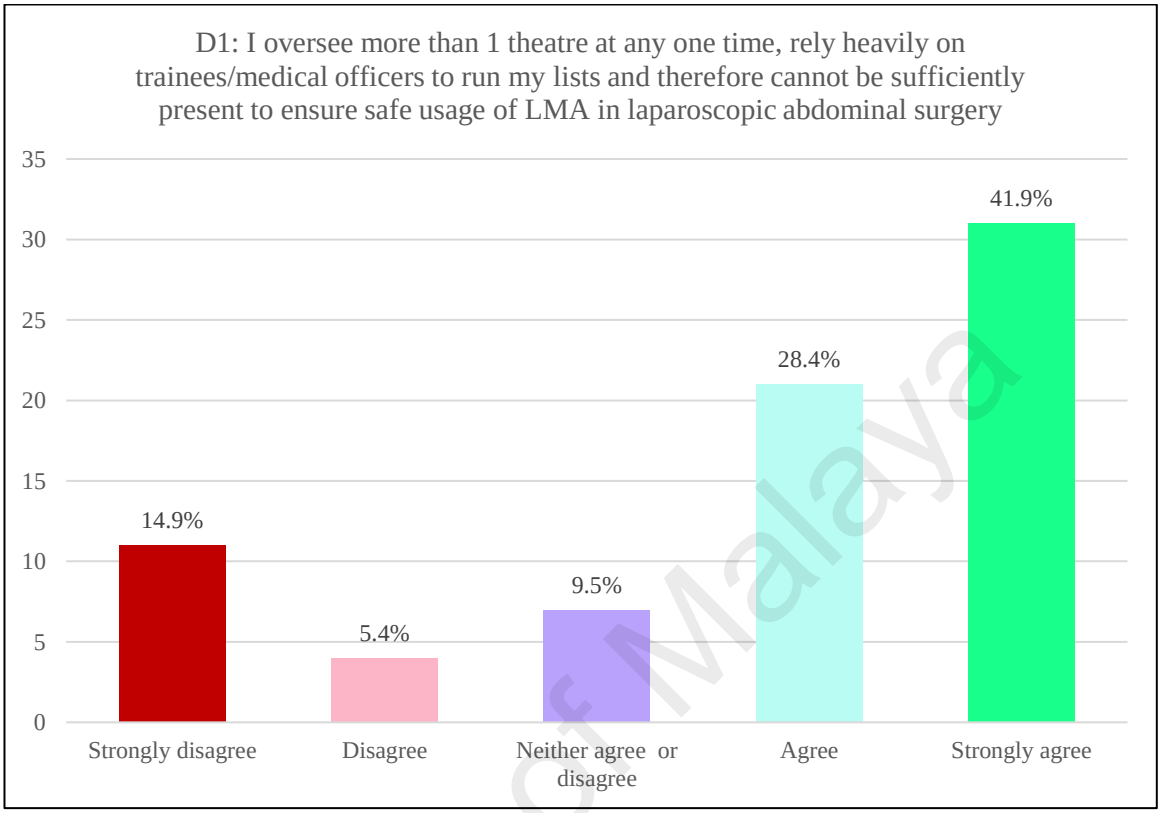


Figure 16: Response to D1

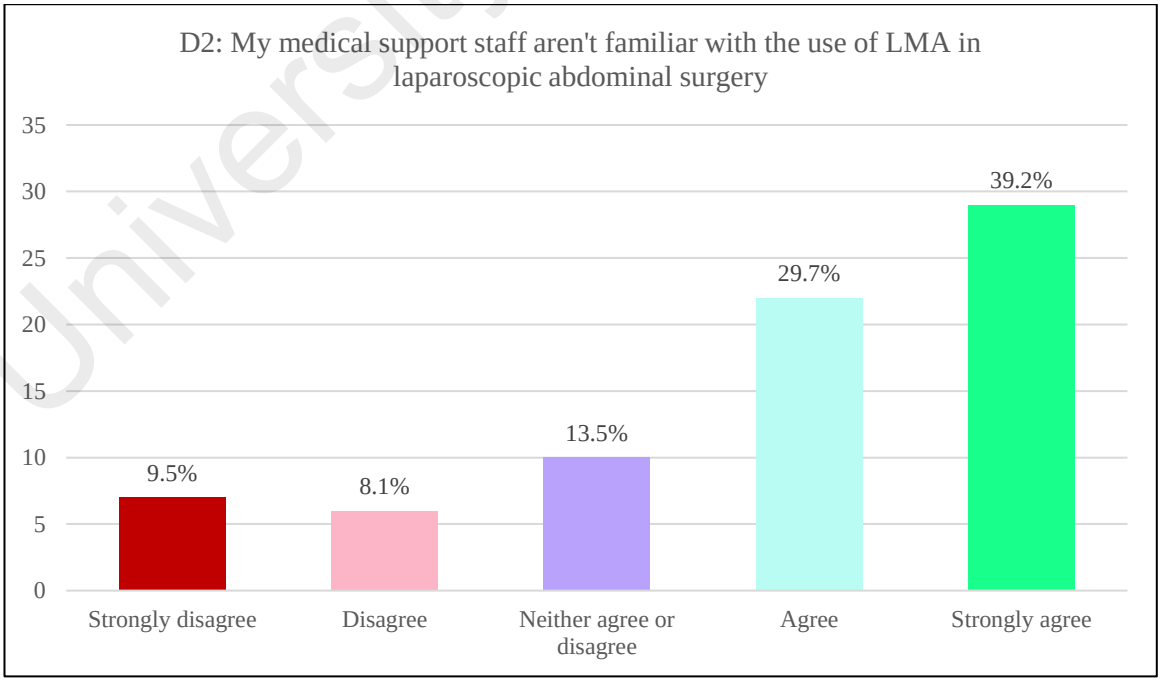


Figure 17: Response to D2

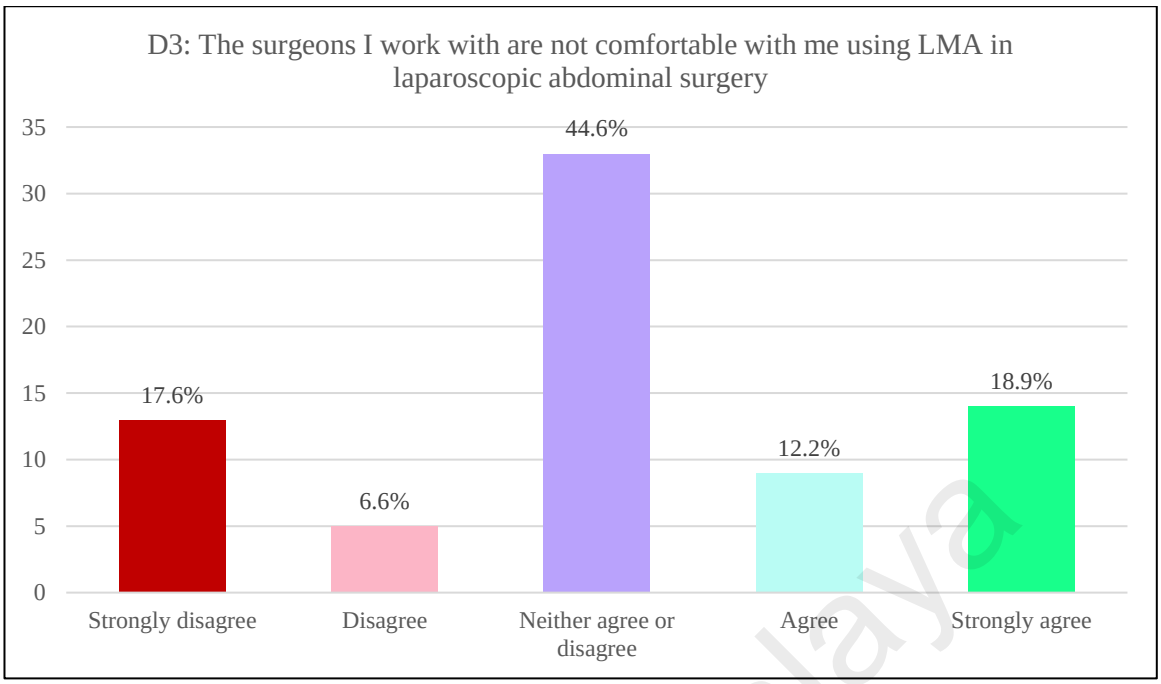


Figure 18: Response to D3

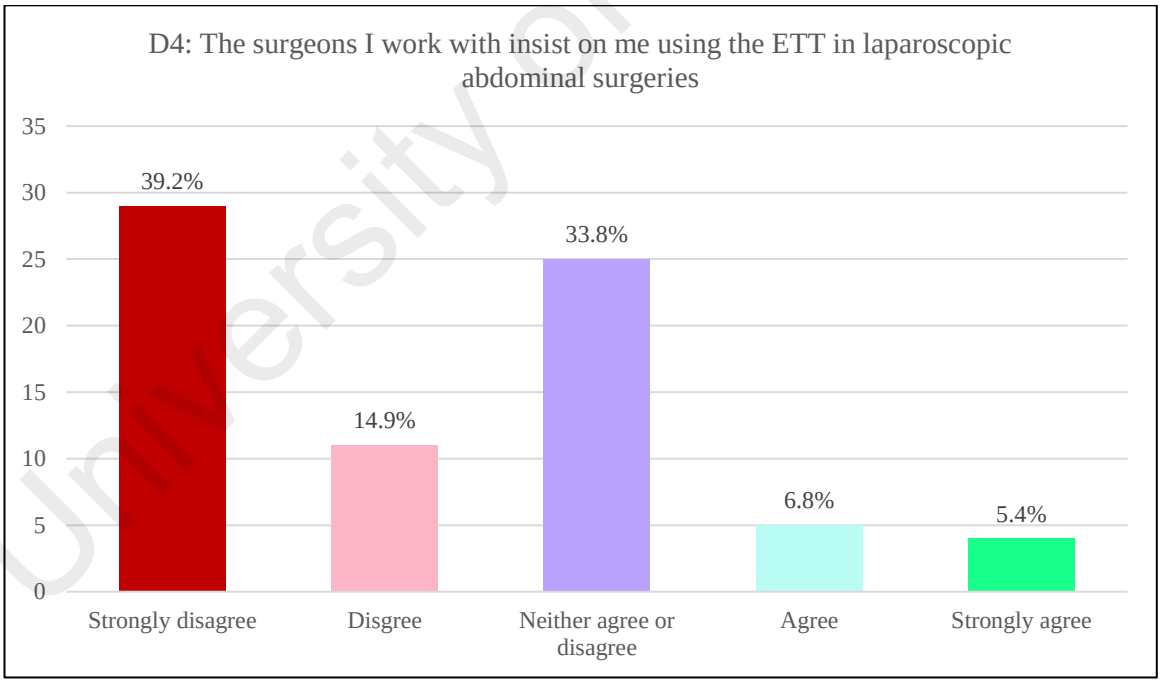


Figure 19: Response to D4

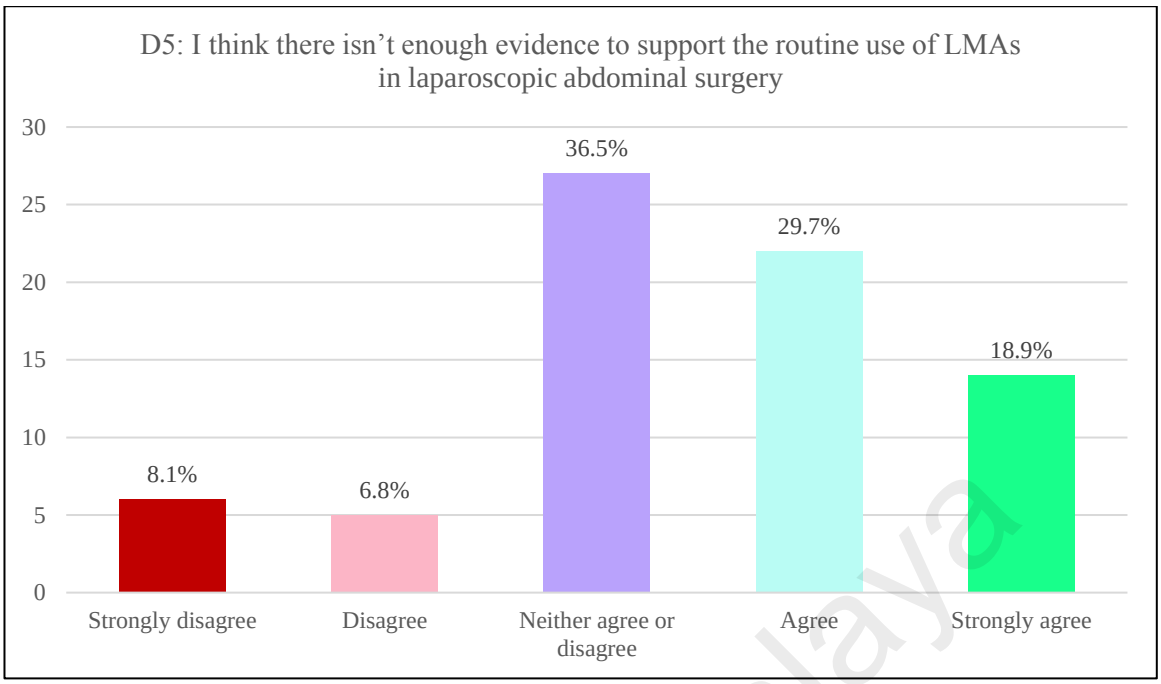


Figure 20: Response to D5

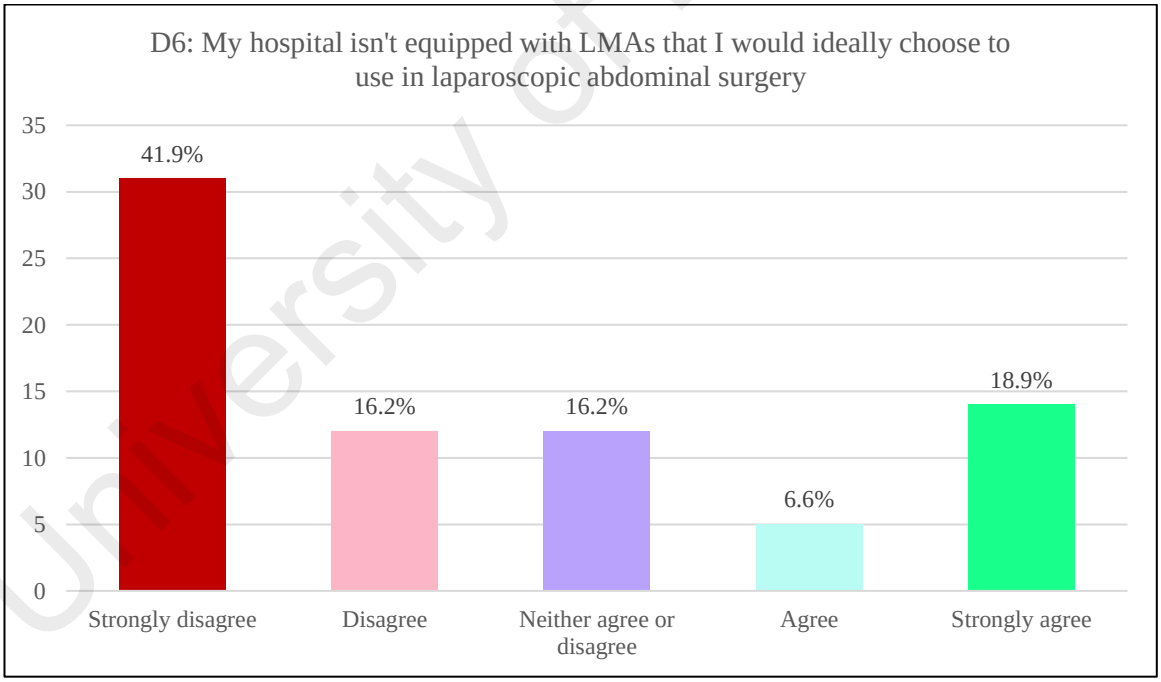


Figure 21: Response to D6

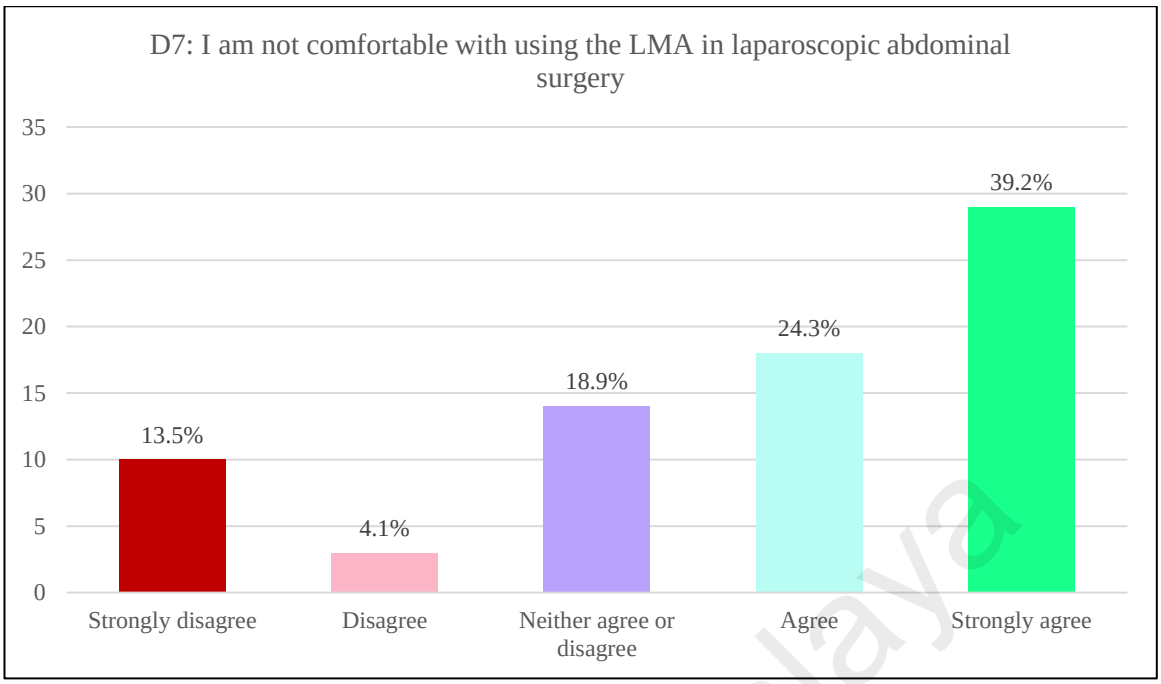


Figure 22: Response to D7

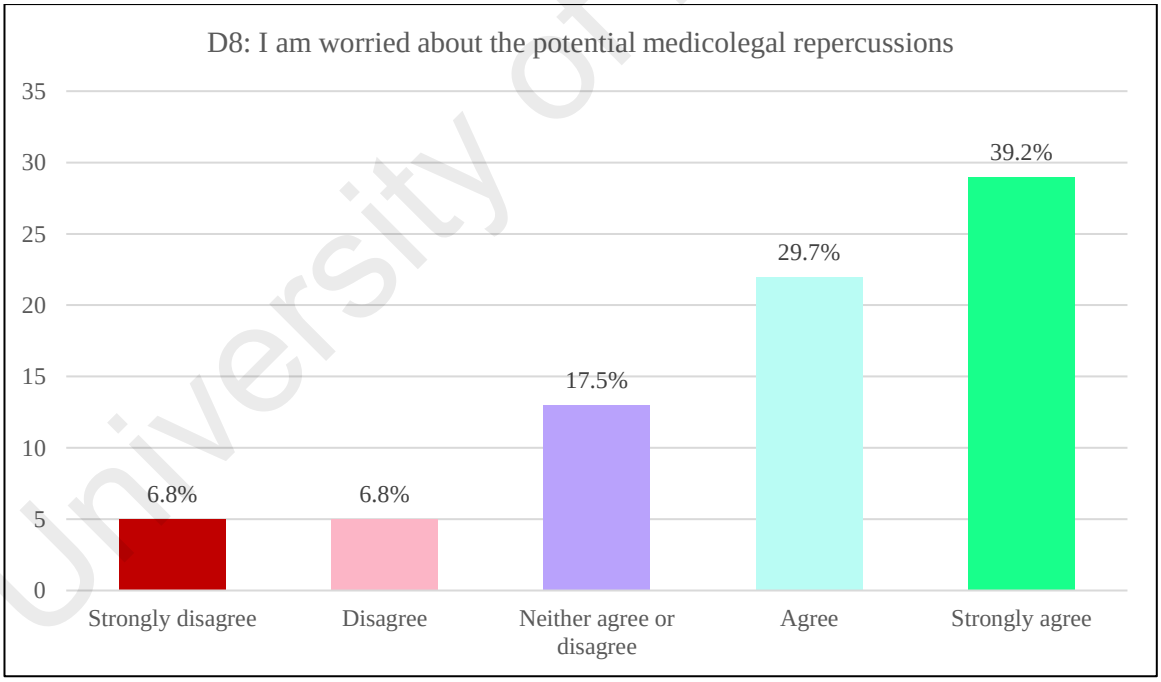


Figure 23: Response to D8

CHAPTER 5: DISCUSSION

This survey managed to recruit a total of 90 participants. When it came down to choosing between ETT vs LMA in managing the airway of patients undergoing LAS, the overwhelming majority of participants still elect to use only ETT, with 67.8% choosing to use only ETT vs 32.2% choosing to use LMA. The majority of them work fully in the public sector (50%), followed by 30% in the private sector. 20% of respondents reported working in both the public and private sector.

Most of the participants who selected to use LMA were from the private sector (48%). 27% were from the public sector and the other 29% worked in both private and public sectors. Whether the group working in both sectors felt that the premise of their work contributed to their choice could not be determined as this was not addressed in the questionnaire. On the flip side, 60% of those who selected to use only ETT were from the public sector.

One of the contributing factors to successful use of LMA in LAS is the experience of the user. The majority of respondents had many years' worth of experience in anaesthesiology under their belts, with 73.3% reporting to have worked in anaesthesiology for more than 10 years. Based on this survey, despite the significant number of years' experience in anaesthesiology, the majority of these senior anaesthesiologist still prefer to use ETT as opposed to LMA in LAS.

When the Pearson Chi-Square test was performed, the values showed significant correlation between work sector and experience in the choice of airway management.

Previous studies have recommended several measures to ensure safe use of LMA in LAS. These included careful patient selection, choice of LMA, controlling the extent of pneumoperitoneum, proper positioning, and use of a gastric drain [3, 4, 24, 25].

Aspects of patient selection explored in this survey included factors that may increase risk of aspiration: BMI, history of upper gastrointestinal surgery, history multiple abdominal surgeries, and pregnancy [7 – 8]. This survey shows that the majority of participants who use LMA tend to select patients without factors associated with risk of gastric aspiration. The majority chose patients who were not obese (BMI < 30 kg/m2), with no history of upper GI surgery or multiple previous abdominal surgeries, and were not pregnant.

Studies have shown that LMAs of the 2nd generation and above are more efficacious and safer to use in laparoscopic surgery due to their provision of an added port for gastric drainage and higher leak pressures [9, 10, 12, 13]. The vast majority of those who use LMA in LAS preferentially use 2nd generation LMAs and above (LMA supreme, ProSeal and Baska Mask). Not all routinely insert a gastric tube to decompress the stomach. This could possibly be due to the use of the Baska Mask which does not require a gastric tube insertion, and instead has an attachment specifically for continuous suctioning of secretions from the sump area [26].

In addition to that, the survey demonstrates that most participants in the LMA group maintain peritoneal insufflation pressure below 12 mmHg, for a duration of between 1 – 2 hours and keep the Trendelenburg tilt angle between 15 - 30°.

There have been literature reviews and studies examining the effects of low-pressure vs high-pressure pneumoperitoneum whereby the pressures are kept > 15mmHg. However, these seem to consistently show that the adverse effects of high-pressure pneumoperitoneum outweigh its benefits [27 – 19]. Reasons for our participants veering from these practices may be to accommodate specific surgical or patient factors, for example to creating suitable exposure and operating field, or variant anatomy rendering surgery technically difficult. However, these reasons were not explored in the survey and is therefore purely speculative.

Many of the ETT group cite the lack of experience of junior anaesthetic caregivers and medical support staff in the use of LMA as reasons for choosing to use only ETT. This survey has shown that there is some significant relationship between length of experience and use of LMA in LAS. NAP4 also reported that airway complications tended to occur when supraglottic airway devices were used inappropriately, oft involving junior trainees (l-30). Although there have been studies that have demonstrated no significant correlation between the duration of experience of the anaesthesiologists and the success rate of first-attempt LMA insertion, these studies included non-laparoscopic surgery as well [31 – 32].

In an article published in 2010 analysing claims against the NHS in England related to airway and respiratory complications of anaesthesia, investigators found that these two groups had the highest median cost of closed claims between 1995 – 2007 (£30,000 airway, £27,000 respiratory). They make a major contribution to the anaesthetic medicolegal burden for patients, anaesthetists and the NHS [33]. It is therefore no surprise that the majority of the ETT-only group were seriously concerned about the potential medicolegal repercussions of using LMA in LAS.

CHAPTER 6: LIMITATIONS

There were a number of limitations to this survey. Firstly, the final sample size was smaller than anticipated. Based on the Raosoft sample size calculator, the ideal number would have been 97, however we failed to achieve that target and results may therefore be affected. Secondly, the term LMA should perhaps have been replaced with supraglottic airway device (SAD) or SAD with gastric access. This is because the term LMA may have a traditional connotation to it and be misconstrued specifically as the classic LMA. Hence, many who would otherwise have used a SAD may have responded in the ETT-only group. Thirdly, the survey did not examine the implementation of placement/performance tests in the LMA group, which plays a role in modifying the risk of aspiration when using LMA in LAS.

CHAPTER 7: CONCLUSION

Most anaesthesiologists appear to have more confidence and experience in tracheal intubation, seeing that it is the bread and butter of their daily work. However, with the advent of various new supraglottic airway devices which have the potential to provide an effective alternative to tracheal intubation, together with the established benefits of laparoscopic abdominal surgery, there needs to be a shift towards providing method of anaesthesia that is best suited for patients. This means meticulous selection of patients, risk minimisation, proper choice of supraglottic airway devices, and taking precautionary measures intra-operatively.

This survey demonstrated that the anaesthesiologists' work sector and duration of experience correlate with the choice of airway management in LAS. To circumvent this problem, perhaps workshops and training programmes can be held to educate junior personnel and anaesthetic support staff regarding the use of LMA in LAS. A better option would be the creation of a standardised protocol for the use of LMA in LAS. However, more evidence pertaining to the use of LMA in LAS needs to be gathered in order to be able to provide such training.

CHAPTER 8: REFERANCE

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