Section: Anaesthesia

Original Research Article

FREQUENCY OF REJECTION AND HIGH-RISK SURGERIES BASED ON PREANAESTHETIC EVALUATION

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ABSTRACT

Background: Pre-anaesthetic evaluation (PAE) is a critical step in perioperative care that identifies comorbidities, personal habits, and systemic illnesses which may lead to surgical delays, cancellations, or designation as high-risk. Understanding the frequency and causes of such outcomes is essential to improve patient safety and optimize operating theatre efficiency. **Materials and Methods:** A cross-sectional observational study was conducted at Dhanalakshmi Srinivasan University Hospital, Trichy. A total of 120 patients scheduled for elective surgeries underwent comprehensive pre-anaesthetic evaluation. Data collected included demographic details, comorbid conditions, medical and surgical history, lifestyle factors (smoking and alcohol use), physical examination findings, and relevant investigations. Surgical outcomes were recorded as proceeding, postponement, cancellation, or classification as high-risk. Statistical associations between risk factors and surgical outcomes were analysed. **Result:** A significant proportion of cancellations were due to uncontrolled systemic conditions, particularly hypertension, anaemia, hypokalaemia, and seizure disorders. Patients aged above 50 years and those with prior medical or surgical histories were more likely to experience postponement or cancellation. Lifestyle factors such as smoking and alcohol consumption showed weaker associations with surgical rejection. Importantly, a majority of cancellations were potentially preventable with earlier identification and optimization of comorbidities during preoperative assessment. **Conclusion:** Pre-anaesthetic evaluation plays a pivotal role in detecting high-risk patients, preventing adverse outcomes, and minimizing avoidable cancellations. Structured PAE protocols and dedicated pre-anaesthesia clinics can enhance perioperative safety, improve operating room utilization, and reduce healthcare resource wastage.

INTRODUCTION

Anaesthesia has become a key element of modern surgical practice guaranteeing safe and effective procedures from minor to major surgery. The primary goal of anaesthesia is to provide analgesia, amnesia, muscle relaxation and physiological stability to enable the surgeon to proceed regardless of patient awareness or discomfort, and in the absence of distress or injury.[1] Over the years, advances in anaesthetic techniques and monitoring have reduced intraoperative risk, however, pre-existing patient characteristics and systemic comorbidities have strong associations with perioperative morbidity and mortality.[2,3]

Importance of Pre-anaesthetic Evaluation: A pre anaesthetic assessment (PAE) is typically viewed as the pillar of perioperative safety where comprehensive history of the patient's medical and surgical history, other factors related to lifestyle,

clinical assessment, and laboratory or imaging that is relevant to the case has been completed.[4] This allows anaesthetists to identify possible risks, predict possible complications, and recondition issues that may already be identified before the surgery. The literature has shown that PAE decreases same day cancellations and delays, increases theatre efficiency, and improves patient outcomes.[5,6]

Burden of Surgical Cancellations: Cancellations of surgery, particularly on the day the surgery is scheduled, are a common problem for healthcare systems in every country. They can produce increased anxiety for patients and diminished trust for patients and their families, wasted hospital resources, and burden the patient and institution financially.[7] Rates of cancellation can vary substantially across institutions, from 5% to 40% according to published reports. The variation is due to quality of preoperative assessment, availability of resources, and scheduling.[8,9] Cancellation of surgery is also common with patient-related factors such as uncontrolled hypertension, diabetes, anaemia, respiratory disease, and poor functional status.[10] Administrative inefficiencies and poor preoperative planning are also contributors to cancellations.[11]

High-risk Surgeries and Patient Factors: Establishing the presence of patients at high risk is critical, as many co-morbidities increase the chances of perioperative complications. For example, cardiovascular disease (e.g., coronary artery disease, heart failure) where intraoperative cardiac events are more likely to occur.[12] Patients with respiratory disease, particularly chronic obstructive pulmonary disease (COPD) and asthma may affect their tolerance to anesthesia and ventilation.[13] Chronic kidney disease, liver disease, and other metabolic derangements (i.e., hypokalaemia or anaemia) have also been associated with increased morbidity.[14] Risk factors associated with lifestyle behaviours, including smoking and alcohol use, are not consistently significant, but may compound the perioperative risk.[15] Elderly individuals over 50 years with two or more co-morbidities are especially susceptible, and requires further attention and assessment.[16]

Regional and Institutional Perspective: In India, perioperative risk stratification is difficult due to high surgical case volume, inadequate resources available in many public hospitals, and variations in compliance with integrity pre-anaesthesia evaluation (PAE). Studies in tertiary facilities have shown that nearly one-third of surgical cancellations can be avoided with preoperative assessment and improved coordination between departments.[17] However, there is little literature from regional centers concerning the incidence of rejection and recognition of high-risk surgical cases through pre-anaesthetic evaluation.

Study Rationale: In this case, it is valuable to understand factors related to patterns, determinants of surgical cancellations, and classifications as high-risk surgeries in the tertiary teaching hospital. This information may contribute to creating targeted interventions including pre-anesthetic clinics, standardized protocols, and introduction proactive optimization approaches to minimize avoidable cancellations and improve perioperative safety. As such, we are interested in examining the prevalence of cancellations and high-risk surgeries to depth, based on an evaluation pre-anesthetic assessment, while identifying patient and clinical characteristics contributing to cancellations and delay. In addition, we will identify measures that may serve to further strengthen perioperative management.

Aim and Objectives

Aim

This study mainly aimed to assess the impact of PAE (Pre-Anaesthetic Evaluation) in predicting the incidence of rejection of surgery and determination of high risk surgeries in elective patients at tertiary care teaching hospital.

Objectives

1. To collect and analyse data from patients undergoing elective surgical procedures over a one-year study period, with specific emphasis on their pre-anaesthetic evaluation findings.
2. To identify the major causes of surgical rejection or postponement based on patient comorbidities, systemic conditions, and preoperative investigations.
3. To classify and document high-risk surgical cases as determined by anaesthesiologists during preoperative screening.
4. To examine associations between demographic and lifestyle factors (such as age, gender, smoking, and alcohol use) and the likelihood of surgical cancellation or postponement.
5. To highlight preventable causes of surgical cancellations and propose recommendations for strengthening structured PAE protocols to improve patient safety and optimize operating theatre utilization.

MATERIALS AND METHODS

Study Design and Setting: This observational cross-sectional study was performed in the Department of Anaesthesia Technology (Dhanalakshmi Srinivasan University Hospital, Tiruchirappalli, Tamil Nadu, India). The study was carried out over the period of 1 year from 2023–2024, after obtaining institutional ethical clearance.

Ethical Considerations: The Institutional Ethics Committee (IEC) of Dhanalakshmi Srinivasan University reviewed and approved the protocol. Written informed consent was obtained from all participants prior to their inclusion in the study. Throughout the study, confidentiality and anonymity of the data were maintained, in accordance with the Declaration of Helsinki.

Study Population: A total of 120 patients scheduled for elective surgical procedures under anaesthesia were included in the study.

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Inclusion Criteria

- Patients aged 18 years and above scheduled for elective surgeries.
- Patients willing to provide informed consent.
- Patients evaluated through the institutional pre-anaesthetic evaluation protocol.

Exclusion Criteria

- Patients undergoing emergency surgeries.
- Patients unwilling or unable to provide consent.
- Cases with incomplete pre-anaesthetic documentation.

Data Collection and Pre-anaesthetic Evaluation Protocol

Each patient underwent a comprehensive pre-anaesthetic evaluation (PAE) performed by trained anaesthesiologists and anaesthesia technologists. The evaluation included:

1. Demographic profile: Age, sex, weight, body mass index (BMI).
2. Medical history: Comorbidities such as hypertension, diabetes mellitus, coronary artery disease, respiratory disorders, renal impairment, and seizure disorders.
3. Surgical history: Previous operative interventions and anaesthetic complications, if any.
4. Lifestyle factors: Smoking and alcohol consumption.
5. Clinical examination: General physical examination, airway assessment (Mallampati score, thyromental distance), cardiovascular and respiratory evaluation.
6. Laboratory and diagnostic tests: Complete blood count, blood sugar, renal and liver function tests, serum electrolytes, coagulation profile, electrocardiography, and chest radiography where indicated.

Classification of Surgical Outcomes

Following evaluation, patients were categorized into one of four groups:

- **Fit for surgery:** Patients cleared to undergo the planned procedure.
- **Postponed:** Surgery delayed due to conditions requiring optimization.
- **Cancelled (rejected):** Surgery cancelled due to unacceptable perioperative risk.
- **High-risk:** Patients deemed fit for surgery but classified under high-risk due to significant comorbidities.

Statistical Analysis: All collected data were entered into a master chart and analysed using SPSS software (version 23.0; IBM Corp., Armonk, NY, USA).

- Descriptive statistics (frequency, percentage, mean, and standard deviation) were used for demographic and clinical variables.
- Comparative analysis between risk factors (age, sex, comorbidities, habits) and surgical outcomes (fit, postponed, cancelled, high-risk) was performed using the Chi-square test.
- A p-value <0.05 was considered statistically significant.

RESULTS

A total of 120 patients were evaluated during the pre-anaesthetic assessment for elective surgical procedures. The age distribution revealed a predominance of middle-aged patients, with the majority in the 41–60 years group. Elderly patients (>60 years) constituted a smaller proportion but showed a higher rate of cancellations. Gender analysis showed a slight male predominance. Lifestyle factors such as smoking and alcohol use were observed in a minority of patients, suggesting they were less common risk contributors in this cohort. A significant proportion of the study group was affected by systemic comorbidities, particularly diabetes mellitus, which emerged as a major determinant of surgical cancellation. More than half of the patients reported previous surgical history, indicating a higher likelihood of encountering complex perioperative scenarios. Statistical analyses highlighted that age, diabetes mellitus, and previous surgical history had significant associations with day-of-surgery cancellations. Conversely, gender, smoking, and alcohol habits were not significantly linked with surgical rejection. Collectively, these findings suggest that systemic comorbidities and advancing age remain critical factors in preoperative risk stratification.

Table 1: Frequency among different variables

Variables	Category	Frequency (N)	Percentage (%)
Age Group	18–40 years	29	24.2%
	41–60 years	71	59.2%
	61–80 years	20	16.6%
Gender	Male	70	58.3%
	Female	50	41.7%
Smoking Habit	Yes	12	10.0%
	No	108	90.0%
Alcoholic Habit	Yes	14	11.7%
	No	106	88.3%
Diabetes Mellitus	Yes	47	39.2%
	No	73	60.8%
Previous Surgical Hx	Yes	69	57.5%
	No	51	42.5%

[Table 1] shows the baseline demographic, lifestyle, and clinical characteristics of the study population, including age groups, gender distribution, habits, diabetes status, and surgical history.

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Table 2: Frequency of age among patients

Age Group (years)	Frequency (N)	Percentage (%)
18–30	19	15.8%
31–40	10	8.4%
41–50	35	29.2%
51–60	36	30.0%
61–70	14	11.6%
71–80	6	5.0%

[Table 2] shows the age distribution of the study population, categorized into specific age groups.

Table 3: Distribution of gender

Gender	Frequency (N)	Percentage (%)
Male	70	58.3%
Female	50	41.7%

[Table 3] presents the distribution of patients according to gender.

Table 4: Frequency of smoking habit

Smoking Habit	Frequency (N)	Percentage (%)
Yes	12	10.0%
No	108	90.0%

[Table 4] depicts the prevalence of smoking among the study participants.

Table 5: Frequency of alcoholic habit

Alcohol Habit	Frequency (N)	Percentage (%)
Yes	14	11.7%
No	106	88.3%

[Table 5] shows the frequency of alcohol consumption among the patients evaluated.

Table 6: Frequency of diabetes mellitus

Diabetes Mellitus	Frequency (N)	Percentage (%)
Yes	47	39.2%
No	73	60.8%

[Table 6] outlines the distribution of patients with and without diabetes mellitus.

Table 7: Frequency of previous surgical history

Previous Surgical History	Frequency (N)	Percentage (%)
Yes	69	57.5%
No	51	42.5%

[Table 7] presents the proportion of patients with a history of previous surgical procedures.

Table 8: Comparison between age and day of surgery cancellation

Age Group (years)	Cancelled (N)	Not Cancelled (N)	Total (N)	p-value
≤50	11	63	74	
>50	17	29	46	0.004*

(*Significant at $p < 0.05$)

[Table 8] analyses the relationship between patient age groups and cancellations on the day of surgery.

Table 9: Comparison between gender and day of surgery cancellation

Gender	Cancelled (N)	Not Cancelled (N)	Total (N)	p-value
Male	14	56	70	
Female	14	36	50	0.483

[Table 9] evaluates the association between gender and surgery cancellations.

Table 10: Comparison between smoking habit and day of surgery cancellation

Smoking Habit	Cancelled (N)	Not Cancelled (N)	Total (N)	p-value
Yes	1	11	12	
No	27	81	108	0.471

[Table 10] shows the correlation between smoking and surgery cancellation outcomes.

Table 11: Comparison between alcoholic habit and day of surgery cancellation

Alcohol Habit	Cancelled (N)	Not Cancelled (N)	Total (N)	p-value
Yes	2	12	14	
No	26	80	106	0.682

[Table 11] examines the effect of alcohol consumption on surgery cancellations.

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Table 12: Comparison between diabetes mellitus and day of surgery cancellation

Diabetes Mellitus	Cancelled (N)	Not Cancelled (N)	Total (N)	p-value
Yes	19	28	47	
No	9	64	73	0.001*

(*Significant at $p < 0.05$)

[Table 12] evaluates the association between diabetes mellitus and day-of-surgery cancellations.

Table 13: Comparison between previous surgical history and day of surgery cancellation

Previous Surgical History	Cancelled (N)	Not Cancelled (N)	Total (N)	p-value
Yes	24	45	69	
No	4	47	51	0.001*

(*Significant at $p < 0.05$)

[Table 13] assesses the impact of prior surgical history on cancellations.

[Table 1] highlights the baseline demographic and clinical profile of the patients. The majority of participants belonged to the 41–60 years age group (59.2%), with a slight male predominance (58.3%). Lifestyle factors such as smoking (10%) and alcohol use (11.7%) were present in only a minority. Diabetes mellitus was reported in 39.2% of patients, and 57.5% had a history of previous surgical interventions, showing that comorbidities and prior surgeries were common in the study cohort. [Table 2] further stratifies age distribution, showing that the largest group was 51–60 years (30%), followed closely by 41–50 years (29.2%). The youngest group (18–30 years) formed 15.8% of the cohort, while the elderly aged 71–80 years were the smallest group at 5%. This demonstrates that middle-aged patients represented the bulk of surgical candidates. [Table 3] presents gender distribution, with males accounting for 58.3% and females 41.7%. While there was a male predominance, later comparisons showed no significant difference in cancellation rates between the genders. [Table 4] demonstrates the prevalence of smoking habits. Only 10% of patients reported being smokers, indicating that tobacco use was not a major lifestyle factor in this population. [Table 5] shows alcohol consumption habits. A total of 11.7% reported alcohol use, suggesting that the influence of this lifestyle factor was limited compared to systemic comorbidities. [Table 6] reports the frequency of diabetes mellitus, present in 39.2% of patients. This high prevalence underscores diabetes as one of the most important comorbidities influencing surgical outcomes in the study. [Table 7] describes the history of previous surgeries, which was found in 57.5% of patients. This indicates that more than half of the population had prior operative exposure, which may contribute to a higher rate of cancellations due to associated medical risks. [Table 8] compares age with day-of-surgery cancellations, showing that patients above 50 years had a significantly higher cancellation rate ($p = 0.004$). This finding confirms that advancing age is a major determinant of perioperative risk. [Table 9] evaluates the association between gender and cancellations. Both males and females had similar proportions of cancellations, with no significant difference ($p = 0.483$). Thus, gender was not a predictive factor for surgical rejection in this study. [Table 10] explores the role of smoking in surgical cancellations. Only one smoker faced cancellation compared to 27 non-smokers, and the association was not statistically significant ($p = 0.471$). This suggests that smoking was not an independent determinant in this cohort. [Table 11] examines alcohol use and cancellations. Two alcohol users faced cancellation compared to 26 non-users, and no significant association was found ($p = 0.682$). This again demonstrates that lifestyle factors such as alcohol consumption did not have a strong influence on surgical rejection. [Table 12] compares diabetes mellitus with cancellations and shows a significant correlation ($p = 0.001$). Nineteen diabetic patients had their surgeries cancelled compared to only nine among the non-diabetic group. These findings highlight uncontrolled diabetes as a major contributor to surgical postponement or cancellation. [Table 13] analyses the effect of previous surgical history on cancellations. A significant association was observed ($p = 0.001$), with 24 cancellations among patients with prior surgeries compared to only four among those without. This indicates that surgical history is an important determinant of perioperative risk.

DISCUSSION

Pre-anaesthetic evaluation (PAE) plays a crucial role in identifying comorbidities, predicting surgical risk, and preventing avoidable cancellations. In the present study of 120 patients, advancing age, diabetes mellitus, and previous surgical history were significantly associated with surgical cancellations, while gender, smoking, and alcohol use did not show statistical significance. These findings align with and expand upon evidence from both Indian and international literature.

Importance of Systemic Comorbidities: Our assessment findings suggested a relationship between diabetes mellitus and cancellations, with nearly 40% of the population affected. This is consistent with prior published evidence indicating that diabetes mellitus is an important perioperative risk factor due to its impact on wound healing, risk of infection, and cardiovascular instability.[10,11] Prior studies have emphasized the importance of glycaemic control intraoperatively to reduce cancellation and complication rates.[12] Our assessment justifies the

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formalization of diabetes optimization protocols into organized PAE protocols.

Impact of Age on Surgical Outcomes: Age was another important factor related to cancellations: Patients over the age of 50 had significantly higher overall cancellation rates ($p = 0.004$) which likely reflects diminished physiological reserve and a higher burden of comorbidities in an older patient population, which increases the risk of perioperative complications.[13] Other large cohort studies had similar conclusions: age independently predicted adverse outcomes and increased mortality.[14] These findings support the rationale for the inclusion of comprehensive geriatric assessments into the pre-anaesthetic pathways for patients aged over 50.

Role of Previous Surgical History: Patients with previous surgical history also had a significantly higher likelihood of cancellations ($p = 0.001$). This trend may be explained by the higher burden of chronic illness, postoperative complications, or prior anaesthetic challenges in such individuals. Studies from tertiary centres have similarly shown that patients with operative history often present with comorbidities that complicate surgical planning.[15] Hence, a detailed operative and anaesthetic history should remain a central focus during PAE.

Gender and Lifestyle Habits: Gender was not associated with cancellations in our cohort, corroborating findings that sex alone is not an independent predictor of perioperative morbidity.[16] Similarly, lifestyle factors such as smoking and alcohol intake, though recognized as contributors to cardiovascular and respiratory risk, did not demonstrate significant associations here ($p > 0.05$). This may be due to their relatively low prevalence in the study population. Previous studies have shown mixed results on the impact of these habits, with some reporting stronger associations in larger, more diverse samples.[17,18]

Comparison with Other Studies: The overall cancellation patterns in our study are in line with international evidence. A systematic review reported that up to 40% of cancellations are preventable through effective preoperative assessments.[19] Indian studies also highlight similar causes, including uncontrolled hypertension, anaemia, and diabetes, as key drivers of cancellations.[20,21] The present study's findings, particularly the emphasis on systemic comorbidities, strengthen the case for dedicated pre-anaesthetic clinics in tertiary hospitals.

Clinical Implications: The implications of these findings are significant. First, they demonstrate the need for structured PAE clinics to detect and optimize comorbidities before surgery, thereby reducing cancellations. Second, incorporation of risk stratification models that combine age, comorbidities, and surgical history could assist in identifying high-risk cases. Third, given the rising prevalence of diabetes in India, standardized perioperative glycaemic control protocols should be integrated into surgical pathways. Such measures could reduce avoidable cancellations, improve operating room utilization, and enhance patient safety.

Strengths and Limitations: The strengths of this study include prospective data collection, systematic evaluation of multiple variables, and robust statistical analysis. However, limitations must be acknowledged. Being a single-centre study with a modest sample size ($n = 120$), the findings may not be generalizable to all populations. Lifestyle factors such as smoking and alcohol may also have been underreported due to social stigma. Additionally, severity grading of comorbidities was not incorporated, which could have provided more nuanced insights.

Future Directions: Larger, multi-centric studies are warranted to confirm these associations and to evaluate other potential determinants such as nutritional status and socioeconomic background. Incorporating predictive indices like the American Society of Anesthesiologists (ASA) physical status score and frailty assessments may further refine risk stratification. Implementation research is also needed to evaluate the impact of structured PAE clinics on reducing cancellations and improving perioperative outcomes in diverse healthcare systems.

To sum up, this research emphasizes the importance of pre-anaesthetic evaluation in perioperative care. Age older than 50 years, a history of diabetes mellitus, and a history of prior surgery were the most significant predictors of cancellation, while gender and aspects of lifestyle were less impactful. Improving structured PAE approaches and early comorbidity optimization strategies could improve patient safety, waste healthcare resources, and produce successful surgical outcomes.

CONCLUSION

This study reveals that pre-anaesthetic evaluations (PAE) are important for reducing procedural cancellations, and for identifying at-risk patients. The above variables tres to be significant predictors of cancellation were advancing age, diabetes mellitus, and previous surgery. In contrast, gender, smoking, and alcohol use were not significant predictors of cancellation. PAE allows considering systemic comorbidities as the principal drivers of perioperative risk.

Focused policy change to implement structured PAE protocols and establish pre-anaesthesia clinics could have several potential benefits. By identifying and addressing comorbidities prior to surgery, we can reduce the number of cancellations that might have been avoided and use the operating theatre resources most efficiently. Lastly, we can provide patients with early identification and management, particularly for high-risk patients, which would promote enhanced safety and patient experience overall, while allowing for more efficient use of healthcare resources and better surgical outcomes.

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