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Frequency of Factors Leading to Elective Surgery Cases Postponement at Tertiary Care Hospital, Karachi

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ABSTRACT

Delay of elective surgery is one of the ongoing issues in hospital systems that disrupts the operating room schedule, creates extra healthcare expenses, patient dissatisfaction, and wasteful use of resources. It is necessary to understand the root causes of these delays to make perioperative planning more effective, multidisciplinary coordination more robust, and patient safety more efficient. **Objective:** To identify the number of factors that cause the delay of the elective cases of surgeries in a Tertiary Care Hospital in Karachi. **Methods:** The study was a cross-sectional study carried out in Jinnah Postgraduate Medical Centre, Karachi. The data were gathered in the form of a structured proforma, which included demographic data that was divided into patient-related, surgeon-related, and anesthesia-related. Sampling involved consecutive sampling. Data analysis was done by use of SPSS version 20. Categorical variables were calculated by frequencies and percentages. The Fisher's exact test was used to determine relationships between postponement factors and demographic factors, where $p \leq 0.05$ was regarded as significant. **Results:** The postponement of elective surgery occurred in 12.1% of patients, and patient-related issues (medication unavailability, refusal, not fasting) were the most common reasons. The causes associated with surgery and anesthesia were less prevalent. The delay was not significantly related to the age, sex, home, or ASA status. **Conclusions:** Patient-related factors were more effective in influencing elective surgery delays than surgeon or anesthesia-related issues. It can be strengthened by having preoperative assessment, enhancing scheduling coordination, and increasing communication within surgical teams to reduce the rate of postponement.

INTRODUCTION

Elective surgeries form a significant part of surgical activities among hospitals in all parts of the world and play a significant role in enhancing the quality of life, decreasing disability, and preventing prolonged complications in patients [1]. Nevertheless, the delay of elective surgical operations has been a chronic problem both in developed and developing nations [2]. Elective surgery postponement is the delay of an operation that was planned to be carried out because of patient-related, administrative, anesthesia, or surgical reasons [3]. These delays not only hamper patient care but also cause emotional distress, augmented morbidity, extended stay in the hospital, and substantial economic drainage of both patients and the healthcare system [4]. The rates of elective surgery delays have been reported globally to vary between 10% and 40%, according to the institute's efficiency, resources, and processes [5, 6]. In developed nations, the frequent causes are a shortage of operating room (OR) time, insufficient preoperative preparation, and staff or equipment shortage [7]. In low and middle-income countries (LMIC), including South Asian countries, the workload is even greater with such high postponement rates of up to 30% to 60% being reported [3]. Among the contributing factors in LMIC settings can be the overbooking of theatre lists, poor interdepartmental communication, unavailability of needed supplies, comorbidities of patients not optimized preoperatively, and infrastructural limitations. The issue is particularly

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acute in Pakistan because of the large number of patients, the limited resources, and the lack of consistency in the hospital management systems. Elective surgery cancellation rates of 22% to 50% have been found in studies across different parts of Pakistan and represent a significant healthcare system problem that impacts governmental and privatized tertiary-care hospitals [8-10]. Karachi is a large metropolitan city hosting high surgical caseloads, which present a significant challenge in scheduling surgeries [11]. Delays not only decrease surgical productivity but also lead to psychological stress in patients and families, bed occupancy, and an increase in hospital costs.

Although the scale of the issue is large, up-to-date region-specific data on Karachi, particularly on the precise distribution of the factors that contribute to the delay in elective surgery, is limited. It is essential to comprehend these determinants in a tertiary-care environment to enhance the use of operating rooms, preoperative check-up, communication channels, and hospital regulations. The research fills a considerable gap by offering local evidence that can be used to inform administrative changes and address avoidable delays to eventually enhance patient satisfaction and surgical outcomes. The purpose of the current research was to establish the frequency and distribution of factors contributing to the delay of elective surgical cases in a tertiary-care hospital in Karachi.

METHODS

The study was a cross-sectional research study conducted in the Department of Anesthesia, Jinnah Postgraduate Medical Centre (JPMC), Karachi. The study was conducted from 1st April, 2025, up to 30th September, 2025, after the study synopsis was approved. The Institutional Review Board of JPMC approved the research under the approval number NO.F.2-81/2025-GENL/256/JPMC. The WHO sample size calculator was used to calculate the sample size. Taking a prevalence of surgeon unavailability as a cause of elective surgery postponement of 10.3%, a margin of error of 6%, and a confidence level of 95%, the sample size required was calculated to be 99 patients [12]. Surgeon unavailability was chosen as a parameter of reference since it is a clearly defined and objectively identifiable cause of postponement and offers a conservative estimation when it comes to calculating the sample size. The non-probability consecutive sampling method was used on all the eligible patients who fell within the scope of the study considered in the period of data collection, until the required sample size was reached. The participants were chosen according to preset inclusion and exclusion criteria. Eligible participants consisted of 20-80 years old patients who had elective surgery scheduled, also had at least 24 hours of preoperative planning time, and were categorized as ASA physical status I or II [13]. Patients were excluded if they were having emergency operations or they had severe comorbidities (including connective tissue disorders, hemoglobinopathies, bleeding disorders, renal insufficiency or failure, coronary heart disease, congestive heart failure, acute coronary syndrome, chronic renal failure, or chronic liver disease). The study excluded patients who did not satisfy these requirements because it would introduce confounding variables that may contribute to surgical delays independently. All participants gave informed consent, in writing, before they were included in the study after being told about the purpose of the research, procedures, risks, and benefits. Participation was voluntary, and the study abided by the confidentiality of patient information. The structured proforma employed in data collection was specifically designed to carry out the study. The proforma was developed using a standardized checklist and guidelines provided by the World Health Organization (WHO) and tested by using highly qualified personnel with expertise to ensure content validity. The demographic data of each patient, surgical details, and postponement factors of elective surgery were documented. Data on administrative reasons, patient-related reasons, surgical or anaesthetic reasons, and resource constraints were gathered in an organized manner. Patient interviews, pre-operative evaluation, surgical scheduling records, and consultation with the anesthesia and surgical team were used to get data. Trained data collectors collected all the information to guarantee standardization and reduce bias of the interviewer.

SPSS 25 was used to analyze the data. Quantitative variables like age were analyzed using mean and standard deviation. The Shapiro-Wilk test was performed to determine the normality of the quantitative data, and the mean ± SD was provided as the metric of central tendency in normally distributed variables, the median and the interquartile range (IQR) in quantitative variables that were not normally distributed. The quantitative variables of gender, residence status, ASA status, and the things that contributed to the postponement of elective surgery cases (yes/no) were computed in terms of frequencies and percentages. Stratification was done to control effect modifiers like age, gender, residence status, and ASA classification in order to assess their influence on the outcome variables. After stratification, Fisher's Exact test was used, and $p \leq 0.05$ was regarded as statistically significant.

RESULTS

A total of 99 patients were included in the study. The participants were characterized by an average age of 46.8 ± 13.2 years. The study population was split into 58.6% and

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41.4% men and women, respectively. Most of them (82.9%) were residing in the rural setting, whereas the rest (17.1) were in an urban setting. On clinical status, 52.5% of the patients were ASA I and 47.5% were ASA II (Table 1).

Table 1: Baseline Characteristics of Patients (n=99)

Variables	Category	n (%) / Mean ± SD
Age	Years	46.8 ± 13.2
Gender	Male	58 (58.6%)
	Female	41 (41.4%)
Residence Status	Urban	17 (17.1%)
	Rural	82 (82.9%)
ASA Status	ASA I	52 (52.5%)
	ASA II	47 (47.5%)

On the whole, 12.1% of elective surgeries were postponed (95% CI: 6.4% – 20.2%), and 87.9% of scheduled procedures were conducted smoothly (Figure 1).

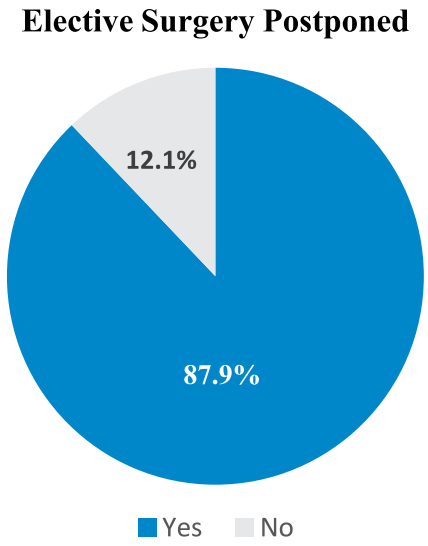

Figure 1: A Pie Chart Showing the Frequency of Overall Postponement

The most common were patient-related factors among the 12 patients whose elective surgery was postponed. In particular, the reason why 41.7% of postponements were carried out was because of refusal to undergo surgery, 50.0% by unavailability of required medications, and 33.3% patients were not properly fasting. Factors relating to the surgeons were less prevalent, with surgeon unavailability leading to 25.0% of the postponements, change in diagnosis 8.3%, extra surgical workup 16.7%, and emergency scheduling 16.7%. The least common causes were associated with anesthesia, including the patient being unfit for anesthesia, abnormal laboratory results, anticipated difficult intubation, and equipment unavailability, all contributing 8.3% of the postponements (Table 2).

Table 2: Frequency of Factors Leading to Postponement of Elective Surgeries (n=12)

Variables	Factor	n (%)
Patient-Related Factors	Refusal to Surgery	5 (41.7%)
	Patient Medication Unavailable	6 (50.0%)
	Patient Not Fasting	4 (33.3%)
Surgeon-Related Factors	Surgeon Unavailability	3 (25.0%)
	Change in Diagnosis	1 (8.3%)
	Additional Surgical Workup Required	2 (16.7%)
	Emergency Scheduling	2 (16.7%)
Anesthesia-Related Factors	Patient Unfit for Anesthesia	1 (8.3%)
	Abnormal Lab Results	1 (8.3%)
	Anticipated Difficult Intubation	1 (8.3%)
	Equipment Unavailable	1 (8.3%)

The proportion of the total postponed cases is determined as percentages (n=12). There can be more than one cause related to the case; therefore, the percentages can be more than 100%

The stratification analysis was done to analyze the relationship between elective surgery postponement and demographic and clinical variables. The small number of postponed cases has led to using Fisher's exact test. The postponement and age group, gender, status of residence, and the ASA classification did not have statistically significant associations ($p>0.05$ at all comparisons), meaning that in the present study, elective surgery postponements were independent of these two patient characteristics (Table 3).

Table 3: Stratification of Elective Surgery Postponement by Demographic and Clinical Variables (n=99)

Variables	Category	Postponed, n (%)	Not Postponed, n (%)	p-value
Age Group	<40 years (n=32)	4 (12.5%)	28 (87.5%)	1.00
	≥40 years (n=67)	8 (11.9%)	59 (88.1%)	
Gender	Male (n = 58)	7 (12.1%)	51 (87.9%)	1.00
	Female (n = 41)	5 (12.2%)	36 (87.8%)	
Residence Status	Urban (n = 17)	1 (5.9%)	16 (94.1%)	0.69
	Rural (n = 82)	11 (13.4%)	71 (86.6%)	
ASA Status	ASA I (n = 52)	6 (11.5%)	46 (88.5%)	1.00
	ASA II (n = 47)	6 (12.8%)	41 (87.2%)	

The Fisher's Exact test was applied, and $p \leq 0.05$ was considered statistically significant

DISCUSSION

Postponement of elective surgery was experienced among 12.1% of the patients in the present study. This is higher than certain international reporting, though within the wide range as seen around the world and resource-constrained environments. Patient-related factors in the delayed cases were noted more than the surgeon or anesthesia-related factors. Nonetheless, the total amount of delayed cases was not high (n=12), and hence the proportionality of the distribution of individual causes is to be taken into consideration with care. These results

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represent tendencies and not the strict predominance of certain postponement variables. Indicatively, a multicenter audit study conducted by Sarang et al. in India gave a cancellation rate of 9.7% on the day of elective surgery in a research consortium 'IndSurg' led by the 'World Health Organization Collaboration Centre' (WHOCC) for Research in Surgical Care Delivery in LMICs [5]. Similarly, a cross-sectional study conducted by Ozcan *et al.* in a higher academic institution in Turkey registered a very minimal cancellation rate of 0.9% in operated patients [14]. Conversely, a study conducted by Sukwana *et al.* in Nelson Mandela Academic Hospital (NMAH), a government-funded public hospital situated in Mthatha, Eastern Cape Province, South Africa, noted a 14.4% rate of cancellation (or postponement) [15]. Therefore, the present study's postponement rate is not as low as in certain high-efficiency centers but is similar to those in which resource limitations and socioeconomic considerations influence surgical scheduling. In terms of causes of delay, our results with patient-related causes (medication unavailability, refusal, and not fasting) are in the lead and replicate those of other similar studies. A study conducted by Feleke *et al.* in Ethiopia at Wolaita Sodo University Comprehensive Specialized Hospital found that patient-related factors were the most common contributors to elective surgery cancellations (31.3%), followed by administrative or facility-related factors; anesthesia-related factors were the least common contributors to cancellations [16]. Correspondingly, Sarang *et al.* in India found that a significant proportion (28%) were cancelled due to patient refusal or no show, and that a significant proportion of cancellations were avoidable preceding [5]. These similarities indicate that patient-level barriers continue to be a significant obstacle in most low- and middle-income countries (LMIC) environments. Conversely, a study conducted by Naderi *et al.* showed a cancellation rate of 6.3% in a large retrospective cohort of almost 30,000 elective cases at Namazi Teaching Hospital, a major referral center in southern Iran [17]. The most common cause was the patient being unfit to be operated on (37%), then patient non-compliance (10%), lack of time (10.5%), and equipment or supply (10%), representing a different ratio with clinical (fitness) and resource factors being more dominant in that study. Their reduced overall delay but higher proportion of anesthesia or facility-based causes could be due to superior preoperative assessment regimens or more rigid scheduling systems as compared to the present study. A study conducted by Spazzapan *et al.* in Princess Royal University Hospital, London, UK showed a quality improvement initiative in a hospital that was introduced in 2021 as a nurse-led preoperative assessment clinic. They showed that the cancellation rates decreased by 23.9% to 4.3% after structured preoperative evaluation [18]. That significant increase in performance highlights the relevance of effective preoperative optimization and planning, which is justified in light of the large percentage of delays caused by patient-level causes, a significant number of which may be prevented. The present study's postponement rate is slightly higher in comparison to most national hospital-based data. Indicatively, a previous study conducted by Bashir *et al.* at the Department of Pediatric Surgery, King Edward Medical University / Mayo Hospital, Lahore, Pakistan, reported that the number of cancellations on the day of surgery was 4% [19]. Another study conducted by Zafar *et al.* in Ayub Teaching Hospital involved delay rates of between 5-6% [20]. Our relatively high delay might be caused by the differences in the population of the patients, rurality, lack of resources, or institutional scheduling policies. Another study conducted by Zaeem *et al.* at District Headquarters Hospital, Faisalabad, Punjab, reported that 6.1% cases were postponed from elective surgery [9]. The stratification analysis showed no important relationships between postponement and age, gender, residence, or ASA status. Conversely, the tertiary center prospective study (0.9% cancellation) revealed that older age and higher ASA class had a significant correlation with cancellations [14]. This difference could be explained by the fact that in our cohort, the number of postponed cases (n=12) is comparatively small, which limits the statistical power, or it might indicate that in the present study, case logistic and patient-related factors surpass clinical risk factors as the determinants of postponement. To conclude, the present study lies halfway between national and international statistics, not as efficient as high-resource optimized settings, but still better than in some rural or resource-limited settings. A majority of patient-related causes of delay are seen in most other similar studies in LMICs, suggesting an important point of improvement. This is contrary to the situation in studies where anesthesia or facility considerations were the main causes, and indicates that reinforcement of preoperative assessment and patient preparation can be the most beneficial in curbing the postponement. The analysis reveals that the most common reasons leading to the postponement of the elective surgery, despite the relatively low percentage of 12.1%, are patient factors, which include the unavailability of medication, refusal, and not fasting. The findings stress the need to conduct preoperative evaluation carefully, educate and counsel patients to be ready. Better coordination of scheduling and proper communication between surgical, anesthesia, and administrative teams can also help minimize delays, maximize operating room efficiency, reduce the anxiety of patients, and improve overall care quality. Hospitals can implement standardized preoperative practices and reminder systems to deal with preventable delays, especially within rural and resource-restricted groups.

This research was conducted in a single tertiary care

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hospital, and this factor may limit the generalizability of the results to other settings. The cross-sectional design can be used to determine associations but not causality. The information was based on hospital data and interviews with patients and may be subject to reporting bias or incomplete records. Also, the relatively low number of delayed cases (n=12) means that the statistical power to identify significant relationships between demographic variables or clinical variables is limited. These limitations notwithstanding, the study offers useful information about the determinants of elective surgery postponement and the room to enhance them. The unequal distribution of the rural participants could have affected stratified analyses and led to the lack of statistical power to determine the impact of residence status on elective surgery postponement.

CONCLUSIONS

Elective surgery postponement was low but significant, with patient-related factors being the most prevalent cause. Problems of the surgeon and anesthesia were less common. Preoperative assessment, patient preparation, coordination of schedules, and effective communication with surgical teams can be used to significantly reduce the postponement rates. These interventions will enhance patient satisfaction, resource allocation, and the timely delivery of surgical care, making surgical care more efficient and improving the quality of hospital services.

Authors' Contribution

Conceptualization: S
Methodology: S
Formal analysis: S
Writing and Drafting: S, SM
Review and Editing: SM

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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