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Prevalence and Causes of Elective Surgical Procedure Cancellations at Aliabad Teaching Hospital, Kabul, Afghanistan: A Cross-sectional Study

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ABSTRACT

Cancellation of elective surgical procedures is a persistent challenge in healthcare systems worldwide, leading to delays in treatment, resource wastage, and adverse clinical outcomes. Despite extensive research globally, data on surgical cancellations in Afghanistan remains scarce. This study aims to evaluate the prevalence and causes of elective surgery cancellations at Aliabad Teaching Hospital (ATH) in Kabul. A prospective hospital-based cross-sectional study was conducted at ATH, Kabul University of Medical Sciences, from September to December 2023. Patients aged 17 years or older scheduled for elective surgeries in general surgery, orthopedics, neurosurgery, and urology departments were included. Data on age, sex, surgical department, and reasons for cancellations were collected. Statistical analysis was performed using IBM SPSS version 26. Cancellation reasons were categorized as patient-related, hospital-related, surgeon-related, and anesthetist-related. A total of 621 elective surgical cases were scheduled during the study period, with a mean patient age of 42.3 years. Of these, 450 (72.4%) surgeries were successfully performed, and 171 (27.6%) cases were canceled. The highest cancellation rate was recorded in the General Surgery Department (37.7%), while Orthopedics had the lowest (19.8%). Monthly variations in cancellation rates were observed, with September having the highest rate (27.5%). Patient-related factors accounted for 35% of cancellations, followed by surgeon-related reasons (30.0%), administrative issues (21.0%), and anesthesia-related causes (14.0%). The most common patient-related cause was acute and chronic medical illnesses, accounting for 50.0% of cases. The study highlights a significant elective surgery cancellation rate at ATH, primarily driven by patient-related and surgeon-related factors. Addressing these issues through enhanced preoperative assessments, better communication, and efficient surgical scheduling could improve operating room efficiency and patient outcomes. The findings underscore the need for targeted interventions and further research to reduce surgical cancellations and optimize healthcare delivery in Afghanistan.

Keywords: Aliabad Teaching Hospital, Reasons for cancellation, Surgery cancellation

INTRODUCTION

Cancellation of elective surgical procedures is defined as the failure to perform a scheduled surgery on the intended date after the patient has been nominated for the procedure (Abate et al., 2020). This issue poses a significant challenge for healthcare systems worldwide, leading to delays in treatment, wastage of resources, and adverse clinical outcomes (Hovlid et al., 2012). Reported cancellation rates vary significantly, ranging from 4.5% to 30.3% in various settings (Lais et al., 2013). Resource-limited environments often report higher rates, with cancellations as high as 31.6%. In these contexts, departments like orthopedics face the highest cancellations (28.8%), while maxillofacial surgeries report the lowest (0.6%) (Melaku Desta et al., 2018).

Cancellation rates also differ geographically, reflecting variations in healthcare systems and patient management protocols. Studies have reported rates of 10.0% in Canada, 11.9% in Australia, 14.0% in England, and 25.0% in Pakistan (Abate et al., 2020). A study in Iran revealed a cancellation rate of 1.3%, with 64.0% of cancellations attributed to clinical issues and 6.0% to operating theater problems (Mohammadi et al., 2012). In Nepal, 10.8% of 794 scheduled elective surgeries were canceled, primarily due to health condition changes and altered management plans

(Karki Bahadur, 2020). In West Africa, patient no-shows and inadequate preoperative management contributed to a 14.4% cancellation rate (Sukwana et al., 2023).

A study conducted in Eastern Ethiopia found that female patients had a 2.4 times higher likelihood of experiencing elective surgery cancellations compared to male patients, highlighting potential gender differences in surgical scheduling and cancellations (Mohammed et al., 2023).

A study conducted at Mulago Hospital in Uganda reported a 28.8% cancellation rate for elective surgeries, with orthopedics (40.9%) and neurosurgery (25.2%) experiencing the highest rates due to facility-related issues (Mulago Hospital Study, 2020). In Canada, a 14.0% overall cancellation rate was found across 20,881 surgeries, with neurosurgery having the highest cancellation rate (20.8%) and gynecology the lowest (10.2%). (Canadian Elective Surgery Study, 2021).

The causes of surgical cancellations are multifactorial. Patient-related factors include no-shows, unresolved comorbidities, and failure to adhere to preoperative instructions (Warlord et al., 2005; Mohammadi et al., 2012). Hospital-related factors, such as insufficient preoperative assessments, resource shortages (ICU beds, oxygen, and operating room time), and scheduling inefficiencies, also play significant roles (Melaku Desta et al., 2018; Sukwana et al., 2023). System-related challenges, including emergency case prioritization and administrative inefficiencies, further contribute to cancellation rates (Karki Bahadur, 2020; Chiu et al., 2012).

In Saudi Arabia, between January 2009 and December 2012, 54,419 surgeries were scheduled, with 6,048 cancellations, leading to an 11.1% cancellation rate. The highest cancellation rate occurred in August 2010 (14.7%), while the lowest was recorded in September 2011 (5.1%) (Fayed et al., 2016).

The implications of surgical cancellations are profound. For patients, they cause psychological distress, treatment delays, and potentially poorer clinical outcomes (Hovlid et al., 2012). Hospitals experience resource wastage, increased costs, and reduced operating room efficiency, with an estimated cost of unused operating room time ranging between USD $1,400 and $2,000 per hour (Macario et al., 2001). The cumulative burden on healthcare systems underscores the urgent need for effective interventions. However, despite extensive global research, a lack of consensus persists regarding the leading causes and best mitigation strategies for surgical cancellations (Cheu et al., 2012).

In Afghanistan, there is a remarkable gap in research addressing surgical cancellations, with no prior studies investigating their prevalence and causes. This study aims to fill this gap by analyzing the rates and reasons for elective surgical case cancellations at Ali Abad Teaching Hospital (ATH) in Kabul. By focusing on various surgical departments, including general surgery, orthopedics, neurosurgery, and urology, this study seeks to evaluate operating room efficiency and assess the impact of cancellations on patient care. The findings will provide evidence to inform policies aimed at reducing preventable cancellations, enhancing patient satisfaction, and improving healthcare services in Afghanistan.

MATERIALS AND METHODS

Study Area

A prospective hospital-based cross-sectional study was conducted at ATH, Kabul University of Medical Sciences (KUMS), over a period of four months, from September to December 2023. ATH has 270 beds, with four surgical wards (general surgery, neurosurgery, orthopedics, and urology) and nine active operating rooms. Approximately 15 operations are performed daily from Saturday to Wednesday, while Thursdays are designated for equipment preparation and washing, and Fridays are public holidays.

Patients aged 17 years or older who were admitted for elective surgery during the study period were included. Exclusion criteria included patients scheduled for minor surgery without a preoperative assessment or emergency cases.

Sample Collection

Ethical approval for the study was obtained from the Scientific Research Center of KUMS. Data were collected by anesthetists and supplemented with information from anesthesia and surgical operating theater logbooks. Data on cancelled elective surgical cases were collected prospectively using structured forms. Information was primarily obtained from operating theater logbooks, surgical and anesthesia records, and the pre-anesthesia assessment forms. In cases of

cancellation, the reason was identified and recorded based on documentation provided by the surgical team or anesthetist in charge. Anesthesia team members, including anesthesia residents, compiled and verified these data daily. Key data elements, such as age, sex, date of operation, department, and cancellation reasons, were recorded and checked daily for completeness and consistency. Reasons for cancellation were categorized as hospital-related, surgeon-related, patient-related, and anesthetist-related.

Statistical Analysis

The data were analyzed using IBM SPSS version 26. The study design was descriptive and aimed to summarize the characteristics of elective surgery cancellations. The dependent variable was the cancellation of operations, which was a binary outcome (canceled or not canceled). The independent variables included age, sex, surgical department, and reasons for cancellation. These independent variables were considered as potential factors influencing the cancellation rates. Descriptive statistics were computed for all variables, including frequencies, percentages, means, and standard deviations for continuous variables (e.g., age). To ensure confidentiality, participant names were replaced with coded identifiers, and all data were stored securely. The statistical analysis was performed to identify patterns and relationships in the data, with particular emphasis on factors associated with surgical cancellations.

RESULTS

A total of 621 elective surgical cases were scheduled for operation during the study period (September to December 2023). The mean age of the participants was 42.3 years. A majority of the participants (49.3%) were in the age group of 20–40 years. Among the scheduled procedures, 450 (72.4%) were successfully performed on the intended day of surgery, while 171 (27.6%) were canceled. Of the 171 canceled cases, 97 (56.7%) were male, and 74 (43.3%) were female, with a male-to-female ratio of 1.31:1.

Table 1. Summary of Patient Demographics and Elective Surgery Outcomes

Variable	Result
Total scheduled surgical cases	621
Mean age of participants	42.3 years
Majority age group	20–40 years (49.3%)
Successfully performed cases	450 (72.4%)
Canceled cases	171 (27.6%)
Gender distribution of canceled cases:	
	Male -97 (56.7%)
	Female 74 (43.3%)
Male-to-female ratio	1.31:1

The cancellation rates across four surgical departments at ATH are summarized in Figure 1. General Surgery recorded the highest number of cancellations with 78 cases (37.7%), followed by Urology with 46 cases (22.2%), and Neurosurgery with 42 cases (20.3%). Orthopedics had the lowest cancellation rate with 41 cases (19.8%).

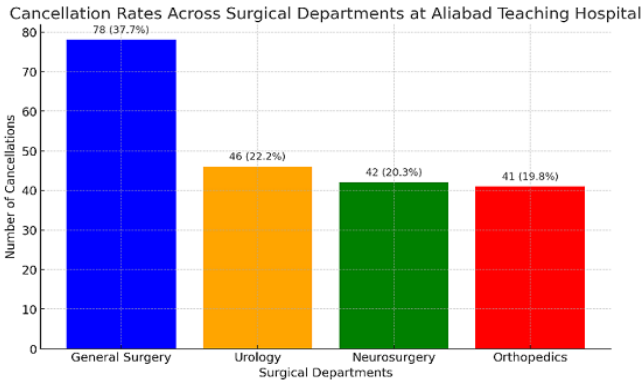

Figure 1. cancellation rates across surgical departments at ATH.

Table 2 shows Monthly variations in surgery cancellations were also observed. The highest cancellation rate occurred in September (27.5%), followed by December (25.8%), October (24.3%), and November (22.4%).

Table 2. Monthly Cancellation Rates of Elective Surgeries

Month	Cancellation Rate (%)

September	27.5%
December	25.8%
October	24.3%
November	22.4%

Figure 2 presents the distribution of reasons for surgical cancellations among 171 patients. The highest proportion, 35.0% (60 patients), was due to patient-related factors. Surgeon-related reasons accounted for 30.0% (51 patients), followed by administrative-related issues at 21.0% (36 patients). Anesthesia-related causes represented the smallest category at 14.0% (24 patients). (Table 4)

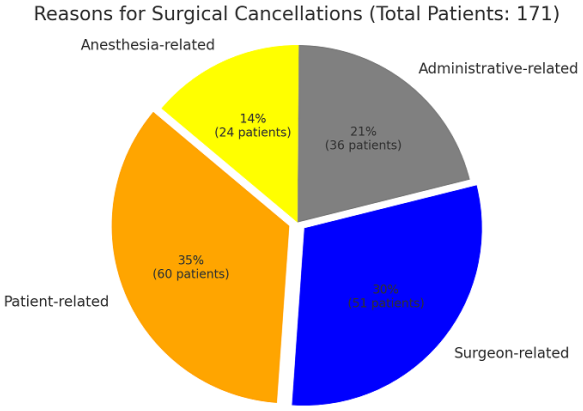

Figure 2. Reasons for surgical cancellations

Table 3 summarizes the patient-related factors contributing to surgical cancellations among 60 patients (35.0% of the total cancellations). The most common cause was acute and chronic medical illnesses, such as uncontrolled hypertension, diabetes, and respiratory infections, accounting for 50.0% (30 patients). Incomplete laboratory investigations contributed to 20.0% (12 patients), while 15.0% (9 patients) were due to patient no-shows.

Table 3: Patient-Related Factors (N = 60.3%)

Causes of Cancellation	**N**	**Percentage**
Acute and chronic medical illness (uncontrolled HTN, DM, respiratory infections)	30	50.0%
Incomplete laboratory investigations	12	20.0%
Patient no-show	9	15.0%
Patient's refusal to sign consent for surgery	5	8.3%
Patient on medication	2	3.3%
Patient not fasting	2	3.3%

Table 4 outlines the surgeon-related factors contributing to surgical cancellations among 51 patients (30.0% of the total cancellations). The most frequent cause was the surgeon's late arrival, accounting for 41.2% (21 patients). Over-scheduling of elective surgeries followed at 35.0% (18 patients). Surgeon unavailability contributed to 20.0% (10 patients), while 3.9% (2 patients) required additional surgical workup. No cancellations were due to diagnosis changes.

Table 4: Surgeon-Related Factors (N = 51.3%)

Cause of Cancellation	**Number (N)**	**Percentage (%)**
Delays in surgeon arrival	21	41.2%
Over-scheduling of elective surgery	18	35.0%
Surgeon unavailability	10	20.0%
Patient requires another surgical workup	2	3.9%
Diagnosis change	0	0.0%

Table 5 presents the administrative-related factors contributing to surgical cancellations among 36 patients (21.0% of total cancellations). The primary cause was the unavailability of ICU beds, accounting for 61.1% (22 patients). Other factors included water shortages in the hospital at 19.4% (7 patients), lack of oxygen and electricity at 11.1% (4 patients), unavailability of equipment at 5.6% (2 patients), and operating room unavailability at 2.8% (1 patient).

Table 5: Administration-Related Factors (N = 36, 2%)

Cause of Cancellation	**Number (N)**	**Percentage (%)**
No ICU beds	22	61.1%

No water in hospital	7	19.4%
Lack of oxygen and electricity	4	11.1%
No availability of equipment	2	5.6%
No availability of operating rooms	1	2.8%

Table 6 highlights the anesthesia-related factors contributing to surgical cancellations among 24 patients (14.0% of total cancellations). The most common cause was the absence of an anesthesiologist or technician, accounting for 40.0% (10 patients). Inadequate staffing for high-risk procedures contributed to 30.0% (7 patients), while 20.0% (5 patients) were canceled due to patients being unfit for anesthesia. Difficult airway identification during the preoperative assessment was a factor in 10.0% (2 patients).

Table 6: Anesthesia-Related Factors (N = 24, 1%)

Cause of Cancellation	**Number (N)**	**Percentage (%)**
Anesthesiologist or technician absence	10	40.0%
Inadequate staffing for high-risk procedures	7	30.0%
Patient unfit for anesthesia	5	20.0%
Difficult airway identification during preoperative assessment	2	10.0%

DISCUSSION

The findings of this study underscore the multifactorial causes of elective surgical case cancellations at ATH in Kabul, Afghanistan, highlighting the necessity for targeted interventions to mitigate their impact. The cancellation rate of 27.6% in this study aligns with data from resource-limited settings, which often report higher cancellation rates compared to developed countries. Understanding the underlying causes of these cancellations provides crucial insights for improving surgical scheduling and enhancing the efficiency of healthcare systems.

The cancellation rate of 27.6% at ATH falls within the range reported in studies from other resource-limited settings, such as 31.6% in Ethiopia (Desta et al., 2018) and 25.0% in Pakistan (Abate et al., 2020). These rates are significantly higher than those reported in developed countries, where rates of 10.0% in Canada and 11.9% in Australia have been documented (Abate et al., 2020). The discrepancy can be attributed to differences in healthcare infrastructure, resource availability, and preoperative management protocols. The findings suggest that resource constraints remain a critical barrier to efficient surgical care in low-income settings.

The higher cancellation rate among male patients (56.7%) compared to female patients (43.3%) observed in this study contrasts with findings from Eastern Ethiopia, where female patients were 2.4 times more likely than males to experience surgical cancellations (Mohammed et al., 2023). However, a research conducted in Nepal concluded that male cancellation was higher than female, which is similar to our study (Karki et al., 2020). This variation highlights the importance of contextual factors in healthcare delivery. Possible reasons for this gender discrepancy could include differences in health-seeking behavior, societal roles, and the types of surgeries commonly scheduled for each gender. Further research is warranted to explore these gender-specific factors and their impact on surgical cancellations.

The cancellation rates observed at ATH (General Surgery: 37.7%, Urology: 22.2%, Neurosurgery: 20.3%, Orthopedics: 19.8%) are comparable to findings from other studies. For example, Mulago Hospital in Uganda reported a 28.8% overall cancellation rate, with orthopedics (40.9%) and neurosurgery (25.2%) having the highest cancellation rates (Mulago Hospital Study, 2020). Similarly, the Canadian study found a 14.0% overall cancellation rate, with neurosurgery having the highest at 20.8% (Canadian Elective Surgery Study, 2021). While the rates at ATH are higher for General Surgery, they align closely with the patterns observed in neurosurgery and orthopedics in the other studies.

In our study, the high cancellation rate in September (27.5%) was primarily due to water unavailability and electricity problems. These infrastructural challenges disrupted surgical schedules, highlighting the impact of external factors on surgery cancellations. This is consistent with Fayed et al. (2016), who observed monthly fluctuations in cancellation rates, though without specifying utility-related issues. The findings suggest that improving hospital infrastructure, particularly essential services like water and electricity, is crucial to minimizing surgery cancellations.

Patient-related factors were the most significant contributor to surgical cancellations, accounting for 35.0% of cases. This finding aligns with studies from Iran and Nepal, where changes in patients' health conditions and incomplete preoperative assessments were major causes of cancellations (Mohammadi et al., 2012; Karki et al., 2020). Acute and chronic medical conditions, such as uncontrolled hypertension and diabetes, were the leading causes within this category. These findings underscore the critical importance of comprehensive preoperative assessments and the optimization of comorbid conditions to reduce cancellations.

Surgeon-related factors accounted for 30.0% of cancellations, with delays in arrival and over-scheduling being the most frequent issues. Similar findings have been reported in studies from other regions, where scheduling inefficiencies and surgeon availability were significant contributors to cancellations (Chiu et al., 2012). Addressing these challenges requires better scheduling practices, adherence to operating room timelines, and strategies to ensure the timely availability of surgeons.

Administration-related factors were responsible for 21.0% of cancellations, with the unavailability of ICU beds being the most prominent cause. This finding reflects the impact of resource limitations on surgical services and is consistent with studies from West Africa and other resource-constrained settings, where inadequate infrastructure and resource shortages significantly affected surgical operations (Sukwana et al., 2023). Strategic planning and investment in healthcare infrastructure are essential to address these challenges and improve surgical service delivery.

Anesthesia-related factors accounted for 14.0% of cancellations, with the absence of anesthesiologists or technicians and inadequate staffing for high-risk procedures being the primary causes. This finding is consistent with other studies that highlight the critical role of anesthesiology services in ensuring the smooth functioning of surgical departments (Fayed et al., 2016). Strengthening the anesthesia workforce and improving preoperative assessments to identify and manage anesthesia-related risks are crucial steps in reducing cancellations.

Implications for Clinical Practice

The high cancellation rate observed in this study has significant implications for both patient care and healthcare resource management. For patients, cancellations can lead to psychological distress, delays in treatment, and potentially poorer clinical outcomes (Hovlid et al., 2012). For hospitals, cancellations result in resource wastage, increased costs, and reduced operating room efficiency (Macario et al., 2001).

To address these challenges, several recommendations can be made:

1. **Enhancing Preoperative Assessment Protocols:** Establishing dedicated preoperative clinics can help identify and manage patient-related issues before the day of surgery.
2. **Improving Scheduling Practices:** Implementing efficient scheduling systems and ensuring the timely availability of surgeons and anesthesiologists can reduce cancellations due to human resource issues.
3. **Addressing Resource Limitations:** Strategic planning and investment in healthcare infrastructure, including the availability of ICU beds and essential resources, are essential to mitigate administrative-related cancellations.
4. **Strengthening Anesthesia Services:** Expanding the anesthesia workforce and enhancing preoperative assessments for anesthesia-related risks are critical for improving surgical outcomes.

Limitations and Future Research

This study has several limitations that should be acknowledged. The research was conducted over a limited period (September to December 2023) and at a single hospital, which may limit the generalizability of the findings. Additionally, the study did not assess the long-term impact of

cancellations on patient outcomes or hospital efficiency.

Future research should consider a multicenter approach to provide a more comprehensive understanding of surgical cancellations in Afghanistan. Longitudinal studies that evaluate the impact of implemented interventions on cancellation rates and patient outcomes are also warranted. Further exploration of gender-specific factors and administrative challenges is essential for developing targeted strategies to reduce cancellations.

CONCLUSION

This study provides valuable insights into the rates and causes of elective surgical case cancellations at ATH in Kabul. The findings highlight the multifactorial nature of surgical cancellations and the need for targeted interventions to reduce their occurrence. By addressing patient, surgeon, administrative, and anesthesia-related factors, healthcare providers can enhance operating room efficiency, improve patient outcomes, and optimize resource utilization.

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Authors' Contributions:

Concept and design: Rassuli Mohammad Farid, Data collection: Kamal Besmillah, Analysis of data: Negin Fahima and Yousufi Mahboba, Drafting of the manuscript: Rassuli Mohammad Farid and Kamran Mohammad Monir. All authors read and approved the final manuscript.

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