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Incidence and Factors Associated with Cancellation of Elective Surgical Operations in Intermediate Hospital Oshakati, Namibia

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Abstract

Introduction: An elective surgical case cancellation refers to any planned operation that was not performed on the scheduled day. Cancellation of elective surgeries has a negative impact on health systems, especially in resource challenged countries. This study determined frequency and factors associated with cancellation of elective surgical operation in Intermediate Hospital, Oshakati. **Methodology:** A prospective observational cohort study design was employed, and all patients scheduled to undergo elective surgeries from September to November 2023 were recruited. A proforma was used to extract data from patient's record, daily scheduled operation lists and theatre surgery register. The data collected were analysed using SPSS for windows (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 28.0. IBM Corporation, Armonk, NY, USA). The results were presented as frequencies and percentages in tables and chat. **Results:** During the study period, 1599 elective surgeries were booked, of which 336 cases (21%) were cancelled on the day of surgery. Of the total cancelled cases, 186 (55.4%) were female and 150 (44.6%) were males patients. Vascular surgery (45.8%) had the highest proportion of cancellations while Ear, Nose and Throat (ENT) department had the least (9.4%). The most common factors why surgeries were cancelled were time constraints (21.4%) and lack of theatre space (15.5%). **Conclusion:** The overall cancellation incidence was found to be higher than the internationally recommended rate of less than 5%. Our 21% rate was found higher than that of most developed countries but lower than some African countries. Factors related to Human and equipment limitations constituted the most common category of reasons for cancellations.

Keywords

Elective Surgery, Case Cancellation, Operation, Frequency, Factor

1. Introduction

An elective surgical operation is a surgery that is scheduled in advance because it does not presume a medical emergency [1]. Elective surgeries differ from emergency surgical operations because emergency surgeries need to be performed urgently with simultaneous resuscitation and stabilization. Cancellation, on the other hand, is an act of terminating a planned procedure on the intended time or day. Therefore, an elective surgical case cancellation is referred to as any elective case that is on the list on the day prior to surgery but not operated upon as scheduled [2] [3]. There is a great concern of increased cancellation of scheduled surgery, which is a common phenomenon worldwide and mostly in developing countries [4] [5]. Abate *et al.* in a meta-analysis revealed that the global prevalence of case cancellation on the intended day of surgery was 18% [6]. However, Cheikh *et al.* put the cancellation rate in paediatric surgery of a Senegalese hospital at 20.8% [7]. Although there is no consensus on the acceptable cut off for case cancellation rates when defining efficient operating theatres, however, less than 5% is generally recommended [8].

Cancellation of elective surgeries results in a high economic burden for the patients and hospitals and is associated with extended hospital stay and repeated operative preparations. Also, cancellation of planned surgeries affects surgeon's productivity and staff morale, in addition to the psychological trauma or distress it causes to the patients and their families alike [8].

The factors associated with cancellation of elective surgical cases can be grouped into avoidable and non-avoidable factors. Also, it could be categorized as management related, infrastructure related, patient, surgical and anesthetic related factors [3].

Therefore, this study was designed to determine the frequency and factors associated with cancellation of elective surgical procedures in the Intermediate Hospital Oshakati (IHO), Namibia's third largest teaching hospital.

2. Research Methodology

The study employed a prospective observational cohort design and data collection was for a period of 3 months. Ethical approval (SOM08/2023) was obtained from the University of Namibia before the commencement of the study. A questionnaire was used to gather information from patient files, daily elective theatre operating lists, and the theatre cancellation registry book. All patients booked for elective procedures irrespective of previous bookings were included while those booked for emergency procedures were excluded. In categorizing the reasons for cancellation, lack of theatre space was defined as when a particular theatre suit meant for a procedure is either closed down or being used by other units/team for emergency surgery making it impossible for the elective list to commence or continue as scheduled. Time constraint was defined as rescheduling elective procedure that was not started before 5 pm, and Emergency priority was when a particular team having elective list prioritizes their team's emergency procedure over elective pro-

cedure. Data obtained included the daily outcome of scheduled procedures, the details of the cancelled procedures and reasons for cancellation. The data collected were analysed using SPSS for windows (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 28.0. IBM Corporation, Armonk, NY, USA). Tables were used to present data as mean, median and proportions.

3. Results

During the study period, 1599 elective surgical cases were booked, out of which 336 were cancelled.

Table 1. Frequency of cancellations of surgical procedures at IHO.

Outcome	N	%
Operated	1263	79
Cancelled	336	21
Total	1599	100

The frequency of cancellation was 21% as shown in Table 1.

Table 2. Sociodemographic characteristics of cancelled participants at IHO.

Variables	Frequency	Percentage
Age (*years*)		
0 - 1	28	8.33
2 - 12	64	19.05
13 - 18	37	11.01
19 - 35	70	20.83
36 - 64	77	22.92
≥65	60	17.86
Mean	33.48	
Gender		
Female	186	55.36
Male	150	44.64
Ratio	1.24:1	

Table 2 showed that more female 186 (55.4%) cases were cancelled than males 150 (44.6%). Age distribution among cancelled patients: Mean age (SD) was 38.4 (25.8), and with the age range from 7 days to 103 years.

Vascular and plastic surgeries had the highest cancellation rates, 45.8% and 42.5% respectively, as represented in Table 3. ENT (Ear, Nose, and Throat) cases were the least cancelled (9.4%).

The categories of factors for cases cancellations were resource limitations, patient-related issues, clinical priorities, and time management as shown in Table 4.

Table 3. Proportion of cases cancellation across surgical specialties at IHO.

Specialty	Total cases booked	Total cases cancelled	Proportion cancelled (%)
General Surgery	420	103	24.5
Gynecology	252	39	15.5
Ophthalmology	250	42	16.8
Orthopedic/Trauma	204	45	22.1
Obstetrics	110	24	21.8
ENT	96	9	9.4
Urology	95	15	15.8
Pediatric surgery	60	23	38.3
Neurosurgery	48	8	16.6
Plastic surgery	40	17	42.5
Vascular surgery	24	11	45.8

$n = 336$.

Table 4. Distribution of factors for elective surgical cases cancellations at IHO.

Category	Factors	n (%)
Resource Limitations	Lack of theatre space	52 (15.5)
	No surgeon	12 (3.6)
	No anesthetic doctor	8 (2.3)
	Malfunctioning/unavailability of anesthetic equipment	23 (6.8)
	Unavailability/non-functioning surgical equipment	39 (11.6)
	Total	**134 (39.8)**
Patient-Related Issues	Patient did not show up for admission	21 (6.3)
	Patient not well prepared	12 (3.6)
	Very sick/not fit for anesthesia	10 (3.0)
	Patient ate	8 (2.3)
	Consent not complete	5 (1.5)
	Patient needs further investigations/workup	10 (3.0)
	Patient refusal	7 (2.1)
	Total	**73 (21.8)**
Clinical Priorities	Emergency priority	47 (14.0)
	Anemia	10 (3.0)
	Total	**57 (17.0)**
Time Management	Time constraints	72 (21.4)
	Total	**72 (21.4)**

Table 5. General linear model of factors influencing surgical cancellations at IHO.

	SS	Df	F	P
Model	919.782	12	2.5078	0.004**
SDep	808.855	10	2.6464	0.004**
Age	118.050	1	3.8624	0.050*
Gender	0.631	1	0.0207	0.886
Residuals	9872.206	323		
Total	10791.988	335		

*$p < 0.05$, significance at the 5% level, not significant $p > 0.05$. Surgical department (SDep) emerged as a significant factor, $p = 0.004$. Patient age showed marginal significance, $p = 0.050$ while Gender did not significantly influence the cancellation of surgical procedures, $p = 0.886$.

Resource limitations were the highest (39.9%), and clinical priority the lowest (17.0%).

4. Discussion

The frequency of cancellations in this study was 21% which is higher than the internationally quoted benchmark of less than 5%. However, this finding was consistent with the frequency of cancellation in studies from Pakistan (21%), Tanzania (21%) and Sudan (20%) [3] [9]. While the cancellation frequency in this study was found to be higher compared to similar studies in Spain (3.6%), Bosnia and Herzegovina (4.6%), United States of America (4.4%), Brazil (6.8%), German (12.7%), Wales (7.6%) and India (17.6%) [2] [3] [10]. It is lower than studies conducted in Burkina Faso (37%), Uganda (28.8%), Ethiopia (31.6%), and Nigeria (28%) [2] [3] [8] [10]. Frequency of cancellation was found to be higher in African countries, probably due to administration and infrastructure related factors, and inadequate human resources [11].

This study showed that more female patients were cancelled than males (55.4% vs 44.6%) similar to studies done in Zambia (60.7%) and South Africa (55%) as more female cases were cancelled [12] [13]. However, the finding disagreed with 2 prospective cross-sectional study conducted by Ethiopia, that concluded that more males were cancelled with proportions of 51.1% and 56.8% respectively [3] [14].

In this study, vascular and plastic surgeries had the highest cancellation rates, (45.8%) and (42.5%) respectively. These high rates might reflect the complexities of the cases, the need for highly specialized equipment or personnel or patient-related factors such as health status fluctuations. A similar study conducted in Ethiopia found cancellations to be high in the department of General surgery (29%) followed by Gynecology/obstetric surgery (26.5%) and then Orthopedics (22.6%) [12]. ENT (Ear, Nose and Throat) recorded the lowest cancellation at (9.4%), followed by Gynecology and Urology with rates of (15.5%) and (15.8%)

respectively. This result is at variance with a study conducted in South Africa, that found most elective surgery cancellations occurred in ENT, Ophthalmology, Gynecology, General surgery, and Urology [13].

The differences in cancellation rates across specialties highlighted the importance of developing tailored strategies to manage and reduce cancellations effectively. For specialties experiencing high cancellation rates, investigating the specific challenges, and implementing targeted interventions would be necessary.

In this study, the most substantial factors associated with case cancellation was time constraints (21%), followed by lack of theatre space (16%) then prioritizing emergency procedures which accounted for 14%. This underscores the importance of efficient scheduling and operational management in accommodating both planned and emergent surgical needs. Furthermore, it indicates that space constraints in operating theatres are a critical barrier to surgery. A similar study by Vahwere *et al.*, found financial constraints (23.3%), patient not fit to surgery (16.6%) and unavailability of the senior surgeon (15.5%) were the highest factors associated with surgical case cancellations [8].

Another study in Australia reported that the most common causes for cancellation were no theatre time owing to a prior surgery's overrun (18.7%); no postoperative bed (18.1%); patient cancellation (17.5%); and a change in the patient's clinical state (17.1%). Patient not ready, no surgeon, list error, administrative cause, and communication failure all accounted for 21.0 percent of all procedural causes [12]. Study conducted by Karki *et al.* found that the main reasons for cancellations were recent changes in the medical status of the patient (20.9%), followed by overbooking (12.7%), and changes in the plan of management (10.4%) [15]. Although none of these reasons were identified in this current study, overbooking is related to time constraints, which was an important factor in the study.

The was a strong association between general surgery specialty and cancellation of surgery according to **Table 5**. This was probably due to the volume of elective surgeries done by this specialty which by far exceeded that of other specialties. Patient age showed marginal significant association with cancellation ($p = 0.050$). This indicated that age had a slight effect on the likelihood of a procedure's cancellation, and this could be attributed to age-related health considerations, or the prioritization of surgical needs based on patient age. On the other hand, this study suggested that the reasons for cancellation were not substantially different between male and female patients, indicating a relatively uniform risk of cancellation across genders.

A similar study conducted in Zambia identified surgery type, anaesthesia, co-morbidity, and gender as factors associated with surgery cancellation [10]. The study concluded that there was a statistically significant association between type of surgery, anaesthesia and co-morbidity and surgery cancellation while the association of gender with surgery cancellation was not significant ($p > 0.05$). Ogwal *et al.*, used a multivariate analysis and concluded that surgical specialty was significantly associated with the cancellation of elective surgical procedures [16].

Based on the findings of this study in comparisons to previous studies, it can be concluded that there is a similarity in the factors associated with cancelations of elective surgical operations across African countries and the world at large.

5. Limitations of the Study

The study was conducted in a period of three months and partly during a festive (mid-December to mid-January) period when majority of the staff would want to take their annual leave. This could have affected the workforce availability and contributed to increased cancellation of elective list.

6. Conclusion

The observed increase in cancellation frequency impedes timely care for surgical patients. Cancellation was found to be predominantly higher in departments that perform complex surgeries that require specialized equipment and highly skilled manpower; anesthetists and surgeons, to handle these specialized areas. Also, the high contribution of avoidable factors to cancellation underscores the importance of efficient scheduling and planning to accommodate both emergent and elective cases.

7. Recommendation

The development of an effective communication policies among theatre users will ensure that reasons for possible cancellation are notified within 24 hours to surgery to enable adjustments to be made to the final list. Also, having a digital patient booking system that allows patients to timeously confirm or cancel their appointments will enable reducing the contribution of patient related factors in cancellation of elective procedures and enhance the judicious use of theatre time.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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