FREQUENCY AND FACTORS ASSOCIATED WITH CANCELLATION OF ELECTIVE SURGICAL OPERATIONS IN INTERMEDIATE HOSPITAL OSHAKATI

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT

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ABSTRACT

Introduction: An elective surgical case cancellation refers to any planned operation that was not performed on the scheduled day. This problem 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. 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. A thematic analysis of reasons for cancellation was employed. Furthermore, analysis included descriptive statistics as frequencies and percentages, presented in tables.

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. Resource limitations related factors constituted the most common category of reasons for cancellations.

Recommendation: Most causes of cancellation can be avoided by building more theatre space, employ more staffs and prioritizing the optimal functioning of operating theatre in the hospital. Development of operating theatre standard of practice and policies is of equally important. Furthermore, a constant communication between theatre user parties should me maintained.

Keywords: Elective surgery, case cancellation, operation, frequency, factor.

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DEDICATION

I dedicate this thesis to my late grandmother, Frieda Gwaankugo Jesaya.

It is because of the teaching, guidance and discipline that you instill in me that I am who I am, and where I am. I know your spirit is watching over me. May your peaceful soul continue resting well.

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Firstly, I would like to give glory and gratitude to the Almighty God, who has been my pillar of strength, and I am blessed to be where I am today. I would like to express my sincere gratitude to my family and friends for their support and love throughout this journey.

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To the Intermediate Hospital Oshakati main operating theatre and maternity theatre staffs, surgeons and anesthetists, thank you all for your support and contribution in making this study possible.

Lastly to everyone, the support rendered to me is highly appreciated. May God bless you all.

DECLARATION

I, Josef Sakeus Ndeshipanda, declare that this thesis is my own work. It is a true reflection of my own research and it has not been submitted before for any degree or examination at this university or any other institution, and does not represent any interest group(s).

Josef Sakeus Ndeshipanda		April 2025
Name of Student	Signature	Date

CHAPTER 1: INTRODUCTION

1.1 Orientation to the study

An elective surgical operation is surgery that is scheduled in advance because it does not presume a medical emergency. Equally important, an elective surgical operation is a planned surgery that can be booked in advance as a result of a specialist clinical assessment that results in the person being placed on a surgical waiting list.[1] Elective surgeries differ from emergency surgical operations due to the fact that emergency surgeries need to be performed urgently with simultaneous resuscitation and stabilization. Delaying surgery would lead to a significant increase in threat to life or body part.

Cancellation can be defined as an act of terminating an organized event or procedure on the intended time or day. 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] Although there is no consensus on the acceptable cut off for case cancellation rates when defining efficient operating theatres, less than 5% is generally recommended.[6]

Operating rooms are some of the most important areas of hospitals that have significant impact on the overall picture of a hospital's performance.[7] In most countries, hospital budgets are constrained and the hospital administration allocate and invest their limited resources to operating theatres that in most cases do not materialize.[8,9] An efficient operating room should start early, finish on time, allocate minimal time for preparation between procedures and have a low rate of

cancellation.[7] Efficient and maximum utilization of operating theatres is one of the main goals of a good hospital to cope with increasing numbers of patients.[9,10] The rising cost of health care and dwindling economic resources necessitate the need to encourage cost-effectiveness, while maintaining quality of care.[11]

Cancellation of elective surgeries result in high economic burden for the patients and hospitals, and is associated with extended hospital stay and repeated operative preparations. Equally, important cancellation of planned surgeries affects surgeon's productivity and staff morale, causes psychological trauma or distress to the patients as well as their families.[3]

In a healthcare setting, the constraints of resources can be categorized into space, stuff and staff constraints. When it comes to elective surgical case cancellations, patient factors might affect cancellations, but many of those patient factors are originating from these three constraints. The shortfall of these major resources can significantly affect surgical cases intervention outcome and may contribute to operation cancellations. Space linked constraints include limited inpatient beds in surgical wards, no postoperative space either in general wards, high dependency unit or intensive care unit, limited theatre space to operate and no designated emergency operating theatres. Stuff associated constraints may include unavailability or technical problem of equipment; anesthetic drugs not available and essential drugs not sufficient nor procured on time; laboratory and other investigations not ordered or results not obtained on time prior to surgeries. Staff associated constraints may include, shortage of theatre nursing personnel, surgeons and anesthetic physician; patient not pre-operatively assessed as a result of the shortage from the anesthetic or

surgical teams; lack of communication between surgical and anesthetic team to adequately prepare and optimize patients for surgeries.

The reasons for cancellation of elective surgical cases can be grouped into avoidable and non- avoidable reasons. Furthermore, factors associated with cancellations of elective surgeries can be categorized into management related, infrastructure related, patient, surgical and anesthetic related factors.[3] Scheduling errors, shortage of equipment and, inadequate preoperative evaluation are the most avoidable reasons. Unavoidable reasons include emergency cases intervening in the elective schedule, unexpected changes in the patient's medical status, or patient's absenteeism.[3]

Despite most cancellations being avoidable and many improvements being done for patient quality of care, cancellation of elective surgery remain high in the world and mostly in developing countries. Therefore, the purpose of this study was 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.

1.2 Statement of the problem

IHO is one of the major intermediate referral hospitals located in the northern part of Namibia. The hospital accommodates and receive referrals patients from all district's hospitals located in the five northern regions (Omusati, Oshana, Oshikoto, Ohangwena and Kunene). IHO operating theatre performs various elective and emergency surgeries yearly. The hospital has four main operating theatres and one functional obstetric theatre. The hospital has a higher catchment area due to its demographic location, with an overflowing number of patients presenting with

various surgical conditions.

IHO setting face challenges that directly or indirectly affect elective surgical operation, efficiency, utilization and productivity of the operating theatre. Some of them include: limited theatre space, due to the fact that only 5 operating theatre caters for all elective and emergencies surgeries from all surgical disciplines and referrals from all five northern regions; lack of dedicated emergency operating theatre to handle urgent and emergency cases, which keeps on interrupting the elective lists; an increased in number of emergency cases due to poor access to elective surgery that keeps on being postponed and rebooked; and essential investigating and screening equipment not being available, or malfunctioning.

Health care provider shortage is one of the rising and major concerns in IHO. Surgical departments, anesthesia and intensive care are challenged with limited specialists and medical officers. As an outcome, supervision, academic sessions and training of medical officer in these department is shortcoming. Operating theatre nurses that have specialized in theatre technique are not sufficient in IHO, major and complex special surgical operations are affected. The above mentioned organizational, infrastructural and administrative problems in IHO can be solved by building more theatres space, employing more staffs in theatre, anesthesia and surgical domains. Employ more specialists and subspecialist in these respective departments and motivate for junior doctors to take up academic fields, training and specialize. Overall, provide support and motivate health care workers in the hospital to increase morale and conducive working environment.

Many patients travel long distance to access the hospital services and are mostly booked in advance for elective surgeries with no guarantee of the service. Majority

of these patients reside in suburban communities, mostly unemployed with limited income. Denying these patients timeous surgical operation will not only cause deterioration in their disease processes, but contribute to a higher morbidity and mortality. It has been observed that the number of booked elective surgeries does not tally with the actual number of performed cases, suggesting an underperformance of the IHO operating theatres. However, there is no empirical data to quantify the number of cases cancelled and the contributing factors, so this study (the first of its kind) would fill in the gap.

It is hoped that the findings will assist us in making appropriate recommendations to the government and the hospital management to address the problem of case cancellations at IHO. Potentially these measures will enhance efficiency, reduce wastage of already limited resources and manpower and promote patient's safety and satisfaction.

1.3 Objectives of the study

1.3.1 Main Objectives

To determine the frequency and factors associated with cancellation of elective surgical operations in the Intermediate Hospital Oshakati.

1.3.2 Specific Objectives

1. To quantify the frequency of cancellation of elective surgical operations within IHO.
2. Analyze the correlation between sociodemographic characteristics of patients and the likelihood of surgical cancellations.
3. Identify and categorize the underlying factors, for surgical cancellations into thematic groups through qualitative analysis of patient records observed.

4. Compare cancellation rates across different medical specialties to identify disciplines with significantly higher rates of cancellations.
5. Determine the impact of significant variables on the likelihood of cancellations.

1.4 Significance of study

Namibian health care system is challenged by limited resources making it difficult to meet the health demand of its growing population. In recent years, it has been noted that the number of patients admitted for elective surgeries at IHO has increased, but the outcome of these operations are not well documents and recorded annually. There is a need to conduct this study to determine the incidence of cancellation and identify the etiologies. This would allow surgeons, anesthetists and other personnel to plan better and address avoidable causes of cancellation and improve communication between staff and patients.

The finding of this study will bring to the fore the various reasons for suboptimal service delivery in the operating theatres. These will help the hospital management and the theatre staff to focus their efforts on the identified areas so as to improve efficiency and overall patient satisfaction.

1.5 Limitations of the study

Factors associated with cancellation of surgeries which were not clearly documented in the theatre record registry during data recording, were obtained from the surgeons and anesthetist before the end of the operating day.

1.6 Delimitations of the study

All scheduled patients were included in the study and identification of cancelled cases were done based on the performed procedures from the daily theatre list. Once

a case was cancelled the nurse working at reception informed the data collecting medical officers in theatre, who filled the form before the patient was sent back to the ward. The nurses working at reception were well informed during training to clearly enter all the details necessary for the study into the theatre cancellation book in order to avoid insufficient and omitted information. Equally important, respective surgical departments were informed about the study and the relevant information needed on the data collection form, which they indicated clearly in the patient's files when procedures were cancelled.

CHAPTER 2: LITERATURE REVIEW

Elective surgery is defined by non-emergency surgeries which are medically necessary but can be delayed for at least 24 hours.[12] Equally significant, elective surgical operations can be defined as a planned surgery that can be booked in advance as a result of a specialist clinical assessment that results in the person being placed on an elective surgery waiting list.[1] Some examples of elective surgeries that are performed in IHO are hip replacements, tonsillectomies, cataract extraction, total abdominal hysterectomy, caesarean section, hernia repair and cleft palate repair.

Cancellation of surgery refers to failure to realize a scheduled surgical procedure on the intended date.[6] Cancellation rate differs in different part of the world; literature reports commonest in developing countries with a range of 10-45% and 0.37-28% in developed countries.[6] It is challenging to have a clear picture of the cancellation rate of elective surgical case in Africa due to the paucity of studies conducted. For instant, cancellation rates reported in Burkina Faso stands at 37%, while in Uganda stands at 28.8%.[6] Cancellation rate in Sub-Sahara Africa stands at 36%.[13] Currently there are no data pertaining to cancellation of surgeries in Namibia, due to the fact that no study in this regard was conducted in the Namibian health settings.

Elective surgical cancellation is a problem that most hospitals still face across the world, and the reasons for cancellation differ depending on where you are.[9] Based on various studies, reasons for cancellation of planned surgeries can be divided into avoidable and unavoidable.[9] Definitions of avoidable vs. unavoidable cancellations are based on the opportunity to intervene to prevent cancellation, mainly on those

situations that existed before the day of surgery and could have been avoided by careful planning and communication.[13] A study done in South Africa concluded that, 59.4% of the cancellations were unavoidable, while 40.6% were avoidable.[13] This is comparable to a Nigerian study in which 60.8% of cases were cancelled due to no-shows and classified as unavoidable.[14]

The most common causes of cancellations were patient-related, facility-related, surgical related factors and anesthetic related factors. Surgical-related factors accounted for the majority of avoidable causes (99.12%), followed by anesthetic-related factors (66.67%).[13] Cancellations of surgeries for administrative reasons had a percentage of only 2.29% and the highest cancellation rate (33,73 %) was due to patient-related causes.[14] Typical unavoidable causes were patients not showing up, patients eating prior to operating theatre, and operating time running out, all of which are preventable with improved planning.[13] Similarly, cancellation of planned surgeries can be attributed to modifiable reasons such as blood not arranged, improper scheduling, lack of equipment and no critical care and recovery bed available.[10]

A study conducted at the National Institute of Cardiology in the state of Rio de Janeiro, emphasizes the high rate of cancellations due to institutional, administrative and/or logistical problems of the hospital, in which of the 170 scheduled surgeries, 119 were related to these reasons.[15] Patient related problems are among the most frequent reasons for cancellations of elective surgeries in health institutions, including lack of hospital beds, scheduling errors, miscommunication.[15]

Inadequate number of anesthesiologists, and anesthetic facilities such as oxygen cylinders and drugs contributed to cancellation.[16] Shortage of staff and lack of health resources have been reported to be a common problem in most hospitals in developing nations.[16] In resource-limited setting, where staff shortage is a challenging problem, re- distribution of the few staff available needs to be designed to address the problem. Cancellations due to shortage of Anesthetists can be avoided by employing more anesthetists and setting up appropriate arrangements to cover for leaves.[16] Motivation for academic and training for anesthetist is crucial, to equip the departments with skilled specialized anesthetist that can take up challenging and complex cases and also to train and supervise the junior doctors to enhance efficiency, decrease turn over time, preoptimization of patients and avoid surgical case cancellations.

Currently world-wide, operating room practices and procedures are being closely monitored by the hospital management and government, because the cost of surgery is continuously moving up and pressurizing the health care system.[10] Several problems may arise when cancellation is made after admission, such as loss of opportunity to include another patient, under-utilization of operating rooms, increased length of stay rate, risk of nosocomial infection and decreased availability of hospital beds.[15] Wastage of sterilized material, unnecessary presence of theatre staff in the operating room and the sterilization process can leads to financial losses when a scheduled surgery gets cancelled.[15] The emotional impact on the patient after cancellation may generate a broken bond of trust with the institution and/or health professionals, which contributes to the decrease in the quality of care.[15]

Overall cancellation rates for elective surgeries worldwide range from 1.96 to 49%,

with 20% cancellation rate in Western countries and a high cancellation rate of 48,5% in low-income countries.[17] Cancellation rates in some African countries such as Tanzania and South Africa stand at 21% and 44.5% respectively.[18] In Burkina Faso, a prospective study was undertaken on cancellation of scheduled surgery, 103 patients were included the study. Of these, 63 patients had their scheduled surgery as planned and 38 (36,0%) surgeries were cancelled including 10 final cancellations (9.7%) with 28 cases postponed (27.1%).[19]

Based on case cancellation among surgical sub-specialty, orthopedic cases (28.7%) followed by general surgery (17.8%) and gynecology surgery (15.1%) were the commonest while maxillofacial (0.6%) was the least cancelled cases.[3] Contribution to total cancellation was highest in orthopedic 33.8% followed by general surgery 27.5%, obstetrics 7.7% and ENT 5.2%.[10] In a different study conducted by Sukwana et al, most elective surgery cancellations occurred in ophthalmology, gynecology, general surgery, urology, and ENT.[13]

In order to enhance cost effectiveness and efficiency, efforts should be made to prevent unnecessary cancellations through careful planning aimed at proper scheduling, pre- anesthetic evaluation and perioperative preparation. In addition, adequate surgical history for the scheduled patients must be provided by the surgeons to anesthesia and theatre team, provision must be made to provide necessary operating room equipment by hospital administrators and other stakeholders.[6]

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Design

The study employed a prospective observational cohort design using quantitative and qualitative approach for data collection. Information was meticulously gathered using a Data Collection Checklist (refer to Appendix A, Part A and B) from various sources, including patient files, daily scheduled theatre operating lists, and the theatre cancellation registry book. The research unfolded over a period of three months, providing a comprehensive understanding of elective surgical cancellations and their underlying causes at IHO.

3.2 Study Setting

The research was situated at the IHO, a premier teaching and referral hospital in the northern part of Namibia, positioned 700km from the capital. With an 800-bed capacity, IHO served as a critical healthcare node, receiving referrals from ten district hospitals. The facility has five operational theatres (four main theatres and one in the obstetric ward) alongside a six-bed Intensive Care Unit (ICU), catering to a wide spectrum of surgical disciplines including general surgery, obstetrics/gynaecology, orthopaedics, ENT, and more. The anesthesia department, pivotal to the study, included two consultants and eight registrars, ensuring comprehensive coverage across surgical needs.

3.3 Population of the Study

Study Population: Patients who were admitted for various elective surgical procedures and appeared on the IHO's daily operating theatre lists throughout the three-month

study period. This included those scheduled for surgery who, for various reasons, were not operated on as planned.

Inclusion Criteria

- Patients admitted for any elective surgical operation listed on the daily IHO-operating theatre schedules were included.

Exclusion Criteria

- Patients scheduled in minor operating theatres for minor surgeries.
- Emergency surgeries and elective surgeries that became emergencies.
- Privately booked elective cases.
- Patients who passed away before the scheduled surgery.
- Patients whose condition resolved spontaneously before surgery were excluded from the study.

3.4 Sampling Procedure

Utilizing a prospective observational cohort study design, the study systematically reviewed daily scheduled elective surgery lists. It meticulously documented and included all cancelled elective surgery cases as recorded in the operating theatre registry book and patient files, provided they met the study's inclusion criteria within the set timeframe.

3.5 Research Instruments

A data collection questionnaire was employed to gather essential data from patient files, daily elective theatre operating lists, and the theatre cancellation registry book. It was divided into two parts: Part A focused on the details of the cancelled procedures and

reasons for cancellation, while Part B captured the daily outcome of scheduled procedures. The questionnaire ensured patient confidentiality by excluding personal identifiers.

3.6 Data Collectors

Data collection was undertaken by a dedicated team comprising two registrars specializing in anaesthesia and two nurses stationed at the reception, all under the supervision of a senior nurse. This team underwent thorough training on the data collection process and the specific information required, ensuring precision and reliability in data gathering.

3.7 Data Analysis

The data collected were analyzed using SPSS for windows (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 28.0. IBM Corporation, Armonk, NY, USA).

Thematic Analysis

A thematic analysis was conducted on the qualitative data pertaining to the factors for cancellation. This involved an iterative process of coding data into themes and sub-themes. The analysis aimed to identify common patterns and categorize the factors for surgery cancellations.

Tabulation and Descriptive Statistics

The cancelled cases were tabulated, with a total of 336 cases broken down by surgical specialty. Tables were used to present data as mean, median and proportions. Data was assessed for normal distribution using Shapiro-Wilk analysis. This allowed for a clear visual representation of the distribution of cancellations across different groups and departments.

General Linear Model (GLM) Analysis

To quantitatively assess the factors influencing the cancellation of scheduled surgical operations, a General Linear Model (GLM) was employed with cancellation of surgery as the dependent factor. The factors analyzed included surgical department (SDep), patient age, and patient gender, which were identified as significant variables through initial exploratory analysis.

3.8 RESEARCH ETHICS

3.8.1 Ethical Considerations

A prospective observational study was conducted, reviewing patients records and files and entering of data on the data collection checklist. Patient details were kept completely private and all data were entered and saved on a password-protected computer. Before the study commenced, ethical clearance was obtained from the Decentralized Ethics Committee (DEC) of the University of Namibia (Appendix II). Furthermore, approval was obtained from the Ministry of Health and Social Services (Appendix III). In addition, permission was granted by the IHO Management to conduct the study (Appendix IV).

3.8.2 Confidentiality of data

All patients' information were kept confidential and their names were not included. All data were kept in a password- protected computer.

3.8.3 Benefits of participation

All data gathered did not impact on the actual perioperative care of any patient during their hospital stay. The information gathered in this study has the potential to assist future patients, society and the healthcare systems. As a consequence of this study, more

resources may be directed to patients who are determined to be at a higher risk of surgical delay. To improve treatment for at-risk populations, policy changes may be undertaken at the Federal or Local level.

3.8.4 Voluntary participation

There was a waiver of consent since the study was observational, with review of medical records and files, and no direct contact with patients.

3.8.5 Anonymity

Patients' identity was not required during data collection period and the data collection checklist did not include patients' specific details.

3.8.6 Non-Maleficence to Participants

There was no potential risk involved in the study. It did not involve any physical procedures conducted on the patient's body and the objectives were not intend to cause any psychological trauma.

3.8.7 Dissemination of results

The information will be handled with care and be disseminated to the Ministry of Health and the hospital management. The study will be introduced to the department of Anesthesia and the Anesthesia society of Namibia. The results will be shared with the society of Anesthetists in Namibia for quality improvement and uplift of evidence-based standards. The data will be submitted and published in a medical journal.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter examined the complex issue of elective surgical cases cancellations at Intermediate Hospital Oshakati, blending quantitative and qualitative analyses to determine the frequency, sociodemographic patterns, and underlying factors for these cancellations. A correlation between variables factors influencing surgical cancellation was established. Furthermore, the impact of significant variables on the cancellations was analyzed.

4.2 Frequency of cancellations of surgical procedures at IHO

During the study period, 1599 elective surgical cases were booked, out of which 336 were cancelled. The frequency of cancellation was 21%, with 79 % of operated cases as shown by Table 1.

Table 1: Overview of surgical cases completed versus cancelled at IHO

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

4.3 Sociodemographic characteristics of cancelled participants at IHO.

Figure 1, 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), median 37 and with the age range from 7 days to 103 years.

4.4 Variability in surgical case cancellation across surgical domains at IHO.

Vascular and plastic surgeries had the highest cancellation rates, 45.8% and 42.5% respectively, as represented in Table 2. ENT (Ear, Nose, and Throat) cases were the least cancelled (9.4%).

Table 2: 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

4.5 Factors associated with elective surgical case cancellation

The categories of factors for cases cancellations were resource limitations, patient-related issues, clinical priorities, and time management as shown in Table 3. Resource limitations were the highest (39.9%), and clinical priority the lowest (17.0%).

Table 3. 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 (2.4)
	Malfunctioning/unavailability of anesthetic equipment	23 (6.8)
	Unavailability/non-functioning surgical equipment	39 (11.6)
	Total	**39.9%**
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 (2.4)
	Consent not complete	5 (1.5)
	Patient need further investigations/workup	10 (3.0)
	Patient refusal	7 (2.1)
	Total	**21.9%**
Clinical Priorities	Emergency priority	47 (14.0)
	Anemia	10 (3.0)
	Total	**17.0%**
Time Management	Time constraints	72 (21.4)
	Total	**21.4%**

4.6 Analysis of surgical cancellations by factors and gender

The distribution of factors associated with cancellations among the demographic profiles of the participants was analyzed. There was no significant difference in frequency of factors between males and females.

4.7 Analysis of factors influencing surgical cancellations at IHO

Variables factors such as surgical department (SDep), patient age and gender were analyzed in Table 5 using General Linear Model (GLM). Surgical department emerged as a significant factor, $p = 0.004$. Patient age showed marginal significance, $p= 0.050$. Gender did not significantly influence the cancellation of surgical procedures, $p = 0.886$. The model left a considerable portion of variance unexplained (SS = 9872.206), pointing to the presence of other factors not included in the model that may also influence surgical cases cancellations.

Table 4: Analysis of variance (ANOVA) 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, **p<0.01, significance at the 1% level, ***p< 0.001, significance at the 0.1% level, ns, not significant p>0.05.

CHAPTER 5: DISCUSSION

Cancellation of elective surgeries is a worldwide major problem, that carries significant implications on the countries health system with potentially immediate and long-term patients' surgical disease complications. Cancelling surgeries on the intended day increase costs of operating theatres, decrease efficacy, patient satisfaction and undermine the morale of staff which leads to wastage of scarce health care resources which is a major concern in developing countries.[20, 21]

This study was carried to determine the frequency and factors associated with cancellation of elective surgical operations at Intermediate Hospital Oshakati, in Namibia. A total of 1599 elective surgical cases were booked during the study period of September to November 2023, amongst these cases 336 elective cases were cancelled. The frequency of cancellations was (21%). This is higher than the internationally quoted benchmark of less than 5%.

The findings of this study were consistent with the findings in Pakistan (21%), Tanzania (21%) and Sudan (20.2%).[3,22] The frequency of cancellation was found to be higher compared to similar studies conducted 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 in India (17.6%).[2,3,23] Furthermore, the frequency were lower than studies conducted in Burkina Faso (37%), Uganda (28.8%), Ethiopia (31.6%), India (30.3%) and in Nigeria (28%).[3,6] Frequency of cancellation was found to be higher in African countries, the reasons adduced were administration and infrastructure related, followed by inadequate human resources.[16]

The study showed that more female patients were cancelled than males (55.4% vs 44.6%). The findings of this study are similar to studies done in Zambia (60.7%) and South Africa (55%) as more female cases were cancelled.[8,13] However, the finding was in disagreement with a prospective cross-sectional study conducted by Feleke et al, that concluded that more males (51.1%) were cancelled compared to females (48.9%).[24] A similar study conducted in Ethiopia also concluded that more males (56.8%) were cancelled then females (43.2%).[3]

The mean age of study participants was 38.4 (25.8). Feleke et al, reported the mean age of 41.3 ± 17.9 (SD) and in a similar study by Desta et al, reported the mean age of the participant was 26.7 ± 4.37(SD).[3,24]

In this study, vascular and plastic surgeries exhibit the highest cancellation rates, at (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 (29.03%) followed by Gynecology/obstetric surgery (26.5%) and then Orthopedics (22.6%).[24]

ENT (Ear, Nose and Throat) showed the lowest cancellation at (9.4%), followed by gynecology and urology with rates of (15.5%) and (15.8%) respectively. These results are in disagreement with a study conducted in South Africa, that found most elective surgery cancellations occurred in ENT, ophthalmology, gynecology, general surgery, 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 (21.4%), followed by lack of theatre space (15.5%) then emergency priority which accounts 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. In a similar study by Vahwere et al, found financial constraints (23.3%) followed by patient not fit to surgery (16.6%) and unavailability of the senior surgeon (15.5%) were the highest factors associated with surgical case cancellations.[6]

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.[8] Another 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%).[25] Although none of these reasons were identified in this current study, overbooking is related to time constraints, which was established as a factor in the study.

The distribution of factors associated with cancellations among the demographic profiles of the participants was analyzed, and found no significant difference between males and

females. This was similar to a study conducted in South Africa, that found no significant observed between demographic characteristics.[13]

Surgical department, age and gender were identified as factors influencing surgical cancellations and were analyzed. Surgical department emerged as a significant factor ($p = 0.004$). Surgical department plays a crucial role in elective operation cancellation. As the primary department that admit and assess patients, it is also the driving unit that book and prepare patients for operations. Surgical domains can be faced with multiple challenges that can significantly leads to cancellation. Constraints that surgical department face among other are: limited operating room, time constraint for scheduled surgeries, unavailable or inappropriate scheduling policy, unavailable postoperative bed in intensive care unit or high dependency units for high-risk elective surgeries, unavailable of diagnostic modalities for complex and high-risk surgeries.

Patient age showed marginal significance ($p= 0.050$). This indicates that age has a slight effect on the likelihood of a procedure's cancellation, which could be attributed to age-related health considerations or the prioritization of surgical needs based on patient age. Gender did not significantly influence the cancellation of surgical procedures ($p = 0.886$). This outcome suggested that the reasons for cancellation are not substantially different between male and female patients, indicating a relatively uniform risk of cancellation across genders.

A similar study conducted in Zambia by Nambahu E, identified surgery type, anaesthesia, co-morbidity and gender as factors associated with surgery cancellation.[8] This study concluded that there was a statistically significant association between type of surgery, anesthesia and co-morbidity ($p<0.05$) and surgery cancellation. There was no association

between gender and surgery cancellation ($p>0.05$).[8] Ogwal et al, used a multivariate analysis and concluded that surgical specialty was significantly associated with the cancellation of elective surgical procedures.[17]

Having a digital patient booking system that allows patients to timeously confirm or cancel their appointments will enable the fruitful use of theatre time.[13] An alternative approach to assess and provide solutions to the problem of elective surgery late cancellations is to apply a strong management tool.[20] Elective surgical case cancellations should be regarded as adverse events with regular auditing to determine the causes and provide solutions.[13]

Referral state hospital such as IHO with an overflowing of patients needing surgeries are overwhelmingly burdened with limited resources, limited theatre space, overscheduling of cases, shortage of staffs and malfunctioning or unavailability of surgical and anesthetic equipment. This factors in most cases are responsible for the surgery cancellations.

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.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

Cancellation of elective surgeries is a worldwide problem that affect countries health systems and has a major impact on patients and their families. In many developing countries of Africa, it is a major concern as these countries health systems are faced with major limiting factors like resources and infrastructure to cater and deliver efficient services to their growing populations. From this study, the overall frequency of cancellation was 21%, which is higher than the internationally recommended rate.

Cancellation was found to be predominantly higher in departments of vascular, plastic and pediatric surgeries. This reflects the complexities of surgeries in these departments, the need of specialized equipment and skilled anesthetists and surgeons to handle these specialized areas. Resource limitations related factors constituted the most common category of reasons for cancellations. Time constraints, lack of theatre space and emergency priority were identified as common factors associated with cancellations. This underscores the important of efficient scheduling and planning to accommodate both emergent and elective cases, the crucial need to build more theatre space as the population of patients needing surgeries arises. Although the study was conducted in a short period, it can be concluded that the observed increase in cancellation frequency provides evidence that cancellation of elective surgeries is a serious problem which impede timely care for patients.

Furthermore, it requires a multidisciplinary organizational effort between surgical team,

anesthesia, theatre staff and hospital administration. To ensure maximum and efficiently utilization of the limited theatre space, to equip operating theatre with essential vital specialized equipment and man power. Operating theatre policies can be developed by the theatre user management committee, that can regulate and ensure effective functioning of theatre. Further in-depth analysis and longer-duration studies may help in identifying definitive solutions.

6.2 LIMITATION OF THE STUDY

- The study was a prospective study, all the limitations of the prospective study apply.
- The study was conducted only in IHO, and being a single centered study, the findings may not be generalizable to other institutions with different settings, demographics and perioperative practices.
- Factors associated with cancellation of surgeries which were not clearly documented in the theatre record registry during data recording, were obtained and verified from the surgeons and anesthetist before the end of the operating day.
- The study was conducted during a period of pre-festive season when operating theatre halt elective cases from mid-December to mid-January. During this period the surgical departments have an increase volume of patients and overwhelmed, leading to increased cancellations, although this has benefited our study, similar study needs to be conducted during a different period for comparisons.

6.3 RECOMMENDATIONS

- The outcome of this study, need to be addressed by the hospital management committee and presented to the ministry to address the rising need of building more operating theatres.
- Employment of more staffs in surgical disciplines, anesthesia and theatre must be of priority during staff establishments revising meetings at the public service levels.
- Theatre must be equipped with essential drugs, necessary equipment and ensure constant maintenance.
- Surgical and anesthesia domains need to reinforce policies such as standard of practice (SOP) for pre-operative assessment and patient preparation.
- Equally important, an improvement on patients booking, communication, scheduling an admission is mandatory.
- Constant communication between medical interns, physicians, surgeons, anesthesiologists, nurses, and patients is necessary.

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APPENDICES

APPENDIX I

DATA COLLECTING CHECKLIST

Frequency and Factor associated with cancellation of elective surgical operations in Intermediate Hospital Oshakati.

Part A - Description of cancelled procedure + reasons

Date	Age	Surgical Department	Booked Procedure	Reason(s) for cancellation

Part B - Daily outcome of scheduled procedures

Date	Total Number of scheduled cases	Total Number of performed operation	Total Number of cancelled cases

Principal investigator: Dr. Sakeus N Josef

Phone numbers: 0817666345

Main Supervisor: Dr Onochie Nweze

Sponsor of the Research: None

APPENDIX II

UNIVERSITY OF NAMIBIA ETHICAL COMMITTEE CLEARANCE CERTIFICATE

ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: SOM08/2023 **Date: 6/07/2023**

This Ethical Clearance Certificate is issued by the University of Namibia Ethics Committee (REC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the ethics committee.

Title of Project: Incidence and etiology of cancellation of elective surgical operations in Intermediate Hospital Oshakati

Student: Sakeus Ndeshipanda Josef

Student Number: 200827707 **Supervisor(s):** Onochie Nweze

Centre for Research Services

Take note of the following:

1. Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the ethics committee. An application to make amendments may be necessary.
2. Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the ethics committee
3. The Principal Researcher must report issues of ethical compliance to the ethics committee (through the Chairperson) at the end of the Project or as may be requested by the ethics committee
4. The ethics committee retains the right to:

i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,

ii) Request for an ethical compliance report at any point during the course of the research.

The ethics committee wishes you the best in your research.

Mareli Claassens

A/Prof Mareli Claassens (Chairperson Ethics Committee)

Prof. Davis Mumbengegwi (Head, Multidisciplinary Research)

APPENDIX III

MINISTRY OF HEALTH AND SOCIAL SERVICES APPROVAL LETTER

REPUBLIC OF NAMIBIA

MINISTRY OF HEALTH AND SOCIAL SERVICES

Ministerial Building
Harvey Street
Private Bag 13198, Windhoek

OFFICE OF THE EXECUTIVE DIRECTOR

Tel: No: 061 -203 2507
Fax No: 061-222 558
Andreas.Shipanga@mhss.gov.na

Ref: 22/3/1/2
Date: 07 August 2023

Enquiries: Mr. A. Shipanga

Mr. Sakeus Josef
P.O. Box 4030
Ondangwa

Dear Mr. Josef

Re: Academic Research Proposal Approval – UNAM – Masters of Medicine (Anaesthesiology, Critical Care and Pain Management)

Title: Incidence and etiology of cancellation of elective surgical operations in Intermediate Hospital Oshakati.

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**
   - 3.1 The data to be collected must only be used for completion of the Master of Medicine;
   - 3.2 No other data should be collected other than the data stated in the proposal;
   - 3.3 No any specimen should be collected from Human Subjects;
   - 3.4 Stipulated ethical considerations in the protocol related to the protection of Human Subjects' information should be observed and adhered to; any violation thereof will lead to termination of the study at any stage;
   - 3.5 A quarterly report to be submitted to the Ministry's Research Unit;
   - 3.6 Preliminary findings to be submitted upon completion of the study;
   - 3.7 Final report to be submitted upon completion of the study;
   - 3.8 Separate permission should be sought from the Ministry for the publication of the findings.
4. All the cost implications that will result from this study will be the responsibility of the applicant and **not** of the MoHSS.

Yours sincerely,

BEN NANGOMBE
EXECUTIVE DIRECTOR

All official correspondence must be addressed to the Executive Director.

My NAMIBIA MY COUNTRY, MY PRIDE

APPENDIX IV

INTERMEDIATE HOSPITAL OSHAKATI APPROVAL LETTER

Ministry of Health and Social Services

Private Bag X5501 Tel: + 264 65 2233021

OSHAKATI **INTERMEDIATE HOSPITAL OSHAKATI** Fax: + 264 65 224564

Enquiry: Ms R. Junias 22 August 2023

TO: Mr S N Josef
P.O.Box 4030
Ondangwa
Cell: +264817666345

Dear Mr Josef

Re: Academic Research Proposal Approval- UNAM-Master of medicine (Anaesthesiology, Critical Care and Pain Management)

Title: Incidence and Etiology of cancellation of elective surgical operations in Intermediate Hospital Oshakati

This letter serves to inform you that your request to conduct the above mentioned study has been approved.

Kindly note that this approval is subject to all the conditions outlined in a letter dated 07 August 2023 from the MOHSS to you. Therefore confidentiality of the patient information seen during the study must be observed.

In addition, the hospital requires a copy of your final report for our archive when you have completed your study.
We wish you all the best during your research

Yours sincerely

DR. R.S KANIME
MEDICAL SUPERINTENDENT

MINISTRY OF HEALTH
AND SOCIAL SERVICES
PRIVATE BAG 5501
21 AUG 2023
OSHAKATI 9000 NAMIBIA
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