



**MAGNITUDE AND CAUSES OF ELECTIVE SURGICAL CASE  
CANCELLATION IN JIMMA UNIVERSITY MEDICAL CENTER  
PROSPECTIVE CROSS-SECTIONAL STUDY**

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**RESEARCH THESIS TO BE SUBMITTED TO JIMMA UNIVERSITY  
INSTITUTE OF HEALTH SCIENCE, FACULTY OF MEDICINE,  
DEPARTMENT OF SURGERY FOR PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR SPECIALTY IN GENERAL SURGERY**

**DECEMBER/2022**

**JIMMA, ETHIOPIA**

**JIMMA UNIVERSITY**  
**INSTITUTE OF HEALTH**  
**FACULTY OF MEDICINE**  
**DEPARTMENT OF SURGERY**

**MAGNITUDE AND CAUSES OF ELECTIVE SURGICAL CASE  
CANCELLATION IN JIMMA UNIVERSITY MEDICAL CENTER FROM  
MAY 1,2022 – OCTOBER 30, 2022, JIMMA, SOUTH-WEST ETHIOPIA**

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## ***ABSTRACT***

**Background:** Cancellations of elective surgical cases are recognized as a major cause of emotional trauma to patients and families. Elective surgical case cancellation is a common problem and can cause prolonged waiting time, waste resources, and affect patient satisfaction

**Objective:** The aim of this study was to assess the magnitude and causes of cancellation of elective surgical operations and to suggest the appropriate solutions for better patient management and effective utilization of resources.

**Methods:** A prospective cross-sectional study design was conducted at Jimma university medical center from May 1- October 30, 2022. All elective surgical cases scheduled but canceled due to some reason (n=398) to undergo elective surgical procedures were included in this study.

**Result:** A total of 1943 patients were scheduled for elective surgical operations. Of these, 398(20.48%) were canceled. About 243(61.06 %) of males and 155(38.94 %) of females were canceled respectively. Orthopedic surgery had the highest rate of cancellations 87(21.86%) followed by General surgery 72(18.09%). lack of time 95 cases (23.87%) and unavailability of Oxygen and Blood 82 cases (20.65%) were the main causes of cancellation.

**Conclusion and Recommendation:** Lack of time and unavailability of oxygen and blood were the main causes of the Cancellation of elective surgical operations in our hospital during the study period. Concerned bodies should bring a sustainable change and improvement to prevent unnecessary cancellations and enhance cost effectiveness through communications, careful preoperative planning, and efficient utilization of time management and available hospital resources.

**Keywords:** Cancellation; Elective Surgery; Operations.

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## List of abbreviations

AA	Addis Ababa
ASA	American Society of Anesthesiology
CI	Confidence Interval
DOS	Day of surgery
MC	Medical Center
JUMC	Jimma university medical center
OR	Operative Room
OT	Operative Theatre
SD	Standard Deviation
USA	United State of America
URI	Upper Respiratory Infection
UTI	Urinary Tract Infection

## **Acknowledgment**

I want to publicly thank the public health department, the student research program office, and the surgery department for allowing me to perform this research and for providing me with financial support. I want to express my sincere gratitude to the surgery department for helping me in doing this research from the time I chose the topic till the development of this research.

finally, I would like to thank my advisors, D. Birhanu Abdisa and Dr. Tegenu Dinku for their constructive comments, providing materials and guidance for the development of this research

# CHAPTER I: INTRODUCTION

## 1.1 Background information

When a patient's name appears on the list of people who will have surgery, but the procedure is not carried out on the appointed date, it is said to have been canceled. In Western countries, about 20% of elective surgeries are canceled on the day of surgery. The incidence of cancellations, however, might reach 48.5% in low-income nations. Patients are the most affected, but these cancellations have broad clinical, psychological, and financial ramifications for them as well as for hospitals and other healthcare organizations<sup>1</sup>

Surgery cancellation is a metric used to evaluate the level of care delivered by a hospital, indicating a weakness in the administrative strategy of the Surgical Center (SC). It is, however, an event considered avoidable most of the time, if attended by those responsible for the unit<sup>2</sup>.

The inefficient use of limited resources is caused by cancellation on the day of surgery. It has extensive ramifications. To the patient, it results in prolonged hospital stay and repetition of preoperative investigations, thereby increasing cost. It prolongs the waiting list, causes upward stage migration of previously booked cancer cases, and results in poor patient turnover which is also detrimental to residency training in teaching hospitals. It is a waste of time for the surgeons and other staffs. Cancellation rate is an indicator of quality of patient care<sup>3</sup>.

In Ethiopia, the frequency and underlying reasons for postponing elective surgery differs occasionally depending on the location. There was a significant amount of cancellation of elective surgery cases. Administrative issues were the most frequent reason for canceling elective surgical cases, followed by issues with the surgeon, the patient, and medical. The factors that led to the cancellation of the surgeries may be avoidable. As a result, meticulous planning should be done to prevent unnecessary cancellations<sup>4</sup>.

Numerous primary investigations have been carried out in Ethiopia to ascertain the prevalence of cancelled elective surgery cases and their underlying factors. In the Ethiopian context, the percentage of cancelled elective surgical cases ranged from 8.9 to 33.9%. The national estimation is difficult to generalize due to differences between studies. Having national representative data is real to underpin effective management strategies. Thus, there is a need to estimate elective surgical case cancellation at the country level<sup>5</sup>.



There is a global issue with DOS cancellations, which range from 0.37 to 28% in developed nations and from 11 to 44% in developing nations. Cancellations may be avoidable or unavoidable. However avoidable cancellations were more prevalent. The cancellation of elective operations diminishes the overall effectiveness of operating rooms (ORS), decreases time spent in the OR, and wastes resources. As a result, patients and hospitals bear a heavy financial burden due to prolonged hospital stays and repeated preoperative preparations. OR is both the hospital's biggest expense and revenue generator. As well as having an impact on staff morale and surgeon output, it also traumatizes patients and their family's psychology. Elective surgery cancellations can happen for a variety of reasons that range from hospital to hospital. A variety of causes are cited, including inadequate pre-operative planning and assessment, management-related issues or infrastructure constraints, a lack of operating room time, a shortage of hospital beds, patient-related issues, surgery-related issues (surgeon-related concerns, improper scheduling, and anesthesia-related issues), and patient-related issues. The most frequent cause of those cancellations might have been avoided. Elective surgical cancellations are common in Ethiopia, despite the fact that most are preventable and patient care quality has improved significantly. In order to achieve this, the efficiency of the operating room theatre must be permanently and universally increased through the provision of information and a decrease in the number of elective surgical procedures that need to be canceled<sup>6</sup>.

Surgery cancellation leads to loss of opportunity to include another patient, under utilization of operating rooms, increased length of stay, risk of nosocomial infection with consequent increase in costs per bed/day, decreased availability of hospital beds, waste of sterilized material, unnecessary work of personnel involved in the preparation of the operating room and the sterilization process<sup>7</sup>.

This study was aimed to assess root causes of cancellation of elective operation and its magnitude on the intended day of surgery at a tertiary referral academic medical center. The finding of this study will assist us in making to enhance efficiency and minimize wastage of already limited hospital resources and manpower, policymakers or planners to set their target with feasible interventions in the study area, as a baseline for further studies.

## **1.2 Statement of the problem**

Surgery cancellation is a significant issue in the quality of medical care, affecting each patient, their families, and the real medical organization.

Although there is disagreement on the maximum allowable case cancellation rate for an effective operating room, rates under 5% are typically advised<sup>1</sup>.

Elective surgical case cancellations are a world-wide problem, ranging from 0.37–28% in developed and from 11 to 44% in developing countries. It can be avoidable and non-avoidable and avoidable cancellations were the commonest<sup>6</sup>.

The overall cancellation rate was 6.5% in Spain public general hospitals. Cancellation by broad category was for ‘medical reasons’ in 50%, ‘patient-related factors’ in 23%, and due to ‘administrative/logistic problems’ in 25%<sup>8</sup>.

In Uganda, prevalence of cancellation of elective surgical procedures was 28.8%. Facility-related reasons were the most commonly listed factors that cause cancellation of elective surgical procedures<sup>1</sup>.

Numerous primary investigations have been carried out in Ethiopia to ascertain the prevalence of cancelled elective surgery cases and their underlying factors. In the Ethiopian context, the percentage of cancelled elective surgical cases ranged from 8.9 to 33.9%<sup>5</sup>.

## **1.3 Significance of the study**

Due to a lack of research in our nation and the study area, this study will contribute to a better understanding of the underlying reasons why elective surgery cases at JUMC were canceled. By identifying the root causes of elective case cancellation in our hospital, the result will be forwarded for all responsible bodies to take corrective measures. Future researchers will also benefit from the study as it will provide information for their future reference and serve as a guide for those who have conducted similar investigations.

## CHAPTER II. LITERATURE REVIEW

A prospective study for 54 months done on Causes of cancellation of elective surgical procedures in a Spanish general hospital showed overall cancellation rate was 6.5% (2559 of 39 115 scheduled operations). A similar number of women and men underwent surgery (51% vs 49%) and the cancellation rate by gender was similar (6% vs 7%). Cancellations were, however, more common in patients aged 0–10 years (13%, n = 202), followed by those aged 21–30 years (9%, n = 255). Cancellations were less frequent in older age groups (71–80 years, 5%, n = 378; 61–70 years 6%, n = 438). Cancellation by broad category was for ‘medical reasons’ in 50%, ‘patient-related factors’ in 23%, and due to ‘administrative /logistic problems’ in 25%. The commonest specific causes within these categories were: infections / fever (18%), patient did not attend (20%,) and lack of theatre time (23%) respectively<sup>8</sup>.

Out of the 8,443 (100%) elective surgeries scheduled for 2013 in a public hospital of the State of So Paulo, 7,870 (93.21%) were conducted, and 573 (6.79%) were canceled, according to a retrospective and descriptive study on the topic. Of these, 275 (3.26%) were postponed because the patient's clinical condition changed, 264 (3.13%) were postponed for reasons other than clinical ones, 30 (0.36%) were postponed for reasons that were not recorded, and four (0.05%) were postponed because the patient died<sup>2</sup>.

A retrospective study done in Spain on Suspended Surgeries and Influencing Factors During an 8Year Period showed 10,5403 surgeries were scheduled, 3867 of which were suspended (3.66%). Factors that influenced the suspensions included: surgical specialty, ASA 4 patients, elderly patients, ambulatory patients, and surgeries scheduled during the winter. The most frequent medical cause was infection or fever (17.6%), while the most frequent administrative and patient causes were lack of time (26.8%) and no-show (6.3%), respectively. The avoidable causes were 64.8% versus 35.2% unavoidable causes<sup>9</sup>.

The results of a retrospective Nigerian research showed total number of elective procedures scheduled for the 15-month period was 1296. 118 (9.1%) of these cases were subsequently canceled. The most common cause is patient factors (47.5%), followed by the surgeon-related factor (28%). The most frequent patient-related cause for cancellation was a lack of cash. Orthopedics (25.4%), urology (11%), and general surgery (36.4%) made up the majority of the cases that were canceled. The top two instances on the elective list made about 70% of the cases

that were canceled. As a result, this study had a high cancellation rate. Preventable factors contributed to these cancellations<sup>3</sup>.

At the university teaching hospital center Yalgado Ouedrago in Burkina Faso, a prospective study was conducted on the cancellation of scheduled procedures over a three-month period. A total of 103 surgeries were planned for patients with an average age of 41.1 years. The majority (36.9%; n = 65) of the operations were abdominal surgeries. Interventions were delayed by 36.9% (n = 38), of which 9.7% (n = 10) were ultimately canceled and 27.2% (n = 28) were continued. 31.6% of the cancellations were due to patient-related issues, while 47.4% were equipment-related. 63.9% of cancellations had a hospital component. 68.5% of cancellations might have been prevented. 16.6% of cancellations (n = 6) had a financial reason, and 2.6% had a "long prior intervention"<sup>10</sup>.

A prospective cross-sectional study conducted in a tertiary hospital in Uganda revealed that 115 procedures out of a total of 400 cases were abandoned, representing a cancellation prevalence of 28.8%. At 40.9% (n = 47), orthopedic surgery had the highest cancellation rate. 67.8% of cancellations were caused by facility-related problems<sup>1</sup>.

Lack of time in the theater to finish the surgery on the planned day was the most frequent cause of cancellation. There weren't enough beds in the intensive care unit to postpone any treatments. At multivariate analysis, there was a significant correlation between surgical specialty and cancellation (P 0.05). Conclusion. At Mulago Hospital, the cancellation rate for elective surgical procedures was 28.8%, with orthopedic surgery having the highest rate. More than half of all cancellations were possibly avoidable, and facility-related issues accounted for two-thirds of the variables driving cancellations<sup>1</sup>

A prospective cross-sectional study was done at tertiary private hospital in Uganda found four hundred patients were scheduled for elective surgery over 6 months duration, among which 90 (22.5%) were canceled and 310 (77.5%) had their surgeries as scheduled. The highest cancellation of elective surgical operations was observed in general surgery department with 81% elective cases canceled, followed by orthopedic department (10%), and gynecology department (9%). The most common reasons for cancellation were patient-related factors (39%) and health worker-related factors (35%) factors. Other factors include administrative (17%) and anesthesia related factors (9%). Cancellations were mainly due to lack of finances which accounted for 23.3% of the patients, inadequate patient preparation (16.6%), and unavailability of surgeons (15.5%). Major elective

surgeries were canceled 1.7 times more than minor electives surgeries [adjusted prevalence ratio 1.7 (95%CI: 1.07-2.73) and p-value: 0.024]<sup>11</sup>.

After conducting a systematic review and meta-analysis, Ethiopian researchers discovered a total of 5 studies with 5591 study participants. The overall prevalence of postponed elective surgical patients was 21.41 percent (95% CI: 12.75 to 30.06 percent). Administration-related issues (34.50%) were the most prevalent root causes, followed by surgeon-related (25.29%), medical (13.90%), and patient-related (13.34%) factors<sup>5</sup>.

A cross-sectional prospective study done at Debre Tabor General hospital showed 221 elective surgical cases with a mean age of 39±17.5 were scheduled for operation in different specialties. From these schedules, 116 (52.5%) were females. From the scheduled cases, a total of 150 (67.9%) patients were operated on the intended date of surgery whereas 71 (32.1%) patients were canceled. The cancellation distribution among sex shows females has high cancellation rate (37(52.1%)) than males (34 (47.9%)). The cases were canceled due to administrative problems (30 (42.2%)) like unavailability of necessary materials and inadequate preparation of the patients (31 (43.7%)) with the necessary investigations<sup>12</sup>.

At Hawassa University Teaching Medical Center in Ethiopia, a prospective hospital-based cross-sectional survey over a month revealed that 462 patients had elective surgical procedures scheduled. Nearly one-third of the operations—146 (31.6%)—were postponed, while 316 (68.4%) patients had surgeries on the scheduled day. Surgeons related issues (35.8%), patient related factors (28.7%), management related factors (21.2%), and anesthesia related factors (14.4%) accounted for the majority of cancellations. The primary causes of the cancellation were incorrect scheduling (20.5%), a lack of surgeons (8.9%), a lack of oxygen and blood (8%), and equipment (5.5%). The most often canceled cases were in orthopedic (28.8%) and general surgery (17.1%) fields<sup>13</sup>.

A prospective cross-sectional study done at St. Paul's Hospital Millennium Medical College showed, the overall cancellation rate during the study period was 8.9%. The highest cancellation rates were for gynecologic procedures (18.3%). Among the canceled patients, 65.9% were younger than 45 years, 88% had hematocrit values >30%, 89.4% had no associated comorbidity, and 89.8% were classified as American Society of Anesthesiologists class I or II. Administration-related

factors, which accounted for 73.1% of cancellations, were the most frequently cited reasons for canceling elective procedures; specifically, problems associated with the Central Sterilization and Supply Department were the leading causes for case cancellation<sup>14</sup>.

At Jimma University Teaching Hospital during the course of 5 months, a prospective longitudinal study demonstrated, there were 1438 patients scheduled for elective surgical procedures in total. 331 (23.9%) of them were cancelled (45.6% of men and 54.4% of women respectively). The number of cancellations in general surgery was the highest, at 198 (23%) followed by orthopedic surgery, at 78 (20%). The major reasons for cancellation were improper scheduling and a lack of sterile drapes and lab sheets<sup>15</sup>.

## Conceptual framework

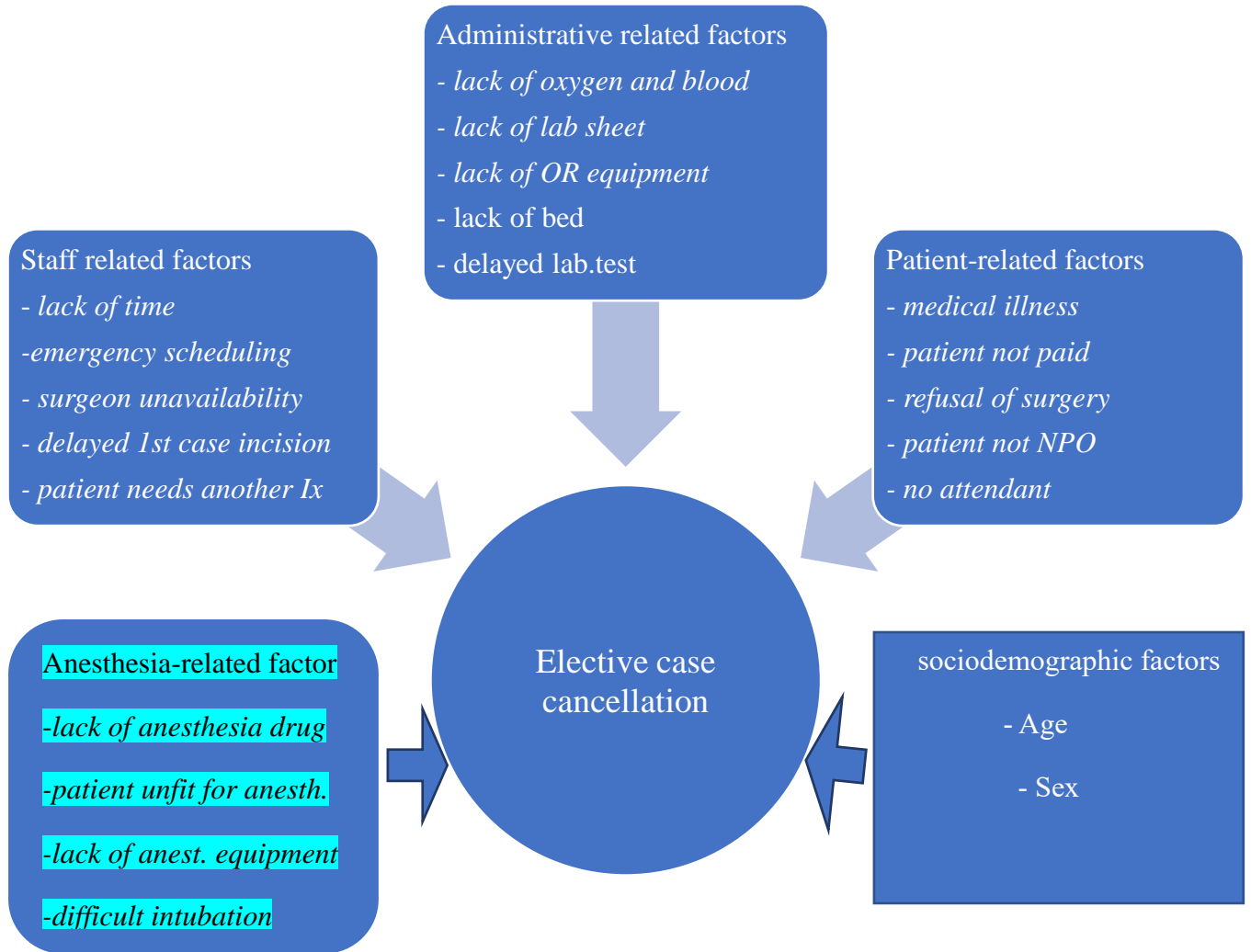


Figure 1 conceptual frame work

## **CHAPTER III. OBJECTIVES**

### **3.1 General objective**

To assess the causes and magnitude of elective surgical case cancellation at JUMC from May 1, 2022 to October 30, 2022

### **3.2 Specific objectives**

1. To assess causes of elective surgical case cancellation at JUMC
2. To assess magnitude of elective surgical case cancellation at JUMC



## **CHAPTER VI: METHOD AND MATERIALS**

### **4.1 Study Design and Setting**

A prospective Hospital-based cross-sectional study was conducted at Jimma university medical center, operative theatre which is a tertiary referral academic medical center found in Jimma town, 350 kilometers southwest of Addis Abeba. Jimma university medical center is a teaching and referral hospital with a capacity of 800 beds and a catchment population of more than 15 million people. The study was conducted from May 1- October 30,2022. The Major operation theaters of Jimma university medical center provide service for General surgical procedures, Obstetrics and gynecologic surgery, pediatric surgery, Neurosurgery, Plastic and reconstructive surgery, ENT surgery, maxillofacial surgeries and orthopedic procedures. Over all the operation theaters consists of eight operation tables. All patients are seen by the surgeon/senior resident a day before surgery either in the ward or at the referral clinic and usually fully investigated, prepared according to the diagnosis. The operating list is prepared by the residents, verified by OR director, and sent to the theatre. Operative cancellations were defined as those cases that were booked in the operative list and did not have the planned surgery on the intended date.

### **4.2 Study participants and sampling procedure**

All patients who were scheduled for elective surgical procedures from May 1 -October 30, 2022 were the source population. All patients who were scheduled to undergo routine elective surgical operation at major operation theatre of Jimma university medical center, but due to some reasons they could not have their surgery done on the intended date were included

### **4.3 Exclusion criteria**

All tentative scheduled and cancelled elective surgical cases were excluded.

### **4.4 Variables and measurement**

The dependent variable of the study was the cancellation of operation and the independent variables included were age, sex, address, occupation, unit of admission, reasons for cancellation. Cancellation of operation was defined as any elective operation that was either scheduled on the final theatre list for that day or was subsequently added to the list, and that was not performed on that day. The reasons for cancellation were categorized as administrative-related, staff-related, patient-related and anesthetist related factors.

## **Operational definitions**

**Elective surgery**-planned surgical case that is the list on the day prior to surgery

**Elective surgical case cancellation**- any elective surgical case that is the list on the day prior to surgery but not operated upon as scheduled on that day.

**Surgery cancellation hours:** morning (7:00 a.m. to 1:00 p.m.), afternoon (1:00 p.m. to 7:00 p.m.).

### **4.5 Data collection technique, quality control**

Structured questionnaire was adapted from a validated and modified individual patient questionnaire and other related literature. Data on the canceled operations were obtained from the daily operating theatre list and documented in a special form. A pre-tested was done on 5% of the study subjects and training for 3 days was given. The causes for cancellation were provided by residents and prospectively recorded into the computerized database. The assigned OR staff confirmed the cancellation reason and added additional explanation, if necessary, by calling patients or through direct inquiry of clerical and clinical staff the following day. A questionnaire was prepared in English. Six residents were collecting the data, one resident and one OR staff were recruited as supervisors. The data were checked on the daily basis for completeness and consistency.

### **4.6 Data processing and analysis**

Data from the completed questionnaires were entered into Kobo Toolbox. After editing, the data were exported to SPSS 25.0 for analysis. For the presentation of descriptive statistics, categorical variables are summarized using percentages, and proportions and means, standard deviations, medians, and interquartile ranges are used for continuous variables. overall prevalence of cancellation was calculated by dividing the total number of cancellations by the total number of operations scheduled. Descriptive and basic analytical statistics were used to summarize the data.

### **4.7 Dissemination of Results**

The result of this study will be submitted to surgery department, JUMC with hard copy. Attempts will be made to publish the finding on peer review journals.

### **4.8 Ethical Clearance**

Ethical approval was obtained from the Jimma university ethical review committee before the commencement of the study. Patients' records were kept confidential

## CHAPTER V: RESULT

### 5.1 Sociodemographic characteristics

A total of 1,943 patients were scheduled to undergo elective surgical procedures during the study period. The mean age of the participant was  $33.56 \pm 24.86$ (SD) years. Of these, 1,545 (79.5%) patients were operated on the intended date of schedule while the remaining 398 cases were canceled on the day of surgery for various reasons, giving an overall cancellation rate of 20.48%. Of 398, about 243 (61.06 %) male and 155 (38.94%) female were not operated on the intended day of schedule respectively. Male to female ratio was 1.57:1. Male have a high rate of cancellation than female.

*Table 1 Sociodemographic characteristics of cancelled cases (n = 398)*

Variables		Frequency	Percentage
Sex	Male	243	61.06
	Female	155	38.94
Age In Year	< 5	69	17.3
	5-10	12	3
	11-18	31	7.8
	19-30	83	20.9
	31- 40	68	17.1
	41-50	48	12.1
	51-70	63	15.8
	>70	24	6
Address	Urban	144	36.18
	Rural	254	63.84
Occupation	Farmer	154	38.69
	Government employee	55	13.82
	Student	66	16.58
	Merchant	44	11.06
	Others	9	2.26

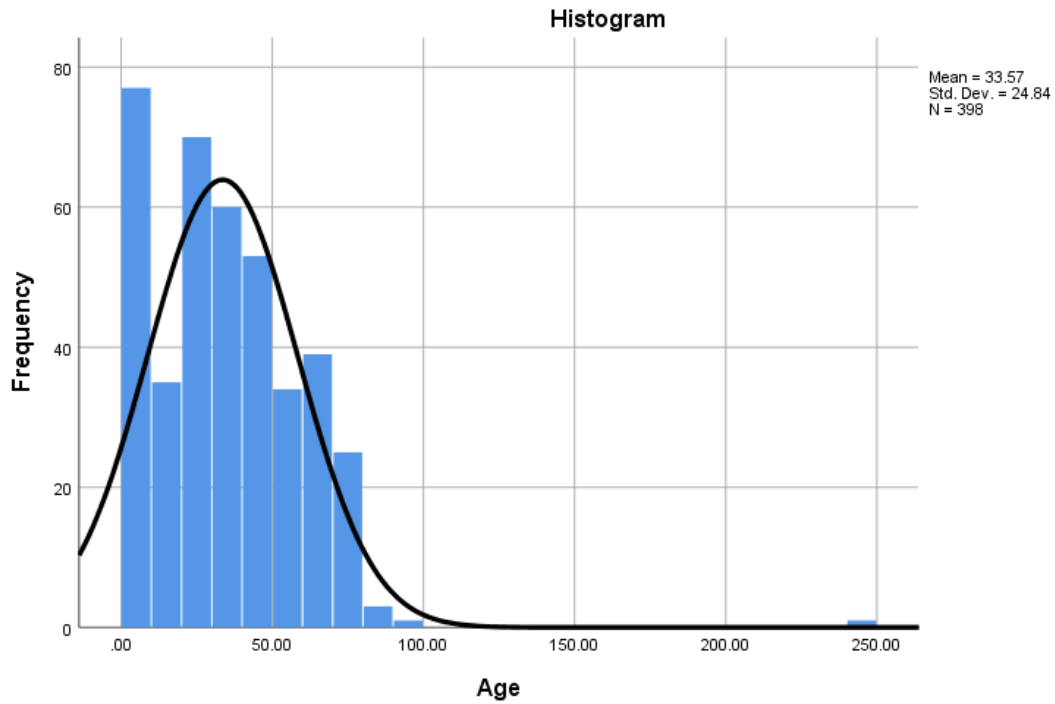


Figure 2 Age distribution of cancelled elective cases at JUMC during May 1- October 30,2022

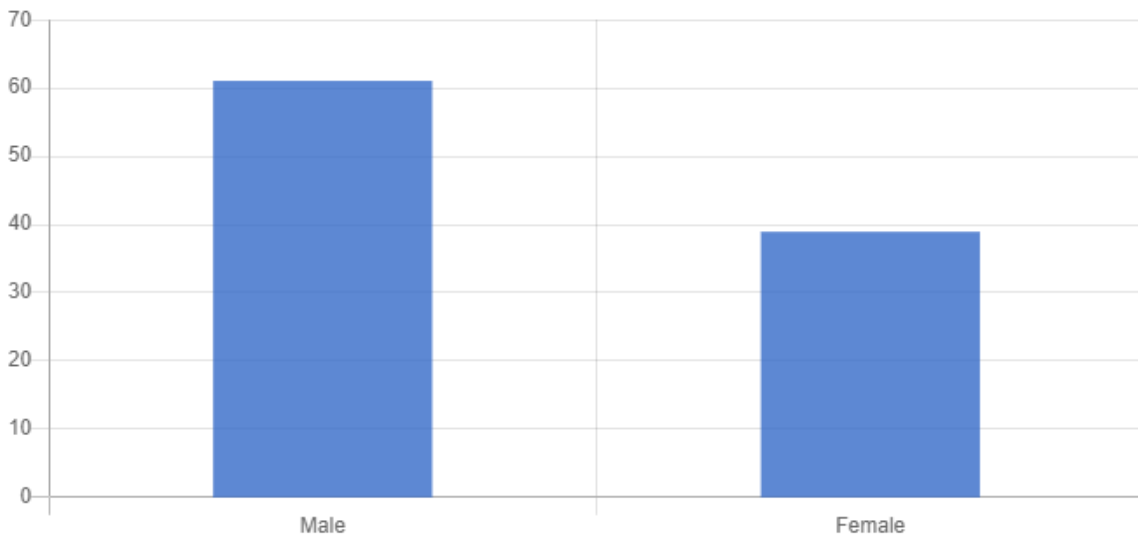


Figure 3 Sex distribution of cancelled elective cases at JUMC from May 1,2022 to October 30,2022

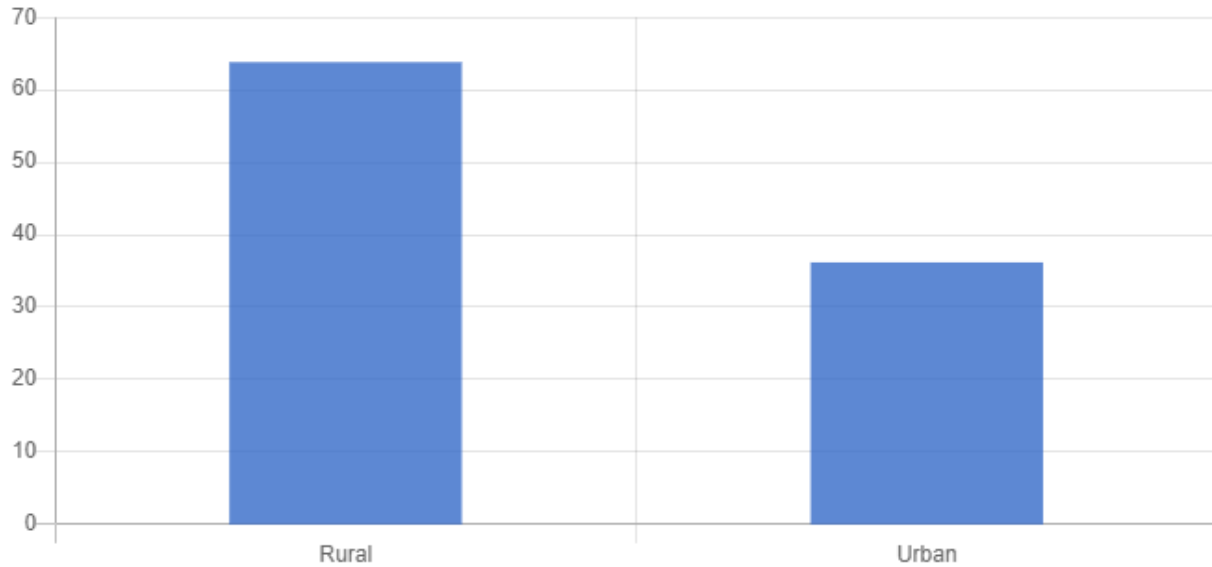


Figure 4 Address of canceled elective cases at JUMC from May 1, 2022 to October 30, 2022

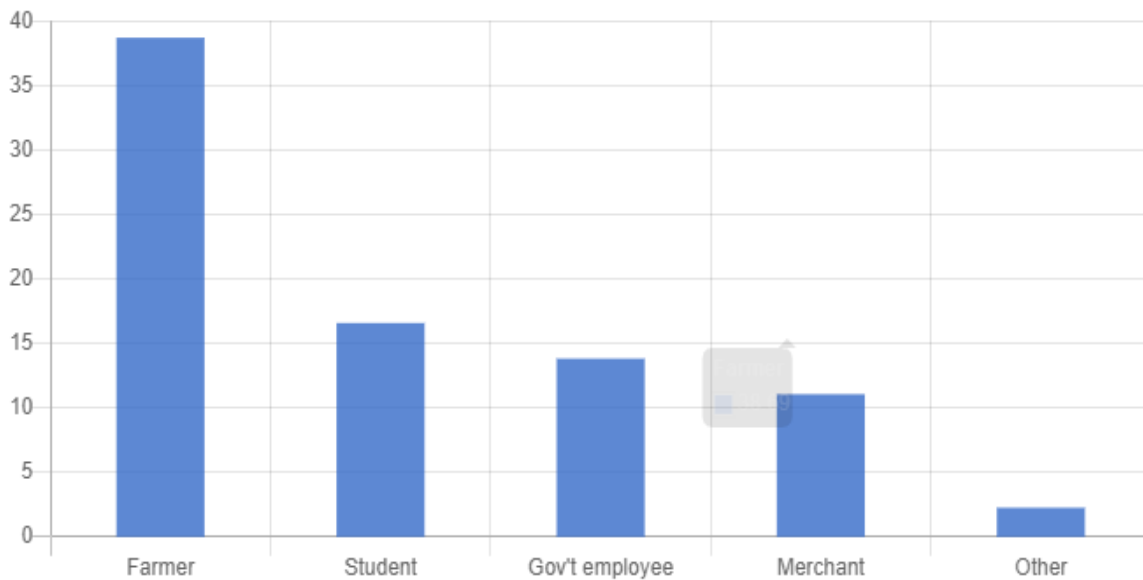


Figure 5 Occupation of the study participants

## 5.2 Causes of cancellation of elective operation

The most frequent causes for elective case cancellation were staff-related factors, which accounted for 146 cases (36.68%) followed by administrative-related reasons, 114 cases (28.6%). Regarding, the staff related reasons, lack of time accounted for cancellation of 95 cases (23.87%) followed by emergency scheduling, 17 cases (4.27%) and unavailability of the surgeon, 14 cases (3.52%) were the commonest reasons of cancellation of elective surgery.

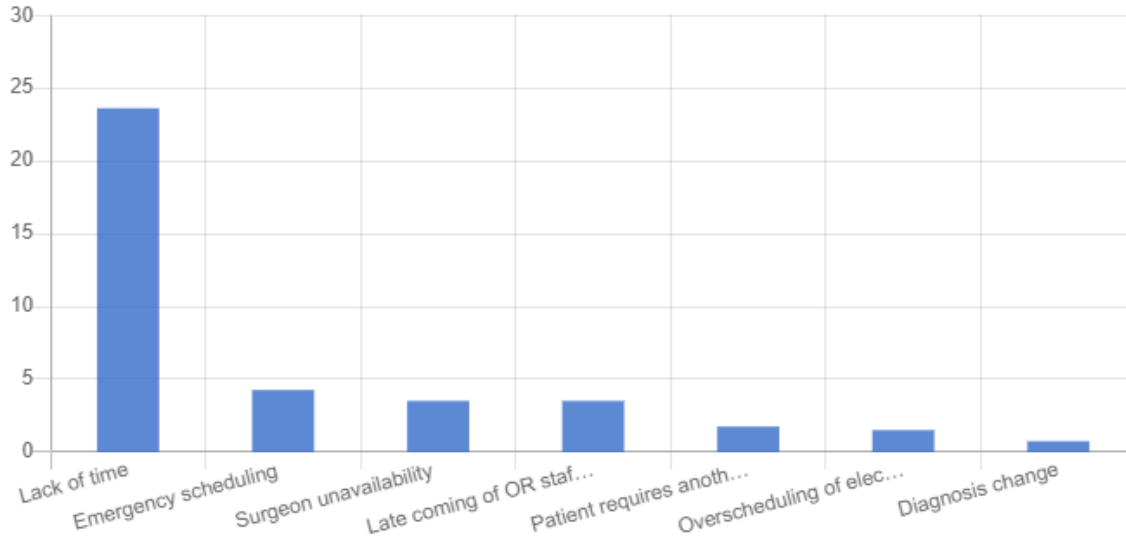


Figure 6 Staff related factors that caused elective case cancellation at JUMC from May 1, 2022 to October 30, 2022

Administrative-related cause of cancellation of elective cases was primarily by lack of oxygen and blood (20.65%), followed by lack of lab sheet (3.77%) and lack of OR material (3.5%).

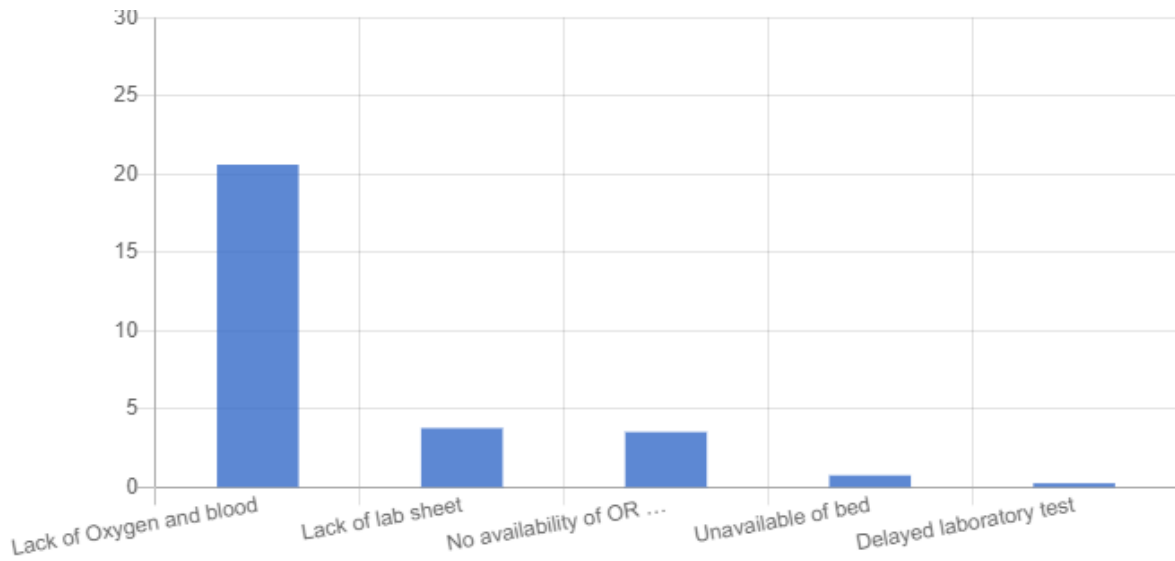


Figure 7 Administrative factors which resulted in elective case cancellation at JUMC from May 1, 2022 to October 30, 2022

The frequent patient-related reasons for elective case cancellation were patients who had acute and chronic medical illness (9%) and patients were not affording (3%). Infection or Fever (38.8%) and Hypertension (36.1%) were the commonest among the illness.

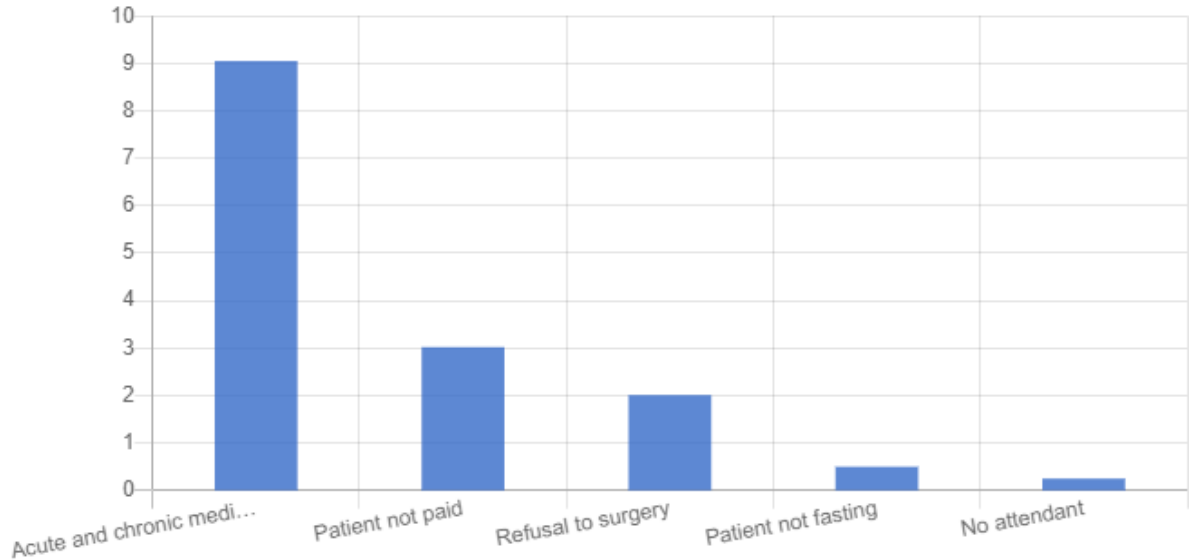


Figure 8 Patient related factors which caused cancellation of elective surgery at JUMC from May 1,2022 to October 30,2022

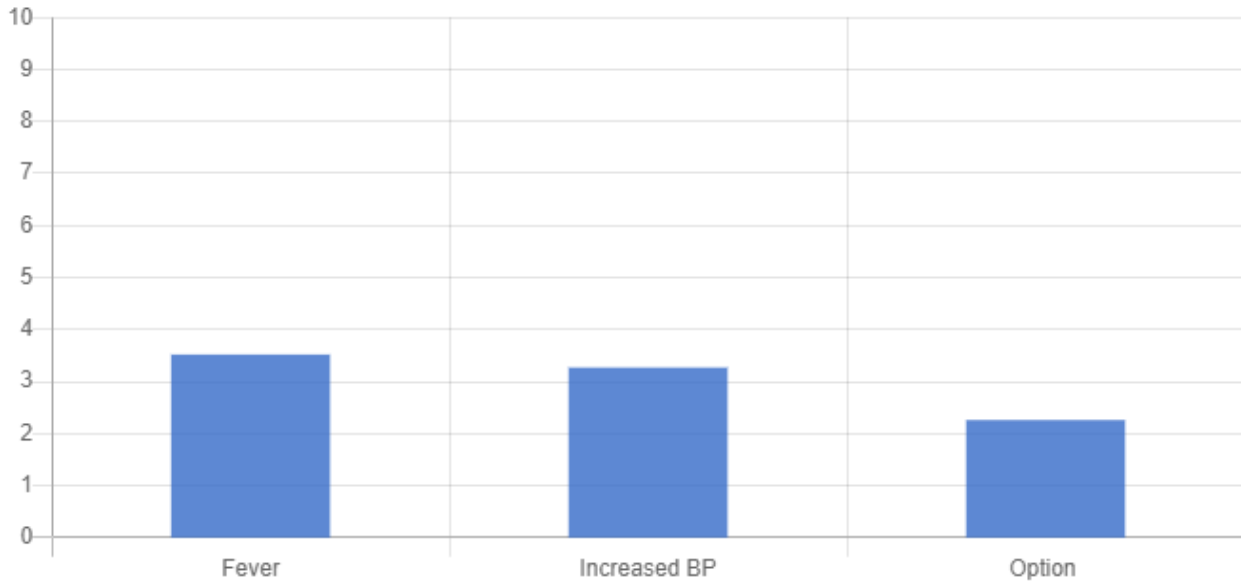
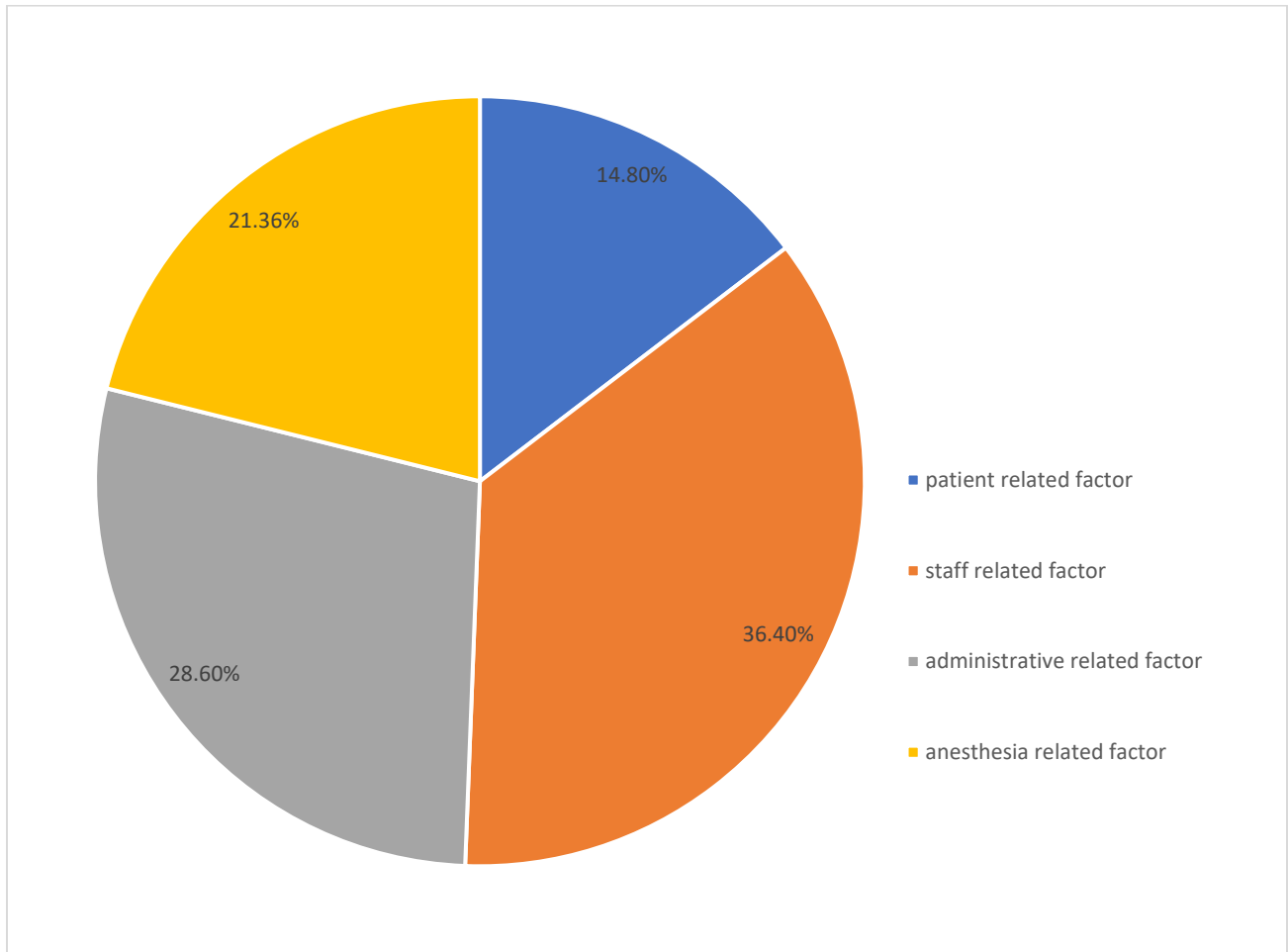


Figure 9 Acute and chronic medical illness that caused elective cases cancellation at JUMC from May 1,2022 to October 30,2022

Table 2 Resean of cancellation of elective surgery (n=398)

<i>Reasons</i>		<i>Frequency</i>	<i>Percentage</i>
Patient related factor	Acute and chronic medical illness	36	9.05
	Patient not paid	12	3.02
	Refusal to surgery	8	2.01
	Patient not fasting	2	0.5
	No attendant	1	0.25
	Total	59	14.8
Staff Related factor	Lack of time	95	23.87
	Emergency scheduling	17	4.27
	Surgeon unavailability	14	3.52
	Late coming of OR staff/delayed first case incision	14	3.52
	Patient requires another surgical workup	7	1.76
	Over scheduling of elective surgery	6	1.51
	Diagnosis change	3	0.75
	Total	146	36.6
Administrative related factor	Lack of oxygen and blood	82	20.6
	Lack of lab sheet	15	3.77
	Lack of OR equipment	14	3.52
	Unavailability of bed	3	0.75
	Delayed laboratory test	1	0.25
	Total	114	28.6
Anesthesia related factor	Lack of anesthesia drug	57	14.32
	Patient unfit for anesthesia	23	5.78
	Lack of anesthesia equipment	3	0.75
	Difficult intubation	1	0.25
	Total	84	21.1





*Figure 10 specific causes of elective case cancellation at JUMC from May 1- October 30,2022*

### **5.3 Cases cancelled among elective operations in each department**

Orthopedics was the department with the high rate of elective surgical cases scheduled, 386 cases (19.9%) from the total schedule and has high cancellation rate from the total cancellation, 87 cases (21.9%) followed by general surgery which accounted for 72 cases (18.1%). The least cancellation was observed from GI oncology unit, OMFS, and hepatobiliary, from each 13 cases (3.3%) were cancelled from the whole scheduled patients during the study period.

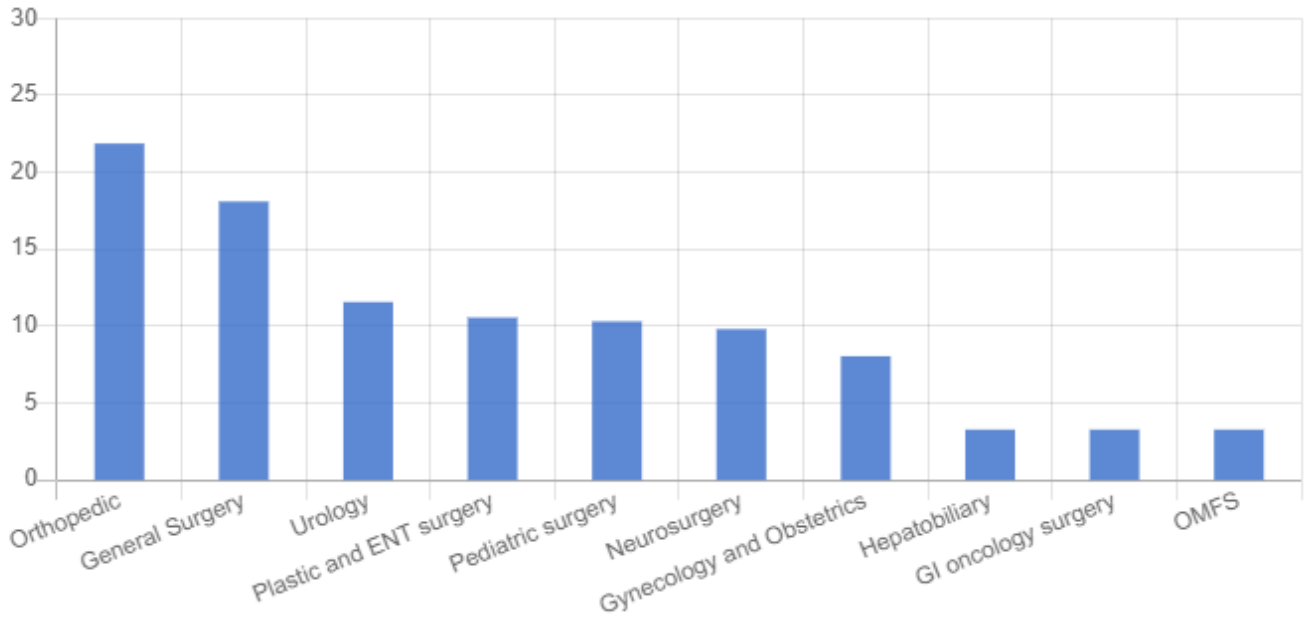
*Table 3 pattern of scheduling and cancellation among each unit at JUMC from May 1,2022 to October 30,2022*

Type of surgery	Total cases scheduled	Cases cancelled	Percentage
General surgery	330	72	21.95
Gynecology and obstetrics	198	32	16.16
Urology surgery	183	46	25.14
Pediatric surgery	225	41	18.2
Orthopedics	386	87	22.5
GI oncology	81	13	16
Hepatobiliary	72	13	18
Plastic and ENT	196	42	21.4
Neurosurgery	165	39	23.64
Maxillofacial	107	13	12.15
Total	1,943	398	20.48

Urology surgery unit has highest cancellation rate,46 patients were cancelled from 183 patients scheduled (25.14%) followed by Neurosurgery,39 patients cancelled from 165 patients scheduled (23.64%). The least cancellation rate was from Maxillofacial unit, 13 patients were cancelled from 107 patients scheduled (12.15%).

*Table 4 Distribution of elective case cancellation among different specialties (n = 398)*

<b>Type of surgery</b>	<b>Frequency</b>	<b>Percentage</b>
General surgery	72	18.1
Gynecological/obstetrical	32	8.04
Urological	46	11.56
Pediatrics	41	10.3
Orthopedic	87	21.86
GI oncology	13	3.27
Hepatobiliary	13	3.27
Plastic and ENT	42	10.55
Neurosurgery	39	9.8
Maxillofacial	13	3.27
Total	398	100



*Figure 11* Cases cancelled among elective surgery in each department at JUMC from May 1-October 30,2022 ( $n=398$ )

## CHAPTER VI: DISCUSSION

Cancellation of elective surgical operations is a significant problem with many undesirable results. Surgery cancellation leads to loss of opportunity to include another patient, underutilization of operating rooms, increased length of stay, risk of nosocomial infection with consequent increase in costs per bed/day, decreased availability of hospital beds, waste of sterilized material, unnecessary work of personnel involved in the preparation of the operating room and the sterilization process<sup>7</sup>

Numerous primary investigations have been carried out in Ethiopia to ascertain the prevalence of cancelled elective surgery cases and their underlying factors. In the Ethiopian context, the percentage of cancelled elective surgical cases ranged from 8.9 to 33.9%. The national estimation is difficult to generalize due to differences between studies. Having national representative data is real to underpin effective management strategies. Thus, there is a need to estimate elective surgical case cancellation at the country level<sup>5</sup>.

This study revealed that about 20.48% of the elective surgical cases were canceled, indicates preoperative system was inefficient. The result of the study is in line with studies done at Onofre Lopes University Hospital in Brazil, 25.8%<sup>7</sup>, tertiary hospital in Uganda, 28.8%<sup>1</sup>, tertiary private hospital in Uganda, 22.5%<sup>8</sup>, Ethiopian systematic review, 21.41%<sup>5</sup> and Jimma teaching hospital, 23.9%<sup>9</sup>. But, this finding is higher when compared to other studies done in Spanish general hospital, 6.5%<sup>10</sup>, Brazil (So Paulo hospital) 6.8%<sup>2</sup>, Nigeria, 9.1%<sup>3</sup>, St. Paul's hospital millennium medical college, 8.9%<sup>11</sup>. The result of this study is lower when compared to study done at Debre Tabor General hospital, 32.1%<sup>12</sup> and Hawassa university comprehensive specialized hospital, 31.6%<sup>6</sup>. This discrepancy might be due to the fact that differences in sociodemographic characteristics, sample size, study area, and health facility.

19–30 years old age group were the highest cancelled age groups (20.9%) followed by <5 years old group (17.3%) and Cancellations were less frequent in older age groups (6% among >70) years and 3% among 5-10 years and similar age distribution was found in Spain cancellations were more common in patients aged 0-10 years (13%) followed by those aged 21–30 years (9%). Cancellations were less frequent in older age groups (71–80 years, 5%, n = 378; 61–70 years 6%, n = 438)<sup>10</sup>. The reason why rate of cancellation was less common among old ages may be due to thorough preoperative investigations and preparation of this high-risk group.

This study showed about 243 (61.06 %) male and 155 (38.94%) female were not operated on the intended day of schedule respectively. Male to female ratio was 1.57:1. Male had a high rate of cancellation than female. This study is in line with study done at Mulago Hospital in Uganda, 67.3% of male and 32.7% of female cancelled with male to female ratio of 2:1<sup>1</sup> and Hawassa university comprehensive specialized hospital, from the cancelled cases 83(56.8%) were male and 61(43.2%) were female. Male to female ratio was 1.31:1<sup>13</sup>.The result of this study is not supported by study done at Spanish general hospital, the cancellation rate by gender was similar (6% vs 7%)<sup>10</sup>, Yalgado Ouedraogo Hospital in Burkina Faso, female to male ratio was 1.3:1<sup>14</sup>, St. Paul's Hospital Millennium Medical College, 53.5% female and 46.5% male were cancelled<sup>11</sup> and Jimma university teaching hospital, 45.6% male and 54.4 % female were cancelled with female to male ratio of 1.2:1<sup>15</sup>

Staff-related factors were the most common cause for cancellation of elective surgical cases in our hospital, which accounted for 146(36.6%) of cases. The commonest reason of Staff- related factors were lack of time 95(23.87%), emergency scheduling 17(4.27%), unavailability of a surgeon 14(3.52%) and late coming of OR staff/delayed first case incision 14(3.52%). This study is supported by similar study done in Uganda, Mulago hospital(24.35%)<sup>1</sup>, Hawassa University Teaching Medical Center(35.8%)<sup>13</sup>,and Jimma university teaching hospital(52.2%)<sup>9</sup>. Staff-related factors due to unavailable operating time and emergency scheduling were the leading reason of elective surgical case cancellation. This is might be due to the fact that prolonged subsequent cases and scheduling of emergency surgery were the cause for elective case cancellation on the day of surgery.

This study revealed administrative related factors were another common reason of cancellation of elective cases which accounted for about 114(28.6%). The commonest cause of administrative factors were lack of oxygen and blood 84(20.6%) followed by lack of lab sheet 15(3.77%) and unavailability of OR material 14(3.52%). The result is similar with studies done at Hawassa university comprehensive specialized hospital, administration related reason accounts for 21.2% of cancellation, the commonest were failed to prepare cross-matched blood 12(8%) followed by OR material shortage and bed unavailability 8(5.5%)<sup>13</sup>, St. Paul's Hospital Millennium Medical College, Administration-related factors accounted for 73.1% of cancellations, were the most frequently cited reasons for canceling elective procedures; specifically, problems associated with

the Central Sterilization and Supply Department were the leading causes for case cancellation<sup>11</sup>. The result of study showed the most common administrative related factor which cause cancellation of elective surgery was lack of oxygen and blood followed by lack of lab sheet which almost all were avoidable causes and resulted in cancellation as they were important for operation.

The result of this study also showed another important factor for elective surgical case cancellation was anesthesia related factors which accounted for cancellation of 84(21.1%). The most common anesthesia related factors were lack of anesthesia drug 57(14.3%) followed by patient unfit for anesthesia 23(5.78%). This result is supported by study done at Tertiary private hospital in Uganda, anesthesia related factor accounted for 9%<sup>8</sup>, and Hawassa university comprehensive specialized hospital, anesthesia related factor accounted for 14.4%<sup>13</sup>. This might have explained due to lack of preparing and checking availability of anesthesia drug before elective surgery day and inadequate use of preanesthetic clinic.

In this study another less common cause of elective surgical case cancellation was patient related factor which accounted for cancellation of 59(14.8%). The most common cause of this factor was uncontrolled acute and chronic medical illness 36(9.05%) and patient not affording 12(3.02%). This result is in line with systematic review and meta-analysis done in Ethiopia which showed patient related factor causes 13.34%<sup>5</sup>. Unlike the result of this study, patient related factors were the common cause of cancellation at Spanish general hospital (23%)<sup>10</sup>, tertiary private hospital in Uganda (39%)<sup>8</sup>, Yalgado Ouedrago in Burkina Faso (31.6%)<sup>14</sup>, and Nigerian (47.5%)<sup>3</sup>.

Moreover, the study showed that Orthopedics cases (21.9%) followed by General surgery cases (18.1%) and urology surgery cases (11.56%) were the commonest cancelled cases, while GI oncology surgery (3.27%), OMFS (3.27%) and Hepatobiliary surgery (3.27%) were the least cancelled cases. This result is supported by similar studies done at Nigeria, orthopedics accounted for 25.4%<sup>3</sup>, tertiary hospital in Uganda, orthopedics accounted for 40.9%<sup>1</sup>, and Hawassa university comprehensive specialized hospital, orthopedics accounted for 28.8%<sup>6</sup>, unlike studies done at tertiary private hospital in Uganda, which showed General Surgery accounted for 81%<sup>8</sup> and Jimma University Teaching Hospital, General surgery accounted for 23%<sup>9</sup>. This might be due to the fact that high rate of trauma and road traffic accident in the study area leads to giving priority for emergency orthopedic cases and orthopedic cases are scheduled for five days per week. Besides this the most commonly cancelled cases are among Orthopedics, General surgery and Urology

surgery which are invasive surgeries which is more likely at risk of excessive bleeding and may be affected by unavailability x-matched blood.

This study is limited to health facilities and it is difficult to generalize the finding of this study to the general population. This study cannot establish a causal association because it is difficult to determine which factors led to the exposure or the outcome, because it is a cross-sectional descriptive study. In addition, as this study was self-reported, there may be data collection bias and the precise cause of cancellation may not be known.



## **CHAPTER VII: CONCLUSION AND RECOMMENDATION**

### **7.1 Conclusion**

The rate of cancellation in this medical care center is high. This study showed that the majority of cancellations were deemed avoidable and staff and administrative related. Lack of operation theatre time, lack of blood and oxygen, unavailability of anesthesia drug, acute and chronic medical illness and patient unfit for anesthesia were the commonest reason for the cancellation of an elective surgical cases.

### **7.2 Recommendation**

1. All OR staffs should bring a sustainable change and improvement to prevent unnecessary cancellations and enhance cost effectiveness through communications
2. Appropriate preoperative planning, and appropriate time management should be a practiced by all OR staffs
3. Creation of awareness on the significance of blood donation and Clear communication between operating teams and hospital administrators
4. All patients should be evaluated at preanesthetic clinic before admission and anesthesia drugs should be checked a day before surgery
5. Oxygen, blood, and anesthesia drug should be supplied early and adequately

## REFERENCE

1. Ogwal A, Oyania F, Nkonge E, Makumbi T, Galukande M. Prevalence and Predictors of Cancellation of Elective Surgical Procedures at a Tertiary Hospital in Uganda: A Cross-Sectional Study. *Surg Res Pract.* 2020;2020:e1464098. doi:10.1155/2020/1464098
2. Santos GAAC dos, Bocchi SCM. Cancellation of elective surgeries in a Brazilian public hospital: reasons and estimated reduction. *Rev Bras Enferm.* 2017;70:535-542. doi:10.1590/0034-7167-2016-0084
3. Okeke C, Obi A, Tijani K, Eni U, Okorie C. Cancellation of elective surgical cases in a Nigerian teaching hospital: Frequency and reasons. *Niger J Clin Pract.* 2020;23(7):965-965.
4. Birhanu Y, Endalamaw A, Adu A. Root causes of elective surgical case cancellation in Ethiopia: a systematic review and meta-analysis. *Patient Saf Surg.* Published online 2020. doi:10.1186/s13037-020-00271-5
5. Yohanes Y, Endalamaw A, Ayisa A. *Root Causes of Elective Surgical Case Cancellation in Ethiopia: A Systematic Review and Meta-Analysis.*; 2020. doi:10.21203/rs.3.rs-58087/v3
6. Desta M, Manaye A, Tefera A, et al. Incidence and causes of cancellations of elective operation on the intended day of surgery at a tertiary referral academic medical center in Ethiopia. *Patient Saf Surg.* 2018;12(1):25. doi:10.1186/s13037-018-0171-3
7. Ferreira Cavalcante de Sousa Araújo P, Silva do Nascimento J, Barbosa de Melo Azedo SP, Mesquita Xavier S, Karolyne Fernandes Costa I, Martins Melo G de S. Cancelamento de cirurgias eletivas em hospital escola: causas e estatísticas. *Enferm Glob.* 2020;19(3):286-321. doi:10.6018/eglobal.396911
8. Vahwere BM, Sikakulya FK, Ssebuufu R, et al. Prevalence and factors associated with cancellation and deferment of elective surgical cases at a rural private tertiary hospital in Western Uganda: a cross-sectional study. *Pan Afr Med J.* 2021;39(139). doi:10.11604/pamj.2021.39.139.24667

9. Haile M, Desalegn N. Prospective Study of Proportions and Causes of Cancellation of Surgical Operations at Jimma University Teaching Hospital, Ethiopia. *Int J Anesthesiol Res.* 2015;3:87-90. doi:10.19070/2332-2780-1500022
10. González-Arévalo A, Gómez-Arnau JI, delaCruz FJ, et al. Causes for cancellation of elective surgical procedures in a Spanish general hospital. *Anaesthesia.* 2009;64(5):487-493. doi:10.1111/j.1365-2044.2008.05852.x
11. Muleta M, Gebru S, Mesai D. A cross-sectional study investigating the rate and determinants of elective case cancellations at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. *East Cent Afr Med J.* 2020;25.
12. Demilew BC, Yisak H, Terefe AA. Magnitude and causes of cancelation for elective surgical procedures in Debre Tabor General hospital: A cross-sectional study. *SAGE Open Med.* 2021;9:20503121211003356. doi:10.1177/20503121211003357
13. Desta M, Manaye A, Tefera A, et al. Incidence and causes of cancellations of elective operation on the intended day of surgery at a tertiary referral academic medical center in Ethiopia. *Patient Saf Surg.* 2018;12(1):25. doi:10.1186/s13037-018-0171-3
14. Lankoande M, Bonkoungou P, Traore SIS, Kabore R a. F, Ouangre E, Pendeville P. Cancellation of elective surgical procedures in the university teaching hospital center Yalgado Ouedraogo in Burkina Faso: incidence, reasons and proposals for improvement. *South Afr J Anaesth Analg.* 2016;22(5):140-144.
15. Haile M, Desalegn N. Prospective Study of Proportions and Causes of Cancellation of Surgical Operations at Jimma University Teaching Hospital, Ethiopia. *Int J Anesthesiol Res.* 2015;3:87-90. doi:10.19070/2332-2780-1500022

## Annex: Questionnaires/Check list

**Date:** dd \_\_\_\_ mm \_\_\_\_ yy \_\_\_\_\_

My name is Diriba Terfa and I'm surgery resident from Jimma university medical center. I intend to conduct research on Root causes of elective surgical case cancellation in JUMC. I want to enroll and interview eligible study participants, and fill in questionnaire forms. I am delighted to tell you that I am really value your participation as your individual contribution to the study output will definitely be very significant. I am glad to inform you that, you are one of the eligible study participants and you are welcome to take part in this study. But you can freely decide whether to participate in this study or not. I will admire and respect what so ever your decision is. I would also like to inform you that your name will not be written anywhere in this paper. Would you like to participate in this study?

1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

Ani maqaan koo Diribaa Tarfaa jedhaama giddu gala fayyaa Jimmaati reesiidentii ispeeshalistii baqaqsaaani yaaluuti. Giddu gala fayyaa Jimmaa keessatti sababa yaaliin baqaqsanii yaaluu guyyaa karoorafatametti hojjetamuu dhabuu irratti qorannoo gochaan jira. Qoranno kana irratti yoon isin/si hirmaachisu gammachuudhani. Hirmaannan keessan baay'ee barbaachisaa fi qorannoof waan filaatameef fedhii keessan/kee irratti hundaa'un , hirmaachuuf yaada keessan bilisaan murteessuu dandeessu/sa. Qoranna kana keessatti maqaan keessan/kee kan hin barreefamnee fi icciitiin kan eegamee ta'u isinif/sif ibsun barbaada. Irratti hirmaachuuf feedhi qabduu?

1. Eeyyee \_\_\_\_\_  
\_\_\_\_\_

2. Lakki

Part 1 socio-demographic variables			
S.N	Questions	Response	Remark
1	Age	A. < 5 B. 5-10 C. 11-18 D. 19-30 E. 31- 40 F. 41 - 5 0 G. 51 - 70 H. >70 +	
2	Sex	A. Male  B. Female	
3	Address	Urban	
		Rural	
4	Occupation	1. Farmers 2. Merchant 3. government employee 4.Student. 5.other	
5	Marital status	A. Married B. Single C. Divorced D. widowed E. separated	

Part 2. Reasons of cancellation of elective surgery

S. N		Questions	Resp onse	Remark
1	Patient related factor	A. Refusal to surgery B. patient on medication C. Acute and chronic medical illness If yes to Q.C what medical condition cause cancellation? 1. infection or fever 2.Hypertension 3. Other(specify) D. patient not fasting E. patient not paid F. No attendant		
2	Staff Related factor	A. surgeon unavailability B. diagnosis change C. patient require another surgical workup D. Emergency scheduling E. over scheduling of elective surgery F. late coming of OR staff (delayed first case incision time) G. lack of time H. If yes to Q. G, why lack of time occurred? 1.prolonged subsequent cases 2.other(specify)		
3	Administrative related factor	A-No availability of OR equipment B-Delayed laboratory test C- Lack of oxygen and blood D-Unavailable of bed E-Lack of lab sheet		

4	Anesthesia - related	A-patient unfit for anesthesia B-Abnormal lab result C-Unavailable anesthesia equipment D- Difficult intubation E-unavailable anesthesia drug		
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Part 3. Distribution of elective case cancellation among different specialties.

		Response	Remark
Type of surgery	A General surgery  B. Gynecological/obstetrical  C Urological  D Pediatrics  E Orthopedic  F GI oncology  G Hepatobiliary  H Plastic and ENT  I maxillofacial  J Neurosurgery		