



**MAGNITUDE OF CASE CANCELLATION AND ASSOCIATED
FACTORS AMONG ELECTIVE SURGICAL CASES IN TIKUR ANBESA
SPECIALIZED HOSPITAL HOSPITAL, ADDIS ABABA, ETHIOPIA, 2016**

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**A RESEARCH PREPARED FOR PARTIAL FULLFILLMENT OF THE
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JUNE, 2016 G.C

ADDIS ABABA; ETHIOPIA

**ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCE,
SCHOOL OF MEDICINE DEPARTMENT OF ANESTHESIA**

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ABSTRACT

BACK GROUND: Elective surgical case cancellation refers to any elective surgical case that is booked into the operation theatre list on the day prior to surgery, but is not operated upon as scheduled. Elective surgical case cancellation is common and can have significant adverse effects. The cancellation of planned surgeries causes prolonged wait times, harm to patients, and is a waste of scarce resources. Reasons for cancellations are complex because they are related to patients, organizational issues, and clinical staff.

OBJECTIVE: To assess magnitude of case cancellation and reasons for case cancellation among elective surgical cases in Tikur Anbesa specialized hospital from February 1 to March 1, 2016 G.C.

METHODS: A cross sectional study design was conducted. All elective surgical cases were included in the study. Data was collected by using pretested structured questionnaires and entered in to SPSS version 20 for analysis and cleaning up. P=0.05 value and/95% C.I was used to judge significant of association. The result of study was explained by narratives, tables and graphs.

RESULTS: During the study 369 patients were scheduled for elective surgical operations, 244 (66.1%) patients were operated on their planned date and 125 (33.9%) operations were cancelled. The mean age was 27.9 ± 19.3 years, with male to female ratio of 1.67:1. The main reasons for cancellation were shortage of time related (39.2%), management related (21.48%) and patient related (20%)

CONCLUSION: Cancellation of elective surgical procedures on the scheduled day of surgery was high during the study. Most of the reasons were shortage of time and management related and patient related were the least reason. Most of the reasons were avoidable.

RECOMMENDATION: Implementation of patient preoperative assessment should be applied. A team approach ensuring presence of policies and procedures for improving and ensuring realistic scheduling of patient lists, reducing time spent preparing and cleaning the operating room and better handling resources should be applied.

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ABBREVIATIONS AND ACRONYMS

CC-case cancellation

CR- cancelation rate

DM-diabetes mellitus

ICU-intensive care unit

OR-Operation Room

PI-principal investigator

PRE OP-pre operative

SPSS- Statistical Package for the Social Sciences

TASH-Tikur Anbesa specialized hospital

URTI-upper respiratory tract infection

LFT-Liver function test

ECG-Electrocardiogram

RFT-Renal function test

PFT-Pulmonary function test

CHAPTER ONE

INTRODUCTION

1.1. BACK GROUND

Cancellation of elective planned surgical case is a known quality problem in healthcare system that harms patients and wastes resources, leading to increased healthcare costs. Reasons for cancellations are complex because they are related to patients, organizational issues, and clinical staff (1).

Unexpected surgical cancellations are not uncommon, decrease patient satisfaction, waste medical resources, and undermine the morale of medical personnel. Before seeking a strategy to reduce case cancellation rate, many medical providers and institutes investigate the cancellation rate and understand cancellation reasons. Due to a lack of standard case cancellation definition, and using different study methods , studies in the US have reported cancellation rates from as low as 0.21% to as high as 26% . Cancellation reasons also vary across studies including medical condition changes, patient no show, and scheduling issues (2).

Cancellation of elective cases is a significant problem in many hospitals in that it may lead to dissatisfaction of patients, increased costs and prolonged patient stay in hospital. It also reflects inefficiency in the management of the operating theatre (3).

Operation Theater is the heart of a hospital requiring considerable human resources and expenditure from hospital budget. However, Operation Theater is underutilized and lies idle at times. Many patients who are called for operation from waiting list are not operated upon. A significant amount of work needs to be undertaken to prepare the patient for a surgical procedure. This includes the patient notes being written on the day of admission, the consultant taking the time to review the notes, operation theater staff ensuring the correct surgical instruments are available, ward staff preparing the ward for the patient, secretarial staff preparing theatre lists, the patient preparing self for admission to hospital, and preparations for

postoperative care. Last minute cancellations result in inefficient use of resources, not in the interests of the patient or the hospital, and result in lost capacity (4).

The reported incidence of cancellation in different hospitals ranges from 10% to 40%. There are many reasons of cancellation of elective surgical cases; and they differ from hospital to hospital. Unexpected operating room cancellations are traditionally divided into avoidable cancellations (e.g., scheduling errors, equipment shortages, and cancellation due to inadequate preoperative evaluation) and unavoidable cancellations (e.g., emergency case superseding the elective schedule, unexpected changes in the patient's medical status, or patient nonappearance). The most common factor which has led to cancellation is lack of OR time (4).

Increasing patient satisfaction through efficient practice is an appropriate objective of a health care system. A high cancellation rate for elective surgical procedures makes it difficult to accomplish this. Cancellation reduces operating room efficiency and increases costs (5).

However, different definitions of cancellation exist in the international literature. Some authors define 'cancellation' as only those procedures that were cancelled on the day on which surgery was scheduled, whereas others also include those that were cancelled on the previous day. The Modernization Agency Theatre Programme (National Health Service (NHS), UK) appears to define cancellations as those that occur after the patient has been notified of operation date. In definitions used by a number of reports, cancellations are considered to be any operation that appears in the definitive schedule list that ultimately is not performed. Some other study group reasons for cancellation into relatively broad categories, while others simply list causes without grouping them. In yet other studies, the underlying decision to cancel is explored (5).

1.2. STATEMENT OF THE PROBLEM

Elective case cancellation on the planned day of surgery is a common problem in hospitals which harms patients and leads to resource wastes that increase health care costs(1).

Cancellation of patients from elective theatre operating lists increases cost, decreases efficiency, duplicates workload and wastes operating room time. Cancellation of elective surgical procedures also causes significant emotional trauma to the patients as well as their families and the community in general, and its impact on hospital resources is great due to prolonged hospitalization and high cost of health care(4)

Cancellations of surgical procedures can result in inefficient use of hospital resources and loss of hospital income. The most damaging cancellations with regard to inefficient and costly use of medical resources are cancellations that occur after the patient has been prepared for the operating room. Reasons for cancellations vary, depending on the patient population, the type of surgery, and the adequacy of hospital administrative procedures (6).

Cancellation of an elective surgery increases the patient's stay in the hospital and associated inconvenience. It leads to waste of time for the surgeon and other support staff as well as underutilization of operation theatre (7).

Surgery cancellations are undesirable in hospital settings as they increase costs, reduce productivity and efficiency, increase waiting lists, and directly affect the patient. Considerable resources are invested in maintaining operating theatres, and having surgeons and theatre staff available on an agreed schedule. In spite of this, the cancellation rate of elective surgeries is high, especially in the public sector. Cancellations can significantly inconvenience patients and their families. It is also reported that patients may suffer psychological stress, and/or financial hardships. Accordingly, cancellations are stressful and costly, with a high level of emotional involvement before surgery (8).

1.3. SIGNIFICANCE OF THE STUDY

The aim of this study is to determine the magnitude and identify the reasons for elective case cancellation. Study on this topic is important and relevant because researches and reviews are inadequate. Identification of reasons for elective surgical case cancellation will enable the management body to make appropriate strategies and thus, make better use of its operation theatre facility.

So this research may add to the few available materials and increase the awareness and the sensitivity of the problem to health professionals, hospital managements and ministry of health for better management of the problem at any level. In addition to this, the result of the study will motivate and simulate for more detailed research.

CHAPTER TWO

LITREATURE REVIEW

Operation theatre is one of the important departments that provides sound basis for an effective healthcare framework. It requires considerable human resource as well as budgets as to deliver the best results in an efficient manner. Though, all major hospitals make substantial investment in ensuring the on time availability of surgeons and theatre staff , a major problem that remain prevalent in all hospitals is the cancellation of operation at an eleventh hour. The situation leads to the underutilization and idleness of the operation theatres. In addition to it, cancellation of planned operations also establishes the inefficiency of management. Wastage of resources and inefficient use of operation theatres is highly attributed to the late cancellation of scheduled operations. Last minute cancellation provides consequences not only for hospitals but it also affect patient interests (9).

The prospective research done in India 1590 patients were scheduled for elective surgical procedures in 458 operation rooms during the study period. 47.7% patients were male and rest being females. 28% of the total surgical procedures were planned laparoscopically. From 1590, 482 (30.3 %) patients were cancelled on the day of surgery. 288 (59.7%) were cancelled due to lack of availability of theatre time; 52 (10.8%) were cancelled because of medical reasons and 78 (16.2%) did not turn up on the day of surgery. In 26 (5.4%) patients, surgery was cancelled by surgeons due to a change in the surgical plan; 18(3.7%) were cancelled because of administrative reasons, 20 (4.2%) patients were postponed because of miscellaneous reasons (10).

The researches done in Finland from 1 July 2009 to 30 June 2011, reports a total of 12,205 patients were scheduled for surgery, and 551 (4.5%) cases were canceled. The most common surgical specialty was orthopedic (31.8%), followed by gastroenterology (15.2%), ORL (13.6%), and gynecology (11.1%) The type of surgical specialty had significant effect on the frequency of cancelations ($p < 0.001$). Cancelations were most common in hand surgery (8.2% of all hand surgery patients), followed by orthopedic (5.4%), pediatric (5.1%), and ORL surgery (5.0%). On the contrary, of 122 scheduled operations for endocrinological surgery, none were canceled.

Between the two most common types of surgery, orthopedic surgery had more cancellations (5.4%) than gastroenterological surgery (3.8%) (11).

Reasons for cancellation were divided into three categories: patient, hospital, and staff-related issues. Most of the cancellations were due to patient-related issues 72.4%, hospital-related issues 19.8% and staff-related issues 7.8%. Three most common reasons for cancellation covered 60.3% of all cancellations (308/511 cases). The most common reason was operation no longer being necessary (143 cases, 26% of all cancellations, and 1.2% of all patients). The second most common reason was patient being unfit for operation (86 cases, 15.6% of all cancellations, 0.7% of all patients). Other reasons were emergency operation prioritized (9.2%, 51 cases), prolonged previous operation (6.9%, 38 cases), and lack of surgeon (6.2%, 34 cases) (11).

A prospective survey was conducted in UK Royal Glamorgan Hospital over a 12-month period to identify cancelled day case and in-patient elective operations. A dedicated nurse practitioner was employed for this purpose, ensuring that the reasons for cancellation and the timing in relation to surgery were identified. The reasons for cancellation were grouped into patient-related reasons, hospital clinical reasons and hospital non-clinical reasons. In total, 13,455 operations were undertaken during the research period and 1,916 (14%) cancellations were recorded. The common reasons for cancellation were inconvenient appointment (18.5%), list over-running (16%), the patients thought that they were unfit for surgery (12.2%) and emergencies and trauma (9.4 %) (12).

One of the study conducted in Hong Kong Hospital on 6234 scheduled cases, 476 were cancelled, which yielded a point prevalence of 7.6%. The highest number of cancellations occurred in patients scheduled for major general surgical procedures (n=94, 20%), major urological procedures (n=64, 13%), major orthopedic surgery (n=38, 8%), and ultra-major cardiothoracic surgery (n=29, 6%). The most common category for cancellation was facility (73%), followed by work-up (17%), patient (10%), and surgeon (1%). No available operating room time due to overrun of the previous surgery was the most common reason for case cancellation (n=310) (13).

Study conducted in Saudi Arabia on a total of 2480 scheduled cases to undergo elective surgical procedures. Of those 189 cases were cancelled (7.6%). The highest number of cancellation

occurred in the general surgical service (28%) and the least (3.1%) occurred in neurosurgery. There were many reasons recorded for cancellation of surgeries, the most common was the no show up reason (32.5%). The least cause of cancellations was due to improper scheduling and acute illness (0.5%). The highest cancellation among different surgery subspecialties was for general surgery (28%), followed by orthopedic surgery (14.8%), plastic surgery (13.7%), pediatric surgery (13%), gynecology surgery (10.5%), and urology surgery (10%). The least cancellations were found among vascular surgery and neurosurgery sections (3.7% and 3.1% consequently) (14).

Another research done on reasons for cancellation of elective cardiac surgery at Prince Sultan Cardiac Centre, Saudi Arabia, a total number of cardiac surgical patients including pediatric and adult during a period from June 2008 to May 2009 were 2191. Out of those, 1681 cases were done during the study period, 510 (23.27%) cases were cancelled during the study period. The operation theatre was functional for 331 days during the study period. Cancellations done by the surgeons were 34% while the patient's related cancellations were 32%. The administrative issues contributed to 34% in overall cancellation and anesthetists related cancellation were 0 % (15).

Other 52 months prospective studies in Spain on Causes for cancellation of elective surgical procedures in Spanish general hospital 39,115 operations were scheduled in 9733 theatre sessions. There were 2559 cancellations (6.5%). 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 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 (16).

The main causes of cancellation by broad category, 'medical causes' accounted for 50%, 'patient-related causes' for 23%, and 'administrative/logistic causes' for 25%. In order, the most frequent specific causes were: 'lack of theatre time' 23%, 'patient did not attend' 20% and 'infection/fever' 18% (the vast majority of these due to respiratory tract infection). Together, these three causes alone accounted for 60% of all cancellations (5).

In study done in Abbottabad total number of general surgical operations performed form July 2006 to June 2007 was 2820. 3756 patients were scheduled for surgery during this study period. The operation theatre was functional for 285 days during the study period resulting in 9.8 cases

per day. 936 (25%) operations were cancelled in the hospital. 338 (36%) operations were cancelled due to insufficient operating time. 296 (31.6%) were cancelled due to medical reasons. Shortage of beds resulted in cancellation of 152(16.2%) operations. The anesthetist cancelled the operations in 399 (43%) and surgeons in 367 (39%) patients. 170(18%) operations were cancelled due to organizational reasons (16).

From the total 455 surgical operations booked for surgery during the study period of three months in Pakistan Karachi civil hospital 33 operative days were analyzed, out of them; one day full list cancelled due to law and order situation in the city (strike). The average cases per list scheduled were 14.2 cases. Out of total 455 booked operations, 97 (21%) operations were cancelled. As most of cancelled Patients did not come on the scheduled day of operation for cases under local anesthesia; noncompliance of patient has been identified as the major contributor for operations cancellation followed by lack of operating theatre time.(9)

During the period of January - December 2013 In the Kingdom of Saudi Arabia, Makkah region, there were total 16211 scheduled surgery cases in 15 different surgical specialties and 1238 (7.6%) cases were cancelled. Out of total cancelled cases, Orthopedics' cases were 419(33.9%), general surgery 340(27.5%), obstetrics 95(7.7%), ENT 65(5.2%), ophthalmology 59(4.8%), and others. Total numbers of operative cases cancelled were 1238. There were 27 different reasons for cancellation of the operations, and the causes for cancellations were categorized as patients related, 42.81%, facility related 20.03%, because of improper work-up 9.45%, linked with anesthesia 1.45%, related with surgeons 7.19%. The most common single reason for operation cancellation was failure of the patients to attend 20.76%, followed by from surgeon 6.95%, blood was not arranged 5.57%, because of other medical conditions 5.17%, on patients request 4.77%, for improper scheduling 4.84%, lack of equipment 4.20% and others(17).

The study in Sudan including 1724 patients were scheduled for elective surgical procedures during the study period; 106 (6.0%) of these were cancelled on the day of surgery. The causes were coexisting medical problems 38.7%, administrative 25.5%, patient related 18.8%, surgical 12.2%, and anaesthesia related 2.8%. Out of the medical problems which led to cancellation were commonly: acute cardiac causes 17.9% and acute respiratory causes 9.4%. From the

administrative causes 17.9% were due to lack of theatre time. Out of the patient related causes 16.9% were because the patient failed to admit. According to the age group cancellations were mostly within the 61– 70 year age group (31.1%) & 51 – 60 year age group (25.4%). The cancellations of major, intermediate & minor surgeries were 58.5%, 18.9%, 22.6 % respectively (18).

The study at Aga Kahn, Pakistan, and University shows a total of 810 patients were scheduled to have surgeries in the main operating rooms. In these 810 patients 55 cancellations (6.7%) were noted. Patient related factors accounted for 32 (58%) cancellations. Further break-up of this group showed that 'no-shows' were 40%, patient refusals 3.6%, financial constraints 3.6% and failure to follow preoperative instructions 5.4%. Acute illnesses of the patients were a cause in 5.4% of the cancelled cases. Anaesthesia related factors accounted for 12 (22%) cancellations. Cancellations done by surgeons accounted for 10 (18.2%) of the total cancellations. Surgery related factors were unplanned booking (5.45%), patient requiring further surgical workup (3.6%), surgeon busy in emergency surgery (3.6%) and surgeon's non availability due to other reasons (1.8%) (19).

From 17,625 patients, in swedish public health care system, scheduled for elective surgery, 6,911 (39%) had their procedure cancelled at least once. A quantity of 4,008 (58%) had their procedure cancelled once, 1,935 (28%) twice, 622 (9%) three times, 208 (3%) four times and 138 (2%) more than four times. This adds up to a total number of 9,836 cancellations for the 6,911 actual patients. Of these patients, 2,639 (38%) underwent surgery on a later occasion at the current hospital, while 4,272 (62%) were transferred to other clinics or declined surgery (20).

In South Africa a retrospective evaluation was done on why is surgery canceled? Over 12 months, during which 5,786 operations were complete (2,800 urgent and 2,986 elective), cancellations occurred in 333 (5.6%) of cases. The most common reason was lack of medical clearance and patient preparation (65.1%). More decisions for postponement came from surgeons (25.8%) than from anesthetists' (4.5%). Other reasons for postponement of surgery were: lack or failure of instruments (2.8%), and cancelled by patients (1.8%). No operations were cancelled because of lack of ICU beds (21).

The study done in Tanzania shows that a total of 3,064 patients were scheduled to undergo elective surgical procedures. Of these, 2,420 (79.0%) patients were operated on while the remaining 644(21%) patients' procedures were cancelled. The ages of patients whose operation were cancelled ranged from 1 month to 86 years. There were 424 (65.8%) males and females were 220 (34.2%) with a male to female ratio of 1.9:1. General surgery had the highest number of patients booked for operation (24.7%) followed by orthopedic surgery in 21.8% of patients. Cardiothoracic surgery and Ophthalmology had the least number with 3.2% and 2.2% of patients booked for operations respectively (4).

A research done at El Oboid Hospital western Sudan shows 1633 elective major general surgical operations performed during the study period. 162 cases (9.9%) were cancelled; eighty nine patients (55%) were females. The mean age was 46.5 years. The causes of cancellations were 34.6% patient related, 32.1% staff related and 33.3% procedural reasons. (5).

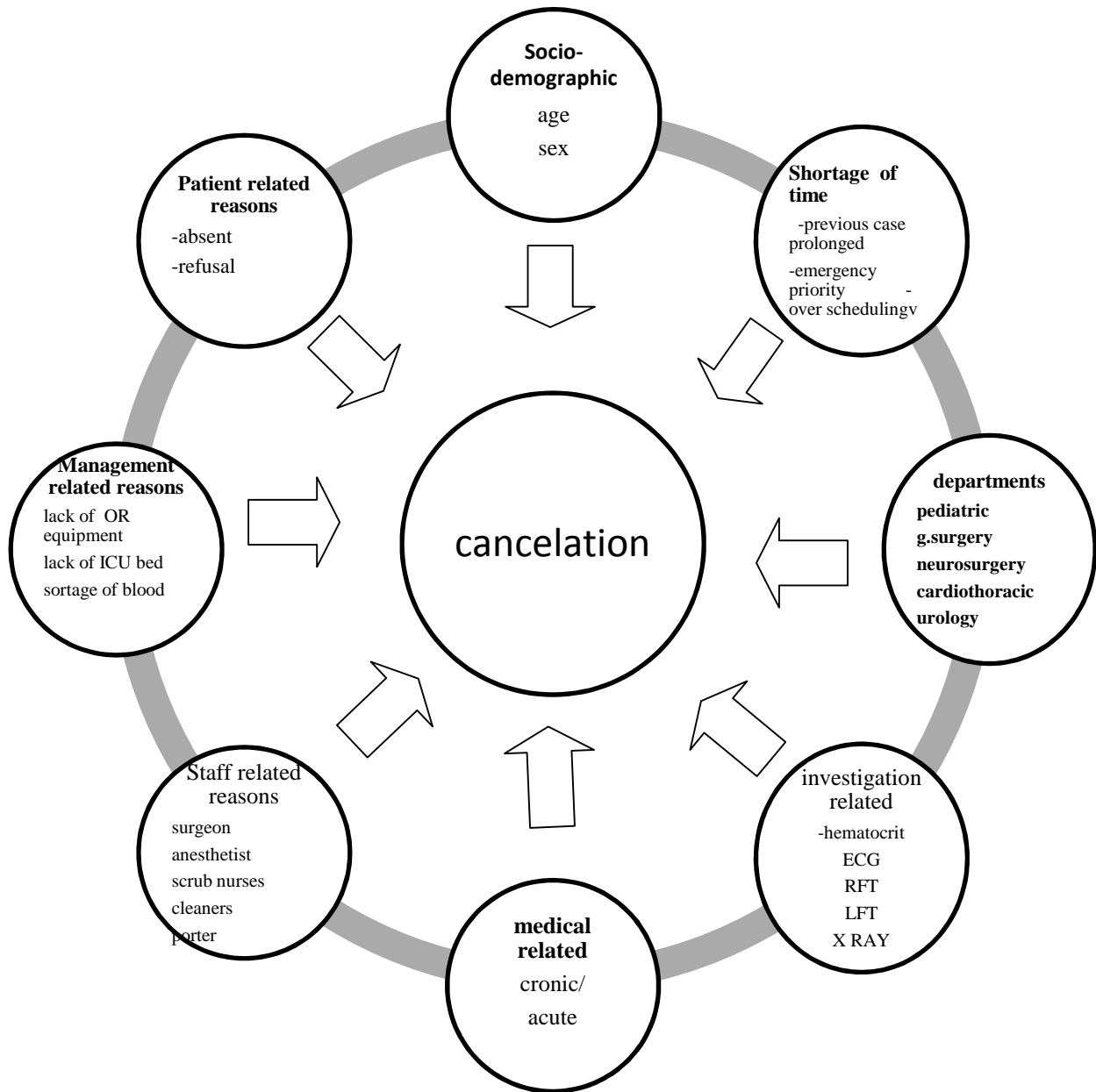
During the study at Khartoum, Sudan 2750 patients were scheduled for general surgical operations, 2460 (89.5%) patients were operated on their planned date. A total of 290 (10.6%) operations were cancelled. The mean age was 41.2 ± 16.5 years, with female to male ratio of 1.2:1. There were many reasons for postponement of surgery; the main reasons were categorized into medical related, patient related, administrative, inadequate preparations of patients and other reasons, accounting for 30.3%, 24.9%, 20.3%, 19.5% and 4.6% respectively. The major three causes for cancellation in the study were; failure of the patients to attend, uncontrolled hypertension and overloaded schedule. These were seen in 57 (19.7%), 35 (12.1%) and 32 (11.0%) patients respectively. Most of the reasons (76.9%) were potentially avoidable (22).

A total of 1015 patients were scheduled at a University Teaching Hospital, Enugu, Nigeria for elective surgery during the study period while 284 (28%) of the patients had their surgery cancelled for various reasons. The two most frequent reasons for cancellation were insufficient theatre time (24.30%) and booked patients not showing up on the day of surgery (21.13%). Miscellaneous (6.69%) causes of cancellation in this audit included patient not fasted, patient menstruating, or non availability of sterile surgical instrument pack. General surgery had the highest number (352) of booked cases and also the highest number, 103 (36.27%) of cancelled

cases. However, pediatric surgery with the 4th largest number (92) of booked cases had the highest (44.57%) cancellation rate. The most common reason for cancellation of elective pediatric surgical cases, was insufficient theatre time while for orthopedic surgery it was failure of patients to show up for booked surgery (23)

During the study 2750 patients were scheduled for general surgical operations, 2460 (89.5%) patients were operated on their planned date. A total of 290 (10.6%) operations were cancelled. The mean age was 41.2 ± 16.5 years, with female to male ratio of 1.2:1. There were many reasons for postponement of surgery; the main reasons were categorized into medical related, patient related, administrative, inadequate preparations of patients and other reasons, accounting for 30.3%, 24.9%, 20.3%, 19.5% and 4.6% respectively. The major three causes for cancellation in the study were; failure of the patients to attend, uncontrolled hypertension and overloaded schedule. These were seen in 57 (19.7%), 35 (12.1%) and 32 (11.0%) patients respectively. Most of the reasons (76.9%) were potentially avoidable (24).

During study done at Jimma University 1438 patients were scheduled to undergo elective surgical procedures and these 1107 (77.0%) patients were operated, while the remaining 331(23%) cases were cancelled. From the total number of patients whose operation was cancelled general surgery takes the majority 198 (23%) followed by orthopedic surgery 391 (20%). Common reasons for elective surgical patient cancellation is inappropriate scheduling (33.5%) followed by lack of sterile drape (23.5%) and in appropriate patient preparation (11.8%) (25)



CHAPTER THREE

OBJECTIVES

3.1. General objective:

To assess magnitude of case cancellation and factors associated with case cancellation among elective surgical cases in Tikur Anbesa specialized hospital from February 1, 2016 to March 1, 2016 G.C.

3.2. Specific objectives:

- ❖ To determine magnitude of case cancellation among elective surgical cases in Tikur Anbesa specialized hospital
- ❖ To asses factors associated with elective case cancellation among elective surgical cases in Tikur Anbesa specialized hospital

CHAPTER FOUR

METHODS AND MATERIALS

4.1. Study area and period:

The study was carried out in Addis Ababa, Tikur Anbesa Specialized Hospital. Addis Ababa is a chartered city; having three layers of government: city government at the top, 10 sub city administrations in the middle, and 116 wereda administrations at the bottom. The total land area of the city of Addis is 54,000 hectares and located between 8055' and 9005' North Latitude and between 38040' and 38050' East Longitude with more than 3 million population(26).

Tikur Anbesa Specialized hospital is Ethiopia's largest general public hospital and one of University Hospitals in the country. The hospital provides a tertiary level referral treatment and is open 24 hours for emergency services. The hospital is administered by Addis Ababa University and is the largest and oldest teaching hospital among all in Ethiopia providing teaching for about 300 medical students and 350 Residents every year. Tikur Anbesa Specialized hospital offers diagnosis and treatment for approximately 370,000- 400,000 patients a year. The hospital has 800 beds, with 130 specialists, 50 non-teaching doctors. The emergency department sees around 80,000 patients a year (26).

TASH has four major operation theatres with total eight functional operation rooms and one operation theatre with nine operation rooms is under innovation. From the functional rooms six of them are giving services for elective surgical cases and the other two for emergency operations. Around 4,450 cases operated in one year in all operation theatres.

The study was conducted in TASH from February 1 to March 1, 2016 G.C.

4.2. Study design:

Institutional based cross sectional study was conducted to determine magnitude of case cancellation and reasons for cancellation.

4.3. Population

4.3.1. Source population: Elective surgical cases who are scheduled for elective surgery

4.3.2. Study population: All patients scheduled for different elective surgical procedures during the study period were included.

4.3.3. Exclusion criteria: listed for elective surgery but done before the day of schedule as emergency.

4.4. Study variables

4.4.1. Independent variables:

- age
- Sex
- Department(specialty)
- Reasons for cancellation
 1. Patients related
 2. Medical related
 3. Management related
 4. Shortage of time
 5. staff related
 6. Incomplete investigation

4.4.2. Dependent variables: Case cancellation

4.5. Operational definition:

Elective surgery- non-emergency surgery which is medically necessary, but which can be delayed for at least 24 hours

Cancellation-a planned operation that is not done on the day of the schedule time

4.6. Data collection

The data was collected by reviewing the daily schedule lists for elective surgery with a predesigned form which included information about the patient and the presumed reasons for cancellation. Relevance information from schedules was transferred to the predesigned form. Causes for cancellation were identified by continuous interviewing the operation theatre staffs (nurses, surgeons or anesthetists) and ward medical staffs on the day of surgery and immediately recorded in the predesigned form by the data collector. The forms were included the detailed description of the situation and formulation of the main cause leading to surgery cancellation.

4.7. Data collectors

The data collectors were two BSc anesthetists and one MSc anesthetist supervisor with more than two years experience who were trained how to collect the data. After giving the training using lecture and demonstration on data collection procedure and about the information to be collected and collect the information in collaboration with the principal investigator.

4.8. Data Quality assurance

Before actual data collection was started pretest was made for two days on the questionnaires at Zewuditu memorial hospital which had similar service to the study area and amendment was made on the questions. To ensure data quality the data collectors were provided training for one day on the objective of the study, contents of the questionnaires and how to maintain confidentiality and privacy of the study subjects. All data collectors were anesthetists who are working in TASH. The data collection process was closely monitored by supervisor and principal investigator (PI); collected data were checked for any incomplete content by PI on daily basis.

4.9. Data analysis and interpretation

After all information collected, template developed, data was entered in to SPSS version 20 software. Both descriptive and bi-variate/multivariate logistic regression analyses were performed. A descriptive analysis was done using frequency, mean and standard deviation and interpreted by tables and graphs.

4.10. Ethical considerations

Ethical clearance was obtained from school of medicine department of anesthesia after the proposal approved by the department of anesthesia institutional review board. After receiving ethical clearance, permission to conduct the research was obtained from the medical director and OR directorate of TASH. Verbal consent was taken after explaining about the study and its importance. Name of the participant were omitted from the questionnaire; instead we use medical record number to ensure confidentiality.

4.11. Data disseminations

The result of this study will be present to Addis Ababa University College of health science as partial fulfillment of master's degree in anesthesia. Further more the result will be shared with TASH and also the manuscript of the research will be prepared and submitted to appropriate journals for possible publication and copy to library of Health science, and department of anesthesia and for each individual specialty at TASH.

CHAPTER FIVE

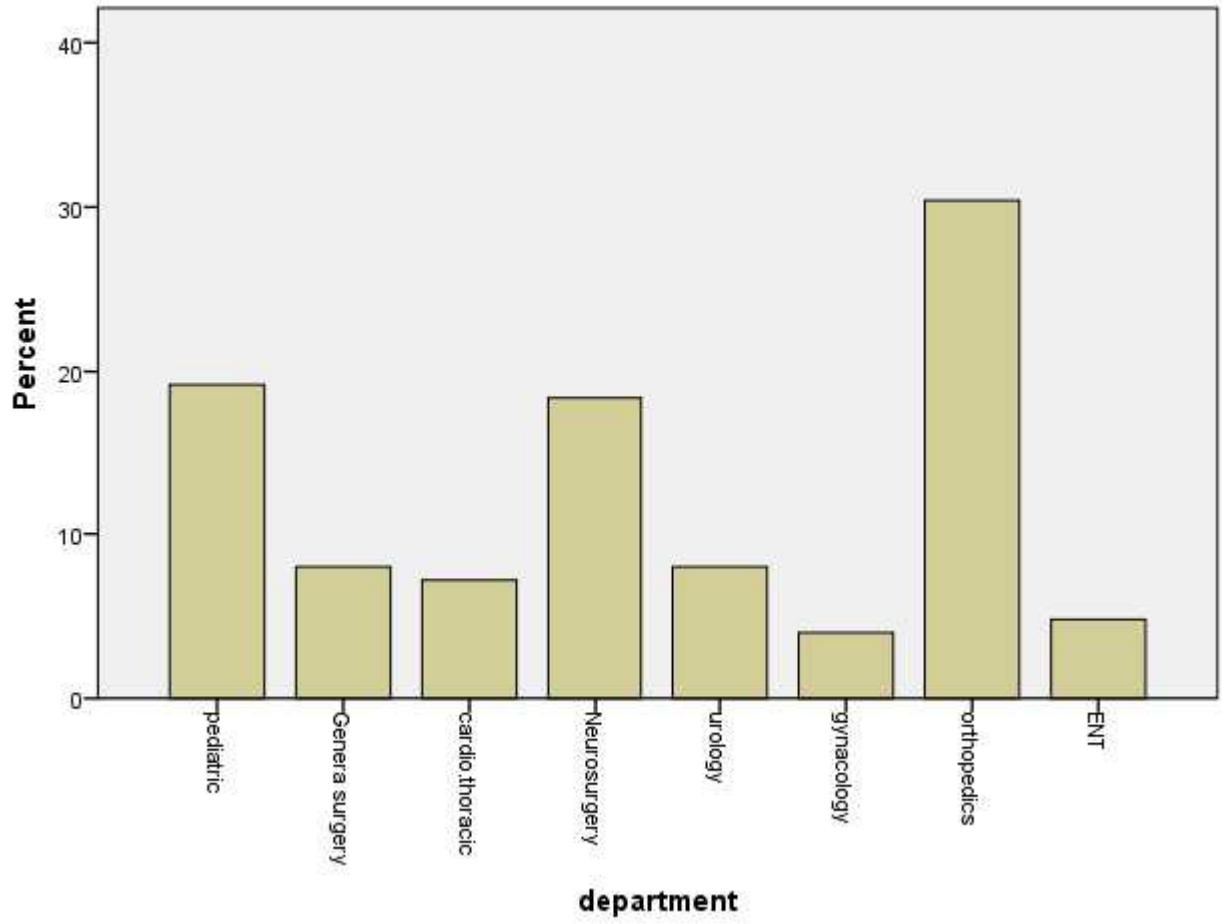
RESULTS

During the study period 369 elective surgical cases were scheduled for operation. There were 231(62.6%) male and 138(37.4%) female. From the study 244(66.1%) were operated on the day of scheduled and 125(33.9%) were cancelled. Male to female ratio was 1.67:1 (Table 1).

Table 1: Scheduled elective surgical cases and sex of the cases distribution at TASH from Feb 1 to March 1 2016 G.C.

Sex	Operated	Cancelled	Total
Male	145(62.8%)	86(37.2%)	231
Female	99(71.7%)	39(28.3%)	138
Total	244	125	369

From the table male has high cancellation rate 37.2% and female 28.3% within the same sex.



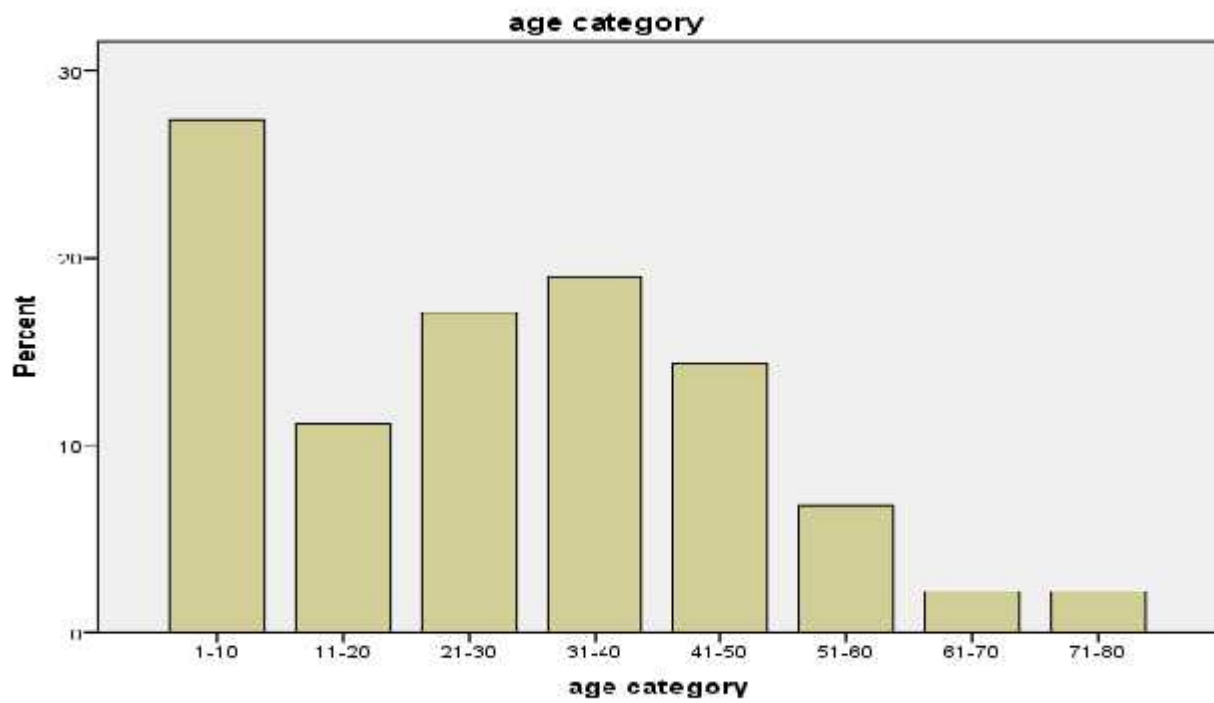


Table 2: scheduled elective surgical case cancellation and uncontrolled/acute medical illness reasons for elective case cancellation distribution at TASH from Feb 1to March 1 2016 G.C

Medical illness	Frequency	Percent
Ischemic heart diseases	2	25.0
Acute febrile illness	2	25.0
URTI	3	37.5
Others	1	12.5
Total	8	100

Eight patients were canceled by medical illness 6/125(6.4%), URTI was the highest 3/8(37.5%) reason.

Table 3: Scheduled elective surgical case cancellation and reasons for elective case cancellation distribution at TASH from Feb 1to March 1 2016 G.C

Reasons	Frequency	Percent
Pt related	27	20.00
Medical reasons	8	5.93
Mgt related	29	21.48
Lack of ix	8	5.93
Staff related	9	6.67
Time shortage	53	39.26
Failed anesthesia	1	0.74
Total	135	100.00

As shown in table 3, the most frequent reasons for elective cancellation were shortage of time which accounts 53 cases (39.26 %) from the canceled cases. The second frequent reason was management reasons 29 cases (21.48%) and the least reason was unexpected emergency only one case.

Table 4; Scheduled elective surgical case cancellation and reasons because of shortage of time for elective case cancellation distribution at TASH from Feb 1 to March 1 2016 G.C

Shortage of time	Frequency	Percent
Previous case prolonged	13	24.5
Emergency priority	2	3.8
Over scheduling	38	71.7
Total	53	100.0

From the table the highest frequent reasons for shortage of time were over scheduling 71.7 % (38 cases) and the least was emergency priority 3.8 % (2cases) were canceled.

Table 5:scheduled elective surgical case cancellation and Management related reasons for elective case cancellation distribution at TASH from Feb 1 to March 1 2016 G.C

Management related reasons	Frequency	Percent
Material shortage	9	31.0
Lack of ICU	2	6.9
Blood not prepared	17	58.6
Lack of oxygen	1	3.4
Total	29	100

Lack of prepared blood 17 (58.6%) and shortage of OR material 9 (31%) were common management related reasons for elective surgical case cancellations.

Table 6: scheduled elective surgical case cancellation and patient related reasons for elective case cancellation distribution at TASH from Feb 1to March 1 2016 G.C

Patient related factors	Frequency	Percent
Medical illness	8	29.6
Lack of investigation	3	11.1
Refusal	3	11.1
Absent	5	18.5
Not fasting	5	18.5
Other	3	11.1
Total	27	100.0

Uncontrolled/acute medical illness was the highest patient related reason 8/27(29.6%) for cancellation.

Table 7: Bi-variante Multivariate analysis

Variables		Case cancellation		COR 95%CI	AOR 95%CI
		Yes	no		
Sex	Male	86(37.2%)	145(62.8%)	0.66(0.42-1.05)	1.89(1.12-3.15)
	Female	39(28.3%)	99(71.7%)	1	
Department	Padiatrics	24(33.3%)	48(66.7%)	1	
	G surgery	10(37%)	17(63%)	0.85(0.34-2.14)	0.72(0.21-2.45)
	Cardiothoracic	9(33.3%)	18(66.7%)	1(0.39-2.56)	0.62(0.18-2.09)
	Neurosurgery	23(52.3%)	21(47.7%)	0.46(0.21-0.98)	1.52(0.56-4.12)
	Urology	10(22.7%)	34(77.3%)	1.7(0.72-4.01)	0.28(0.09-0.91)
	Gynecology	5(33.3%)	10(66.7%)	1(0.31-3.36)	1.07(0.24-4.72)
	Orthopaedics	38(33.9%)	74(66.1%)	0.97(0.52-1.82)	0.67(0.27-1.67)
	ENT	6(21.4%)	22(78.6%)	1.83(0.66-5.12)	0.46(0.15-1.41)
Grouped age	<10	31(30.7%)	70(69.3%)	0.32(0.03-2.74)	2.94(0.30-28.61)
	11-20	12(29.3%)	29(70.7%)	0.35(0.04-3.12)	3.33(0.35-31.96)
	21-30	18(28.6%)	45(71.4%)	0.36(0.04-3.12)	3.54(0.38-32.79)
	31-40	30(42.9%)	40(57.1%)	0.19(0.02-1.63)	8.02(0.88-73.62)
	41-50	24(45.3%)	29(54.7%)	0.17(0.02-1.50)	8.83(0.95-82.22)
	51-60	7(28.0%)	18(72.0%)	0.37(0.04-3.6)	3.51(0.34-36.27)
	61-70	2(25.0%)	6(75.0%)	0.43(0.03-5.99)	3.00(0.20-45.15)
	>70	1(12.5%)	7(87.5%)	1	
Reasons for cancellation	Investigation related	8(2.2%)	361(97.8%)	0.07(0.01-0.57)	0.00(0.00-0.03)
	time related	53(14.4%)	316(85.6%)	0.01(0.01-0.04)	0.00(0.00-0.002)
	Staff related	9(2.4%)	360(97.6%)	1	

Investigation related and time related reasons were significant for elective case cancellation compared to staff related during the study (p value <0.05).

CHAPTER SIX

DISCUSSION

Cancellation of elective surgical operations in hospitals is a significant problem with many undesirable consequences. Cancellations are a major drain on health resources, increases theatre costs, results in wasted operating room time and decreases efficiency. An efficient surgical service should have a low rate of cancellation.

Elective surgical case cancellations decrease operation room efficiency and increases patients waiting for operation and cost (22) decrease patient satisfaction, waste medical resources, and undermine the morale of medical personnel(2).

Elective surgical case cancellation rate in this study was 33.9 % (125) from 369 scheduled cases which is high compared to the study recently done at Tanzania (21%), South Africa (5.6%) Sudan (10.5%), Nigeria (28%) and Jimma University (23%) (4,21,22,23,25). Rate of elective surgical case cancellation in developing country ranges from 10-40% (4) and developed country 0.21-26%(2). This high cancellation rate is may be because of the operation theatre is on the innovation.

From 369 cases 231(62.6%) were male and 138(38.2%) were female. Male to female ratio was 1.67:1. Cancellation rate in male and female were 37.2% and 28.3% respectively. From the canceled cases male was high 68.8% and female 31.2% in other study done in Tanzania male to female ratio were 1.9:1 with 65.8% and 34.2% respectively (4).

The mean age of the scheduled elective surgical cases were 27 ± 19.3 , range 79 with minimum value one and maximum 80 years old but in Sudan mean age was 41.2 ± 16.5 years (22).

Less than 10 years old age group were the highest scheduled and canceled 101(27.4%) and 31 (24.8%) respectively and 31-40 years old group were second highest 30(24.0%) canceled groups and less frequent cancellation were over the age of seventy (0.8%) and in Spain cancellations

were 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%, $n = 438$) (16). But in Sudan the highest canceled group was 61-70 years old 31.1% followed by 51-60 years old group 25.4% (18).

During the study from the canceled 125 cases orthopedic cases were most common canceled 38(30.4%), pediatrics 24(19.2%), neurosurgery 23(18.4%) and the least was ENT 6(4.8%) similar with the study in Saudi Arabia orthopedics account the highest 33.9% and ENT 5.2% least (17) and in Finland 31.8% orthopedics cases canceled (11) but in Saudi Arabia general surgery was high canceled 28% neurosurgery least 3.1%(14).

Most common reasons for cancellation was shortage of time and management related 53(39.26%) and 29(21.4%) respectively almost similar compared with the study in Spain Shortage of time 36.6% (16) but in UK patient related was high (51%) (12) and in China management related reason was high(73%)(13). Over scheduling were the most common reason for shortage of time 38(71.7%) and case prolongation second 13(24.5%).

Cancellation by medical staffs were account 7.2%, surgeons 6.4% and anesthetist 0.08% which is low compared to 34% in Saudi Arabia (15) and similar with the study in Finland 7.8%(11) and high compared to the study in India(3.7%)(10).

Management related reason accounts 21.4% for cancellation ,the commonest were failed to prepare cross matched blood 17(13.6%) followed by OR material shortage 9(7.2%) similar compared to 20.03% at Saudi Arabia(17) and 25.5% at Sudan(18) and high compared to 4.2% in India(10).

Two patients were canceled by lack of postoperative ICU bed for better management, in South Africa no patient was canceled because of ICU bed shortage (21).

Patient related reasons for cancellation were 27(21.6%) from the canceled cases which is low compared to UK Glamorgan hospital 51 % (12), in Finland 72.4 % (11), in Saudi Arabia (32%) but high compared to china 10 % (13).

Medical related reasons was account 5.93% from the canceled cases which is low compared to in Sudan 38.7%(18) and in India 10.8%(10).

LIMITATIONS

As it is a cross sectional study we cannot generate cause effect relationship between dependent and independent variables. It is a single centered study as a result diversity of population could have missed for comparism.

There was shortage of time during proposal development, data collection and analysis.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATION

CONCLUSION

Cancellation of elective surgical procedures on the scheduled day of surgery was high during the study. Most of the reasons were shortage of time and management related and patient related were the third common reason.

It was known most of the reasons for cancellation were avoidable and can be prevented by different methods. Cancellation can be minimized if the patient with medical problems were detected early and referred for anesthetic evaluation as soon as scheduled for operation.

RECOMMENDATION

Implementation of patient preoperative assessment should be applied. A team approach ensuring presence of policies and procedures for improving and ensuring realistic scheduling of theatre lists, reducing time spent preparing and cleaning and better handling resources.

In order to enhance cost-effectiveness and efficiency; efforts should be made to prevent unnecessary postponement through careful planning aim at increasing operation theatre spaces and efficient utilization of few available hospital resources including that of the operating room, theatre facilities and valuable man power improving the scheduling and admission procedure is required for better use of hospital

Monthly reports should be sent to Directorate director/operating room Director Teams to monitor causes of cancelled operation, taking into consideration the distinction between avoidable and unavoidable causes.

I would like to recommend the implementation of control charts for monitoring cancellation of operations.

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ANNEXS

ANNEX I

Questioner

Addis Ababa University College of health Science School of medicine Department of Anesthesia

A Questioner to be filled by data collector

The main purpose of this questionnaire is to assess the magnitude of elective case cancellation and reasons for cancellation of the cases on day of schedule. Through this, feasible recommendations to the identified problems will be forwarded to the responsible body.

Hence, you are kindly requested to every item in the questionnaire. Your correct and complete response to this questionnaire will have a great effect on the success/failure to the study.

Thank you in advance for your cooperation.

1. Identification (socio demographic information)

- | | |
|-------------------|-----------------------------|
| 1.1. Card no----- | 1.4. Diagnosis ----- |
| 1.2. Sex ----- | 1.5. Planned procedure----- |
| 1.3. Age ----- | 1.6. Department ----- |

2. Is the operation done? YES/ NO. If no, continue.

3. Factors for cancellation

3.1. Patient related

- | | |
|--|-------------------------|
| 1. Uncontrolled /acute medical illnesses | 5. financial shortage |
| 2. lack of important investigation | 6. Absent |
| 3. refusal/request | 7. Not fasting |
| 4. poor bowel preparation | 8. Taking anticoagulant |

3.1.1 Uncontrolled or acute medical illnesses

- | | | |
|----------------------------|-------------------|------------------------|
| 1. Increase blood pressure | 2. Uncontroled DM | 3. Uncontrolled asthma |
|----------------------------|-------------------|------------------------|

- | | | |
|----------------------------|-------------------------|----------------|
| 4. Coagulopathy | 6. Uncontrolled Thyroid | 8. URTI |
| 5. Ischemic heart diseases | 7. Acute fever | 9. Others----- |

3.1.2 Lack of important investigation

- | | |
|----------------|------------------|
| 1. Hematocrit | 5. ECG |
| 2. Electrolyte | 6. RFT |
| 3. LFT | 7. X-RAY/CT SCAN |
| 4. PFT | |

3.2 Management related

1. Shortage of OR material
2. Power breakdown
3. Lack of ICU bed
4. Shortage of water supply
5. Lack of mechanical ventilator
6. Blood not prepared
7. Lack Oxygen source
8. Others.....

3.3 staff related

- | | |
|----------------|------------|
| 1. Surgeon | 4. Cleaner |
| 2. Anesthetist | 5. Porter |
| 3. Nurse | |

3.4 Shortage of time

1. Previous case prolonged
2. Emergency priority
3. Over scheduling

3.8. Unexpected emergency

1. Cardiac arrest
2. Aspiration on the table
3. failed intubation/spinal

Data collector name: -----

Signature: -----

Date: -----

DECLARATION

I the undersigned, declare that this is my original work, has never been done in other university and that all the source materials used for the reference acknowledged.

Name ADDIS SHIFERAW AYELE

Signature-----

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Date of submission-----

This thesis has been submitted with my approval for examination.

Name-----

Signature-----

Date-----