COLLEGE OF HEALTH SCIENCES

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DEPARTMENT OF NURSING

DELAY OF FIRST CASE SURGERY START TIME OF ELECTIVE SURGERIES AND ITS ASSOCIATED FACTORS IN TIKUR ANBESSA SPECIALIZED TEACHING HOSPITAL ADDIS ABABA, ETHIOPIA, 2021

BY: ZENBABA BELETE (BSC.RN)

JUNE 2021

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A RESEARCH PAPER TO BE SUBMMITED TO SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN PERIOPERATIVE CARDIOTHORACIC NURSING

JUNE 2021
ADDIS ABABA, ETHIOPIA

STATEMENT OF DECLARATION

ADDS ABABA UNIVERSITY

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I, the undersigned MSc student, declare that I have submitted my original work on a title of Delay of first case surgery start time of elective surgeries and its associated factors in Tikur anbessa specialized teaching hospital Addis Ababa, Ethiopia, 2021

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This thesis work has been submitted for examination with my approval as an advisor.

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ACKNOWLEDGMENTS

Firstly, my special thanks go to Addis Ababa University, College of Health Science, Tikur Anbessa Specialized Hospital (TASH) for the financial support for the research and sponsoring to join post graduate school.

Secondly, my great gratitude is goes to my Advisors Dr. Hussen Mekonnen (Assistant prophesier of Public health, PHD) and Sr Tsion Alemu (MSC, Lecturer) for their guidance, advice, encouragements and support throughout the entire process of this Paper.

Thirdly, Special thanks will goes to Mr.Yoseph Tsige for his supportive comments.

Fourthly, I would like to express my deep gratitude to the surgical teams and administrative body of Tikur Anbesa specialized hospital for their cooperation and help.

Lastly, but not least I would like to give my appreciation to my study participants for their cooperation and background data for of this study.

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LIST OF ACRONYMS

AAU	Addis Ababa University
AOR	Adjusted Odds Ratio
AM	Anti Meridian
COR	Crude Odd Ratio
CSSD	Central Supply Sterilization Department
DOS	Day of Surgery
Dx	Diagnosis
ENT	Ear, Nose, Throat
HER	Electronic Health Record
ICU	Intensive Care Unit
JAN	January
OR	Operation Room
OT	Operation Theater
PM	Post Meridian
PRE OP	Pre -Operative
TASH	Tikur Anbesa Specialized Hospital
WHO	World Health Organization

ABSTRACT

Background: Delay is defined as considerable wait time for staffs, patients, and waste of resources. It can occur during each stage of the perioperative pathway and can be the result of patient and/or hospital related reasons and has negative impact on patient and health care system.

Objectives: To determine 1st case surgical delay of elective surgery and its associated factors at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia.

Methodology: Hospital based cross-sectional study was conducted at Tikur Anbessa Specialized Hospital surgical specialties from 5 Feb, 2021 – 15 March, 2021. Study subjects were selected from daily scheduled elective cases purposively. The delay of surgery was assessed by using the observation checklist and entered in to Epi-data version 3.1 and imported to SPSS version 25.0 for analysis for descriptive statistics. Bivariate and multivariable logistic regression analysis technique was used to analyze the associations between independent variables and dependent variables with P-values < 0.05 were considered statistically significant.

Result: The prevalence of surgical delay was 227(91.5%). There was a significant association between patients age [(AOR=3.51) 95%CI(1.78, 14.80)] and lack of patients investigation [(AOR=7.17) 95%CI(3.02, 29.38)] from patient factors**,** Long time needed to Anesthesia team to prepare patient [(AOR=8.21) 95%CI(1.98, 28.80)] and punctuality of surgeons [(AOR=9.22) 95%CI(1.05, 16.45)] from health care providers factors**,** and Lack of ICU bed [(AOR=6.19) 95%CI(4.04, 25.49)] and absence of blood for transfusion [(AOR=5.28) 95%CI(2.18, 9.88)] from hospital factors and first case delay**.**

Conclusion: The prevalence of 1st case delay is high. Patient's age**,** lack of patient's investigation, refusal of patients, long time needed to Anesthesia team to prepare patient, punctuality of surgeons and absence of blood for transfusion were significantly associated with delay of 1st case surgery.

Recommendation: Stakeholders should minimize time needed to prepare patient for surgery, responsible and punctual on time, avoid a breakdown in communication or process in the pre-hospital/scheduling phase of the patient journey and have good planning hospital management to prepare sufficient theatre for avoidance of delay of for surgery and minimization of cancellation of patient out come and theatre inefficiency.

Key words: Surgical delay, Operation Theater, first case surgery, start time, elective surgery

1. INTRODUCTION

1.1 Background

Success of an Operating Theater (OT) day depends largely on outcomes of the day's first surgical cases. Maximal utilization of the OT requires on-time starts and efficient room turnover (1). Effectiveness of performance in the operating Theatre (OT) has indispensable profit for both hospitals and health care systems to provide timely, safe, and cost-effective care to patients undergoing surgical treatment. Conversely, various studies revealed that there are considerable inefficiencies and delays within OT (2, 3).

Health service delivery is people-centered care that it should be focused and organized around the health needs and expectations of people and communities rather than on diseases (4). Service delivery is an immediate output of the inputs into the health system, and it is what is visible to the clients. Strengthening service delivery ensures access to quality and efficient interventions leading to improved health outcomes (4).

One of the challenges of service delivery is the delays that patients experience at the various service points. A surgical delay is defined as an operation that does not start on or before schedule; and that has been shown to increase surgical wait times, number of cancelled cases, costs, and time under anesthesia (5).

In addition, although delays and disruptions to workflow can be minor, the accumulation of delays can create provider stress and fatigue, and ultimately lead to errors (3, 6). Such delays are a barrier to access of care, and all efforts must be put in place to minimize them. Hendy et al acknowledges that among the delays are those associated with access to elective surgical services and are major sources of concern for all healthcare institutions (7).

Most causes of starting time delays are avoidable with proper planning team work, optimization of resources and maintaining good communication between surgeon, anesthesiologists and nursing staffs.

1.2. Statement of the Problem

Despite notable successes in strengthening of surgical service delivery in developing countries, delays of elective surgical cases remain a source of concern to many hospital settings across the African continent, including Ethiopia (8).

These delays act as barriers to optimal patient workflow efficiency and result to piling of scheduled elective surgical cases, wastage of resources as well as dissatisfaction among staff and patients (9). For hospital administrators, delays of elective surgical cases result in loss of revenue and negative reputation for the organization (10).

Though there are no internationally acceptable benchmarks on what can be considered acceptable levels of delays of elective surgical cases, the National Advisory Committee of the United States of America has set 59% as the bench mark of first cases being wheeled in operating rooms across United States (8). This is to ensure that subsequent cases are also not delayed.
Ciechanowicz et al , while carrying out an observation from a UK health Centre established that 22% of cases did not start on scheduled time with most of the elective surgical cases starting more than 15 minutes after the scheduled time (11). A study by Yamuragiye on starting time delay in operating theatre at university teaching hospital of Kigali established that only 3% of first surgeries started on time while 97% were delayed (12).

Maine R.G., et al. carried a study on the effect of in-hospital delays on surgical mortality for emergency general surgery conditions at a tertiary hospital in Malawi, where the study established an increased mortality in OR and advised on increased staffing levels and operating room availability at tertiary hospitals, especially at night, are needed (13). Another study by Okunu on cancellation of elective surgical cases at Kenyatta National Hospital established that cancellation of elective cases occupies a substantial population (20.6%) of cases at Kenyatta National Hospital, Nairobi with majority of these cases being due to hospital non-clinical reasons with lack of time being the commonest (14). These cancellations cause delays of elective surgical cases. The study further stated that 60% of these cancellations were avoidable with better management.

In developing countries, the delay in the performance of these elective procedures is largely due to bottlenecks in the existing health system essentials. These include lack of adequate infrastructure, like operating theater space, admission beds, diagnostic equipment, and intensive care units. Shortage of a dedicated, well-trained, and motivated human resource (technical and support) cadre is another cause for these delays. Additionally, inconsistent supply of recurrent utilities like medication and theater supplies hinders timely performance of elective surgical procedures (3, 15).

Wolters Kluwer observed that the most common reason for delay in starting the operation table was patient getting shifted late from the ward, followed by administrative causes, medical condition of the patient, and operating surgeon reporting late. And his study highlights that most causes of delays of surgeries are avoidable(16) .

Delayed elective surgery may lead to increased morbidity and mortality for the patient, but it may also result in high hospital costs given the prolonged hospital stay (17).

It has been observed that delay in starting surgery for patients who have been scheduled for surgery is becoming a recurrent phenomenon in the operation Theatres of Tikur Anbessa Specialized Hospital (TASH) and this results many impacts on patient and health staffs. Also starting first case lately ends with unplanned cancellation of scheduled surgery.

As the reasons for the delays may vary from one facility to another, any delay results in cost-burden for the health facility and client dissatisfaction with surgical care and available study is scarce in Ethiopia in the study area of interest therefore cannot be considered to be conclusive on the factors influencing delays of elective surgical cases. Therefore, this study was aimed to assess the magnitude and the factors influencing delays of elective surgical cases on the intended day of surgery at Tikur Anbessa Specialized Hospital, Ethiopia.

1.3 Significance of the study

The study will have the following significance in contributing knowledge by investigating different factors affecting first case starting time delay.

This research will help minimize starting time delay and improve hospital performance.

The findings will help patients by minimize starting time delay and in allaying the fears and anxieties associated with surgical operations, decrease unplanned cancelations and make cost effective surgery as per the patient bill.

The findings will help Perioperative Personnel specifically Nurses by adding information on available few in the field of Perioperative nursing on the subject matter and serves as a stepping stone document.

It will also serve OT managers with a necessary knowledge to plan and implement theater schedules for timely operations for continuous quality improvement. .

It will also help Policy makers to design a sound perioperative system through policy formulation in line with adequate provision of conducive work environment in the operating theatres.

Finally the finding of this study will help researchers as base line data to conduct research on the same subject matter in the same study area.

2. LITERATURE REVIEW

2.1. Magnitude and its impact of delay of first case surgery start time

Different literatures revealed that the prevalence of delay of first case surgeries from the scheduled time is high and have different impact on health care system. Even though there are no internationally acceptable benchmarks on what can be considered acceptable levels of delays of elective surgical cases, the National Advisory Committee of the United States of America has set 59% as the bench mark of first cases being wheeled in operating rooms across United States (8).

A study conducted at in Queen Elizabeth Barbados hospital identified only four percent of surgeries started punctually while all 96% started late(18). Again, another study conducted in a tertiary care hospital found a proportion of 33% of on time starts and 67% that started late (19) .

Study ducted by Cox Bauer CM. et. al., showed tah, mean time from arrival to scheduled surgery and in-room placement was 104.6 and 127.4 minutes, respectively. Mean delay time was 28.2 minutes. Nearly 60% of delayed cases had no documented reason for delay. For cases with documentation, causes included the physician (52%), anesthesia (15%), patient (13%), staff (9%), other sources (6%) and facility (5%). Regression analysis revealed age, late arrival, department and facility as significant predictors of delay (20).

A study by kumar and Gandh reported that the incision of the first patient took place after 9 o'clock was 62.5% (10). Another study conducted in one tertiary hospital in southern United States Of America revealed that 61.5% of all cases were delayed and the delay rate for the first case was 27.2% (21).

Ferschl MB, Tung. A states the majority of the operative surgical procedures 93% were not started at the expected time(22). Another study by Schuster M. et al. showed that the frequency of delay found was very high, affecting 40–70% of cases. Even when delays only of more than 10 minutes were considered, there was still a delay of 20–40% at time of incision (23).

In India 63% of cancellations is due to a lack of time related to a long preceding surgical operation. Late starting time, going beyond expected duration and a long time cleaning the operation theater (OT) between two cases led to a waste of resources. Late start prolongs total operating room time. This is a major cause of surgery being postponed due to lack of time (24).

It was found in India that 43.5% of surgeries started late and 66.5 % were on time with the reasons being mainly the surgeons and anesthetists availability(25). Similarly in South Africa, a study conducted by Van AS AB., identified the starting time delays in operating room and the causes were mainly Surgeons related factors (26).

In developing countries, the delay in the performance of these elective procedures is largely due to bottlenecks in the existing health system essentials. These include lack of adequate infrastructure, like operating theater space, admission beds, diagnostic equipment, and intensive care units. Shortage of a dedicated, well-trained, and motivated human resource (technical and support) cadre is another cause for these delays. Additionally, inconsistent supply of recurrent utilities like medication and theater supplies hinders timely performance of elective surgical procedures (3,15).

Delayed elective surgery may lead to increased morbidity and mortality for the patient, but it may also result in high hospital costs given the prolonged hospital stay (17).

2.2. Factors associated with delay of first case surgery start time

Literatures revealed that different factors were related with delay of first case surgeries. Among these factors health care providers such as Surgeon, Nurse, Anesthesia, supportive staff, cleaner, team work, communication punctuality, incomplete evaluation and documentation are the major one.

2.2.1. Patient related factors

Studies had showed that socio-demographic factors such as age of the patient, financial problems, patient refusal for surgery and medical conditions are among factors related with delay of first case surgeries.

The study conducted by Gabriel et al. showed that pediatric patients had a 2.83 odds ratio (95% CI 2.75-2.91) of being delayed compared to people aged 19 to 49, demonstrating that younger patients had a much higher risk of delay than adults (27).

Study findings conducted by Lydia J., et al. Predictive Factors for Operating Room Utilization in Elective Orthopedic and Ear Nose and Throat Surgeries at Moi Teaching and Referral Hospital, Eldoret, Kenya showed a significant relationship between age group and delay in first surgery start

time. Adults aged 14 years and above had a higher mean of 99.2 minutes compared with children aged less than 14 years with a mean of 63 minutes (t=2.5; df=33; P= 0.02); but no significant relationships were seen between gender, and delay in start time for first surgical patients (male had lower mean 72.9 minutes compared with female with a mean of 79.6 minutes (t=0.4; df=33; P= 0.67) (28).

Gabriel et al. stated that even though it is clear that there are issues specific to the patient that lead to delays, the literature is not very clear on the specific causes. From total 986,902 cases studied 14.43% of cases were delayed. The authors found that patients undergoing gastroenterology procedures (primarily endoscopy cases performed in an outpatient setting) were delayed most frequently at 22.8%. Patients with a higher acuity, as measured by the American Society of Anesthesiologists (ASA) classification, had a decreased odds (OR 0.88; 95% CI, 0.86-0.89) of being delayed versus patients with a lower ASA classification (27).

Another study done by (Deldar et al. & McIsaac et al.), revealed that Higher ASA status, which equates with more co morbidities, had a slightly lower odds ratio for delay versus healthier patients (OR, 0.88; 95% CI 0.86-0.89) which is surprising since most of the other studies found patient medical status, or decompensation, as a source of delay (29, 30).

Another study finding by Van As AB, Brey Z N. A. revealed that, of the 83 patients who had nephrectomies, 75 (86%) were performed laparoscopically, 1 case (1%) was performed robotically, and 4 cases (5%) were converted to open surgeries. Seven (8%) were performed with an open technique. No significant difference in delays was found among nephrectomies performed via laparotomy (4/7, 57%) or minimally invasively (35/76, 46%). For these procedures, p=0.701 (26).

The same study revealed that, regional anesthesia had a decreased odds for delay versus general anesthesia (OR, 0.47; 95% CI, 0.45-0.48). MAC cases had a noticeable increased odds for delay (OR, 3.79; 95% CI, 3.73-3.86.) This is especially interesting as gastroenterology procedures also had higher odds for delay and these cases are primarily performed under MAC. This study also showed that, renal failure has 1.17 odds (95% CI 1.05, 1.30) of being delayed. Insulin has 1.14

odds (95% CI 1.01, 1.29) of being delayed and steroid has 1.13 odds (95% CI 1.02, 1.25) of being delayed. Obesity is associated with a 1.42 odds (95% CI 1.23, 1.64) of being on-time or early (26).

In contrast of the above studies, the study by Kimeu J. on Factors Influencing Delays of Elective Surgical Cases in Private Health Facilities in Kenya, showed that out of four factors studied, staff, patient, equipment and management factors; patient factors (X1: $\beta 1 = .216$, $P > .818$) did not have any influence on delays of elective surgical cases in private health facilities in Kenya (31).

2.2.2. Health care provider related factors

Literatures revealed that different factors were related with delay of first case surgeries. Among these factors health care providers such as Surgeon, Nurse, Anesthesia, supportive staff, cleaner, team work, communication punctuality, incomplete evaluation and documentation are the major one.

Study conducted by Robert P. et al., revealed that, 150 (57%) of the 262 first cases were delayed. The reasons for delay showed that, from a provider standpoint the surgeon accounted for 30% of the delays, anesthesiologist 17%, and nursing 10%. The odds ratio of being surgeon was about 6 folds 5.59 (95% CI 2.30-9.93) in those surgical cases with a delay than being nurses (32).

Deldar et al studied that 36.8% of the delays were attributed to surgeon readiness and 6.8% to anesthesia readiness. Availability of the provider as well as factors such as extra time needed for an epidural (attributed to “anesthesia”) or lack of consent (attributed to the “surgeon”). Among delays, earlier surgery (within 24, 48 or 72 hours) was correlated with a significant mortality risk reduction (relative risk (RR) 0.81, 95%CI 0.68-0.96) (29).

Retrospective review by McIsaac et al showed that availability of either the surgeon or anesthesia provider is one of the frequent causes of delay in research studies to date. Subsets of 1109 cases were reviewed for the cause of delay. The largest source of delays was attributed to availability of personnel (31.7%), with the surgeon being overwhelmingly the most common cause of delay over other surgical healthcare providers (30).

Another study conducted by Kimeu J. Factors Influencing Delays of Elective Surgical Cases in Private Health Facilities in Kenya, showed that out of four factors studied; patient, staff, equipment and management factors; staff factors (X2: β 2 =.481, P<.008) had a significant influence on the delays of elective surgical cases in private health facilities in Kenya (31).

2.2.3. Organizational related factors

Different studies showed that different factors were related with delay of first case surgeries. Among these factors Lack of supply, man power, ICU, bill payment process, blood, investigation result, sterilization machine, improper planning were few of them.

The study done by Van W. et al. showed that, of all delayed procedures, 31.8% were delayed due to no post-operative bed being available, 23% absence/occupied ICU bed. This may be attributed to a breakdown in communication or process in the pre-hospital/scheduling phase of the patient journey (33). The odds of being delayed due to absence of ICU bed has 1.12 (95% CI 1.03, 1.26) of being delayed.

The finding of study by Garonzik W. et al. also revealed that, 56% of patients were specifically missing informed consents, 11% were with late investigation and 29% were absence of blood cross-mach, which caused a delay in 14% of surgical cases(34). The odds of being delayed due to missing informed consents 3.13 odds (95% CI 2.02, 7.25) of being delayed.

Another study at Maiduguri Teaching Hospital shows that various factors are associated with delay in starting surgery in the hospital. Shortage of man power 33%, waiting for instrument and gown from the central supply sterilization department (CSSD) 27%, lack of functional air-conditioning system in some of the operating suites 7%, staff attitude to work and process of paying the operation bill 23% were among the major factors identified (35). The odds of being delayed due to waiting for instrument and gown from the central supply sterilization department (CSSD) have 2.13 odds (95% CI 2.02, 7.25) of being delayed.

In contrast of the above studies, the finding of the study by Kimeu J. on Factors Influencing Delays of Elective Surgical Cases in Private Health Facilities in Kenya, showed that out of four factors studied, staff and management factors equipment/Organizational/ factors (X3: β3 =.432, P > .055) did not have any influence on delays of elective surgical cases in private health facilities in Kenya (31).

2.3. Summary of review

Delay is defined as considerable wait time for staffs, patients, and waste of resources. Delays can occur during each stage of the perioperative pathway and can be the result of patient and/or hospital related reasons. Delays contribute to poor utilization by resulting in late starts, prolonged changeovers, late finishes, bottlenecks in patient flow and day of surgery cancellations. Factors associated with surgical delay includes patient related, health care provider related and organizational related. A great few of research has been conducted to assess factors influencing delay of surgical case of start time, but there is no research on the same topic in the Ethiopian setting. Therefore the purpose of this study is to assess delay of first case surgery cases and associated factors at Tikur Anbessa Specialized Hospital, Ethiopia.

2.4. Conceptual Framework

Existing literature shows that delay of first case surgery start time of elective surgeries is affected by several factors including socio-demographic characteristic of the patient, health care provider (waiting for the nurses, surgeons and the anesthetists to arrive in to the theatre, staff attitude to work, communication gap between health professionals, prolonged time for anesthesia preparation) and organizational factors such as lack of supply, man power, ICU bed, bill payment process, improper planning of operation theater (19, 26,29,36) .

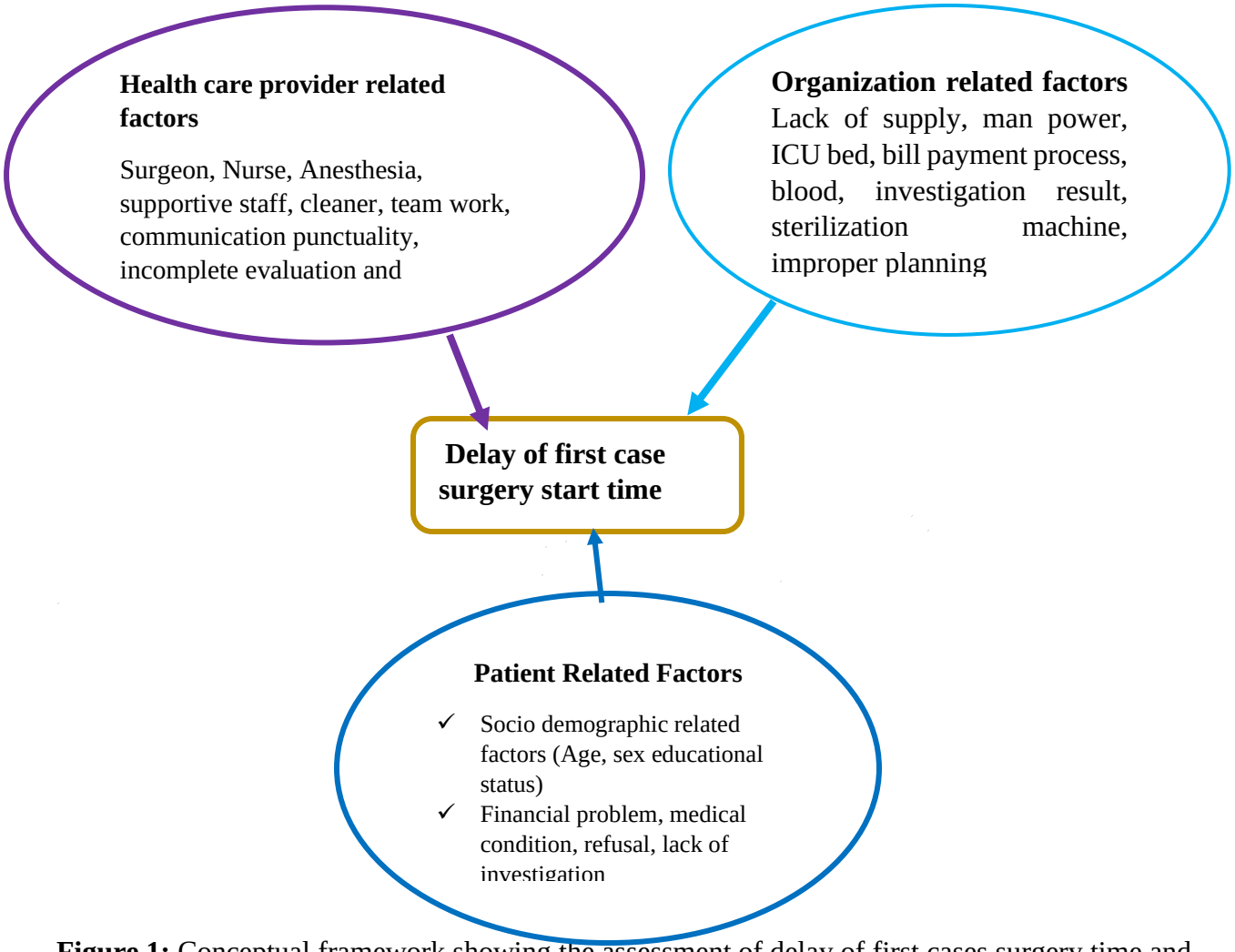

Figure 1: Conceptual framework showing the assessment of delay of first cases surgery time and at TASH, Addis Ababa, Ethiopia, 2021 Adapted and modified from Baragaba Amani & Alsharqi (37)

3. OBJECTIVES

3.1. General Objective

- ✓ To assess delay of first case surgery start time among elective surgeries and its associated factors at Tikur Anbessa Specialized Hospital, Addis Ababa Ethiopia, 2021.

3.2. Specific objectives

- ✓ To determine the magnitude of delay of first case surgery start time among elective surgeries in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2021
- ✓ To assess factors associated with first case surgery start time delay in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2021.

4. METHODS AND MATERIALS

4.1. Study area and setting

The study was conducted at Tikur Anbessa specialized Hospital (TASH). Tikur Anbessa specialized Hospital (TASH) is located in Addis Ababa, capital city of Ethiopia with 10 sub cities and 116 woreda administrations at the bottom. It is located between 8055' and 9005' North Latitude and between 38040' and 38050' East Longitude. TASH is under college of health science and all schools are affiliated with it. It is the training center for many health professionals. It is also an institution where specialized clinical services are given. TASH is a very large 700 bedded referral hospital and sees approximately 370,000-400,000 patients a year but the exact number is not known(38).

The hospital has, one main theatre which has 9 operation rooms', used for general surgery, ENT, gynecology, pediatrics, cardiothoracic, neurosurgery, one table for each of above specialties and two tables for urology and one table only for emergency surgery .In another floor of same building there is one theatre for obstetrics near the labor ward and this operates both emergency and elective obstetric surgeries and in separate building orthopedics has 4 operation room's 3 for elective(currently one is not functional)and one for emergency (39).

The mandates of the hospital like any other tertiary health institution include training of health personnel, provision of health services and research. The main theatre of the hospital has also one Post Anesthesia Care Unit (PACU) which has six beds. There are various specialist surgeons, perioperative nurses, and anesthetists who provide services and train personnel(29).

The study was conducted at TASH from 5 Feb, 2021 to 15 March, 2021.

4.2. Study design

Hospital based cross-sectional study design was conducted in all operation rooms in Tikur Anbessa Specialized Hospital.

4.3. Populations

4.3.1. Source population

Source population was all surgical patients who were admitted and waiting for surgery according to the schedule in Tikur Anbesa specialized hospital.

4.3.2. Study population

All first cases scheduled surgeries done on the day of surgery at all three theaters (major theater, orthopedic, ENT and A6 Theater (Obstetric)) during the time of study period.

4.4. Eligibility criteria

4.4.1. Inclusion Criteria

All elective surgical procedures in the departments of major theater, orthopedic and A6 Theater were included in the analysis

4.4.2. Exclusion Criteria

Cases that occurred on weekends or evenings were excluded.

4.5. Sample Size and sampling Techniques

4.5.1. Sample Size Determination

The sample size was calculated by using single population proportion formula. Taking p-value 50% because the prevalence of delay of cases is not known at study area to get the maximum sample size, using the following formula, Z = 95% Confidence level, P=50%, d = 5% marginal error. Thus, required sample size was calculated as;

$$\mathbf{n = \frac{(Z\ \alpha/2)^2\ P\ (1-P)}{d^2}}$$

Where, Z = 95% Confidence interval: Z1-α/2 =1.96, P =0.5, d =0.05

$$\mathbf{n = \frac{(1.96)^2\ 0.5(1-0.5)}{(0.05)^2} = 384}$$

Since the total population < 10,000 which is **565,** number of cases performed per a month, the investigator used population correction formula.

So Nf can be calculated as follows: $Nf = \frac{no}{1+no/N}$; where Nf=final sample size, no=calculated sample size, N=total population under study. Hence, $Nf = \frac{384}{1+384/565} =$ **229**

By considering 10% non-responders the final sample size was = **252**

4.5.2. Sampling Techniques

From the respective surgical specialties of Tikur Anbesa Specialized Hospital (TASH) namely Major OR, Orthopedic, and A6 theatre (Obstetric OT), all first cases of elective surgical patients were selected from list of daily schedules as a sample frame taken purposively.

4.6. Study variables

4.6.1. Dependent variables

- ✓ Delay of first case surgery start time

4.6.2. Independent variables

- ✓ **Patient factors:** Socio-demographic factors of patient (age of patient, sex of patient & level of education), financial problem, medical condition, refusal, lack of investigation result
- ✓ **Hospital Factors:** Lack of supply**,** lack of manpower**,** lack of ICU bed**,** bill payment process**,** lack of blood**,** improper planning**,** non functional sterilization machine
- ✓ **Health care provider factors:** Anesthesiologists/anesthetists related**,** perioperative nurse related**,** surgeon related**,** lack of trained supportive staffs**,** lack team work**,** communication gap **&** incomplete evaluation and documentation

4.7. Operational definition

- ➢ **Surgical delay**: Surgical delay defined as being in the room 1 minute or more after the scheduled time (36). According to BLH any case that started after 8:31 am counted as a delay.
- ➢ **Operation theater start time**: The time the first case was shifted inside the OT. Recommended start time for the operations is supposed to be 8.30 am (28)
- ➢ **First case surgery**: Using hospitals departmental protocol that “knife on skin” for the first elective case should be 8.30am.
- ➢ **Induction to incision time**: The time when anesthesiologist attaches the first monitor to the patient to the time when the patient is handed over to the surgeons for scrubbing.
- ➢ **Elective surgery**: Represents patients for whom the surgery can be well planned in advance.

4.8. Data collection procedure

Four Data collectors (BSC nurses), and one MSc nurses for supervision activities who were not employees of the study hospitals were selected to reduce bias. The English language questionnaire was translated to Amharic, and then translated back to English by language experts who are fluent in both language to maintain the consistency of the questionnaires.

Both data collectors and supervisors were fortunately previous experienced of data collectors. The training was given for data collectors and supervisor for one day on method of extracting the needed information, how to fill the information on a structured questionnaire and the ethical aspect in approaching the participants as well as the aim of the study and contents of the instruments. Therefore, the data collectors were become familiar about each question. They had approached the participants in a polite and respectful manner. The supervisor had monitored the data collection process of the data collectors and if any problem happens, they had tried to solve or contact the principal investigator.

4.9. Data collection tools

Data was collected by reviewing daily posted schedules by using observation checklist adapted and modified from Nigerian Journal of Surgery , International Journal of Life Sciences and Nuhu lawn Adamu (28,35,40). The questionnaire used to collect information on the demographic data, patient's arrival time to theater, surgery start time and questions related to factors associated with delay of first case starting time delay of elective surgeries when applicable. 5% of the tools were pretested in Zewditu Memorial Hospital and necessary adjustments done five days before the actual data collection data which is not added to analysis process.

Section 1: Socio-demographic characteristics of respondents contain 03 questions.

Section 2: Patient related factors 05.

Section 3: Hospital/management related factor 10.

Section 4: Provider related factors 12 questions.

4.10. Data quality control

To assure the data quality, the questionnaires were pre-tested, followed by modification. Each questionnaire had been checked for completeness, missed values and unlikely responses; those incomplete questionnaires were omitted from the analysis. Principal investigators and supervisor had made spot-checking and reviewing the complete questionnaires by the data collectors ensures completeness and consistency of the information that were collected; before the actual data

possessing entry of 5% of the data to EPI data software package was made to maintain the data quality.

4.11. Data processing and analysis

The collected data were checked usually for its completeness and the response were coded and entered in into the computer using Epi data version 3.1 statistical package and the 10% of the response were randomly selected and checked for the consistency of data entry.

Then data has been exported to windows of Statistical Package for Social Science (SPSS) version 25.0 for data analysis. During the process of analysis, descriptive statistics was used to provide an overall and coherent presentation and description of the data.

Binary logistic regression was done using bivariate analysis technique to see the crude significant relation of each independent variable with dependent variables. Variables with 95% confidence interval and P value at <0.05 during the bivariable analysis was entered to multivariable logistic regression analysis to see the relative effect of confounding variables and interaction of variables. Odd ratio with 95% CI was performed on variables to determine the strength of association of variables. P-value less than or equal to 0.05 was taken as cut of value to be significant.

4.12. Ethical consideration

Initially ethical clearance for the study was obtained from institutional ethical review board of College of Health Sciences School of Nursing and Midwifery, Addis Ababa University. Official permission letter was obtained from Addis Ababa University, Black Lion Specialized Hospital.

Before the beginning of data collection permission letter was provided to the hospitals administrative body for data collection. Participation was voluntary and information was collected anonymously after obtaining oral informed consent from each respondent by assuring confidentiality throughout data collection period. Participants also were told the objective of the study and their right to refuse to answer the questionnaires and were given the right to stop or withdraw at any time of data collection. Confidentiality was maintained by omitting their name and personal identification.

4.13. Dissemination of the results

The study will be submitted to College of Health Sciences, School of Nursing and Midwifery, Addis Ababa University, Black Lion Specialized Hospital. The documents will be disseminated to all responsible bodies. Furthermore, the manuscript will be submitted to national or international peer review journals for possible publication. Hard and soft copies will be made available in the library of AAU, for graduate students as well as for other researchers and reader.

5. RESULTS

5.1. Socio-demographic factors

From total patients operated 252 were operated on the first list, four questionnaires had been rejected due to incompleteness and 248 questionnaires were analyzed giving response rate of 99.41%. From total 248 study participants 129(52.00%) were females, 50(20.20%) were age less than 14 years with mean age of 34.6 and SD ±19.38 years and the age range was between 0.08 to 96.0 years. About 45(18.10%) were university graduate as shown in table 1 below.

Table 1: Socio demographic characteristics of patients on the first list of the day at TASH operation to assess delay of elective surgery and associated factors, Addis Ababa Ethiopia, 2021 (n=248)

S.N	Characteristics	Frequency	Percentage
1	**Age**		
	<14	50	20.20
	≥14	198	79.80
2	**Sex**		
	Male	129	52.00
	Female	119	48.00
3	**Level of Education**		
	Illiterate	96	38.70
	primary school	70	28.20
	secondary school	45	18.10
	university graduated	37	14.90

5.2. Over all prevalence of first cases delayed

The overall prevalence of first cases surgery delayed on the first list of the day at TASH during study period out of total surgery performed, 227(91.50%) cases were delayed as shown on figure 1 below.

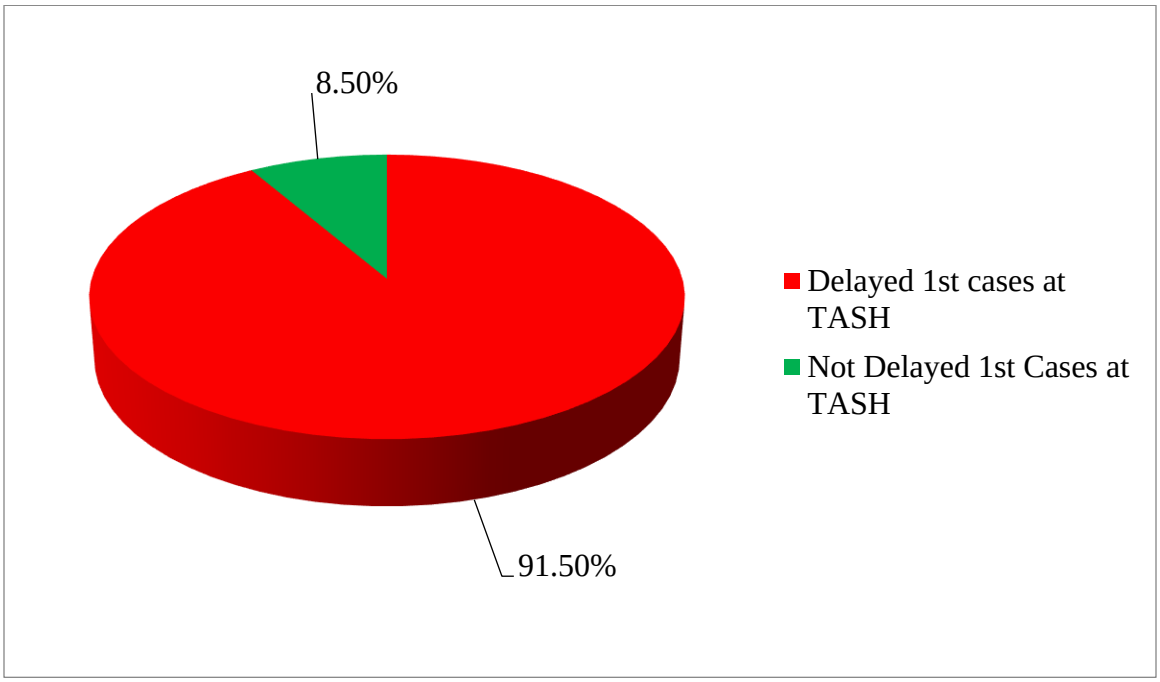

Figure 2: Over all delayed of surgical cases of patients on the first list of the day at TASH operation during assessment of delay of elective surgery and associated factors, Addis Ababa Ethiopia, 2021 (n=248)

From the total study participants, the distribution of cases delayed was analyzed and 20(8.06%) cases delayed was due to patient related factors, 80(32.26%) were Hospital management related factors and 127(51.20%) cases were due to health care providers related factors (as shown figure 2 below).

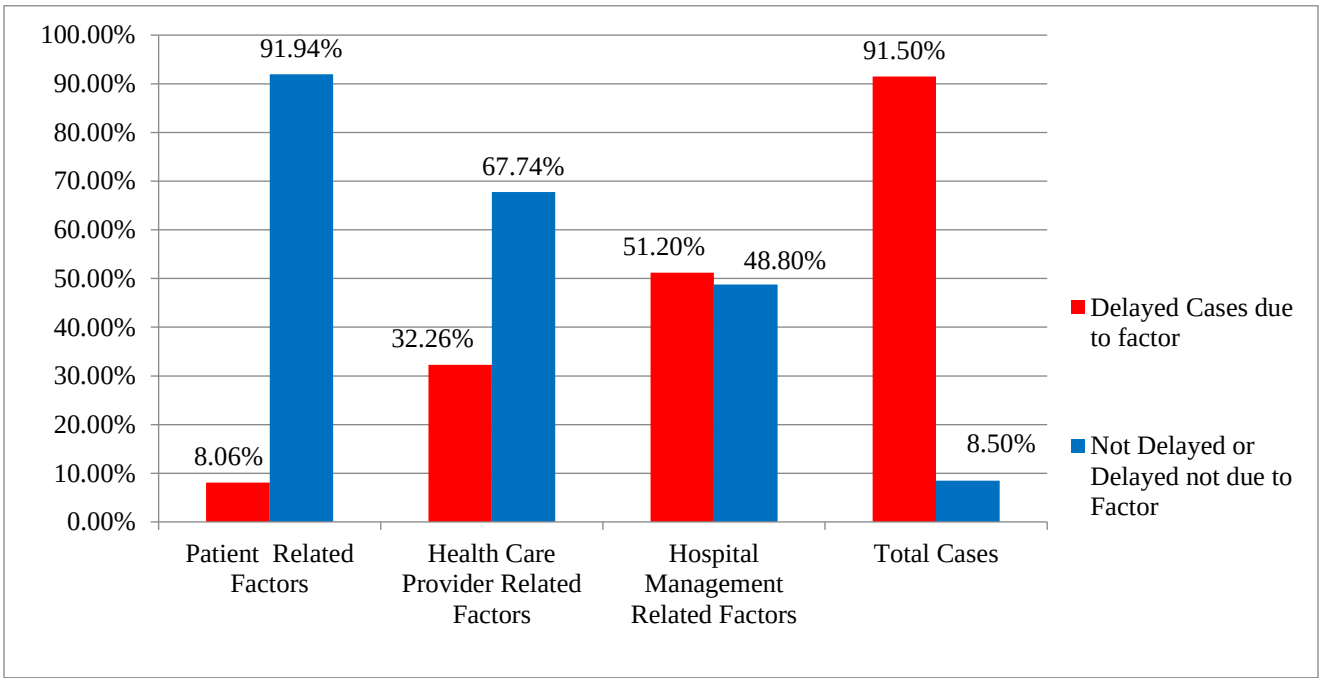

Figure 3: Percentage distribution of delayed of surgical cases of patients on the first list of the day at TASH operation due to patient, health care provider and hospital management factors during assessment of delay of elective surgery and associated factors, Addis Ababa Ethiopia, 2021 (n=248)

5.3. Factors associated with delay of elective surgery 1st Cases start time

5.3.1. Prevalence of surgical delay due to patient related reasons

Out of total patients undergoing first case elective surgeries 20(8.06%) were delayed due to patient related factors. From delayed cases, 9(3.20%) of them were due to lack of investigations and 1(0.40%) was because of financial shortage as shown in Table 2 below.

Table 2: Prevalence of delay of surgical cases of patients on the first list of the day at TASH operation due to patient related factors to assess delay of elective surgery and associated factors, Addis Ababa Ethiopia, 2021 (n=248)

S.N	Factors	Delayed	Not delayed Due to Pt factor	Total Cases
1	Acute medical illness	5(2.00%)	45(18.15%)	50(20.15%)
2	Lack of important investigations	9(3.60%)	40(16.13%)	49(19.73%)
3	Refusal	3(1.20%)	56(22.58%)	58(23.78%)
4	Financial shortage	1(0.40%)	39(15.73%)	40(1613%)
5	Others	2(0.80%)	48(19.35%)	50(20.15%)

5.3.2. Prevalence of delay due to Health care providers

Of total 248 respondents underwent surgical procedures, 127(51.20%) were delayed due to health care providers. Out of delayed elective surgeries nearly one forth, 60(24.20%) were due to Anesthetist/Anesthesiologist take longer time to prepare patient for surgeries as shown in Table 3 below.

Table 3: Prevalence of delay of surgical cases of patients on the first list of the day at TASH operation due to health care providers factors to assess delay of elective surgery and associated factors, Addis Ababa Ethiopia, 2021 (n=248)

S.N	Factors	Delayed Cases	Not delayed Due to Provider	Total Cases
1	Anesthetist take long time to prepare	60(24.20%)	23(9.27%)	83(33.47%)
2	Communication gap between healthcare providers	7(2.80%)	44(17.74%)	51(20.56%)
3	Lack of team work	13(5.20%)	12(4.84%)	15(10.04%)
4	Lack of punctuality among anesthesiologist staff member	13(5.20%)	9(3.63%)	21(8.83%)
5	Lack of punctuality among OR nurse	2(0.80%)	8(3.23%)	19(7.70%)
6	Lack of punctuality among surgeons	7(2.80%	12(4.84%)	10(4.08%)
7	Perioperative nurse took long time to prepare surgical equipments	5(2.02%)	19(7.70%)	24(9.92%)
8	Others	6(2.40%)	8(3.23)	14(5.63%)

5.3.3. Prevalence of delays of first case due to hospital management factors

Of total 248 participants, 80(32.26%) cases were delayed due to hospital management related factors. From those delayed, 20(8.06%) cases were delayed due to occupied ICU bed and 4(6.85%) were due to delayed patient investigation as shown in table 4 below.

Table 4: Prevalence of delay of surgical cases of patients on the first list of the day at TASH operation due to hospital management factors to assess delay of elective surgery and associated factors, Addis Ababa Ethiopia, 2021 (n=248)

S.N	Characteristics	Delayed Cases	Not Delayed Cases Due to Hospital mgt	Total
1	Inadequate Theater supply	35(12.50%)	36(14.52%)	71(28.63%)
2	Improper planning of Theater	9(7.27%)	21(4.83%)	30(12.10%)
3	Delayed patients investigation result including Covid-19	4(6.85%)	29(6.46%)	33(13.31%)
4	lack of ICU bed	11(8.06%)	22(5.25%)	33(13.31%)
5	Dysfunctions of sterilization machine	7(8.06%)	32(7.66%)	39(15.72%)
6	Absence of blood for transfusion	13(5.64%)	15(5.64%)	28(11.28%)
7	Others	1(2.82%)	13(2.82%)	14(5.64%)

5.4. Bivariate and multinomial logistic analysis to evaluate association

5.4.1. Association of patient factors with delay of 1st case surgery

Table 5: Association of patient factors with delay of 1st case surgery at TASH Addis Ababa, Ethiopia, 2021(n =248)

Variables	Delayed	Not Delayed	COR(95%CI)	P-value	AOR(95%CI)	P -value
Age						
<14	45	5	1.00		1.00	
≥14	182	16	2.51(1.20, 1.31)	0.001	3.51(1.78, 14.80)	0.004*
Other Factors						
Others	2	48	1.00		1.00	
Acute medical illness	5	45	2.82(0.30, 28.49)	0.74	0.36(0.05, 3.22)	0.56
Lack of investigations	9	40	6.23(1.78, 49.80)	0.007*	7.17(3.02, 29.38)	0.005*
Refusal	3	56	2.57(1.47, 7.84)	0.03*	2.42(1.05, 9.45)	0.02*
Financial shortage	1	39	1.56(0.50, 4.85)	0.84	0.28(0.18, 2.88)	0.28

***Adjusted for all significant variables p <0.05**

In order to identify factors associated with delay of elective surgery of first case, bivariate logistic regression with enter method was used with 95% CI and p value < 5%, and all variables regardless of their significance entered to multiple-logistic regression and among patient factors, patients age, lack of patients investigation availability on time and refusal of patients were identified as the independent predictor of delay of first surgery of elective cases at TASH.

The odds of ≥14 aged patients had 3.51 times [AOR=3.51) CI95% (1.78, 14.80)] more of being delayed compared to people aged <14, demonstrating that younger patients had a much higher risk of delay than adults. The odds of lack of patient's investigation availability on time had about **7**-fold **[(**AOR=7.17) CI95% (3.02, 29.38)] more of being delayed compared to other patient related factors. The odds of patient's refusal to surgery had 2.42 times [(AOR=2.42) 95%CI (1.05, 9.45)] more of being delayed compared to other patient related factors.

5.4.2. Association of Health care providers factors with delay of 1st case surgery

Table 6: Association of Health care providers factors with delay of 1st case surgery at TASH Addis Ababa, Ethiopia, 2021(n =248)

Variables	Delayed	Not Delayed	COR(95%CI)	P-value	AOR(95%CI)	P -value
Others	6	8	1.00		1.00	
Anesthesiologist punctuality reason	13	9	1.22(1.30, 28.49)	0.99	1.47(1.01, 2.12)	0.81
Anesthetist long time to prepare	60	23	13.31(6.32, 22.3)	0.005*	8.21(1.98, 28.80)	0.001*
OR nurse punctuality reason	2	8	2.82(0.30, 28.49)	0.74	0.36(0.05, 3.22)	0.56
OR nurse long time to prepare	5	19	8.23(0.82, 39.10)	0.87	6.19(1.04, 2.49)	0.09
Surgeons punctuality reason	7	12	3.97(1.81, 11.81)	0.03*	9.22(1.05, 16.45)	0.01*
Lack of team work	13	12	5.56(1.20, 4.85)	1.1	5.28(2.18, 4.88)	0.8
Communication gap b/n providers	7	44	3.52(0.30, 8.49)	0.74	0.36(0.05, 3.22)	1.2

***Adjusted for all significant variables p <0.05**

In order to identify factors associated with delay of elective surgery of first case, bivariate logistic regression with enter method was used with 95% CI and p value < 5%, and all variables regardless of their significance entered to multiple-logistic regression and among health care provider factors, Long time needed to Anesthesia team to prepare patient for surgery and punctuality of surgeons on time were identified as the independent predictor of delay of first surgery of elective cases at TASH. The odds of long time needed to Anesthesia team for preparation was about 8 times [(AOR= 8.21; 95% CI (1.98, 28.80)] of being delayed compared to others health care provider related factors. The odds of punctuality of surgeons on time had about had 9.22 times [(AOR=9.22) 95%CI (1.05, 16.45)] more of being delayed compared to other others health care provider related factors.

5.4.3. Association of Hospital management factors with delay of 1st case surgery

Table 7: Association of Hospital management factors with delay of 1st case surgery at TASH Addis Ababa, Ethiopia, 2021(n =248)

Variables	Delayed	Not Delayed	COR(95%CI)	P-value	AOR(95%CI)	P -value
Others	1	13	1.00		1.00	
Inadequate OT supply	35	36	2.92(0.80, 8.09)	0.98	0.45(0.08, 1.12)	0.72
Improper planning	9	21	3.11(1.22, 2.31)	0.08	2.21(2.88, 5.70)	0.14
Delayed investigation result	4	29	1.00		1.00	
lack of ICU bed	11	22	8.23(2.82, 39.10)	0.003*	6.19(4.04, 25.49)	0.002*
Dysfunction sterilization machine	7	32	2.77(1.91, 8.81)	0.012*	3.22(1.05, 6.45)	0.01*
Absence of blood for transfusion	13	15	1.56(1.20, 4.85)	0.04*	5.28(2.18, 9.88)	0.008*

***Adjusted for all significant variables p <0.05**

In order to identify factors associated with delay of elective surgery of first case, bivariate logistic regression with enter method was used with 95% CI and p value < 5%, and all variables regardless of their significance entered to multiple-logistic regression and hospital management factors, Lack of ICU bed, problems with CSSD and absence of blood for transfusion were identified as the independent predictor of delay of first surgery of elective cases at TASH.

The odds of Lack of ICU bed was about 6 times [(AOR=6.19) 95%CI (4.04, 25.49)] of being factor for delay compared to others hospital management related factors. The odds of problems with CSSD had 3.22 times [(AOR=3.22) 95%CI (1.05, 6.45)] more of being factor for delay compared to other others hospital management related factors. The odds of absence of blood for transfusion was about **5** times [(AOR=5.28) 95%CI (2.18, 9.88)] more of being factor for delay than other others hospital management related factors.

6. DISCUSSION

This investigation determined the extent of first cases delay and associated factors among elective surgeries daily performed at TASH. In this study the overall prevalence of first cases surgery delayed on the first list of the day at TASH during study period out of total 248 surgeries performed were 227(91.50%). From the total study participants, the distribution of cases delayed was analyzed and 20(8.06%) cases delayed was due to patient related factors, 80(32.26%) were due to hospital management and 127(51.20%) cases were due to health care provider related factors

The result of this study was higher than the study conducted by Kumar M. et al. in a tertiary care hospital of India, study by kumar and Gandh in multidisciplinary 500 bedded hospital of Japan and study conducted in one tertiary hospital in southern United States Of America found that a proportion of 67%, 62.5% and 61.5% respectively started late (10, 19, 21). The reason for this difference might be due to socio-economic variation of population of Ethiopia and That of India. Another possible reason for this might be on time availability surgeons and anesthetists.

In contrast of this the finding of this study was in line with the study conducted at in Queen Elizabeth Barbados hospital identified only four percent of surgeries started punctually while all 96% started late (18). The possible explanation of this reason might be difference in study design and time of study period.

On the multivariate analysis, patient factors such as patient's age, lack of patient's investigation availability on time and refusal of patients were identified as the independent predictor of delay of first surgery of elective cases from patient related factors. The odds of >14 aged patients had 3.51 times [(AOR=3.51) 95%CI (1.78, 14.80)] more of being delayed compared to people aged <14, demonstrating that younger patients had a much higher risk of delay than adults.

This result was similar with findings conducted by Lydia J., et al. in Elective Orthopedic and Ear Nose and Throat Surgeries at Moi Teaching and Referral Hospital, Eldoret, Kenya showed a significant relationship between age group and delay in first surgery start time. Adults aged 14 years and above had a higher mean of 99.2 minutes compared with children aged less than 14 years

with a mean of 63 minutes (t=2.5; df=33; P= 0.02) (28). The possible reason for this might be older patients take more time to prepare for surgery relative to their body size.

This result of this study was different from study by Gabriel et al. in England showed that pediatric patients had a 2.83 odds ratio (95% CI 2.75-2.91) of being delayed compared to people aged 19 to 49 (27). The Reason for this scenario might be younger patients had a much higher risk of delay than adults in developed.

The odds of lack of patients investigation availability on time had about **7** fold [(AOR=7.17) 95%CI (3.02, 29.38)] more of being delayed compared to other patient related factors. The odds of patients refusal to surgery had a 2.42 times [(AOR=2.42) 95%CI (1.05, 9.45)] more of being delayed compared to other patient related factors. The results of this study disagree with the study by Kimeu J. on Factors Influencing Delays of Elective Surgical Cases in Private Health Facilities in Kenya, showed that patient factors (X1: β1 =.216, P >.818) did not have any influence on delays of elective surgical cases in private health facilities in Kenya (31). The possible reason for this difference might be study design and method of analysis.

Bivariate and multiple logistic regression was used with 95% CI and p value < 5% to identify significant association of provider factors with delay of first case surgery, and among health care provider factors, long time needed to Anesthesia team to prepare patient for surgery and punctuality of surgeons on time were identified as the independent predictor of delay of first surgery of elective cases.

The odds of long time needed to Anesthesia team for preparation was about 8 times [(AOR=8.21) 95%CI (1.98, 28.80)] of being delayed compared to others health care provider related factors. The odds of punctuality of surgeons on time had about had 9.22 times [(AOR=9.22) 95%CI (1.05, 16.45)] more of being delayed compared to other others health care provider related factors.

This study finding is congruent with study conducted by Deldar et al in Turkey, Retrospective review by McIsaac et al in Arab states and study conducted by Robert P. et al., in England (29, 30, 32). The possible explanation of this reason might be availability of the provider as well as factors

such as extra time needed for an epidural (attributed to "anesthesia") or lack of consent (attributed to the "surgeon") had significant association with delay of first case surgery.

In order to identify factors associated with delay of elective surgery of first case, bivariate logistic regression with enter method was used with 95% CI and p value < 5%, and all variables regardless of their significance entered to multiple-logistic regression and hospital management factors, Lack of ICU bed, problems with CSSD and absence of blood for transfusion were identified as the independent predictor of delay of first surgery of elective cases.

The odds of Lack of ICU bed was about 6 times [(AOR=6.19) 95%CI (4.04, 25.49)] of being factor for delay compared to others hospital management related factors. The result of this study is similar with the study done by Van W. et al. with which the odds of being delayed of first cases due to absence of ICU bed has 1.12 (95% CI 1.03, 1.26) of being delayed (33). This may be attributed to a breakdown in communication or process in the pre-hospital/scheduling phase of the patient journey.

In this study finding the odds of problems with CSSD had 3.22 times [(AOR=3.22) 95%CI (1.05, 6.45)] more of being factor for delay compared to other others hospital management related factors. The result of this study is similar with the study finding done at Maiduguri Teaching Hospital by that various factors are associated with delay in starting surgery such as shortage of man power 33%, waiting for instrument and gown from the central supply sterilization department (CSSD) 27%, lack of functional air conditioning system in some of the operating suites 7% and the odds of being delayed due to waiting for instrument and gown from the central supply sterilization department (CSSD) have 2.13 odds (95% CI 2.02, 7.25) of being delayed (35). The possible reason for scenario might be unplanned hospital management predisposes for delay of supplies for surgery which has a negative effect on patient out come

In this study finding the odds of absence of blood for transfusion was about 5 times [(AOR=5.28) 95%CI (2.18, 9.88)] more of being factor for delay than other others hospital management related factors.

The finding of this study is in line with the finding of study by Garonzik W. et al. by which 29% were absence of blood cross-mach, which caused a delay in 14% of surgical cases and The odds of being delayed due to absence of blood cross-mach 3.13 odds (95% CI 2.02, 7.25) of being delayed (34).

In contrast of the above studies, the results of this study disagree with the finding of the study by Kimeu J. on Factors Influencing Delays of Elective Surgical Cases in Private Health Facilities in Kenya, showed that out of four factors studied, staff and management factors equipment/Organizational/ factors (X3: $\beta 3 = .432$, $P > .055$) did not have any influence on delays of elective surgical cases in private health facilities in Kenya (31). The possible explanation for this difference might be difference in study design.

STRENGTH AND LIMITATION OF THE STUDY

Strength of the study

- ✓ The findings of this study provide valuable information for improving the quality of programs to work on method of reducing delay of first case which in turn reduces delay of consecutive cases and avoids or reduces cancelation of surgeries. This is possible by enabling the hospital management in proper planning and equipping theatre in all supplies and heath providers in the identification of knowledge gaps and proper follow up and facilitation of health care insurance for all patients.
- ✓ The other strength of this study was the use of observation check list to follow all procedure in case of delay of surgeries. Therefore, it minimizes the risk that health care providers and hospital management report what was expected of them but their actual practices may be different.

Limitation of the study

- ✓ The study was carried out in only one hospital which has similar management structures, staff and patient populations. For this reason, the findings may be limited to the one hospital and similar public facilities and other private facilities and may not entirely be generalizable to the other public and private hospitals. Hence, there is need for a similar study focusing on private healthcare institutions
- ✓ Purposively selecting first cases from daily surgery will highly reduce generalization of the result.
- ✓ Lack of universality of delay definition as a cut point surgical cases.
- ✓ Another limitation of this study was that it is a cross-sectional design, which is difficult to determine which come first i.e., chicken and egg dilemma. There is might be temporal relation relationship between dependent and independent variables.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

About one forth 21(8.5%) of cases of first cases surgery were performed on scheduled time without delay while the rest ninety percent cases were delayed on the first list of the day at TASH during study period out of total surgery performed. The finding alerts stake holders to do something in changing the condition.

Findings of this study revealed of cases of first cases surgery has nothing to do with the sex and medical condition of the patient. However, there is a clear association between patient's age, lack of patient's investigation availability on time and refusal of patients and extent delay of first case surgery. This is a clear indication that patient's age, lack of patient's investigation availability on time and refusal of patients has a direct effect on the extent of delay of first case surgery and cancelation.

From health care providers factors, long time needed to Anesthesia team to prepare patient for surgery and punctuality of surgeons on time were identified as the independent predictor of delay of first surgery of elective cases and lack of ICU bed, problems with CSSD and absence of blood for transfusion were identified as the independent predictor of delay of first surgery of elective cases from hospital management factors.

Result shows that minimizing long time needed to Anesthesia team to prepare patient for surgery, being responsible and punctual of surgeons on time, avoidance of a breakdown in communication or process in the pre-hospital/scheduling phase of the patient journey and having good planning hospital management to prepare sufficient theatre will avoid delay of for surgery and minimize cancellation which has a negative effect on patient out come and theatre inefficiency.

Recommendation

To Health workers

- ✓ Health care providers should be responsible for and punctual, minimizing long time needed to Anesthesia team to prepare patient for surgery, smoothly communicating in case of breakdown of communication between teams and above all being working as one team to improve safe, complication free, and positive surgical outcome of our community.

To Hospital Management

- ✓ Hospital managements should avoid a breakdown in communication or process in the pre-hospital/scheduling phase of the patient journey to minimize patients and hospital unnecessary wastage and to improve safe, complication free, and positive surgical outcome of our community.

To Ministry of health and policy makers

- ✓ They should design mechanisms that can strength the existing services such as health care insurance to protect patients' deteriorations from health care impoverishment and to improve safe, complication free, and positive surgical outcome of our community.

To Researchers

- ✓ They should conduct research on the same topic and in addition the impact of cases delay in the same place and other centers within the country to identify the existing gap and report their finding and for implementation in to community service.

To Educators

- ✓ They should design curriculum to be included in educational courses for teaching and learning purposes about factors associated with surgical delays and its impact which intern design mechanism to reduce delays.

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ANNEXES

Annex 1. Information sheet: -

Introduction: -

Good Morning/Afternoon. My name is _____. I am a trained data collector. This questionnaire is prepared to be filled out by data collectors as designated by the student researcher to gather data for theses research project required in partial fulfilment of MSC in Peri-operative Nursing in Addis Ababa University, College of health Sciences, School of nursing and midwifery. This research is titled "First case surgical delay of elective surgery and its associated factors in Tikur Anbesa Specialized Teaching Hospital."

Purpose of the study: -

This study aims at assessing factors contributing to first case surgical delays with particular emphasis on elective surgeries in Tikur Anbesa Specialized Teaching Hospital.

Confidentiality: -

All data collected during the research process will be handled with utmost confidentiality and safety in a manner only the researcher and most relevant persons linked to this research will have responsible access.

Autonomy: -

Your autonomy as a respondant to the questions will be respected, and granted with the right to leave any question unanswered or withdraw from responding for any reason you may not need to mention. But the information that would be taken will be useful for the study since the purpose of this interview is to assess first case surgical delay of elective surgery and its associated factors. The study output will help to identify the gaps in TASH pertaining to the subject of the study. The interview will start when you express your willingness and participation is totally voluntary.

Benefit: -

Participation as a respondent in this research process shall not bring you any kind of direct or immediate benefit in terms of money or any other. The information you provide will rather help the hospital and concerned bodies to improve hospital services which can also benefit you and your community**.**

Risk: -

There will not be any harm to you or your family because of your participation in the study as information you provide shall be handled with utmost confidentiality and safety; Your name and other personal identifiers will not be recorded on data collection form; and information you provide will not be used for another purpose than this study.

Address of PI: -

Name: Zenbaba Belete; **Cell Phone:** +251910486410

E-mail: adonaybelete@gmail.com

Annex 2. Consent form

I have read and understood the information provided to me. Therefore, my signature below indicates that I have decided to participate in the study voluntarily.

Participant's Name (Optional) _____

Participant 's Signature: _____ Date: _____

Investigator's/data collector's Signature: _____ Date: _____

If you have any questions you could contact the principal investigator at any time using the following address:

Name of the Principal Investigator (PI)…Zenbaba Belete

Mobile Phone number: ……+251910486410

E-mail …… adonaybelete@gmail.com

Thank you in advance for your cooperation

Annex 3. Questionnaire

Addis Ababa University College of health Sciences, School of nursing and midwifery

Questionnaire to be filled by data collector Socio demographic information of the patient

Time information about patient surgery process

S.no	Variables	Response focus breakdown
104	Department of operation area	
105	Patient arrival time at OR reception area	
106	Patient entrance time to OR	
107	Anesthesia induction time	
108	Incision time	
109	Is there first case surgical delay?	1.yes 2.No

If your answer to question number 109 is 'yes', please continue to answering the questions below.

A Questionnaire on factors affecting first case starting time delay

S.no	Variables	Response focus breakdown (circle most relevant reasons associated to surgical delay)
201	Patient related reasons for surgical delay	1. Uncontrolled /acute medical illnesses 2. Lack of important investigation 3. Refusal 4. Financial shortage 5.Specify if others……
202	Organizational related reasons for surgical delay	1. Inadequate theater supply 2. Improper planning of theater 3 Delayed patients' covid-19 test result 4. Lack of ICU bed 5. Dysfunctionality of sterilization machine 6. Absence of prepositioned blood for transfusion 7. Limited availability of trained supportive staffs 8. Shortage of manpower 9.. Long theater bill payment process 10. Other? Specify ……

S/N.	Variables	Response focus breakdown (circle most relevant reasons associated to surgical delay)
203	OR staff related reasons for surgical delay	1. Anesthetists take long time to prepare patient 2. Communication gap between health staff team 3. Deficiency in teamwork 4. Lack of punctuality among Anesthetist/ansthesiologist staffs 5.. Lack of punctuality among OR Nurses 6. Lack of punctuality among Surgeons 7. Perioperative nurse take long time to prepare the suit 8. Incomplete evaluation 9 . Incomplete documentation 10. Porter take long time to transfer the patient from ward to theater 11 Cleaner take long time to clean the theater 12 .Specify if others……

Name of data collector: ……

Signature … ……

Date……

አዲስ አበባ ዩኒቨርሲቲ የጤና ሳይንስ ኮሌጅ የነርሶችና ሚድዋይፈሪ ት/ቤት

የጥናት መጠይቅ

የጥናት መረጃ ይዘት

መግቢያ፡-

እንደምን አደሩ/ዋሉ ።እኔ ---------- እባላለሁ። በአዲስ አበባ ዩኒቨርሲቲ የጤና ሳይንስ ኮሌጅ የነርሶችና ሚድዋይፈሪ ት/ቤት የሁለተኛ ዲግሪያቸውን እየተማሩ የሚገኙት ዘንባባ በለጠ የመመረቂያ ጥናታዊ ጽሑፋቸውን ለማሟላት የሚያደርጉትን ጥናት አስመልክቶ መረጃ እየሰበሰቡ ይገኛሉ። በመሆኑም የመረጃ አሰባበሰብ ሂደቱን ለማገዝ ለእኔና ሌሎች መረጃ ስብሳቢዎች ተገቢውን ስልጠና ከሰጡን በኋላ መረጃ ለመሰብሰብ እዚህ ተገኝቻለሁ። የጥናታዊ ጽሑፉ ርዕስ በጥቅሉ ፡ ‹የመጀመሪያ ቀዶ ጥገና መዘግየትና ተያያዥ ምክንያቶች› የሚል ነው።

የጥናቱ ዓላማ፡-

ይህ ጥናት የየቀኑ የመጀመሪያ ቀዶ ጥገና አገልግሎቶች በታቀደላቸው ሠዓት መሰረት እንዳይጀመሩ የሚያደርጉ ምክንያቶችን በዝርዝር መለየትና በጥልቀት ለመገንዘብ ያለመ ነው።

የመረጃ ሚስጥራዊነትና ደህንነት፡-

በዚህ የጥናታዊ ጽሑፍ መረጃ የመሰብበሰብ ሂደት ውስጥ የተገኙ መረጃዎች በሙሉ በከፍተኛ ጥንቃቄና ሚሰጥራዊ በሆነ የሚያዙ ሲሆን ጥናት አድራጊውና ከጥናቱ ጋር በተገናኘ መረጃዎችን ማግኘት ግድ የሚለው ሰው ብቻ ኃላፊነት በተሞላበት ሁኔታ ሊጠቀሙባቸው የችላሉ።

የመረጃ ሰጭው መብትና ነፃነቶች፡-

እንደ መረጃ ሰጭ በዚህ ጥናት ያለመሳተፍ፣ የተወሰኑ ጥያቄዎችን ያለመመለስ መብትና ነፃነትዎ ያለምንም ቅድመ ሁኔታ የተጠበቀ ሲሆን ተሳትፎዎት ሙሉ በሙሉ በፈቃደኝነት ላይ የተመሰረተ ነው። ለመሳተፍ ከወሰኑ ግን እርስዎ የሚሰጡን መረጃ ከጥናቱ አጀንዳ አንፃር ሆስፒታሉ ያሉበትን ክፍተቶችና ችግሮች በጥልቀት በመለየትና በመገንዘብ መፍትሄዎችን ለማበጀት የሚደረገውን ጥረት ለማገዝ ከፍተኛ ዋጋ እንዳለው ልናረጋግጥልዎት እንወዳለን።

ጥቅም፡-

በዚህ ጥናት በመረጃ ሰጭነት ተሳታፊ በመሆንዎ ምንም ዓይነት የገንዘብም ሆነ ሌላ ጥቅም ወይም ክፍያ የማያገኙ ሲሆን የሚሰጡት መረጃ ግን ከጥናቱ አጀንዳ አኳያ ሆስፒታሉ ያሉበትን ችግሮችና ችግሮቹን ለመፍታት ኃላፊነት ያለባቸውን አካላት ጥረት የሚያግዝ በመሆኑ እርስዎንም ሆነ ማህበረሰብዎን ተጠቃሚ የሚያደርግ ይሆናል፡፡

ጉዳት/ስጋት፡ -

በዚህ የጥናት ሂደት ውስጥ በመረጃ ሰጭነት በመሳተፍዎ በርስዎም ሆነ በቤተሰብዎ ላይ ምንም ዓይነት ጉዳት ወይም ስጋት አይገጥምዎትም፡፡ ለዚህም ሲባል ስምዎትንና ሌሎች የርስዎን የግል ማንነት የሚገልፁ መረጃዎች በመረጃ መሰብሰቢያ ቅጹ ላይ በምንም ዓይነት መንገድ አይመዘገቡም፡፡ በተጨማሪም የሚሰጡት መረጃ በሙሉ ከዚህ ጥናት ውጭ ለሆኑ ሌሎች ዓላማዎች ጥቅም ላይ አይውልም፡፡

የጥናቱ ባለቤት አድራሻ፡-

ስም፡ ዘንባባ በለጠ **ስልክ፡** 0910486410

ኢሜይል፡ adonaybelete@gmail.com

የተሳትፎ ፈቃደኝነት መግለጫ ቅፅ

በመረጃ ሰብሳቢው/ዋ የቀረበልኝን መረጃ በሙሉ በሚገባ አንብቤ በቂ ግንዛቤ ወስጃለሁ። በመሆኑም በዚህ ጥናት በመረጃ ሰጭነት ለመሳተፍ ሙሉ በሙሉ በፈቃዴ ወስኛለሁ፣ ውሳኔየንም በሚከተለው መልኩ በፊርማየ አረጋግጫለሁ።

የመረጃ ሰጭ ስም፡ _____

ፊርማ፡ _____

ቀን፡ _____

የጥናቱ ባለቤት/መረጃ ሰብሳቢ ፊርማ፡_____

ቀን፡ _____

በጥናቱ ወቅትም ሆነ ከጥናቱ በኋላ ጥያቄዎች ቢኖሩዎት የጥናቱን ባለቤት በሚከተለው አድራሻ ማግኘት ይችላሉ።

ስም፡ ዘንባባ በለጠ **ስልክ፡** +251910486410 **ኢሜል፡** adonaybelete@gmail.com

ለትብብርዎ በቅድሚያ እናመሰግናለን።

በመረጃ ሰብሳቢ የሚሞላ የጥናት መጠይቅ ቅጽ፡-

የታካሚው ግለሰባዊና ማህበራዊ መረጃዎች

ተ.ቁ.	**ትኩረተ ጥያቄዎች መዘርዝር**	**ትኩረተ መልስ መዘርዝር** ***ቀጥሎ ለቀረቡ ጥያቄዎች በተሰጡ መልሶችን ባዶ ቦታዎች ላይ ይፃፉ***	**ምርመራ**
101	የታካሚው ፆታ	1. ወንድ 2. ሴት	
102	የታካሚው ዕድሜ	.....	
103	የትምህርት ሁኔታ	1. ያልተማረ 2. አንደኛ ደረጃ 3. ሁለተኛ ደረጃ 4. ዩኒቨርሲቲ ምሩቅ	

የታካሚው ቀዶ ጥገና ሂደት የሰአት መረጃ

ተ.ቁ.	ትኩረተ ጥያቄዎች መዘርዝር	ትኩረተ መልስ መዘርዝር	ምርመራ
104	ህክምናው የሚካሄድበት ክፍል	.....	
105	ታካሚው ወደ ቀዶ ጥገና የመስተንግዶ/ሪሴፕሽን ክፍል የደረሰበት ሠዓት	.....	
106	ታካሚው ወደ ቀዶ ጥገና ክፍል የገባበት ሠዓት	.....	
107	የሰመመን መድሃኒት መስጠት የተጀመረበት ሠዓት	.....	
108	ቀዶ ጥገናው የተጀመረበት ሠዓት		
109	በመጀመሪያው የቀዶ ጥገና የሠዓት መዘግየት ታይቷል?	1.አዎ 2. አልታየም	

ከላይ ለተጠቀሱ ጥያቄዎች መልስዎ አዎ ከሆነ ወደሚቀጥሉት ጥያቄዎች ይሂዱ። አልታየም ከሆነ ግን ቃለ መጠይቁን ስለጨረሱ እናመሰግናለን።

የታካሚው ቀዶ ጥገና ሂደት መረጃ

201	ለቀዶ ጥገናው መዘግየት ከታካሚው ጋር የተያያዙ ምክንያቶች	1.ቀዶ ጥገና ለማድረግ የማያስችል ከፍተኛ ህመም 2.ያልተሟሉ አስፈላጊ ምርመራዎች 3.ታካሚው ቀዶ ጥገናውን ለማድረግ ፈቃደኛ አለመሆን 4.የታካሚው ዝቅተኛ የገንዘብ አቅምና አስፈላጊ የህክምና ግብዓቶችን ማሟላት አለመቻል 5. ሌላ ምክንያት ካለ ይግለጹ .....
202	ተቋማዊ የመጀመሪያ ቀዶ ህክምና መዘግየት ምክንያቶች	1. ለቀዶ ህክምና ክፍል አስፈላጊ የሆኑ የህክምና ግብዓቶች 2. ለቀዶ ህክምናው በቂ ቅድመ ዝግጅት አለማድረግ 3. የታካሚው የኮሮና ቫይረስ የምርመራ ውጤት መዘግየት 4. የከፍተኛ ህክምና ክትትል ክፍል አልጋ እጥረት 5. የስቴሪላዜሽን ማሽን ብልሽት 6. በቀዶ ጥገና ሠዓት ጥቅም ላይ የሚውል የተዘጋጀ ደም አለመኖር 7. የሰለጠኑ የቴክኒካል ድጋፍ ሰጭ ባለሞያዎች እጥረት 8. የሰው ሃይል እጥረት 9. የተራዘመ የቀዶ ህክምና የክፍያ ሂደት 10. ሌላ ምክንያት ካለ ይጥቀሱ
203	ቀዶ ህክምና ክፍል ውስጥ ከሚሰሩ የጤና ባለሞያዎች ጋር የተያያዙ የመዘግየት ምክንያቶች	1. የሰመመን ሰጭ ባለሞያ ታካሚን ለማዘጋጀት የተራዘመ ጊዜ መፍጀት 2. በጤና ባለሞያዎች መካከል የሚፈጠሩ የተግባቦት ክፍተቶች 3. በጤና ባለሞያዎች መካከል የሚፈጠር አብሮ መስራት ያለመቻል ችግር 4. የሰመመን ሰጭ ባለሞያ በሠዓቱ አለመገኘት 5. የቀዶ ህክምና ክፍል ነርሶች በሠዓቱ አለመገኘት 6. የቀዶ ህክምና ሀኪም በሠዓቱ አለመገኘት 7. የቀዶ ህክምና ክፍል ነርሶች ታካሚን ለማዘጋጀት የተራዘመ ጊዜ መፍጀት 8. ያልተሟሉ ምርመራዎች 9.የልተሟላ የታካሚ መረጃ 10. የህሙማን ደጋፊ ሰራተኞች ታካሚውን ወደ ቀዶ ህክምና ክፍል ለማድረስ የተራዘመ ጊዜ መፍጀት 11. የቀዶ ህክምና ክፍሉን ለማጽዳት የተራዘመ ጊዜ መፍጀት 12. ሌላ ምክንያት ካለ ይጥቀሱ

የመረጃ ሰብሳቢ ስም፡ .....

ፊርማ፡ .....

ቀን፡ .....