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Cost -Effectiveness Analysis of First Trimester Safe Abortion Services In Bahir Dar Health Facilities, North West Ethiopia

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COST -EFFECTIVENESS ANALYSIS OF FIRST TRIMESTER SAFE ABORTION SERVICES IN BAHIR DAR HEALTH FACILITIES, NORTH WEST ETHIOPIA

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ABSTRACT

Background: - First trimester safe abortion is a process of terminating early pregnancy up to 12 weeks of gestational age by using either of medical or surgical procedures. Despite increasing the access, consumption and popularity these services in Ethiopian health facilities, their economic implications has been poorly understood and the cost effective alternative method hasn't been identified.

Objective: - The aim of this study was to identify the cost-effective first trimester safe abortion service, medical and surgical given to women in Bahir Dar health facilities; 2020

Methods: - Institution based comparative cross sectional cost effectiveness analysis was conducted to identify the cost-effective first trimester safe abortion services, medical and surgical given to women in Bahir Dar health facilities. Two hundred fifty four first trimester pregnant women were selected in both arms using systematic random sampling technique. Pretest was done and training was given. Micro costing and human capita approach were costing methods from provider's perspective. Decision tree was created by model built excel. Socio-demographic and reproductive related data was summarized using descriptive statistics. The cost effectiveness results were summarized and presented by using average cost-effectiveness ratio and cost-effectiveness scatterplot. One way sensitivity analysis was done.

Result: 123 and 122 first trimester pregnant women were included in medication and surgical abortion services respectively. 106 in medication and 103 in surgical abortion were completed abortion. The health facilities incurred a total of US$3,430.66 and US$4,145.83 for medication abortion and surgical abortion respectively. The total cost incurred by health facilities per service were US$27.9 in medication and US$34.87 in surgical. The average cost incurred by health facilities per complete abortion were US$32.4 in medication abortion and US$40.3 in surgical abortion.

Conclusion: - The finding of this study demonstrates that medication abortion service was cost effective. The health facilities incurred US$27.9 per service in medication abortion and US$34.87 per service in surgical abortion. The health facilities incurred US$32.4 per complete abortion in medication abortion and US$40.3 per complete abortion in surgical abortion.

Key words: - First trimester safe abortion services, cost-effectiveness analysis, average cost effectiveness ratio and one way sensitivity analysis.

ACRONYMS

ACER	Average Cost Effectiveness Ratio
CEA	Cost-Effectiveness Analysis
CER	Cost-effectiveness ratio
IRB	Institutional Review Board
IUFD	Intera Uterine Fetal Death
MA	Medication abortion
MVA	Manual vacuum aspiration
PO	Per Ose
USD	United States Dollar
WHO	World Health Organization

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1. INTRODUCTION

1.1 Background

First trimester (early) safe abortion services are medical and surgical procedures that used to terminate a pregnancy during the first trimester gestational age (up to 12 weeks of gestation since the first day of the last menstrual period). Previously; first trimester surgical safe abortion services was the common and acceptable standard procedure for termination of pregnancies but currently, first trimester medical safe abortion services is one of the effective procedure to terminate the pregnancies [1, 2].

Availability and accessibility of first trimester medical and surgical safe abortion services in the health facilities is increasing for reduction of maternal mortality and morbidity [3, 4]. They are playing a great role to ensure the universal access of sexual and reproductive health coverage and are important to attain newly formulated sustainable development goal in target 3.1 [5, 6].

First trimester abortion is performed throughout much of the world countries. More than half of the countries permit the abortion should be taken place in the first trimester gestational age [7]. Ethiopian parliament amended law on abortion to permit the services in a wider set up under certain preconditions in 2005. Safe first trimester abortion can only be offered under conditions where legislation has been passed for legal termination of pregnancy. Pregnancy will be legally terminated if pregnancy resulted from rape/incent, preservation of life, fetus has incurable deformity and women are physically or mental immature for child bearing [2, 8].

Cost-effectiveness analysis is one type of economic evaluation that the costs in monetary unit and outcome in natural unit of two or more alternatives that could produce the same outcome. [9]. The advantage and acceptance of cost-effectiveness analysis (CEA) in the health care system has become raised for health policy making and planning process [10, 11]. The results of CEA could be expressed in the form of incremental or average cost effectiveness ratio to provide an overall implication of cost-effectiveness to inform decision-makers [12].

The average cost-effectiveness ratio (ACER) is the ratio of the cost per outcome (gain) without refereeing of an alternative interventions. It has many advantages over incremental cost effectiveness ratio if decision makers have no ceiling ratio (willingness to pay threshold). 1) it characterizes clinical and economical properties of a treatment independent of its comparators;

2) it conveys an intuitive meaning and interpretation (say, cost spent per year) that even lay persons can understand - it is very likely that researchers, policy makers and patients/payers may want to see the ACERs; 3) it is less vulnerable to numerical instability, compared to the ICER [9, 13].

All estimates of costs and effects are subject to uncertainty which arise from parameter, model and generalizability; and could be addressed with one way sensitivity analysis. The input variables would be tested and varied one at a time and keeping all other variables at the base level to assess its effect on the results [12]. The tornado diagram is a nice way of depicting a result of one-way sensitivity analysis. It would show the effects of changes of many input variables at once, with its conical structure sorted from the high to low impact in a way that shapes the chart like a tornado cone.

1.2 Statement of the problem

Access and consumption of first trimester safe abortion services have dramatically increased after abortion law amended and following introduction of abortion guideline in Ethiopia than the previous [2, 4]. As a result; it is believed that 81-89% abortion take place in the first trimester gestational age with either of the two procedures in Ethiopia [7] and the vast majority (66%) of abortion was performed during the first trimester gestational age either of the two procedures in the health facilities in Amhara region [4].

This shows that there is high coverage of abortion services and consumes large portion of the total health expenditure. The scarcity of resources in the health facilities is a well acknowledged challenges. However; the economic implications of the abortion services in the healthcare system is poorly understood [14].

On the other hand; there is rising the health care costs day to day and increasing the pressure of health care policy makers to allocate available scarce resources to improve health of people and healthcare system [12]. And again, the decision makers have been facing multiple difficulty in allocating of available scarce resources in the healthcare system [15, 16].

This is predominantly imperative given to health system suffering with resources constraints in Sub Saharan African including Ethiopia [17]. Identifying the cost-effective service among the alternatives and deployed scarce resources effectively through scientific sound of economic evaluation may subside the problem [12].

Analyzing cost-effectiveness of abortion services, especially in developing countries (like Ethiopia), is an important for clinical as well as public health issues as a result of generating a very crucial local scientific evidence to assist decision making for resources allocation [15, 18].

Preference and acceptability of first trimester medical and surgical safe abortions services had been investigated independently and well understood [19]. The economic consequences of abortion and cost of its complication had also been investigated [15, 20].

However, there is little research attention has been given to identify the cost effective of first trimester safe abortion services; medical and surgical given to women; in the health facilities [21, 22].

Most of related studies focused on the cost of abortion, costs for the treatment of its complication and the health system costs of post abortion care [15, 23-25].

Studies on the cost effectiveness analysis of first trimester medical and surgical safe abortion services didn't exist in sub-Saharan African health facilities especially in Ethiopia.

Lack of scientific local evidence on cost effectiveness of first trimester abortion services leads policy makers allocate scarce resources merely without evidence. The aim of this study is to identify the cost-effective first trimester safe abortion service; medical and surgical; in Bahir Dar health facilities.

1.3 Significance of the study

The evidences were generated in this study and they will inform policy makers in minister of health and regional health bureau to scale up cost effective abortion service. The finding will also inform health facilities managers on how to allocate limited resources for first trimester abortion provisions in Bahir Dar city health facilities. In addition to this, the evidence could help for researchers in providing a relevant data to conduct further studies.

2. LITERATURE REVIEW

2.1 General overview of first trimester abortion

First trimester legal safe abortion is the ending of pregnancies before fetal viability which is conventionally taken to be less than or equal to twelve weeks from LNMP. It is one of the safest option for first trimester pregnancies termination from the uterus in health facilities to reduce maternal mortality rate according to the recommendation of World Health Organization's (WHO) guidelines [2, 26-30].

2.2 Global burden of first trimester abortion

Globally; the rate of abortion was estimated around 35 per 1,000 while in Africa 34 per 1,000 in all reproductive age groups from 2010–2014 [31] but the large portion of them were performed during the first trimester gestational period [3, 4, 32-34] and it is believed that 81-89% abortion take place in the first trimester gestational age and the proportion rate is rising as a result of increasing the access of abortion services [7].

2.3 First trimester abortion in Ethiopia

First trimester surgical abortion (manual vacuum aspiration) is preferred for pregnancies ≤ 12 weeks from the first day of last menstrual period) services involves the pregnancy being removed through the vagina using a suction method [2, 35, 36]. It is available during early pregnancy gestational age with high success rate (99%) and does not require follow up in most cases, women participation in a single-step process [37]. Its absolute contraindications are unknown but hemodynamically instability, profound anemia, and profound thrombocytopenia may be contraindicated [38, 39].

Medical abortion (abortion with pills) is also the safest medical procedure that offers an important alternative to surgical abortion for early pregnancy termination in the facilities and at home but don't terminate ectopic pregnancies [39] It requires low skill and few health system demand [40-42]. Women participation is crucial throughout a multi-step process [2, 37]. Allergic reaction to one of the abortion drugs, chronic renal disease, inherited porphyria, concurrent corticosteroid drug users and suspected ectopic pregnancy are its contraindications [2, 39].

2.4 Clinical approach of abortion services in Ethiopia

2.4.1 First trimester medication safe abortion services

After administrating mefiprostol 200 mg orally; advising the women to comeback 36-48 hours later to take misoprostol. Also women will be informed to expect and possible expulsion of conception tissue. Misoprostol 800µg will be administered vaginal, buccal or sublingual route in the second visit and then follow for 4 hours. Around 90% of women those took misoprostol will expel the product of conception within 4 hours. If abortion doesn't occur during this observation time, discharge and appoint her to comeback about 2 week latter for confirmation of completion of abortion. Antipain will be ordered based on the need for pain during and after the procedure [2].

2.4.2 First trimester surgical safe abortion services

It is preferred methods for pregnancies 12 weeks or less than from the first day of NLMP in women with regular menstrual and for women irregular cycle, the gestational age may need to determine by physical examination or ultrasound imaging. Antipain/ local anesthesia will be administered prior to cervical manipulation. It should be done in the outpatient procedure room. Women will be observed for an hour before discharge them to their home [2].

2.5 Cost effectiveness findings of first trimester safe abortion services

According to the study done in study done in Mexico City on alternative first-trimester pregnancy termination strategies showed that the direct medical cost of surgical and medical abortion services was (USD 2005) $107 in hospital based and (USD 2005) $69 per complete abortion respectively. Medication abortion was cost effective procedure [22].

A cost effectiveness analysis study done in Nigeria and Ghana on cost effectiveness analysis alternative first trimester pregnancies termination strategies showed that first trimester medical safe abortion was cost effective followed by MVA (surgical abortion) in Ghana and first trimester surgical safe abortion was cost effective in Nigeria. Estimated direct medical cost of MVA was (USD 2007) $33.11in Nigeria and $14.58 in Ghana. Estimated direct medical cost of MA was (USD 2007) $16.40 in Nigeria and $4.17 in Ghana [25].

An operational research conducted on introducing medication abortion into public sector facilities in KwaZulu-Natal, South Africa, 94% of first trimester pregnant women preferred first trimester medication abortion services over first trimester surgical safe abortion services,

and thus the total health service cost during the study (nearly $74,000) largely reflected the lower cost of first trimester safe medication abortions services [43].

A study conducted in South Africa on costs and cost effectiveness of providing first-trimester showed that the average cost was $64.06 and $69.60 per complete abortion for medication and surgical abortion services respectively. US $19.26 and $10.53 was incurred for consumables in first trimester surgical and medical safe abortion services as well as $39.20 and $29.79 personal direct medical cost was required to perform first trimester surgical and medical safe abortion respectively.US $9.41 and $5.30 was invested for material and equipment to perform first trimester surgical and medical abortion respectively [21].

A study done on the health system cost of abortion care with medical and surgical safe abortion services approach in Uganda show that the average annual post abortion care, in both medical and surgical safe abortion services, cost per women was $131. Direct medical costs were cost of drug and supplies, cost of personnel, cost of hospitalization and outpatient special fee [44].

3. OBJECTIVE

3.1 General objective

To identify the cost-effective first trimester safe abortion service; medical and surgical given to women; in Bahir Dar health facilities, 2020.

4. METHOD AND MATERIALS

4.1 Study design and study period

Institutional based comparative cross sectional cost effectiveness analysis was conducted to identify cost effective first trimester safe abortion service from March 1, 2020 to April 30, 2020

4.2 Study area

This study was conducted in Bahir Dar city administration, North West Ethiopia. Bahir Dar is the capital city of Amhara National Regional state and located 565 km away from Addis Ababa. Based on the data obtained from Bahir Dar Zonal Health Department report in 2018, the total population is 445,084. Of this, 222,987 are females and 52,580 are in reproductive age group. There are two government hospitals, five government health centers, and two private reproductive health-based clinic in the city. All the above health facilities provides induced abortion services including first trimester surgical and medical safe abortion services.

4.3 Population

4.3.1 Source of population

All first trimester pregnant women seeking induced safe abortion services in Bahir Dar city administration

4.3.2 Study population

All first trimester pregnant women seeking induced safe abortion services in all health facilities in Bahir Dar city administration.

4.3.3 Sample population

Sampled women with first trimester pregnancy who were attending in selected health facilities for first trimester induced safe abortion services and who fulfill the inclusion criteria during the study period in Bahir Dar city administration.

4.3.4 Study unit

Sampled women with gestation of up to 12 weeks seeking induced safe abortion.

4.4 Eligibility criteria

4.4.1 Inclusion criteria

4.4.1.1 Clinical inclusion criteria

First trimester pregnant women whose gestational age is ≤12 weeks from normal last menstrual period, confirmed with abdominal ultrasound or by physical examination, (alive or IUFD).

First trimester pregnant women who were volunteer for abortion completeness follow up

4.4.1.2 Costing inclusion criteria

Medication costs, diagnostic costs, health institution provider's costs (building, health personnel, and equipment, consumables, and hospitalization costs (if admission is applicable for bed costs)) were included in direct medical costs.

4.4.2 Exclusion criteria

4.4.2.1 Clinical exclusion criteria

- First trimester pregnant women;
- who is seriously ill
- with suspected ectopic pregnancy or undiagnosed adnexal mass
- with chronic adrenal disease
- with concurrent long term corticosteroid treatment
- with history of allergic to mifepristone or misoprostol
- with hemorrhagic disorder or concurrent anticoagulant therapy
- with clotting disorders, severe liver disease, renal disease, cardiac disease, and chronic steroid takers
- with inherited porphyria [2, 39].

4.4.2.2 Costing exclusion

- Cost of some personnel (security guard, cleaners etc.) were excluded due to difficulty of cost estimation.
- professional allowances, housing allowances, transportation allowances, and duty fees were not considered in this calculation

4.5 Operational definition

- ✓ Complete abortion in medication safe abortion service is if placenta, fetus and membrane are expelled without the need for additional MVA done and confirmed with physical examination or ultrasound by abortion services provider and/or other health care providers within four hours in person observation or within two weeks appointment for follow up or phone call confirmation of negative pregnancy test.
- ✓ Complete abortion in surgical safe abortion service is if placenta, fetus and membrane are removed out without the need for repeated MVA done and confirmed with physical examination or ultrasound by abortion services provider and/or other health care providers within four hours in person observation or within two weeks appointment for follow up or phone call confirmation of negative pregnancy test.
- ✓ Failed medication abortion is if abortion is completed with MVA
- ✓ Failed surgical MA abortion is if abortion is completed with at least with one repeated MVA
- ✓ Direct medical cost is the cost of medication, diagnostics, consumable, health care provider's cost including building, personnel, medical supplies and equipment.

4.6 Sample size determination

The sample size was determined by using two population proportion formula. From the result of study done on client preferences and acceptability for medical abortion and MVA as early pregnancy termination method in Northwest Ethiopia in 2011, P1=61.2% success proportion of first trimester pregnant women who choose medical abortion services [19] and p2=42.8% success proportion of first trimester pregnant women who choose surgical (MVA) abortion services [45]. 95% confidence interval, 5% marginal error with 80% power of the test and 10% of none response rate. The resulting sample size was demonstrated in Equation 1.

$$n_1 = n_2 = \frac{\left(z_{\alpha/2}\sqrt{2\bar{p}\bar{q}} + z_{\beta}\sqrt{p_1q_1 + p_2q_2}\right)^2}{\Delta^2}$$

Where $\bar{p} = \frac{p_1 + p_2}{2}$ $\bar{q} = 1 - \bar{p}.$

- ✓ Δ = p1-p2
- ✓ p1=0.612, p2=0.428
- ✓ Δ=p1-p2=0.612-0.428 =0.184

- ✓ n1=n2= $\frac{[1.96\sqrt{2*0.52*0.48} + 0.84\sqrt{0.612*0.388+0.428*0.572}]^2}{(0.184)^2}$
- ✓ n1=n2=$\frac{(1.3848201+0.583347)^2}{0.033856}$=$\frac{73.87367299}{0.033856}$=114.4~115
- ✓ Where,
    - ❖ n1 and n2 = the required sample size
    - ❖ d = margin of error between the sample and population=5%=0.05
    - ❖ Zα/2=standard deviation in standard normal distribution value at α = 5% which is 1.96 at 95% confidence level
    - ❖ Zβ = power 80% = critical value of 0.2= 0.84

By considering 10% of nonresponse rate, the final sample size was 115+10%=115+12=127 first trimester pregnant women were recruited in each group.

4.6 Sampling technique and procedure

Nine health facilities those providing abortion service in the city were selected after making a survey. The sample was drawn proportionally from each study settings by using stratified sampling method based on the two-months of first trimester safe abortion services offered performance in the last year and then the study participants were selected by using systematic random sampling technique with a sampling interval of 2 for each first trimester pregnant women. The respondents of the study were selected with K=2 interval (K=$\frac{total\ population}{sample\ size}$ = $\frac{613}{254}$ =2) and the random start respondent was selected by lottery method

Proportional sample size: nh= (NH / N) * n

N = Size of entire population=613

NH= Population size for h^{th} health facility

n = Entire sample size=254

nh= required sample size for h^{th} health facility

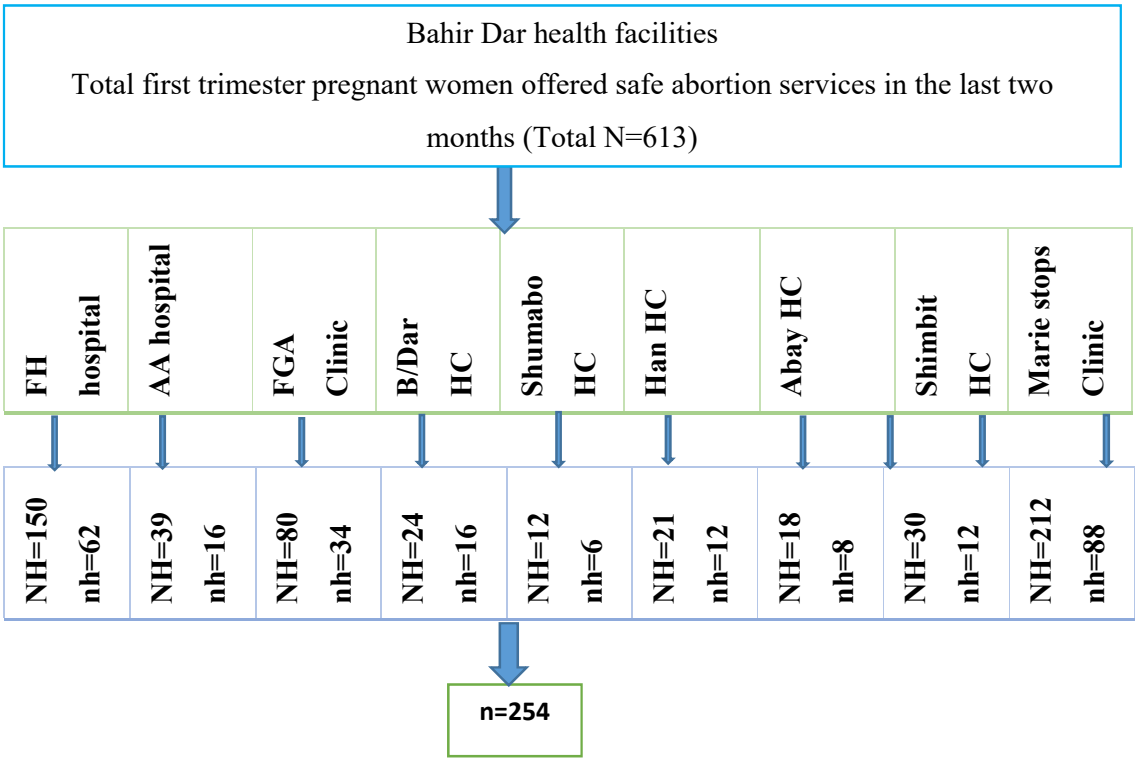

Figure 1:- Schematic presentation of sampling procedure for cost effectiveness analysis of first trimester safe abortion services in Bahir Dar health facilities; 2020

4.7 Data collection tool

A structured close and open ended pretested questionnaire was developed from relevant literatures and adapted it to the objectives of the present study. The questionnaire is then supplemented with structured interview check list. The questionnaire was first prepared in English and translated to local language (Amharic) and check whether the translation was consistent with English version and back retranslated to English. The questionnaire comprised the following sections.

Part I: Data was obtained from first trimester safe abortion services seeking women

1.1 Eligibility criteria (interview the abortion services providers)

1.2 Socio-Demographic Data (interview the abortion seeking women)

1.3 Reproductive related question (interview the abortion seeking women)

1.4 Direct medical costs

1.4.1 Medication costs (participants' card review and determine with health facilities price list)

1.4.2 Diagnostic costs/investigation/ (participants' card review determine with health facilities price list)

1.4.3 Disposable/consumable supplies (documented each inputs resources and determined with health facilities price list)

Part II:- First trimester safe abortion outcomes summary through prospective follow up

Part III:- Health care Providers institution costs

1.4.4 Building costs (measuring the abortion building area and estimate with local rental values for similar building per square km)

1.4.5 health care providers' costs (interview human resources about their salary and estimate with human capital cost approach)

1.4.6 Medical equipment and furniture cost (Interview case team coordinator and purchase price order from health facilities)

4.8 Data collection procedure

One day training was given for nine BSc nurses in each study sites and for two supervisors. After having personal introduction, the purpose and the benefits of the study were told to the study participants. Written consent and their willingness were asked to give their responses for the prepared questionnaires.

Health providers those clerked the women were interviewed for abortion eligibility criteria. Sociodemographic characteristics and reproductive related questionnaires were interviewed and then, unique identification number was given to all participants to prevent double counting and mismatching during appointment. All abortion receiving women were followed and recorded final abortion outcome on appointment date. Cost data were also collected accordingly and valued.

4.8.1 Outcome measurements

The medication abortion service's outcome was captured at individual level within 4 hours observation after administering misoprostol. If didn't occur within these hours, completeness was confirmed by physical examination or pelvic ultrasound after the procedure completed or pregnancy test update within 2 weeks appointment date. The surgical abortion service's outcome was also determined by physical examination or pelvic ultrasound after the procedure completed or pregnancy test update within 2 weeks appointment date. For those women who

didn't return back to the health facilities, the outcome was determined through telephone follow-up. In both abortion services, the measurement of complete abortion within two weeks were used for the cost effectiveness analysis. Cohort based decision model was developed from an ongoing follow for at least 2 weeks follow up. The model was characterized with the following categories.

1. **Comparator groups**

   The study compares cost-effectiveness of first trimester safe medication abortion and surgical abortion services

2. **Time frame**

   The time frame in this model was two months. The probability outcome and costs in the study have two months.

3. **Time horizon**

   The time horizon in this study was two weeks horizon and the outcome and resources inputs were collected within two weeks periods

4. **States and abortion progression**

   Initially; all eligible first trimester pregnant women were in well. An eligible woman from a well sate would be induced with her choice first trimester safe abortion services. A woman can have the following outcomes following the procedures. Complete medication abortion, failed medication abortion and MVA done, failed medication abortion and admitted, returned for required study follow-up, complete surgical abortion, failed surgical abortion and MVA repeated, failed surgical abortion and admitted; and death at the time data collection period.

5. **Perspective**

   The model considered health system side direct medical costs from provider perspective to estimate cost effectiveness of first trimester safe abortion services

4.8.2 Measurement of services provision cost

Identification, measurement, and valuation of the direct medical cost of abortion services were conducted. Medication cost, diagnostic cost, consumable supplies cost, building cost, equipment cost and hospitalization cost (if admission is applicable for bed cost) were collected with bottom up approach. The overall costs of both abortion services were estimated as the sum of the costs weighted by different consumed resources. The economic value of each inputs resources, health facilities voucher in each department was used to determine cost per unit of each inputs resources in both services with micro costing. Personnel costs were estimated

through human capital cost approach in which costs were valued based on an estimated proportion of working-time spent for abortion services multiplied by the rate the employee getting from the employer per hour.

4.9 Data quality control/management

The questionnaire was adapted from literature and prepared in simple understandable English language and translated into Amharic. Before the actual data collected, pretest was conducted on 5% of the sample size at Woreta and Quahare health centers to evaluate the clarity of questions and validity of the tool, reaction of respondents to the questions and estimate time needed. One day training was given for nine data collectors and two supervisors on data collecting technique, particularly the purpose of the study, proper filling of the questionnaire, confidentiality and importance of privacy. One day training was given for nine safe abortion services health care providers to perform according to Ethiopian abortion guideline. Completeness and consistencies of each collected data was checked manually in daily basis by the supervisors and researcher.

4.10 Data processing and analysis

Demographic and reproductive related data was cleaned, coded and entered SPSS version 23; and then summarized using descriptive statistics. The costing and abortion outcome data entry and analysis were conducted using model built excel and direct medical costs were collected in Birr and converted into United States Dollars (USD) at official exchange rate of the National Bank of Ethiopia at the time of women consumed, Saturday 4, April 2020 (1US$=33.05 E.Birr) [46]. Cost effectiveness of first trimester safe MA and MVA were evaluated in terms of cost per abortion services and cost per complete abortion.

4.10.1 Cost-effectiveness of abortion services per services

The cost-effectiveness per woman was expressed as total cost of first trimester abortion service per total number of first trimester pregnant women at the time of the study exit.

4.10.2 Average cost effectiveness ratio abortion services (ACER)

Cost effectiveness of medication abortion in comparison with surgical abortion was expressed in terms of average cost effectiveness ratio (ACER). ACER was expressed as total cost of service per total number of completed abortion at the time of the study exit.

4.10.3 Sensitivity analysis

One way sensitivity analysis (tornado diagram) was conducted to address the uncertainty in the model inputs like costs and outcomes. The values of the following variables were varied as part of sensitivity analysis. Medication cost, equipment and furniture cost, diagnostic cost, personnel costs, completion rate, building and supplies cost. A Monte Carlo simulation was also conducted for scatter plot to show the probability of an intervention is cost effective compared with the alternative with 25% uncertainty.

4.11 Ethical consideration

Ethical clearance was obtained from the Institutional Review Board (IRB) of Bahir Dar University, College of Medicine and Health Sciences. Permission letter was given to each respective health facilities for preceding the data collection. The objective of the study was briefly explained before the beginning of data collection. Obtained data was used only for the purpose of study. Informed written consent was obtained from each participant's anonymity and respondents had the right not to participate in or with draw from the study at any stage. In order to keep confidentiality during data collection, coding was used rather than naming

4.12 Dissemination of the results

After completion of the study, the finding will be disseminated to school of public health, college of health sciences, two hospitals, five health centers and two private reproductive health-based clinic in Bahir Dar through hard and soft copies. It will also serve as a source for other concerned bodies who need it.

5. RESULTS

5.1 Socio-demographic characteristics of study participants

A total of 245 first trimester pregnant women enrolled in this study; of which 123 women received medication abortion and 122 women received surgical abortion which makes a response rate of 96.9% and 96.1% respectively. Among those included in the study, the participants were 15-24 (58.5%) and 25-34 (48.4%) year old in medication abortion and surgical abortion services respectively. The level of education also showed that 84(68.3%) in medication abortion and 74 (60.7%) in surgical abortion participants were above primary education; among which 47(38.2%) in medication abortion and 51(41.8%) surgical abortion were secondary education. House maids were equal in both arms.

Table 1:- Socio demographic characteristics of the study participants in Bahir Dar health facilities; 2020

Socio-demographic variables	Categories description	Type First trimester safe abortion services	
		MA	MVA
age	15-24	72(58.5%)	52(49.2%)
	25-34	49(39.8%)	59(48.4%)
	35-44	2(1.6%)	11(9%)
Marital status	Single	66(53.7%)	60(47.2%
	Married	52(42.3%)	53(43.4%)
	widowed	0(0.0)	2(1.6%)
	divorced	5(4%)	7(5.7%)
Residence	Rural	21(17.1%)	20(16.4%)
	urban	102(82.9%)	102(83.6%)
Level of Education	Illiterate	15(12.2%)	20(16.4%)
	Primary education(1-8)	24(19.5%)	28(23%)
	Secondary education(9-12)	47(38.2%)	51(41.8%)
	College and above	37(30.1%)	23(18.9%)
Occupation	Student	31(25.2%)	30(23.6%)
	Self-employee	30(24.4%)	22(17.3%)
	House wife	16(13%)	20(15.7%)
	House maid	3(2.4%)	3(2.4(%)

others	43(35%)	47(37%0

5.2 Clinical characteristics of study participants

Among those given medication abortion and surgical abortion services, 54(43.9%) and 59(48.4%) of the participants had history of previous pregnancy respectively. Among those had history of previous pregnancy, 44(81.5%) of pregnancies in medication abortion and 41(33.6%) pregnancy in surgical abortion services ended with vaginal delivery. 8(14.8%) of previous pregnancies in the medication abortion and 21(17.2%) of previous pregnancies in the surgical abortion had been ended with abortion. Among those had history of previous abortion, 3(37.5%) of previous abortion in medication abortion and 10(47.6%) of previous abortion in surgical abortion were ended with safe induced abortion (table 2).

Table 2:- Clinical characteristics of the study participants in Bahir Dar city health facilities; 2020

Clinical variables	Categories description	Type First trimester safe abortion services	
		MA	MVA
Previous pregnancy	Yes	54(43.9%)	59(48.4%)
	No	69(56.1%)	63(51.6%)
Outcome of pregnancy	SVD	44(81.5%)	41(33.6%)
	C/S	2(3.7%)	7(5.7%)
	Abortion	8(14.8%)	21(17.2%)
History of abortion	Yes	8(6.5%)	21(17.2%)
	No	115(93.5%)	101(82.8%)
Type of abortion	Spontaneous	5(62.5%)	11(52.4%)
	induced	3(37.5%)	10(47.6%)

5.3 Clinical and services parameter of abortion services

5.3.1 Clinical and services parameter of medical abortion service

All eligible first trimester pregnant women were given mefiprostol and misoprostol. Doxycycline 41(39.8%) and ibuprofen 60(58.3%) were the most utilized antibiotics and

analgesics respectively. 101(98.1%) and 89 (86.4%) of first trimester pregnant women were ordered to do urine pregnancy test and blood group laboratory test (table 3).

Table 3:-Consumed drugs/ medication in the provision of medication abortion service in Bahir Dar health facilities

Clinical and services parameter of first trimester legal safe medication abortion services			
Direct medical and diagnostic cost	Utilized item description	MA	
		complete	complete with MVA
Consumed Drugs' list	Misoprostol 800µg	103 (100%)	20(100%)
	mefiprostol 200mg	103(100%)	20(100)
	Diclofenc 50mg po	28(27.2%)	12(54.5%0
	diclofenac 75mg injection	6(5.8%)	8(36.4%)
	pethidine 50mg injection	0(0.00%)	0(0.00%)
	doxycycline 100mg po	41(39.8%)	12(54.5%)
	follic acid	0(0.00%)	0(0.00%)
	metronidazole 500mg po	0(0.00%)	2(9.1%)
	cephalexine 400mg po	0(0.00%)	0(0.005)
	Amoxacilline 500 mg po	3(2.9%)	1(4.5%)
	ibuprofen 400mg po	60(58.3%)	2(9.1%)
	NS 1000ml	0(0.00%)	4(18.2%)
	Norfloxacilline	0(0.00%)	0(0.00%)
Consumed dagnostic list	Pregnancy test	101(98.1%)	20(90.9%)
	whole blood count (CBC)	48(46.6%)	10(45.5%)
	Rhesus factor (RH) with blood	89(86.4%)	19(86.4%)
	Ultrasound for dating	77(74.8%)	18(81.8%)
	Hemoglobin test	27(26.2%)	8(36.4%)
	HBSA testing	0(0.00%)	0(0.00%)
	RBS	0(0.00%)	0(0.00%)
	Urine analysis (U/A)	0(0.00%0	0(0.00%)
	Ultrasound for completion	6(5.8%)	4(18.2%)
	VDRL	3(2.9%)	0(0.00%0

5.3.2 Clinical and services parameter of surgical abortion service

Doxycycline 64(63.4%) and diclofenac injection 57(56.4%) were the most utilized antibiotics and analgesics medication during and after the procedure respectively. Cephalexin and norfloxacilline were the least prescribed antibiotics. 97 (77.2%) and 81(80.2%) of first

trimester pregnant women were ordered to do urine pregnancy test and blood group respectively (table 4).

Table 4:- Consumed drug/medication in the provision of surgical abortion service in Bahir Dar health facilities; 2020

Clinical services parameter of first trimester legal safe MVA abortion services			
direct medical and diagnostic	Utilized item description	MVA	
		complete	Repeated MVA
Consumed drugs list	Misoprostol 800µg	0(0.00%)	0(0.00%)
	mefiprostol 200mg	0(0.00%)	0(0.00%
	Diclofenc 50mg po	39(38.6%)	15(68.2%)
	diclofenac 75mg injection	57(56.4%)	15(68.2%)
	pethidine 50mg injection	3(3%)	0(0.00%)
	doxycycline 100mg po	64(63.4%)	16(23.7%)
	follic acid	2(2%)	0(0.00%)
	metronidazole 500mg po	11(10.9%)	1(4.5%)
	cephalexine 400mg po	1(1%0	1(4.5%0
	Amoxacilline 500 mg po	9(8.9%)	0(0.00%)
	ibuprofen 400mg po	16(15.8%)	4(18.2%)
	NS 1000ml	7(6.9%)	4(18.2%)
	Norfloxacilline	1(1%)	1(1%)
consumed dagnostic list	Pregnancy test	97(77.2%)	19(86.4%)
	whole blood count (CBC)	27(26.7%)	12(54.5%)
	Rhesus factor (RH) with blood	81(80.2%)	18(81.8%)
	Ultrasound for dating	78(77.2%0	17(77%)
	Hemoglobin test	27(26.7%)	4(18.2%)
	HBSA testing	1(1%)	0(0.00%)
	RBS	1(1%)	0(0.00%)
	Urine analysis (U/A)	3(1%)	0(0.00%)
	Ultrasound for completion	10(14.9%)	2(13.6%)
	VDRL	3(3%)	0(0.00%)

5.4 Outcome of services provision

One hundred twenty three and one hundred twenty two first trimester pregnant women were volunteers to participate in medication and surgical safe abortion services respectively. Of the 123 women in medication abortion arm, 118(95.9%) was returned for the 2-weeks follow-up and of the 122 women in surgical abortion arm, 115(94.3%) was returned for the 2- weeks follow-up. Of the 123 women in the medication abortion arm, 106 (86.2%) of first trimester

pregnant women's abortion process were completed without needed for MVA done and the remaining 17(13.8%) women were defined as failure and MVA was required. Of 122 women in the surgical safe abortion arm, 103(84.4%) of first trimester pregnant women's abortion process was completed without needed for repeated MVA and the remaining 19(15.6%) women were defined as failure and MVA was repeated (table 5).

Table 5:-First trimester safe abortion services outcomes' summary in Bahir Dar health facilities; 2020

First trimester safe abortion services' outcomes (N=254)	
Over all outcomes for women receiving medication abortion services	**Number (%) unless otherwise indicated**
lost follow up	5(4.1%)
returned for follow up	118(95.9%)
complete medical abortion without needed for MVA done at study exit	106 (86.2)
failed medcation abortion and MVA was done as out patient servive	9 (7.3%)
failed medication abortion and hospitalization for completion	8(6.5%)
death	0(0.0%)
Over all outcomes for women who receiving surgical abortion service	**Number (%) unless otherwise indicated**
lost follow up	7(5.7%0
returned for follow up	115(94.3%)
lete surgical abortion without needed for repeated MVA done at study	103(84.4%)
led surgical abortion and repeated MVA was done as out patient servi	12(9.8%)
failed surgical abortion and hospitalization for completion	7(5.8%)
death	0(0.0%)

5.5 Costs of services provision

5.5.1 Medication abortion service

5.5.1.1 Total costs of medication abortion service

The economic costs of medication abortion service from the providers' perspective were presented in table 6. From the total medication abortion costs (US$3,430.66), US$ 2,415.47 were covered by variable costs and US$ 1,015.19 were covered by fixed costs. Medication costs (US$1,243.17) covered the major portion of the total incurred costs followed by

equipment's cost (US$955.72). From the total complete medication abortion costs (US$2,884.08), US$2,016.12 were covered by variable costs and US$ 867.96 were covered by fixed cost. From the total failed medication abortion cost (US$546.58), US$165.15 and US$ 132.1 were contributed by medication and equipment costs respectively (table 6).

Table 6:- Total direct medical costs of medication abortion services in Bahir Dar health facilities; 2020

Cost categories	cost (US$) for completed	cost (US$) for failed
Variable cost	**Base estimate**	**Base estimate**
Medication cost	$ 1,078.02	$ 165.15
Diagnostic cost	$ 717.62	$ 122.50
Consumables supplies cost	$ 40.28	$ 38.70
Personnel cost	$ 180.20	$ 54.50
Bed fee	$ -	$ 18.50
Subtotal	$ 2,016.12	$ 399.35
Fixed cost		
Buildings cost	$ 44.34	$ 15.13
cost	$ 823.62	$ 132.10
Subtotal	$ 867.96	$ 147.23
Grand total (US$)	$ 2,884.08	$ 546.58

5.5.1.2 Cost-effectiveness of medication abortion per service

The total cost incurred by health facilities for the provision of first trimester medication abortion services for each woman was US$27.9 per service. The cost of medication (drugs) used in medication abortion was (US$ 10.11) per service and covered 36% of the total medication abortion followed by diagnostic cost (US$6.8) per service. Equipment and furniture cost covered 27.6% of the total fixed cost (table 7).

Table 7:- Direct medical costs of medication abortion service per woman in Bahir Dar health facilities; 2020

MA cost per woman (US$), (N=123)			
Cost categories	**Base estimate (US$)**		
Variable cost	Cost (US$		% of total
Medication cost	$	10.11	36%
Diagnostic cost	$	6.80	24.40%
Consumables Supplies cost	$	0.64	2.30%
Personnel cost	$	1.90	7%
Bed fee	$	0.15	1%
Subtotal	$	19.60	70%
Fixed cost			
Building cost	$	0.48	1.70%
Equipment and furniture cost	$	7.77	27.60%
Subtotal	$	8.25	29.30%
Grand total (US$)	$	27.90	100%

5.5.2 Direct medical costs of surgical abortion service

5.5.2.1 Total costs of surgical abortion service

The health facilities incurred a total of US$4,145.83 for those selecting MVA and the costs were categorized as cost for completion and cost for failed first trimester safe abortion. The total costs utilized for the provision of completed first trimester safe surgical abortion service was US$. $3,441.23. Equipment costs including completed and failed (US$ 1,952) covered the major portion of the total utilized costs in surgical abortion (US$4,145.83) followed by personnel costs including completed and failed (US709.75). However; the contribution of medication cost to a total completed surgical abortion cost was minimal compared to the others. The total Variable costs utilized for the provision of surgical abortion service was US$ US$1,864.43. The fixed cost, on the other hand, was US$ 2,281.4. A total of US$704.6 were consumed to manage failed surgical abortion. Equipment and furniture costs (US$304) covered the majority portion of this cost (table 8).

Table 8:-Total direct medical costs of surgical abortion service in Bahir Dar health facilities; 2020

Cost categories	Cost (US$) in completed	Cost (US$) in failed
Variable cost	**Base estimate**	**Base estimate**
Medication cost	$ 25.75	$ 15.70
Diagnostic cost	$ 548.99	$ 175.00
Consumables supplies cost	$ 296.64	$ 76.70
Personnel cost	$ 643.75	$ 66.00
Bed fee	$ -	$ 15.90
Sub total	$ 1,515.13	$ 349.30
Fixed costs		
Buildings cost	$ 278.10	$ 51.30
Equipment and furnitures	$ 1,648.00	$ 304.00
Sub total	$ 1,926.10	$ 355.30
Grand total (US$)	$ 3,441.23	$ 704.60

5.5.2.2 Cost-effectiveness of MVA per service

The total cost incurred by health facilities for the provision of surgical abortion service per service was US$34.87. Equipment cost contributed 47% of the total surgical abortion cost per service. Diagnostic cost (US$ 5.9) also covered 17% of the total costs followed by personnel cost (US$5.8) covered 17% of the total surgical abortion cost per service (table 9).

Table 9:-Direct medical costs of surgical abortion services in Bahir Dar health facilities; 2020

MVA abortion cost per service (US$), (N=122)			
Cost categories	**Base estimate (US$**		
Variable cost	Cost		% of total
Medication cost	$	0.34	1%
Diagnostic cost	$	5.90	17.00%
Consumables Supplies cost	$	3.00	9.00%
Personnel cost	$	5.80	17%
Bed fee	$	0.13	1%
Subtotal	$	15.17	45%
Fixed variables			
Building cost	$	2.70	8.00%
Equipment and furniture cost	$	16.00	47.00%
Subtotal	$	18.70	55.00%
Grand total (US$)	$	33.87	100%

5.6 Average cost effectiveness ratio (ACER) of abortion services

The health facilities incurred a total of $3,430.66 and $4,145.83 for 106 and 103 completed first trimester abortion procedure in MA and MVA arms respectively during the time of study. The average cost effectiveness ratio (ACER) of MA was US$32.4/number of complete abortion and the ACER of MVA was US$40.3/number of complete abortion (table 10).

Table 10:-Cost, outcome and cost per outcome of abortion services in Bahir Dar health facilities; 2020

Type of abortion services	Total cost in US$	Number of complete abortion	ACER (cost (US$) per complete abortion)
MA	$3,430.66	106 complete abortion	$32.4per complete abortion
MVA	$4,145.83	103 complete abortion	$40.3 per complete abortion

5.7 Average cost effectiveness scatter plot of abortion services

The scatter plots in figure 2 below present for comparisons between medication and surgical abortion services and shows that medication abortion was less costly than surgical abortion without variation of number of complete abortion.

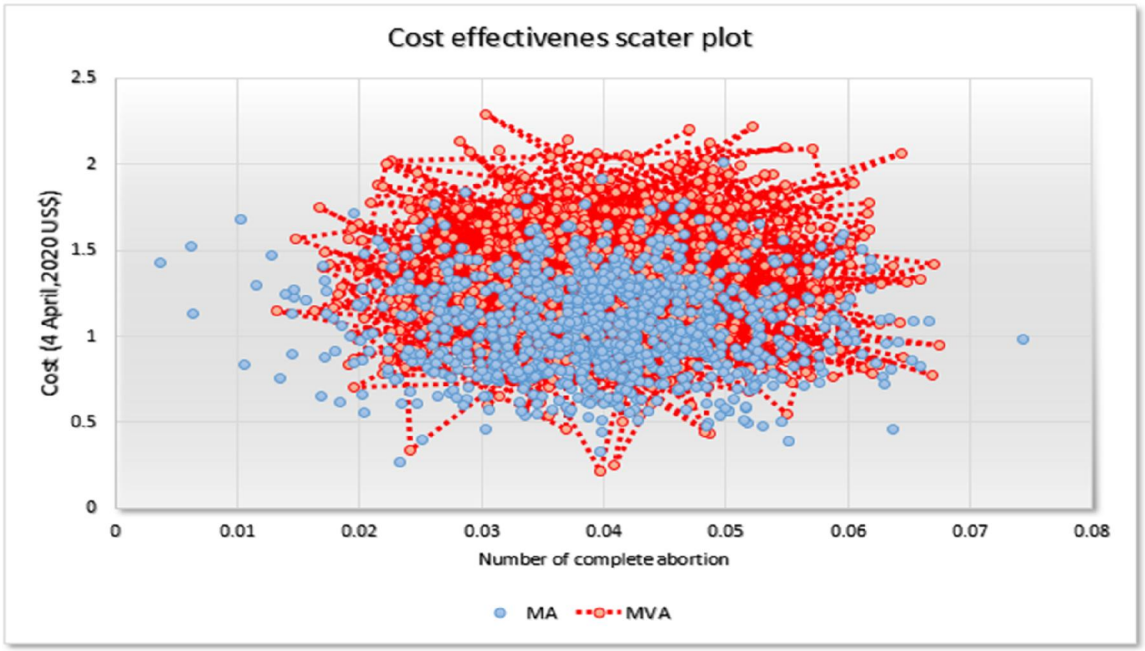

Figure 2:- Cost effectiveness scatter plot per number of complete abortion for first trimester safe abortion services (1000) Monte Carlo simulations

5.8 Sensitivity analysis

In order to assess the influence of variations in the value of key model inputs on cost-effectiveness, one way sensitivity analysis was performed on variables and displayed the results in a tornado diagram. To address uncertainty and to test robustness in the model conclusion, we varied medication costs, diagnostic costs, personnel, supplies costs, building cost, completion rate and equipment costs by±25% to create a range around each base case cost value each permutation of the parameters (table 11 and 12). All variables in MA and MVA services were roughly at ±25% of the base case respectively (figure 3 and 4, table 11, 12)

5.8.1 One way sensitivity analysis (tornado diagram)

In figure 3 and table 11 depicts each horizontal bar represents the range in cost per number of complete abortion across the uncertainty interval for one of 7 key input parameters by 25% on ACER. The input with the greatest influence is the cost of medication at 880% -1460% of $11.7 in the base case value; the ACER of medication abortion ranges 24.3-40.5 per number of complete abortion. The total cost of medication abortion service per number of complete abortion was sensitive to the cost of medication. If medication cost was reduced by hypnotically 25% to price US$2.93 would result in a 9% decrease in the total cost per number of complete abortion. The next most important influences variable is the cost of equipment and furniture. If the cost of equipment and furniture similarly varied at 680%-1,130% of $9 the base case value; the ACER ranges from 24.3-40.5 per number of complete abortion. If equipment cost was reduced by hypnotically 25% to price 2.25 would result in a 6.9% decrease in the average cost effectiveness ratio (figure 3 and table 11).

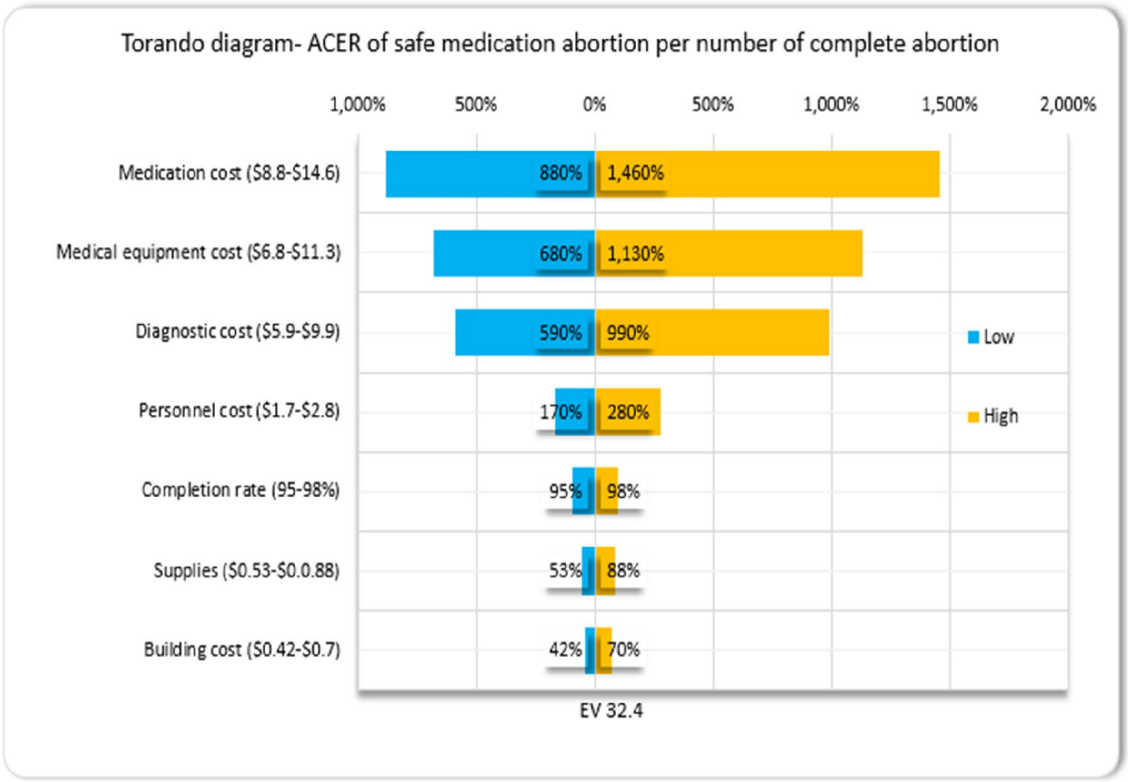

Figure 3:- Tornado diagram: - ACER of first trimester safe medication abortion service per complete abortion

Table 11:-Uncertainty and sensitivity analysis base estimate and ranges for medication abortion service in Bahir Dar health facilities; 2020

Uncertainity and sensitivity analysis base estimate parameter and ranges of medication abortion services			
Uncertaininty base estimate and ranges			Sources for ranges
Parameters	Base case	Ranges	
Medication cost	$ 11.70	±25%	[21].
Diagnostics cost	$ 7.90	±25%	[21].
Suplies cost	$ 0.70	±25%	[21].
Personnel cost	$ 2.20	±25%	[21].
Buliding cost	$ 0.56	±25%	[21].
Equipment and furniture	$ 9.00	±25%	[21].
Sensitivty analysis			
Medication cost	$ 11.70	$8.8-$14.6	own data
Diagnostic cost	$ 7.90	$5.9-$9.9	own data
Supplies	$ 0.70	$0.53-$0.0.88	own data
Personnel cost	$ 2.20	$1.7-2.8	own data
Buldings	$ 0.56	$0.42-$0.7	own data
Equipment and furniture	$ 9.00	$6.8-$11.3	own data
Completion rate	86.20%	95-98%	[47].
Follow up visite rate	95.90%	0-100%	[21].

[47]

In figure 4 and table 12 depicts that the input with the greatest influence is the cost of equipment and furniture at 1420%-2370% of $18.95 in the base case value; the ACER ranges 30.2-50.4 per number of complete abortion. Reducing the price of equipment costs by a hypnotical by 25% to price US$ 4.7 would result in 11.7% decrease in the average cost effectiveness ratio. The next most important influences variable is the cost of diagnostic procedure. If the cost of diagnostic procedure similarly varied at 525%-875% of $7 the base case value; the ACER ranges from 30.2-50.4 per number of complete abortion. If cost of diagnostic procedure was reduced by hypnotically 25% to price 1.75 would result in a 4.3% decrease in the average cost effectiveness ratio. The detail explanation of the model inputs and ranges explored in the sensitivity analysis were provided in figure 4 and table 12.

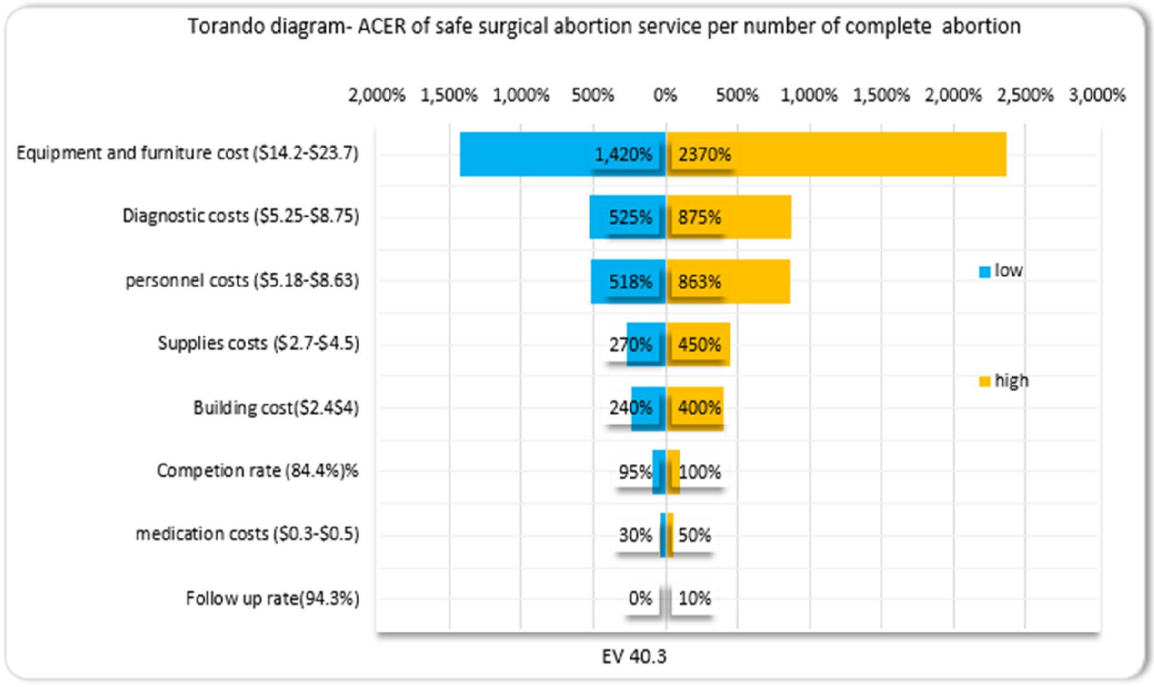

Figure 4:- Tornado diagram: ACER of first trimester safe surgical abortion services per number of complete abortion

Table 12:-Uncertainty and sensitivity analysis of base estimate and ranges for surgical abortion services in Bahir Dar health facilities; 2020

Uncertainity and sensitivity analysis base estimate parameter and ranges of surgical abortion services			
Uncertainity base estimate and ranges	Base case	Ranges	Sources for ranges
Parameters			
Medication cost	$ 0.40	±25%	[21].
Diagnostics cost	$ 7.00	±25%	[21].
Suplies cost	$ 3.60	±25%	[21].
Bed fee	$ 0.15	±25%	[21].
Personnel time spent	$ 6.90	±25%	[21].
Building costs	$ 3.20	±25%	[21].
Equipment and furniture cost	$ 18.95	±25%	[21].
Sensitivity analysis			
Medication costs	$ 0.40	$0.3-$0.5	own ata
Diagnostic cost	$ 7.00	$5.25-$8.75	own data
Supplies	$ 3.60	$2.7-$4.5	own data
Personnel costs	$ 6.90	$5.18-$8.63	own data
Building costs	$ 3.20	$2.4-$4	own data.
Equipment and furniture	$ 18.95	$14.2-$23.7	own data
Follow up visite rate	94.30%	0-10%	[21].
Completion rate	84.40%	95-100	[47]

[47]

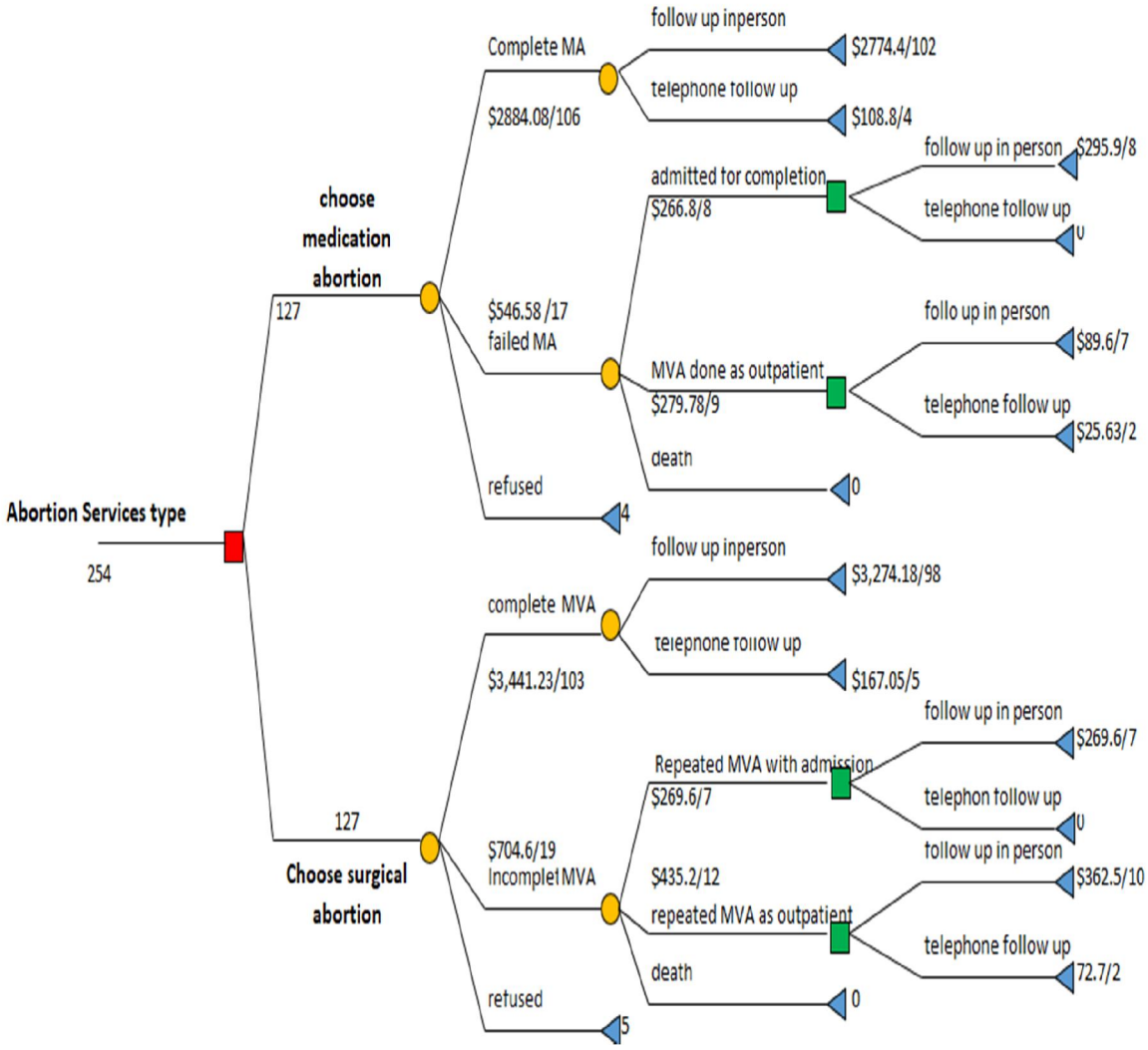

Figure 5:- Decision tree for first trimester safe MA and MVA services based on clinical follow up

6 DISCUSSION

This study demonstrates that medication safe abortion was cost effective service for all first trimester safe abortion.

From the total 254 eligible first trimester pregnant women, 123 and 122 of them were volunteer to be included in medication and surgical (MVA) abortion services respectively. Study found that 72(58.5%) in MA arm and 52(49.2%) in MVA arm of participants were aged between 15-24 year old. This showed that MA service was a better choice in this age group. 66(52%) and 60(47.2% single women opted MA and MVA respectively. This also showed that MA was relatively the chosen first trimester abortion services among the single women.

Among abortion services receiving first trimester pregnant women in both arm, 118(95.9%) of them in medication abortion and 115(94.3%) of those in surgical abortion return back their outcome follow up. However; routine follow up after medication abortion may not be as such required and two weeks appointment for check in after surgical abortion may advisable [30]. and The finding was higher compared to the previous study done in South Africa that 85.6% of the participants in MA and 33% of them in MVA were return back to their required follow up [21]. Among in the medication abortion arm, 106 (86.2%) of first trimester pregnant women's abortion process were completed without MVA done and in the surgical abortion arm, 103(84.4%) of first trimester pregnant women's abortion process was completed without repeated MVA. Medication completeness was similar with study done in America where 84% of women in medication arm had completed their abortion process but surgical completeness was lower in America where 97% of women had completed without repeated MVA [48]. Another similar study in South Africa showed that 96.8% the participants in MA arm and 100% of the participants in MVA arm had complete abortion [21]. The discrepancy might be drug efficacy, professional level and skill, health facility's set up and maternal reproductive and obstetric history.

A total consumed cost to health facilities services of providing 123 first trimester medication abortion services during two months period was US$3,430.66. This is lower than the study done in KwaZulu-Natal, South Africa (US$53,299 for 834 first trimester abortion [21]. This might be due to sample size variation and health facilities setup. From the total medication abortion cost, medication costs (US$1,243.17) covered the major portion of the total incurred costs followed by equipment's cost (US$955.72). This is similar with study done in KwaZulu-Natal, South Africa [21].

The total consumed cost to health facilities for providing 122 first trimester surgical abortion services was US$4,145.83. This is lower than study done in KwaZulu-Natal, South Africa [21]. This might be due to sample size and health facilities set up. From the total surgical abortion services, equipment costs including completed and failed (US$ 1,952) covered the major portion of the total incurred cost followed by personnel cos (US709.75). However; personnel cost covered the major portion of the total cost in KwaZulu-Natal, South Africa [21].

The total costs incurred by health facilities for the provision of medication and surgical abortion services per service was US$27.9 and 33.87 per woman respectively. Medication cost contributed 36% and 1% of the total medication and surgical abortion cost per woman. Equipment cost covered 27.6% and 47% of the total medication and surgical abortion cost per woman. In similar study done in South African, 27% and 2.5% of the total estimated cost of medication and surgical abortion was covered by drugs (medication) respectively[21]. Even though the cost of mefiprostol was relatively high worldwide [49], the study found that medication abortion service is relatively costly than first trimester safe surgical abortion service. Personnel costs contributed 7% and 17% of the total estimated costs of medication and surgical abortion services respectively. This may be related to the costs of time spent of the nurses during abortion procedure. Similar studies showed that the largest component of average procedural costs were covered by nurses [21].

The total direct medical costs per number of complete medication and surgical abortion was US$32.4 and US$40.3 per number of complete abortion This showed that medication abortion service with ACER of US$ 32.4 per number of complete abortion was likely to be cost effective compared to surgical abortion service with ACER of US$40.3 per number of complete abortion. Similar study done in Nigeria showed that the cost for medication abortion and surgical abortion service were (US$ 2007) $16.40 and $33.11 per complete abortion respectively; and study done in Ghana showed that the cost of medication and surgical abortion services per complete abortion were (US$2007) $4.17 and $14.58 respectively [25]. Even though both studies showed that medication abortion was cost effective; cost per complete abortion were less than this finding. This might be due to health facilities set up and potential for self-medication administration which leads reduce personnel cost. Another similar study showed that the total cost of medication and surgical abortion per number of complete abortion in South Africa was (US$ 2015) $63.91 and (US$2015) $69.60 [21] and greater than the ACER of MA and MVA respectively in this study. This might be due to health facilities set up and level of the health facilities; and level of health profession performing the procedure as well as

frequency of follow up visit. Similarly, the direct medical cost in Mexico City for safe hospital based MA and clinic based MVA were (US$2005) $69 and $107 respectively [22]. This supports that MA was relatively cost effective than MVA but greater than the ACER of MA and MVA respectively. However; another study done in America where MVA was found to be more cost effective than MA [48].

To address uncertainty in the model, we varied medication costs, diagnostic costs, personnel, supplies costs, building cost, completion rate and equipment costs by±25% to create a range around each base case cost value and recalculated each permutation of the parameters (table 11 &12 and figure 3&4). The input with the greatest influence in medication abortion is the cost of medication services at 880 -1460 % of $11.7 in the base case value. The ACER was sensitive to the cost of medication. If medication cost was reduced by hypnotically 25% to price US$2.93 would result in a 9% decrease in ACER. This finding was supported by similar study done in South Africa where reducing the price of medication by a hypothetical 50% to a price of $8.00 would result in a 14.1% decrease in the ACER, resulting in a cost of $56.13 per complete abortion [21]. Previous related literature suggest that the completion rate of medication abortion may vary from 95-98% [30]. If completion rate increases from 86.2% to 95% for medication abortion and holding other variables constant at the base case; ACER will be decreased by 8.8% (US$2.9) to be US$ 29.5. This is almost four times in the study done in South Africa [21].

Like medication abortion, each input variables varied at ±25% and figure 4 and table 12 depicts that the input with the greatest influence is the cost of equipment and furniture at ±25% of $18.9 in the base case value. ACER of surgical abortion was sensitive to the cost of equipment and furniture costs. Reducing the price of equipment costs by a hypnotical by 25% to price US$ 4.7 would result in 11.7% decrease in the ACER. Previous related literature suggest that the completion rate of surgical abortion may vary from 95-100% [30]. Increasing the completion rate for MVA from 84.4% to 95% and holding the other variables constant at the base case, the ACER will be decrease by 10.6% (4.3) to be US$36. This was the opposite of study done in South Africa [21].

7 LIMITATION AND STRENGTH

7.1 Limitation

This study was conducted based to compare the cost, outcome and the cost-effectiveness of first trimester safe abortion services through decision tree model from provider's perspective. However, the study encounters a number of limitations.

The study didn't consider some personnel costs like security guard, cleaners etc. It didn't also consider professional allowances, housing allowances, transportation allowances. Training cost did not included and may underestimate the actual cost of the first trimester abortion services.

Due to the possibility of association in both cost and health outcome of implementing several single interventions at once; it is likely that the number of complete abortion could have been over estimated. And this wasn't assessed.

8 CONCLUSION

The health facilities incurred US$27.9 per service in medication abortion service and US$34.87 per service in surgical abortion service. The average cost effectiveness ratio (ACER) of MA was US$32.4 per complete abortion and the ACER of MVA was US$40.3 per complete abortion.

Generally; MA was cost effective compared to surgical abortion service.

9 RECOMMENDATIONS

9.1 For ministry of health and regional health bureau

Ministry of health and regional health bureau health planner at each level will save scarce resources and produce more complete abortion if they allocate them for first trimester safe medication abortion service in the health facilities. They can use as a reference to prepare abortion policy that inforce to use medication abortion for women without any surgical indication to reduce the burden of first trimester abortion on the healthcare system.

Efforts should also be done to make the first trimester medication safe abortion service scaling up at the health facilities to be able to achieve better economic benefit.

9.2 For researchers

Since this study is the first of its kind in Ethiopia so, it is wise to call more researchers to perform studies in this area and publish their findings to support the high demand for published research on first trimester safe abortion services cost-effectiveness analyses .The researcher recommends you to do further studies with cost effectiveness analysis of first trimester safe abortion services and associated factors on intervention cost and outcome at private and public health facilities independently based on generated data to confirm this.

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11 APPENDIXES

11.1 Information Sheet/details of the study

Good morning/afternoon

My name is…..... And I am working in a study conducted by Mr. Getachew Wubet, from Bahir Dar University. And now he is conducting a research to identify the cost-effective first trimester safe abortion service, medical and surgical given to women in Bahir Dar health facilities.

Research title: - Cost -effectiveness analysis of first trimester safe abortion services in Bahir Dar health facilities, North West Ethiopia, 2020

Objective: - To identify the cost-effective first trimester safe abortion service, medical and surgical given to women in Bahir Dar health facilities, 2020..

Participants: - first trimester pregnant women who will be attended in selected health facilities for first trimester safe abortion service for confirmed a viable intrauterine first trimester pregnancy or fetal death of up to 12 weeks of gestational age

If you are volunteer for participation and follow up for completion of abortion out come in the study, I would like to ask few questions. Your honest response will have great value to achieve the stated objective and all the information that you give will be kept confidential. Only the principal investigator and interviewer will have access to the information and data will be used only for the research purpose. There are no any incentives or direct benefits as well as risks in participating in this research project. You are kindly requested to respond voluntarily but you

can also choose not to participate in this study or if you become uncomfortable during the interview, you will be allowed to leave the study at any time.

11.2 Informed consent

I, the undersigned, hereby attest that the implication this research has been fully explained to me and I have understood it. I hereby, agree to participate in this study to be interviewed. I promise to answer honestly to all reasonable questions and not provide any false information or in any other way purposely to mislead the researcher. I promise to come back for follow up or give phone information.

Participant signature_____

Questionnaire code_____

Interviewer name_____ signature_____

Checked by: Name of supervisor/ investigator_____Signature_____

11.3 English Questionnaire

Part I: First trimester legal safe abortion services eligibility criteria (data obtain from health provider who sees her)

s.n	Questions	Coding categories
101	Did you have positive urine pregnancy test or other confirmation of pregnancy?	Yes .....1 No 2
102	Gestational age ≤12 weeks/	Yes ...……..…..…….. 1 No..... ……...……...2
If women not pregnant or above 12 weeks of gestational age, stop here. If ≤12weeks, proceed		
103	Are there any contraindications to medication abortion?	Yes.....…….……...1 No.....…….……....2
104	Are there any contraindications to surgical abortion?	Yes.....1 No.....2
If the above criteria from 101-104 are met, the women can choose either of the two abortion services.		
205	Indicate her choice of procedures	Medication abortion.....1 Surgical abortion.....2

Part two: - Data will be obtained from first trimester safe abortion services seeking women

1.1 Socio-Demographic characteristics

s.n	Questions	Coding categories	Skip
201	What is your age	Age ……..in years	
202	What is your marital status	Single…….……..... 1 Married…….……..2 Widowed…….…….……..;3 Divorce/separated……..……....4	
203	Residence	Urban…….....1 Rural…….....2	
204	What is your educational status	Unable to read and write……....…....1 Primary school……...…2 Secondary school…….…..3 College diploma and above……....…4	
205	What is your main occupation?	Student …….....1 Self-employed .....2 House wives.....3 House maid.....4 Others specify.....	

1.2 Reproductive related questions

s.n	Questions	Coding categories	Skip
206	Have you pregnant before?	yes.....1 no.....2	No, skip 207
207	What were the results of each pregnancy?	Normal vaginal birth.....1 Cesarean.....2 Spontaneous abortion.....3 Ectopic pregnancy.....4	
208	Did you have any history of previous abortion?	Yes ……..…….....….1 No …….....….2	No, Skip 209

209	Type of abortion	Spontaneous.....1 Induced.....2	

1.3 Direct medical costs

1.3.1 Medication costs (participants' card review and determine with health facilities voucher)				
Time of mifepristone taken		_____time_____date_____month___ year_____ (12hour in Ethiopian calendar)		
sn	Used item description	Number of use (number)	Unit cost per dose per women	Total cost
210	Mefiprostol 200mg			
211	Misoprostol 800µg			
212	Ibuprofen 400mg po			
213	Plasil 10mg			
214	Metronidazole 500mg po			
215	Amoxicillin 500mg			
216	Oxytocin			
217	Erigometrine			
218	Normal saline 1000ml			
219	DNS1000ml			
220	40% glucose			
	others			
221				
222				

1.3.2 Diagnostic Costs (from women's card and their price determined health facilities voucher)				
s.n	Description of Investigation Type	Number of investigation	Units Cost per women	Total cost
223	Urine-based pregnancy test			
224	Ultrasound for dating			

225	Full blood count(CBC)			
226	Rhesus factor (RH) with blood group			
227	Hemoglobin			
228	Syphilis			
229	others			
300				
301				

1.3.3 Supply used for provision of first trimester safe abortion (document each and cost determine with health facilities voucher)

s.n	In put item /supply used	measurement	number	Average women with abortion used per month	Total cost others used it per month	Unit cost per women	Total price	Annual abortion usage cost
302								
303								
304								
305								
306								
307								
308								
309								
310								

Part II:- First trimester safe abortion outcomes summary (please put √)

s.n	Possible first trimester legal safe abortion's outcomes	Put (√) mark
311	Did abortion completes	
312	Did medication abortion fail and MVA was 28done	
314	Did surgical abortion fail and MVA repeated	
315	Did medication abortion fail and hospitalized for completion	
316	Did surgical abortion fail and hospitalized for completion/management	
317	Did she return for required study follow up	
318	death	

Part III:- Health care system first trimester safe abortion costs

1.3.4 Building cost (measuring the abortion building area and estimate with local rental values for similar building per square km)							
s.n	Service given	No. of room at the clinic	Room space (in square meter/ estimations)	Average rental value of the space	Average women with abortion coming to the room per month	Other joint services given in the room	remark
1							
2							
3							

1.3.5 health care providers' costs (interview human resources about their salary and estimate with human capital cost approach)												
s.n	Type of providers	Expected working hour/month	Average women with abortion seen per month	Average time spent for Provide per women with abortion following activates (day, hours) per months						Average Monthly salary of health professionals	Month salary/total working hours	Average women with abortion per provider
				History taking	Drug provides	Lab test	ultrasound	To do abortion	Total hour for abortion			
1	BSc nurse											
2	Diploma nurse											
3	ultrasound technician											
4	Health officer											
5	General practitioner											
6	Laboratory technologist											
7	radiologist											
8	Laboratory technician											

9	Diploma pharmacy											
10	BSc pharmacy											
11	gynecologist											
12	IESO											

1.3.6 Medical equipment and supplies cost (Interview case team coordinator and purchase price order from health facilities)

sn	Types of Equipmen	number	Birr of purchase	Year of purchase	Month /year in operatio	Depletion(cost) Birr	Days/month in operation	Average number of women with abortion served per month
1	ultrasound machine if used)							
2	vacuum aspirator syringe							
3	Urine-HCG machine							
4	full blood count machine							
5	abortion table							
6	light							
7	Bed if hospitalized							
8	Speculum							
	others							
9								
10								
11								
12								

13								
14								
15								
16								

11.4 የጥናቱ ዝርዝር መረጃ

ጤና ይስጥልኝ ስሜ _____ይባላል። እናም አሁን **<u>አቶ ጌታቸዉ ዉበት</u>** በባህር ዳር ጤና ተቋማት ዉስጥ በመጀመሪያ ሶስት ወራት ላይ በሚሰሩ ደህንነቱን የጠበቀ የዉርጃ አገልግሎቶች ላይ የትኛዉ የዉርጃ አይነት በአነስተኛ ዋጋ ከፍተኛ ዉጤትይሰጣል የሚለዉን ለመለየት ምርምር እያደረገ ይገኛል።

የጥናቱ ራዕስ፦ Cost -effectiveness analysis of first trimester safe abortion services in Bahir Dar health facilities, North West Ethiopia, 2020

የጥናቱ ዋና አላማ፦ በባህር ዳር ከተማ ዉስጥ በመጀመሪያ ሶስት የእርግዝና ወራቶች ላይ በሚሰጡ ህጋዊ የዉርጃ አገልግሎቶች ላይ መረጃ በመሰብሰብ የትኛዉ የዉርጃ አይነት በአነስተኛ ወጭ ከፍተኛ ዉጤት ይሰጣል የሚለዉን በመዳሰስ እና የተሻለዉን በመጠቆም በዉርጃ ምክያት የሚመጣዉን የኢኮኖሚ ጫና መቀነስ ነዉ።

ተሳታፊዎች፦ በተመረጡ ጤና ተቋማት ዉስጥ ደህንነቱ የተጠበቀ ህጋዊ የሶስት ወር ዉርጃ አገልግሎት የሚፈልጉ ሶስት ወር እና ከዚያ በታች የሆኑ ነፍሰ ጡር እናቶች ናቸው።እንዲሁም በተመሳሳይ የእርግዝና ወራቶች በመሀጸን ዉስጥ የሞተባቸዉም ይሳተፋሉ።

በጥናቱ ለመሳተፍ ፍቃደኛ ከሆናችሁ ፣ ጥቂት ጥያቄዎችን መጠየቅ እፈልጋለሁ። ሐቀኛ ምላሽዎ ከላይ የተገለጸዉን ዓላማ ለማሳካት ትልቅ ዋጋ ይኖረዋል። እንዲሁም የሚሰጡት መረጃ ሁሉ በሚስጥር የተጠበቀ ነው። ለዋና ተመራማሪዉ እና መረጃ ሰብሳቢው ብቻ መረጃዉ ይደርሳቸዋል። የሰጣችሁት መረጃዉም ለጥናቱ ዓላማ ብቻ ይዉላል። በጥናቱ በመሳተፍዎ የሚያገኙት ቀጥተኛ ጥቅምም ሆነ ጉዳት የለም። በፍቃደኝነት ምላሽ እንዲሰጡ በትህትና ተጠይቀዋል። ነገር ግን በዚህ ጥናት ዉስጥ ላለመሳተፍ መምረጥ ይችላሉ ወይም በቃለ መጠየቁ ወቅት የማይመችዎ ከሆነ በማንኛዉም ጊዜ ቃለ መጠየቁን አቋርጠዉ መዉጣት ይችላሉ።

11.5 የፍቃድ ስምምነት

እኔ ፣ ከታች የፈረምኩት፣ የዚህ ምርምር አንድምታ ሙሉ ለሙሉ ተብራርቶልኛል። እኔም ተረድቸዋለሁ። በዚህ ጥናት ዉስጥ በቃለ መጠየቅ ለመሳተፍ እስማማለሁ። እናም ለሁሉም ምክንያታዊ ጥያቄዎች በሐቀኝነት መልስ ለመስጠት እና ማንኛዉም የሀሰት መረጃ ላለመስጠት ፍቃደኛ ነኝ።

የተሳታፊዋ ፊርማ_____

የጥያቄዉ መለያ _____

የጠያቂዉ ፊርማ_____ ቀን_____

ያረጋገጠዉ፣ የተቆጣጣሪዉ/ተመራማሪዉ ስም_____ፊርማ_____

11.6 አማርኛ ጥያቄዎች

ክፍል አንድ፦ ለዉርጃ የእጩነት መመልመያ መስፈርት (የመረመራትን ባለሙያ የሚጠቅ)

ተቁ	ጥያቄ	መስፈርቶች
101	የሽንት ወይም አልትራሳዉንድ ምርመራዉ እርግዝናን ያሳያል?	አዎ.....1 የለም 2
102	ካረገዘች አስራ ሁለት እና ከዛ በታች ሳምንት ነዉ?	አዎ ..... 1 የለም.....2
ካላረገዙ ወይም የርግዝናዉ ጊዜ ከ12 ሳምንት በላይ ከሆነ፣ ከዚህ ላይ ያቁሙ። የእርግዝናቸዉ ጊዜ 12 እና ከዛ በታች ከሆነ ይቀጥሉ።		
103	የዉርጃ መድሃኒት እንዳትወስድ የሚከለክሉ ነገሮች አሉ?	አዎ.....1 የለም.....2
104	የመህጸን ጠረጋ እንዳይሰራላት የሚከለክሉ ነገሮች አሉ?	አዎ.....1 የለም.....2
ከላይ ያሉት ከ102-104 ያሉት መስፈርቶች በተቀባዉ ዉስጥ ከተሟሉ፣ የዉርጃ አገልግሎት ተጠቃሚዎች የፈለጉትን መምረጥ ይችላሉ።		
106	የመረጡት የጽንስ ማቋረጫ መንገድ	መድሃኒት.....1 የማህጸን ጠረጋ.....2

ክፍል ሁለት፦የሶስት ወር ደህንነቱ የተጠበቀ ዉርጃን ከሚፈልጉ እናቶች የሚሰበሰብ

2.1 **ማኅበራዊ ሁኔታዎች**

ተቁ	ጥያቄ	አማራጭ መልሶች	ይለፉ
201	እድሜ	……..……በዓመት	
202	የጋብቻ ሁኔታ	ያላገባች.....1 ያገባች……..……..2 የሞተባት…..……..3	

		የፊታች…….....…….....4	
203	መኖሪያ ቦታ	ገጠር……...…….....1 ከተማ…….....2	
204	የትምህርት ደረጃ	ማንበብና መጻፍ የማትችል.....1 አንደኛ ደረጃ (1_8) …….....2 ሁለተኛ ደረጃ (9_12) …….....3 ኮሌጅ እና ከዚያ በላይ …....……....4	
205	መደበኛ የስራ ሁኔታ	ተማሪ…….....1 የራስ ስራ.....2 የቤት እመቤት.....3 የቤት ሰራተኛ.....4 ሌላ ይገለጽ.....	

2.2 ስነ ተዋልዶን የተመለከቱ ጥያቄዎች

ተቁ	ጥያቄዎች	አማራጭ መልሶች	ይለፉ
206	ከዚህ በፊት አረገዝሽ ነበር?	አዎ.....1 የለም.....2	የለም ካለ 207ኛዉን ጥያቄ ይለፉ
207	የርግዝናዉ ዉጤት ምን ነበር?	በምጥ መዉለድ.....1 በኦፕራሲዮን መዉለድ.....2 ዉርጃ..... 3 ከማህጸን ዉጭ እርግዝና.....4	
208	ከዚህ በፊት አስወርዶሽ ያዉቃል?	አዎ …….....1 የለም …….....2	የለም ካለ 209ኛ ጥያቄ ይለፉ
209	አዎ ካለ የዉርጃው አይነት	በራሱ.....1 ሆን ተብሎ.....2	

2.3 ቀጥተኛ የህክምና ወጮች

2.3.1 የመድሃኒት ወጮች (መረጃ ሰብሳቢው የተጠቀሙትን እየተከታተለ ይመዘግባል፤ ዋጋቸዉ በተቋሙ የዋጋ ዝርዝር መሰረት የሚሞላ)

ሜፊፕሮስቶል የወሰደችበት ሰዓት እና ቀን		_____ሰዓት_____ቀን_____ወር_____ዓም_____ (12 በኢትዮጵያ አቆጣጠር)		
ተቁ	የመድሃኒቶች አይነት መግለጫ	የተጠቀመችዉ ብዛት (በቁጥር)	ነጠላ ዋጋ በነፍስ ጡር	ጠቅላላ ዋጋ
1	ሜፊፕሮስቶል (mefiprostol) 200 ሚ/ግ			
2	ሚሶፕሮስቶል (misoprostol) 800 ማ/ግ			

3	ኢቡፕሮፌን(ibuprofen) 400ሚ/ግ			
4	ፕላዚል (plasil) 10ሚ/ግ			
5	መትሮኒዳዞል (metronidazole) 500ሚ/ግ			
6	አሞክሳሲሊን (amoxacilline) 500mg			
7	ኦክሲቶክሲን (oxytocin)			
8	ኢርጎሜትሪን (Ergometrine)			
9	ኖርማል ሳላይን (Normal saline) 1000ሚ/ሊ			
10	ዲኤንኤስ (DNS)1000ሚሊ			
11	40% ግሉክስ			
	ሌሎች			
12				
13				
14				

2.3.2 የላቦራቶሪ የምርመራ ወጮች (ከዉርጃ ፈላጊዋ ካርድ ላይ የሚሰበሰብ እና ዋጋቸዉ በተቋሙ የዋጋ ዝርዝር መሰረት የሚሞላ)

ተቁ	የምርመራዉ አይነት	የምርመራዉ ብዛት (በቁጥር)	ነጠላ ዋጋ በነፍሰ ጡሯ	ጠቅላላ ዋጋ
1	የእርግዝና ሽንት ምርመራ (Urine-HCG)			
2	አልትራሳውንድ(Ultrasound for dating)			
3	ጠቅላላ ደም ቆጠራ ምርመራ(full blood count)			
4	የደም ወገን ምርመራ(Rhesus factor (RH) with blood group)			
5	ሂሞግሎቢን(Hemoglobin)			
6	ቂጥኝ (Syphilis)			
	ሌሎች			
7				
8				
9				

2.3.3 የእላቂ እቃዎች ወጮች (መረጃ ሰብሳቢው የተጠቀሙትን እየተከታተለ ይመዘግባል ፤ ዋጋቸዉ በተቋሙ የዋጋ ዝርዝር መሰረት የሚሞላ)

ተቁ	የግብዓት አይነት	መለኪያዉ	ብዛት	በአማከይ በወር ለስንት ዉርጃ ፈላጊዎች ይጠቀማል?	በአማካይ በወር ስንት ሌሎች ታካሚዎች ይጠቀሙታል?	ነጠላ ዋጋ	ጠቅላላ ዋጋ	የዓመቱ ጠቅላላ የዉርጃ ፈላጊዎች ወጭ
1								
2								
3								
4								
5								
6								

7								
8								
9								

2.3.4 የመጀመሪያው ሶስት ወር ህጋዊ ደህንነቱ የተጠበቀ ዉርጃ ውጤት ማጠቃለያ (እባክዎ (√) ያርጉ)

ተቁ	ሊሆኑ የሚችሉ የዉርጃ ውጤቶች	(√) ያርጉ
1.	ሙሉ በሙሉ ዉርጃዉ ተጠናቋል?	
2.	የመድሃኒት ዉርጃው ስላልተሳካ የማህጸን ጠረጋ ተሰርቶላታን?	
3.	የማህጸን ጠረጋው ስላልተሳካ የማህጸን ጠረጋው ተድግሟል?	
4.	የመድሃኒት ዉርጃው ስላልተሳካ አልጋ ይዘዉ ታክመዋል?	
5.	የማህጸን ጠረጋው ስላልተሳክ አልጋ ይዘዉ ታክመዋል?	
6.	ለክትትል ተመልሰዋል?	
7.	ሞት ተከስቷል?	

ክፍል ሶስት:- የጤና እንክብካቤ አቅራቢዎች ወጪ ለመገመት የተዘጋጀ ቃለ መጠይቅ

1.1

1.1.1 <u>የዉርጃ ክፍሎች ወጪ(በልኬታ እና በተመሳሳይ የህንጻ ዋጋ በመጠየቅ የሚሞላ</u>

ተቁ	ክፍሉ የሚሰጠው አገልግሎት	ስንት ክፍል አለው	የክፍሉ ስፋት በካሬ ሜትር	የኪራይ ዋጋው	በወር ስንት ዉርጃ ፈላጊዎች ይታዩበታል
1					
2					
3					
4					

1.1.2 <u>የባልሙያ ውጮች (የሰው ሃይልን በመጠየቅ የሚሞላ)</u>

ተቁ	የባልሙያዉ አይነት	በአማካይ በወር ለስንት ዉርጃ ፈላጊዎች አገልግሎት ይሰጣል?	ዉርጃ ፈላጊዎችን ለማስተናገድ በአማካይ ለባልሙያዉ የሚወስድዉ ጊዜ (በሰዓ)						ዉርጃ ፈላጊዎች በባልሙያ	የባልሙያዉ አማካይ ወርሃዊ ደሞዝ (ብር)
			ታሪክ ለመዉሰድ	መድሃኒት ለመስጠት	ለላቦራቶሪ ምርመራ አልትራሳዉንድ		ዉርጃዉን ለመስራት	ጥቅላላ ሰዓት በወር የፈጀው ጊዜ		

1	የመጀመሪያ ድግሪ ያለው ነርስ									
2	ዲፕሎማ ያለዉ ነርስ									
3	የአልትራሳዉንድ ባል ሙያ									
4	ጤና መኮነን									
5	ጠቅላላ ሃኪም									
6	ላቦራቶሪ ቴክኖሎጅ									
7	ላቦራቶሪ ቴክኒሻን									
8	የመጀመሪያ ድግሪ ያለው ፋርማሲ									
9	ራዲዮሎጅስት									
10	ጋይናኮሎጅስት									
11	አፋጣኝ ቀዶ ጥገና ባልሙያ (IESO or emergency surgeon)									

1.2 የመጀመሪያ ሶስት ወር እና ከዚያ በታች ደህንነቱ የተጠበቀ የዉርጃ አገልግሎት ለመስጠት የሚያስፈልጉ የህክምና መገልያ እቃዎች(አስተባባሪውን እና ግኙ ክፍልን በመጠየቅ የሚሞላ)

ተቁ	የእቃው ወይም የቁሳቁሱ አይነት	ብዛት	ስንት ብር ተገዛ	የገዛበት አመት	የሰራበት ጊዜ ወር/ዓመት	የቀነሳ ጊዜ በር	መሰረት የጀመረበት ወር እና አመት	በአማካይ በወርሰ ስንት ዉርጃ ፈላጊዎችን	በአማካይ በወር ስንት ሊሎችን ተገልጋዮችን ያገለግላል?
1	አልትራሳዉንድ ማሽን(ultrasound machine if used								
2	ቫኩዩም አስፓሬተር (vacuum aspirator syringe)								
3	የእርግዝና ሽንት ምርመራ (Urine-HCG) መስሪያ								
4	ጠቅላላ ደም ቆጠራ ምርመራ(full blood count) መስሪያ ማሽን								
5	የዉርጃ አልጋ (abortion table)								
6	መብራት (light)								
7	ማረፊያ አልጋ (bed)								
8	ስፔኩለም (speculum)								
	ሌሎች								
9									

10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

11.7 Declaration

I hereby state that this is a thesis prepared for the partial fulfillment of the requirements for the degree of masters of health system and project management on the title of "**cost - effectiveness analysis of first trimester safe abortion services in Bahir Dar health facilities, north west Ethiopia.''** I declare that this thesis is my original work, prepared under the guidance of **Mr. Getasew Taddesse** (MPH) and **Mr. Ayinengida Adamu** (MPH, Assistant professor) (thesis advisors). All sources of materials used for the thesis have been duly acknowledged. I further confirm that this thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of warding any diploma of university or other institution of higher learning, except where due acknowledgement is made in acknowledgments.

STUDENT NAME	SIGNATURE	DATE
Getachew Wubet	_____	_____

NAME OF ADVISOR 1	SIGNATURE	DATE
Mr. Getasew Taddesse	_____	_____

NAME OF ADVISOR 2	SIGNATURE	DATE
Mr. Ayinengida Adamu	_____	_____