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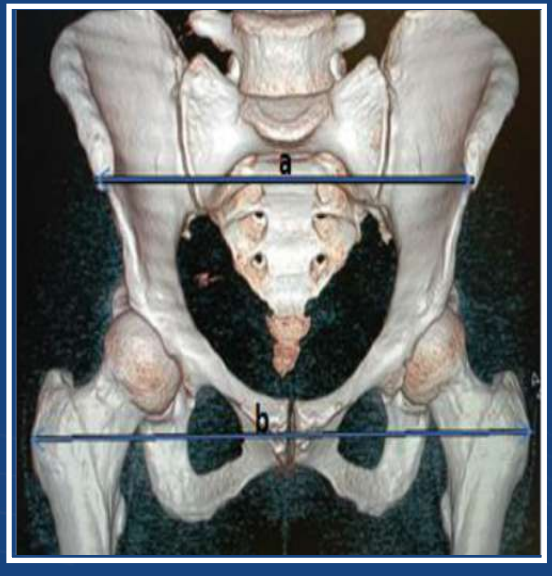

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ASSESSMENT OF PREDICTORS AND EFFECT OF DISCLOSURE OF HIV SEROPOSITIVE STATUS TO SEXUAL PARTNER AMONG HIV POSITIVE PREGNANT WOMEN ATTENDING ANTENATAL CARE IN FOUR TEACHING HOSPITALS IN ADDIS ABABA

Eskinder Kebede, MD[1], Yitbarek Fantahun, MD[1], Amanuel Tamiru, MD[1]

ABSTRACT

BACKGROUND: It is very crucial that women have the ability to disclose safely the status of being HIV-positive to male partners for the uptake as well as the continued use of methods of mother-to-child transmission (PMTCT) services. The majority of the women are afraid to disclose their seropositive status to their partners due to denial, blame, physical violence, and lack of financial support. Because of these reasons they discontinue the antenatal care follow-up and anteretroviral medication for them as well as the baby. In Ethiopia, there are not many studies done to explore HIV positive status disclosure to partners, the predictors, and the effects of disclosure of HIV positive status among HIV positive women during pregnancy.

METHOD: A cross-sectional study was conducted among 328 HIV-positive pregnant women who were attending ANC in four teaching Hospitals in Addis Ababa. Data was collected using a pretested structured questionnaire and SPSS- 21 version was used to analyze the data.

RESULT: Among the study participants 80% of the women had disclosed their HIV status to their partner. Presence of partner discussion before HIV test, the duration of the relationship between the couples, and knowing partner's HIV status were found to be strongly associated with their disclosure and those with status disclosure to the partners are 12 times more likely to utilize the PMTCT services than those with no disclosure.

CONCLUSIONS: The HIV-positive status disclosure among pregnant women is found to be high in our study. It showed that those women with no disclosure were found to have less participation in PMTCT programs. It is very important to note that proper uptake of and continued utilization of all PMTCT programs is hugely affected by women's disclosure of their HIV-positive status to their partners.

KEYWORDS: Disclosure, HIV, PMTCT

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INTRODUCTION

It has been three decades since HIV started its spread across the globe with a devastating impact on populations and economies of countries and regions.. UNAIDS 2021 shows 37.7 million people globally were living with HIV in 2020 [1] Among them, 68% was estimated in sub-Saharan African countries. Globally studies showed that pregnant women living with HIV were nearly 90% and HIV infection among children under 15 years old were more than 90%. [2]

Ethiopia is one of the sub-Saharan Africa countries worst affected by the HIV/AIDS pandemic. According to a ministry of health report published in 2011, approximately a 1.1million people were living with HIV. From this number, the higher number was accounted by women aged greater than 15 years. The primary mode of transmission is through unprotected sex with infected individuals which constitute 88% of transmission. [2]

Prevention of HIV infection depends on how successful the strategies to preventing new infection and how successfully we can treat currently infected individuals. The most critical prevention and treatment tools in control of HIV epidemics are PMTCT and HCT (HIV counseling and Testing) program. The success of the programme is affected by HIV status disclosure among HIV infected clients to their sexual partners. [3]

Disclosure is one of the important public health goals because it will motivate sexual partners to seek testing, it might also help to change behavior and ultimately to decrease transmission of HIV. [4]

In addition disclosure has a number of potential benefits for the individual including increased opportunities for social support, improved access to necessary medical care including antiretroviral treatment, increased opportunities to discuss and implement HIV risk reduction with partners, and increased opportunities to plan for the future. [3]

Disclosure is crucial to pregnant women since adherence to the recommended HIV treatment and breastfeeding regimens that are necessary to reduce transmission of HIV to their infants protect their own health and ensure the health of their partner will be very difficult without the support of the partner. Currently, there are 23.3 million people globally on HIV treatment. In Ethiopia HIV incidence is 0.72 per thousand. [1]

Antiretroviral therapy coverage for PMTCT (% of pregnant women living with HIV) in Ethiopia was reported at 92 % in 2020. [5] In Ethiopia, only 65% of HIV infected pregnant women have received antiretroviral drugs to reduce the risk of mother to child transmission of HIV/AIDS during 2020. [6]

A different institution like WHO and the Center for Disease Control has put the importance of disclosure of status to the partner in their prevention protocols of HIV testing and counseling. [7]

It helps couples to make informed reproductive health choices that may ultimately reduce the unintended pregnancies rates among women with HIV.

Along with these benefits, however, there are a number of potential risks from disclosure for HIV infected women including loss of economic support, blame, abandonment, physical and emotional abuse, discrimination, and disruption of family relationships which might force women not to share HIV positive status to their partners which in turn leads to a missed opportunity for new infection prevention as well to get appropriate treatment, care, and support. [8]

The aim of our study was to explore the different associated factors and the effects of HIV seropositive status disclosure to sexual partner among HIV positive pregnant women attending antenatal care.

METHOD

328 HIV-positive pregnant women were included in the study. The Institution based cross-sectional study design that used quantitative data collection method was carried out in four teaching hospitals,namely Tikur Anbessa Specialized Hospital, Ghandi Memorial Hospital, Zewditu Memorial Hospital and Saint Paul's Millineum Medical College Hospital, in Addis Ababa, the

capital city of Ethiopia. The study was conducted from 1st May 2017 GC till 30th August 2017 GC
All consequative HIV-positive pregnant mothers who come for ANC follow-up during the study period were included till the sample size is filled. A structured questionnaire was developed to assess the variable regarding the disclosure of positive HIV status to a partner and the utilization of PMTCT. A trained data collector interview immediately after the patient was seen by the doctor. The sample was divided equaly in the four teaching hospitals.
An assesment was done on the determinant of disclosure of HIV status including socio-demographic characteristics (age, family income, level of education, religion, and occupation), relationship factors (the duration of the relationship, the fear of partner's reaction and the HIV status of partner), HIV Status disclosure barriers (fear of abandonment, fear of confidentiality, and fear of accusation of infidelity) and the outcomes of disclosure (acceptance, understanding, blame, and violence). The partner disclosure status was documented by asking if the woman had revealed her HIV-positive status verbally to her sexual partner.
The Ethical clearance for the study was obtained from the Department of Obstetrics and Gynecology Research and Publication Committee (DRPC) of Addis Ababa University.. Permission was also obtained from the study facilities to collect data. Participation in the study was completely voluntary and informed written consent was acquired from every participant before participation. The study did not involve vulnerable populations.
Data were coded, entered, and cleaned using SPSS version 21 statistical software. Descriptive statistical analysis is used to describe and analyze the data into graphs and tables for easy interpretation. The independent variables were tested for statistical significance using the chi-square test and a binary logistic regression model was used to identify the influencing factors for disclosing to their partner. Results were expressed using an adjusted odds ratio relative to the reference category at the statistical significance of 95% confidence intervals and a P-value of <0.05 as statistically significant.

RESULTS

The study population was 340 consecutive HIV-positive pregnant women, of whom 328 of them agreed to be interviewed, making the respondent rate of 96.47%. The majority of the study participants were married 237(72.3%) and belongs to Orthodox Christianity and majority 301 (91.8%) had formal education and 140(42.7%) were housewife/ homemaker.
More than one-third of the respondents 118(36%) had a monthly income of less than 500 birr. The study showed that majority respondents respondents were Amhara and 269(82.6%) had completed primary school education. More than three fourth of the respondents 249(75.9%) were in the age group of 25–34 years. Our study has not shown any statistically significant relationship between those disclosing their status compared to those who had not with respect to these above-mentioned variables on bivariate analysis with P value of 0.13 (0.61 – 1.013).

Table 1. Socio demographic characteristics of respondents (n = 328).

Age	Frequency	Percent
18-24	10	3
25-34	249	75.9
>35	69	21
Total	328	100
Marital status		
Never married	73	22.3
Married	237	72.3
Divorced	18	5.5
Total	328	100
Religion		
Orthodox	234	71.3
Muslim	51	15.5
Protestant	37	11.3
Catholic	3	0.9
Others	3	0.9
Total	328	100
Ethnicity		
Amhara	161	49.1
Tigray	31	9.5
Oromia	78	23.8
SNNP	49	14.9
Others	9	2.7
Total	328	100
Educational status		
Unable to write and read	27	8.2
Grade 1-4	30	9.1
Grade5-8	102	31.1
Grade 9-12	111	33.8
college &above	58	17.7
Total	328	100
Average monthly income		
<500	118	36
500-1000	72	22
1000-3000	120	36.6
>3000	18	5.5
Total	328	100

Two hundred sixty-four (80.5%) of the 328 respondents had disclosed their HIV seropositive status to their sexual partners. Out of the 328 participants, 186 (56.7%) of them had HIV-positive partners. However, 78(23.8%) of them had HIV-negative partners (discordant). Less than one-fourth of the participant 64 (19.5%) did not know the HIV status of their partners.

The possible reasons for disclosure were concern for their partner's health 81(30.7%), ethical responsibility 122(46.2 %), fear of God to hide such things 19(7.2%) and to get support from the partner 36 (13.6%).

In addition, the study showed a very small percentage of participants disclosed their HIV seropositive status to their mother, father, and others 20(6.1%), 2(0.6%), and 1(0.3%) respectively. The study revealed that the majority of the respondents 148(56%) disclosed their status in the first six months of the diagnosis.

Table 2. Sero-positive HIV status disclosure experience among HIV Positive pregnant women

Disclosure HIV status to partner (n=328)		
	Frequency	**Percent**
Yes	264	80.5
No	64	19.5
Total	328	100
Duration of time for disclosure since diagnose(n=328)		
	Frequency	**Percent**
<6months	148	56.0
6-9months	96	36.4
>=9months	18	6.8
total	264	100
Reasons for disclosure of HIV status to sexual partner(n=328)		
	Frequency	**Percent**
I do not want to risk him	81	30.7
I want to get his support	36	13.6
It is usual to tell him every secret things	122	46.2
I feared God to hide such things	19	7.2
To feel free	6	2.3
Total	264	100
Discussion about VCT before HIV test (n=328)		
	Frequency	**Percent**
Yes	234	71.3
No	85	25.9
Not known	9	2.7
Total	328	100

The majority of participants 174(53.0%) of 186 study participants whose partners are HIV positive disclosed their HIV positive status to their partner and 75(22.9%) out of 78 discordant couples disclosed their HIV status. The majority of

participants 234 (71.3%) had discussed HIV testing prior to seeking PMTCT services but 85 (25.9%) of the respondents did not. From 234 women who had discussion about VCT, 224 (95.7%) had disclosed their status compare to from those 85 women who never had discussion 37 (43.5%) had diclosed.

Table 3. Sero-positive HIV status disclosure character among HIV Positive pregnant women

Variable	Frequency	Percent
Discordant		
HIV positive husband	186	56%
HIV negative husband	78	23.8%
Do not know husband status	64	19.5%
Total	328	100%
Discussion prior to seeking PMTCT		
Discussed	234	71.3%
Did not discussed	85	25.9%
DK	9	2.7%
Total	328	100%
Discussion before HIV testing		
Yes	224	68.3%
No	37	11.3%
DK	67	20.4
Total	328	100%

Factors influencing disclosure of HIV positive status including the duration of the relationship, the presence of prior discussion HIV test, and awareness about the partner's HIV status. The majority of participants 280 (85.4%) lived more than two years with their partners and of those 259 (79.9%) had disclosed their status when compared to those individuals who lived less which is five (1.5%).

Our study has found that prior communication about HIV testing with a partner, knowing Partner's HIV status, and HIV serostatus disclosure were strongly associated. Participants who had prior discussion before testing were 14 times more likely to disclose their status to partners than women without prior discussion (AOR 14.614, 95% CI (3.608-59.185). Women who know Partner's HIV status were nineteen times more likely to disclose their HIV status to partners than their counterparts (AOR 19.377, 95% CI (5.624-66.766) and women having less than two years duration of the relationship with partners were 99% less likely to disclose their HIV status to partners than the women who had a relationship more than 2 years (AOR 0.007, 95% CI (0.001-0.040).

The Positive outcomes reported by the participants were increased support and more intention to utilize PMTCT programs and out of 264 participants most 116(43.9%) reported that their partners reacted supportively to the disclosure of their HIV status. Fifty-four (20.5%) them are assured by their partner following disclosure. Fifteen (5.7%) care from their partner.

Some of the possible negative outcomes of disclosure reported by women were partner being annoyed 27(10.2%), partner yelling at women 24(9.1%), partner being worried about his HIV status11(4.2%), partners blaming the women 6(2.3%) partner talking about divorcing women 5(1.9%), and anger by partner 3(0.9%).

Table 4. Factors influencing disclosure of HIV positive status to sexual partner among HIV Positive pregnant women

Variables	Duration	Disclosed (N = 264)	Not disclosed (N-64)	COR (95% CI)	AOR (95% CI)
Duration of relationship:	<2yrs	5	43	0.009(0.003-0.026)	0.007(0.001-0.040)
with partners	>=2yrs	259	21	1	1
Discussion about VCT	yes	224	10	29.059(13.523-62.446)	14.614(3.608-59.185)
before HIV test	no	37	48	1	1
Knowing Partner's HIV status	yes	249	15	54.227(24.896-118.113)	19.377(5.624-66.766)
	no	15	49	1	1

Table 5. Partner reaction when he knew that I am HIV positive

Partner reaction	Frequency	Valid percent
Was supportive	116	43.9
Assured me	54	20.5
Annoyed	27	10.2
Yelled at me	24	9.1
Took care of me	15	5.7
Worried about his/her own HIV status	11	4.2
Blamed me to infect him	6	2.3
Talked about divorcing me	5	1.9
Was angry	3	0.9

The study demonstrated that those women who disclosed their positive status to their partners were twelve times more likely to participate in Prevention of Mother to Child Transmission programs than those who didn't disclose (COR 12.01(3.64-39.81).

Table 6. Effects of HIV status disclosure on intension to utilize PMTCT service

	N=328	ART use	COR
Disclosed	264	260	12.1
Did not disclose	64	1	

DISCUSSION

From our study, we have found that two hundred sixty-four (80.5%) of the 328 respondents had disclosed their HIV seropositive status to their sexual partner which is significantly higher than a study done in Tanzania (16.7%), Burkina Faso (31.6%) and Kenya (65%) and this could be related to advances in PMTCT and antiretroviral treatment programs in our country, the study setting and the time of the study. Counseling of HIV-positive pregnant women who did not disclose their HIV status during ANC would help them to disclose their status.

The delayed disclosure rate is found to be lower than those reported in other studies like the study done in Tanzania which showed around 22% of women disclosed to someone within 18 months period following diagnosis. In our study, the women who disclosed to a partner about their HIV positive status within less than six months of knowing their HIV status were more than half (56.8%), while 36.4% of the disclosures were delayed by 6-9 months, and 6.8% of the participant delayed by more than nine months.

In a similar study of 52 women who reported timing of disclosure, 31 (60%) had disclosed within 3 days of testing, and 79% of disclosures occurred in the first 30 days after a positive test. [6]

These study participants might have at least one sexual contact with their partner before disclosure which might raise the possibility of transmission risk if condoms were not used and may limit the beneficial aspect of disclosure making negotiating safer sex difficult and perhaps putting the partner at risk of infection. [8]

Unlike other studies, our study found that there was a greater proportion of disclosure to partners 80.5% disclosed to husband, and other family members which could be explained by the different levels of concern about the health condition of one's partner.. Our study identified that partner's health concern was the major reason cited for disclosing to sexual partner which is in line with some other studies. [7, 9]

Despite the high rate of HIV status disclosure, some (19.5%) of the participants did not know their partner's HIV status. The absence of disclosure to the partners could be either acknowledging that she is already infected with HIV or the result of the emotional rejection of the partner.

In this study, prior discussion with partners about HIV tests, is significantly associated with higher disclosure and it might be helpful to anticipate their partner's reaction and helpful for women to make decision making about disclosures better. This finding is in line with other studies which suggested individuals with prior discussion before testing are more likely to disclose their HIV positive status. [10]

The majority of women in this study reported that their partners reacted supportively to disclosing their HIV status but the reported negative outcome by women included partner being annoyed, yelling at the partner, being worried about his HIV status, blaming the women, raising issues of divorce, fear of confidentiality and accusation of infidelity. These findings were also demonstrated by a study done in Kenya. [11]

Those women with fear of the negative consequences of disclosure were less likely to disclose their status which could be explained that these perceptions and beliefs are some of the important predictors of behavior. [12, 13]

Our study concluded that women who disclose their status are found to be more likely to utilize PMTCT service . The possible explanation could be disclosure facilitates other behaviors that may improve utilization of PMTCT programs and HIV/AIDS prevention. [13]

Our study showed a 12 times more likely participation in PMTCT services in women who disclosed than the counterparts, (COR 12.01(3.64-39.81) which is somewhat different from other studies. [4]

CONCLUSIONS

Our study showed a high number of women disclosing their HIV positive status to their partners. It showed that those women with no disclosure were found to have less utillization of PMTCT programs. It is very important to note that proper uptake of and continued utilization of all PMTCT programs is hugely affected by women's disclosure of their HIV-positive status to their partners.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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DO THE EXTERNALLY MEASURABLE PELVIC DIAMETERS ESTIMATE THE RELEVANT BIRTH CANAL PARAMETERS IN A REPRODUCTIVE-AGE WOMAN? PELVIMETRY BY REFORMATTED COMPUTED TOMOGRAPHY AT SODO CHRISTIAN HOSPITAL, SOUTH ETHIOPIA

Weredekal Gashaw, MSc.[1], Abinet Gebremickael, MSc.[1], Girma Seyoum, PhD.[2], Sisay Manna, MD[3], Desalegn Ajema, MPH.[4], Simeon Meskele, MSc.[1]

ABSTRACT

INTRODUCTION: Assessment of the size of the female pelvis is an important obstetric practice to identify mothers at risk of cephalopelvic disproportion. The present study was aimed at assessing the prediction capability of intertuberous diameter, anterior interspinal diameter, and bi-trochanteric diameters on the pelvic inlet and mid-pelvis diameters as an alternative method to estimate different birth canal parameters.

METHODS: Institution-based retrospective study design was conducted on randomly sampled 423 abdominopelvic computed tomography images of reproductive-age women who visited Sodo Christian Hospital from September 2018 to November 2020. Pelvic diameters were measured on 3D workstation using multiplanar reconstruction and volume rendering images. Multivariate regression analysis were done for assessing the relationship between the variables by using STATA 16.

RESULTS: The present study demonstrated that, the intertuberous diameter (ITD) is a significant predictor of obstetric conjugate diameter (OCD), transvers diameter of pelvic inlet (TDI) and interspinous diameter (ISD). A millimeter increase in ITD is associated with 0.552 mm, 0.558 mm, and 0.74 mm increase in OCD, TDI, and ISD, respectively. The TDI is the only lesser pelvis diameter significantly predicted by the anterior interspinal diameter (AISD). A millimeter increase in AISD is associated with 0.229 mm increase in TDI.

CONCLUSION: As to the present study, the ITD is a potential predictor of the pelvic inlet and mid pelvic diameters. Besides, only the TDI could be estimated from AISD, whereas the BTD could not estimate any of the birth canal parameters. To obtain better perditions on lesser pelvis parameters, further studies by including additional anthropometric and pelvimetric variables is required.

KEYWORDS: Bi-trochanters, Intertuberous diameter, Mid-pelvis, Pelvic inlet, Pelvimetry

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INTRODUCTION

In the developing world, where most women deliver outside health centers and emergency transport is difficult to obtain, procedures like cesarean section (CS) cannot be performed in peripheral health centers. Hence, the ability to early identify women who are at high risk of Cephalopelvic Disproportion (CPD) is crucial in reducing feto-maternal morbidity and mortality either by timely refer to well-equipped health centers or by preparing them for elective CS [1, 2].

In health facilities in low-income countries where there is a limited resource, measuring and estimating internal pelvic parameters and predicting the outcome of labor is still performed by a routine clinical pelvimetry, in which the internal pelvic parameters are estimated and inferred subjectively. Because of such reason, clinical pelvimetry has been found to have a limited value and becomes a lost art [3, 4].

Although radiological pelvimetry, particularly CT as it has been described as the most accurate, patient-friendly, and provide reliable picture for high quality pelvimetry [5, 6], high costs and availability remains a major problem for using such instruments especially for developing countries like Ethiopia [4, 7]. To escape such problems different studies have been conducted to evaluate the correlation between easily measured greater pelvic and other anthropometric measurements with the internal birth canal parameters.

Due to the availability of obstetric pelvimeter even in low-income countries, the prediction of delivery complications by using external pelvimetric parameters has been commonly used [8]. Some related studies in Cameroon and Ethiopia have reported that using external pelvimetry in combination with other anthropometric parameters could be helpful in the screening of generally contracted pelvis particularly in developing countries with a limited resource. However, these studies were not assessed and clarified the direct relationship between such anthropometric measurements and external pelvic parameters with the birth canal parameters. Therefore, such conclusions could enhance subjectivity [1, 9-11].

Hence, this study attempted to assess the prediction capability of bi-trochanteric diameter (BTD), anterior interspinal diameter (AISD), and intertuberous diameter (ITD), which can be measured easily and externally, on obstetric conjugate diameter (OCD), transverse diameter of pelvic inlet (TDI) and inter-spinous diameter (ISD) of the lesser pelvis, which cannot be directly or precisely measured through clinical digital examination, by using reconstructed abdominopelvic CT scanned images of reproductive age women.

METHODS

An institution-based retrospective study was conducted in the radiology department of Sodo Christian Hospital, Southern Ethiopia. A total of 804 abdominopelvic CT scanned images of reproductive age women who were scanned in the Hospital for another purpose from September 2018 to December 2020 were available in the Hospital's picture archiving and communication system (PACS). Of these, 648 abdominopelvic CT images were fulfilled the inclusion criteria. The calculated sample size was 423 by using single population mean formula taking 50% population standard deviation since we could not find related studies conducted in Ethiopia and neighbor countries. By using the image ID as a sampling frame, a computer-generated simple random sampling technique was used to draw the CT scanned images of study participants. Only the CT images of women who visited the Hospital from September 2018 to December 2020 and were free from any disease which affects the bony pelvis such as pelvic bone fractures, visually decreased bone mass, pronounced curvatures of the vertebral column were included in the present study [9].

The pelvimetry was performed on three-dimensional workstation (Ad Wantage Workstation for Diagnostic Imaging) using multiplanar reconstruction and volume-rendered

abdominopelvic CT images with a slice thickness of 1.25mm. A structured checklist was used to record the measurements of all the variables of interest. All measurements were taken in millimeter (mm) and recorded in a checklist.

The AISD was measured transversely at the widest distance between the two anterior superior iliac spines, and the BTD was measured transversely at the widest distance between the two greater trochanters (Figure 1).

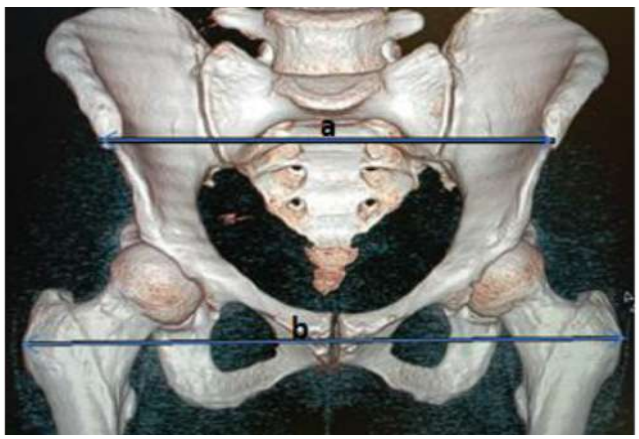

Figure 1. Measurements of the AISD (a), and the BTD (b). A reconstructed CT scanned image obtained from the Sodo Christian Hospital's PACS, 2020.

The OCD was measured between the center of the sacral promontory and the posterior surface of the symphysis pubis, and TDI was measured transversely at the widest distance of the pelvic brim (Figure 2).

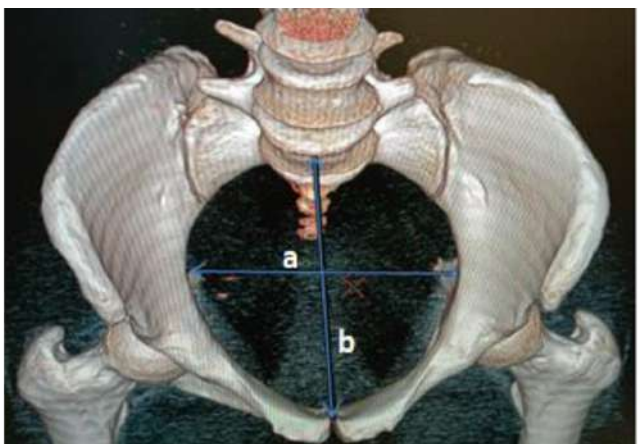

Figure 2. Measurements of the TDI (a) and OCD (b). A reconstructed CT scanned image obtained from the Sodo Christian Hospital's PACS, 2020.

The ISD was measured at the medial edge of the two ischial spines, and the ITD was measured at the level of inner margins of the ischial tuberosities transversely (Figure 3).

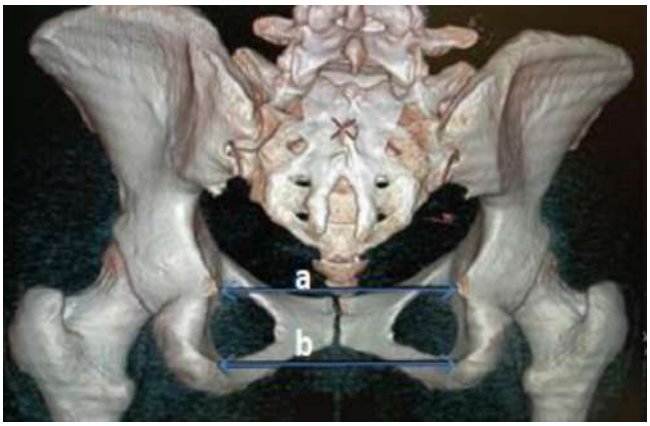

Figure 3. Measurements of ISD (a) and ITD (b). A reconstructed CT scanned image obtained from the Sodo Christian Hospital's PACS, 2020.

To maintain the data quality, each measurement was done by two radiologists on the same reconstruction and then results were averaged for analysis. To measure reproducibility of measurements, the inter observer variability were evaluated by the intra-class correlation coefficient (ICC) on the first thirty observations of the two examiners, and agreement was considered good when ICC was ≤ 0.8 and excellent when ICC > 0.9 2, 12. The Intra-class correlation coefficient (ICC) was range from 0.94 to 0.99 and excellent for all parameters in the present study.

Study Variables

In the present study, the intertuberous diameter (ITD), the anterior interspinal diameter (AISD), and the bi-trochanteric diameter were the independent variables, while the obstetric conjugate diameter (OCD), transvers diameter of pelvic inlet (TDI), and interspinous diameter (ISD) were taken as dependent variables.

Statistical Analysis

The data analysis was performed by using STATA version 16 program. The normality of the distribution was tested through Shapiro-Wilk test.

The level of significance was determined based on two-tailed tests and a p-value of < 0.05 was considered as statistically significant. Pearson correlation and partial correlation analysis were applied to measure the degree and strength of correlation between intertuberous diameter (ITD), anterior interspinal diameter (AISD) and bi-trochanteric diameter (BTD) with the obstetric conjugate diameter (OCD), transverse diameter of pelvic inlet (TDI) and interspinous diameter of the mid pelvis (ISD). To measure the partial effect of ITD, AISD and BTD on OCD, TDI and ISD, a multivariate regression analysis was performed after checking the presence of dependency between the dependent variables by using multicollinearity test. The multivariate regression analysis model can be described by the equation: $Y_{nxp} = X_{nx(k+1)}\ \beta(k+1)xp + \varepsilon$, where Y is the dependent variable, X is the independent variable, β is a parameter to be estimated and ε is the error term.

Ethical approval

This study was carried out after obtaining ethical approval from Arba Minch University institutional research ethics review board/IRB (Ref.no: IRB/567/12; Issue date: 26/11/2020). As the study was a retrospective review of archive data, the need for consent was waived by the ethics committee. No personal identifiers were used in the study.

RESULTS

The mean age of women who participated in this study was 33.79 ± 8.86 (SD) years (range 15 to 49 years).

Parameter correlation

The Pearson's correlation analysis demonstrated that, all the three externally unmeasurable lesser pelvis diameters have shown significant linear correlation with externally measurable, BTD and ITD. TDI is the only lesser pelvis diameter which has a significant correlation with AISD of the greater pelvis (p<0.05) (Table 1).

Table 1. Results of Pearson's correlation between ITD, AISD, BTD, and the internal lesser pelvis parameters of women participated in the study at Sodo Christian Hospital from September 2018 to November 2020.

Parameters		BTD	AISD	ITD
OCD		0.586	0.047	0.329
	Sig. (2- Tailed)	0.000	0.340	0.000
TDI		0.639	0.443	0.399
	Sig. (2- Tailed)	0.000	0.000	0.000
ISD		0.831	-0.001	0.505
	Sig. (2- Tailed)	0.000	0.979	0.000

After controlling the effect of other third variables on the correlation analysis, the partial correlation analysis revealed that the BTD was not a significant predictor of OCD, TDI, and ISD. Similar to Pearson's correlation analysis, the ITD is a significant predictor of all the three lesser pelvis diameters. Besides, the AISD is a significant predictor of TDI of the lesser pelvis only. The ITD can predict about 27%, 45% and 58% of the OCD, TDI, and ISD respectively. About 36% of the TDI is predicted by the AISD (Table 2).

Table 2. Partial Correlation Results of OCD, TDI, and ISD with ITD, AISD, BTD of women participated in the study.

	Variable	Partial Corr.	Partial Corr. ^2	Significance Value
OCD	ITD	0.5181	0.2684	0.0000
	AISD	0.0774	0.0060	0.1130
	BTD	-0.0197	0.0004	0.6871
TDI	ITD	0.6688	0.4473	0.0000
	AISD	0.5965	0.3558	0.0000
	BTD	-0.0643	0.0041	0.1879
ISD	ITD	0.7644	0.5842	0.0000
	AISD	0.0213	0.0005	0.6635
	BTD	0.0682	0.0046	0.1626

The Partial Effect of ITD, AISD and BTD on the OCD, TDI and ISD

The multicollinearity test has shown the presence of relationship among the dependent variables; hence to measure the partial effect of the ITD, AISD, and BTD on the pelvic inlet and mid pelvis diameters, multivariate regression analysis was performed with taking the OCD, TDI, and ISD as dependent variables and the ITD, AISD, and BTD as independent variables (Table 3).

Table 3. Multivariate Regression Analysis Results of ITD and AISD with OCD, TDI, and ISD of women participated in the study.

	Variable	Coef.	Std. Err	T	P>|t|
OCD	AISD	.035082	. .0220898	1.59	0.113
	BTD	-.0102576	.0254481	-0.40	0.687
	ITD	.5524478	.0445571	12.40	0.000
	_cons	41.0921	7.642484	5.38	0.000
TDI	AISD	.2286927	.0150341	15.21	0.000
	BTD	-.0228429	.0173198	-1.32	0.188
	ITD	.5584255	.0303252	18.41	0.000
	_cons	17.77793	5.201412	3.42	0.001
ISD	AISD	.0066258	.015218	0.44	0.664
	BTD	.0245257	.0175316	1.40	0.163
	ITD	.7448523	.0306961	24.27	0.000
	_cons	11.2566	5.265025	2.14	0.033

Results of the multivariate regression analysis demonstrated that, the ITD has shown a significant positive effect on OCD, TDI and ISD. A millimeter increase in ITD is associated with 0.552 mm, 0.558 mm, and 0.74 mm increases in the predicted values of OCD, TDI, and ISD respectively. The AISD has shown a significant positive effect only with the TDI. A millimeter increase in the AISD is associated with 0.229 mm increase in the average value of the TDI. Beside this, the TDI of the pelvic inlet is the only diameter that is significantly and positively affected by the ITD and AISD. A millimeter increase in the ITD and AISD is associated with 0.787 mm increase in the average value of the TDI.

Findings of the multivariate regression analysis indicate that, women who have larger ITD are expected to have wider OCD, TDI, and ISD and women with larger AISD are expected to have larger TDI, respectively.

DISCUSSION

For health institutions in low-income countries like Ethiopia, predicting internal lesser pelvis diameters at the level of pelvic inlet and midpelvis by using externally measurable pelvic outlet, greater pelvis and hip diameters is crucial and clinically important issue. There are few studies in the literature that attempted to see the relation between obstetrically important pelvic cavity diameters with externally measurable hip and pelvic bone marking diameters [19].

Results of the current study demonstrated that, A millimeter increase in ITD is associated with 0.552 mm, 0.558 mm, and 0.74 mm increases in the predicted values of OCD, TDI, and ISD respectively. The AISD has shown a significant positive effect only with the TDI. A millimeter increase in the AISD is associated with 0.229 mm increase in the average value of the TDI. Predicting TDI from the values of ITD and AISD is clinically important. According to previous studies, low TDI is associated with dystocia and emergency caesarian section [13, 14]. Our finding on the association between ITD with OCD, TDI, and ISD can be explained as, women who have smaller ITD are expected to have narrower mid pelvis, which is represented by ISD and narrower pelvic inlet size, represented by OCD and TDI.

Based on the reports of previous studies, ISD is found to be the best predictor of head descent, emergency deliveries, instrumental extractions, and obstructed labor in comparison to other pelvic and fetal head parameters [13, 15-17]. In addition to this, studies have also reported a correlation between low OCD values with the probability of caesarean section and cephalopelvic disproportion [13-14, 18].

As far as our literature search is concerned, there is a paucity of imaging studies carried out to assess the predicting capability of intertuberous diameter (ITD) and anterior interspinal diameter (AISD) on obstetrically important pelvic inlet diameters, which are obstetric conjugate diameter (OCD) and transverse diameter of the pelvic inlet (TDI). However, a study conducted in Latvia has assessed the prediction capabilities of ITD, AISD, and BTD on interspinous diameter of the mid pelvis (ISD) only and reported that, unlike AISD and BTD, intertuberous diameter (ITD) was a potential predictor of interspinous diameter of the mid pelvis (ISD), which is consistent with the current report [19].

Conducting a study on the prediction and estimation of obstetrically relevant pelvic cavity diameters from easily and externally measurable pelvic diameters is would be very important in the fields of obstetrics and gynecology, especially for resource limited countries like Ethiopia. However, all the measurements in this study were done on CT images only, which is a limitation of the study.

CONCLUSION

Results of the current study demonstrated that, ITD is a significant predictor of OCD, TDI and ISD. Among the three lesser pelvis diameters, the TDI is the only diameter significantly predicted by the AISD. The BTD has found statistically insignificant to be a potential predictor of OCD, TDI and ISD. The findings of this study give a piece of baseline information on the predictive capabilities of the externally measurable greater pelvis and hip diameters to the main birth canal parameters.

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CONFLICTS OF INTERESTS

The authors declare that they have no conflicts of interests in the publication of this paper. We also would like to acknowledge Sodo Christian Hospital for giving us permission to conduct this study in the center.

ABBREVIATIONS

AISD: Anterior interspinal diameter
BTD: Bi-trochanteric diameter
ISD: Interspinous diameter
ITD: Intertuberous diameter
OCD: Obstetric conjugate diameter
TDI: Transvers diameter of pelvic inlet

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EARLY SEXUAL DEBUT AND ASSOCIATED FACTORS AMONG HIGH SCHOOL STUDENTS IN KINDO KOYISHA DISTRICT, WOLAYTA ZONE, SOUTH ETHIOPIA

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ABSTRACT

BACKGROUND: Early Sexual debut during adolescent period has several potential impacts on sexual and reproductive health of adolescents. Sexual interest peaks around puberty and continues through adolescence. The adolescent sexual interest is motivated by a number of factors, including physiologic changes, nutritional and social factors, peer influences, and rehearsal for identity and adult gender roles. . Therefore, the aim of this study was to determine the magnitude and associated factors of early sexual debut among high school students in Kindo Koyisha district Wolaita zone southern Ethiopia.

METHODS: A cross-sectional study was conducted in Kindo Koyisha district, Wolaita Zone, Sothern Ethiopia. About 508 students were selected to be enrolled in this study. The Data were analyzed by using SPSS version 20. Both bivariable and multivariable logistic regression analysis were done. Multi-colinearity tests were conducted using variance inflation factor (VIF<10) and tolerance (>0.1) as cutoff. Hosmer and Lemeshew goodness of fit test was used to check for model fitness. Normality tests were done for continuous data. Variables with p<0.05 in multivariable regression were considered as statistically significant.

RESULT: This study revealed that 152 (30.3%), of respondents were involved in early sexual debut. Factors associated with early sexual debut were higher grade 10th-11th (AOR =2.6; 95% CI: 1.32-5.13), marital status being single (AOR= 0.10; 95% CI:0.049-0.29), watching porn media (AOR=1.72; 95%CI:1.01-2.94), having boy/girl friend (AOR=2.16; 95%CI:1.38-3.40), not discussing sexual and reproductive health issues with parents (AOR=2.91;95%CI:1.74-4.89).

This study showed that relatively high early sexual debut has been verified compared to other study areas. The major factors associated with early sexual debut were student's grade (grade 10th), marital status (singles), watching porn media, having boy/girl friend, not discussing sexual and reproductive health issues with parents and having source of information on sexual and reproductive health.

KEYWORDS: Early sexual debut, students, Kindo Koysha, high school, Ethiopia

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INTRODUCTION

Early Sexual debut during adolescent period has several potential impacts on sexual and reproductive health of adolescents. Sexual interest peaks around puberty and continues through adolescence. The adolescent sexual interest is motivated by a number of factors, including physiologic changes, nutritional and social factors [1] .

Transition to sexual activity is an important event in the life stage of human being. However, youths in early adolescence have not yet made the physical, mental, and emotional developments necessary to make sensible decisions surrounding sexual activity. Early sexual debut increases exposure to sexually transmitted diseases and other reproductive health disorders [2].

Adolescence is the natural and physiologic milestone whereby individuals make the gradual shifting from childhood to adulthood. Adolescent people are those with ages between 10 to 19 years old and young people 10-24 years, where as those aged 15-24 years are referred as youths. The adolescent age group is state of rapid physical, social and psychological change where new behaviors are more easily learned than when in adulthood. [3].

Adolescents have curiosity, responsibility and or risk taking and urge to experience new phenomena. This behaviour exposes them to significant sexual and reproductive health related problems including sexually transmitted infections and most importantly HIV/AIDS, unwanted pregnancy and its outcomes [3, 4] .

According to Ethiopian Demographic and Health Survey (EDHS) 2016 report, among women age 25-49 years, 24% of them had first sexual intercourse before age 15 [5]. Also another studies conducted in different part of Ethiopia for instance Gamo Gofa, South West Ethiopia; Dessie, North East Ethiopia, Gojjam, North Ethiopia, 72%, 51% and 12.7% of high school students had initiated sex respectively at the mean (±SD) age of 17.07(±2.12), 16.8(+2.3) and 16.5(±1.6) respectively(6-8). Additionally astudy conducted among Jiga high school students showed that 56.3% of respondents had first sexual intercourse before their 18th birthday [9]. Also among Wollega University students premarital sexual practice between 15-19 years of age were 62.1% [10].

In Addis Ababa 20.8% of the study participants ever had practiced sexual intercourse at median age of 16 years [11]. Other studies in Addis Ababa, Ambo University and Awi zone northwest Ethiopia showed 25%, 25.3% and 20.4% respectively [12-15]. In Wolaita Sodo University students the mean age of first sexual experience was found to be 18.4(±1.75) and 19.9(±1.87) for males and females, respectively(16). Also the Boditti's high school study shows that 29.1% of participants had a sexual debut at age of 16.8 and 20.4 years for males and females respectively [17].

This indicate that youth who begin early sexual activity have little knowledge and awareness, therefore, they are more likely to have high-risk sex. This may be related with increased susceptibility to HIV transmission and other STIs, unwanted pregnancy and its complications [18].

Some of the factors associated with early sexual debut among high school youths are age, gender, educational level, knowledge on HIV, communication on sexual and reproductive health issues with parents, living arrangement, parental socio economic status, watching pornography, attitude towards early sex and substance abuse [18, 19].

Although rates of adolescent childbearing are declining in many countries, 15 million women ages 15 to 19 give birth every year, 13 million in less developed countries. Overall, 33% of women from less developed countries give birth before the age of 20 years [20].

In Ethiopia, adolescents have been given higher priority in the prevention and control of HIV/AIDS because most new infections are occurring among them so that delaying time of sexual debut is the base for prevention of HIV/AIDS and STIs, teenage and unwanted pregnancy and related consequences among adolescents [2].

As shown in the different studies gender, substance use (smoking and alcohol use), having been in a physical fight, lack of parental or guardian attachment, lack of peer support at school [21, 22] maternal education, place of residence and family influence [22], participating in religious activity [23, 24], medias such as (internet, TV, newspaper, magazines, romantic novels, etc) [25-27] were factors associated with early sexual debut among high school students.

Communication between parents and adolescents [28], pornographic films [29], personal interest or curiosity, sex for money source, forced sex, to pass examination [30, 31], employment status [7], lack of access to health care services [32], living at rural area were the associated factors on pre-marital sex among adolescents [33].

Therefore, the aim of this study was to determine the magnitude of early sexual debut and associated factors among high school in Kindo Koyisha district, Wolaita zone, SNNPR Ethiopia.

METHODS

Study setting and Period

The study was conducted in Kindo Koyisha district, Wolaita Zone, Sothern Ethiopia which is 410 km far from Addis Ababa from February 1-30, 2017. According to 2017 report of district education office, there were 45 primary schools and 4 high schools in the district, of which one is located in urban kebele and the other three high schools in the rural kebeles of the district. The total number of grade 9th -12th student were 6349 (male 3448 and females 2901) [34].

Study design

Institution based cross-sectional study was conducted in Kindo Koysha district.

Study population

All high school students

Study Unit

The study units were randomly selected students from randomly selected sections of each grade.

Inclusion Criterion

All students who attended a class during this study period were included.

Exclusion Criteria

Students who were ill were excluded. For this study, students who were younger than 15 year were excluded.

Sample size determination and sampling procedure

The sample was calculated with Open-Epi statistical software version 3.03 using single population proportion statistical formula using p- prevalence of early sexual debut 20.4% (0.204) from previous study [19]. The final calculated sample size was 499 and 10% non response rate was added become 549. After computing correction formula the final sample size becomes 508.

Data collection tools

A structured pre-tested and self-administrated questionnaire was used to collect data which was prepared form different studies and literatures. Information was extracted on: Socio-demographic characteristics, non-sexual behavior, sexual behavior, knowledge on sexual and reproductive issues, attitude toward early sexual debut and student-parent communication on sexual and reproductive issues. The data was collected by using pre-structured questionnaire which adopted from Central Statistical Agency CSA [35]. List of sections from each school used as a sampling frame. Sample sections were selected randomly using simple random sampling technique. Students from the section were selected again using lottery method from list of students in each selected section.

Data quality assurance

Before data collection, the questionnaires were pretested and translated into Amharic and back to English to keep consistency of the questionnaires. One day training was given to data collectors and supervisors.

Data management and analysis

The ddependent variable for this study was early sexual debut. However, iIndependent variables

Socio-demographic variables such as age, sex, religion, own income, getting pocket money, living arrangement, grade level, residence, behavioral and knowledge factors such as alcohol drinking, chewing khat, smoking, having boy/girl friend, watching pornographic films, attitude toward early sexual debut, knowledge about HIV/AIDS, parental factors: Parental education level, discussing SRH issues, family income.

Data were checked for completeness and consistency, coded and then entered into EpiData version 3.1 and exported into SPSS version 20 to be analyzed. Descriptive statistics was used to calculate frequencies and percentages of the data. Both bivariable and multivariable logistic regression analysis were done. Variables with a p-value <0.25 on bivariable analysis were considered as candidates for multivariable analysis. Multi-colinearity tests were conducted using variance inflation factor (VIF<10) and tolerance (>0.1) as cutoff. Hosmer and Lemeshew goodness of fit test was used to check for model fitness. Normality tests were done for continuous data. Variables with p<0.05 in multivariable regression were considered as statistically significant.

RESULTS

Socio-demographic characteristics

A total of 501 out of 508 students participated in this study. From 501 respondents 265(52.9%) were males, 421(84%) were age less than 18 years with the mean and SD age of 17.64 (+1.915) years. Majorities 296(59.1%) of the respondents were protestant, 442(88.2%) of respondents are single or not married, 331(66.1%) were residing in urban area, 224(44.7%) of them live with their father and mother (Table 1).

Table 1: Socio-Demographic Characteristics of high school students, in Kindo Koysha district South Ethiopia, February 2017(n=501)

Variables	Category	Frequency	Percent
Age	15-18 years	421	84
	≥18 years	80	16
Sex	Male	265	52.9
	Female	236	47.1
Grade	9th	142	28.3
	10th	122	24.4
	11th	157	31.3
	12th	80	16
Marital status	Single	442	88.2
	Ever married	59	11.8
Age at marriage (n=59)	<18 years	44	74.5
	≥18 years	15	25.5
Respondents residence	Rural	170	33.9
	Urban	331	66.1
Family residence	Rural	339	67.7
	Urban	162	32.3
Fathers education	Can't read and write	87	17.4
	Primary	175	34.9
	Secondary	172	34.3
	Tertiary	67	13.4
Mothers education	Can't read and write	157	31.3
	Primary	195	38.9
	Secondary	103	20.6
	Tertiary	46	9.2
Family monthly income	<500 ETB	105	21.0
	500-1500ETB	218	43.5
	≥1501ETB	178	35.5

Prevalence of Early sexual debut

About 152(30.3%) of students had practiced sex before 18 years of age. From these, 77(50.7%) were males and 75(49.3%) were females. The mean age at first sexual intercourse was 15(+1.64) years.

About 473 (94.4%) of study participants had no comprehensive knowledge while 28 (5.6%) had comprehensive knowledge towards RH. Regarding the attitude towards early sexual debut, 322(64.3%) of the respondents had positive attitude while 179

(35.7%)of them had negative knowledge attitude. Majority 383(76.4%) of the respondents had never drink alcohols in their life. Moreover, 190(37.9%) of participants watched pornographic movies, 311(62.1%) of them never watched pornographic movies (Table 2).

Factors associated with early sexual debut among High school students

According to results of bivariate analysis, students higher grade level, marital being single, ever watching porn/sex film, having boy/girl friend, having source of information on SRH issues, discussing SRH issues with parents, SRH service provision in schools, participating on school SRH services, mean attitude towards early sexual debut and having comprehensive knowledge towards HIV/AIDS were associated with early sexual debut (Table 2).

Table 2: Bivariate analysis showing factors associated with early sexual debut among High school students in Kindo Koysha district, February 2017.

Variable	Category	Early sexual debut		COR with 95%CI	P value_
		No	Yes		
Grade	9th	109	33	1	1
	10th	73	49	2.07[1.21-3.52]	0.005*
	11th	112	45	1.32[0.78-2.23]	0.05*
	12th	55	25	1.5[0.81-2.77]	0.26
Marital status	Single	334	108	0.11[0.05-0.20]	0.00*
	Ever married	15	44	1	1
Fathers education level	Can't read/write	63	24	1	1
	Primary(1-8)	112	63	1.44[0.82-2.52]	0.15*
	Secondary (9-12)	126	46	0.93[0.522-1.66]	0.94
	Tertiary	48	19	1.03[0.51-2.11]	0.40
Ever watched sex film/porn	Yes	110	80	2.31[1.56-3.14]	0.04*
	No	239	72	1	1
Ever drink alcohol	Yes	65	53	2.18[1.42-3.35]	0.22*
	No	284	99	1	1
Ever chewed chat	Yes	36	23	1.45[0.82-2.57]	0.05*
	No	313	129	1	1
Have boy girl friend	Yes	126	90	2.56[1.74-3.79]	0.001*
	No	223	62	1	1
Have source or information on SRH issues	Yes	214	123	1	1
	No	135	29	0.38[0.24-0.60]	0.00*
Discuss SRH issues with parents	Yes	170	54	1	1
	No	179	98	1.73[1.17-2.58]	0.00*
Comprehensive knowledge towards HIV/AIDS	Had no knowledge	325	148	1	1
	Had knowledge	24	4	0.36[0.12-1.07]	0.06*

* Variables eligible for multivariate analysis

Students who watch sex films or porn media were 1.7 times more likely to practice early sexual debut than who did not watch AOR 1.72[1.01-2.94]. Students who have boy or girl friend had two times higher chance of practicing early sexual debut when compared with those who did not have AOR 2.16[1.38-3.4]. Those students who did not discuss Sexual and Reproductive Health (SRH) issues with their family are 2.9 times more likely to experience early sexual debut than those who discuss AOR 2.91[1.74-4.89] (Table 3).

Table 3: Multivariate logistic regression analysis showing factors associated with early sexual debut among high school students in Kindo Koysha district February 2017

Variables	Category	Early sexual debut		COR 95%CI	AOR 95% CI
		No	Yes		
Grade	9	109	33	1	1
	10	73	49	2.07[1.21-5.52]	2.61[1.32-5.13]*
	11	112	45	1.32[0.78.2.23]	1.93[0.98-3.8]
	12	55	25	1.5[0.81-2.77]	1.55[0.7-3.53]
Watching sex film or porn media	Yes	110	80	2.31[1.56-3.14]	1.72[1.01-2.94]*
	No	239	72	1	1
Having boy/girl friend	Yes	126	90	2.56[1.74-3.79]	2.16[1.38-3.4]*
	No	223	62	1	1
Discuss SRH issues with family	Yes	170	54	1	1
	No	179	98	1.73[1.17-2.58]	2.91[1.74-4.89]**
Have source of information on SRH issues	Yes	214	123	1	1
	No	135	29	0.57[0.24-0.59]	0.34[0.19-0.59]**
Marital status	Single	334	108	0.11[0.05-0.2]	0.10[0.049-0.29]**
	Ever married	15	44	1	1

* P< 0.05, ** P< 0.00; COR: crude odds ratio, AOR: adjusted odds ratio, CI: confidence interval

DISCUSSION

Our study showed that 152(30.3%) of students had practiced sex before 18 years of age with mean age at first sexual intercourse was 15(+1.64) years. Watching sex film or porn media, having boy/girl friend, discussing of SRH issues with family, have source of information on SRH issues, marital status being single are one of the associated factors.

This study revealed that 152(30.3%), (95% CI=26.30%-34.38%) of respondents were involved in early sexual debut (sexual initiation before 18 years of age). This finding is higher than studies conducted in six Caribbean countries (29.9%)[21], combined DHS results in sub Saharan Africa(25%)[36], Addis Ababa(25%) [11] and Awi zone Amhara region(20.4%) [14]. However, this finding is lower than other studies done in Ghana(72%) [37],Tanzania (40.2%) [1], EDHS 2016 (62%) [35] and Gamo Gofa (72%) [7]. This might be the definition of early sexual debut that we used, age category of respondents, differences in social, cultural, religious values and different setup of the study area and study population.

This study show that the mean +SD age at first sexual intercourse was 15(+1.64) years (16.07+1.71 for males and 15.86+1.57 for females). This is similar with studies done in Shendi town 16.5±1.6 [8] and Swaziland 16.2±1.1(38),but lower than studies conducted in Tanzania17.2±1.8 [1], Gamo Gofa 17.07 ±2.12 [7] and higher than results of studies conducted in Ghana 14.5 [37] and in Nigeria 14.1±1.2 for males and 13.4±1.5 for females [39]. The likely explanation could be the larger sample size, social, religious, cultural setting and diversity of population.

In this study being grade 10 student was found to be more associated with early sexual debut, which is different from the study conducted in Awi zone [14]. The difference might be due to that current study used students from grades 9-12 and so the larger proportion of grade 10 students were participated. However, the previous study used only preparatory students (grades 11 and 12) [40].

The current study also showed that singles were 90% less likely to practice early sexual debut than ever married. This may be related with presence of early marriage (lower age at marriage) in the study area and also the reason that the majority of respondents were not married in this study.

In present study those who watching sex films or porn media had 1.7 times more liable to have early sexual debut. This finding is in line with findings from Nigeria [26], Zimbabwe [27], Shendi town [8], Shireendaselassie school [41], Dessie [6], Jigjiga [29] and Addis Ababa [11]. The possible suggestion might be that sex films may raise student's arousal and motivation to practice what they have seen. But this finding is contrary to study done in Gamogofa zone [AOR 1.9 (1.0, 3.3), p<0.09] [7]. This might be that the previous study used samples from those who visited health institutions for VCT service and the interview method was face to face which may make fear of giving true response about the issue.

This study revealed that having boy/girl friend is another factor associated with early sexual debut which is similar of the study conducted in Shendi town(8), Shireendasellasie [41] and Awi zone [14]. Even though some studies are not in line with this study the possible reason could be that boy/girl may pressure each other to have or practice sex because of their relationship.

According to this study those students who do not discuss sexual and reproductive health issues with their parents were three times more likely to start early sex than their counterparts. This finding is consistent with other studies from Tanzania [42], Debremarkos University [15], Shireendasellasie [41] and Diredawa [28]. The likely explanation could be that discussion about sexual and reproductive health issues helps to create awareness about consequences of early sex and this may reduce student's engagement in early sex.

Our study revealed that those who do not have information source about sexual and reproductive health issues had 66% reduced odds of engaging in early sex. This finding is consistent with study

done in Shire town [31] and West Shoa [43]. The possible explanation might be that the students used different information for safer and protective manner for sexual practices.

CONCLUSION

In this study area relatively high early sexual debut has been verified compared to other study areas. The major factors associated with early sexual debut were student's grade (grade 10th), marital status (singles), watching porn media, having boy/girl friend, not discussing sexual and reproductive health issues with parents and having source of information on sexual and reproductive health. We recommend that the formal comprehensive sex education programs targeted at delaying age at first sex. Further studies using large sample size should be conducted to explore more.

LIMITATION

Since, the study is very sensitive that are more of private that someone may have Social desirability bias and has recall bias.

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Availability of data

The data used/analyzed during the current study available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The ethical clearance was obtained from Ethical Review Committee of the College of Health Sciences, Wolayta Sodo University. Based on approval, official letter of cooperation was written to Kindo Koyisha district education and health office for permission. Permission letter was obtained from Kindo Koyisha district education and health office and the school principals were contacted and communicated. For students less than 18 years ages were signed over assent with parents or guardians.

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GYNECOLOGIC LAPAROSCOPIC SURGERY; EXPERIENCE OF CENTER OF FERTILITY AND REPRODUCTIVE MEDICINE AT SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

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ABSTRACT

BACKGROUND: Recent data suggests that up to 80% of gynecologic surgeries can be accomplished laparoscopically. However, laparoscopy does not come without risks – specifically risks of injury to the bowel, urinary tract, and vasculature. This study assesses the indications for, as well as the complications and outcomes of gynecologic laparoscopic surgery in the Center of Fertility and Reproductive Medicine at St Paul's Hospital Millennium Medical College (CFRM at SPHMMC).

METHODS AND MATERIALS: This was a cross sectional study using data abstracted from medical records between April 2019 to September 2020. We included all gynecologic laparoscopies done during this study period. The data was collected with Open Data Kit (ODK) software and then transferred to Microsoft Excel then to SPSS version 20 analysis..

RESULTS: There were 135 gynecologic surgeries performed, with a mean patient age of 32.4 years. About two-thirds of them presented with primary infertility, and 30% had a previous laparotomy or laparoscopy. The main indication for laparoscopy is hydrosalpinx (51.1%). The overall complication ratio was 3.7% and ratio of conversion to laparotomy was 5.2%.

CONCLUSION: The complication ratio was higher compared to previously published studies from Asia and Europe.

KEYWORDS: Gynecology, laparoscopy, surgery, Saint Paul's Hospital Millennium Medical College.

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INTRODUCTION

Laparoscopy is a surgical procedure where a surgeon accesses the abdominal cavity by making small opening into the belly for the introduction of instruments [1]. Over the last 30 years, laparoscopy has shown marked advancement and has become popular with both patients and surgeons for its fast recovery, better aesthetic result, less pain, and shorter hospital stay [2]. Currently, laparoscopy is the preferred operating technique for gynecologic procedures such as ovarian cystectomy, diagnosis and management of endometriosis [3–6], myomectomy [7], tubal ligation [8], diagnosis and management of tubal pathology [9–11], treatment of ectopic pregnancy [12,13], workup of unexplained infertility [14], and hysterectomy [1]. In addition, it is also being used in the management of pelvic organ prolapse, urinary incontinence, chronic pelvic pain and some pelvic cancers [1]. Large abdominal mass, irreducible external hernia, hypovolemic shock, inexperienced surgeon, lack of appropriate instruments, and medical problems (eg. cardiorespiratory failure, obstructive airway disease, myocardial infarction) are contraindications for laparoscopic surgery [1].

Laparoscopic surgery is not without complications. Many risks, like deep vein thrombosis, adhesion formation and anesthesia exposure, are shared with laparotomy. But the occurrence of injury to bowel, bladder, and major pelvic vessels is higher in laparoscopy. In general, laparoscopic complications are grouped into two categories: major and minor [1]. Major complications include injury to the hollow organs of the viscera (intestine, bladder, or ureter), bleeding or infection during laparoscopy that later needs exploration, death or severe medical sequelae. Minor complications includes anemia following mild bleeding, fever, abdominal wall hematoma, urinary tract infection, postoperative urinary retention, and paralytic ileus. For these reason patients with previous history of surgery for appendicitis, tuboovarian abscess, and patients with clearly documented adhesions should be carefully selected [7]. Obese patients with a BMI of above 45kg/m2 are also at increased risk for laparoscopic-associated complications for two reasons: one, pneumoperitoneum creation with Veress needle can occur due to increased thickness of adipose tissue, and second, they don't tolerate prolonged Trendelenburg position due to increased airway pressure [2].

Despite the multiple advantages of laparoscopy over laparotomy like less adhesion, less hospital stay, less postoperative pain and faster return to work, it is still underutilized in low and middle income countries (LMIC) [1]. This is mainly because of limited funding for laparoscopic instruments, a culture of surgical practice and training that does not promote new technology, and a lack of willingness by surgeons to engage in more technical and time consuming procedures. Despite these barriers, laparoscopic surgery is showing slow but encouraging progress in many resource limited African settings [16]. In Ethiopia, there are now ten hospitals (both private and government) that provide biliary, gastrointestinal, and gynecologic laparoscopic surgery. Most of them are located in Addis Ababa, and due to training constraints, are limited to providing only diagnostic and minor laparoscopic procedures. This study was conducted to review the experience of laparoscopic surgeries at CFRM at SPHMMC. It also evaluated the occurrence and management of intraoperative complications. For future studies, in the field of gynecologic laparoscopic surgery, our study will provide baseline information.

METHODS AND MATERIALS

The study conducted an institution based, cross-sectional study for all women who underwent laparoscopic gynecologic surgery at CFRM at SPHMMC from April 2019 to September 2020.

The inclusion criteria included all women who had undergone all gynecologic laparoscopic surgery that had been documented in the operation room log book. Women were excluded if their medical records were illegible or incomplete.

The calculated sample size using single population proportion formula,

$$n = \frac{(z2\ 1-\alpha/2p(1-p)}{d2}$$

5% acceptable margin of error(d), a confidence level of 95%(z), and a complication rate of 6.7%(p) derived from a prior similar study from Cameroon [16] to yield a sample size of 96 participants. However, given that the total number of cases at CFRM at SPHMMC far exceeded this sample size, we opted to incorporate all 135 cases that were performed during this study period in order to provide better representation.

The gynecologic laparoscopic surgeries were categorized into four levels [20]. Level one includes basic procedures for diagnostic purposes only. This includes chromopertubation, acquisition of pelvic washings, and second-look laparoscopy. Level two, termed minor laparoscopy includes tubal sterilization, ovarian biopsy, adhesiolysis not involving bowel, and destruction of minor endometriotic lesions. Level three, major laparoscopy, includes any procedure that required well defined laparoscopic techniques such as resection of ectopic pregnancy, management of pelvic inflammatory disease, polycystic ovarian drilling, removal of benign ovarian cysts, tuboplasty, management of moderate to severe endometriosis, and extensive adhesiolysis. Level four, advanced laparoscopy, includes myomectomy, hysterectomy, pelvic lymphadenectomy, resection of retroperitoneal endometriosis and surgery for gynecologic malignancy.

The questionnaire for data collection included age, weight, previous history of surgery, history of tuberculosis or sexual transmitted disease, indication for laparoscopy, complication and its management, outcome of complication management, and duration of surgery.

Complication was defined as any incident that shifted the surgical plan into an unplanned direction which necessitate additional action like laparotomy. Injury to the bowel, bladder, ureter, major vasculature, peritonitis, and thromboembolic events were considered as complication.

The data was collected using Open Data Kit (ODK) software and then transferred to Microsoft Excel then to SPSS version 20 analysis to generate descriptive statistics. Approval of ethical clearance obtained from SPHMMC IRB office. The researchers have no any interest of conflict with other individual, group or drug companies

RESULTS

The study included 135 women who underwent laparoscopy between April 2019 through September 2020. The mean age of patients was 32.4 years with 67.4% (n=91) between 20-34 years of age. Sixty-nine percent (n=93) presented with primary infertility.

Table 1: Basic characteristics of patients who undergone gynecologic Laparoscopy at CFRM at SPHMMC, September 2020.

Age in years	No.	%
20-34	91	67.4
35-39	34	25.2
40-45	10	7.4
History of previous infection		
STI	6	4.4
TB	19	14.1
No infection	72	53.3
Not documented	38	28.1
Infertility type		
Primary	93	68.9
Secondary	42	31.1
Previous history laparotomy		
No	105	77.8
Yes	30	22.2
Previous history of laparoscopy		
No	123	91.1
Yes	12	8.9

Half of patients reported no history of infection. Fourteen percent (n=19) had a history of tuberculosis. Twenty-two percent (n=30) had history of laparotomy and 9% (n=12) had a prior history of laparoscopy.

The most common indication for laparoscopy was hydrosalpinx which accounted for 51.1% (n=69) of cases. This was followed by benign ovarian tumor 22.2% (n=30), diagnostic laparoscopy - chromopertubation 11.1% (n=15), and myomectomy 8.1%(n=11).

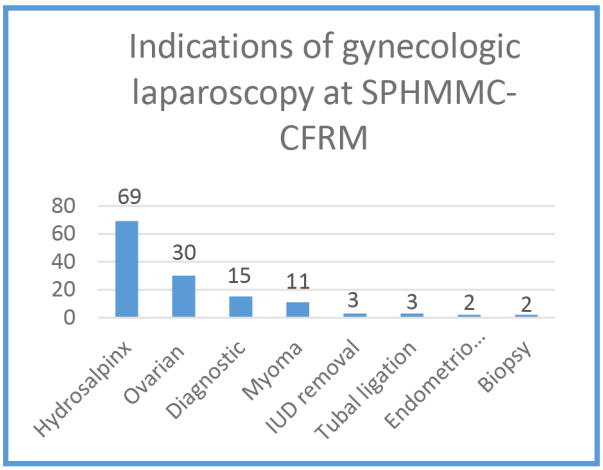

Figure 1 Laparoscopic Indications for patients who undergone gynecologic Laparoscopy at CFRM at SPHMMC-, September 2020.

Of the 69 patients with hydrosalpinx, 97% (n=67) were diagnosed preoperatively by transvaginal ultrasound. Intraoperatively 64%(n=44) were found to have bilateral hydrosalpinx, 29% (n=20) were found to have unilateral hydrosalpinx, and 4% (n=3) had only adhesive disease without hydrosalpinx. For patients with laparoscopically confirm hydrosalpinx, 54% (n=37) underwent bilateral salpingectomy, 17% (n=12) underwent unilateral salpingectomy, and proximal tubal occlusion (PTO) for hydrosalpinx was the only procedure performed in 16% of cases (n=11). When evaluating the level of laparoscopic difficulty, two-thirds of these were level three (major), followed by minor type or level one(17.8%). About 9% of the total laparoscopic procedure is regarded as advanced type of level four.

Table 2: Distributions of intraoperative procedure done for hydrosalpinx and Level of Laparoscopy difficulty and their histopathology result at CFRM at SPHMMC

Intraoperative procedure for hudrosalpinx	Frequency	%
bilateral salpingectomy	37	27.4
unilateral salpingectomy	12	8.9
one side salpingectomy the other side PTO	9	6.7
unilateral PTO	6	4.4
bilateral proximal tubal occlusion(PTO)	5	3.7
Difficulty of Laparoscopy	**Frequency**	%
advanced laparoscopy	12	8.9
major laparoscopy	89	65.9
minor laparoscopy	24	17.8
diagnostic	10	7.4
Histopathology	**Frequency**	%
inconclusive	59	43.7
benign mass	48	35.56
bacterial infection	16	11.85
TB	11	8.15
malignant tumor	1	0.74

The study showed two cases were unable to get completed laparoscopically. In both instances entry to the peritoneum using the Verres needle or trocar was unsuccessful due to obesity and adhesions and these cases were converted to laparotomy. There were five (3.7%) complications: two bladder injuries, two bowel injuries, and one hemorrhage from utero-ovarian pedicle. Three were diagnosed intraoperatively and two were diagnosed on the second and third postoperative days. Those that were diagnosed intraoperatively were managed by conversion to laparotomy. And those diagnosed in the postoperative period were taken back to the operating room for diagnostic laparotomy and management. Thus, 5.2% (n=7) of cases were converted to or managed by laparotomy. All patient's for whom the final outcome was laparotomy improved and subsequently were discharged from the hospital (length of stay ranging from 4-21 days). For those cases without complication, patients were discharged on first postoperative day.

Table 3: Characteristics of the five major complications against to indications, level of laparoscopy, previous history of surgery and history of infection at CFRM at SPHMMC, September 2020.

Complications	Indication	Level of laparoscopy	Previous surgery	History of infection	Experience of surgeon(years)	Management	Hospital Stay(days)
Bowel injury (1)	Ovarian cyst	major	no	TB	1	laparotomy	8
Bowel injury (2)	Ovarian cyst	major	yes	PID	1	laparotomy	21
Bladder injury (1)	hydrosalpinx	major	yes	no	2	laparotomy	5
Bladder injury (2)	Ovarian cyst	major	no	PID	2	laparotomy	5
Hemorrhage	myoma	advanced	no	no	1	laparotomy	4

Tissues was routinely sent for histopathologic evaluation when indicated and 8.1% (n=11) patients were found to have active tuberculosis and 12% (n=16) patients were diagnosed with PID. All of these patients were provided with the appropriate antibiotics base on culture results and the tuberculosis patients were linked to TB centers in their vicinity. There was also one case of ovarian malignancy. There was no difference in operative time between patients had a history of prior intrabdominal surgery as compared to those who did not.

Table 4: Association between surgical time to previous history of surgery at CFRM at SPHMMC, September 2020.

	History of laparotomy		
	No (n=105)	Yes (n=30)	p-value
Surgery time, median (IQR)	65.0 (50.0, 95.0)	70.0 (50.0, 100.0)	0.44
History of laparoscopy	No (n=123)	Yes (n=12)	
	70.0 (50.0, 100.0)	67.5 (60.0, 72.5)	0.93

DISCUSSION

This study had a finding with 51.1% of cases performed for tubal pathology followed by ovarian pathology (22.2%), and 11.1% were done solely for diagnostic purposes. Myomectomy accounted for 8.2% of laparoscopies. In a review of 2888 gynecologic laparoscopy cases over 12 years, Fuentes MN et al. [17] found that the primary indication was tubal ligation (30.7%), followed by cystectomy (26.1%), unilateral adnexectomy (10.3%), and salpingectomy (10.2%). And 54% of cases were considered major laparoscopic surgeries. Another study that included 3724 gynecologic laparoscopic surgeries done in India from 2013-2017 by Shastri SS et al. [18] found that the main indication for laparoscopy was tubal sterilization (69.2%). Cystectomy and salpingectomy accounted for 17.2% of cases. These all studies indicated that the tubal surgeries were the main indication for gynecologic laparoscopy. But study by Belinga E, et al. in Cameroon [16] found that their primary indication for surgery was ovarian cyst (25%) followed by ectopic pregnancy (20%). They also found that the majority of their cases were level III (major) laparoscopies (58.6%) followed by level II (minor) laparoscopies (13.2%). This study had similar results with a majority of cases constituting level III (major) laparosocopies (67.8%) followed by level II (minor) laparoscopies (17.8%). But their indications were different because the set up that this study done is a fertility center where patients require surgery for the evaluation or management of infertility.

A study done in Cameroon [16] encountered 6.8% (18/266) laparoscopic complications including 9 hemorrhagic, 3 bowel injury. Sixty-seven percent of the complications were managed by laparoconversion.. But this study done in Ethiopia showed lower of complication of 3.7% (two bowel injury, two bladder perforation and one hemorrhage) and lower conversion to laparotomy of 5.2%; where 5 cases were done for laparoscopic complication and 2 cases for failed laparoscopy due to difficult Verres or trocar insertion. But when it was compared to Spanish [17], Taiwanese [19] and indian [18] studies, they showed lower ratio of complication 1.93%, 0.72%, 1.98% respectively. Thought our complication ratio was higher than most Asian and European centers, it was better than other African hospitals. Two of the five complications were diagnosed in the postoperative period but should have been picked intraoperatively. This may be due to inherent problem of laparoscopy itself with respect to visualization and instrument handling This can be explained due to our surgeons' lack of experience, lack of criteria for patient selection, and patient factors like previous infection and adhesive disease.

CONCLUSION

In conclusion, this study showed that complicated gynecologic procedures were being done. This study only indicated the procedure done for those patients who come for fertility care. So other gynecologic pathologies are not being dealt laparoscopically. The study showed that laparoscopy is minimal access surgery rather than minimal invasive surgery. Finally, in future we recommend that there should be prospective large scale study.

LIMITATION OF THE STUDY

The study was retrospective with small size which is done by data abstraction from chart.

DISCLOSURE OF CONFLICT OF INTEREST

The authors have no conflict of interest to and organization or individual to mention.

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READINESS OF HEALTH FACILITIES IN PROVIDING ANTENATAL CARE LABORATORY TESTS AND SATISFACTION OF CLIENTS IN ETHIOPIA

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ABSTRACT

BACKGROUND: For early identification of pregnancy complications and other problems that affect the outcomes of pregnancy, pregnant women need to receive laboratory tests during antenatal care. The provision of antenatal care laboratory tests is influenced by the availability and capacity of the support systems.

OBJECTIVE: The objective of this study is to assess the readiness of health facilities in providing antenatal care laboratory tests and satisfaction of clients.

METHODS: A health facility based cross-sectional study design was employed. Facility readiness was assessed in a sample of 205 health facilities and exit interview with 1,180 pregnant women.

RESULTS: 199 facilities and 960 pregnant women were involved. The sampled facilities have fulfilled the minimum requirements including 67% for infrastructure, 67.2% for documents, 49.6% for equipment, and 76% for trained laboratory personnel. The average reagents stockout rate on the date of the visit was 29.6% with stockouts during the past thirty days being at 32% and the mean number of days stocks last for 93 days. The average availability of the laboratory tests was 84% with infrastructure (p=0.018) and equipment (p=0.000) being the significant predictors. The overall satisfaction rate with the services provided was 83.2%.

CONCLUSIONS: Readiness of health facilities to deliver antenatal care laboratory tests was low with acceptable client satisfaction rate. The identified gaps need to be addressed to ensure better quality antenatal care laboratory test services.

KEYWORDS: Laboratory test, Antenatal care laboratory tests, ANC laboratory tests, USAID, Transform: Primary Health Care.

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INTRODUCTION

Globally, 303,000 maternal deaths, 2.6 million stillbirths, and 2.7 million newborn deaths occur annually from preventable causes related to pregnancy and childbirth. Antenatal care (ANC) is crucial for the prevention of these deaths. Eighty six percent of pregnant women access at least one ANC service from a skilled provider and 78% deliver with the assistance of skilled provider globally [1].

Ethiopia has made progress in reducing maternal mortality with the maternal mortality ratio declining from 1,400/100,000 live births in 1990 to 401/100,000 in 2017: mainly due to improved access, quality, and utilization of services [2].

The major causes of maternal deaths in the country include hemorrhage, anemia, hypertension during pregnancy, and sepsis which can be prevented by interventions like ANC [3].

To achieve the benefits of ANC, at least four visits where essential evidence-based interventions are provided is required. The essential interventions in ANC focus on the identification and management of complications which require effective laboratory services. In Ethiopia, ANC 1 coverage is 74% and ANC 4+ is 43%. However, only 20% attend their first ANC visit before 16 weeks of gestation [4-8].

Pregnant women should receive ANC laboratory tests (hemoglobin, blood group and Rh status, urinalysis, test for human immuno-deficiency virus (HIV) serostatus, Rapid Plasma Reagin (RPR) test for syphilis, and hepatitis B surface antigen) to identify complications and other potential problems that affect the outcomes of pregnancy [6].

Provision of quality ANC is influenced by the availability and capacity of support systems, including adequately staffed and stocked laboratories. The Service Availability and Readiness Assessment (SARA) is used in Ethiopia to determine the availability of basic equipment, amenities, essential medicines, and diagnostic capacity at health facilities (HFs) [7,9-11].

The limited capacity of HFs in Ethiopia to provide adequate laboratory tests remains a major barrier to the quality of ANC services. ANC-related laboratory tests can be hampered by shortages and quality of human resources, equipment, test kits, reagents, and other supplies [12].

The objective of this study is to assess the readiness of HFs in providing ANC laboratory tests and satisfaction of clients.

METHODS

Study setting and period: The study was conducted in primary hospitals (PHLs) and health centers (HCs) in three regions (Amhara, Oromia, SNNP) of the country where USAID Transform: Primary Health Care has been operating since January 2017. During the study time, Sidama and South-west regions were part of SNNP and hence, the term "SNNP" refers to Sidama, SNNP, and South-west. The study period was July–September 2020.

Study design: A HF based cross-sectional study design was employed.

Sample size and sampling: HFs: HF numbers were determined based on the Aga Khan Foundation's recommendations [13] and 205 HFs [22 PHLs and 183 HCs] were selected.

Exit interviews: A single population proportion survey formula was used. P was 56.3%-proportion of satisfied women with ANC laboratory test services in Addis Ababa [10], margin of error of 4% with confidence interval at 95% and design effect of 2. Hence, the sample size was 1,180.

The sample size was allocated proportionally for the three regions and primary healthcare entities. The primary health care entities were identified through simple random sampling. Exist interview was completed through consecutive sampling method until an adequate sample was obtained.

Data collection process and instrument: 25 data collectors and three supervisors, fluent in the local languages, were involved. All were health workers with at least master's level degrees in health fields. Data was collected using structured interview questionnaires; an equipment, reagent, materials, and supply audit tool; and a secondary data extraction format. Readiness of HFs in delivering

ANC laboratory tests was assessed in relation to infrastructure; standard operating procedures (SOPs), guidelines, protocols, and documentation; equipment; reagents; personnel; and overall availability of ANC laboratory tests. Interviews of pregnant women were conducted after they received ANC laboratory tests. The five scale Likert scale was used to assess degree of satisfaction of clients. The questionnaire used in the interviews was developed in English language, was translated into local languages, and back to English.

To ensure quality of data, properly designed data collection processes were followed. Data collectors and supervisors attended a two-day training with pretesting of data collection tools. Supervisors reviewed samples of collected data daily and held discussions with data collectors.

Data management and analysis: The research team assessed the quality, accuracy, and completeness of the collected data using range plausibility and cross-validation checks. The exit interview data was collected using local languages and was translated back to English before analysis. The quantitative data was entered into EPI-Data version 10 for Windows and exported into SPSS version 25 for analysis. A bivariate logistic regression analysis was used. An odds ratio of 95% confidence interval (CI) was calculated to identify predictors of the availability of ANC laboratory tests and satisfaction levels.

Ethics

Ethical clearance was granted from JSI IRB, REFERENCE: IRB #19-30E and the IRBs of the three regional state health bureaus. The necessary and appropriate information about the study was explained to the study participants. Written consent was sought from pregnant women for the exit interviews. Verbal consent was obtained from heads of the HFs and the professionals who provided information.

RESULTS

Findings are categorized into: 'readiness of HFs' and 'client satisfaction'.

1. **Readiness of HFs**: 199 of the sampled 205 HFs (97.1%) were assessed.

1.1. Infrastructure: 67% of the HFs had the minimum infrastructure ranging from 26.8% for 'access to safe drinking water' to 91.9% for 'a well-maintained roof'. Running water was available in 42.1% while 64.0% had consistent electric power supply (table 1).

Table 1. Status of laboratory infrastructure in HFs at USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia.

Variables	N	n (%)
Infrastructure	191	128 (67.1%)
Area is maintained in good condition	197	173 (87.8%)
Is secured with lock and key, accessible during normal working hours	198	178 (90.4%)
Has shelves and lockable cupboards; access is limited to authorized personnel	197	139 (70.6%)
Has enough space to store existing supplies	198	82 (41.4%)
Has running water.	195	82 (42.1%)
Has a consistent power supply and/or a generator with a guaranteed supply of petrol or solar power	189	121 (64.0%)
Has an adequate number of power points	198	147 (74.2%)
Has separate sinks for washing laboratory ware and staining, and for washing hands after being exposed to infected materials	198	130 (65.7%)
Has drainage for laboratory sinks that are closed and that lead to either a septic tank or deep pits	197	134 (68.0%)
Has a functioning incinerator or another nationally acceptable waste management system (e.g., a protected pit) to correctly dispose of all hazardous waste (e.g., needles, toxic materials) and fuel for the incinerator (if applicable)	198	165 (83.3%)
Floors are in good condition without the need for repair	198	169 (85.4%)
At all times, roof is maintained in good condition to avoid sunlight and water penetration	197	181 (91.9%)
Internal walls are in good condition without the need for repair	196	179 (91.3%)
External walls are in good condition without the need for repair	197	176 (89.3%)
Is well lit	194	172 (88.7%)
Is well ventilated and cross-ventilated	198	173 (87.4%)
Windows and doors are in good condition without the need for replacement or repair	197	174 (88.3%)
Has firm built-in benches with leveled tops in good condition	196	132 (67.3%)
Has firm shelves to store supplies and reagents	197	125 (63.5%)
There is adequate glassware and/or plasticware	197	100 (50.8%)
Distilled/deionized water is available	196	90 (45.9%)
Windows have security bars	196	126 (64.3%)
There is an adequate number of laboratory stools	195	76 (39.0%)
Has an indoor patient waiting area with seats	196	96 (49.0%)
Staff have access to clean toilet facilities	198	112 (56.6%)
Staff have access to safe drinking water	194	52 (26.8%)
Has a working fire extinguisher	193	80 (41.5%)
The working environment is kept organized and clean, with safe procedures for handling of specimens and waste material	198	146 (73.7%)
Has adequate lighting, ventilation, water, waste and refuse disposal.	195	134 (68.7%)

1.2. SOPs, guidelines, protocols, and documentation: The minimum documents were present in 67.2% of the HFs, ranging from 26.1% for 'referral forms' to 96.5% for 'registers' (table 2).

Table 2. Presence of laboratory SOPs, guidelines, protocols, and documentation in HFs at USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia. (N=99)

Variables	Number	Percent
Availability of laboratory SOPs, guidelines, protocols, and documentation	134	67.2%
SOP manuals	177	88.9%
Guidelines for all tests and equipment	137	68.8%
Request and report forms	172	86.4%
Specimen and results registers	192	96.5%
Equipment and supplies inventory registers	107	53.8%
Quarterly/monthly reporting forms	135	67.8%
Referral forms	52	26.1%
Periodic reporting (monthly, quarterly)	170	85.4%
Preliminary analysis	58	29.1%
Utilization of results	107	53.8%
Collection of useful and appropriate information	117	58.8%
Archiving and retrieval	69	34.7%
Patient identification	189	95.0%
Date and time of specimen collection	160	80.4%
Test performed	184	92.5%
Date of report	170	85.4%
The reference or normal range	76	38.2%
Interpretation	79	39.7%

1.3. Laboratory Equipment: The minimum equipment was present in 49.6% of the HFs, ranging from 13.6% for 'lab coats' to 99.5% for 'waste receptacles' (table 3).

Table 3. Availability of laboratory equipment in HFs at USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia. (N=199)

Variables	Number	Percent
Availability of laboratory equipment	99	49.6%
General centrifuge for urine	176	88.4%
Micro-hematocrit centrifuge	112	56.3%
Hemo Cue for hemoglobin determination	59	29.6%
Complete blood count machine	66	33.2%
Refrigerators	152	76.4%
Bright field compound microscopes	154	77.4%
Light source	132	66.3%
Desktop computers and printers	56	28.1%
Thermometers	57	28.6%
Hand soaps	57	28.6%
Unused sharps boxes	170	85.4%
Gloves	187	94.0%
Waste receptacles	198	99.5%
Goggles	188	94.5%
Masks	62	31.2%
Plastic aprons	158	79.4%
Lab coats	27	13.6%

1.4. Laboratory reagents, test kits, and other supplies: The average stockout on the day of the visits was 29.6%, ranging from 10.1% for 'immersion oil' to 61.8% for 'xylene'. The average presence of stockout during the last thirty days was 32%, ranging from 6.5% for 'Uristix (dipstick)' to 73.4% for "xylene". The mean number of days the available stocks last was 93 days, ranging from 70 days for 'HIV test kits' to 129 days for 'immersion oil' (table 4).

Table 4. Stockout of laboratory reagents, test kits, and other supplies in HFs at USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia. (N=199)

Variables	Stockout on the day of visit		Stockout on the last thirty days		Mean number of days stock is available
	Number	Percent	Number	Percent	
Stockout of laboratory reagents, test kits, and other supplies	59	29.6%	64	32.0%	93
Uristix (dipstick)	21	10.6%	13	6.5%	78
Capillary tube (heparinized)	39	19.6%	35	17.6%	106
Giemsa staining solution	37	18.6%	31	15.6%	97
Crystal violet	109	54.8%	124	62.3%	89
Gram iodine	112	56.3%	130	65.3%	100
Acetone alcohol	95	47.7%	112	56.3%	103
Safranin	108	54.3%	125	62.8%	97
Hepatitis test kits	27	13.6%	23	11.6%	84
RPR antigen kits	21	10.6%	17	8.5%	86
Blood group/type antisera	24	12.1%	18	9.0%	88
Pregnancy test kits	22	11.1%	19	9.5%	85
HIV test kits	40	20.1%	47	23.6%	70
Hematology auto analyzer reagent kits	113	56.8%	126	63.3%	84
Methanol	61	30.7%	66	33.2%	92
Xylene	123	61.8%	146	73.4%	96
Immersion oil	20	10.1%	14	7.0%	129

1.5. Personnel: 76% of HFs have laboratory personnel who can provide services while 6% have non-laboratory personnel who are providing laboratory services.

1.6. ANC laboratory tests: The average availability of ANC laboratory tests in HFs was 84% ranging from 60.8% for 'Hgb/CBC/HCT' to 98.5% for 'RPR syphilis tests' and 'urinalysis'. Fifty three percent of the HFs reported stoppage of providing one or more of the tests during the last six months (table 5).

Table 5. Availability of ANC laboratory tests in HFs at USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia. (N=199)

Variables	Number	Percent
Availability of ANC laboratory tests	167	84.0%
Hgb/CBC/HCT	121	60.8%
HBsAg	183	92.0%
RPR	196	98.5%
Blood group & RH	192	96.5%
HIV tests	184	92.5%
Urine-analysis	196	98.5%
HF stopped providing service of ≥1 of the ANC laboratory tests in the last six months	105	52.8%

A bivariate logistic regression was performed to ascertain the effects of availing SOPs, personnel, equipment, reagents, and infrastructure on the likelihood that HFs have laboratory test services. Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962) procedure. A Bonferroni correction was applied using all fifteen terms in the model, resulting in statistical significance being accepted when p<.00333 (Tabachnick & Fidell, 2014). Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable. There was no standardized residual with a value of greater than 3.0 standard deviations. The logistic regression model was statistically significant, $\chi 2(7)=69.638$, p<.0005. The model explained 40.8% (Nagelkerke R2) of the variance in service availability and correctly classified 73.3% of cases. Sensitivity was 73.0%, specificity was 73.6%, positive predictive value was 75.3%, and negative predictive value was 71.3%. Of the potential predictor variables checked, only two were statistically significant: 'equipment availability' and 'infrastructure' (table 6).

Table 6. Predictors of availability of ANC laboratory tests in HFs at USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia.

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
SOPs, guidelines, documentation Personnel	.015	.012	1.506	1	.220	1.015	.991	1.039
Personnel	-.013	.012	1.212	1	.271	.987	.964	1.010
Equipment	.074	.020	14.216	1	.000	1.076	1.036	1.119
Reagents	-.228	.297	.593	1	.441	.796	.445	1.423
Infrastructure	.025	.011	5.635	1	.018	1.025	1.004	1.047
Constant	-6.217	1.327	21.951	1	.000	.002		

2. Client satisfaction: Exit interview was carried out with 960 pregnant women. Clients satisfied with the turnaround time at laboratory were 78.6%, 86% were satisfied with the laboratory staff, and 83.2% with the overall ANC laboratory services. Chi-square test of homogeneity was conducted between HF type and levels of satisfaction. All expected cell counts were greater than five. There is no statistically significant difference (p>.05) between HCs and PHLs in the level of satisfaction with laboratory turnaround time, laboratory staff, and laboratory test services (table 7).

Table 7. Satisfaction of clients with ANC laboratory services rendered in HFs of USAID Transform: Primary Health Care intervention woredas, July-September 2020, Ethiopia.

Variables	Satisfaction level	Health centers N (%)	Hospitals N (%)	Total N (%)	Pearson Chi-square (P)
Satisfaction with turnaround time	Dissatisfied	54 (8.3)	34 (11.4)	88 (9.3)	0.308
	Neutral	81 (12.5)	34 (11.4)	115 (12.1)	
	Satisfied	514 (79.2)	231 (77.3)	745 (78.6)	
Satisfaction with services	Dissatisfied	43 (6.5)	11 (3.6)	54 (5.6)	0.141
	Neutral	69 (10.5)	38 (12.6)	107 (11.1)	
	Satisfied	546 (83)	253 (83.8)	799 (83.2)	
Satisfaction with staff	Dissatisfied	25 (3.8)	7 (2.3)	32 (3.3)	0.289
	Neutral	65 (9.9)	37 (12.3)	102 (10.6)	
	Satisfied	568 (86.3)	258 (85.4)	826 (86)	

DISCUSSION

The readiness of HFs to provide ANC laboratory tests in terms of infrastructure was at 67.1% which is higher than the 39% of mean availability of tracer items for basic amenities in the 2018 SARA report [9]. This difference may be because the SARA report was based on the overall HF status while this study is on specific unit, the laboratory. Considerable investments have also been made after the SARA report.

Availability of SOPs, guidelines, protocols, and documentation is at 67.2% which is higher than the 15.4% of an Addis Ababa study [10]. This difference may be due to sample size difference (13 versus 199) and a lot has been invested to develop and distribute national documents since the previous study.

The minimum laboratory equipment is available in 49.6% of the HFs which is lower than the 60% for the mean availability of tracer item equipment of the 2018 SARA report [9]. This difference may be because in the SARA report, the tracer items selected were the most easily procured and easy to maintain medical equipment while in this study specific laboratory equipment which are expensive to procure and become non-functional easily were assessed.

Stockout on the day of the visit was found in 29.6% of the HFs which is lower than the 53.8% for equipment down time due to reagents stockout in a study done in Addis Ababa [14]. This difference may be due to the difference in sample size and the country's investment since the Addis Ababa study.

Trained laboratory personnel who can provide ANC laboratory tests were present in 76.1% of the HFs which is comparable with the 77.5% of HCs in Addis Ababa but lower than the 92.4% of hospitals in Addis Ababa [14]. The difference with hospitals in Addis Ababa may be due to the regional difference in the required number of laboratory personnel and the tendency for professionals to be concentrated at the hospitals in the capital city.

ANC laboratory tests were available in 84% of HFs which is comparable with the 80% in Northwest Ethiopia [15] and 83.4% at Debremarkos hospital [16], but higher than the 38.5% of a study in Addis Ababa [14] and the 40% report of mean availability of tracer items in the SARA 2018 report [9]. The difference with the Addis Ababa study may be due to the difference in sample size. Additionally, the significant investments in health after the previous study may explain the difference with both the Addis Ababa study and the SARA 2018 report.

Client satisfaction with overall ANC laboratory test services provided was found to be 83.2% which is comparable with the 87.9% of a study in Wolaita [17] but higher than the pooled estimate of 66% in a systematic review [18], and the 56.9% in a study at public HFs of Addis Ababa [10]. This difference with the systematic review and the Addis Ababa study may be because the systematic review is a pooled estimate of different study settings with varying study populations, while the study in Addis Ababa was on women who are more educated and have better incomes than the women in the current study (rural women with lower educational and socio-economic statuses).

Client satisfaction with turnaround time in facilities was 78.6% which is lower than the >90% in Egypt [19]. This difference may be due to the difference in study settings and population.

The overall readiness of HFs to deliver ANC laboratory tests in terms of infrastructure (67.1%), documents (67.2%), equipment (49.6%), reagents, and personnel (76%) was found to be low. The client satisfaction rate was found to be within the acceptable range (83.2%). There is a need to fill gaps in infrastructure, documents, medical equipment, reagents, and personnel of HFs to deliver a better-quality service. Based on this study more emphasis should be given to infrastructure and laboratory equipment to improve the laboratory test service availability in HFs.

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COMPARISON OF MIFEPRISTONE PLUS MISOPROSTOL WITH MISOPROSTOL ALONE FOR FIRST TRIMESTER MEDICAL ABORTION: A SYSTEMATIC REVIEW & META-ANALYSIS PROTOCOL

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ABSTRACT

BACKGROUND: Original clinical trials have demonstrated that the combined mifepristone plus misoprostol has a marked effectiveness on first trimester abortion practices compared to the misoprostol alone regimen. However, there is no clear evidence if this effect holds consistent direction for all main outcomes and, whether subsequent side effects are minimal or not. This review is intended to provide aggregated evidence for this question through comparison of the respective regimens based on findings reported by previous randomized control trials.

OBJECTIVE: The aim of this review is to compare mifepristone plus misoprostol combined regimen with misoprostol alone in medical abortion of first trimester pregnancy.

METHODS: An internet based search of different engines will be undertaken to identify articles on the proposed topic. Using text words contained in the titles and abstracts of relevant articles, a full search of PubMed/ Medline, Cochrane, EMBASE, WHO international clinical Trial registry platform and google scholar will be made. All English-based articles published earlier to December 2021 on human subjects will be included. Studies which fulfil the inclusion criteria will be selected, appraised and assessed for methodological quality by two independent reviewers. Data on participants, study methods, interventions, and outcomes will be abstracted. Included studies will be pooled for meta-analysis. Results will be reported in either of a risk or ratio at 95% confidence intervals.

PROSPERO Registration Number: CRD42019134213

KEYWORDS: First Trimester, Mifepristone plus Misoprostol, Medical abortion, Misoprostol alone

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INTRODUCTION

Abortion is a medical phenomenon which requires either a drug or non-drug based intervention.[1] Causes for seeking abortion services may vary among different groups. A significant number of pregnant women appear to visit health facilities for emergency management of induced abortion.[2] Whereas, those women with unwanted pregnancy and having an intention to stop at early weeks of gestation are one inevitable aspect of this group, attendance following an intrauterine foetal death or viability failure, due to various causes, is frequently mentioned.[3-5]

Medical management (procedure that institute drugs) alone or in combination with surgical alternatives is a strategy to manage emergency abortions.[6,7] It was reported that medication based abortion reduces the occurrence of complications. The drugs can be self-administered with a considerably high level of success rate.[7,8] In the US alone, medication abortion using mifepristone and misoprostol is practiced by 92% of the providers.6 Similarly, about 75% of the providers in Canada and 98% of the providers in the US offered medication abortion to people less than 18 years of age.[6]

Endogenous substances with property of uterine contractility include prostaglandins (PGE2 and PGF2a) and their synthetic analogues (gemeprost, sulprostone, meteneprost and misoprostol), cytotoxic drugs as methotrexate, the anti-progesterone mifepristone and aromatic organic compounds as ethacridine lactate.[9,10] It is widely accepted that a remarkable possibility of attaining complete expulsion of conceptus tissue occurs when prostaglandin analogues and mifepristone are used together. [11,12] The introduction of these agents in the maternal healthcare has also brought about a breakthrough to preventing premature mortality and pregnancy related maternal complications.[13]

The effect of prostaglandins alone and combined agents in the termination of first trimester of pregnancy was evaluated in a systematic review by Kulier et al.[14] Four out of five studies included in the review compared combinations other than mifepristone and misoprostol against misoprostol alone on successful abortion and side effects. Though an updated version of the same review was published in 2011, [15] the evaluation of recent trials has been sought as an added merit to gain a precise insight on the conditions, such as missed abortion, effect difference by fetal heartbeat status, secondary outcomes in addition to nausea and vomiting, as well as pooled effect size estimates for studies on complete abortion. The two regimens have important pharmacokinetic and pharmacodynamics properties making them drugs of choice in the maternal healthcare. Among all prostaglandin analogues which contract the uterus and ripen the cervix, Misoprostol is the most widely used agent which is also orally active, stable at room temperature, and relatively inexpensive. [16, 17] In addition, it is well absorbed following oral, vaginal, buccal or sublingual administration and has a proven safety record.[16] Advances in the reproductive health and gynecology practices have devised the administration of mifepristone, a progesterone receptor antagonist, prior to misoprostol to attain effective termination of pregnancy. [18] This agent substantially blocks the P receptors (progesterone receptors) in the placenta, resulting in the cessation of the uterine implanatation. [19] Combination of mifepristone, even at a low-dose with misoprostol is highly effective and acceptable as a self-administered abortifacient recommended as the preferred combination regimen. [19,20]

An original clinical trial [20] and reviews [21-23] showed that the combination regimen of mifepristone and misoprostol has resulted in higher proportion of success rate as compared to the misoprostol alone in second trimester abortions. Considerably, it remains to be a question of thorough investigation whether termination of first trimester pregnancy with mifepristone followed by misoprostol would show a better outcome when compared with misoprostol alone. The fact that proportion of unsafe abortions is reported to be higher in the developing than developed nations (49.5% vs. 12.5%), [24] and

the growing number of first trimester pregnancy abortions globally most being adolescents in poor income countries, [25] demands for rich evidence on safe management strategies.

Rate of successful abortion was also reported to vary with timing of subsequent misoprostol administration following mifepristone.[26] The systematic reviews conducted, so far, have significant variation in terms of the designs employed, drugs considered, target population factors as well as statistical measures applied by original studies, consequently, ending with diverse conclusions. [27, 28] This, again, poses a question if the conjugate result assures what is claimed in certain controlled trials,[20,26,29,30] holds a consistent strength and direction of effect in extended weeks of gestation. The objective of the present systematic review is to compare the mifepristone plus misoprostol regimen to misoprostol alone in medical abortion of first trimester pregnancy based on randomized or quasi-randomized control trials conducted in different times until December 2021.

Review question(s)

The question/s of this review is: what is the effectiveness, as measured through either risk or odds ratio, of mifepristone plus misoprostol when compared to misoprostol alone for inducing complete expulsion as well as reducing incomplete abortion, missing abortion and ongoing pregnancies when used during first trimester of pregnancy. Furthermore, the review will examine and compare the incidence of potential side effects following administration of the respective regimen in both treatment groups.

Inclusion criteria

Participants

The review will consider studies that included pregnant women with live or dead foetus during the first trimester (≤12 weeks of gestation) and appeared to health facilities for medical abortion. Studies that involved additional means of intervention along with the drugs, included population out of the defined trimester, or those with ectopic pregnancy will be excluded.

Intervention(s)

This review will consider controlled clinical trials with randomized study populations to receive mifepristone plus misoprostol as an intervention group for first trimester abortion. Misoprostol could be administered at least 24 hours apart from mifepristone at any route. When necessary, additional doses of misoprostol might be considered.

Comparator(s)

Populations that have been assigned to receive the misoprostol alone regimen as alternative means of first trimester medical abortion will be considered as comparators. The drug could be administered after or followed by placebo and 3 to 48 hours apart between subsequent doses. Frequency may depend on unit doses and last until at least the third day via any route.

Outcomes

This review will consider incidence of these outcomes: complete expulsion or abortion, incomplete abortion, missed abortion or miscarriage and, ongoing or continuing pregnancy confirmed by ultrasound sonography and an expert's opinion. In addition, secondary outcomes, such as nausea and vomiting, fever, chills or shivering, subjective report of pain, subjective report of bleeding, diarrhoea, and headache will be evaluated. The outcomes will be reported in either of risk or odds ratio as appropriate.

Types of studies

The review will consider randomized control trials with true, quasi or no-randomization. As the problem in question is best addressed through controlled designs of clinical trials, such studies published from database inception to December 2021 will be included in the review. Because of language barriers, articles published in a language other than English will not be considered.

METHODS

The proposed systematic review will be conducted in accordance with the Joanna Briggs Institute

methodology for systematic reviews of effectiveness evidence.[31]

Search strategy

The search strategy will aim to locate both published and unpublished studies. An initial limited search of Medline and the Cochrane Central will be undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles will be used to develop a full search strategy for PubMed/Medline (Appendix I), Cochrane Central (Appendix II), EMBASE (Ovid) (Appendix III),WHO Trial Registration dataset and, google scholar. The search strategy, including all identified keywords and index terms, will be adapted for each included information source. The reference list of all studies selected for critical appraisal will be screened for additional studies.

Information sources

Electronic search of various databases or digital libraries such as PubMed, EMBASE, and the Cochrane CENTRAL will be checked for published reports. Gray literature sources as Google Scholar and the WHO international clinical trial registry platform will be included as source log.

Study selection

Following the search, all identified citations will be collated and uploaded into EndNote and duplicates will be removed. Titles and abstracts will then be screened by two independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant studies will be retrieved in full and their citation details imported into the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI) (Joanna Briggs Institute, Adelaide, Australia).[32] The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full text studies that do not meet the inclusion criteria will be recorded and reported in the systematic review. Any disagreements that arise between the reviewers at each stage of the study selection process will be resolved through discussion, or with a third reviewer. The results of the search will be reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram.[33]

ASSESSMENT OF METHODOLOGICAL QUALITY

Eligible studies will be critically appraised by two independent reviewers at the study level for methodological quality in the review using standardized critical appraisal instruments from the Joanna Briggs Institute for experimental studies.[32] Authors of papers will be contacted to request missing or additional data for clarification, when required. Any disagreements that may arise will be resolved through discussion, or with a third reviewer. The results of critical appraisal will be reported in narrative form and in a table.

DATA EXTRACTION

Data will be extracted from studies included in the review by two independent reviewers using the standardized data extraction tool. The data extracted will include specific details about the populations, study methods, interventions, and outcomes of significance to the review objective indicate the specific details. Any disagreements that arise between the reviewers will be resolved through discussion, or with the third reviewer.

DATA SYNTHESIS

Studies will, where possible, be pooled in statistical meta-analysis using review manager (RevMan) software version 5.3.[34] Effect sizes will be expressed as either odds ratios or risk ratio and their 95% confidence intervals will be calculated for analysis. A subgroup analysis will be conducted considering gestational age, dosage and route of administration of misoprostol, or foetal heartbeat status. Heterogeneity will be assessed statistically using the standard chi-squared and I squared tests. Statistical analyses will be performed using either of the fixed or random effect models. A sensitivity analysis will

be conducted by excluding certain studies with relative small effect [30] or exclusion of assumptions for missed data (if available). Likely, robustness of the review will be checked against changes of analysis method. Where statistical pooling is not possible, the findings will be presented in narrative form including tables and figures to aid in data presentation. A funnel plot will be generated using RevMan software to assess publication bias if there are 10 or more studies included in a meta-analysis. Statistical tests for funnel plot asymmetry (Egger test, Begg test, Harbord test) will be performed where appropriate.

ASSESSING CERTAINTY IN THE FINDINGS

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence will be followed and a Summary of Findings (SoF) table will be created using GRADEPro GDT 2015 (McMaster University, ON, Canada).[35] The SoF will present the following information on main outcomes: incidence of complete abortion, missed abortion, incomplete abortion and ongoing pregnancy for the treatment and control groups, estimates of relative risk or odds ratio, and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, precision and risk of publication bias of the review results. Subgroups reports will be included as appropriate.

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CONFLICTS OF INTEREST

There is no conflict of interest in this project.

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SPONTANEOUS RUPTURE OF AN UNSCARRED NON-LABORING GRAVID UTERUS AT TERM: A CASE REPORT

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ABSTRACT

BACKGROUND: Rupture of the pregnant uterus is life-threatening for the mother and fetus. Most ruptures occur in women who have had a previous transmyometrial surgical incision, typically for cesarean delivery. Rupture of the unscarred non-laboring uterus is rare, but the incidence is increasing. It is associated with higher major maternal and neonatal morbidity than cases of rupture of the scarred uterus.

CASE PRESENTATION: A 36-year-old gravida 4 para 3 mother presented at gestational age of 38 weeks with nonspecific upper abdominal pain of 12 hours which was associated with multiple episodes of vomiting which was initially ingested matter latter became blood mixed. She had no bearing down pain or passage of liquor. She denied any vaginal bleeding or urinary symptoms. The previous deliveries were at term and at home. During her third delivery, after the delivery of the baby, she failed to deliver placenta and was taken to a nearby primary hospital. There placenta was delivered manually and was transfused two units of blood. Otherwise, she has no history of pelvic surgery, no history of trauma. Initially, she was diagnosed to have severe anemia secondary to acute blood loss secondary to upper gastrointestinal bleeding. Finally, diagnosed to have uterine rupture and total abdominal hysterectomy done.

CONCLUSION: A high index of suspicion is needed in pregnant patients presenting with sudden onset of abdominal pain so as not to miss uterine rupture and its complications.

KEYWORDS: Uterine rupture, unscarred uterus, upper gastrointestinal bleeding, intrauterine fetal death

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BACKGROUND

Uterine rupture is a rare but hazardous obstetric complication with catastrophic outcomes. It is a life-threatening obstetric emergency bearing a high risk for the mother and the fetus [1]. Rupture of the unscarred pregnant uterus is a rare event and is usually traumatic, estimated to occur in 1/5700 to 1/20,000 pregnancies [2]. Its incidence decreases with improvement in obstetric practice. However, its incidence remains high in developing countries where frequency of obstructed labor, high parity and injudicious use of uterotonic drugs are common [3, 4]. Here we are presenting an unusual case of a 36-year-old female patient with spontaneous upper uterine segment transverse uterine rupture. The purpose of presenting the case is to focus light on the possibility of rupture in unscarred uterus in a non-laboring uterus with no previous risk factors.

CASE PRESENTATION

A 36-year-old gravida 4 para 3 Ethiopian pregnant mother was presented at Dilchora Referral Hospital at a gestational age of 38 weeks with nonspecific upper abdominal pain of 12 hours which was associated with multiple episodes of vomiting which was initially ingested matter latter became blood mixed. She had no bearing down pain or passage of liquor. She denied any vaginal bleeding or urinary symptoms. She had no prenatal care follow-up. The previous deliveries were at term and at home. During her third delivery, after the delivery of the baby, she failed to deliver placenta and was taken to a nearby primary hospital. There the placenta was delivered manually and was transfused two units of blood. Otherwise, she has no history of pelvic surgery, no history of trauma.

On examination, she was pale and distressed with a PR 140/min and BP 80/60 mmHg. Abdomen was distended, tense and tender. It was difficult to feel fetal body parts. There was no uterine contraction and the fetal heart beat was negative. There was a fluid thrill and shifting dullness. An emergency obstetric ultrasound scan revealed fetal demise. Placenta covered cervical os totally with bulk anterior. An intact amniotic sac with a normal volume of amniotic fluid is clearly seen. There was also free fluid in the peritoneal cavity. Hematocrit was determined and 18% and the blood group was O positive. An internist was also consulted and she was diagnosed to have hypovolemic shock secondary to acute blood loss secondary to perforated peptic ulcer diseases, severe anemia secondary to acute blood loss, IUFD and placenta previa totalis. She started on resuscitation with crystalloid and took 2000ml of normal saline over one hour, transfused 2 units of compatible blood, given omeprazole 80mg intravenously(iv), metoclopramide 10mg iv. Despite these management, the patient's clinical condition was the same (still hypotensive and tachycardic) and decided for emergency laparotomy. On entry into the peritoneal cavity, a large (500 mL) hematoma was identified anterior to the uterus (figure-1), and a freshly dead male fetus (weight 2800 grams) in an intact amniotic sac was found in the abdominal cavity (figure-2). Placenta was found covering the lower uterine segment and cervix (figure -3). There was upper uterine segment transverse uterine rupture which was about 15 cm involving both sides of uterine arteries (figure -3). There was no evidence of a couvelaire uterus and no demonstrable congenital uterine anomaly. The rest of the pelvis looked normal, with no evidence of endometriosis or adhesions. About 1.5 liters of hemoperitoneum was sucked out and hysterectomy done. She received one unit of blood during intraoperative and one unit during the post-operative period. She was discharged 5 days after surgery.

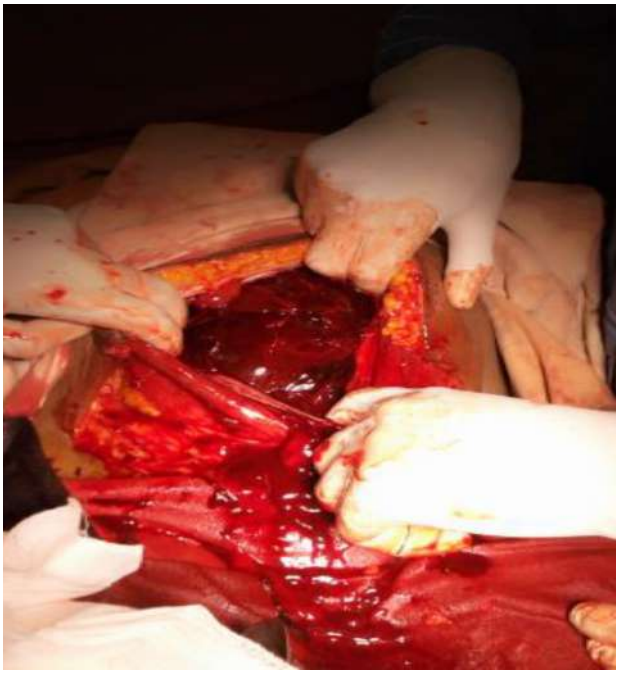

Figure 1: large hematoma anterior to the uterus upon entry to the peritoneal cavity

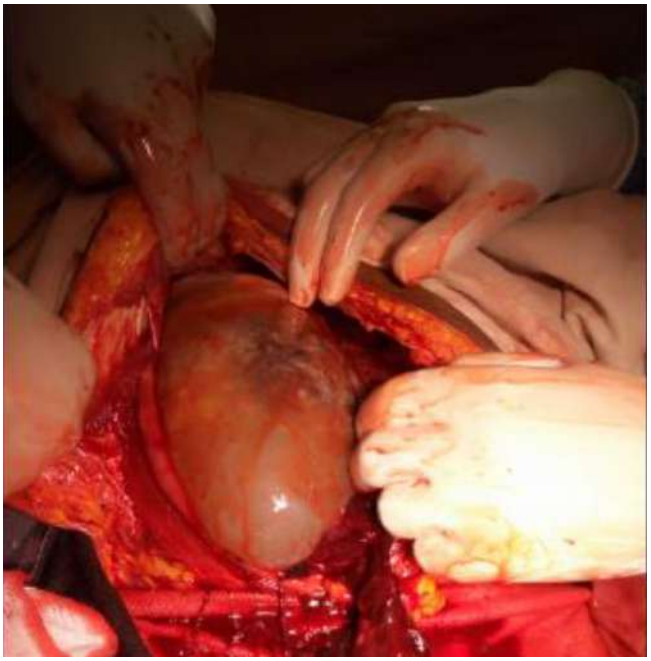

Figure-2: fetus with an intact amniotic sac found in the peritoneal cavity

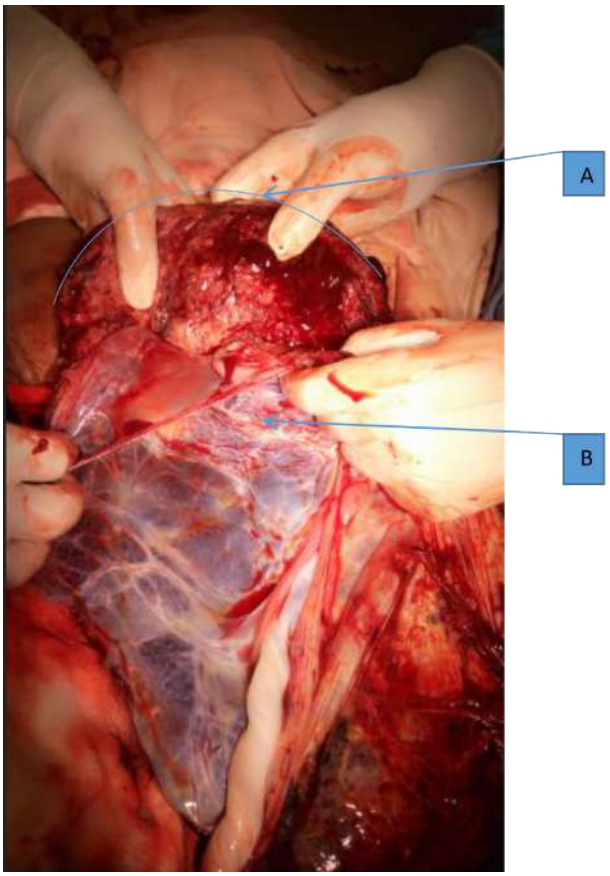

Figure 3: showing (A) – upper uterine segment transverse rupture and (B) – placenta attached to lower uterine segment and cervix

DISCUSSION

This case presentation describes a rare presentation of Spontaneous rupture of an unscarred non-laboring gravid uterus at term diagnosed upon laparotomy. Rupture of the non-laboring unscarred uterus is rare and is a potentially catastrophic event and can be life-threatening for the mother and fetus. Rupture of an unscarred uterus may be caused by trauma or congenital or acquired weakness of the myometrium. Sources of trauma include motor vehicle accidents, domestic violence and obstetric maneuvers (e.g., internal or external version, breech extraction) [5] which were not present in this case.

The myometrium may be inherently weak because of a congenital disorder, such as Ehlers-Danlos type IV [6], but this was not excluded in our patient because genetic testing was not available. The myometrium may become weakened from acquired causes like protracted labour or use of strong uterotonic drugs (e.g., misoprostol), which place prolonged stress on the myometrium [5] but in our case, the patient was not in labor and she was not induced or augmented. Grand multiparty, advanced maternal age, endometriosis, arteriovenus malformation and abnormal placentation like placenta accreta, fetal macrosomia, and uterine instrumentation are all predisposing factors for uterine rupture [5]. In our case, during her third delivery, she had retained placenta and it was removed manually and manual removal might have been forceful that might have caused weakening of myometrium. The uterine rupture was upper uterine segment transverse and she had placenta previa totalis with bulk anterior which might support that manual removal of placenta in the previous delivery might have caused myometrial weakening in upper uterine segment.

Initial signs and symptoms of uterine rupture are typically nonspecific, which makes diagnosis difficult and sometimes delays definitive therapy [7]. But most commonly uterine rupture in the third trimester presents as sudden occurrence of severe and shearing abdominal pain with cessation of uterine contractions while vaginal bleeding and shock occurs[8]. The fetus suffers in utero distress with bradycardia as well as decreased fetal movement and the infrequent symptoms of uterine rupture are epigastric pain, shoulder pain (right sided or bilateral), abdominal distention and paralytic ileus as well as, hematuria, etc. In our case, the patient presented with upper abdominal pain and vomiting of ingested matter mixed with blood of multiple episodes, which led to the diagnosis of perforated peptic ulcer disease and delayed the diagnosis and management of uterine rupture.

The basic treatment for a patient with a ruptured uterus is immediate resuscitation and surgery. At the time of exploratory laparotomy, the patient should be evaluated for possible uterine repair or hysterectomy. For young females, especially those who do not have children, it is better to preserve the uterus. But in some cases, the patients often have severe tears not suitable for repair. In general, the surgical option must be individualized and should be dependent upon the type, location and extent of the rupture, as well as on the patient's parity, the degree of bleeding, the available resources and desire to preserve her childbearing capacity[9]. If possible, repair is probably the best approach. In cases with wide bruises and contamination, intractable uterine bleeding and multiple uterine rupture sites and longitudinal uterine rupture hysterectomy is preferable [10]. In our case, the patient was resuscitated with 2 bags of crystalloid intravenous fluid and transfused 2 units of compatible blood before surgery, transfused one unit of blood intraoperatively and one unit of blood post operatively. Hysterectomy was done because, the rupture was an upper uterine segment transverse involving both uterine arteries. A comparison of this case with other case reports published previously is presented in Table 1.

CONCLUSION

Spontaneous uterine rupture is a serious and potentially catastrophic event and a high index of suspicion is needed in pregnant patients presenting with sudden onset of abdominal pain so as not to miss uterine rupture and its complications.

Table 1 Review of literature on Spontaneous rupture of an unscarred gravid uterus.

Reference	Description of the study	Type of uterine rupture	Status of labor rupture	Gestational age at time of uterine	Procedure and outcome
Nanda et al., 2017 [2]	Case report	lower segment of posterior wall of uterus	In labor	9 month amenorrhea	4kg freshly dead male Hysterectomy done
Sreelatha et al., 2018 [5]	Case report	postero-lateral wall extending from fundus to cervix	In labor	40 weeks	2. 5 male alive neonate Uterine repair
Posthumus et al., 2017 [6]	Case report	5 cm long and located in fundo close to the insertion of the left tube	No in labor	31 weeks + 3 days	1.1 kg freshly dead female fetus uterine repair
Silva et al., 2012 [7]	Case report	12 cm irregular tear on the left side of the anterior aspect of the uterus extending from the lower segment to the fundus, longitudinally	Not in labor	32 weeks	2.2 kg freshly dead male Subtotal hysterectomy
Kaur et al., 2012 [10]	Case report	long lateral wall tears extending from fundus up to internal os with partial avulsion of cervix from uterus	Not in labor Has history of falling down accident	16 weeks	200 grams dead abort us Uterine repair with bilateral tubal ligation
Chang et al., 2006 [11]	Case report	A laceration of approximately 12 cm extending from her right fundal area to the right supracervical area	In labor following induction	41 weeks	3.6 kg alive fetus Uterine repair
Agarwal et al., 2011 [12]	Case report	Fundal uterine rupture	In labor	9 months amenorrhea	Freshly dead fetus Hysterectomy done
Halassy et al., 2019 [13]	Case report	complete uterine rupture of the anterior, left sidewall of the uterus	In labor following induction	36 weeks +2 days	Freshly dead fetus cesarean supracervical hysterectomy
Mizutamari et al., 2014 [14]	Case report	A 2-cm diameter uterine perforation was located at the right cornual area, with prolapse of the amniotic sac	In labor	32 weeks	1.8 kg alive male fetus Uterine repair
Our case	Case report	upper uterine segment transverse uterine rupture which was about 15 cm involving both sides uterine arteries	Not in labor	38 weeks	Freshly dead fetus Hysterectomy done

COMPETING INTERESTS

The author declare no competing interest

Author's contribution

TD did the literature review and prepared the manuscript

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