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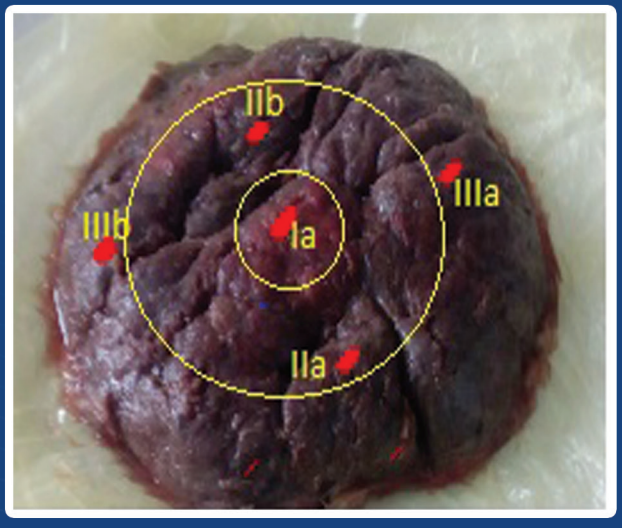

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GROSS MORPHOLOGICAL CHANGES OF PLACENTA ASSOCIATED WITH MATERNAL ANEMIA

Teshome Gebremeske, MSc[1], Abay Mulu, MA, MSc[2], Solomon Kumbi, MD[3], Wondwossen Ergete, MD[4]

ABSTRACT

INTRODUCTION: Placenta is a feto-maternal organ composed of maternal part, decidua basalis, and a fetal part, chorion frondosum. The intra-uterine survival of the fetus is dependent on this vital organ.

AIM: The main aim of this study was to compare the macro architectural changes of placenta associated with maternal anemia in Dessie Referral Hospital, Northeast Ethiopia.

METHODS: A comparative cross-sectional study design was conducted from May 1-June 16, 2018 at Dessie Referral Hospital. A total of 96 placentas (48 anemic and 48 non-anemic) was collected after delivery at the labor room. EPI data version 4.2.0 was used to enter the data and analyzed by SPSS version 24. One way ANOVA and independent sample t- test was used to compare the mean differences of the groups.

RESULTS: In pregnancies with maternal anemia, the mean placental weight was 544±98 g and in non- anemic mother's it was 502±93 g ($p=0.03$). The mean birth weight in anemic group was 2502±360 g and in non-anemic group 3035±305 g ($p<0.001$). The mean number of cotyledons, was 13.5±1.8 and 17.6±1.1, ($p<0.001$) in anemic and non-anemic groups, respectively. There was a significant difference in the mean placental diameter of anemic 18±1.5 cm and in non-anemic 17±1.5 cm mothers ($p<0.001$).

CONCLUSIONS: The placenta was larger in anemic mothers than non-anemic mothers with amplifying in mean placental weight, thickness and diameter. It was bigger in weight, diameter and thickness in mild and moderate anemic but smaller in severe anemic mothers than non-anemic mothers.

KEYWORDS: Anemia, Placenta, Morphology, Dessie Referral Hospital

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INTRODUCTION

Placenta is a fetomaternal organ composed of maternal part, decidua basalis, and a fetal part, chorion frondosum[1]. During the period of pregnancy, it acts as the lungs, gut, kidneys, and liver of the fetus[2]. It plays a crucial role in fetal development and health by tightly regulating the exchange of endogenous and exogenous materials between the mother and the fetus. Placenta gives the picture of the most accurate record of the prenatal experience of an infant[3, 4]. Even though fetal growth and well-being depends on the functional and structural component of the placenta[5], this organ is affected by various defects and diseases just like the other vital organs of the body[6].

Various clinical conditions such as anemia, diabetes, hypertension and others have an injurious effect on the placenta occasionally resulting in morphological change. It undergoes different changes in weight, volume, structure, shape and function continuously throughout the gestation to support the prenatal life. This may seriously affect the health and even life of the fetus. Some researchers observed that the placenta has considerable functional reserve capacity; it can fix any damage it suffers from considerable damage. It has also its own compensatory mechanisms which tend to limit the ill-effects of both tissue injury and an unfavorable maternal situation like anemia[6]. Even though placenta has a remarkable reserve capacity to withstand noxious environment, it is equally true that some unfavorable changes due to maternal anemia causes adverse effect on placenta which ultimately might compromise the well-being of the fetus[7]. Severe abnormalities of the placenta lead to the adverse fetal outcome and some structural changes could be the consequences of poor fetal condition[8].

Anemia is a medical condition which defined as low hemoglobin level in the blood. It is a condition in which the hemoglobin content of the blood is lower than normal for a person's age, gender and environment resulting in oxygen carrying capacity of the blood is being reduced. World Health Organization classify anemia in pregnancy based on hemoglobin level as 10.0-10.9g/dl(mild anemia),7-9.9g/dl(moderate anemia) and <7g/dl (severe anemia) [9].

IIn fact, pregnancy is a state of increased iron demand which rises from 2.5mg/day in earlier weeks to 6.6mg/day in the third trimester. If demand and supply balance is not met, the women will develop anemia (10). Anemia during pregnancy affects about half of all pregnant mothers in developing countries and it is the major cause of indirect maternal mortality. For instance, severe anemia contributes to the risk of maternal death in cases of hemorrhage[11].

In Ethiopia, anemia prevalence among women aged 15-49 years declined from 27% in 2005 to 17% in 2011. But currently it has increased to 24% in 2016 and women who are pregnant or breastfeeding are more likely to be anemic (29% for both groups) as well; these data suggest that anemia is a public health problem in our country[12]. Anemia can directly cause poor growth of the fetus in utero due to inadequate oxygen flow to the placental tissue or it is an indirect indicator of maternal nutritional deficiency[13]. Mal-development of the placenta is the leading cause of maternal and perinatal mortality and an important factor of fetal growth retardation[14]. Therefore, there is a need to explore the extent of structural changes of placenta, because the severity of these morphological parameters change i.e. placental weight, shape, thickness and diameter is correlated with the efficiency of placenta to support the growth of the fetus, and low hemoglobin level is likely to be related to insufficient functioning of the placenta[7,15].

Morphological changes of the placenta due to anemia condition influences the placenta's exchange and hemodynamic processes[16]. Notably early examination of placental morphology in the postpartum period can improve the skill of clinicians to predict birth outcomes and will give a clue for earlier identification of the fetus at risk. After delivery, if the placenta is inspected meticulously, it can provide much insight into the prenatal health of the baby and the mother. Thus, it facilitates preparation for management at least in neonatal and childhood periods.

METHODS:

A comparative cross-sectional study design was conducted in Dessie referral hospital from May-June, 2018. Dessie town is Northeast of 401 Km from Addis Ababa the

capital of Ethiopia and 478 km far from Bahirdar which is the capital city of Amhara regional state. The Hospital is found in Dessie town serving 2.4 million peoples including neighboring zones. It has more than six wards including the obstetrics and gynecology ward and the hospitals monthly delivery report is above 500 mothers.

Source Population

All full term pregnant mothers who attend their delivery at Dessie referral hospital.

Study Population

Full term anemic and non-anemic mothers attend their delivery at Dessie referral hospital during data collection period.

Eligibility Criteria

Inclusion criteria

Group I; Anemic (mild, moderate and severe) pregnant mothers during our data collection period aged 20-35 years, diagnosed clinically and hematologically.

Group II; Non-anemic pregnant mothers aged 20-35 years having no signs and symptoms of anemia with their hemoglobin level recorded to be more than or equal to 11g/dl at any time during pregnancy.

Exclusion criteria

Any pathological condition which affect the placenta as well as fetus, such as; Pregnant mothers who experience any complication during pregnancy like gestational hypertension, chronic hypertension, Malaria, pre-existing diabetes mellitus, multiple pregnancy, fetal congenital anomaly, diagnosed single umbilical artery, IUFD, pre and post term pregnancies were excluded from this study.

Sample Size and Sampling procedure

The desired sample size was calculated by using Open Epi, version 3.0, using the difference of means formula, by considering two sided 95% confidence level and 80% power; comparison with equal number of cases and controls (n1= n2) was considered. Then, the final calculated sample size was 96 placentas (48 anemic, and 48 non-anemic).

$$n_1 = \frac{(\sigma_1^2 + \sigma_2^2)(Z_{\alpha/2} + Z_\beta)^2}{(\mu_1 - \mu_2)^2}$$

Sampling Technique and Procedure

Purposive sampling technique was employed to conduct this research; during the data collection period the number of mothers delivered in Dessie Referral Hospital were 550. From those 550 mothers delivered in the hospital, the sample was taken purposively till the total sample size was achieved.

For each case, a preliminary history was elicited from the mother and her clinical sheets regarding her current and past Medical, Surgical, Obstetrics and Gynecologic histories which affect the morphology of placenta. Then, the fresh placenta was collected as soon as delivery and checked for its completeness; secondly umbilical cord was cut 5cm away from its site of insertion and the membrane trimmed. Then it was washed by running water, cleaned up by towel and labeled with code numbers. After doing this the following placental parameters was observed and measured.

A. Shape:- Shape of the placenta was noted after proper inspection. Each placenta was categorized as circular, oval, and irregular in shape.

B. Diameter:-After putting the placenta on a flat tray, the maximum diameter was measured with a non-stretched wooden scale graduated in centimeters. Then the second maximum diameter was taken at right angles to the first one. The mean of the two measurements was considered as the diameter of the placenta expressed in centimeter (Figure 1).

Figure 1: Maximum diameter measured on the maternal surface in two axes at right angle to each other at Dessie Referral Hospital, Northeast Ethiopia.

C. Thickness:- With a long needle, placental thickness was measured at five points of each placenta. Each placenta was placed on fetal surface and divided

arbitrarily into three equal zones by drawing two circles on the maternal surface. One thickness was measured from the center of the central zone, two from middle and two from peripheral zones. Finally, the mean of all five measurements was calculated and considered as thickness of the placenta (Figure 2).

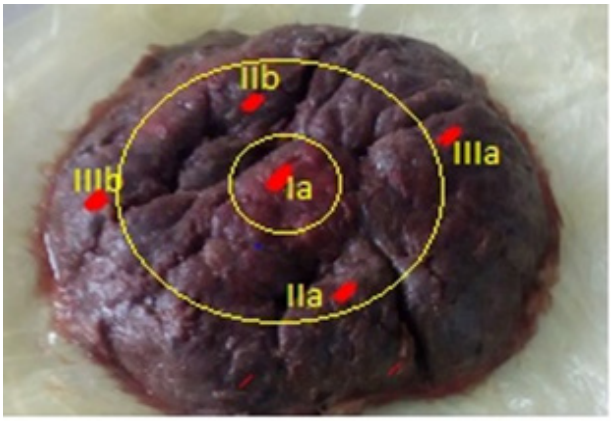

Figure 2: Method of selecting sites from different zones of placenta for measurement of placental thickness. Ia represents the site in the arbitrary central zone; IIa and IIb the sites in the middle zone; IIIa and IIIb represent the peripheral zones at Dessie Referral Hospital, North East Ethiopia.

D. Weight:- Weight of each placenta was recorded in grams by using a weighting machine scale after removal of membranes, umbilical cord and blood clots inside it (Figure 3).

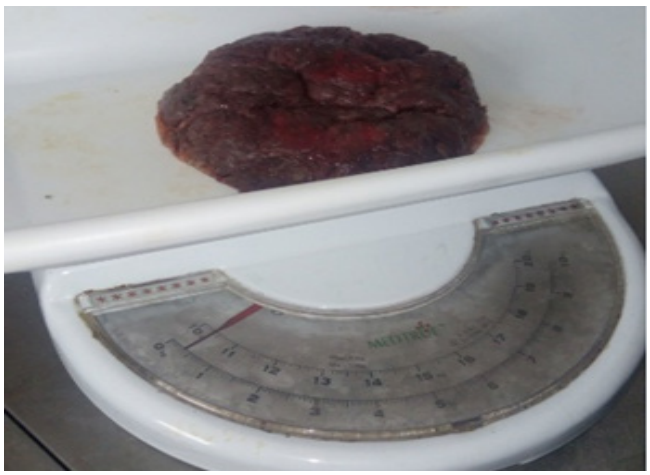

Figure 3: Method of weighting placenta by standardized weighting machine at Dessie Referral Hospital, Northeast Ethiopia, May-June, 2018.

E. Number of Cotyledons:- After measuring and inspecting the above parameters placenta was fixed by 10% formalin for 24 hours to make the placental septum separation visible to count the cotyledon. Each formalin-fix placenta was taken on both hands; then gentle pressure was applied on the central part of the fetal surface with thumbs of both hands while holding the periphery of the placenta with the other fingers. As a result, the cotyledons on the maternal aspect become prominent. Then the placenta was put on a flat tray with maternal side facing upward by placing a wood block on the fetal side. Then counting was started from the left side of one end of the placenta going rightward and again turning back to the left in a manner of loop. This counting procedure was repeated until the other end of the placenta is reached. Then, the total number of cotyledons was recorded.

Data Quality Assurance

For insuring data quality training was given for data collectors and supervisors for 2 days concerning on the placental gross morphology, measurements, and appropriate disposal of the placenta. Data was collected and recorded on the checklist by 2 BSc midwifery staff members working in delivery room. Finally, the collected data was checked for completeness by the principal investigators.

Data Processing and Analysis

Data was entered using EPI-data Version 4.2.0 and exported to SPSS Version 22 for analysis. Descriptive statistics like frequency, ratio, mean and standard deviation was computed to describe the study variable and was presented by tables and graphs. Comparison of gross morphology of placenta in anemic and non-anemic mothers was analyzed by independent t-test and one way ANOVA. Differences $p<0.05$ was considered statistically significant.

4.13 Ethical Considerations

Ethical clearance for the beginning of the study was obtained from Research and Ethics committee of Department of Anatomy School of Medicine, College of Health Sciences, Addis Ababa University. Following

approval by the committee it was submitted to Institutional Review Board (IRB). After which, letter of cooperation was written by Department of Anatomy to Dessie Referral Hospital. Each study participant was adequately informed about the objective, benefit and risk of the study. Finally, individual verbal informed consent was obtained from every study participant and those who agree were included in the study. Then, giving due respect, confidentiality, and appropriate disposal of placenta was observed/done by the data collectors and the supervisors.

RESULTS

The mean maternal age in the study was 27±4 years and 67(69.7%) of the mothers age was within 25-29 years. The mean (±SD) gestational ages of mothers were 38±0.9 weeks. Regarding their mode of delivery 73(76%) of mothers delivered spontaneous by vaginal delivery, and 23(24%) of mothers delivered by cesarean section. Out of 96 deliveries 52(54.5%) of babies were males and (45.5%) of them were females. The majority (43.5%) of the mothers were multipara. In this study, the mean placental weight of anemic mothers was 544±98 g, and, in non- anemic mothers it was 502±93 g with (t =2.162, p = 0.03). The mean placental thickness of anemic mothers was 22.7 ±2.4mm, and in non-anemic mothers it was 20±0.6 mm with (t=5.742, p=0.001). In case of mean number of cotyledons, in anemic mothers it was 13.5±1.8 as compared to non- anemic mothers 17.6±1.1 (Table 1).

Table 1: Independent sample t- test of placental morphology and birth weight of fetus both in anemic and non-anemic mothers, at Dessie Referral Hospital, Northeast Ethiopia, May- June, 2018.

Variables	Anemic (case)	Non-anemic (control)	t- statistic	P- value
Placental weight	544 ±98 g	502±93 g	2.162	0.03
Placental diameter	18±1.5 cm	17±1.5 cm	3.14	0.002
Placental thickness	22.7±2.4 mm	20±0.6 mm	5.742	0.001
Placental thickness	22.7±2.4 mm	20±0.6 mm	5.742	0.001
Number of cotyledons	13.5±1.8	17.6±1.1	- 13.153	< 0.001
Birth weight of fetus	2562±360 g	3035±305 g	- 6.938	< 0.001

In the current study, the mean placental weight increases as the level of hemoglobin decreases from normal to moderate anemic mothers, then it decreases when the level of hemoglobin reaches at severe anemia level with significant difference in the mean placental weight between groups (ANOVA, F=8.974, P< 0.001) . In the case of mean number of cotyledons, as the level of hemoglobin decreases the number of cotyledons also decreases with significant difference between groups (ANOVA, F= 86.8, p<0.001) (Table 2).

Table 2: One way ANOVA result on morphologic characterstics of placenta and birth weight of fetus at different maternal hemoglobin levels in Dessie Referral Hospital, Northeast Ethiopia, May- June, 2018.

Variables	Group I (Non-anemic)	Group II (Anemic) Mild anemic n=23)	Moderate anemic (n=19)	Severe anemic (n=6)	ANOVA
Placental weight	502±93 g	510±41 g	612±116 g	455±39 g	8.974*
Placental diameter	17±1.3 cm	17.5±1.1 cm	19±1.2 cm	16±1. cm	0 13.89*
Placental thickness	20.0±0.6 mm	22±1.5 mm	23.8±2.4 mm	18±1.2 mm	38.4*
No. of cotyledons	17.5±1.1	14.3±1.9	13±0.9	11±1.1	86.8*
Birth weight of fetus	3035±305g	2721±261g	2536±318g	2033±314g	28.5*

(* significant)

DISCUSSION

Placenta is a functional component between mother and fetus. Any unpleasant incident related to mother or fetus may seriously distress the structure and function of placenta and even life of the fetus. The weight of the placenta has a significant importance and much information can be gathered by proper weight recording. In the current study the mean placental weight of anemic mothers was (544±98 g), which is significantly larger than that of non-anemic mothers (502±93 g) (t = 2.162, p= 0.03). This is in line with other studies conducted in India (502±50.7 vs. 466±20.7 g, p<0.025), and (512.8±89.8 g vs. 459.4±74.8 g, p=0.001) [6,17]. The mean placental enlargement in anemic mothers may be due to adequate compensatory capacity of anemic placentas to satisfy the intrauterine environment. An increase in placental weight in anemic mothers also confirmed by Biswas et al., even though there was no statistical significance difference between the two group (382g vs. 370.3g, p= 0.4)[18].

In this study, there was an increase in placental weight as the hemoglobin level decreases from non-anemic to moderate anemia. But when the hemoglobin levels of the mother reaches at severe anemia, the placental weight was decreased. This result is in contrary to other studies conducted in Norway; In pregnancies with hemoglobin concentrations <9 g/dl, mean placental weight was 701.2±160.6 g, followed by 678.1±150.2g for hemoglobin concentrations 9–13.5 g/dl, and 655.5±147.7 g for hemoglobin concentrations >13.5 g/dl[19]. This discrepancy may be due to the use of different cut off point for anemia severity, and 'it may be suggested that higher placental weight in pregnancies with low hemoglobin concentrations is only pregnancies with optimal potential for placental growth are successful. Hence, it is possible that women with low hemoglobin concentrations have higher risk of placental atrophy and miscarriage''. Decrease in weight of placenta when the level of hemoglobin decreases was also revealed (480g (non-anemic) vs. 350g(mild), 300g(moderate) and 250g(severe) mothers respectively, and(581.67 ± 83.97 g(non-anemic) vs. 545.95 ± 73.24 g (mild), 499.15 ± 87.52 g (moderate) and 373.60 ± 83.48 g (severe) mothers respectively [8,20]. This inconsistency may be due to the difference in mode of delivery, discrepancy in collection and processing techniques and difference in inclusion and exclusion criteria of study participants.

It is also evident that placental weight maintains more or less a constant relation with the fetal weight. In this study the placental-fetal weight ratio (P/F ratio) was varied among anemic and non-anemic mothers. The mean placental fetal ratio in this study was (0.212 vs. 0.166) in anemic and non-anemic mothers respectively. This result is in line with other studies conducted in Norway (0.203 vs. 0.193) and India (0.160 vs. 0.142) in anemic and non-anemic mothers respectively[6,19]. The high placental to birth weight ratio with low maternal hemoglobin concentrations may be due to the differences in placental growth relative to fetal growth across different maternal hemoglobin concentrations.

Placental shape is usually described as flattened discoid with an approximate circular margin. Even though it was statistically insignificant in the current study, placentas of anemic mothers were 4(8.3%) irregular in shape and 2 (2.1%) succenturiate lobes; which were somewhat deviates from its typical shape. This finding is parallel with other findings conducted by AL-Hakeem, in which 10 out of 50 placentas were irregular in shape [21]. On the other hand, another researcher reported on 60 mothers (30 anemic and 30 non-anemic) there was no difference in the shape of placenta in which 67% and 33% of both anemic and non-anemic placenta was circular and oval in shape respectively. This inconsistency may be due to the fact that the difference in the number of study participants and discrepancy in severity of anemia cases under the study [6].

The number of cotyledons shows discrepancy in anemic and non-anemic mother's placenta. Mongia et al, stated that, average number of cotyledons in non-anemic and anemic was 18 and12 respectively [20]. Similarly, another researcher revealed that maternal anemia showed reduced number of cotyledons and increase in incidence

of ill-defined cotyledons than non-anemic mothers[22]. Our study finding is in concurrence with the above results in which the average number of cotyledons was 13.5±1.8 in anemic and 17.6±1.1 in non-anemic mothers respectively. The reduction in number of cotyledons in anemic mothers may be due to the fact that the increase in number of ill-defined cotyledons.

The linear relationship between maternal hemoglobin and different components of fetal anthropometry indicates that fetal growth is compromised in maternal anemia, particularly when it is moderate and severe anemia. In the current study birth weight of fetus in non-anemic group was significantly larger (3035±305 g) than anemic mothers (2562±360 g) with (p<0.001). This result is comparable with others (2589 g vs. 2182g, p<0.001) and (2595 g vs. 2376 g p< 0.001) in non-anemic and anemic mothers respectively[6,18,23]. This reduction in birth weight of fetus in anemic mothers may be due to the fact that, a reduction in the exchange surface of the placenta which may be due to ongoing hypoxia of placenta causes direct deterioration of fetal growth.

The diameter and thickness of placenta gives an idea to the size of placenta. In the current study the mean diameter of placenta in non-anemic and anemic mothers was (16.4 ± 1.0 cm vs. 17.6±1.1cm, p< 0.001) respectively. This result is comparable with another studies conducted in India in which the mean placental diameter of anemic mothers was wider than non-anemic mothers (19.38±1.1 cm vs. 18.56±1.7cm) [6]. This may be due to the fact that the compensatory increment in the size of anemic placenta increases its diameter. Decrease in placental diameter in anemic mothers also reported by AL-Hakeem, the mean diameter of placenta in anemic mothers was 16.26 cm in comparison with non-anemic group which was 16.79 cm[21]. This discrepancy may be due to the difference in inclusion of study participants and difference in genetic and environmental factor.

In our study, as the level of hemoglobin decreases the diameter of placenta increases till it reaches at the level of severe anemia such; in non-anemic (17±1.3 cm), mild(17.5±1.1 cm), moderate (19±1.2 cm) and severe (16 ±1.0 cm) respectively with (t=13.9, p<0.001). This result was in line with other studies conducted in Bangladeshi with the diameter of non-anemic (15.60±0.74 cm); mild (18.041±1.32 cm) and moderate (18.80±1.96 cm), p<0.001) even though they couldn't incorporate severe anemia cases [24]. The decrease in diameter of placenta in severe anemic cases in the current study may be due to placental insufficiency as a result of irresistibility of the disease process.

The thickness of placenta gives an idea about the size of placenta which may intend to give indirect information about the fetal-placental ratio. In the current study the mean placental thickness of non-anemic mothers was significantly thinner than anemic mothers (p<0.001). This result is in line with other studies conducted in India, in which the mean placental thickness of anemic mothers was thicker (1.9 ±0.2 cm) than non-anemic mothers (1.79±0.1 cm)[6]. This may be due to the fact that the adequate compensatory hypertrophy due to anemia tends to increase its thickness as well.

In this study, as the level of hemoglobin decreases the mean placental thickness was 20.6±0.6mm, 22±1.5mm, 23.8±2.4mm and 18±1.2mm in non-anemic, mild, moderate and severe mothers respectively (p<0.001). This result is not comparable with other studies conducted in Bangladesh in which 2.14±0.26 cm, 2.10±0.16 cm and 2.19±0.13 cm in non-anemic, mild anemic and moderate anemic mothers with (p=0.1)[24]. This controversy may be due to the fact that discrepancy in method of data collection and processing techniques and difference in the inclusion and exclusion criteria of study participants.

CONCLUSIONS

Based on this study, the mean placental weight, thickness, and diameter were greater in anemic mothers than non-anemic mothers. Placenta was bigger in mild and moderate anemic mothers with increased weight, thickness and diameter, and it was small in weight, thickness and diameter in severely anemic mothers compared to non-anemic mothers. It was also observed

that maternal anemia resulted in decrease birth weight of fetus and number of cotyledons and it further decreased according to its severity.

LIMITATIONS

Due to budget constraint the study was conducted on small number of participants, hence difficult for generalization.

RECOMMENDATIONS

Clinicians should carry out routine placental examination and measurement during post-partum period; hence, this will provide better evidence for clinical decisions.

Prompt anatomic placental interpretation should be conducted on sick mothers and babies before referral to pathologists.

Large scale study should be conducted on the effects of anemia on placental morphological changes using this study as a baseline data.

DECLARATIONS

Ethical Approval and Consent to participate

Ethical clearance for the beginning of the study was obtained from Research and Ethics committee of Department of Anatomy School of Medicine, College of Health Sciences, Addis Ababa University. Following approval by the committee it was submitted to Institutional Review Board (IRB). After which, letter of cooperation was written by Department of Anatomy to Dessie Referral Hospital. Each study participant was adequately informed about the objective, benefit and risk of the study. Finally, individual verbal informed consent was obtained from every study participant and those who agree were included in the study.

CONSENT FOR PUBLICATION

"Not applicable"

AVAILABILITY OF SUPPORTING DATA

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

COMPETING INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

FUNDING

We got financial support from Addis Ababa University

AUTHOR'S CONTRIBUTIONS

Teshome Gebremeskel, and Abay Mulu participated in designing the study, involved in the write up of methodology of the proposal, research work, and statistical analysis. Dr. Solomon Kumbi and Dr. Wondwossen Ergete participated in helped in drafting the paper, contributed to the designing of methodology and write up of the proposal and wrote up of the manuscript. All authors read and approved the final paper.

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GENDER DIFFERENCE IN RISKY SEXUAL BEHAVIOUR AND ASSOCIATED FACTORS AMONG UNDERGRADUATE STUDENTS IN DAMBI DOLLO UNIVERSITY, ETHIOPIA

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ABSTRACT

BACKGROUND: Risky sexual behaviour is defined as any sexual act that puts individuals at increased exposure to sexually transmitted infections including Human Immunodeficiency Virus. The prevalence of risky sexual practices is high in Ethiopia youths including students in higher education institutions. In Ethiopia young people are at high risk to acquire STI, HIV, and other sexually transmitted diseases and unintended pregnancy because of their risky sexual behaviour. These in turn affect school/academic performance and their health.

METHODS: Institution based comparative cross-sectional study design was used. Simple random sampling method was used to select study subjects and five hundred seventy nine students received, properly filled and returned the questionnaire. The data were collected using pretested, structured self-administered questionnaire. The data were processed using SPSS-20. Bivariate and multivariable analyses were used to identify the predictors of risky sexual behaviour.

RESULT: Life time risky sexual behaviour was higher in male compared to female, 181(54.8.0%) and 54(21.7%) respectively. Respondents with age less than 20 years old were less likely to have life time risky sexual behaviour. Male students were 3.5 times more likely to practice life time risky sexual behaviour compared to female. The likelihood of students ever visited night clubs to practice life time risky sexual behaviour compared to non-visitors was high. The odds of the students who ever drunk and those ever chewed Khat to commit life time risky sexual behaviour were more compared to their counterparts. Ever watching romantic films increased the odds of lifetime risky sexual behaviour compared to those who did not. Students ever attended sexual and reproductive health education tends to have more odds of lifetime risky sexual behaviour.

CONCLUSION: Life time risky sexual behaviour was common in this study. Significant gender difference in risky sexual behaviour was observed with higher risk in male respondents compared to female. Specific Strategies that address and promote safe sexual and reproductive health should be identified and implemented.

KEYWORDS: Gender; risky sexual behaviour, students, Dambi Dollo University.

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INTRODUCTION

Risky sexual behavior is defined as any sexual act that puts individuals at the risk of contracting sexually transmitted infections (STI) including Human Immunodeficiency Virus/acquired immune deficiency syndrome (HIV/AIDS); unplanned pregnancy; early child bearing; disability and death[1-3]. Risky sexual behavior can take several forms, including having sex with multiple sexual partners, not using or inconsistent condom use, sex under the influence of substances and initiation of sex before the age of 18 years[2]. In line with this, literatures indicated that understanding, identifying and the solution actions remain challenging[4].

Risky sexual behaviours are linked with increased risk of HIV infection, particularly among adolescents[5]. Adolescence is a period of overwhelming changes and challenges, which expose them to high-risk behaviors which entails physical risks and psychosocial harms[6]. In Sub-Saharan Africa, the chance of young adolescents to be exposed to HIV and other sexually transmitted infections (STIs) is high4 especially among women[7].

The prevalence of risky sexual practices is high in Ethiopia[2,8-10]. Youths including students in higher education institutes in Ethiopia are at high risk to acquire STI, HIV, and other sexually transmitted diseases and unintended pregnancy because of their risky sexual behaviour. These in turn results in dropout from school/poor academic performance, abortion, disability and death[11-13]. For example, the result from a study conducted among high school students in north Ethiopia pointed out significant proportion of sexually active students reported to have had pregnancy from which majority of them terminated the pregnancy[14]. A study conducted at Jigjiga also identified higher proportion of students engaged in risky sexual practice including anal and oral sex, transactional sex, inconsistent condom uses and multiple sexual partners University[15]. A study conducted at Haromaya University indicated significant numbers of students were sexually active in which more proportion of male students ever had sex compared to females and the majority started sexual intercourse before they joined university[11].

Studies revealed different factors to be associated with risky sexual behaviour; however, they were not consistent. Porn video watchers were significantly associated with ever had sex and having multiple sexual partners16, risky sexual behaviour[2,17], and not using condom during the most recent sex[18]. Visiting night clubs also reported to positively influence risky sexual behaviour. For example in one study visiting night clubs significantly associated with ever having sex[16]. Substance use before sex was among factors frequently reported to influence risky sexual behaviour. It is believed to influence the quality to make a genuine decision at sexual intercourse. Chewing Khat was stated to increase ever having sex[16], risky sexual practice8 and HIV risk behaviour[17]. Alcohol use also indicated to influence risky sexual behaviour in different studies. It was found to increase the risk of ever having sexual experiences[16], increase the probability of experiencing risky sexual activities[11,17], and the chance to engage into premarital sex[19]. Similarly studies reported that cigarette smokers are at greater risk to engage in risky sexual practice[8,11] and to commit premarital sexual intercourse[19].

Parents and peers play a role in shaping the behaviour of youths however; parental discussion with adolescents on reproductive and sexual matter seems to be unfamiliar in Ethiopia[20-22]. For example, according to the study conducted among secondary and preparatory schools' students in Debremarkos town, North West Ethiopia[20], the proportion of the students who had discussion on sexual & reproductive health issues with their parent was found to be 36.9% and significantly associated with having sexual information. However, this study revealed students who had discussion on sexual & reproductive health issues with their parent were at greater risk sexual behaviour. On the other hand, the study conducted among youths in Western Ethiopia found youths who had high family connectedness were less likely to commence sexual activity and have multiple sexual partners[23]. Culture, embarrassment and other problems like poor communication skill were among factors that hinder parent-adolescent communication about sexual and reproductive health matters[21]. Peer pressure towards sex was significantly associated with having multiple sexual partners[23]. Other factors like being male[8,11,19], sex for transaction[18] and family monthly income19 were factors also associated with at least one form of risky sexual behaviours.

The presentation of risk sexual behaviour and the conditions in which young people engage into risk sexual practice addressed in many researches in Ethiopia among students in higher institution. However, investigation on gender difference in risky sexual practice and contributing factors did not well addressed and little is known of sexual risk behaviors among Ethiopian youths across gender. Therefore, the aim of this study is to identify gender differences in risky sexual behaviour and associated factors among undergraduate students in Dambi Dollo University to help design gender based strategies to protect students in the university's context.

METHOD:

Study Area and Period:

The study was conducted January to February, 2011 E.C.at Dambi Dollo University. Dambi Dollo University is among the 4th generation Public University and launched in 2010 E.C. It is located in western Oromia, Kelem Wolega zone, Dambi Dollo town at 652 km from Addis Ababa. The University has six colleges and three schools with 36 total departments in a regular undergraduate program. The University has also undergraduate and post graduate studies on non-regular programs. In 2011 E.C, the university enrolled a total of 2321 students in regular undergraduate program in two batches from which 1312 (56.53%) were male and 1009 (43.47%) were female.

Study Design and Study Population

Institution based cross-sectional study was used. The source population was all students enrolled at Dambi Dollo University. All undergraduate students of Dambi Dollo University were considered as a study population and the study unit was individual student enrolled in undergraduate study under the regular program.

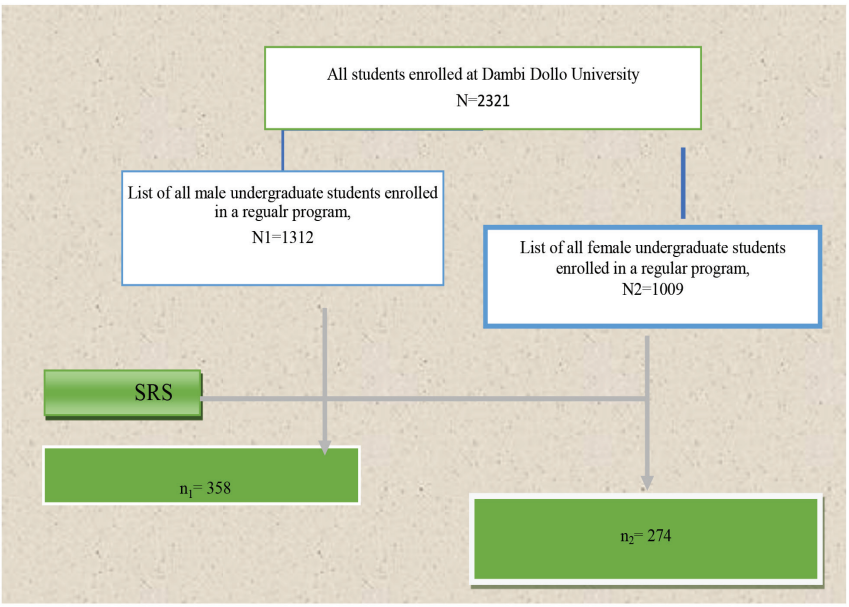
Eligibiity Criteria

All undergraduate students enrolled under the regular program at the University were considered eligible for this study.

Sample Size

The sample size was calculated using a formula to estimate the difference between two population proportions. By taking 22% (P1=0.22) and 15% (P2=0.15) of ever had premarital sex among male and female youths respectively from a study conducted among in-school youths at west Gojjam, North West Ethiopia [24]; a 95% confidence interval (Z=1.96), and 80% power of study and considering 10% non-response rate for each sample, the minimum sample size was 633 subjects; 358 for male and 275 for female.

Sampling Technique: Sampling frames containing list of all regular undergraduate students was prepared for male and female students separately. Then, computer generated simple random sampling method using SPSS version 21 was executed to draw samples from sampling frames from each group. The students' ID number and name was utilized to identify the study subjects. Figure 1 below indicates the schematic presentation of drawing study subjects.



*SRS- simple random sampling

Figure 1: Schematic presentation of the sampling method

Data collection tool and techniques

The questionnaire was developed in English after reviewing related literatures. The data were collected using structured questionnaire. Six BSC holders collected the data and 2 MSC holders supervise the data

collection. The data collectors were responsible for the distribution, collection, checking the completeness and submission of the filled questionnaire to the supervisors while the supervisors were in a position to make sure the day to day activities of the data collectors recheck the collected questionnaires for their completeness and submit to the researcher. The data were collected by administering questionnaires at their dorm and 2 day duration was allowed to complete and return the filled questionnaire. For subjects who were absent from dorm at the allocation and return of the questionnaire, revisits were conducted until the next two days.

Variables and Measurement

Demographic and socio-economic variables: These variables were used to assess individual background information. These include sex, age, previous place of residence, region, marital status, religion, ethnicity, father's educational status and mother's educational status. Sex refers to the biological identity of the respondents and was measured by item with male/ female response. Age was measured in completed years in number. Place of residence refers to the place where the respondent resides before his/her university life on Urban and rural response options. Region refers to one of the 9 country's regional states where the respondent came from. Religion refers to the respondents' religious conviction and was measured on item with nominal responses. Marital status refers to the respondents' matrimonial status. Ethnicity refers to the individual race identity and was measured on nominal response question. Education indicates the parental educational status and data were gathered by two interrelated items.

Substance use: includes substances like Alcohol use, cigarette smoking and Khat chewing and was measured on items with close ended questions.

Knowledge about HIV/AIDS: refers to the individual scientific knowledge about cause, mode of transmission, risk factors, and prevention methods of HIV/AIDS and was measured by 10 true/false questions. The score was standardized to hundred by counting the number of correct answers as the sum of scores the respondent achieved divided by the maximum score the respondent would achieves times hundred percent and was classified as good and poor knowledge depending on the score.

Risky sexual behaviour: refers to any unsafe/unprotected sexual act that can enhance the transmission of HIV including sexually transmitted infections and other sexual and reproductive health problems. It was derived from individuals who have at least one or more history of premarital sex, multiple sex partner, non-condom use/ inconsistent condom use, paid sex, sex with commercial sex worker, anal sex, or oral sex.

Data Quality Assurance

The questionnaire checked by two experts in reproductive health for its content validity. Pre-test was conducted on 10% the respondents that were not participate in the main study and all necessary modification was made depending on the result of the analysis. The students were asked to fill honestly and return the completed questionnaire on time. The questionnaire was evaluated by experts for wordings and content validity.

Data Processing and Statistical Analysis

The data were entered in to computer, cleared, explored, standardized and summarized using SPSS version 20.0. Difference in risky sexual practice among students was analysed and associated factors were identified. Logistic regression was put to use to determine crude and adjusted odds ratio (AOR) in identifying associated factors. Statistical significance was measured by crude and adjusted odds ratio (AOR) with 95% confidence interval (95% CI).

Ethical Consideration

Approval and ethical clearance sought from Institutional Review Board in Dambi Dollo University was brought to the colleges. A consent sheet was prepared and attached to the questionnaire in a separate page. In the consent sheet, the purpose of this study was stated. To ensure confidentiality, the consent sheet will also provide information that there is no need to put their name on the survey questionnaire and that no individual response be reported. Statement about voluntary characteristic of their participation will also be provided in the consent form.

RESULTS

Socio-demographic characteristics of respondents

Of the 633 study subjects, 579 received, properly filled and returned the questionnaire making a response

rate of 91.5% (92.2 for male and 90.5 for female). The male to female ratio was 1.3. The mean age of the study subjects were 20.8 and 20.6 years for male and female respectively. In both male and female respondents more than 50% of them were second year students, 166(50.3%) and 130(52.2%) respectively. More than 5 in 10 of the students were from rural origin from which majority were male respondents. accounting for 64.1%. Five hundred fifty seven respondents (96.2%) were single from which 313(94.8%) and 244(98.0%) were from male and from female respectively. Three different religions identified among the subjects from which Protestant were the highest, 254 (43.9%) with more girl proportion. More than half of the study subjects were from Oromo ethnic group, 172(521%) male and 143(57.4%) female (Table 1).

Table 2: Distribution of socio demographic characteristics by sex among undergraduate students in Dambi Dollo University, Ethiopia

Socio-demographic	characteristics	Response by Sex Male= 330 N (%)	Total Female=249N (%)	Frequency (%)
Year of study	I	164(49.7%)	118(47.4%)	282 (48.7)
	II	166(50.3%)	131(52.6%)	297(51.3)
Previous Place of Residence	Urban	131(39.7%)	130(52.2%)	261(45.1)
	Rural	199(60.3%)	119(47.8%)	318(54.9)
Marital status	Single	313(94.8%)	244(98.0%)	557(96.2)
	Ever married	17(5.2%)	5(2.0%)	22(3.8)
Religion	Orthodox	133(40.3%)	111(44.6%)	244(42.1)
	Protestant	137(41.5%)	117(47.0%)	254(43.9)
	Muslim	36(10.9%)	16(6.4%)	52(9.0)
	Others	24(7.3%)	5(2.0%)	29(5.0)
Ethnic group	Oromo	172(52.1)	143(57.4%)	315(54.4)
	Amhara	103(31.2%)	82(32.9%)	185(32.0)
	Others	55(16.7%)	24(9.6%)	79(13.6)
Father's Education	Illiterate	126(38.2%)	62(24.9%)	188(32.5)
	Can read and Write	104(31.5%)	82(32.9%)	186(32.1)
	Literate	100(30.3%)	105(42.2%)	205(35.4)
Mother's Education	Illiterate	152(46.1%)	80(32.1%)	232(40.1)
	Can read and write	89(27.0%)	76(30.5%)	165(28.5)
	Literate	89(27.0%)	93(37.3%)	182(31.4)
Father's Occupation	Farmer	207(62.7%)	171(68.7%)	378(65.3)
	Gov employee	66(20.0%)	38(15.3%)	104(18.0)
	Merchant	37(11.2%)	28(11.2%)	65(11.2)
	Others	20(6.0%)	12(4.8%)	32(5.6)
Mother's Occupation	Housewife	160(48.5%)	145(58.2%)	305(52.7)
	Farmer	86(26.1%)	50(20.1%)	136(23.5)
	Merchant	44(13.3%)	27(10.8%)	71(12.3)
	Govt employee	35(10.6%)	19(7.6%)	54(9.3)
	Others	5(1.5%)	8(3.2%)	13(2.2)

Substance use and night club visit

Of the total study subjects, 199 (34.4%) of them ever drunk alcohol. Majority of the male respondents 139 (69.8%) reported ever drunk alcohol while only 60(24.1%) of female respondent experienced drinking alcohol. In both sexes ever chewing Khat was less experienced 69 (20.9%) among male versus 25 (26.6%) among female. A few respondents, 21 (3.6%) ever smoke cigarette from which 19 (5.8%) and 28(0.8%) were from male and female respondents respectively. In our study, 83(25.2%) from male respondents and 28(11.2%) from female respondents ever visited night clubs (Table 2).

Table 3: Distribution of the substance use and night club visit by Sex among undergraduate students in Dambi Dollo University, 2019

Risky lifestyle	Variables rage	Response by Sex Male N =249	Female N= 330	Total Frequency (%)
Ever drunk alcohol	Yes	139(42.1%)	60(24.1%)	199(34.4)
	No	191(57.9%)	189(75.9%)	380(65.6)
Ever chew Khat	Yes	69(20.9%)	25(10.0%)	94(16.2)
	No	261(79.1%)	224(90.0%)	485(83.8)
Ever smoke	Yes	19(5.8%)	2(0.8%)	21(3.6)
	No	311(94.2%)	247(99.2%)	558(96.4)
Ever visited night club	Yes	83(25.2%)	28(11.2%)	111(19.2)
	No	247(74.8%)	221(88.8%)	468(80.8)

Sexual and reproductive health information by source

Students' exposure to sexual and reproductive health information was high having various source, majority 472 (81.5%) exposed to one or more sources. Exposure to sexual and reproductive health information was proportional among male 268 (81.1%) and female respondents 204 (81.9%). Almost half, 283 (48.9%) of the respondents seen information about sexual and reproductive health on social medias like Face book, Google, YouTube and Yahoo. Majority of the respondents, 414 (71.5%) of them, ever watched films from which 65 (15.7%) ever watched pornography films. Of the total respondents 282 (48.7%) discussed information about sexuality with their father. The proportion of father-respondent communication about sexual and reproductive health is comparative across gender, 80(24.2%) among male and 59(23.7%) among female). While 264 (45.6%) of the total study subjects ever held discussion about sexual and reproductive health with their friends, there is big difference across gender with higher proportion among male, 184(55.8%) versus 80(32.1%). Only 68 (11.7%) of the respondents ever discussed the information with their mother. Relatively female respondents, 39(15.7%), better discussed the information with their mothers than male respondents, 29(8.8%).

HIV/AIDS Knowledge

We assessed respondents' HIV knowledge by different items with true or false response categories. Majority of the respondents, 418 (72.2%) (58.6% male versus 41.4% female), knew that HIV is an immune compromising virus. Only 200 (34.5%) of the total respondents (23.0% male and 11.6% female) correctly responded, HIV-infected person can have a negative HIV test. Knowledge about the fact that HIV-infected person may not have AIDS was another problem as only 27.3% of the respondent gave the right response to the item "HIV-infected person may not have AIDS" while the response of 421 (72.7%) respondents were not correct from which 224 (67.9%) and 197(79.1%) were male and female respondents, respectively. Of the total study subjects, 79.6%, 84.1% and 86.9% of them responded lip kissing is a major mode of HIV transmission; eating food prepared by an HIV-infected person transmits HIV and handshaking with a person with AIDS transmits HIV infection respectively while 76.2% of them attested there is a "morning after" pill that prevents HIV infection. Poor knowledge about HIV observed in this study both in male and female respondents with more proportion in female (Table 3).

Table 4: Distribution of respondents' response to HIV knowledge assessment items by their sex among undergraduate students in Dambi Dollo University, 2019

HIV knowledge assessment Items		Sex		Total
		Male N (%)	Female N (%)	N (%)
HIV is an immune compromising virus	Yes	245 (74.2%)	173(69.5%)	418 (72.2%)
	No	85 (25.8%)	76 (30.5%)	161 (27.8%)
HIV infected person can have negative HIV test	Yes	133 (40.3%)	67 (26.9%)	200 (34.5%)
	No	197 (59.7%)	182 (73.1%)	379 (65.5%)
HIV infected person may not have AIDS	Yes	106 (32.1%)	52 (20.9%)	158 (27.3%)
	No	224 (67.9%)	197 (79.1%)	421 (72.7%)
HIV can be cured if treated early	No	77 (23.3%)	94 (37.8%)	171 (29.5%)
	Yes	253 (76.7%)	155 (62.2%)	408 (70.5%)
HIV infected person can live normal life as usual	Yes	113 (34.2%)	119 (47.8%)	232 (40.1%)
	No	217 (65.8%)	130 (52.2%)	347 (59.9%)
You can't get HIV the first time you have sex	No	268 (81.2%)	193 (77.5%)	461 (79.6%)
	Yes	62 (18.8%)	56 (22.5%)	118 (20.4%)
Lip kissing is a major mode of HIV transmission	No	72 (21.8%)	46 (18.5%)	118 (20.4%)
	Yes	258 (78.2%)	203 (81.5%)	461 (79.6%)
Eating food prepared by an HIV-infected person transmits HIV	No	67 (20.3%)	25 (10.0%)	92 (15.9%)
	Yes	263 (79.7%)	224 (90.0%)	487 (84.1%)
Hand shaking with a person with AIDS transmits HIV infection	No	46 (13.9%)	30 (12.0%)	76 (13.1%)
	Yes	284 (86.1%)	219 (88.0%)	503 (86.9%)
There is a "morning after" pill that prevents HIV infection	No	56 (17.0%)	82 (32.9%)	138 (23.8%)
	Yes	274 (83.0%)	167 (67.1%)	441 (76.2%)
Consistent and correct use of condom prevents HIV transmission	Yes	130 (39.4%)	143 (57.4%)	273 (47.2%)
	No	200 (60.6%)	106 (42.6%)	306 (52.8%)

Risky sexual behaviour

Significant respondents, 218(37.7%), were experienced sexual intercourse from which 169(51.2%) were male respondents while 49(19.7%) were female respondents. The mean and median age at first sexual debut were 16.9 (SD=1.9) and 17.0, respectively. The minimum and maximum ages at first sexual intercourse were 13 and 21 years, respectively. The mean and median number of life time sexual partner was 2 (SD=2.7) and 1.0 and the minimum and maximum number of lifetime partner were 1 and 20, respectively. More than half, 123 (56.4%), of the respondents who had initiated sexual intercourse had their sexual debut at age below 18 years. Of the total 579 study subjects, 56 (25.7%) of them committed sexual intercourse with a person whom they have never seen before; 36 (16.5%) of the respondents ever committed commercial (paid) sex and 33(15.1%) committed intercourse with a person whose HIV status was unknown. Of the total 218 respondents who ever had sex, 76 (34.9%) of them ever used condom (male/female) on sexual intercourse from which 26 (34.2%) of them always use condom while 15 (19.7%) of them rarely use on sexual intercourse. Condom (male/female) use at first sexual practice was 73.7%. Anal and oral sex was reported in this study. Of the total 579 respondents 45 (7.8%) of the respondents committed anal sex from which only 29 (64.4%) of them utilized condom. Another 50 (8.6%) of the respondents committed oral sex from which 31 (62%) used barriers.

Determinants of Life time risky Sexual Practice

We conducted multivariate analysis to determine the predictors of lifetime risky sexual behaviour among the study subjects. We entered variable statistically significantly associated with lifetime risky sexual behaviour from bivariate analysis on Forward Stepwise (Likelihood Ratio) methods. Respondents with age less than 20 years were less likely to have life time risky sexual behaviour, (adjusted OR [95%CI] = 0.2 [0.1, 0.4]). Male students were 3.5 times more likely to practice life time risky sexual behaviour compared to female (AOR [95%CI] = 3.5 [2.3, 5.3). The likelihood of students ever visited night clubs to practice life time risky sexual behaviour compared to non-visitors was high (adjusted OR [95%CI] = 2.5 [1.4, 4.4). The odds of the students who ever drunk and ever chewed Khat to commit life time risky

sexual behaviour were more than those who never did (AOR [95%CI] = 7.3[3.7, 14.3) for chewing and AOR (95% CI) of 1.6 (1.0, 2.4) for alcohol. Ever watching romantic films increased the odds of lifetime risky sexual behaviour by 1.9 (adjusted OR [95%CI] = 1.9[1.2, 2.9]) compared to those who did not. Students ever attended sexual and reproductive health education tends to have more odds of lifetime risky sexual behaviour, (adjusted OR [95%CI] = 1.8[1.2, 2.8]) (Table 4).

Table 4: Factors predicting lifetime risky sexual practice among undergraduate students in Dambi Dollo University, 2019

Variables	Life time Risky Sexual Behaviour		Adjusted OR [95.0% C.I]
	Yes N (%)	No N (%)	
Age category (<20 years)	18 (3.1%)	83 (14.3%)	0.2 [0.1, 0.4]
Sex (Male)	181 (31.3%)	149 (25.7%)	3.5 [2.3, 5.3]
Ever visited night club	81 (14.0%)	30 (5.2%)	2.5 [1.4, 4.4]
Ever drunk alcohol	118 (20.4%)	81 914.0%)	1.6[1.0,2.4]
Ever chewed Khat	77 (13.3%)	17 (2.9%)	7.3 [3.7, 14.3]
Ever watched Pornographic films	199 (34.4%)	215 (37.1%)	1.9 [1.2, 2.9]
Ever attended SRH education	122 (21.1%)	106 (18.3%)	1.8 [1.2, 2.8]

DISCUSSION

Big gender difference in risky sexual behaviour was observed in our study. The risky sexual behaviour was about 33% higher in male respondents compared to female, 181(54.8%) versus 54(21.7%). Similar with the result from a study conducted at Haromaya University[12], our study revealed more proportion of male students ever had sex compared to females (51.2% versus 19.7%). This finding is also supported by systematic review of similar studies in Ethiopia[2]. This finding indicates the study subjects are at higher risk of acquiring HIV and other STIs. For example, a research conducted among the University of Limpopo students in South Africa, defined risky sexual behaviors as sexual activities that may expose an individual to the risk of infection with HIV and other STIs[3].

The odds of the students less than 20 years old found to be independently less likely to practice life time risky sexual practice. This indicates that as age advances, respondents more engage in risky sexual behaviour. As an evidence for this the finding of a study conducted in South Africa illustrate the proportion of high probability of HIV infection and STI increased significantly with increasing chronological ages[25].

In our study, the odds of male students was 3.5 times more likely to commit life time risky sexual behaviour as compared to female. This finding was consistent with that of the Haromaya University students' finding[12]. Other researchers' findings are also comparable with our study[2,19]. On the other hand, study conducted in Nigeria showed no significant difference on the expression of undergraduates on predisposing factors influencing risky sexual behaviours[26]. However, these variations among gender may does not mean that women are protected rather both sex exhibited risky sexual behaviour because social inequalities and poverty place women at an elevated risk, and they have limited access to HIV or sexual reproductive health education, so they become more vulnerable to HIV and SRH-related problems[27].

Ever visiting night clubs predicted the lifetime risky sexual behaviour. Visiting night clubs has been known to increase the youths' risk of committing risky sexual behaviour16. Substance uses were detected to predict lifetime risky sexual behaviour. For example use of Khat and alcohol were significantly independently associated with lifetime risky sexual activities. These findings were consistent with finding of similar studies in other areas[2,8,11,16]. Ever watching pornography revealed risky life time sexual practice. The odds to have life time risky sexual practice was 1.9 more among respondents ever watched pornography than that of the counterpart. Alike our finding, watching pornography were factors associated with an increased in risky sexual practices in a systematic review of similar studies[2].

Even if attending sexual and reproductive health education theoretically expected to improve the youths' safe sexual practice, the finding of this study indicates that respondents ever attended sexual and reproductive health education were more likely practiced lifetime risky sexual practice. This may be due to sequence in risky sexual practice and their participation on the education,

which means the students may attended education after they had committed risky sexual practice. On other hand, education by itself may not reduce risky sexual practice until it brings change in knowledge, attitude, value and skill in safe sexual practice.

CONCLUSION

Life time risky sexual behaviour was common in this study. Big gender difference in lifetime risky sexual behaviours observed with higher risk in male respondents compared to female. Age less than 20 years exhibited less likely to practice lifetime risky sexual behaviour keeping other factors constant. Significant male compared to female respondents also practice lifetime risky sexual behaviours controlling for other confounders. The finding from our study also indicates that substance use, attending night clubs, and watching romantic films were found to be independent predictors of lifetime risky sexual behaviour. To bring change in health behaviour, promoting youth responsibility for sexual and reproductive health through health-related education, establishing a dialogue on possible solutions and how to put them into effect, fostering community self-reliance and ownership of health initiatives are mandatory.

AVAILABILITY OF DATA AND MATERIAL

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

CONFLICT OF INTERESTS

The author declares that they have no competing interests. The author performed the designing of the study, analysis, and interpretation of data and writing this manuscript and has agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work.

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MAGNITUDE OF GESTATIONAL TROPHOBLASTIC DISEASE AT HAWASSA UNIVERSITY COMPREHENSIVE SPECIALIZED HOSPITAL, ETHIOPIA: A FIVE-YEAR RETROSPECTIVE ANALYSIS

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ABSTRACT

BACKGROUND: Gestational Trophoblastic Disease (GTD) is a spectrum of interrelated conditions but histologically distinct disease entities originating from placenta. It can be associated with significant morbidity and mortality in the absence of timely and proper intervention.

OBJECTIVE: The main objective of this study was to assess magnitude of gestational Trophoblastic diseases and associated factors in Hawassa University Comprehensive Specialized Hospital.

METHODS: A retrospective review was conducted in Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia from September 11, 2005 to September 11, 2010.E.C. The medical records of patients managed for GTD and the total number of deliveries during the study period were retrieved. There was a total of 16,957 deliveries and 194 Gestational trophoblastic cases. The data were entered with Epi data version 3.1statistical software and exported to Statistical Package for Social Sciences version 22.0 for analysis

RESULTS: The magnitude of gestational trophoblastic disease was 11.4%. Gestational trophoblastic disease deliveries were diagnosed in the first pregnancy 15.5% of cases and 40.2% between para one and four. Vaginal bleeding was the most common presenting symptom 87.1% and 46.4% patients had anemia at admission and 26.3% of patients were transfused with blood. Hydatidiform mole was the commonest disease accounting for 90.2%. Suction curettage was the commonest treatment modality 70.8%. Having history of GTD, hyperemesis gravidarum, respiratory symptoms and not referred cases had a statistically significant association with hydatidiform mole

CONCLUSION: The burden of Gestational Trophoblastic Disease is high in the hospital.

KEYWORDS: Gestational trophoblastic disease, molar pregnancy, hydatidiform mole, choriocarcinoma, Ethiopia

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INTRODUCTION

Gestational trophoblastic disease (GTD) refers to a spectrum of interrelated conditions but histologically distinct disease entities originating from placenta[1]. It usually occurs during conception and changes the process and outcome of pregnancy by developing abnormal fertilization and placenta[2]. It could happen months or years after any antecedent pregnancy that the lady encountered. It encompasses a spectrum of interrelated tumors and includes complete and partial hydatidiform mole, placental site trophoblastic tumor, and choriocarcinoma, which have varying propensities for local invasion and metastasis1. Although persistent trophoblastic tumors (GTTs) most commonly follow a molar pregnancy, they can occur after any gestational event, including induced or spontaneous abortion, ectopic pregnancy or term pregnancy[3,4]. These diseases are characterized by a reliable tumor marker, β-subunit of human chorionic gonadotropin (χ hCG) which is important for follow up[5].

Its incidence has been reported differently in various geographic areas and among different target population. It showed a decreasing trend in the developed world while still remain to be a significant problem in developing countries[6]. The incidence of molar pregnancies in the united states is 1 per 1000 pregnancies, in the United kingdom 1.5 per 1000, and in Japan 2 per 1000.In Nigeria, incidences of 3.8 per 1000 deliveries in the northeast while 4.7 per 1000 deliveries in southeast[3]. The major well-established risk factors for GTD are advanced maternal age and a past history of GTD but the exact etiology is not known[7].

It affects women's health during her pregnancy and rest of her life. It even could be a cause of maternal mortality[8]. It induces uterine bleeding and as a result makes the mothers to be anemic and suffer from its consequences. Also, it is likely that the mother experience hyperemesis gravidarum, preeclampsia, hyperthyroidism, symptoms of lung function shortage and acute abdominal manifestations[9,10]. The most common presentation of patient with GTD is vaginal bleeding and other symptoms include abdominal swelling, pain, excessive vomiting and passage of vesicles[3,7,11].

Suction curettage is optimal method of evacuation regardless of uterine size, in patients who have a desire of child bearing, because it carries a significantly lower risk of excessive bleeding, infection and retained molar tissue than methods involving induction (with oxytocin or prostaglandins). Patients who have completed their families or don't wish to retain reproductive function may undergo hysterectomy[12]. Prophylactic chemotherapy is considered to be particularly useful in the management of patients with high risk molar pregnancy (initial serum β-hCG more than 100,000 mIU/ mL, uterine size larger than dates, theca lutein cysts more than 6 cm in diameter, maternal age over 40) specially when hormonal follow up is either unavailable or unreliable[13]. Patients diagnosed to have GTD need regular follow up after suction evacuation and or hysterectomy. But most studies indicate that this follow up is poor, for example it is only 23.3% in Nigeria[14-16]. The incidence of the disease is believed to vary with racial and environmental factors approximately 0.5-5 per 1000 deliveries or 0.23-12.9 per 1000 pregnancies[6]. In some of societies, high range incidence of molar pregnancies is assigned to nutrition and socio-economic factors. It showed a decreasing trend in developed world; while still remain to be a significant problem in developing countries like Ethiopia. In our set up its magnitude, clinical presentation, treatment outcomes and follow up after management is not known.

METHODS:

Study area and period

The study was conducted in Hawassa university comprehensive specialized hospital, which is one of the teaching hospitals in the whole country, Hawassa town. Hawassa is located at 270 km to south east of the capital city of Ethiopia, Addis Ababa. Hawassa university comprehensive specialized hospital is the first referral hospital established in the region serving as a teaching hospital for the College of Medicine and Health Science of Hawassa University, with a catchment population of 10-12 million. It serves about 43,384 patients of all types per year. It was conducted from July 8, 2010 to November 6, 2011 E.C.

Study design

A retrospective document review of GTD patients managed at Hawassa university comprehensive specialized hospital

Source population

The source population was all pregnant mothers who were admitted to obstetrics and gynecologic unit of Hawassa university comprehensive specialized hospital from September 11, 2005 to September 11, 2010.E.C

Study population

The study population was all pregnant mothers admitted to obstetric and gynecologic unit of Hawassa university comprehensive specialized hospital with diagnosis of GTD during the study period.

Inclusion criteria

All clinical diagnosed GTD patients during the study period.

Exclusion criteria

Those cases with suspected GTD but their diagnosis changed after management. Women whose charts were lost or grossly incomplete were excluded from the study

Sample size and sampling technique

Based on the inclusion and exclusion criteria of the study, all cases managed for Gestational trophoblastic disease 194 patients' chart were retrieved and reviewed during the study period.

Data collection instrument

Data were collected from patient's chart after medical record number was obtained from log-books of the Gynecology OPD, Gynecology ward and major operation room. Finally, medical records from patients' card were entered into a structured check list by trained medical interns. The check list was pretested and all questionnaires form was checked for completeness and accuracy. Any problem encountered during the data collection was reported to principal investigator for immediate action

Operational definitions

Anemia: hemoglobin level of <11g/d in the 1st trimester and <10.5g/d in the 2nd trimester.

Gestational trophoblastic disease: a pregnant woman with vaginal bleeding with or without passage of vesicles and ultrasound features of molar pregnancy and or confirmed histologically. Asymptomatic cases with incidental finding by ultrasound based on clinical diagnosis.

Data Processing and Analysis

The collected data was checked visually by the investigators, then data was coded, entered and cleaned using Epi-Data version 3.1 software and finally exported into SPSS version 22 for analysis. Descriptive statistical analysis such as simple frequencies, measures of central tendency and measures of variability was used to describe the characteristics of participants. Then the information was presented using frequencies, summary measures, tables, and figures (charts). Bivariate analysis, COR with 95% CI, was used to see the association between each independent variable and the outcome variable by using binary logistic regression. AOR with 95% CI was estimated to identify the factors associated with outcome variable using multivariable logistic regression analysis. Level of statistical significance was declared at p-value ≤ 0.05

Data quality assurance

During data collection, the principal investigator checked the completeness, ambiguous suspicions and checked on the spot. Before feeding the information into the computer, it was checked for completeness and accuracy

Ethical consideration

Ethical clearance was obtained from Institutional Review Board (IRB) of College of Medicine and Health Sciences, Hawassa University and no personal identifiers was collected. Confidentiality was maintained during data collection, analysis and interpretation.

RESULTS

Socio-demographic characteristics

In five years, period there were a total of 16,957 deliveries, with 203 Gestational trophoblastic disease cases, 194 cases were eligible for analysis and 9 cases were excluded from the study due to failure to meet the inclusion criteria. The age of the patients ranged from 16-50 years with a mean (± 1SD) of 30.8 (± 8.6) years. More than half of patients (56.2%) came from greater than 50 km distance and 62(32%) of patients came from >100 km. Out of these cases 135(69.6%) came with referral paper (Table 1)

Table 1: Socio-demographic characteristics of women with GTD admitted at HUSCH, Southern Ethiopia from September 11, 2005 to September 11, 2010 E.C

Variables	Category	Frequency	Percent
Age in years	<=20	26	13.4
	21-30	91	46.9
	31-40	52	26.8
	41-50	25	12.9
Distance from	<50 km	85	43.8
health facilit	50-100 km	47	24.2
	>100 km	62	32
Region	SNNP	83 4	2.8
	Oromia	111	57.2
Referred case	Yes	135	69.6
	No	59	30.4

GTD was diagnosed in the nulliparous women in 30(15.5%) cases. Most of them (n=74, 40.2%) were para 1 to 4. Seven (3.6%) patients had history of previous GTD while 33(17%) and 4(2.1%) had history of previous abortion and ectopic pregnancy respectively. Majority of patients with GTD, 90(46.4%) were diagnosed during second trimester, 80(41.2%) during first trimester whereas 9(4.6%) were in the third trimester. Menstrual history was documented for 101(52.1%) of cases and out of these 72(71.3%) have had regular menses while 29(28.7%) have had irregular menses. (Table 2)

Table 2: Reproductive History and Gestational age of women with GTD admitted at HUCSH, Southern Ethiopia from September 11, 2005 to September 11, 2010

Variables	Category	No. of cases	Percentage
History of previous	Yes	33	17
abortion	No	161	83
History of previous	Yes	7	3.6
GTD	No	187	96.4
History of previous	Yes	4	2.1
Ectopic pregnancy	No	190	97.9
Parity status	Nulliparous	30	15.5
	1-4	78	40.2
	5-8	63	32.5
	9 and above	23	11.9
Gestational age	≤12week	80	41.2
in week	13-20 week	90	46.4
	>20week	9	4.6
	Unknown GA	15	7.7

Magnitude of GTD

The magnitude of GTD was 1.14 % (194 of 16,957) deliveries and 7.8/1000 deliveries and 2.5/1000 deliveries for complete and partial hydatidiform mole respectively, 0.5/1000 deliveries for invasive mole, 0.6/1000 deliveries for choriocarcinoma and there was no patient with a diagnosis of placental site trophoblastic tumor. The highest prevalence of GTD varies from year to year, 1.57% (62 of 3957) in the year of 2008 E.C and lowest (0.73%) was in 2006 E.C, (20 cases among 2723) deliveries.

Clinical presentation and management of patients with gestational trophoblastic disease

Patients had variable presenting complaints. Vaginal bleeding was the most common (n=169, 87.1%) presenting symptom followed by abdominal pain and large for date uterus in 73(37.6%) of cases for each (Table 3)

Table 3. Clinical presentation cases with Gestational trophoblastic disease (n=194) admitted at Hawassa University Compressive Specialized Hospital, Southern Ethiopia from September 11, 2005 to September 11, 2010 E.C

Variables	Number of cases	Percentage
Vaginal bleeding	169	87.1
Passage of vesicles	59	30.4
Big for date uterus	73	37.6
Abdominal pain	73	37.6
Respiratory symptoms	23	11.9
Theca-lutein cyst size > 6cm	19	9.8

Anemia was a common (n=90, 46.4%) medical complication, hyperthyroidism in 55(28.4%) and preeclampsia in 34(17.5%) of cases, Twelve (6.2) and 11 (5.7%) patients had shock and respiratory distress, respectively. Theca-lutein cysts were found in 19(9.8%) of patients.

Most of patients were managed by suction curettage, 136(70.8%) while 56(56/194=28.9% patients were managed by total abdominal hysterectomy (TAH). TAH with bilateral salpingo-ophorectomy (BSO) was done for 2 cases and TAH with unilateral salpingo-

ophorectomy(USO) for 5 cases). Fifty-one (26.3%) of patients were transfused with blood. Four patients were treated with methotrexate.

Factors associated with hydatidiform mole

In the bivariate analysis, absence of the following conditions: previous history of GTD, passage of vesicles, respiratory symptoms, theca luiten cyst, anemia, hyperemesis gravidarum, shock, respiratory embarrassment and not referred patient as well as absence of blood transfusion were identified to be associated with hydatidiform mole. However, in multiple logistic regression analysis, only absence of previous history of GTD, absence of respiratory symptoms, absence of hyperemesis gravidarum and not referred patient remained significantly associated with hydatidiform mole (P <0.05) (Table 4)

Table 4: Bivariate and multivariate logistic regression analysis showing factors associated with hydatidiform mole patients admitted at Hawassa University Comprehensive Specialized Hospital, Southern Ethiopia from September 11, 2005 to September 11, 2010 E.C

Variables	Hydatidiform mole(n=194) Yes (N=175)	No'(n=19)	COR (95% C.I)	AOR (95% C.I)
Previous history of GTD				
Yes	3	4	1	1
No	172	15	15.2(3.13-7.77)*	5.40(5.50-4.6) *
Passage of vesicles				
Yes	50	9	1	1
No	125	10	2.25(0.86-5.87)	1.70(0.44-6.59)
Respiratory symptom				
Yes	14	9	1	1
No	165	10	10.3(3.61-29.67)*	16.89(3.73-76.58) *
Theca leutin cyst				
Yes	15	4	1	1
No	160	15	2.84(0.54-9.67)	3.63(0.66-19.70)
Anima				
Yes	77	13	1 1	
No	98	6	2.76(1.0-7.59) *	1.67(0.29-9.70)
Hyperemesis gravidarum				
Yes	12	3	1	1
No	163	16	2.55(0.65-9.98)	8.06(1.20-5.4) *
Shock				
Yes	9	3	1	1
NO	166	16	3.46(0.85-14.08)	1.60(0.16-15.58)
Respiratory embarrassment				
Yes	7	4	1	1
No	168	15	6.40(1.68-24.37)	0.96(0.12-7.40)
Patient referred				
Yes	118	17	1	1
No	57	2	4.11(0.92-18.4)	5.95(1.02-4.84) *
Blood transfusion				
Yes	40	11	1	1
No	135	8	4.64(1.74-12.3) *	1.86(0.37-9.40)

*P value <0.05

DISCUSSION

The magnitude of gestational trophoblastic disease in this study was 11.4 per 1000 deliveries, that is 7.8/1000 deliveries and 2.5/1000 deliveries for complete and partial hydatidiform mole respectively, 0.5/1000 deliveries for invasive mole, 0.6/1000 deliveries for choriocarcinoma and there was no patient with a diagnosis of placental site trophoblastic tumor. It is in line with study in Egypt 6.6/1000 deliveries12, 7.2/1000 deliveries in Nigeria[17], done lower than study done in Turkeys, 12.1per 1000 deliveries[7] and it is higher than other study done in Saudi Arabia 0.9/100018, 1.1/1000 deliveries in Uganda[19] and 2.8/1000 deliveries in two teaching hospitals in Ethiopia[6]. This discrepancy might be due to difference in health care systems to manage and early detection of Gestational trophoblastic disease and it might be due to socio economic and cultural difference.

This study showed that the diagnosis of GTD was made during second trimester for majority of patients which similar with study done in Uganda19. In contrary to the result of other study showed that majority were diagnosed during first trimester[9,15,19]. This is may be due to most of our patients are not evaluated with routine first trimester ultrasound after history amenorrhea which can identify the problem, even though they may be asymptomatic at the time of diagnosis. It could also be due to access to health care limitation.

This study has also demonstrated that almost all the cases reviewed were diagnosed clinically and the diagnosis was confirmed using histopathologically for few cases. This data is in contrary to other studies which demonstrated that clinical diagnosis was confirmed with histopathological for most cases[3,5,12,15,18]. In this finding vaginal bleeding was the commonest presenting symptom which is similar with other study[2-18]. The finding of this study confirmed that anemia was the commonest complication which account 46.4% cases followed by hyperthyroidism 28.4% and preeclampsia 17.5% Which is similar with others findings[3,15,19]. In this study complete mole was commonest types of GTD which accounted 68% of cases which was similar to other studies[7,15,19].

CONCLUSION

The findings showed that the burden of Gestational Trophoblastic Disease is persistently high in the study facility. Moreover, majority of patients presented to Hawassa hospital was late.

LIMITATIONS OF THE STUDY

Since the study was retrospective, details of socio-demographic factors, obstetrics characteristics, management follow up and final treatment outcome was not assessed in detailed. The incidence of subsequent pregnancies after complete treatment of GTD was not studied.

DECLARATIONS

Ethical approval and consent to participant

Ethical clearance was obtained from Institutional Review Board (IRB) of College of Medicine and Health Sciences, Hawassa University. Confidentiality was maintained during data collection, analysis and interpretation

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AVAILABILITY OF DATA AND MATERIAL

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

CONSENT FOR PUBLICATION

Not applicable

COMPETING INTERESTS

The authors declare that they have no competing interests.

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OUTCOME OF HYPERTENSIVE DISORDERS OF PREGNANCY AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN ADMITTED TO JIMMA UNIVERSITY MEDICAL CENTER, SOUTHWEST ETHIOPIA

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ABSTRACT

BACKGROUND: Hypertensive Disorder of Pregnancy (HDP) is one of the most common obstetric complications that occur during pregnancy. It occurs in about 5 – 10 % of pregnancy and accounts for 10 – 15 % of maternal death worldwide. The disorder is also associated with perinatal mortality and complications. This study intends to assess maternal and perinatal outcome of hypertensive disorders of pregnancy.

OBJECTIVE: The main objective of this study was to assess outcome of Hypertensive Disorders of Pregnancy and associated factors in Jimma University Medical Center.

METHOD: Hospital based cross sectional study was conducted among 202 mothers. Purposive sampling method with consecutive technique was employed using interviewer administered questionnaires. Bivariate and multivariable binary logistic regression analysis was conducted.

RESULT: From 1980 total admissions to labor and maternity ward, 202(10.2%) mothers were diagnosed with HDP. Preeclampsia with severity feature was the most (60%) common presentation followed by eclampsia (10.4%). About one third (32 %) of the mother developed at least one maternal complication. Hemolysis elevated liver enzyme and low platelet (HELLP) syndrome was the most common complications (38.5%) followed by aspiration pneumonia (20 %). Five (2.4 %) mothers were died during the study period, three of them were due to eclampsia complicated by pulmonary edema and two were due to preeclampsia with severity feature complicated by acute kidney injury (AKI) with encephalopathy. Place of residency (AOR = 0.142, 95 % CI: 0.025, 0.801) and eclampsia (AOR = 9.852, 95% CI: 2.963, 133) were significantly associated with maternal outcome.

CONCLUSION: The presence of preeclampsia with severity features and eclampsia has been associated with poor maternal and perinatal outcomes.

KEYWORDS: Hypertensive disorders of pregnancy, maternal outcome, perinatal outcome, Jimma university medical center

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INTRODUCTION

Hypertensive disorder of pregnancy is an umbrella term that encompasses preexisting and gestational hypertension, usually defined as having a blood pressure higher than 140/90 measured on two separate occasions, more than 6 hours apart without the presence of protein in the urine and diagnosed after 20 weeks of gestation[1]. Hypertensive disorders are the most common medical disorders encountered during pregnancy, occurring in approximately 5 to 10% of all pregnancies[2]. Hypertensive disorders in pregnancy (HDP) remain a major global health issue not only because of the associated high adverse maternal outcomes but there is a close accompaniment of significant perinatal morbidity and mortality as well as it consists of wide spectrum of presentation, ranging from minimal elevation of blood pressure to severe form with multiple organ dysfunctions[3].

Among the hypertensive disorders, the pre-eclampsia syndrome, which is a multisystem disorder of unknown etiology, unique to pregnancy either alone or superimposed on chronic hypertension is the most dangerous. Eclampsia is the convulsive form of preeclampsia and affects 0.1% of all the pregnancies[4].

In low income and middle income countries, preeclampsia and eclampsia are associated with 10-15% of direct maternal deaths. World health organization (WHO) estimates the incidence of preeclampsia to be seven times higher in developing countries (2.8% of live births than in developed countries 0.4%) [4]. Incidence of eclampsia in developing nations varies widely, ranging from1case per100 pregnancies to 1 case per 3448 pregnancies. For patients obtaining prenatal care, the incidence is about 1 in 800 patients[5].

The typical feature of preeclampsia is the HELLP syndrome (hemolysis, elevated liver enzymes and low platelet count) or eclampsia that is occurrence of convulsions that cannot be attributed to other etiologic factors. Eclampsia is reported to be associated with a maternal mortality rate of 0.5 – 10% usually requiring high quality intensive care[6].

Preeclampsia predisposes toward potentially lethal complications involving placental abruption, disseminated intravascular coagulation, intracranial hemorrhage, hepatic failure, acute renal failure and cardiovascular collapse. Intrauterine fetal growth restriction (IUGR), intrauterine fetal demise and prematurity appear to be the other related obstetric problems[7].

Clinical situations noticed in HDP trigger elicit diagnosis and aggressive management in order to reverse the adverse maternal and perinatal outcome. Risk factors associated with preeclampsia include chronic hypertension, multifetal gestation, maternal age greater than 35 years, obesity, and African American ethnicity[8,9]. According to the report of the National Center for Health Statistics hypertension complicates around 3.7% of pregnancies in the USA and 16% of pregnancy related deaths. Black women were 3 times at increased risk to die from preeclampsia as white women[10].

Generally the HDP is more common in the developing countries than it is in the developed countries. Several studies have shown that nulliparity, extreme ages, race (being black) and others as risk factors for this problem. There is a significant risk of both maternal and perinatal morbidity and mortality in pregnancies affected by the disorder, this poor pregnancy outcomes are associated with lack of ANC follow up which is associated with delayed recognition and intervention in the affected mothers[2,10,11].

Findings of the study done in India reported that incidence of women presenting with HDP was 6.92%, from these 50.2% were preeclampsia, 35.7% eclampsia, 12.5% were gestational hypertension [12]. According to a population based study in South Africa the incidence of hypertensive disorders of pregnancy (HDP) was 12.5% [13].

World Health Organization estimates that at least one woman dies every seven minutes from complications of hypertensive disorders of pregnancy[14]. Analysis from the World Health Organization (WHO) from a multi-country survey shows that there were about 3-and 5-fold increased risk of perinatal death in women with preeclampsia and eclampsia, respectively, compared to women with no preeclampsia/eclampsia[15].

In Ethiopia as claimed by study conducted on disease burden and Ethiopian healthy system response given the demanding infrastructure, the case-specific fatality rate accounts for 3.8% which is unacceptable high and impermissible. Preeclampsia/eclampsia complicated to 1.2% of all institutional deliveries[16].

Studies figure outs that pregnancies complicated with hypertensive disorders are associated with increased risk of adverse fetal, neonatal and maternal outcome including preterm birth, Intrauterine Growth Retardation (IUGR) and Perinatal death. High perinatal mortality in women with HDP is mainly due to premature delivery and growth restriction[16].

In Ethiopia hypertensive disorder of pregnancy is among the third common causes of perinatal mortality rate (PNMR) accounting for 19% accordingly hypertension complicating pregnancy is a major cause of preterm births resulting in perinatal deaths of fetuses[5]. Few studies conducted in Ethiopia, yet focus on trends and prevalence of HDP, hence this study check out the outcome of HDP and associated factors in order to give direction for the care providers and administrators of the medical center father the finding of the study will help as the base line data for researcher interested in the area.

METHOD:

Study area and period:

Institution based cross-sectional study was conducted from January 01/2019 to June 30/2019 in (JUMC). Jimma University Medical Center is found in Jimma city, Southwest Ethiopia 369 km from Addis Ababa. Jimma University is one of the higher institutions in Ethiopia and JUMC which is part of Jimma University (JU) is established in 1930. It provides services for approximately 9,000 in patient and 80,000 outpatient attendances a year with a very wide catchment population of about 15 million people in southwest Ethiopia. The hospital provides almost all major types of medical care and it has a total of 659 beds of which 52 are found in the maternity ward. The labor and maternity wards are run by midwives, medical interns, resident physicians of obstetrics and gynecology and obstetrics consultants.

Study design:

Facility based cross sectional study design was employed.

Source population:

All mothers who were admitted to labor and maternity ward with hypertensive disorders of pregnancy in JUMC during the study period .

Study population:

Selected mothers among hypertensive disorders of pregnancy admitted to labor and maternity ward who diagnosed with gestational hypertension, preeclampsia with or without severity feature, eclampsia, and chronic hypertension, preeclampsia superimposed on chronic hypertension and gestational age ≥ 28 weeks were included to the study.

Sample size and Sampling technique:

Facility based consecutive sampling technique was employed among eligible women who were admitted during the study period. Sample size was determined by using single population proportion formula with Z=1.96 for 95% confidence level, d (degree of precision expected) of 0.05, and p of 36% (10). The desired sample size after using correction formula was 202.

Data collection:

Data collection tools were prepared in English and translated to local languages Afaan Oromo and Ahmaric, and translated back to English to check its consistence. Pretest was conducted on 5% (11) mothers among similar populations outside of the study area at Shenen Gibe hospital. After making appropriate modification based on pretest data were collected using structured, interviewer-administered questionnaires. Data were collected by trained medical ten medical interns and the principal investigator was motoring the overall data collection on daily basis.

The data was collected by reviewing records of the pregnant ladies and supplemented by interviewing the subjects on admission to labor ward and until discharged so as to assess presence and development of complications. The neonates admitted to Neonatal Intensive care unit (NICU) were followed for possible complications until discharge. The neonates who were discharged immediately after 24 hours of delivery, the mothers were asked on phone about neonatal status and

for any complications at 7 days of life. During discharge, mothers were communicated to answer a phone call at the 7th day or to send call me back request with any available phone to the data collector.

Data processing and analysis:

After checking its completeness collected data was entered to Epidata version 4.1 and exported to SPSS version 20 for analysis. Bivariate binary and multivariable logistic regressions were fitted to identify factors associated with the dependent variables by controlling confounders. Variables with p-value < 0.25 were candidate for multivariate logistic regression to identify factors that affect maternal and perinatal outcome. Statistical Significance was declared at p-value < 0.05 with 95% CI. Both crude odds ratio (COR) and adjusted odds ratio (AOR) with 95% confidence interval were reported.

Ethical consideration:

Ethical approval for the study was obtained from Jimma University Ethical review board. A research ethical committee was dedicated to approve all ethical issues of the research in Jimma university medical center. A verbal consent was obtained from study participants during data collection and the confidentiality was maintained by avoiding identifiers in the data collection tool.

RESULTS

Sociodemographic characteristics

During the study period, there were a total of 1980 deliveries of which 202 (10.2%) were diagnosed to have HDP making response rate of 100%. Most of the mothers 70(34.7%) were in the age group of 25 -29 years. Majority of study participant were Oromo 157(77.7%) and Muslim by religion 143(70.8%). More than half mothers came from rural areas 123(60.9%). This study revealed that 77(38.1%) of study participants had no formal education (See Table 1).

Table1: Frequency distribution of sociodemographic characteristics of mothers admitted with HDP JUMC, January 01/ 2019 to June 30/2019 G.C

Variables	Frequency(N)	Percent(%)
Age in years		
15-19	33	16.3
20-24	38	18.8
25-29	70	34.7
30-34	37	18.3
35 -39	24	11.9
Ethnicity		
Oromo	157	77.7
Amhara	18	8.9
Tigrie	2	1
Gurage	8	4.0
Silte	4	2.0
Other	13	6.4
Religion		
Muslim	143	70.8
Orthodox	39	19.3
Protestant	16	8
Catholic	4	2
Place of residency		
urban	79	39.1
rural	123	60.9
Occupation		
Employee	22	10.9
Merchant	34	16.8
Daily laborer	2	1.0
House maid	8	4
House wife	116	57.4
Farmer	14	6.9
Student	6	3.0
Educational status		
No formal education	77	38.1
Elementary school	66	32.7
Secondary school	32	15.8
Some University/college	18	8.9
University/ college completed	9	4.5
Income per month		
< 1075	34	16.8
1075 - 1680	97	48
1681- 3360	40	19.8
3361- 10920	26	12.8
>10920	5	2.4
Marital status		
single	5	2.5
married	193	95.5
divorced	3	1.5
separated	1	0.5
History of change in partner		
Yes	2	1.0
No	200	99

Obstetric history and HDP diagnosis related variables

The finding of this study shows that 98(48.5%) of mothers were primi-gravida. With regard to ANC service, 192 (95%) of mothers with HDP had at least one ANC visit. About one third (37.6%) had four or more ANC visits. Majority of mothers (61.9%) had ANC follow up at health center. Severe headache and blurring of vision were the most common presentation accounting for 121(59.9%) and 97 (48%) respectively. Twenty one (10.4%) had history of abnormal body movement, of which 4 (2 %) had more than five episodes of abnormal body movement. Eleven (52.3 %) had abnormal body movement before onset of labor.

Majority of the mothers (76.7%) came with referral from nearby health care facility. Of all cases, 44 (21.8%) had systolic blood pressure in severe range (≥ 160) and 28 (13.9%) had diastolic blood pressure in severe range (≥ 110). For the majority of mothers 161(80%) onset of labor was spontaneous and induced in 32(16%) of cases. Cesarean delivery was the most common mode of delivery in 79(39.1 %) of cases. Non reassuring fetal heart rate pattern (NRFHRP)and failed induction were the most common indication for cesarean delivery accounting for 42 (53.2%) and 22(29.7%) of cases respectively. Preeclampsia with severity features was the most common HDP accounting for 121(60%). HELLP syndrome occurred in 25 (12.4 %) of cases. Majority of mothers with HDP were given magnesium sulphate for seizure prophylaxis in 132(65.3%) and diazepam in one third of cases (34.6 %).(See Table 2 and Table 2.1)

Table 2: Frequency distribution of obstetric history related variables among mothers with HDP admitted to JUMC, January 01/ 2019 to June 30/ 2019 G.C

Obstetric Variables	Frequency(N)	Percent(%)
Gravidity		
1	98	48.5
2-4	69	34.2
5-9	35	17.3
Gestational age		
28 to 33	28	13.8
34 to 36	28	13.8
≥37	146	72.4
ANC follow up		
Yes	192	95.0
No	10	5.0
Number of ANC follow up		
1	10	5.0
2-3	107	54.0
≥4	75	37.6
Place of ANC follow up		
Health Center	125	61.9
Private clinic	10	5
Governmental Hospital	47	23.3
Others	10	5.0
Blurring of vision		
Yes	97	48.0
No	105	52
Epigastric pain		
Yes	80	39.6
No	122	59.4
History of abnormal body movement		
Yes	21	10.4
No	181	89.6
Number of abnormal body movement		
< 5	17	80.9
≥ 5	4	19.1
Time of occurrence of abnormal body movement		
Antepartum	11	52.3
Intrapartum	5	23.4
Postpartum	5	23.4
Time from the first convulsion to delivery		
< 12 hours	2	10
12-24 hours	12	57
>24hours	7	33
Previous history of hypertension during pregnancy		
Yes	20	9.9
No	182	90.1
History of diagnosed hypertension before pregnancy		
Yes	14	6.9
No	188	93.3
History of diagnosed cardiac disease		
Yes	4	2.0
No	198	98
History of diagnosed diabetes mellitus		
Yes	3	1
No	199	99
Patient came referred		
Yes	155	76.7
No	47	23.3
Patient came referred from		
Health center	87	43.1
District hospital	51	24.3
Private clinic	9	5.2
Others	8	4.1

Table 2.1: Frequency distribution of HDP diagnosis and management of labor related variables among mothers with HDP admitted to JUMC, January 01/ 2019 to June 30/ 2019 G.C

Obstetric Variables	Frequency(N)	Percent(%)
Systolic BP		
<140	25	12.4
140 - 159	133	65.8
≥ 160	44	21.8
Diastolic BP		
< 90	17	8.4
90 - 109	157	77.7
≥ 110	28	13.9
Onset of labor		
Spontaneous	161	80
Induced	32	16
Mode of delivery		
Spontaneous vaginal delivery	79	36.6
Forceps assisted	37	18.3
Vacuum assisted	8	4
Cesarean delivery	74	39.1
Destructive delivery	4.0	2.0
Reason for Cesarean delivery		
Non reassuring fetal heart rate pattern	42	53.2
Failed induction	22	29.7
Cephalo pelvic disproportion	4	5
Others	8	10.6
Protein in urine		
Negative	45	32.2
+1 and above	157	67.8
AST ≥ 2 times elevated		
Yes	25	12.9
No	177	87.6
ALT ≥ 2 times elevated		
Yes	20	9.9
No	182	90.1
Platelet count		
< 100,000	31	15.3
≥ 100,000	171	84.7
Serum creatinine ≥ 2 times elevated		
Yes	19	9.4
No	183	90.6
Type of hypertensive disorders of pregnancy		
Preeclampsia with severity feature	121	60
Eclampsia	23	11.3
Preeclampsia without severity feature	21	10.3
Chronic hypertension	14	6.9
Preeclampsia superimposed on chronic hypertension	11	5.4
Gestational hypertension	12	5.9
Onset of HDP		
Antepartum	91	45
Intrapartum	77	38
Postpartum	34	17
HELLP syndrome		
Yes	25	12.4
No	177	87.6
Seizure prophlaxis		
Magnesium sulfate	132	65.3
Diazepam	70	34.6
Magnesium sulphate toxicity		
Yes	5	5
No	127	96.2
Magnesium sulphate toxicity detected		
Depressed DTR	3	60
Depressed RR <12	2	40

Maternal outcome with hypertensive disorders of pregnancy

Of the total mothers with hypertensive disorders of pregnancy admitted to labor ward, 147(68 %) of them had favorable maternal outcome. Sixty five (32 %) of them developed at least one maternal complications (unfavorable maternal outcome). HELLP syndrome was the most common maternal complication 25(38.5%. A total of 14(6.9 %) cases of mothers with HDP were admitted to ICU. Of these 9(64.2%) cases were discharged with improvement. Five (35.3%) cases were complicated by maternal death. Three cases were complicated by pulmonary edema and two cases complicated by AKI with encephalopathy (see Table 3).

Table 3 : Maternal outcome among mothers with hypertensive disorders of pregnancy admitted to labor ward, January 01/2019 to June 30/ 2019 G.C.

Obstetric Variables	Frequency(N)	Percent(%)
Maternal complications		
HELLP syndrome	25	38.5
Abruptio placenta	13	20
AKI	10	15.3
Aspiration pneumonia	11	16.9
Pulmonary edema	4	6.2
DIC	2	3
ICU admission		
Yes	14	6.9
No	188	93.1
Outcome after ICU admission		
Died	5	35.7
Discharged improved	9	64.3
Cause of death		
Pulmonary edema	3	60
AKI with encephalopathy	2	40

Perinatal outcome of neonates

According to this study, 188(91.6%) were singleton and 14(8.4%) were twin. Most of the neonates (60.9%) were in the normal birth weight of 2500- 3999 gm followed by low birth weight (1500 -2499 gm) in 20.3 % and very low birth weight (< 1500 gm) in 11.9 % of cases. A total of 187(85.6%) of neonates were alive and 29(14.4 %) were still birth at delivery. Of the total still births 21(72.4 %) were before admission to labor ward and 3 (10.3 %) were after admission in the maternity ward before onset of labor and 5(17.2 %) were intrapartum. Fifty (23.13 %) of the fetuses had developed at least one complication(unfavourable outcome). A total of 30(16 %) neonates were admitted to NICU. HMD and prematurity was the most common indication for NICU admission in 33.3% and in 26.6 % of cases respectively. Twelve (40 %) of neonate admitted to NICU were complicated by ENND. HMD and PNA was the major cause of neonatal death accounting for 7(58.3 %) and 3(25 %) of cases respectively (see Table 4).

Table 4: Perinatal outcome among neonate born to mothers with hypertensive disorders of pregnancy admitted to labor ward, JUMC from January 01/ 2019 to June 30/ 2019 G.C

Obstetric Variables	Frequency(N)	Percent(%)
Fetal outcome at delivery		
Alive	187	85.6
Dead	29	14.4
Time of death		
Before admission	21	72.4
After admission	3	10.3
Intrapartum	5	17.2
Number of fetus		
Singleton	188	91.6
Twin	14	8.4
Birth weight		
<1500 gm	24	11.9
1500-2499 gm	41	20.3
2500-3999 gm	123	60.9
≥ 4000 gm	1	5
APGAR score at 1st minutes		
< 4	5	2.67
≥ 4	182	97.3
APGAR score at 5th minutes		
< 7	12	5.9
≥ 7	175	93.6
Neonate admitted to NICU		
Yes	30	16
No	157	84
Indication for NICU admission		
Prematurity	8	26.6
PNA	5	16.6
MAS	3	10
HMD	10	33.3
EONS	3	10
Other	1	3.3
Neonatal outcome at NICU		
Discharged improved	18	60
Complicated by ENND	12	40
Cause of neonatal death		
HMD	7	58.3
PNA	3	25
Others	2	16

Factors affecting maternal outcome

Out of the 202 mothers, 65 had developed at least one complication making the prevalence of unfavorable maternal outcome of 32 %. Those mothers who came from rural areas were 86 % less likely to have favorable maternal outcome than those who came from urban areas (AOR = 0.142, 95 % CI:0.025,0.801). Mothers who

had history of abnormal body movement had 9.8 times more likely to have unfavorable maternal outcome (AOR = 9.852, 95 % CI: 2.963, 133) than the counterparts. (See Table 5)

Table 5: Factors affecting maternal outcome using multivariate logistic regression among mothers with HDP admitted to labor ward from January 01/ 2019 to June 30/2019 G.C

Variables	Maternal outcome Favourable	Unfavourable	COR (95% CI)	AOR (95% CI)	P value
Place of residence					
Urban	76	3	1	1	1
Rural	85	38	11.3 (3.359-38.18)	0.142(0.025,0.801)	0.027*
Severe headache					
Yes	89	32	0.348(0.56,0.775)	2.255(0.392,12.966)	0.36 2
No	72	9	1	1	
Blurring of vision					
Yes	67	30	3.66(1.714,7.83)	0.529(0.115,2.44)	0.414
No	90	11	1	1	
Epigastric pain					
Yes	54	26	3.474(1.676,7.200)	2.9(0.902,0.801)	0.074
No	101	14	1	1	
Having eclampsia					
Yes	14	9	0.15 (0.062,0.359)	9.852 (2.963,133)	0.002*
No	146	32	1	1	
Mode of delivery					
SVD	69	10	1	1	
Forceps assisted	28	9	0.048(.005,.511)	0.6 (0.01,35.479)	0.806
Vacuum assisted	6	2	0.111(.007,1.776)	1.803(0.012,262.27)	0.816
Cesarean delivery	1	17	0.099(0.01,1.02)	1.17 (0.021,65.237)	0.939
Destructive delivery	57	3	0.107(0.01,1.163)	0.431(0.007,27.44)	0.691
AST ≥ 2 times elevated					
Yes	12	14	0.341(0.136,0.856)	0.579(0.053,6.366)	0.655
No	149	26	1	1	
ALT ≥ 2 times elevated					
Yes	12	8	0.32(0.122,0.852)	0.062 (0.04, 1.031)	0.053
No	149	32	1	1	
Platelet count					
<100,000	2	23	1	1	
≥ 100,000	159	18	0.01(0.002,0.045)	6.286(0.603,65.542)	0.124

Factors affecting perinatal outcome

Gestational age, having history eclampsia, antepartum onset of HDP of the mother had shown strong association with unfavorable perinatal outcome. Neonate delivered at GA 28 -33 weeks had 10 times more likely to have unfavorable fetal outcome than those who delivered at GA of 34 -36 weeks and ≥ 37 weeks (AOR = 10.117,95% CI: 1.635 , 62.6). Those mothers who had abnormal body movement were 2.7 times more likely to have unfavorable perinatal outcome than those who were not having abnormal body movement (AOR=2.761, 95% CI :1.898,8.487). Antepartum onset of HDP increased the risk of unfavorable perinatal outcome by more than 6-fold compared with intrapartum and postpartum onset of HDP (AOR = 6.6, 95% CI: 3.4,12.75) (See Table 6).

Table 5: Factors affecting maternal outcome using multivariate logistic regression among mothers with HDP admitted to labor ward from January 01/ 2019 to June 30/2019 G.C

Variables	Neonatal outcome Favourable	Unfavourable	COR (95% CI)	AOR (95% CI)	P value
Occupation Employee					
Merchant			0.222(0.03,1.535	0.248(0.0232.623)	0.247
Daily laborer	18	4	0.172(0.027,1.108)	0.156 (0.015,1.583)	0.116
House maid	28	5	0.25(0.027,2.319)	0.207(0.011,4.045)	0.299
House wife	8	2	0.2(0.022,1.816)	0.09(0.05,1.88)	0.121
Farmer	77	28	0.369(0.069,1.908)	0.408(0.056,2.982)	0.377
Student	84	62			
Gestational age					
28 to 33	6	22	7.2(1.284,40.365)	10.117(1.635,62.60)	0.013*
34 to 36	17	17	0.667(0.819,26.604)	4.228(0.642,27.857)	0.134
≥37	13	21	1	1	
ANC					
Yes	147	45	1	1	0.691
No	5	5	3.267(0.905,11.703)	0.678(0.1,4.61)	
Severe headache					
Yes	84	37	2.304(1.135,4.678)	0.661(0.181,2.414)	0.531
No	68	13	1	1	
Blurring of vision					
Yes	64	33	3.2(1.586,6.475)	1.15(0.465,2.848)	0.762
No	87	14	1	1	
Having eclampsia					
Yes	12	11	0.306(0.125,0.747)	2.761(1.898, 8.487)	0.042*
No	140	39	1	1	
Onset of HDP					
Antepartum	57	34	2.6 (1.57-4.38)	6.6(3.4-12.75)	0.003*
Intrapartum	62	12	1.4(0.77-2.55)	0.5(0.99-1.04)	0.41
Postpartu	13	4	1	1	
Systolic BP					
<140	20	5	1	1	
140 - 159	103	30	0.483(0.151,1.544)	0.535(0.136,2.112)	0.372
≥ 160	29	15	0.563(0.268,1.185)	0.531(0.2,1.408)	0.203
ALT ≥ 2 times elevated					
Yes	12	8	0.453(0.174,1.182)	1.852(0.612,5.608)	0.276
No	139	42	1	1	
HELLP syndrome					
Yes	16	9	0.536(0.22,1.303)	1.029(0.296,3.581)	0.961
No	136	41	1	1	
AKI					
Yes	10	9	0.321(0.122,0.842)	3.478(1.038,11.651)	0.43
No	142	41	1	1	

DISCUSSION

The magnitude of HDP among 1980 mothers who gave birth at JUMC during the study period was 10.2%. Preeclampsia with severity feature was the commonest HDP followed by eclampsia. Among mothers with hypertensive disorders of pregnancy admitted to labor ward, 68% of them had favorable maternal outcome without complication and 32% had unfavorable maternal outcome with at least one maternal complication. Among mothers with HDP, 23.13% of the fetuses had developed unfavorable perinatal outcome with at least one complication and 76.87% had favorable perinatal outcome with no complication.The most common neonatal complications were prematurity, still birth, early neonatal death (ENND) and hyaline membrane disease (HMD).

In this study, the prevalence of HDP was 10.2% which is higher than the study done in the same area eight years back and it is also higher than the global prevalence of HDP which is 5- 10%[2]. Majority (48.5%) of the mothers with HDP were primigravida. Similar study conducted in India showed that primigravida accounted for majority of HDP compared to multigravida[17]. Ninety five percent of mothers with HDP had ANC follow up of whom 37.6% had four and above visits. Similar studies conducted in Addis Ababa Gandhi Memorial Hospital showed 96.5% had ANC follow up. Another study In Nigeria showed 76.6 % of pregnant mothers with HDP received ANC18. But, a study in India showed 82% of them had no ANC follow up [17]. The higher rate of ANC follow up in the current study could be because of the awareness created by government intervention and improvement in ANC coverage. According to this study, HDP was found to be more common in mothers who had ANC visit during current pregnancy.

In this study, preeclampsia with severity feature was the commonest presentation (60%) which is similar with reported from many other studies. A study in Tikur Anbessa Hospital of Addis Ababa and Gandhi Memorial Hospital showed that 78 % and 82.5 % of HDP respectively were due to preeclampsia with severity feature[9]. while study done at Jimma University Specialized hospital showed preeclampsia with severity feature occurred in 51.9 % of cases[3].The large number of preeclampsia with severity feature cases in this study could be due to the fact that the study was undertaken in referral hospital which serves more advanced cases which were difficult to be managed at lower level.

Regarding maternal outcome, 32% of mothers had unfavorable outcome with at least one complication. HELLP syndrome was the most common complication accounting for 38.5 % followed by abruptio placenta in 20% aspiration pneumonia in 16.9% AKI in 15.3% and pulmonary edema in 6.2%.

Similar study done in Addis Ababa governmental hospital showed 36% experienced at least one complication, like HELLP syndrome in 39.5% aspiration pneumonia in 17.5%, pulmonary edema in 17% and abruption placenta in 15.3% of cases(19). Hence, our findings are seems like consistent. Almost 70% of mothers were from rural areas and there was statistically significant association between place of residency being rural area and unfavorable maternal outcome. This may be due to the fact that mothers who live in rural areas have lower access to health facility which is an important contributing factor for the development of maternal complications. About 50% of mothers with eclamptic mothers had antepartum onset. But there was no statistically significant association between time of first episode of convulsion to delivery and unfavorable maternal outcome. Liver function tests were elevated ≥ 2 times (AST in 12.9% and ALT in 9.9%) of cases. Similar study done in India showed that liver function tests both AST and ALT elevated ≥ 2 times in 17.3% and 18.67% of cases respectively (20). Renal function tests were elevated with serum creatinine level of ≥ 1.2 mg/dl. Similar study done in India showed elevated serum creatinine ≥ 1.2 mg/dl in 59% of cases[20].

HELLP syndrome developed in 12.4% of cases which is higher than the previous study accounting for 8.9%5. While the study conducted in Addis Ababa reported HELLP syndrome developed in around 39.5% of the women10. A relatively higher HELLP syndrome cases in this study may be due to delays in early detection and timely management of preeclamptic women.

Five mothers (2.4 %)with hypertensive disorders of pregnancy died during the study period, of this three

were due to eclampsia complicated by pulmonary edema and two of them were complicated by AKI with encephalopathy.More over eclampsia contributed for 10 cases out of 14 ICU admissions while the remaining 4 cases were due to preeclampsia with severity feature. The Case fatality rate for eclampsia was 13%. There was statistically significant association with mother having eclampsia and unfavorable maternal outcome with P -value of 0.02.

In this study, 23% of the neonates had developed unfavorable perinatal outcome with at least one complication and 76.87% had favorable perinatal outcome with no complication. The most common perinatal complications were still birth in 58 % very low birth weight 48% ENND in 24% and HMD in 20 %.

Similar study done at Addis Ababa governmental hospital showed that the most common neonatal complications were prematurity with 32.8% respiratory distress syndrome with 37.9% very low birth weight with 30.2 %[10]. Furthermore, other studies focusing only on eclamptic women reported that perinatal deaths were caused by prematurity in 68%[20,21], on the other hand, significantly increased odds of perinatal mortality were observed among women with eclampsia, which was consistent with other studies[22], this is probably because of the severe nature of the eclampsia disease, which usually complicates by severe intrauterine asphyxia and severe placental abruption16. The perinatal mortality rate of HDP in this study was 189 per 1000 total birth. The proportion of still birth was more than 2.5 times higher than early neonatal death 14.4%. In this study HMD was the most common cause of neonatal death accounting for 58.3 % of cases. The presence of HDP has been linked with poor maternal and perinatal outcomes which were manifested by increased maternal ICU admissions, preterm delivery rate, LBW and PNMR. Moreover, there was a 13 % case fatality rate in those mothers affected by eclampsia. This study also revealed the presence of high intervention rates by induction of labor, cesarean section and instrumental delivery than what expected. The fact that the study was undertaken in a tertiary teaching hospital may partly explain the high rate of interventions observed.

CONCLUSION

The magnitude of HDP was 10.2%. Preeclampsia with severity feature was the commonest HDP followed by eclampsia. Among mothers with hypertensive disorders of pregnancy, majority of them assessed with favorable maternal outcome without complication. The most common maternal complications were HELLP syndrome and abruptio placenta. Place of residence and eclampsia were significant predictors of maternal outcome. Near to one fourth of the fetuses born to mother with HDP had developed unfavorable perinatal outcome. The most common neonatal complications were prematurity and still birth.

RECOMMENDATION

Due emphasis should be given to strategies that reduce HDP related unfavorable maternal and neonatal outcomes. Place of residence and having eclampsia should be taken into account in planning to reduce unfavorable maternal outcome. Antepartum and intrapartum close monitoring of high risk mothers in the maternity ward should be improved to prevent IUFD and other. Further study with gold standard design with large sample size is recommended.

DECLARATIONS:

Competing/ Conflict of Interest

All authors declare that they have no any financial and non-financial competing interests.

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PREVALENCE OF FEMALE GENITAL MUTILATION IN ETHIOPIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ABSTRACT

BACKGROUND: Female Genital Mutilation (FGM) is a major harmful traditional practice that affects the health and well-being of women and girls. FGM is widespread across Ethiopia with a varying degree. Even though, there are various studies conducted on prevalence of FGM in Ethiopia, it has inconsistent findings. Therefore, this review was conducted to estimate the pooled prevalence of FGM among women and children and its regional variations in Ethiopia.

METHOD: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline was followed to review published and unpublished studies conducted in Ethiopia. The databases used were; PubMed, Google Scholar, CINAHL an AJOL. Data were extracted using the Joanna Briggs Institute tool for prevalence studies. The meta-analysis was conducted using STATA version 14 software. The heterogeneity and publication bias was assessed using the I^2 statistics and Egger's test respectively. Descriptive information of studies was presented in narrative form and quantitative results were presented in forest plots. Random effects model was used to estimate the pooled prevalence of FGM with the corresponding 95% confidence interval.

RESULTS: A total of 25 studies were included in the analysis. Twenty articles included 44,283 participants and 14 articles with 38,230 participants to estimate the pooled prevalence of FGM among women and children less than 15 year respectively. The pooled prevalence of FGM among women and children aged less than 15 years in Ethiopia was 84.6% (95% CI: 80.51%, 88.7 %%) and 49.79% (95% CI: 41.91%, 57.68%) respectively. The highest prevalence of FGM among women was observed in Somali region (91.09 % (95 % CI: 85.75, 96.44)), and the lowest reported in Harari region (79.50% (95 % CI: 76.77, 82.23)). The highest prevalence of FGM among children less than 15 years was observed in South Nation Nationalities and Peoples Region (SNNPR) (82.20% (95 % CI: 79.52, 84.88)) and the lowest reported in Harari region (19% (95 % CI: 16.35, 21.65)).

CONCLUSION: The prevalence of FGM is high in Ethiopia with a wide variation was observed across regions. Attentions should be emphasized to end or reduce the practice, mainly at the high FGM clustered regions of Ethiopia.

KEYWORDS: Female genital mutilation, Harmful traditional practice, Ethiopia, Systemic review, Meta-analysis

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INTRODUCTION

Female Genital Mutilation (FGM), also known as 'female genital cutting' or 'female circumcision', refers to "all procedures involving partial or total removal of the female external genitalia or other injuries to the female genital organs for non-medical reasons[1-3]. FGM reflects the disparity between the genders, and it's a serious violation of human rights[4].

World Health Organization (WHO) estimates, every year, more than two million girls are subjected to FGM[5]. Globally, FGM type II is the most frequently practiced form, representing an estimated 80% of all procedures[6]. While type III practiced about 10% of FGM in Africa. It is mostly practiced in Djibouti, Somalia, and Sudan[7]. The estimated prevalence of FGM in 27 countries across Africa ranged from < 1% in Uganda to 98% in Somalia3. According to the Ethiopian Demographic Health Survey (EDHS), the estimated prevalence of FGM among women (15–49 years) was 65%. However, there is a great inconsistency among different regions in Ethiopia ranges from 24.2% in Tigray to 98% and 99% in Afar and Somali regions respectively[8].

Female genital mutilation mostly practiced on girls less than 15 years[9]. Even though the EDHS report showed more than 52.5% of girls who undergo FGM during the infancy period, it was practices differently on the ethnic group, and across regions[8]. On the other hand, it was performed in the first week of birth in Northern Ethiopia regions (Tigray and Amhara), and much later or before marriage in the Southern Ethiopia regions (Oromia and SNNPR)[10-12]. Moreover, it is principally carried out by traditional birth attendants or old women by non-sterile sharp instruments[10-13].

Besides, there is an international movement to halted the FGM and increased the awareness of its consequences, FGM still continues[14-15]. The 2005 Criminal Code of Ethiopia was implemented the articles 565 and 566 the FGM practice punishable by imprisonment from 3 months to 10 years[16]. However, the FGM law is not very effective as expected on the reduction of the practice of FGM. The reasons for continued FGM are the cultural value of the practices, and societies reflected as compulsory for a girl to become womanhood ritual. It was also believed that FGM demanded to preserve a girl's virginity[17-19].

Various studies show that FGM is widespread across Ethiopia with a varying degree. These studies reported inconsistently. There were also notable differences between regions of Ethiopia. In addition, EDHS data are not entirely consistent. The DHS data does not directly measure the FGM status of girls aged 0-14 years, however, pre-2010, the DHS surveys asked women whether they had a least one daughter with FGM. This data cannot be used to accurately estimate the prevalence of girls under the age of 15[20]. Whereas, from 2010, the DHS methodology changed so that women are asked the FGM status of all their daughters under 15 years. Therefore, this study was conducted to estimate the prevalence of FGM by summarizing the evidences on the prevalence of FGM among women and children in Ethiopia. Additionally, this study identified the prevalence and regional variations of FGM among women aged 15- 49 years and girls less than 15 years in Ethiopia.

METHOD AND MATERIALS

Study design and search strategy

A systematic review and meta-analysis was conducted using published and unpublished research on the prevalence of FGM among women and their daughters in Ethiopia from 1997 to October 11, 2017, were included in the review. Unpublished studies were retrieved from the official website of Addis Ababa University electronic database[21]. The databases used to search for studies were PubMed, Google Scholar, CINAHL, and African Journals Online. All search terms for; ''Female genital mutilation OR cutting OR circumcision OR harmful traditional practices OR infibulation AND Ethiopia.'' were used separately and in combination using the Boolean operators like "OR" or "AND". The selected papers were fully reviewed and the required information for the systematic review was extracted and summarized using extraction table in Microsoft Office Excel software. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline was followed throughout the review and analysis process[22].

Study selection and eligibility criteria

Inclusion criteria

Any studies in Ethiopia that reported on FGM and fulfilled the following criteria were entered into the analysis, including the following factors:(1) the participants were women 15 years old and above and children less than 15 years;(2) Observational epidemiologic studies had reported prevalence or total of participants and number of FGM events;(3) studies used the outcome measure based on the World Health Organization (WHO), United Nations Children's Fund, and United Nations Population Fund definition of FGM. Female genital mutilation is defined as "all procedures involving partial or total removal of the external female genitalia or other injuries to the female genital organs whether for cultural or other non-therapeutic reasons"[23] ; and (4) all published articles, thesis, and dissertations in English language journals from 1997 to October 11, 2017 were included in the review.

Exclusion criteria

If studies failed to mention any of the above inclusion criteria it was excluded. In addition, studies were excluded if they were:(1) studies that do not include quantitative data on the prevalence FGM;(2) duplicate studies. In the case of duplicated publications, only the study containing the most important information in the context of prevalence and ascertainment methodologies or most recent results was included; and(3) Studies with methodological problems and review articles were excluded from the review.

Data extraction and quality assessment

Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) was used for critical appraisal of studies [24]. The information required for the review was collected using the data extraction tool for prevalence studies prepared by Joanna Briggs Institute (JBI)[25].

The main findings regarding the prevalence of FGM was summarized by two authors and excel sheet was prepared under subheadings agreed upon by all authors. The data collection tool contained information regarding the article author, the year of the study conducted, year of publication, sample size, response rate, study design, setting, mean age and prevalence of FGM. Additionally, the tool contains information regarding the percentage of FGM among women, their children, and by the regional state was included in the data collection tool. Retrieved articles were assessed for inclusion using their title, abstract and then a full-text review of articles for quality was done before inclusion in the final review.

Heterogeneity and publication bias

The heterogeneity test of included studies was assessed by using the I^2 statistics and its corresponding p-value. The p-value for I^2 statistics less than 0.05 was used to determine the presence of heterogeneity. Low, moderate, and high heterogeneity was assigned to I^2 test statistics results of 25, 50, and 75% respectively[26,27]. The publication bias was assessed using the Egger regression asymmetry test[28,29]. For meta-analysis results which showed the presence of publication bias (Egger test = $p < 0.05$), the Duval and Tweedie nonparametric trim and fill analysis using the random effect analysis was conducted to account for publication bias [30].

Statistical methods and analysis

Data were entered into Microsoft excel, and the meta-analysis was conducted using STATA version 14 software. Forest plots used to present the combined prevalence and 95% confidence interval (CI). To estimate the pooled prevalence of FGM with the corresponding 95% confidence intervals (CI) was computed by random effects models. For test results with significant variation across studies, the random effect analysis was used as a method of analysis[26]. Subgroup analysis was conducted by regions of Ethiopia.

RESULTS

Study selection

The review brought a total of 1,160 published articles and 7 unpublished reports. From this, 97 duplicate records were removed and 934 records were excluded after screening by title and abstract. A total of 136 full-text articles were screened for eligibility. From this, 37 articles were excluded since they failed to satisfy the eligibility and 11 articles were excluded by different reasons such as 8 articles focused on other harmful traditional practices and do not reported FGM, one article conducted on refugees which is different population characteristics, one repeated article, and one article has a methodological problem. Finally, 25 studies were included for the final analysis (Figure 1).

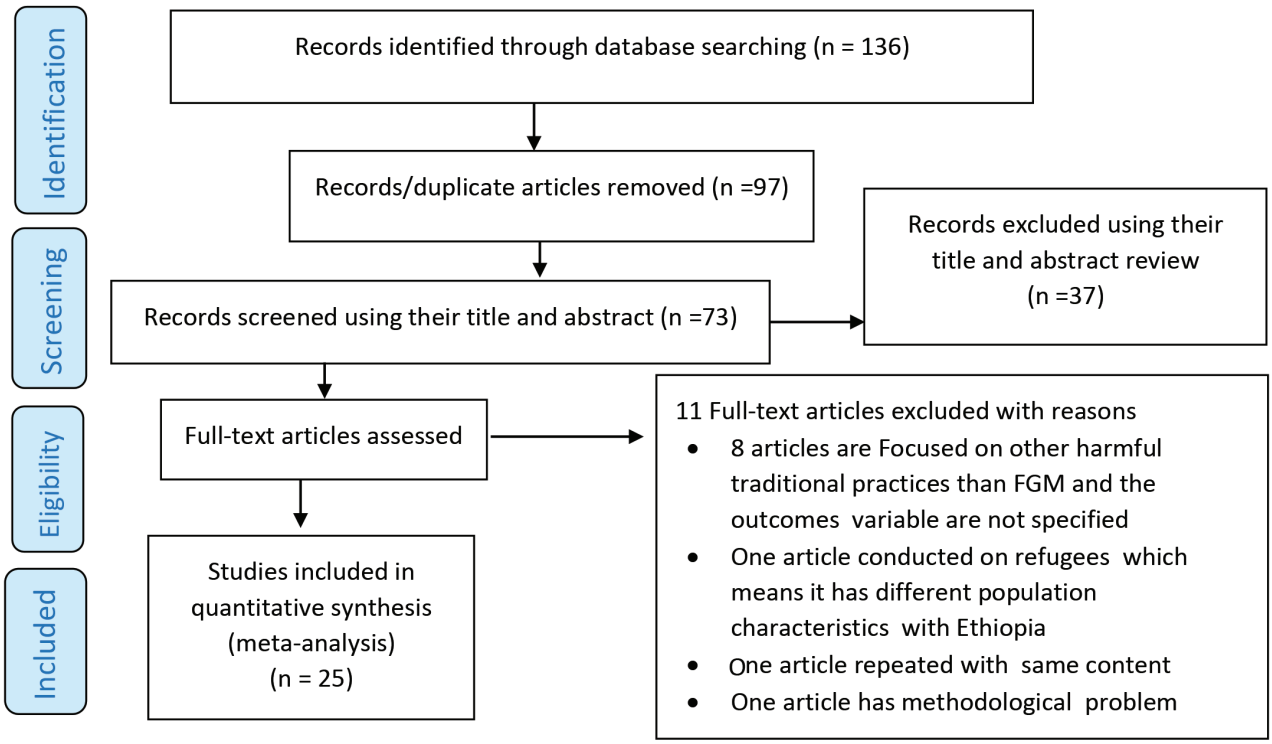

Figure 1: Flow diagram of the studies included in the Meta-analysis

Characteristics of included studies

All included articles were cross-sectional studies. From 25 studies were included in the analysis, 20 articles included to identify the prevalence of FGM practices among women. The sample size of studies ranged from a minimum of 138 in a study conducted in Serbo town, Oromia region [31] to a maximum of 15,367 women, in a nationwide study [32]. A total of 44,283 participants were included in the review. The studies were conducted from 1997 to 2017 in different regions of the country (Table 1).

Fourteen articles were included in the Meta analysis to estimate the prevalence of FGM among children less than 15 years. The sample size of studies ranged from a minimum of 138 in a study conducted in Serbo town, Oromia region [31] to a maximum of 15,367 participants in a nationwide study [32]. A total of 38,230 participants were included in the review. The studies were conducted from 2000 to 2014 in different regions of the country (Table 2).

Table 1: Summary of studies included in the meta-analysis to estimate the prevalence FGM practice among women in Ethiopia.
, 1997–2017.

S.N	Author, Year	Study area	Study design	Study period	Study population	Sampling strategies	Age in years	Sample size	Response rate	SE	Prevalence of FGM (95% CI)
1.	Moges et al., 2015 [33]	Lejet Kebele, Dembecha Woreda, Amhara	Cross-sectional	April 27-May 4, 2014	Women who had daughter less than 5 years	Systematic random sampling	Mean ± SD= 29.35 ± 7.75 years	234	100%	1.55	94 (90.96, 97.04)
2.	Mulusew Andualem, 2016 [34]	Goncha Siso-Enessie District, Amhara region	Cross-sectional	September 2004	Women in reproductive age group (ages 15-49) and who had daughters less than five years of age	Systematic random sampling method	Range=15-24 years	718	98%	0.52	98 (95.98, 99.02)
3.	Bogale, Markos, & Kaso, 2014 [11]	Bale zone, Oromia region	Cross-sectional	April 18, 2014 to May 20, 2014.	Childbearing age women	Simple random sampling	Mean ± SD = 30 ± 9.2 years	619	97.6%	1.65	78.5 (75.26, 81.74)
4.	Hakim, 2001 [35]	Addis Ababa,	Cross-sectional	Jan-Dec, 1997	Childbearing age women	Simple random sampling	Mean ± SD = 25.9 ± 5.9 years	1481	100%	0.98	82.7 (80.77,84.63)
5.	Argaw & Fisseha, 2002 [31]	Serbo town, Jimma Zone, Oromia region	Cross-sectional	January, 2001	Mothers aged 15 years and above who had at least one daughter	Systematic random sampling method	----	138	100%	1.59	96.4 (93.29,99.51)
6.	Hussein, Adem, & Mohammed, 2013 [36]	Jigjiga town, Somalia region	Cross-sectional	January 1 to May 30, 2012	Women of reproductive age group (15-49 years of age)	Systematic random sampling method	Range=15 -49 years	323	100%	1.67	90 (86.73, 93.27)
7.	S. Rahlenbeck Mekonnen, & Melkamu, 2010 [37]	Oromia region	Cross-sectional	Ethiopia Demographic and Health Survey, 2005)	women aged 15–49 years	Multi -stage clustered sampling method	median age of 25 years	2221	--	0.68	88.4 (87.0, 89.73)

S.N	Author, Year	Study area	Study design	Study period	Study population	Sampling strategies	Age in years	Sample size	Response rate	SE	Prevalence of FGM (95% CI)
8.	Oljira, Assefa, & Dessie, 2016 [38]	Harara town, Harari	Cross-sectional	February 1 and 28, 2013	Women with at least one daughter younger than	Simple random sampling)	Range= 25–39 years	842	100%	1.39	79.5 (76.77, 82.23) (38)
9.	Yirga, Kassa, Gebremichael, & Aro, 2012 [39]	Kersa district, East Hararge, Oromia region	Cross-sectional	January to February 2008	Women of reproductive age (15–49 years)	Systematic random random	~~~	858	100%	0.91	92.3 (90.52, 94.08)
10.	Gebremariam, Assefa, & Weldegebreal, 2016 [40]	Jigjiga district, Somalia region	Cross-sectional	February to March 2014	Female young-adult (10–24 years of age)	Multistage sampling technique	Mean ± SD=20 ±2.4 years	662	97.5%	1.47	82.6 (79.71,85.49)
11.	Setegn et al., 2016 [32]	Nation based	Cross-sectional	Data from EDHS 2000	Women of reproductive age (15–49 years)	Two-stage stratified cluster sampling	15-49 years	15,367	95.6%	0.23	79.9 (79.44, 80.36)
		Nation based	Cross-sectional	Data from EDHS 2005	Women of reproductive age (15–49 years)	Two-stage stratified cluster sampling	15-49 years	14,070	97.8%	0.35	74.3 (73.61, 74.99)
12.	M Andualem, 2013 [41]	GonchaSiso-Enessie District, East Gojjam Zone, Amhara region	cross-sectional	2012	Women in reproductive age group (15-49) w ho had daughter less than five years old	Simple random sampling	Mean ± SD= 29 ± 7 years	730	100%	1.54	77.70 (74.68,80.72)
13.	S. I. Rahlenbeck & Mekonnen, 2009 [42]	Amhara region	Cross-sectional	-	Women of reproductive age (15–49 years)	Stratified, two-stage clustered sample	Mean ± SD= 17.75 ±1.37 years	1942	96.8%	1.05	69 (66.94,71.06)

S.N	Author, Year	Study area	Study design	Study period	Study population	Sampling strategies	Age in years	Sample size	Response rate	SE	Prevalence of FGM (95% CI)
14.	Kibret, Ejigu, Tiruneh, & Mekonnen, 2014 [43]	Debaytilatgin District, Amhara region	Cross-sectional	16-30 of March 2013.	Women in reproductive age group with daughters of under five years old.	Systematic random sampling method	mean (±SD)= 29(±7) years	730	100	1.56	77.7 (74.65,80.75)
15.	Shiferaw, Deyessa, Fufa, Kinati, & Desalegn, 2017 [44]	Dale Wabera Woreda, Oromia Regional State	Cross-sectional	January, 2012	Female young-adult (10–24 years of age)	Multistage sampling ±1.32 years	mean ± SD = 16.93	769	96.4%	1.50	77.8 (74.86, 80.74)
16.	Abeya, Chuluko, & Gemeda 2017 [45]	Gewane Woreda, Afar region.	Cross-sectional	July 4 to 14, 2016.	Reproductive age women (15-49 years) who ever gave birth	Systematic random methods	mean ± SD = 32.69 ±7.53. years	792	93.7%	1.03	90.8 (88.79,92.81)
17.	Abdisa, Desalegn, & Tesew, 2017 [46]	Kebirbeyah Town, Somali Region.	Cross-sectional	Feb to March 2017	Women in reproductive age 15-49 years	Systematic random methods.	mean ± SD = 28.3 ± 6.16 years	320	94.9%	1.87	87.1 (83.43,90.77)
18.	Belda SS, Tololu AK, 2017 [47]	Wolisso woreda, Oromia region	Cross-sectional	July 18 to August 09/ 2009 July 18 to	Women of childbearing age	Systematic sampling technique	mean age = 33 years	384	95%	2.45	63.7 (58.89, 68.51)
19.	Tigist Moges Getanehe, 2017 [48]	Gursum Woreda, Somali Regional State	Cross-sectional	January 16 – 20, 2017	Women in reproductive age 15-49 years	Systematic sampling technique	Range= 15 to 45year	211	98%	0.68	99 (97.66, 100.34)
20.	Gebremichael, 2002 [49]	Jijiga town, Somali Regional State	Cross-sectional	December 2001	Women of reproductive age who's first born was or would have been 5 years or less	Multistage. sampling	mean ± SD = 24.2 ± 4.5 years	872	95.5%	0.66	96 (94.70, 97.30)

FGM= Female Genital Mutilation

Table 2: Summary of studies included in the meta-analysis to estimate the prevalence FGM practice among children less than 15 years in Ethiopia, 2000–2014.

S.N	Author, Year	Study area	Study design	Study period	Study population	Sampling strategies	Age in years	Sample size	Response rate	SE	Prevalence of FGM (95% CI)
1.	Moges et al., 2015 [33]	Lejet Kebele, Dembecha Woreda Amhara region	Cross-sectional	April 27-May 4,	Women who had daughter less than 5 years	Systematic random sampling method	Mean ± SD= 29.35 ± 7.75 years	234	100%	3.10	34 (27.93, 40.07)
2.	Mulusew Andualem, 2016 [34]	Goncha Siso-Enessie District, Amhara region	Cross-sectional	September 2004	Women in reproductive age group (ages 15-49) and who had daughters less than five years of age	Systematic random sampling method	Range=15-24 24 years	805	98%	1.76	49 (45.55, 52.45)
3.	Tamire & Molla, 2013 [50]	Hadiya Zone, SNNPR	Cross-sectional	January to February, 2011	Female young-adult (10–25 years of age	Multi-stage cluster sampling) technique	Mean ± SD = 16.2 ± 1.35 years Range= 13–25 years	780	97.87%	1.37	82.2 (79.52,84.88)
4.	Shay, Haidar, & Kogi-Makau, 2010 [51]	Addis Ababa	Cross-sectional	August and June 2008	Female young-adult (10–24 years of age)	Simple random sampling	Median age being 9 years	407	92.1%	2.17	26.0 (21.74, 30.26)
5.	Argaw & Fisseha, 2002 [31]	Serbo town, Jimma Zone, Oromia region	Cross-sectional	January, 2001	Mothers aged 15 years and above who had at least one daughter	Systematic random sampling method	---	138	100%	4.13	62.3 (54.21, 70.39)
6.	S. Rahlenbeck et al., 2010 [37]	Oromia region	Cross-sectional	Ethiopia Demographic and Health Survey, 2005	Mothers with daughters	Stratified, two-stage clustered sample	Median age of 25 years	1244	-	1.37	37.4 (34.71, 40.09)
7.	Oljira et al., 2016 [38]	Harara town, Harari	Cross-sectional	February 1 and 28, 2013	Women with at least one at least one daughter younger than 12 year	Simple random sampling	Range= 25–39 years	842	100%	1.35	19.0 (16.35, 21.65)

S.N	Author, Year	Study area	Study design	Study period	Study population	Sampling strategies	Age in years	Sample size	Response rate	SE	Prevalence of FGM (95% CI)
8.	Yirga et al., 2012 [39]	Kersa district, East Hararge, Oromia region	Cross-sectional	January to February 2008	Women of reproductive age (15–49 years) who had least one daughter	Systematic random sampling	-	858	100%	1.10	88.1 (85.93, 90.27)
9.	Setegn et al., 2016 [32]	Nation based	Cross-sectional	Data from EDHS 2000	Women of reproductive age (15–49 years) who had least one daughter	Two-stage stratified cluster sampling	-	15,367	95.6%	0.29	47.8 (47.23, 48.37)
		Nation based	Cross-sectional	Data from EDHS 2005	Women of reproductive age (15–49 years) who had least one daughter	Two-stage stratified cluster sampling	-	14,070	97.8%	0.39	37.7 (36.93, 38.47)
10.	M Andualem, 2013 [41]	GonchaSiso-Enessie District, East Gojjam Zone, Amhara region	Cross-sectional	2012	Women in reproductive age group (ages 15-49) and who had daughters less than five years of age	Systematic random sampling method	Mean ± SD= 29 ± 7 years	730	100%	1.79	62.7 (59.19, 66.21)
11.	S. I. Rahlenbeck & Mekonnen, 2009 [42]	Amhara region, Ethiopia	Cross-sectional	-	Mothers with daughters	Stratified, two-stage	Mean ± SD= 17.75 ±1.37 years	1006	96.8%	1.51	64 (61.03, 66.97)
12.	Gajaa, Wakgari, Kebede, & Derseh, 2016 [52]	Hababo Guduru District, Western Ethiopia, Oromia region	Cross-sectional	April 5 to 26, 2014	Reproductive age mothers with at least one daughter under 15 years old	Systematic random sampling technique	Mean ± SD= 32.2± 7.2 years Range=17–49 years	610	98 %	2.02	48 (44.04, 51.96)

S.N	Author, Year	Study area	Study design	Study period	Study population	Sampling strategies	Age in years	Sample size	Response rate	SE	Prevalence of FGM (95% CI)
13.	Kibret et al., 2014 [43]	Debaytilatgin District, Amhara Region	Cross-sectional	16-30 of March 2013	Women in the reproductive age. group with daughters of lesst han five years old	Systematic random sampling method	Mean ± SD= 29±7 years	730	100	1.79	62.7 (59.19, 66.21)
14.	Zewde, 2009 [53]	Addis Ababa	Cross-sectional.	--	Female young-adult (10–24 years of age)	Multistage sampling	Majority (62.2%) was in the age group of 11-15 years	409	92.1%	2.16	25.8 (21.56, 30.04)

FGM= Female Genital Mutilation SNNPR= South Nation Nationalities and Peoples' Region

Prevalence of FGM in Ethiopia

The pooled prevalence FGM among women in Ethiopia was 84.6% (95% CI: 80.51%, 88.7%). However, statistically significant heterogeneity was observed (I^2=99.4%), P-value of <0.001). The analysis indicated that there was no publication bias when estimating FGM among women (Egger's test, P-value= 0.281, and Begg's test= 0.334) (Figure 2).

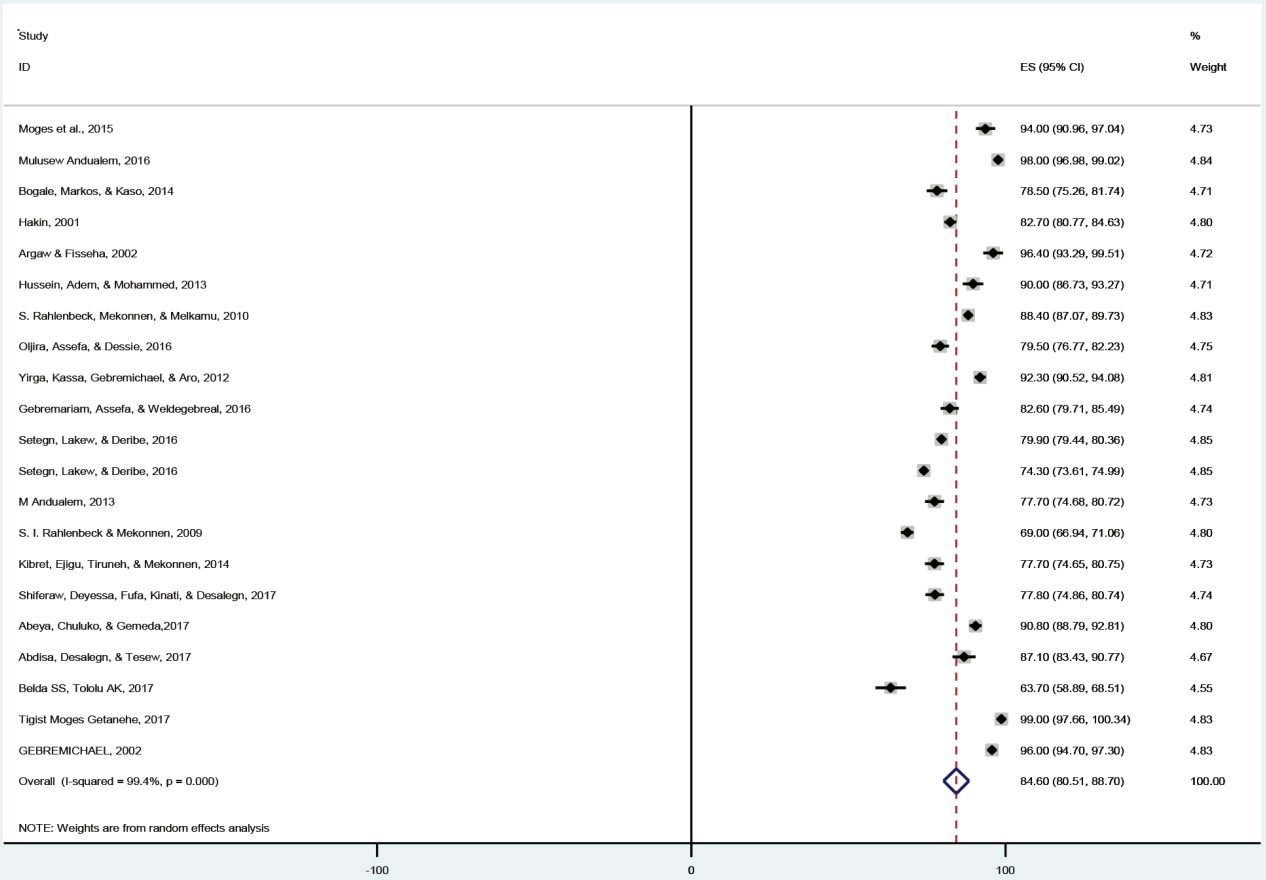

Figure 2: Prevalence of female genital mutilation among women in Ethiopia, 1997–2017

The overall pooled prevalence of FGM among children less than 15 years in Ethiopia was 49.79% (95 % CI: 41.91 %, 57.68%). The I^2 test result showed high heterogeneity among studies included for this analysis (I^2=99.6%, P <0.001). Therefore, we used random effects model to estimate the pooled prevalence. The analysis did not show publication bias (Egger's test, P-value= 0.492, and Begg's test= 0.553) (Figure 3).

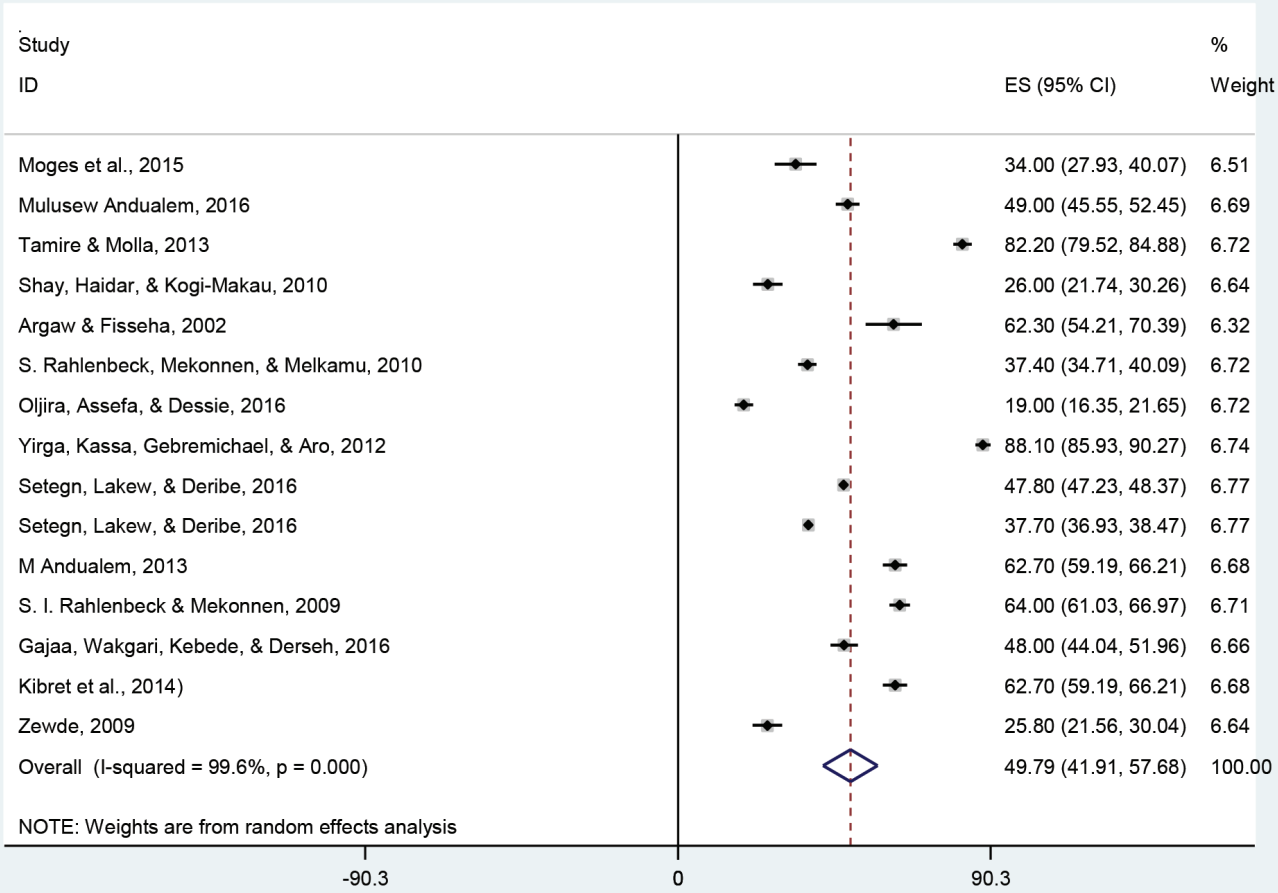

Figure 3: Prevalence of female genital mutilation among children less 15 years old in Ethiopia, 2000–2014

Prevalence of FGM by Region

In the subgroup analysis of the regions of the country, the highest prevalence of FGM among women was observed in Somali region (91.09% (95% CI: 85.75, 96.44)), followed by Afar region (90.80% (95 % CI: 88.79, 92.81)). The pooled prevalence of FGM in Amhara region and Oromia region was nearly similar which is 83.29 % (95 % CI: 69.88, 96.70) and 83.07% (95 % CI: 76.44, 89.70) respectively. On the other hand, the lowest prevalence was reported in Harari region (79.50% (95 % CI: 76.77, 82.23)) (Figure 4).

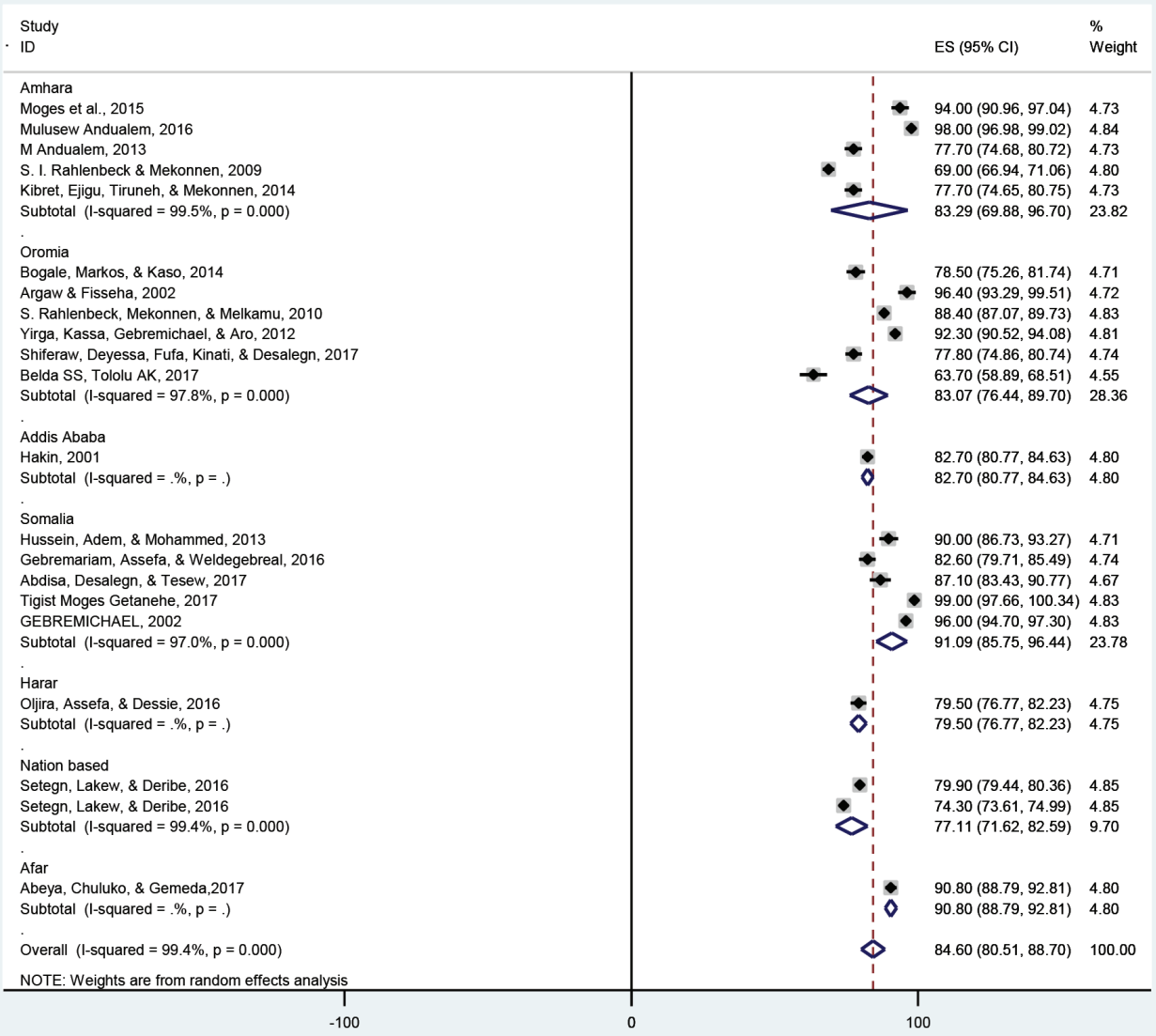

Figure 4: Variation in prevalence of female genital mutilation among women by region in Ethiopia, 1997–2017

The highest prevalence of FGM among children less than 15 years was observed in SNNPR (82.20% (95 % CI: 79.52, 84.88)) followed by Oromia region (58.95% (95 % CI: 29.85, 88.05)). While the lowest prevalence was reported in Harari region (19% (95 % CI: 16.35, 21.65)) followed by Addis Ababa, capital city of Ethiopia (25.9% (95 % CI: 22.89, 28.91)) (Figure 5).

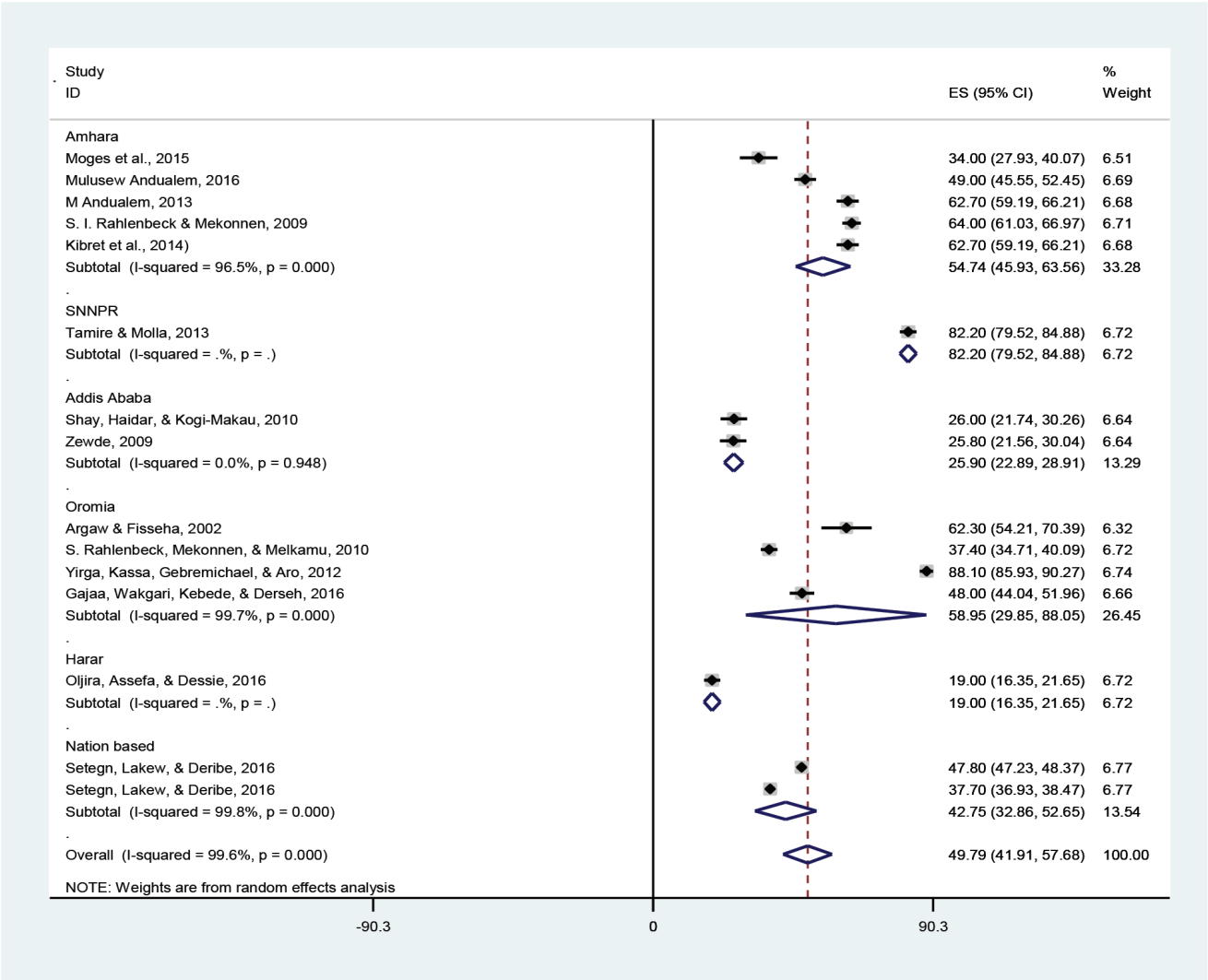

Figure 5: Variation in prevalence of female genital mutilation among children less 15 years old by region in Ethiopia, 2000–2014

DISCUSSION

This review was conducted to estimate the prevalence of FGM among women and children less than 15 years and its regional variation in Ethiopia. The overall pooled prevalence of FGM among women in Ethiopia was found to be 84.6% (95% CI: 80.51%, 88.7%) and among children age less than 15 years was 49.79% (95 % CI: 41.91 %, 57.68%). These findings may suggest a decline in trend of FGM in Ethiopia. Moreover, the disparity or the lower prevalence of FGM among children as compared to women might be resulted from some women were unwilling to report their daughters were circumcised, since the practice is conserved illegal. Additionally, the decline among girls might be partly explained by increased governmental and non-governmental sector commitment to halted the practice of FGM[8].

In this meta-analysis the pooled prevalence of FGM in Ethiopia was high. However, the trends of the prevalence of FGM in Ethiopia has decreased over the past 16 years, reducing from 80% in the EDHS 2000 report [54] to 74% in the EDHS 2005 report [55], and to 65% in the EDHS 2016 report[8]. The reduction is predominantly distinguished on younger children than women. This may due to FGM was criminalized in 2005, and this

may lead to under reporting of the practice to avoid legal consequences[8]. FGM depicts a public health concern and it has also subsequent infections and infertility problems associated with it.

This review also showed that FGM is widespread across Ethiopia with a varying degree. The practice of FGM among women is higher in Somali and Afar regions while the lowest prevalence was reported in Harari region. Regarding to the prevalence of FGM among children, the highest was observed in SNNPR followed by Oromia region, while the lowest was reported in Harari region followed by Addis Ababa. Thus, a significant disparity in the prevalence of FGM among regions might be resulted from the cultural difference within the country or reflect the variation of ethnicity. For instance, in Somali region, most of them were Muslim religion followers, they believed that if they are not circumcised, they feel that they are totally against their religion[56]. Moreover, FGM is deep-rooted in social beliefs within a frame of psycho-sexual reasons such as control of women's sexuality and family honor, which is highly enforced to practice by the community[32, 57-59]. Though, currently the practice is considered illegal, some of the communities have expressed their belief in its importance and their interest in its persistence of the practice[58,60]

The strength of this review and meta-analysis was identified the prevalence of FGM by categories (women vs children less than 15 years) and showed the regional variation of FGM in Ethiopia. However, our study didn't assess the factors associated with FGM and the pooled data analysis considered irrespective of the study year.

CONCLUSION

The prevalence of FGM is high among women and children in Ethiopia. There is a wide variation of the FGM among women and children from region to region in Ethiopia. The highest prevalence of FGM among women was observed in Somali region followed by Afar region. FGM in Amhara region and Oromia region is nearly similar. On the other hand, the lowest prevalence was reported in Harari region. Regarding to FGM among children, the highest prevalence was observed in SNNPR followed by Oromia region, whereas the lowest prevalence was observed in Harari region followed by Addis Ababa. Attentions should be emphasized to end or reduce the practice, mainly at the high FGM clustered regions of Ethiopia. Further large-scale studies and reviews should be done to identify the factors associated with FGM are recommended.

LIST OF ABBREVIATIONS

CI: Confidence Interval
CINAHL: Cumulative Index to Nursing and Allied Health Literature
EDHS: Ethiopian Demographic and Health Survey
FGM: Female Genital Mutilation
HTTP: Harmful Traditional Practices
JBI-MAStARI: Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SD: Standard Deviation
SE: Standard Error
USAID: United States Agency for International Development
WHO: World Health Organization

DECLARATIONS

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and material

All data pertaining to this study are contained and presented in this document.

Competing of interest

The authors declare no competing of interest

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Authors' contribution

AAM involved in the design, selection of articles, data extraction, statistical analysis and manuscript writing. AKB, GMK, and GAF also involved in data extraction, analysis and manuscript editing. All authors read and approved the final draft of the manuscript.

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UNSAFE SEX PRACTICE AND ITS ASSOCIATED FACTORS AMONG REGULAR UNDERGRADUATE STUDENTS OF MEKELLE UNIVERSITY, ETHIOPIA, 2019: A FACILITY BASED CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Unsafe sex is ranked second among the top ten risk factors to health that may lead to Sexually Transmitted Infections (STIs), unplanned pregnancy and/or unsafe abortion. Despite the high burden of unsafe sex practices in Ethiopia, little was known on reasons and associated factors in the study setting in particular.

OBJECTIVE: To examine unsafe sex practice and its associated factors among regular undergraduate students of Mekelle University, Ethiopia, 2019.

METHOD: A facility based cross-sectional study design was conducted among 797 regular under graduate students of Mekelle University selected using the multistage sampling design. A multiple logit model was fitted to identify factors associated with unsafe sex practice. Finally, Adjusted Odds Ratio (AOR) was estimated and 95% confidence intervals (CI) were used for statistical decision.

RESULT: Overall, approximately 44% of the participants who had sex in the last 12 months practiced unsafe sex. Major reasons to have had unsafe sex were - for fun, lack of awareness, trusting sexual partners and no access to use condom. Dormitory living condition (AOR = 0.44; 95% CI: 0.20 – 0.99) and taking course on Sexual and Reproductive Health (SRH) (AOR =0.49; 95% CI: 0.28 – 0.85) had protective effect against unsafe sex practice.

CONCLUSION: The unsafe sex practice was significantly high in the current study. Thus, comprehensive information and education on SRH has to be implemented by the University to prevent unsafe sex practices associated bad consequences among the students.

KEYWORDS: Condom use, Mekelle University, Multiple partners, Reasons, Unsafe sex practice.

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INTRODUCTION

Since the last two decades, unsafe sex practice is defined as engaging in risky sexual behavior that allow passage of body fluids, sexual intercourse without condom, and/or having multiple sexual partners which includes early sexual practice, inconsistent use of condom and/or multiple partners[1]. On the other hand, risky sexual behavior is defined according to the behavior itself including vaginal, oral and/or anal intercourse especially with Human Immunodeficiency Virus (HIV positive, intra-venous user or non-exclusive partner)[2].

Globally, the fast growth of the young population accounts for approximately half of the total population and 90% of whom were residents of developing nations. Adolescents and young adults sexual desires increase from time to time without being adequately considering the negative consequences[3,4].

In terms of Disability Adjusted Life Years (DALYs), unsafe sex is ranked second (causes 5% global DALYs) among the leading risks for global burden of disease next to childhood underweight (6%) followed by Alcohol use (5%), unsafe water, sanitation and hygiene (4%), high blood pressure, tobacco use, suboptimal breast feeding, high blood glucose, indoor smoke and overweight and obesity. Unsafe sex affects populations particularily in Low and Middle Income Countries (LMICs) especially south-east Asia and the Sub-Saharan Africa (SSA) region[5].

More than 30 Sexually Transmitted Infections (STIs) are caused through practices of unsafe sex including Human Immune-Deficiency Virus/Acquired Immune-Deficiency Syndrome (HIV/AIDS). Unsafe sex causes an estimated of 376 million chlamydia, gonorrhoea, syphilis and trichomoniasis cases and above 290 million women infected with Human Papilloma Virus that may lead to cervical cancer. STIs such as syphilis and Herpes Simplex Virus type 2 further aggravate the risk of HIV infection spread[6-8].

Several studies have revealed that young adults in Sub-Saharan Africa (SSA) region also tend to be engaged in having multiple sexual partners and unprotected sexual intercourse, and consequently, these behaviors make the region the most severely affected. University students in the age group of 15-24 years are susceptible to risky sexual practices[9-11]. University students are in the youth age group (15-24 years) and are highly exposed to risky sexual practices such as unprotected sexual intercourse and having had sex with multiple partners[12-15].

Ethiopia is a developing country with an age composition dominated by a young population in the ages of 15 to 24 years. This age group represents one third of the total population and that is why HIV /AIDS pandemic is a major public health problem and concern in the country[16].

Different facility based cross-sectional studies have reported a prevalence of premarital sex from approximately 19% to 53% among school youth in various parts of Ethiopia[17-19]. Consequently, sexually active and pre-marital sexual engagement intensified the risky sexual practices up to 84% in central Tigray[20-22]. Even though the major reasons to have unsafe sex was due to sexual desire, peer pressure and alcohol use also had significant roles in risky sexual behavior[21]. Furthermore, sex , place of residence, educational level, substance use (khat, alcohol drinking, smoking), age, income, and peer pressure are some of the contributing factors of unsafe sex practices among youths[20-27].

Despite the high burden of unsafe sex practices in the country, little was known on the reasons and associated factors of unsafe sex practice among university students in the study setting in particular. Therefore, the aim of the study was to explore reasons and identify risk factors of unsafe sex practices among undergraduate students of Mekelle University, Northern Ethiopia.

METHODS:

Study design and setting

A facility based cross-sectional study design was employed among regular undergraduate students of Mekelle University from April 15 to May 21, 2019 in Mekelle, Ethiopia. Mekelle is the capital of the National Regional State of Tigray, which is located 783 kilometers far northern part of Addis Ababa, Ethiopia. According to the 2018 population projection, Mekelle has an estimated population of 342,000 where 63% of the population is under the age of 25 years old.

Currently, Mekelle University is one of the secular public universities in Ethiopia. Its student intake capacity has reached 31,000. According to its 2018/2019 registrar student statistics report, a total of 16688 regular undergraduate students were attending in three campuses (i.e. Main, Ayder and Adi-haqi campuses) of the university. Sixty five percent (65%) of them are males whereas 35% of them are females.

Sample size determination, sampling design and procedure

The minimum sample size for this study was determined using the formula for single population proportion based on the assumptions of 95% confidence level, 5% acceptable level of precision, and expected proportion of unsafe sex practice (62%) in Bahir Dar [27].

$$\text{Sample size (n)} = \frac{(Z\alpha/2)^2 * P(1-P)}{d^2} \approx 362$$

Where $Z_{\alpha/2}$ = 1.96, p= 0.62, 1 – p = 0.38, and d (margin of error) =0.05.

However, a multistage sampling design was used to select departments and participants from the selected departments as well. Thus, the final sample size is adjusted by considering design effect (2x) and adding 10% for non-response rate.

Final sample size (adjusted) = 362*2+73 ≈ 797

Thus, a total of 797 (i.e. 465 from main campus, 190 from Adi-haqi campus and 142 from Ayder campus) regular undergraduate students were selected randomly by proportionally allocating the sample based on the size of population in each campus/college and departments as well.

Study variables and data collection tool

The outcome variable was unsafe sex practice operationally defined based on two indicators (i.e. frequent condom utilization and number of sexual partners). It was labeled as 1 for "high risk" (infrequently use condom and having multiple sexual partners) otherwise 0 "low unsafe sex practice". An English version questionnaire was prepared and then pre-tested to validate its quality. Eventually, data were collected from the participants using self-administered questionnaire.

Statistical methods of data analysis

Data were entered in STATA version 12 and then cleaned prior its analysis. Categorical variables were described using frequency and percentage (%) whereas numeric variables were presented using mean and standard deviation (Mean (±sd)). Furthermore, missing values were analyzed and hence, handled by multiple imputations so as to identify factors associated with unsafe sex practice. Furthermore, model diagnostics and model fit statistics were also checked. Finally, a multiple logit model was fitted to identify the risk factors of unsafe sex practice in the last 12 months. Adjusted Odds Ratio (AOR) and 95% Confidence Interval (CI) were estimated and used for statistical decision.

RESULTS

Socio-demographic and family socio-economic characteristics of the participants

A total of 797 questionnaires were distributed, of which 729 (92%) respondents gave response. Approximately 68% of the students were males and the mean and standard deviation age of students was 21.6±1.9 years (i.e. 22.2±2.0 among males and 21.5±2.4 years among females). In addition, 710 (97.4%), and 476(65.7%) of the students were - single, and urban residents, respectively. Based on their family socio-economic characteristics, 282 (38.9%) mothers had no formal education where as 32.1% of fathers had college and above educational status (Table 1).

Table 1: Socio-demographic and family characteristics of regular undergraduate students of Mekelle University, Mekelle, Northern Ethiopia, 2019

Socio-demographic Characteristics	Category	Count	Percent (%)
Sex (n=729)	Male	493	67.6
	Female	236	32.4
Age (n=654)	21.6±1.9 years [a]		
Year of study (n=729)	I	134	18.4
	II	216	29.6
	II	209	28.7
	IV/V	170	23.3
Field of Study (n=729)	Medicine / Health sciences	131	18.0
	Engineering	287	39.4
	Natural sciences	75	10.3
	Agriculture	61	8.4
	Accounting/Management	87	11.9
	Law	29	4.0
	Social sciences/languages	59	8.1
Marital Status (n=729)	Single	710	97.4
	Married/Widowed/divorced	19	2.6
Residence (n=725)	Urban	476	65.7
	Rural	249	34.3
Religion (n=726)	Orthodox	608	83.7
	Muslim	50	6.9
	Catholic	10	1.4
	Protestant	48	6.6
	Others (no religion/unspecified)	10	1.4
Current campus living condition (n=724)	Non dormitory	54	7.5
	Dormitory	670	92.5
Non-Cafe status (n=724)	No	453	62.6
	Yes	271	37.4
Mother's educational level (n=724)	No formal education	282	38.9
	Primary school (1-8)	164	22.7
	Secondary school (9-12)	117	16.2
	College and above	161	22.2
Father's educational level (n=719)	No formal education	212	29.5
	Primary school (1-8)	163	22.7
	Secondary School (9-12)	113	15.7
	College and above	231	32.1
Mother's occupation (n=722)	House wife	455	63.0
	Government employee/civil servant	82	11.4
	Private employee	14	1.9
	Merchant	116	16.1
	Others	55	7.6
Father's occupation (n=714)	Unemployed/Daily laborer	19	2.7
	Farmer	265	37.1
	Government employee	104	14.6
	Private employee/NGO	26	3.6
	Merchant	199	27.9
	Others (Evangelist, driver, priest or solider)	101	14.1
Family size (n=522)	<=6	343	65.7
	>6	179	34.3

[a]: age is described using mean±standard deviation

Behavioral and family history characteristics of the participants.

Based on their behavioral characteristics, 71 (9.8%), 71 (9.8%), 216 (30.2%), 50(7.0%), and 221 (30.9%) of the students had smoking, Chat chewing, night club visiting, shisha use, and porn movies viewing practices in the last 12 months, respectively. Furthermore, 510(70.9%) of students had also information or education on SRH or HIV (Table 2).

Table 2: Behavioral characteristics of regular undergraduate students of Mekelle University, Mekelle, Northern Ethiopia, 2019

Behavioral Characteristics	Category	Count	Percent (%)
Having friend who started sex before marriage (n=727)	No	469	64.5
	Yes	258	35.5
Smoking history in the last 12 months (n=728)	No	657	90.2
	Yes	71	9.8
Khat chewing history in the last 12 months (n=727)	No	656	90.2
	Yes	71	9.8
Alcohol consumption history in the last 12 months (n=726)	No	483	66.5
	Yes	243	33.5
Night club visiting in the last 12 months (n=716)	No	500	69.8
	Yes	216	30.2
Shisha use (n=717)	No	667	93.0
	Yes	50	7.0
Porn moves viewing (n=716)	No	495	69.1
	Yes	221	30.9
Family history of smoking (n=722)	No	670	92.8
	Yes	52	7.2
Family history alcohol consumption (n=723)	No	539	74.5
	Yes	184	25.5
Family history khat chewing (n=717)	No	658	91.8
	Yes	59	8.2
Student's discussion with mother about sex (n=724)	No	479	66.2
	Yes	245	33.8
Student's discussion with father about sex (n=722)	No	469	65.0
	Yes	253	35.0
Course taken on HIV or SRH (n=719)	No	209	29.1
	Yes	510	70.9
Student's participation in HIV/AIDS or related	Not participated	372	51.4
	Previously participated	320	44.2
Clubs (n=724)	Currently participating	32	4.4
Disability status (n=723)	No	700	96.8
	Yes	23	3.2

SRH: Sexual and Reproductive Health HIV: Human Immunodeficiency Virus

Sexual experience, behavior and HIV screening status of the participants.

Overall, 41.2% [95% CI: 37.6% - 44.8%] of students had sexual experience throughout their life time with a mean age and standard deviation at start of sex was 18.2 ±2.7 years (i.e. 18.2±2.9 years among males and 18.2±1.8 years among females). However, only 269 of 300 (89.7%), 86 of 300 (28.7%) have had sex in the last 12, and 3 months, respectively. Only 29.3% [95% CI: 23.8% - 35.3%] of students who had sex in the last 12 months were used condom frequently and 56.1% [95% CI: 50.0% - 62.2%] had multiple sexual partners. Therefore, 43.9% [95% CI: 38.0% - 49.8%] have had sex with multiple partners without consistent use of condom in the last 12 months (Table 3).

Table 3: Sexual experience, behavior and HIV screening status of regular undergraduate students of Mekelle University, Mekelle, Northern Ethiopia, 2019

Sexual behavior and STI screening status	Category	Count	Percent (%)
Life time sexual experience (n=729)	No	429	58.8
	Yes	300	41.2
Sexual practice in the last 12 months (n=729)	No	460	63.1
	Yes	269	36.90
Sexual practice in the last 3 months (n=729)	No	643	88.2
	Yes	86	11.8
Having sexual partners in the last 12 months (n=729)	No	459	63.1
	Yes	269	36.9
Number of sexual partners in the last 12 months (n=269)	One	118	43.9
	Multiple	151	56.1
HIV or other STI Screening Status (n=708)	No	550	77.7
	Yes	158	22.3
Frequent utilization of condom (n=256)	No	181	70.7
	Yes	75	29.3
Unsafe sex practice in the last 12 months (n=269)	No	151	56.1
	Yes	118	43.9

HIV: Human Immunodeficiency Virus STI: Sexually Transmitted Infections

Factors associated with unsafe sex practice

In the final multiple logit model, only two variables were statistically significantly associated with high unsafe sex practice. Keeping the effect of other variables constant, living in campus (dormitory) decreases the odds of having unsafe sex practice by 56% (AOR = 0.44; 95% CI: 0.20 – 0.99). Like wisely, students who took a course on HIV or SRH had protected by 51% from practicing unsafe sex (AOR =0.49; 95% CI: 0.28 – 0.85) (Table 4).

Table 4: Factors associated with unsafe sex practice among regular undergraduate students of Mekelle University who initiated sex in the last 12 months, Mekelle, Northern Ethiopia, 2018/2019 (n= 269)

Variables	Category	Unsafe sex practiceCount (%)	AOR [95% CI]		P-value
Current living condition	Non-dormitory	18 (58.1)		1.00	
	Dormitory	100 (42.0)	0.44 [0.20, 0.99]		0.048*
Non-Café status	No	84(48.0)		1.00	
	Yes	34 (36.2)	0.80 [0.43, 1.50]		0.489
Having Friend started Sex	No	71 (51.8)		1.00	
	Yes	47 (35.6)	0.75[0.41, 1.40]]		0.374
Alcohol Consumption History	No	74 (48.7)		1.00	
	Yes	44 (37.6)	0.99 [0.48, 2.05]		0.991
Viewing Porn Movies	No	77 (48.7)		1.00	
	Yes	41 (36.9)	0.66 [0.33, 1.32]		0.235
Visiting Night Club	No	82 (49.4)		1.00	
	Yes	36 (35.0)	0.90 [0.41, 2.00]		0.805
Discussion with Mother about Sex and STIs	No	84 (48.0)		1.00	
	Yes	34 (36.2)	0.72 [0.41, 1.25]		0.243
Course taken on HIV and SRH	No	48 (56.5)		1.00	
	Yes	70 (38.0)	0.49 [0.28, 0.85]		0.011*

AOR: Adjusted Odds Ratio 95% CI: 95% confidence Interval 1.00: Reference category *: statistically significant at 5% Level of significance

DISCUSSION

Unsafe sex practice rate

In the current study, the prevalence of unsafe sex practice was 43.9% [95% CI: 38.0% - 49.8%] among regular undergraduate students of Mekelle University. The magnitude was higher when compared to other similar studies conducted in Sri Lanka, Western Ethiopia, Jimma, Gondar and Bahir dar though the participants from Bahir Dar were private college students and high school students in Gondar[12,22,28-30]. However, it was lower as compared other studies from in Nigeria, Debre Tabor University, Bahir Dar University and Aksum University[25-27]. The possible reasons for the low unsafe practice rate could be due to recall and social desirability that participants might be reported the expected practices than the actual practices in the current study.

Students were practicing unsafe sex for reasons- fun, lack of awareness, trusting sexual partner, for business purpose, no access to use condom, knowing status of partner/s, unconsciously, no privacy to buy condom and even no fear about HIV and other STIs. Despite this fact, the reasons will be best addressed by qualitative studies.

Dormitory living status was statistically significantly associated with unsafe sex practice among regular undergraduate students in the current study. The odds of having unsafe sex practice was reduced by 56% among dormitory regular undergraduate students who had sexual experience in the last one year prior to conducting the current study. The reason why the unsafe sex practice was high among non-dormitory students (58.1% versus 42.0%) might be non-dormitory students getting the chance of visiting night clubs and also became non-dorm intentionally for seeking freedom.

Students who had taken a course on HIV or SRH education were less likely to practice risky sexual practice. Consistent recommendations and reports were also

disseminated by the World Health Organization and United Nations Educational, Scientific and Cultural Organization (UNESCO) that compressive information and education can reduce the problems related to unsafe sex practice associated negative consequences in young people especially girls[31-33].

CONCLUSIONS

In the current study, the unsafe sex practice was found to be significantly high. Dormitory and taking course on HIV or SRH reduced the odds of practicing unsafe sex significantly. Therefore, expanding youth friendly confidential clinics, implementing and strengthening comprehensive SRH information and/or education are some of the recommended solutions applied to reduce the practices of unsafe sex among regular undergraduate students. Furthermore, qualitative studies are recommended to explore the reasons.

LIMITATION OF THE STUDY

The current study was a cross-sectional study that was based on the self-report of the students on risky sexual behavior and thus, it was prone to recall and social desirability bias. The operational definition for high risky sexual behavior might be under-estimated its rate as his/her partner could have multiple sexual partners and a comparative study by sex was not employed.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethics approval was obtained from the Institutional Review Board (IRB) of Mekelle University, College of Health Sciences on April 8/2019 with reference number (ERC: 1322/2019). We received written informed consent and confidentiality of data was kept.

COMPETING INTERESTS

No conflict of interests to be declared by the authors. The final draft of the manuscript has read and approved by all authors.

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A CASE REPORT OF ADVANCED UNRUPTURED CORNUAL PREGNANCY

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ABSTRACT

Ectopic pregnancy is one of the major causes of maternal morbidity and mortality. Cornual pregnancy is a rare type of ectopic pregnancy where the gestational sac is implanted in the cornua part of the tube, it's more dangerous than other types of ectopic pregnancies, and contributes a significant amount of maternal mortality and morbidity. Here a case report is presented where a patient was admitted to a rural hospital and with a diagnosis of missed abortion. Treated with Misoprostol and later referred where laparatomy was done after transvaginal ultrasound diagnosis

KEYWORDS: Cornual pregnancy, unruptured ectopic, Ectopic pregnancy

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INTRODUCTION

Cornual pregnancy is one of the rare form of ectopic pregnancy. Although it is an unusual problem with an estimated rate of 2-4% of all ectopic pregnancies it carries the major risk of maternal morbidity and mortality rate of 2-2.5% which is the highest compared to other types of ectopic pregnancies (1). We report a case of unruptured cornual pregnancy at 17+4 weeks GA.

CASE REPORT

A 25year old G II P I mother at GA of 17+4 weeks presented to our emergency OPD with referral from rural hospital. One week back she was diagnosed with second trimester missed abortion and she was counselled on option of the management and she opted for elective medical termination of pregnancy. At the referring hospital, she was put on 400 micrograms of misoprostol for a total of five doses every 6 hours. Since there was no expulsion the dose was repeated on the third day and on fifth day but still there was no expulsion. Then she was referred to our tertiary Hospital.

Upon presentation to our hospital, she was having mild lower abdominal pain with history of minimal vaginal spotting. On examination, she was hemodynamically stable with lower abdominal tenderness more on the right lower quadrant and asymmetric right lower abdomen palpable uterus of 16 week sized. On pelvic examination, the cervix was closed and there was cervical motion tenderness. There was 16 week sized asymmetric uterus palpated more on the right side.

Transvaginal ultrasonography revealed an empty uterus with minimal endometrial clot, and a-10 by 10 cm eccentrically located gestational sac at the right cornua with well-formed 15week fetus with negative heartbeat. No free fluid in the peritoneal cavity seen.

After informed written consent was taken, under general anesthesia, the abdominal cavity was entered via mid line infra-umblical incision. There were distended right cornua of the uterus measuring 12cm by 10 cm size with health looking bilateral fallopian tubes and ovaries (Fig 1). Resection started and right round ligament and utero-ovarian ligament clamped, cut and transfixed, the broad ligament opened and right uterine artery ligated after identifying the right ureter. Purse-string stitch applied at the junction of the uterus and the gestational sac to decrease bleeding. Cornual resection is done at the base of the gestational sac circumferentially maintaining the myometrium at the base of the cornua. The pregnancy resected intact and the defect was explored and there was no communication to the uterine cavity. The defect closed in three layers with Vicryl 2.0. The estimated blood loss was 100ml and the patient left OR with stable vital signs. The patient is counseled for elective cesarean delivery for subsequent pregnancy.

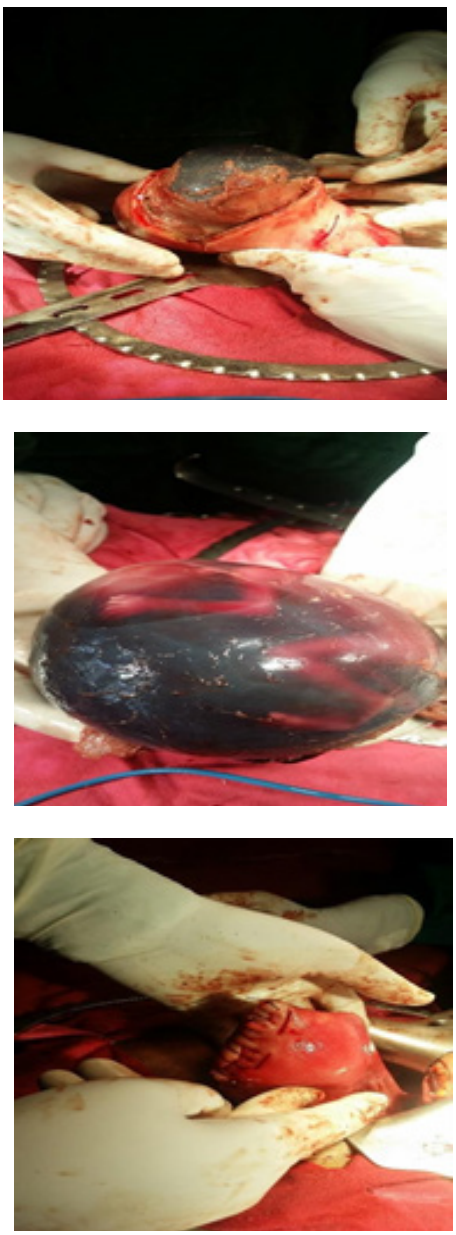

Fig 1: Intraoperative findings and cornual resection for advanced cornual pregnancy

DISCUSSION

Although cornual ectopic pregnancy accounts for 2 to 4% of ectopic pregnancies, it is associated with 15 times higher morbidity and mortality compared to other types of tubal pregnancies. Cornua is the part of the fallopian tube which is 1 – 2 cm in length and 0.7 cm in width, which is supplied by Sampson's artery, which is connected to both the ovarian and the uterine arteries.

Sometimes Cornual pregnancies can be confused with angular pregnancies; the latter, however, are located within the endometrial cavity, medial to tubo-endometrial junction. A cornual pregnancy is a rare type of pregnancy and it is more dangerous than other types of ectopic pregnancies, as they tend to grow larger and rupture later because of the myometrial strechability with potentially devastating hemorrhages.[2]

Risk factors for ectopic pregnancies include Pelvic inflammatory disease, IUCD use, tubal surgery, SIN (salphingities isthmica nodosa), endometriosis, Assisted Reproductive technologies, previous ectopic pregnancies and congenital uterine anomalies. The key to better outcome is early diagnosis and management which heavily relies on ultrasound evaluation. The USG criteria for making a diagnosis includes an empty uterine cavity, a gestational sac which is separate from the uterine cavity and a myometrial thinning of less than 5mm around the gestational sac, typically the interstitial line sign, an echogenic line from the endometrial cavity to the corner which is next to the gestational mass, is seen[3]. The case presented here fulfilled all the USG criterial for the diagnosis. Other diagnostic tools include 3D US and MRI, the latter can better demonstrate the eccentric location of the gestational sac[4].

The treatment options of cornual ectopic pregnancy could be conservative or surgical, which is mainly dependent on early recognition of the ectopic pregnancy. Conservative management includes systemic methotrexate and local injection of methotrexate or potassium chloride to the gestational sac. In cases of cornual pregnancy some seetings use a strict criteria which includes; early gestation, diameter <4 cm, serum beta Human Chorionic Gonadotropin (hCG) of <10,000 IU/l and no evidence of rupture is used. This medical option could have a failure rate of up to 35%[5].

The traditional surgical management of cornual ectopic was laparotomy with cornual resection or hysterectomy. Currently a more conservative laparascopic approaches including laparoscopic cornuostomy (incision of the cornual region), or cornuectomy (resection of the cornual region of the uterus and the suturing of the incision site) have been reported. The current trend is to use conservative surgical alternatives to cornual resection in an attempt to increase future fertility and decrease the risk of uterine rupture during a subsequent pregnancy. These conservative surgical treatments successfully used combination of hysteroscopic, laparoscopic and ultrasound guided transcervical evacuation of interstitial ectopic pregnancy[6].

Succesful treatment of cornual ectopic with bilateral uterine artery embolization has also been reported[7]. Although the place of laparotomy for cornual ectopic pregnancy is decreasing as medical practice is advancing, it is important to remember that it is still important in cases with ruptured ectopic pregnancy or with advanced pregnancy, like the case reported here. There are reports of successful pregnancy after cornual resection, but delivery should be by cesarean section because of risk of uterine rupture [8].

CONCLUSION

Cornual ectopic pregnancy is still a major cause of maternal morbidity and mortality compared to other types of ectopic pregnancies. It is also a challenge in diagnosis and management. Although there are different conservative and less invasive surgical approaches, laparotomy still remains an integral part of surgical management of cornual pregnancy.

CONFLICT OF INTEREST:

The authors declare that there is no conflict of interest regarding the publication of this paper.

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Abstracts: It should not be more than 250 words. It should summarize the background, objective, methods, major findings and conclusions.

Tables and Figures: All tables and figures should be submitted on separate sheets of paper and be clearly labeled in the order of their citation in the text. A reader should be able to read only the tables and easily understand all information without reading the text.
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