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Ethiopian Journal of Reproductive Health (EJRH)

July, 2023

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EDITORIAL

Since the Ethiopian Journal of Reproductive Health (EJRH) was launched in 2007, it has undergone a series of changes. For the first 10 years after its inception, our journal used to be published only once a year, which was even at times difficult to sustain.

With the goal of improving both the quality and quantity of the research we publish every year, in 2017, in collaboration with the American College of Obstetrics and Gynecology (ACOG) and a financial support from the Center for Reproductive Health Training (CIRHT) we conducted a landscape study to find out the major challenges of the Journal.

Following the findings and recommendations of this study, we have been able to make major changes to the scientific publication. Among these changes are the numbers of volumes we publish per year-which grew to four times, the launching of its own automated manuscript processing and publishing website- https://ejrh.org/, the training of staff and editorial board members, the adoption of a comprehensive editorial policy, inclusion in Scopus and African Journals Online and recognition by the Ministry of Education.

As you go through our July, 2023, volume, one of the articles you find is entitled - Evaluation of the Quality of Ethiopian Journal of Reproductive Health. This manuscript is compiled based on the land-scape study conducted back in 2017.

As our readers go through the conclusions and recommendations of this study, it might appear inconsistent with the current status of our publication. We decided to publish this article, even though it contrasts to the current reality of EJRH, because it would help other upcoming new scientific journals in their struggle to become a better platform for the scientific community they serve. We hope this study will inspire the same change in other scientific journals as it did to our Journal. I invite you to enjoy reading this and other articles with important findings to our practice.

> Professor Delayehu Bekele Editor-in-Chief

INCIDENCE, ASSOCIATED FACTORS AND OUTCOMES OF ANTEPARTUM HEMORRHAGE AT AYDER COMPREHENSIVE SPECIALIZED HOSPITAL AND MEKELLE GENERAL HOSPITAL, MEKELLE, TIGRAY, ETHIOPIA

Hagos Hailu¹, Girmatsion Fisseha², Gelila Goba³, Hale Teka¹, Sumeya Ahmed⁴, Awol Yemane Legesse¹

ABSTRACT

INTRODUCTION: The leading cause of maternal mortality in the world is obstetric hemorrhage. Antepartum hemorrhage (APH) is defined as bleeding from or into the genital tract after 28 weeks of pregnancy and before delivery of the baby. Placenta previa and abruptio placenta are the two major causes of antepartum hemorrhage worldwide including in Ethiopia, and contribute significantly to obstetric hemorrhage which is the most common cause of maternal death in developing countries like Ethiopia. Hence, the present study assesses the prevalence, maternal and perinatal outcomes of APH at Ayder Comprehensive Specialized Hospital (ACSH) and Mekelle General Hospital (MGH).

METHODOLOGY: Hospital based prospective cross-sectional study was carried out at ACSH and MGH.

RESULTS: There were a total of 5368 deliveries in both hospitals over a period of six months between February, 1/2018 to July, 30/2018. During this period, 192 mothers were diagnosed to have APH making prevalence of 3.8 %. The major causes of APH were abruptio placenta in 89 (46.5 %) and placenta previa in 64 (33.3 %). Anemia and postpartum hemorrhage (PPH) were the main maternal complications, each accounting for 98(51%) and 25 (13%) respectively. There was one maternal death (0.5 %). Of the total 200 newborns, 26 (13 %) were stillbirth and there were 19 (9.5 %) early neonatal deaths that died in the first seven days of life after admission to NICU, making PMR of 22.5 %.

CONCLUSION: APH which is primarily caused by abruptio placenta and placenta previa significantly affects the maternal and perinatal outcomes ACSH and MGH compared to reports from other countries. Maternal address out of Mekelle, severe maternal anemia, and abruptio placenta are predictors of increased perinatal mortality.

KEY WORDS: APH, Placenta Previa, Abruptio Placentae, Ayder, Mekelle, Ethiopia

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INTRODUCTION

Antepartum hemorrhage (APH) is defined as any bleeding from or into the genital tract after the period of viability and before the end of the second stage of labor¹. Obstetric hemorrhage is the leading cause of maternal morbidity and mortality throughout the world and is responsible for one third of all pregnancy-related deaths in both high and low-income countries¹, ². According to the Center for Disease Control and Prevention, hemorrhage was a direct cause of maternal death in about 30% of cases². It complicates about 2-5% of all pregnancies³. APH can be due to placenta previa, abruption placentae, indeterminate cause, or local causes of genital tract.

Maternal mortality due to APH has significantly decreased in developed countries to about 6/100000 live births due to better obstetrical care. Ethiopia has one of the world's highest maternal mortality ratios (MMRs) at 412 maternal deaths per 100,000 live births in 2016⁴. Despite reductions observed during the last decade, perinatal mortality also remained high compared to other developing and developed countries⁵. The average perinatal mortality rate in Ethiopia between 2006 and 2011 was 46 perinatal deaths per 1,000 pregnancies of seven or more months of gestation⁶. Obstetric hemorrhage remains one of the major leading causes of maternal death^{7,8} and one of the primary obstetric causes of perinatal mortality ^{9,10}. Placenta previa is one of the major causes of antepartum hemorrhage and is defined as a placenta overlying or proximate to the internal cervical os. It complicates approximately 1 of every 200 births. Recently placenta previa is reclassified in to two categories: placenta previa and low-lying placenta¹¹.

Placental abruption is the premature separation of a normally implanted placenta either partially or totally from its implantation site before delivery. It is initiated by hemorrhage in the decidua basalis which results in a retroplacental hematoma¹².

Maternal and perinatal complications of antepartum hemorrhage are malpresentation, premature labor,

postpartum hemorrhage, shock, acute kidney injury, and retained placenta. It also includes higher rates of caesarean sections, peripartum hysterectomies, coagulation failure and death. Fetal complications are prematurity, low birth weight, intrauterine death, congenital malformations, and birth asphyxia¹³.

Studies on APH are limited in the study area. To this end, this study aims to assess the prevalence of maternal and perinatal outcomes of APH at Ayder Comprehensive Specialized Hospital (ACSH)and Mekelle General Hospital (MGH).

METHODS

An institution-based prospective cross-sectional study design was employed at ACSH and MGH.

ACSH is a tertiary hospital with a catchment population of more than 9 million people of the regions of Tigrai, Northern part of Afar and Northeast of Amhara. The hospital has 13 departments and 3 special units. The labor ward gives delivery service on average for around 500 mothers per month.

Mekelle General Hospital is one of the oldest regional hospitals that gives service currently mainly for residents of Mekelle city and neighboring districts. From its 9 departments, the labor ward is the famous ward in the city which gives delivery service to 400 mothers on average each month.

The study population were all mothers who were admitted to labor and maternity wards of both ACSH and MGH with the diagnosis of APH or who developed APH during labor and gave birth between February 1 and July 30, 2018; the study period.

The inclusion criteria were all patients with bleeding per vagina ≥28 weeks of gestation and before delivery of the last fetus or end of second stage of labor. The exclusion criteria were women who refused to take part in the study and those who had physical or mental infirmity which precluded them to take part in the study. All pregnant mothers who were admitted with APH or developed APH during labor follow-up who fulfilled the inclusion criteria and who attended the ACSH and MGH labor wards during the study period were included in the study and were followed until discharge from the hospitals or seven days from birth, whichever came first. Data was collected prospectively using data collection sheet.

Coded and de-identified data was entered in SPSS version 23 statistical software. Bivariate logistic regression was used to see an association between independent variables and dependent variables. The primary outcome of the study was prevalence of APH and secondary outcomes were maternal outcome (maternal complication) and perinatal mortality. During the step-wise modeling for regression analyses, all variables of clinical importance or with p-value 0.25 and less on bivariate analysis were considered for inclusion in the multivariate analysis. Multivariate logistic regression was used to control the possible confounding effect of selected variables and to determine the independent predictors of maternal and perinatal outcomes of APH. Statistical significance was declared at p<0.05 ¹⁴. The study received ethical approval (MU-IRB 1789/2018) from the Institutional Review Board of College of Health Sciences, Mekelle University, Mekelle, Ethiopia. Written informed consent was obtained from the study participants.

RESULTS

Sociodemographic characteristics

There was a total of 5368 deliveries in both ACSH and MGH between February 1/2018 to July, 30/2018. During this period, 192 mothers with APH were diagnosed, with prevalence of 3.8 %.

The mean age of the mothers was 29.31 year + 5.8 (18-46). More than two-thirds of women 132 (68.8 %) were in the age range of 21 to 34 years and one-fourth 49 (25.5%) were 35 years and older. Regarding marital status, 181 (94.3%) were currently married, 8 (4.2) were single, followed by 2 (1%) divorced and 1(0.5%) widowed.

Educational status showed that 68 (35.4%) were illiterate, 40 (20.8%) attended between grade 1 to 8, 48 (25%) attended grade 9 to 12, and 36 (18.8%) of them attended college or university. (Table 1)

Table 1: Socio-demographic characteristics of mothers with APH at ACSH & MGH, Mekelle, Ethiopia, 2018

| Variables | (N) | (%) |
|-----------------------|-----|------|
| Age | | |
| 20 or younger | 11 | 5.7 |
| 21-34 | 132 | 68.8 |
| 35 or older | 49 | 25.5 |
| Marital status | | |
| Married | 181 | 94.3 |
| Single | 8 | 4.2 |
| Divorced | 2 | 1 |
| Widowed | 1 | 0.5 |
| Educational level | | |
| None | 68 | 35.5 |
| Primary (1 to 8) | 40 | 20.8 |
| Secondary (9 to 12) | 48 | 25 |
| College or University | 36 | 18.8 |

Reproductive and Obstetrical details

Regarding parity of mothers, 51 (26.6%) were primipara, 85 (44.3%) of them multiparous (Para II to IV) and 56 (29.2%) were grand multipara (>V). Three-quarters of the respondents had no history of abortion, and one-quarter had history of abortion at least once. 36 (18.8%) of those who had history of abortion, uterine curettage was done.

Pregnancy induced hypertension (PIH) was diagnosed in 20 (10.4 %) of mothers with APH in the current pregnancy. The most common type of PIH in the current pregnancy was preeclampsia/ superimposed preeclampsia. There were also two mothers with eclampsia. Twenty-one (10.9 %) mothers were diagnosed with preterm rupture of membrane and 2(1 %) mothers sustained abdominal trauma during the current pregnancy (Table 2).

| Variables | (N) | (%) |
|--------------------------------|---------------|------|
| Parity | | |
| Ι | 51 | 26.6 |
| ILIV | 85 | 44.3 |
| ≥V | 56 | 29.2 |
| History of abortion | | |
| None | 145 | 75.5 |
| One time | 33 | 17.2 |
| Two times | 10 | 5.2 |
| Three times and above | 4 | 2.1 |
| History of uterine curettage | | |
| Yes | 36 | 18.8 |
| No | 156 | 81.2 |
| Number of fetuses | | |
| Singleton | 184 | 95.8 |
| Twin | 8 | 4.2 |
| Previous cesarean delivery | | |
| Once | 18 | 72 |
| Twice | 6 | 24 |
| Three times and above | 1 | 4 |
| History of myomectomy | | |
| Yes | 4 | 2.1 |
| No | 188 | 97.9 |
| Hypertensive disorder in curre | ent pregnancy | |
| Yes | 20 | 10.4 |
| No | 172 | 89.6 |
| Type of hypertensive disorder | | |
| Preeclampsia/superimposed | 13 | 65 |
| Gestational HTN | 1 | 5 |
| Chronic HTN | 4 | 20 |
| Eclampsia | 2 | 10 |
| PPROM | | |
| Yes | 21 | 10.5 |
| No | 171 | 89.1 |
| Trauma in current pregnancy | | |
| Yes | 2 | 1 |
| No | 190 | 99 |
| History of APH | | |
| Yes1 | 0.5 | |
| No 140 | 72.9 | |
| Not applicable | 51 | 26.6 |
| | | |

Table 2: Reproductive and Obstetrical details of mothers with APH at ACSH & MGH, Mekelle, Ethiopia, 2018

Causes of APH

The major causes of APH established as final diagnosis were abruptio placenta in 89 (46.5 %) and placenta previa in 64 (33.3 %) patients. Local causes, unexplained and others account for 7 (3.6 %), 23 (12.3 %) and 9 (4.7 %) respectively. The prevalence of abruptio placenta and placenta previa among mothers who gave birth during the study period in both hospitals were 1.7 % and 1.2 % respectively.



Figure 1. Proportion of women by causes of APH (N=192) at ACSH and MGH, Mekelle, Tigray, Ethiopia, 2018

Maternal outcomes

More than half (51 %) of the mothers with APH were anemic (Hgb level < 11 gm /dl) and of these, 20 (10.4 %) had severe anemia (<7 gm/dl). PPH was the second most common complication of APH patients after anemia affecting 25 (13 %) mothers. Hysterectomy was done for 3 (1.6 %) patients with intractable PPH. There was one maternal death due to PPH during the study period (Table 4).

Table 4: Maternal outcomes of APH at ACSH & MGH, Mekelle, Ethiopia, 2018

Table 5: Perinatal outcomes of pregnant mothers with APH at ACSH & MGH, Mekelle, Ethiopia, 2018

| Variables | (N) | (%) | |
|-------------------------------|-----|------|--|
| Hemoglobin level | | | |
| ≥ 11gm/dl | 94 | 49 | |
| Mild Anemia(10-10.9 gm/dl) | 40 | 20.8 | |
| Moderate anemia (7-9.9 gm/dl) | 38 | 19.8 | |
| Severe Anemia (< 7 gm/dl) | 20 | 10.4 | |
| РРН | | | |
| Yes | 25 | 13 | |
| No | 167 | 87 | |
| Peripartum Hysterectomy | | | |
| Yes | 3 | 1.6 | |
| No | 189 | 98.4 | |
| DIC | | | |
| Yes | 2 | 1 | |
| No | 190 | 99 | |
| Puerperal sepsis | | | |
| Yes | 1 | 0.5 | |
| No | 191 | 99.5 | |
| Maternal death | | | |
| Yes | 1 | 0.5 | |
| No | 191 | 99 | |
| Other complications | | | |
| Yes | 4 | 2.1 | |
| No | 188 | 97.9 | |

Perinatal Outcomes

A total of 200 babies were born to 192 mothers with APH. One hundred and eighty-four (95.8 %) were singleton pregnancies and eight (4.2%) were twin pregnancies. Of the total deliveries, 174 (87%) were born alive and 26 (13 %) were stillbirths. There were also 19 (9.5 %) early neonatal deaths (within 7 days of delivery) after admission to Neonatal Intensive Care Unit (NICU) making the perinatal mortality rate of 22.5 % among mothers with APH. The prevalence of prematurity (gestational age < 37 weeks) was 35.4 % and the low birth weight (Birth weight < 2500 gm) was 40 %. Seventy-four (42.5 %) of the neonates born alive were admitted to NICU (Tables 5).

| Variables | (N) | (%) |
|------------------------------------|-------------|------|
| Gestational age at birth | | |
| 28 -33weeks + 6 days | 38 | 19.8 |
| 34 - 36 weeks + 6 days | 30 | 15.6 |
| 37-41 weeks +6 days | 120 | 62.5 |
| ≥42weeks | 4 | 2.1 |
| Sex of neonate | | |
| Male | 101 | 50.5 |
| Female | 99 | 49.5 |
| Fetal condition at birth | | |
| Alive | 174 | 87 |
| Stillbirth | 26 | 13 |
| First minute APGAR score | | |
| ≤ 3 | 2 | 1.1 |
| 4-6 | 52 | 29.9 |
| ≥7 | 120 | 69 |
| 5 th minute APGAR score | | |
| ≤ 3 | 1 | 0.5 |
| 4-6 | 9 | 5.2 |
| ≥ 7 | 164 | 94.3 |
| Birth weight | | |
| < 1500 gm | 12 | 6 |
| 1500-2499 gm | 68 | 34 |
| 2500-3999 gm | 117 | 58.5 |
| ≥ 4000 gm | 3 | 1.5 |
| Admission to NICU | | |
| Yes | 74 | 42.5 |
| No | 100 | 57.5 |
| Outcome within one week of NICU | J admission | |
| Alive | 55 | 74.3 |
| Early neonatal death | 19 | 25.7 |
| Causes of early neonatal death | | |
| RDS (Prematurity) | 10 | 52.6 |
| Sepsis | 2 | 10.5 |
| Perinatal asphyxia | 7 | 36.8 |
| | | |

Bivariate and multivariate analysis of factors associated with maternal and perinatal outcomes of APH

In the bivariate analysis of contributing factors such as address, maternal age, educational level, hypertensive disorders of pregnancy, cause of APH, mode of delivery, and history of cesarean delivery as predictors of maternal complication, only the history of previous cesarean delivery was a significant predictor of maternal complications. Mothers with a history of cesarean delivery and currently with APH had 4.174 times higher maternal complications than those without history of previous cesarean delivery who were currently primipara (COR: 4.174; 95 % CI: 1.429,12.196). Regarding perinatal mortality predictors in the bivariate analysis, mothers with APH who came outside of Mekelle city had high odds of perinatal mortality. Mothers with a hemoglobin level (mild, moderate and normal), both placenta previa and unexplained APH, current cesarean delivery had lower odds of perinatal mortality when compared to those with hemoglobin level $\leq 7 \text{gm/dl}$, abruptio placenta, and vaginal delivery respectively.

The adjusted binary logistic regression model analysis of predicting factors of perinatal mortality in mothers with APH revealed that address, maternal hemoglobin level <7 (moderate, mild anemia and normal), placenta previa and unexplained APH were independent predictors of perinatal mortality but the mode of delivery was not found to be significant in the adjusted binary logistic regression analysis. Newborns born to mothers with APH, who came outside of Mekelle, were 2.749 times more likely to die during the perinatal period when compared to mothers who came Mekelle (where the study area is located) (AOD: 2.7491; 95% CI:1.241,6.090). Neonates born to mothers with APH but no anemia, 0.110 times, mothers with mild anemia 0.144 times and moderate anemia 0.087 times less likely to die during their perinatal life as compared to mothers with APH who had had severe anemia (AOR: 0.110; 95% CI: 0.032-0.380, 0.144; 95% CI: 0.037-0.561,0.087;95 % CI: 0.021-0.366) respectively. Mothers who had placenta previa as a cause of APH and unexplained APH had 0.232 and 0.153 times less perinatal mortality compared to those with abruptio placenta (AOR:0.232; 95% CI: 0.080-0.674, 0.153; 95% CI: 0.042-0.552) respectively (Table 6). (Table 6).

Table 6: Bivariate and Multivariate analysis of factors associated with perinatal mortality of mothers with APH at ACSH and MGH, Mekelle, Ethiopia, 2018

| Variable | Perinatal mo | ortality | Crude OR(95 % CI) | Adjusted OR(95 % CI) |
|------------------------------------|--------------|-------------|------------------------|-----------------------|
| | Yes | No | | - |
| Address | | | | |
| Mekelle | 13 (6.8%) | 84(43.7%) | 1 | 1 |
| Out of Mekelle | 32(16.7%) | 63 (32.8%) | 3.282(0.1.593,6.761) * | 2.749(1.241,6.090) * |
| Hemoglobin level | | | | |
| ≥11gm/dl | 17 (8.8%) | 77 (40.1%) | 0.147(0.052,0.415) * | 0.110(0.032,0.380) * |
| 10-10.9 gm/dl | 10 (5.2 %) | 30 (15.6%) | 0.222(0.071,0.699) * | 0.144 (0.037,0.561) * |
| 7-9.9 gm/dl | 6 (3.1 %) | 32 (16.7%) | 0.125(.036,0.436) * | 0.087 (0.021,0.366) * |
| <7 gm/dl | 12 (6.3%) | 8 (4.2 %) | 1 | 1 |
| Causes of APH in current pregnancy | | | | |
| Abruptio placenta | 33 (17.2 %) | 56 (29.2 %) | 1 | 1 |
| Placenta previa | 8 (4.2 %) | 56 (29.2 %) | 0.242 (0.103,0.571) * | 0.232(0.080,0.674) * |
| Unexplained/ Local causes/Other | 4(2.1%) | 35(18.2 %) | 0.194 (0.063,0.595) * | 0.153 (0.042,0.552) * |
| Mode of delivery | | | | |
| Vaginal delivery | 26 (13.5%) | 60(31.3%) | 1 | 1 |
| Cesarean delivery | 19 (9.9 %) | 87(45.3 %) | 0.504 (0.256,0.992) * | 1.520 (0.645,3.580) |

* Statistical significance ≤ 0.05, OR=Odds Ratio, CI=Confidence Interval

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DISCUSSION

The main objective of this study was to assess the prevalence of maternal and perinatal outcomes, and associated factors of mothers with APH in ACSH and MGH from February 1/2018 to July 30/2018. In the present study, there were 192 cases of APH out of 5,368 deliveries making prevalence of APH 3.8 %. Abruptio placenta and placenta previa were the main causes of APH in the current study, accounting for 46.4 %, and 33.3 % respectively. The prevalence of abruptio placenta was 1.7 % and placenta previa 1.2 %. The mean maternal age was 29.3 with standard deviation of 5.8. The mode of delivery was cesarean delivery in 55.2 % of the patients. Anemia and post-partum hemorrhage were the two most common complications. There was one maternal death during the study period related to PPH. The perinatal mortality rate was 22.5 %. The prematurity rate and low birth rate were 35.4 % and 40 %, respectively.

The prevalence of APH in this study is consistent with study done in India¹⁵ but higher than studies done in other parts of India and Nigeria¹⁶⁻¹⁸. Compared to a study conducted in Jimma University Specialized Hospital in the Oromia region, the prevalence is lower. This may be due to the low institutional delivery in the Oromia region which was 18.8 % and relatively higher in the Tigray region which was 56.8 % according to the 2016 EDHS report ⁴.

The mean age of the study participants was 29.3 years, which is within the age range of 18-46 years with a standard deviation of 5.8. This contrasts with the traditional association of antepartum hemorrhage with advanced maternal age¹⁹.

Abruptio placenta and placenta previa were the two major causes of APH in our study each accounting for 46.4 % and 33.3 % respectively which is consistent to studies done elsewhere^{17,18,20}. The study revealed that almost half of the cases were anemic (51 %) and 13% of them developed PPH. This finding is lower than the study conducted in India (71.9 %)⁶. This may be due to the relatively less history of previous cesarean delivery and current cesarean delivery in our study area. Many studies have shown that increased rate of previous cesarean delivery is associated with increased rate of placenta previa and morbidly adherent placenta which led to increased risk of anemia, PPH and cesarean hysterectomy^{12,21}.

There was one maternal death (0.5 %) during the study period and the cause of the death was PPH. Compared to studies done in low- and middle-income countries 16-18,20,22, this rate of maternal death related to APH was lower than studies conducted in low- and middle-income countries 16-18,20, 22, but higher than in a study report from France where there was no maternal mortality related to APH²³. This low rate of maternal death secondary to APH compared to many other regions of the country and other countries may be due to improved timely referral, road access and increased health seeking behavior.

The mode of delivery was cesarean delivery in 55.2% of APH mothers and out of those with placenta previa 92.2 % of them gave birth by cesarean delivery. This finding is consistent with studies done in other parts of Ethiopia and Africa^{18,20}, but lower than studies done in India^{13,15}.

Adjusted binary logistic regression model demonstrated also that address and level of maternal hemoglobin were significantly associated with perinatal mortality. These independent predicting factors were also found to contribute to PMR in another study²⁰.

The main causes of early neonatal death in the study were respiratory failure and perinatal asphyxia. This finding is in congruence with other studies^{15,20}. Quality of intrapartum care, appropriate neonatal resuscitation, and other NICU services are therefore a critical component of the continuum of care to prevent early neonatal death. The care study did not assess the processes in the NICU; however, the high mortality rate among neonates admitted to the NICU compared to findings from other studies^{20,24} is an indicative of the need for improvement in the quality of NICU services in the study hospitals.

CONCLUSION

The study showed that the prevalence of APH to be 3.8 %. The prevalence of abruptio placenta was 1.7 % and placenta previa 1.2 %. There was one maternal death during the study period related to PPH. The perinatal mortality rate was 22.5 %. The prematurity rate and low birth rate were 35.4 % and 40 %, respectively.

LIMITATION OF THE STUDY

The most important limitation lies in the fact that the number of maternal death (1) and perinatal death (19) was relatively small for regression modeling.

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PREVALENCE AND DETERMINANTS OF UNINTENDED PREGNANCY AMONG MOTHERS DELIVERED IN TERTIARY AND GENERAL HOSPITALS, TIGRAY REGION, ETHIOPIA

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ABSTRACT

BACKGROUND: Unintended pregnancy represents an important public health challenge in many countries, especially in the developing world. Numerous prevention strategies have been employed worldwide in an effort to address this problem. Unintended pregnancies contribute significantly to adverse health, social and economic outcomes and increase the risks of maternal death as well as neonatal, infant and child mortality. At present, standardized efforts to reduce the incidence of unintended pregnancy are sparse.

OBJECTIVE: This study aimed to assess prevalence and determinants of unintended pregnancy among mothers delivered in Ayder Comprehensive Specialized Hospital and Mekelle Hospital.

METHODS: A facility based cross-sectional study was conducted over a period of two months (January 1, 2018 to February 30, 2018). The study was conducted among 614 postpartum mothers across two hospital sites during the aforementioned time period. Bivariate logistic regression was used to assess for association between the independent variables and unintended pregnancy. Statistical significance was determined as P < 0.05.

RESULTS: A totals of 614 mothers participated in the study. The prevalence of unintended pregnancy was 42.8%. Mistimed pregnancy accounting for 33.7 % and unwanted pregnancy accounting for 9.1%. About 88 % of mistimed pregnancies were due to contraception not used and 12% are due to contraception failure. Lower level of education, interpregnancy interval of 6 months to 5 years, older maternal age, and larger family size were factors significantly associated with unintended pregnancy.

CONCLUSIONS: Nearly half of women had an unintended pregnancy, a rate higher than previously reported.. The high prevalence of unintended pregnancies in Mekelle highlights the need for implementation strategies that encourage education of women, creating awareness on family planning and child spacing.

KEY WORDS: Unintended pregnancies, mistimed Pregnancy, Unwanted Pregnancy, Tigray, Ethiopia

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INTRODUCTION

Unintended pregnancy is a worldwide problem which affects women in both developing as well as industrialized countries. The global prevalence of unintended pregnancy was found to be 64 per 1000 women aged 15.49, with the highest rates observed in sub-Saharan Africa and Latin America. In Africa specifically, the prevalence of unintended pregnancy was estimated to be 82 per 1000 women aged 15.49, with the highest rates observed in West and Central Africa².

According to the Ethiopian Demographic Health Survey (EDHS) in 2016, the percentage of unwanted births in Ethiopia had decreased (17% in 2000 to 8% in 2016). Despite this, the percentage of subsequent intended pregnancies has not improved (19- 20%)³. There appears to be a demographic variation as well. Studies done in different regions of Ethiopia revealed much higher unintended pregnancy rates, ranging from 26% and 33% 4, 5.

Most unintended pregnancies occur in developing countries largely due to poor literacy and education as well as lack of knowledge and access to contraceptive methods. In these settings unintended pregnancies contribute significantly to adverse health, social and economic outcomes and increase the risks of maternal death and neonatal, infant and child mortality⁶,⁷.

Unintended pregnancy is a major public health problem due to its adverse consequences on mothers, children and the resources of the health sector.⁸. Antenatal concerns include medical complications and maternal mortality secondary to complications of termination of pregnancy. For pregnancies carried to term, women are at higher risk for interpersonal violence, delayed initiation to antenatal care, and unsafe delivery service utilization. Children born from unintended pregnancies have been shown to be affected in terms of child care, psycho-social development, and health status⁹, 10.

Many adolescents and youth in Ethiopia are under-educated and have little access to sexual and reproductive health information and services¹. As a result, many young women have faced immense sexual and reproductive health problems such as unwanted pregnancies, unsafe abortions, and sexually transmitted diseases.

Large disparities exist globally in terms of access to the most effective methods of contraception¹¹. Most pregnancies in young women in sub-Saharan Africa are unintended or mistimed, which presents much higher risks to both mother and fetus.

Studies have shown that there are a number of factors predicting the occurrence of unintended pregnancies. The sociodemographic factors that have been associated with unintended pregnancy included younger age, lower level of education, unmarried marital status, rural residence, and lower income. Distance from the nearest health facility, higher parity, previous history of unintended pregnancy, unmet need for family planning, failed natural family planning, early sexual initiation, partner's desire for child, domestic violence and lack of autonomy were among other predictors of unintended pregnancy¹².

Hence, this paper aimed to measure the prevalence and determinants of unintended pregnancy among mothers delivered in Ayder Comprehensive Specialized Hospital (ACSH) and Mekelle Hospital (MH), Mekelle, Tigray, Ethiopia.

METHODOLOGY

The study was conducted in ACSH and Mekelle Hospital, which are located in Mekelle city, Tigray 783 km north of Addis Ababa, Ethiopia. ACSH and Mekelle Hospital are teaching hospitals serving about 8 million people living in the northern part of Ethiopia. ACSH has adult, pediatric and neonatal intensive care units for critically ill cases.

A facility-based cross-sectional study design using quantitative data collection methods was used. The sample size was determined using a single population proportion formula with the assumption of 95% confidence level, 5% margin of error, taking the point prevalence done in Welayta 36.6% ¹³. After considering 10% of non-response rate, the total sample size was estimated to be 614 women.

Hospital based cross-sectional study design was applied to all mothers who gave birth in ACSH and MH from January 1 to February 30, 2018.

Data for the study was collected using a pre-tested data collection tool. Women who delivered during the survey period were included in the analysis. Mothers who have delivered in both ACSH and MH during the study period were included. Mothers with mental or physical disabilities that prevent them from participating in the study were excluded. Respondents were asked if the current pregnancy was intended, unintended or mistimed. Sociodemographic data on the primary factor causing unintended pregnancy was collected.

Data was collected by 5 midwives and 2 Supervisors (year two Ob/Gyn residents). The supervisors were assessing collected data for congruence on a daily basis.

Data collectors and supervisors were trained regarding the objectives of the study and the data collection tool by the principal investigator for one day. The principal investigator and supervisors monitored the data collection on daily basis to ensure the completeness of the questionnaire, and to give further clarification and support for data collectors.

Data was entered into SPSS software version 21, and cleaning and coding was subsequently done. Bivariate logistic regression analyses were conducted to test variables for multivariable analysis and those with $p \le 0.25$ were fitted in the initial multiple logistic regression models. Hosmer-Lemeshow goodness of fit was used to evaluate the goodness of fit of the logistic regression model. Bivariable and multivariable binary logistic regression was used to see associations between dependent and independent variables using p value <0.05 and 95% CI as statistically significant. Adjusted Odds ratio (AOR) with its 95% CI was measured to judge for precision and decide whether independent association between outcome and independent variables exist.

Operational definitions

Unintended pregnancy: pregnancy that occurred when no children were desired or that occurred earlier than desired.

Unwanted pregnancy: pregnancy that has occurred to the women who does not want to become pregnant either at the time of conception nor in the future.

Mistimed pregnancy: pregnancy that occurred when a woman has a desire to be pregnant and have a child or children sometime in the future, but not now.

Knowledge of contraceptive methods: Ten knowledge questions about modern contraceptive methods were used and those who answered eight or more questions were categorized as more knowledgeable (yes) & those who answered less than eight were grouped as less knowledgeable (no).

RESULTS

Reproductive and sociodemographic characteristics Table 1: Reproductive and contraception utilization of study participants in ACSH and Mekelle Hospital, Tigray, Ethiopia, 2018

Para 2-4 accounted for 45.3 % of the study participants, followed by primipara 44.8%, grand multipara (>5) 9.9 %. Majority of the study participants had desire for 1-4 children 79%, followed by a desire for 5-6 children 18.9 %, desire for 7 and above children 2% while only 0.2 % of the study participants had no desire for child at all. (Table 1) Ethiopian Journal of Reproductive Health (EJRH) July, 2023 Volume 15, No. 3

Table 1

| Reproductive and contraception utilization variables | Frequency(N) | Percentage (%) |
|--|----------------|----------------|
| | | |
| Primipara | 275 | 44 8% |
| 7.4 | 278 | 45.3% |
| 5-6 | 52 | 8.5% |
| >=7 | 9 | 1.4% |
| Desire of children | , , | 11170 |
| 0 | 1 | 0.2% |
| 1-4 (multipara) | 485 | 79% |
| 5-6 (grand multipara) | 116 | 18.9% |
| >=7(great grand multipara) | 12 | 2.0% |
| ANC booking | | |
| None | 10 | 1.6% |
| One time | 12 | 2.0% |
| Two times | 26 | 4.2% |
| Three times | 92 | 15.0% |
| Four times and above | 474 | 77.2% |
| Number of spontaneous abor | tions | |
| 0 | 538 | 87.6% |
| 1 | 55 | 9.0% |
| 2 | 16 | 2.6% |
| 3 | 5 | 0.8% |
| Number of induced abortion | | |
| 0 | 587 | 95.6% |
| 1 | 25 | 4.1% |
| 2 | 1 | 0.2% |
| 3 | 1 | 0.2% |
| Gestational age at 1st ANC | | |
| <=16 weeks | 483 | 78.7% |
| 20-24 weeks | 121 | 19.7% |
| >28 weeks | 10 | 1.6% |
| Age at 1st pregnancy | | |
| <=19 | 136 | 22.1% |
| 20-24 | 290 | 47.2% |
| 25-29 | 161 | 26.2% |
| 30-34 | 22 | 3.6% |
| >=35 | 5 | .8% |
| Modern contraceptive knowle | edge | |
| Yes | 524 | 85.3% |
| No | 90 | 14.7% |
| Modern contraceptive use(eve | er) | |
| Yes | 365 | 59.4% |
| No | 249 | 40.6% |
| Modern contraception use be | fore pregnancy | |
| Yes | 325 | 52.9% |
| No | 289 | 47.1% |
| If ever used what type is prefe | erred | |
| Pill | 56 | 9.1% |
| Injectable | 202 | 32.9% |
| Implant | 89 | 14.5% |
| Loop | 15 | 2.4% |
| Barrier (including condom |) 3 | 0.5% |

Magnitude of Unintended Pregnancy

The prevalence of unintended pregnancy was 42.8%. Unwanted pregnancy accounted for 9.1% and mistimed pregnancy for 33.7%. The majority (29.8%) of these unintended pregnancies were due to the failure to use contraception, while 3.9% were due to the failure of the contraceptive itself.

Of these, injectable contraception was the most commonly used and therefore the most commonly failed, accounting for 2.0%; OCPs accounted for 1.1% of birth control failures leading to unintended pregnancy. (Figure 1, Table 3).



Figure 1: Magnitude of Unintended pregnancy among study participants at ACSH and Mekelle Hospital, Tigray, Ethiopia, 2018

Table 2: Magnitude of unintended pregnancy among study participants at the ACSH and Mekelle Hospital, Tigray, Ethiopia, 2018

| Pregnancy intention variables | Frequency (N) | Percentage (%) |
|--------------------------------------|------------------|-------------------|
| Unwanted pregnancy | | |
| Yes | 56 | 9.1% |
| No | 558 | 90.9% |
| Pregnancy too early before you pla | an | |
| Yes | 207 | 33.7% |
| No | 407 | 66.3% |
| If it is too early why does it happe | n | |
| Contraception not used | 183 | 29.8% |
| Contraception failure | 24 | 3.9% |
| If contraception failure which typ | e | |
| Emergency contraception | 4 | 0.7% |
| Oral contraception | 7 | 1.1% |
| Injectable | 12 | 2.0% |
| Implant | 3 | 0.5% |
| Loop | 2 | 0.3% |

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Factors associated with mistimed pregnancy

From bivariate analysis age, educational status, residence, monthly income, modern contraceptive knowledge, modern contraceptive use, modern contraceptive use before pregnancy, ANC booking, and birth interval were fitted to multivariate analysis. However, in multivariate analysis using multiple logistic regression educational status and birth interval were found to be independently and significantly associated with mistimed pregnancy.

The odds of having mistimed pregnancy was 5.3 and 4.9 times more likely if the mother has no education or primary education as compared to college or university education (AOR: 5.35; 95% CI: 2.17-13.18) and (AOR: 4.9; 95% CI: 2.44-10.02) respectively.

The odds of having mistimed pregnancy was two times more likely with an interpregnancy interval between 6 months to 5 years as compared to pregnancies greater than 5 years apart (AOR: 1.95; 95% CI: 1.06-3.59).

Table 3: Bivariate and multivariate analysis of factors associated with mistimed pregnancy in mothers delivered in both delivery in Ayder Comprehensive Specialized Hospital and Mekelle hospital, Tigray, Northern Ethiopia, 2018.

| | Mistimed | l pregnancy | Crude Odd ratio | Adjusted Odd ratio | |
|-----------------------------------|----------|-------------|---------------------|---------------------|--|
| | Yes | No | | | |
| Age | | | | | |
| <=19vrs | 11 | 10 | 0.83(0.31-2.27) | 0.46(0.04-5.81) | |
| 20-24 | 43 | 135 | 0.24(0.13-0.45) ** | 0.56(0.24-1.32) | |
| 25-29 | 66 | 158 | 0.32(0.18057) ** | 0.64(0.31-1.35) | |
| 30-34 | 54 | 79 | 0.52(0.28-0.97) * | 0.69(0.33-1.45) | |
| >=35 yrs | 33 | 25 | 1 | 1 | |
| Educational level | | | | | |
| None | 43 | 2.8 | 5.8(3.12-10.77) ** | 5.35(2.17-13.18) ** | |
| Primary (grade 1-8) | 69 | 73 | 3.6(2.13-5.97) ** | 4 9(2,44-10,02) ** | |
| Secondary (grade 9-12) | 64 | 189 | 1.3(0.79-2.08) | 1.76(0.90-3.42) | |
| College or university | 31 | 117 | 1 | 1 | |
| Residence | | | - | - | |
| Urban | 163 | 359 | 0 5(0 32-0 78) * | 1 00(0 50-2 02) | |
| Bural | 44 | 48 | 1 | 1.00(0.90 2.02) | |
| Monthly income in hirr | | 10 | 1 | | |
| 500-999 | 4 | 3 | 4 4(0,89-21,4) | 1,79(0,24-13,14) | |
| 1000-2999 | 130 | 191 | 2 2(1 26-3 96) * | 1 31(0 63-2 73) | |
| 3000-4999 | 55 | 154 | 1 17(0 64-2 16) | 0.86(0.4-1.85) | |
| 5000-15000 | 18 | 59 | 1 | 1 | |
| Modern contracentive knowledge | 10 | 37 | - | - | |
| Yes | 180 | 354 | 1 2(0 75-1 98) | 1 41(0 59-3 35) | |
| No | 27 | 63 | 1 | 1 | |
| Modern contracentive use | 21 | 0.5 | 1 | 1 | |
| Yes | 135 | 230 | 1 44(1 02-2 04) | 2,06(0,76-5,57) | |
| No | 72 | 177 | 1 | 1 | |
| Modern contraception use before t | regnancy | 111 | 1 | 1 | |
| Yes | 116 | 209 | 1 21(0 86-1 69) | 0 70(0 29-1 69) | |
| No | 91 | 198 | 1 | 1 | |
| ANC booking | 71 | 170 | 1 | 1 | |
| No | 6 | 4 | 3.58(1-12.88) | 2.07(0.18-23.32) | |
| One time | 7 | 5 | 3.34(1.04-10.7) | 3,20(0,50-20,35) | |
| Two times | 17 | 9 | 4.51(1.96-10.35) ** | 2.74(0.81-9.36) | |
| Three times | 37 | 55 | 1.605(1.01-2.55) | 1.44(0.73-2.84) | |
| Four times and above | 140 | 334 | 1 | 1 | |
| Birth interval | 110 | 551 | - | - | |
| Less than 6months | 1 | 8 | 0 59(0 115-3 07) | 1 58(0 23-10 81) | |
| 6months to 5 years | 43 | 260 | 1 76(1 04-2 99)* | 1 95(1 06-3 59)* | |
| | 7 | 200 | 1 | 1 | |

*p<0.05; ** p<0.001

Factors associated with unwanted pregnancy

From bivariate analysis age, educational status, residence, desired (ideal) number of children, and ANC booking were fitted to multivariate analysis. However, in multivariate analysis using multiple logistic regression age, educational level, and ideal number of children were found to be independently and significantly associated with mistimed pregnancy.

The odds of experiencing unwanted pregnancy were 95% ,92% and 63% less likely among

mothers in the age group of <=24, 24-29,30-34 years respectively compared to those of >=35 years of age. Thus, likelihood of unintended pregnancies is significantly associated with age greater than 35 years (AOR: 0.05; 95% CI: 0.01-0.20), (AOR: 0.08; 95% CI: 0.03-0.24), (AOR: 0.27; 95% CI: 0.11-0.65).

The odds of having unwanted pregnancy were 85% less likely among mothers with ideal number of children of 0.4, compared with women who desire 7 or more children (AOR: 0.15; 95% CI: 0.02-0.93).

Table 4: Bivariate and multivariate analysis of factors associated with unwanted pregnancy in mothers delivered in both in Ayder Comprehensive Specialized Hospital and Mekelle hospital, Tigray, Northern Ethiopia, 2018.

| | Unwant | ed pregnancy | Crude Odd ratio | Adjusted Odd ratio | |
|----------------------------|--------|--------------|-------------------|--------------------|--|
| | Yes | No | | | |
| Age | | | | | |
| <=24 | 3 | 196 | 0.02(0.01-0.07)** | 0.05(0.01-0.20)** | |
| 25-29 | 7 | 217 | 0.04(0.02-0.10)** | 0.08(0.03-0.24)** | |
| 30-34 | 20 | 113 | 0.22(0.11-0.44)** | 0.27(0.11-0.65)* | |
| >=35yrs | 26 | 32 | 1 | 1 | |
| Educational level | | | | | |
| None | 27 | 44 | 17.6(6.4-48.3)** | 3.99(1.07-14.90) | |
| Primary (grade 1-8) | 17 | 125 | 3.9(1.4-10.5)* | 1.81(0.54-6.05) | |
| Secondary (grade 9-12) | 7 | 246 | 0.81(0.25-2.6) | 0.83(0.23-3.06) | |
| College or university | 5 | 143 | 1 | 1 | |
| Residence | | | | | |
| Urban | 36 | 486 | 0.27(0.15-0.49)** | 1.43(0.53-3.90) | |
| Rural | 20 | 72 | 1 | 1 | |
| Desired number of children | | | | | |
| 0-4 | 16 | 470 | 0.02(0.01-0.09)** | 0.15(0.02-0.93)* | |
| 5-6 | 33 | 83 | 0.28(0.08-0.96)* | 0.87(0.14-5.19) | |
| >=7 | 7 | 5 | 1 | 1 | |
| ANC booking | | | | | |
| No | 3 | 7 | 5.9(1.46-24)* | 2.24(0.26-19.32) | |
| One time | 4 | 8 | 6.91(1.97-24)* | 1.35(0.20-8.90) | |
| Two times | 7 | 19 | 5.09(1.99-13.0)* | 2.52(0.66-9.60) | |
| Three times | 10 | 82 | 1.68(0.797-3.56) | 1.48(0.53-4.15) | |
| Four times and above | 32 | 442 | 1 | 1 | |

*p<0.05; ** p<0.001

DISCUSSION

In the present study, the prevalence of unintended pregnancy was 42.8%. Unwanted pregnancy accounted for 9.1% and mistimed pregnancy for 33.7%. The majority (29.8%) of these unintended pregnancies were due to the failure to use contraception, while 3.9% were due to the failure of the contraceptive itself. No education or primary education as compared to college or university education was associated with mistimed pregnancy. The likelihood of unintended pregnancies is significantly associated with age greater than 35 years, and with those who desire 7 or more children. The World Health Organization report notes that unwanted, mistimed, and unintended pregnancy is the most common cause of maternal mortality in developing countries³. In Ethiopia this remains major public health challenge as maternal mortality complicates 412 per 100,000 live births¹⁴.

In the current analysis, 42.8% of the pregnancies were unintended. Mistimed pregnancy accounted for the vast majority at 33.7% and unwanted pregnancy accounting for 9.1%. This rate is higher than reported in other Ethiopian studies as well as the national reported average of 35% according to EDHS13, 15, 16. The prevalence of unintended pregnancies in our study is higher than report from meta-analysis from Sub-Saharan Africa (33.9%)¹⁷. The discrepancy might be explained due to difference in study design and operational definitions used. Another factor that could account for the incongruity in unintended pregnancy rates is the contrast in the socio-economic characteristics of the subjects under investigation.

It has been reported that 88% of mistimed pregnancies are due to lack of contraception. Limited access to family planning resources and contraception is a significant public health concern which requires action. As stated previously, developing countries are most susceptible to unintended pregnancy due to lack of education and access to contraceptives⁶. Our study shows that uneducated women are five times more like to experience mistimed pregnancy than women who

attended college or university. This is consistent with current Ethiopian data showing 31% of women with no education are using a contraceptive method, compared with 55% of women with more than a secondary education³. Illiterate women are more likely to have an unintended pregnancy, further proving evidence that literate and educated women have a better understanding of their right and have more freedom, control, and participation in decisions around contraception use and family planning¹⁷.

Twelve percent of mistimed pregnancies are due to contraception failure. This type of failure is typically due to inappropriate use of drugs and poor understanding of the purpose and mechanism of action of the drug. This indicates a need for improved counseling on proper contraceptive use, and use of backup methods¹⁸.

Use of long-acting reversible contraceptives (LARC) such as intrauterine devices (IUDs) (0.3%) and implants (0.5%) were lower in our study than the EDHS report of Tigray (1% and 10.7% respectively). It has been suggested this may be due to fear of infertility and side effects¹⁶. This is an area of potential improvement and education, as women who use LARC have a longer interpregnancy interval and less chance of contraception failure.

A major finding of our study is that there is no single factor accounting for the high rates of unintended pregnancy; rather many factors contributed to this outcome. A multivariate analysis revealed that lower educational level, interpregnancy interval between 6 months to 5 years, older maternal age, and higher number of desired children was significantly associated with unintended pregnancy.

The present study showed that unintended pregnancy occurred more likely among women aged older than 35 years. This is inconsistent with study done in Bale, Hosana, and Brazil¹⁹⁻²¹. But consistent with the study done in West Wollega and Jimma that showed higher unintended pregnancy among older women. This might be due to that older women will not consider themselves as fertile, less likely to utilize modern contraceptive²²,23.

According to our study, unintended pregnancy occurred more with a larger family size. This is comparable with study conducted in Debremarkos, and Jimma towns of Ethiopia. The reason for this might be family with larger size have already achieved their desired number of children, thus any pregnancy achieved thereafter will be considered unintended^{23,24}.

The study also showed that as the number of ANC visit decreases as the chance of unintended pregnancy increase. Those who have booked ANC visit less than 3 times are five times more like to have an unwanted pregnancy than those who attend four or more ANC visits. This finding is consistent with studies done elsewhere¹⁹⁻²¹. The possible explanation might be mothers with unplanned pregnancy lack support from their partners thus leading to poor care seeking behavior. Additionally unintended pregnancies are usually associated with factors which dictate care seeking behaviors, genderbased violence, and obstacles to access which may be related with no or late antenatal care²².

CONCLUSION AND RECOMMENDATION:

Nearly half of women had an unintended pregnancy, a rate which is higher than previously reported. Low educational level, older age of mothers, and larger desired family size were all significantly associated with unintended pregnancy. The high prevalence of unintended pregnancies in Mekelle highlights the need for implementation strategies that encourage education of women, creating awareness on family planning and child spacing, thus, alleviating the high prevalence rate of unintended pregnancy.

DECLARATIONS

Limitations: The study used a cross-sectional design, which only provides a snapshot of the prevalence and determinants of unintended pregnancy at a specific point in time. Longitudinal studies would be needed to examine changes in unintended pregnancy rates over time and identify factors that contribute to these changes. The reliability of between-rater and

concordance coefficient agreement between data collectors were not assessed in this study.

Ethics approval and consent to participate: The study was approved by Institutional Ethics Review Committee of College of Health Sciences, Mekelle University. Informed written consent was obtained from study participants. The study participants were informed that participation was voluntary, confidentiality and private information was protected. All methods were carried out in accordance with relevant guidelines and regulations. Competing interests: All authors declared no competing interest.

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AS wrote the proposal, performed the statistical analysis, and drafted the paper, approved the proposal with some revisions, participated in the design of the study and data analysis. AG supervised and coordinated the proposal writing and participated in statistical analysis and writing the manuscript. GF supervised the proposal development, and statistical analysis. AYL, HT, GG, JG, SA participated in data analysis, revision of the manuscripts. All authors read and approved the final manuscript

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COMMUNICATION SELF-EFFICACY AND CONTRACEPTIVE USE AT SEXUAL DEBUT AMONG RURAL ADOLESCENT GIRLS IN ETHIOPIA

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ABSTRACT

INTRODUCTION: Girls with early sexual debuts are exposed to risky sexual behaviours, such as unintended pregnancy and contracting sexually transmitted infections. Communication self-efficacy is vital for protecting girls from unwanted pregnancy by educating them about the use of contraceptives. This study aimed to investigate the relationship between communication self-efficacy and contraceptive use at sexual debut in a rural Ethiopian setting.

METHODS: A cross sectional study design was employed to study communication self-efficacy at sexual debut in West Hararghe rural zone, Oromia region of Ethiopia. Adolescent girls between the ages of 13 – 17 were selected with simple random sampling technique and out of these a total of 394 girls who self-reported their sexual debut, were included in the analysis. Data were collected with an electronic data collection system through one to one interviews. Communication self-efficacy was measured using two items: adolescents who discussed contraceptives with their partners, and adolescents who discussed contraceptives with other people. The association between contraceptive use at sexual debut and communication self-efficacy was examined using a multivariable logistic regression model that accounted for a complex sample survey design.

RESULTS: The mean age of sexual debut was 14.5 years (95% CI 14.38, 14.69) and the proportion of contraceptive use at sexual debut was 17.37% (95% CI 12.75, 22.95). Contraceptive use at sexual debut was higher among girls who talked to their partner about contraceptives (adjusted odds ratio (AOR) = 1.94, 95% CI [0.98 - 3.8]) and those who discussed contraceptives with others (AOR = 2.45, 95% CI [1.56 - 5.55].

CONCLUSIONS: Contraceptive use at sexual debut was low among young rural adolescent girls. Adolescent girls who had communication self-efficacy were likely to use contraceptives at sexual debut. Life skills interventions that improve communication and negotiation are recommended to enhance contraceptive use.

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INTRODUCTION

Adolescent girls who make their sexual debut protection or using without contraceptives face the risk of contracting various sexually transmitted diseases and having a pregnancy at age.¹, ² Studies have shown that early an early childbearing can compromise the physical, mental and social wellbeing of girls³ and can limit them from achieving greater life goals such as education and independence.⁴ Some adolescent girls make sexual debuts without much preparation. Some engage in these behaviours whether by curiosity, sexual attraction, manipulation or coercion.^{5, 6} A synthesis of nationally representative data of 33 Sub-Saharan countries showed that lack of contraceptives was a prominent challenge that girls faced, which prevented them from having safer and protected sex.⁷ This challenge is greater in rural settings where social norms and patriarchal dominance are prominent.⁸, ⁹ These contextual factors have a strong influence on young adolescent girls¹⁰ as they suffer more from negative sexual and reproductive health consequences.¹¹

Enhancing adolescent girls' agency is critical in defining their sexual and reproductive health goals that affect and influence their lives.^{12, 13} Using the extended Bandura's self-efficacy theory, DiClemente argues that people must alter their risky habits and believe in their ability or efficacy to exercise personal control to achieve self-directed change.¹⁴ The concept of self-efficacy, which is defined as an individual's capacity to achieve control over one's behaviour, ¹⁵ has different components, which explain why individuals are compelled to act beyond their ability. Communicating ideas effectively and discussing a particular matter, such as contraceptives, is an essential component necessary actions.¹⁶ taking requires that Communication and negotiation are at the heart of self-efficacy that facilitate the use of contraceptives. Adolescents with high self-efficacy to communicate and negotiate have better chances of using contraceptives and making favourable decisions towards their sexual health.¹⁷ However, there is scant evidence on whether communication selfefficacy is associated with the use of contraceptives at first sexual intercourse among young adolescent girls in low-income settings. The present study aims to examine the association between the use of contraceptives at sexual debut and communication self-efficacy.

The theoretical foundation for this study is conceived from the Yeboah and Appai, 2015 conceptual framework and modified to fit the purpose of the study.¹⁸ In the modified framework, contraceptive use at sexual debut is influenced by sociodemographic factors (including religion, literacy, mother's education, having own income and household food security), awareness factors (awareness and prevention of sexually transmitted infections (STIs) and pregnancy), and self-efficacy factors (ability to refuse nonconsensual sex, talking to a partner about contraception, discussing contraception with anyone and ability to refuse to unprotected sex). This study chooses to focus on self-efficacy to communicate and negotiate contraceptive use while acknowledging that the background and external factors, such as social norms and economy, may influence contraceptive use at sexual debut. The focus on self-efficacy emanated from a keenness to learn about the drive behind young rural adolescent girls' behaviour to use contraceptives at sexual debut. The individual and household factors have been controlled because all girls are drawn from the community that more or less follows similar social norms and from similar socio-economic backgrounds. Thus, we believed those would be reasonably self-controlled.

METHODS

Context

The study was conducted in four rural districts of West Hararghe Zone in Oromia regional state, Ethiopia. The West Hararghe Zone has an estimated population of 1.9 million. Women and girls account for 48.8% of the total population. The majority of the population is rural residents (91.4%), speak Afaan Oromo language (89.47%) and follow Islamic religion (88.05%). Agriculture and related activities are the mainstays of approximately 85% of the population.¹⁹

Study design, participants and data collection

This paper drew data from the baseline study of a larger study, which was a cross-sectional study conducted to evaluate the effect of interventions in improving the sexual and reproductive outcomes of young adolescent girls.

Data were mainly collected from the Adolescent girl questionnaire which was administered to girls aged 13-17 years for households selected for the survey. Information was collected on various variables including sociodemographic status, education and school attendance, girls' empowerment and decision making, and adolescent reproductive health and sexuality. The socio-economic (household income) and food security profile of the households were collected using the Household questionnaire for which head of the household was the respondent. A set of questions were used to construct household food security and income variables.

The sample size for the baseline survey was calculated assuming a reduction of early marriage from 22% to 15%, a 5 percent level of significance, 90 percent power, average cluster size of 30, a design effect of 1.5 and 10% non-response rate. Accordingly, a total of 1140 households were needed for three arms, as per the research and integration objectives. Thirty households with eligible adolescent girls in 38 clusters were selected in each arm, resulting in a total of 3420 (1140*3) households in each arm. The source population for this study was adolescent girls between the age of 10-19 years. The study samples were adolescent girls who self-reported sexual debut. A structured questionnaire was designed to capture the socio-demographic, social, and sexual and reproductive health information of participants. Data were collected face-to-face by trained data collectors at the residence of the adolescent girls. The details of the parent project methodology are discussed elsewhere.20 Out of the 3150 girls interviewed (aged 13-17 years), 394 adolescent girls

who self-reported sexual debut were included for this analysis.

Measurement and Analysis

We used STATA version 14 statistical software for the data analysis. A complex survey data analysis was adopted by applying sampling weights and the "svy" command in the analysis. "Contraceptive use at sexual debut" was the outcome variable of the study, measured if the girls reported using any contraceptives at first sexual intercourse, if "Yes" coded as "1" and if "No" coded as "0". We define contraceptive rate as the percentage of girls who/ whose partners use any form of contraceptive at first sexual intercourse. This was the ratio of the weighted number of girls who used contraceptives at sexual debut to the weighted number of all sexually debuted girls.

All study participants have been sexually initiated. To understand sexual debut experience a bit further, four questions that explored sexual debut were used: respondent's age at the time of debut, person (relationship) with whom she was sexually debuted, use of any contraceptives during first sex and use of condom during first sex. Ever having heard about contraceptives and ever having heard about STIs were two variables used to assess the girl's awareness on contraceptives, which were similarly coded "1" if they said "Yes" and "0" if they said "No".

Four variables that assess self-efficacy to contraceptives were chosen from the questionnaire to explore the relationship between the girls' selfefficacy and their use of contraceptives at sexual debut. The variables are "having talked to a partner about contraceptives", "having discussed contraceptives with anyone", "being able to object to unprotected sex" and "being able to say no to non-consensual sex". Frequency distribution tables have been used to summarize the demographic data. The first two components of self-efficacy that revolved around communication were to identify how communication self-efficacy was associated with contraceptive use at first sex. To examine the association between "contraceptive use at sexual

debut" and "communication self-efficacy", two items (Having talked to a partner about contraceptives AND Having discussed contraceptives with anyone) were each re-coded as "1" if the girls answered "Yes" and "0" if they said "No" or "Don't know".

In bivariate analysis, after significant association is obtained (p-value of 0.25 and less), the self-efficacy for communication factors were taken to multivariable analysis along with other background factors, including individual and household factors. Then, these factors were adjusted in the multivariable logistic regression based on the theoretical criteria listed in the conceptual framework. Statistical significance was declared at $P \le 0.05$.

RESULTS

Background characteristics

A total of 394 self-reported sexually debuted adolescent girls between the ages of 13 and 17 were included in the analysis. About 356 (88.76%) of the participants, which accounts of the large majority, were Muslims. About 229, nearly 60% of the girls could not read and write; although 255 (65.7%) reported ever attending school. Those whose mothers have ever attended school were 63 (15.66%). About one-third of the girls reported having their own source of income. However, 280 (71.6%) of the girls were from food-insecure households (Table 1).

| Characteristics | Number | Percentage |
|-----------------------------|--------|------------|
| Age | | |
| 13 | 1 | 0.19 |
| 14 | 15 | 4.96 |
| 15 | 74 | 19.17 |
| 16 | 93 | 24.78 |
| 17 | 211 | 50.9 |
| Religion | | |
| Muslim | 356 | 88.76 |
| Christian | 38 | 11.24 |
| Ever attended school | | |
| Yes | 255 | 65.7 |
| Never | 139 | 34.3 |
| Can you read and write? | | |
| Yes | 165 | 40.76 |
| No | 229 | 59.24 |
| Mother ever attended school | | |
| Yes | 63 | 15.66 |
| No | 331 | 84.34 |
| Household wealth quintile | | |
| Lowest | 69 | 22.08 |
| Second | 63 | 19.85 |
| Middle | 54 | 21.2 |
| Fourth | 55 | 18.09 |
| Highest | 54 | 18.77 |
| Household food security | | |
| Secure | 102 | 28.38 |
| Insecure | 280 | 71.62 |
| | | |

Table 1. Background characteristics of study characteristics of study participants (sexually debuted girls) (N = 394)

Girls' contraceptive use at sexual debut

Although the study was conducted among girls between the ages 13 and 17. The reported age at first sex ranged from 10 to 17 years. The peak age for the sexual debut was between ages 14 and 15, accounting for 67.31%. The mean age of adolescent girls at sexual debut was 14.5 years (+ 1.31). The majority of the girls, 88.44%, reported having initiated sexual intercourse with a husband or a steady partner. Four out of five (82.63%) of the sexually debuted girls revealed neither themselves nor their partners used any contraceptives at first sex. By the time of the survey, 51.4% of the girls had a pregnancy history (Table 2). However, 41% of them are already mothers (data not presented).

| Table | 2. | Sexual | experience | and | contraceptive | use | in | young |
|--------|-----|----------|--------------|------|---------------|-----|----|-------|
| adoles | cei | nt girls | at sexual de | ebut | | | | |

| | Number | Percentage |
|---------------------------|--------------------|------------------|
| How old were you when | your first had sex | ual intercourse? |
| 10-13 | 56 | 15.48 |
| 14-15 | 262 | 67.31 |
| 16-17 | 76 | 17.21 |
| With whom did you have | sexual intercour | se for the |
| first time? | | |
| Husband/Partner | 347 | 88.44 |
| Boyfriend | 42 | 10.19 |
| Casual person | 5 | 1.37 |
| Did you/partner use any | contraceptives du | iring your |
| first sexual intercourse? | | |
| Yes | 62 | 17.37 |
| No | 332 | 82.63 |
| Did you/your partner use | e a condom at firs | st sex? |
| Yes | 5 | 1.14 |
| No | 389 | 98.8 |
| | | |

Self-efficacy and contraceptive use at sexual debut Three out of the four studied self-efficacy factors were observed to have a significant association with

contraceptive use at sexual debut. Approximately half of all sexually debuted girls (49.76%) neither talked to their partners about contraceptives nor used any at sexual debut. Talking about contraceptives with a partner was significantly associated with using them at first sex. Similarly, girls who reported never discussing contraceptives with anyone (53.39%) also never used it at first sex; this too was significantly associated. A higher percentage of girls (80.65%) who could not object to sex when their partner refused to use condoms did not use any contraceptives at sexual debut. Being able to object to unprotected sex was significantly associated with contraceptive use at sexual debut. Accordingly, the majority of the girls (54.49%) who had sex without contraceptives were not able to say no to non-consensual sex at their sexual debut. However, saying no to non-consensual sex did not have a significant association with the sexual debut (Table 3).

Table 3. Percentage distribution of self-efficacy factors and contraceptive use at sexual debut (n=394)

| | Used contraceptive at sexual debut | Not used contraceptives at sexual debut | Chi-square value | P-value |
|----------------------------------|---------------------------------------|--|------------------|---------|
| Talked to a partner about contra | ceptives | | | |
| Talked | 11.59 | 32.98 | 17.06 | 0.001 |
| Not talked | 5.67 | 49.76 | | |
| Discussed contraceptives with an | yone | | | |
| Discussed | 11.17 | 29.35 | 20.11 | 0.00 |
| Not discussed | 6.09 | 53.39 | | |
| Objected to unprotected sex | | | | |
| Objected | 1.39 | 2.08 | 5.17 | 0.02 |
| Not objected | 15.87 | 80.65 | | |
| Able to say no to non-consensual | sex | | | |
| Able | 6.78 | 27.97 | 0.57 | 0.4 |
| Not able | 10.75 | 54.49 | | |

Contraceptive use at sexual debut and associated factors

Different factors were tested in bivariate logistic regression to evaluate their association with contraceptive use at sexual debut. In background characteristics factors, we observed an association between contraceptives at sexual debut and religion, own income, household food security, mothers' education and literacy, which was at P-value < 0.25 in the binary logistic regression. Similarly, in bivariate analysis, there is an association between awareness about sexually transmitted diseases and awareness about contraceptives (awareness factors). After adjusting the background and the awareness factors, talking about contraceptives with a partner and discussing contraceptives with anyone, the self-efficacy for contraceptives communication showed a statistically significant association with contraceptive use at the sexual debut of the adolescent girls at p-value < 0.05.

Girls who reported having the experience of talking to their partners about contraceptives were almost two times of using one at sexual debut. Girls who perceived themselves to have selfawareness in discussing contraceptives with anyone were again at least two times more likely to report using some form of contraceptives at sexual debut, compared to their counterparts (Table 4).

Table 4. Factors associated with contraceptive use at sexual debut among rural young adolescent girls in West Hararghe, Ethiopia

| | Contracep at sexual d Yes (%) | tive use ebut No(%) | COR (95% C/I) | AOR(95% C/I) |
|------------------------------------|-------------------------------------|---------------------------|---------------------|---------------------|
| Background factors | | | | |
| Religion | | | | |
| Muslim | 13.03 | 75.8 | .38*(0.11 - 0.71) | .29**[0.09 - 1.01] |
| Christian | 4.23 | 6.93 | | |
| Own income | | | | |
| Have own income | 7.31 | 22.61 | 2.02*(1.02 - 3.71) | 2.03*[0.87 - 4.35] |
| Don't have | 9.95 | 60.13 | | |
| Household food security | | | | |
| Secure | 7.323 | 20.88 | 2.22**(1.28 - 4.40) | 2.01**[1.07 - 3.78] |
| Insecure | 9.232 | 62.57 | | |
| Mothers' Education | | | | |
| Attended school | 4.43 | 11.36 | 1.83*(1.12 - 4.19) | 1.4[0.66 - 2.97] |
| Never attended | 12.83 | 71.38 | | |
| Literacy | | | | |
| Literate | 10.95 | 29.93 | 2.28**(1.46 - 6.86) | 2.17**[0.98 - 4.07] |
| Not literate | 6.31 | 52.81 | | |
| Awareness factors | | | | |
| Ever heard of STIs | | | | |
| Have heard | 14.86 | 56.46 | 1.66*(0.16 - 1.09) | 1.10[0.3 - 3.98] |
| Never heard | 2.40 | 26.28 | | |
| Ever heard of contraceptives | | | | |
| Yes | 11.33 | 44.13 | 2.01*(0.82 - 10.0) | 1.50[0.62 - 11.48] |
| No | 5.936 | 38.61 | | |
| Self-efficacy factors | | | | |
| Talk contraceptives with partner | | | | |
| Yes | 11.59 | 32.98 | 3.08**(1.50 - 6.29) | 1.94**[0.98 - 3.8] |
| No | 5.676 | 49.76 | | |
| Discuss contraceptives with anyone | | | | |
| Yes | 29.35 | 29.35 | | 2.45**[1.56 - 5.55] |
| No | 6.09 | 53.39 | | |
| Objected unprotected sex | | | | |
| Yes | 1.391 | 2.086 | | 2.68[0.62 - 11.48] |
| No | 15.87 | 80.65 | | |
| | | | | |

*p < 0.05 **p < 0.001

DISCUSSION

Four out of five of the sexually debuted girls revealed neither themselves nor their partners used any contraceptives at first sex. This study showed that the rural adolescent girls who were sexually debuted at 10-17 years of age were mostly from poor and foodinsecure households, and their families were mostly uneducated. They were mostly below the expected literacy and educational level. In other words, they were below the appropriate school grades for their age. We found that the age for the sexual debut was 14-15 years. Most of the girls reported having their sexual debut with their husbands/partners. Most of the girls did not use any form of contraceptives at sexual debut. While girls who were Muslims were less likely to use contraceptives at sexual debut, being from a food secure household and being literate were found to be protective factors.

We found that two "self-efficacy for communication factors": *Having talked to a partner about contraceptives and Having discussed contraceptives with anyone* were positively and significantly associated with contraceptive use at sexual debut. Girls who talked and negotiated about contraceptives also have used contraceptives at first sex. This could be because discussing contraceptives made them assertive and gave them the confidence to use one when they started having sexual intercourse. Studies show that verbal persuasion is one source of self-efficacy, which explains that talking about and deliberating on matters ahead of time makes them take action when the need arises.²¹

The girls who used any contraceptives at sexual debut had different stances from the majority of those who did not use one. Early marriage is a social norm in the rural Ethiopian community, which predictably leads to an early sexual debut.²² This early marriage norm takes a unique shape in the Hararghe context that allows elopement with a chosen partner in the name of marriage.²³ This in turn has paved the unfortunate way of early sexual initiation among girls as young as 10 years old. The age of sexual debut was between 14 and 15 years, which explains that these debuts

are mostly happening under the cover of marriage as the ideal age for marriage aligns with it.22 For this reason, it is not surprising when the majority of the girls did not use any contraceptives during their sexual debut.²⁴ Adolescents, particularly those less than the age of 16, do not have a track record of using contraceptives at sexual debut whether under marriage or not. 25, 26 Lack of education, lack of exposure to information and being young to comprehend possible consequences are likely to be the major reasons for the lack of using contraceptives.²⁷ Majority of rural adolescent girls do not use any form of contraceptives at sexual debut because of reasons such as non-accessibility, social norms and non-prior preparedness. Thus, unprotected sexual debut places girls' reproductive health and wellbeing at high risk.

One might not expect the girls in such communities to use contraceptives at sexual debut because of the norms and customs. However, those who communicated about contraceptives were exceptions because they took the desired measure towards safe sex. Behavioural theories show that self-efficacy is needed to initiate change. Moreover, the person's evaluation of the outcomes will lead to positive results.²⁸ Thus, individuals who cannot convey results do not even attempt to use contraceptives. Therefore, girls who were able to communicate with partners and others had the self-efficacy to make the decision and to use contraceptives. Expressing their ideas and getting support empowers girls to take favorable measures regarding their sexual and reproductive life.²⁹

Limitations: Our study focused only on communication self-efficacy; the dataset we obtained for analysis did not contain information on attitude and knowledge/awareness, which were components of a general self-efficacy measure. As Levinson argued that communication self-efficacy is critical to the adoption of contraceptive behaviour.²⁹ In this sense, this study provides useful information regarding the interventions in enhancing the use of contraceptives at sexual debut among young adolescent girls.

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CONCLUSION

This study showed that the use of contraceptives at sexual debut among rural adolescent girls was very low. Only one in six uses any form of contraceptives. Adolescent girls who had communication selfefficacy were more likely to use contraceptives at sexual debut. Life skills interventions that improve communication self-efficacy are recommended to enhance contraceptive use at sexual debut.

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RISKY SEXUAL BEHAVIOR AND ASSOCIATED FACTORS AMONG STUDENTS OF HAWASSA UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE, ETHIOPIA 2022

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ABSTRACT

BACKGROUND: Any sexual activity that increases the risk of sexually transmitted infections (STIs) and unwanted pregnancies is considered risky sexual behavior (RSB). Unintended pregnancies and STIs are significant reproductive health challenges faced by adolescents and youth in Ethiopia. Although it is assumed that university students are fully aware of HIV risks and preventive measures, evidence suggests that they are more likely to engage in RSB.

OBJECTIVE: To assess the prevalence of risky sexual behavior and associated factors among students of Hawassa University, college of medicine and health science, Ethiopia.

METHODS: An institutional-based cross-sectional study was conducted from July 18 to August 30, 2022. A total of 334 students were selected first by stratified based on their academic year and then selected using a simple random sampling method. A self-administered questionnaire was used to collect the data. Bivariate and multivariate logistic regression analyses were used to identify factors associated with RSB. Variables with p-value <0.25 were considered candidate for the final model, and statistical significance was declared at p-value of <0.05 in multivariate analysis.

RESULTS: The prevalence of RSB among students at Hawassa University College of medicine and health science was 109(34.4%) (95% CI: 29.3%, 39.7%). Drinking alcohol [AOR: 8.15; 95% CI (2.68, 11.61)], watching pornography videos [AOR: 3.32; 95% CI (1.53, 6.96)], and history of childhood sexual abuse [AOR: 2.34; 95% CI (1.78, 6.37)] were found to be the independent predictors of RSB. While religious engagement [AOR: 0.62; 95% CI (0.29, 0.83)] was a protective factor for RSB.

CONCLUSION: The prevalence of risky sexual behavior was high among students. Comprehensive behavioral intervention programs are needed on the identified factors to reduce the RSB of university students. In addition, sex education programs should rethink their approach to preventing RSB, because so far the pornography influence has rarely been considered.

KEYWORDS: Risky sexual behavior, Hawassa University, Ethiopia

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INTRODUCTION

Any sexual activity that increases the risk of sexually transmitted infections (STI) and unwanted pregnancies is considered risky sexual behavior (RSB)¹. RSB includes having sex with multiple sexual partners, not using or using condoms inconsistently, and sexual intercourse while under the influence of drugs or alcohol. According to 2020 UNAIDS epidemiological estimates, young people aged 15 to 24 years in sub-Saharan Africa account for 33% of new HIV infections due to inadequate knowledge, negative attitudes regarding the disease, and risky sexual behaviors². In Ethiopia, those aged 15 to 24 have the highest reported incidence of STIs and contribute to approximately 60% of new HIV infections and half of all people living with HIV³. These statistics highlight the urgent need to address RSB and improve sexual health education and interventions among young people in Ethiopia. In Ethiopia, young people make up around onethird of the total population, which is one of the largest groups in the country⁴. Young people in many developing countries are increasingly exposed to RSB because this age is characterized by a period of exploration and experimentation, particularly concerning sexual activity, and they typically engage in risky sexual practices such as early sexual intercourse, multiple sexual partners, unprotected sexual intercourse, and non-regular partners such as commercial sex workers (CSW)⁵.

Despite the assumption that university students are fully aware of HIV/STI risks and prevention measures, evidence suggests that they are still prone to engaging in high-risk sexual behavior. A study conducted at Jimma University showed that more than a quarter (28.3%) of sexually active students had multiple sexual partners in the previous year, and around one-fifth of them have had sexual intercourse with non-regular partners for the sake of money⁶.According to a study conducted at Madawalabu University⁷, Gonder University⁸, and Haromaya University⁹, 24%, 23%, and half of sexually active male students, respectively, have reported sexual contact with CSW.

The RSB among university students worsens due to a variety of factors such as a lack of youth-friendly services and institution-targeted interventions, the use of the substances (alcohol and khat) and addiction, peer pressure, lack of life skills, freedom from parental control and liberty from the familiarized community⁷, 9-13. Moreover, Hawassa University is located in the area where there is a high flow of tourists, night clubs, and has a lion's share of khat production and marketing in Ethiopia, which will expose students to engaging in various RSB. Despite their vulnerability and risk, there is scarce information regarding the RSB of Hawassa university students. To develop targeted interventions that address the unique context of the study area, it is crucial to monitor the magnitude and identify the factors that affect the RSB. Therefore, this study aimed to assess RSB and associated factors among students of Hawassa University, college of medicine and health science, Ethiopia.

METHODS

Study design and setting

An institutional-based cross-sectional study was conducted from July-18 to August-30/2022, among undergraduate students of Hawassa University College of Medicine and Health Science, Ethiopia. The college of medicine and health sciences was established in 2003 and consists of two faculties namely Medical and Health science faculty. The college is located in Hawassa city, 275 km far from Addis Ababa, the capital city of Ethiopia. The college currently offers 14 undergraduate programs with a total of 2729 students.

Study population

All regular undergraduate students in the College of Medicine and Health Science at Hawassa University. Due to their different socio-cultural backgrounds, students from other countries (foreign students) were excluded. First-year students were excluded because they are not familiar with the environment; therefore. their risky behaviors may not be attributed to the same factors as other students. Furthermore, intern medical students were excluded from the study because their socioeconomic status, knowledge, attitude, and access to health care varied widely from the other health students.

Sample size determination and sampling procedure

The sample size was calculated using the single population proportion formula considering the following assumptions: estimated proportion of RSB $31.4\%^{13}$ from a study conducted in Arba Minch University, 95% confidence level, 5% margin of error, and 15% nonresponse rate. After considering the correction formula, the final sample size was 334.

A stratified sampling technique was used to select students. First, all students at Hawassa University's College of Medicine and Health Science were stratified according to their academic year. A list of students' number and name were obtained from the registrar's office. Then, the total calculated sample size was allocated proportionally to each academic year. Finally, after preparing the sample frame with a list of students' names from the registrar's office, a simple random sampling technique was used to select students from each academic year.

Study variables Dependent variable Risky sexual behavior

Independent variables

Socio-demographic factors: Age, sex, academic year, residence, educational status of parents, occupational status of parents, monthly pocket money, and religious activities.

Sexual experience of the respondents: Ever had sexual intercourse, age at first sexual intercourse, sexual history, and condom use history in the last 12 months.

Substance use and adverse childhood experience of the students: Substance use history (alcohol, khat, and cigarette), discussing sex matters with family members, history of childhood sexual abuse, and watching pornography videos.

Operational definition

Risky sexual behavior: Students who have practiced at least one of the following during the last 12 months were considered positive for RSB; early sexual debut, inconsistent use of condoms, having multiple sexual partners, sexual intercourse with CSW, or having sex under the influence of alcohol or drugs¹⁴.

Child sexual abuse: is any interaction between a child and an adult or another child in which the child is used for the sexual stimulation of the perpetrator including at least one of the following rape, genital contact, indecent exposure for the sexual gratification of the offender, incest, fondling and sexual exploitation¹⁵.

Watch pornography materials: It includes students who access pornography material intentionally or actively seeking out pornography. It does not include students who are exposed to pornography material involuntarily¹⁶.

Data collection tools and procedure

To collect data, a structured self-administered questionnaire was used. The tool was adopted from the sexual and reproductive health questionnaire of WHO, Ethiopia Demographic and Health Survey (DHS), and Behavioral Surveillance Survey (BSS). The questionnaire contained three parts: information on socio-demographics, sexual behavior, and risk factors. Five BSc Public Health professionals were recruited to facilitate the data collection process, and two supervisors (MPH holders) to monitor the process.

Data quality control

The questionnaire was pretested on 5% of the sample size at the main campus of Hawassa University, which is not part of the actual data collection site. Based on the output of the pretest, some modification was made to the questionnaire. The original questionnaire was prepared in English, then translated into the local language Amharic, then back to English, and then checked for consistency. The principal investigator gave oneday training for the data collectors and supervisors on the objective of the study, data collection tool, and procedure. The supervisors and the principal investigator monitored the data collection process and checked the completeness of the collected data.

Data processing and analysis

The collected data were entered into EpiData Version 3.1 and then exported to SPSS version 20 for analysis. Descriptive statistics were used to describe the findings using frequency and percentage for categorical variables and central tendency and measure of dispersion for continuous variables. To identify the independent predictors of RSB, multivariate logistic regression was used. All predictor variables with a p-value of less than 0.25 in bivariable analysis were considered candidate variables for the final model. Hosmer Lemshow goodness of fit was used to test for model fitness and variance inflation factor (VIF) to check the presence of multi-co-linearity. Variables with p-values less than 0.05 were considered significant predictors in the multivariate analysis.

Ethical considerations

Hawassa University's institutional review board granted the ethical clearance. Before beginning data collection, each study participant was informed and written consent was obtained from them. Throughout the study, the confidentiality of the collected information was also maintained.

RESULTS

Socio-demographic characteristics

A total of 334 questionnaires were distributed, but complete data for analysis was obtained from 317 students making a 94.9% response rate. Of 317 study participants, 184 (58%) were males and more than half 172 (54.3%) of students were under 24 years old, with a mean age (±SD) of 23.1±2 years. Regarding their current accommodation, only 9(2.8%) students were residing with their parents or relatives. The majority of the students were living in the university dormitory. Nearly three-fourth 234(73.8) of students get \geq =1000 ETB monthly pocket money (Table 1).

Table 1 Socio-demographic characteristics of students at Hawassa University, college of medicine and health science, Ethiopia 2022

| Variables | Category | Frequency (%) |
|--------------------------------------|---|---|
| Sex | Male Female | 184(58%) 133(42%) |
| Age | <24 years > 24 years | 172(54.3%) 145(45.7%) |
| Study year | Second Third Fourth Fifth | 83(26.2%) 63(19.9%) 94(29.6%) 77(24.3%) |
| Current accommodation | University dormitory Living with parents /relatives | 308(97.2%) 9(2.8%) |
| Father's educational status | Unable to read and write Read and write College/University degree and above | 33(10.4%) 141(44.5%) 143(45.1%) |
| Mother's educational status | Unable to read and write Read and write College/University degree and above | 61(19.2%) 156(49.2%) 100(31.6%) |
| Fathers occupation | Daily laborer Farmer Government employee Employed in private sector Has private business | 13(4.1%) 84(26.5%) 99(31.2%) 51(16.1%) 70 (22.1%) |
| Mothers occupation | Housewife Daily laborer Government employee Employed in private sector Has private business | 164(51.7%) 8(2.5%) 67(21.1%) 18(5.7%) 60(19.0 %) |
| Monthly pocket money | <1000ETB* >=1000ETB | 83(26.2%) 234(73.8) |
| Frequency of religious attendance | Daily More than twice a week Rarely Never | 61(19.2%) 154(48.6%) 81(25.6%) 21(6.6%) |

ETB*=Ethiopian Birr

Sexual experience of the students

Of the total study participants, 195 (61.5%) reported having a history of previous sexual intercourse, among those 137 (43.2%) of them had a sexual history in the last 12 months. Among sexual active students in the last 12 months, around 70 (51.1%) and 21 (15.3%) of them had sex with multiple partners and had sex with CSW, respectively (Table 2).

Table 2 Sexual experience of students at Hawassa University, college of medicine and health science, Ethiopia 2022.

| Variables | Category | Frequency (%) |
|--|---|--------------------------|
| Ever had sexual | Yes | 195(61.5) |
| intercourse | No | 122(38.5) |
| Sexual history during the last 12 months | Yes No | 137(43.2%) 180(56.8%) |
| Age at first sex | <18 >=18 | 20(10.2%) 175(89.8%) |
| Time at first sex | Before joining university After joining university | 82(42.1%) 113(57.9%) |
| Condom use history in | Yes | 93(67.9%) |
| the last 12 months | No | 44(32.1%) |
| Multiple sexual partners | Yes | 70(51.1%) |
| in the last 12 month | No | 67(48.9%) |
| Sex with CSW in the | Yes | 21(15.3%) |
| last 12 months | No | 116(84.7%) |
| Sex to receive a gift/money | Yes | 41(29.9%) |
| in the last 12 months | No | 96(70.1%) |
| Sex after drinking alcohol | Yes | 104(32.8%) |
| in the last 12 months | No | 213(67.2%) |
| Sex after chewing khat | Yes | 12(3.2%) |
| in the last 12 months | No | 305(96.8%) |

Substance use and adverse childhood experiences of the students

Of 137 study participants 132(41.6%) of them had a history of alcohol consumption during the last 12 months. Around ten percent of study participants had a history of CSA. More than half 183(57.7%) of the respondents reported watching pornographic videos during the last 12 months, among these 37(20.2 %) and 17(9.3%) consume pornography once a week and daily respectively (Table 3).

Table 3 Substance use and adverse childhood experience of students at Hawassa University, college of medicine and health science, Ethiopia 2022.

| Variables | Category | Frequency (%) |
|--|---|---|
| Knows ways of avoiding /getting HIV/AIDS and/or STI | Yes No | 309(97.5%) 8(2.5%) |
| History of childhood sexual abuse | Yes No | 29(9.1%) 288(90.9%) |
| Ever discussed sex with anyone | Yes No | 264(83.3%) 53(16.7%) |
| History of peer pressure to have sex during the last 12 months | Yes No | 118(37.2%) 199(62.8%) |
| Gone to the night club in the last 12 months | Yes No | 186(58.7%) 131(41.3%) |
| Watched pornography in the last 12 months | Yes No | 183(57.7%) 134(42.3%) |
| Pornography type | Internet Mobile video | 152(83.1%) 31(26.9%) |
| Frequency of pornography consumption | One/two times Once a week A few times a week Once a day Several times a day | 82(44.8%) 37(20.2%) 34(18.5%) 17(9.3%) 13(7.2%) |
| History of alcohol drinking in the last 12 months | Yes No | 132(41.6%) 185 (58.4%) |
| Frequency of alcohol drinking | Daily More than once a week Weekly Monthly and above | 22(16.7%) 39(29.5%) 31(23.5%) 40(30.3%) |
| History of chat chewing in the last 12 months | Yes No | 30(9.5%) 287(90.5%) |
| Frequency of chat chewing | Daily More than once a week Weekly Monthly and above | 9(30.1%) 7(23.3%) 10(33.3%) 4(13.3%) |

Prevalence of risky sexual behavior

Among the total students (317), more than onethird 109(34.4%) (95% CI: 29.3%, 39.7%) of them had RSB during the last 12 months (Figure 1).



Figure 1 Prevalence of risky sexual behavior among students at Hawassa University, college of medicine and health science, Ethiopia 2022

Factors associated with RSB

After adjusting for possible confounders in the multivariate logistic regression analysis variables, alcohol drinking, watching pornography videos, history of CSA, and religious engagement were significantly associated with RSB at <0.05 P-value. Those who consumed alcohol were 8.15 more likely to engage in RSB compared to those who reported not using alcohol [AOR: 8.15; 95% CI (2.68-11.61)]. The odds of engaging in RSB were 3.32 times higher among students who reported watching pornography videos compared to their counterparts [AOR: 3.32; 95% CI (1.53-6.96)]. Students who reported a history of CSA were 2.34 times more likely to engage in RSB compared to students with no history of CSA [AOR: 2.34; 95% CI (1.78-6.37)]. Students who regularly attend religious places were 38% less likely to engage in RSB compared to those who did not attend religious places regularly [AOR: 0.62; 95% CI (0.29-0.83)] (Table 4).

Table 4 Binary logistic regression analysis of factors associated with RSB among students of Hawassa University, college of medicine and health science, Ethiopia 2022

| Variables | Category | Risky | Sexual Behavior | COR (95% CI) | AOR (95% CI) | |
|---|---------------------------|----------------------|------------------------|---|--|--|
| | | Yes No | | | | |
| Age | < 24 years | 40 | 132 | 1 | 1 | |
| | >24 years | 69 | 76 | 2.99 (1.85, 4.84) | 1.25 (0.72, 2.03) | |
| Time of first sexual intercourse | Before joining university | 37 | 45 | 0.46 (0.26, 0.83) | 0.80 (0.72, 1.78) | |
| | After joining university | 72 | 41 | 1 | 1 | |
| Parent student discussion about sexual matter Drink alcohol | Yes No Yes No | 40 69 76 33 | 123 85 56 152 | 1 2.49 (1.54, 4.02) 6.25 (3.75, 10.41) 1 | 1 2.03 (0.89, 3.61) 8.15 (2.68, 11.61)* 1 | |
| Chew khat | Yes | 19 | 11 | 3.78 (1.72, 8.27) | 2.04 (0.93, 4.74 | |
| | No | 90 | 197 | 1 | 1 | |
| Attending night club | Yes | 87 | 99 | 4.35 (2.53, 7.48) | 3.52 (0.64, 5.65) | |
| | No | 22 | 109 | 1 | 1 | |
| History of childhood | Yes | 20 | 9 | 4.96 (2.17, 9.34) | 2.34 (1.78, 6.37)* | |
| sexual violence | No | 89 | 199 | 1 | 1 | |
| Regular religious attendance | Yes | 65 | 150 | 0.57 (0.31, 0.76) | 0.62 (0.29, 0.83)* | |
| | No | 44 | 58 | 1 | 1 | |
| Watching porn video | Yes | 105 | 78 | 8.75 (3.75, 10.94) | 3.32 (1.53, 6.96)* | |
| | No | 20 | 130 | 1 | 1 | |

*significantly associated variables with p-value <0.05

DISCUSSION

This study revealed that the magnitude of RSB is 34.4%. It requires special attention from the concerned bodies because even though the study was conducted among students with health backgrounds who believed they had better knowledge of STI/HIV and contraception, more than one-third of them engaged in risky sexual behavior in the previous 12 months. This study finding is lower than the study conducted among undergraduate students at the University of Gondar 44% (8), Addis Ababa Ethiopia 43.1%¹⁷, Jimma Ethiopia 43.5%¹⁸, and Madawalabu 51.4%⁷. However, this is higher than two other studies conducted in Arba Minch 13 , ¹⁹. The possible explanation for the disparity in the magnitude of RSB among university students of different studies could be due to differences in the academic background of students, this study includes students with health backgrounds which might affect their knowledge, attitude, and, practice to ward STI/HIV and contraception.

The present study revealed that religious engagement is a protective factor for RSB. This association has also been reported in comparable studies conducted in Gondar, Boston, and Sri Lanka⁸, ¹⁰, ¹². The plausible explanation for this association lies in the fact that students with strong religious engagement are less inclined to abuse alcohol or drugs, which are known to be key factors associated with RSB. In addition, religious students often hold negative attitudes toward non-procreative sexual activities and less likelihood of engaging in early sexual debut or having multiple sexual partners, or participating in sexual intercourse with commercial sex workers, even if they have prior sexual experience. A similar study among Nigerian university students, also showed that students with higher levels of religiosity were less likely to engaged in RSB, because religious beliefs and practices often emphasize abstinence, fidelity, and moral values, which can service as protective factors against RSB²⁰.

In this study, a significant relation was found between exposure to pornography and RSB in

students. A Nigerian study also found that those who frequently accessed pornographic sites on the Internet had more multiple sexual partners than those who rarely accessed sexual content on the Internet²¹. In countries with a lack of adequate sex education, the increasing access to smart mobile technology, internet, and unrestricted access to pornographic media are aggravating the problem of RSB among youths. This could be because pornographic materials are impulsive, leading to erotic sex stimulation or risky sexual practices. This finding is in line with studies conducted in Axum²², Bahir Dar¹¹, and Tiss Abay²³.

Students with a history of sexual violence during childhood have a higher chance of participating in risky sexual practices. This could be due to the fact that childhood sexual violence has a direct relation with poorer psychological functioning, aggressive behavior, and increase use of alcohol and other drugs²⁴. Students with a history of CSA might use alcohol and other drugs to cope with trauma symptoms, and alcohol use may lead to the risk of RSBs. In addition, the attachment theory could provide a better explanation for this finding, from the theoretical perspective victims of CSA have casual sexual behaviors to inhibit the development of deep emotional attachment²⁵.

This study also indicated that alcohol consumption increases the risk of having RSBs. In this study out of 138 students with a history of alcohol consumption, 90(65.2%) of them used condoms inconsistently. And out of 138 students with a history of alcohol consumption, 102(73.9%) had gone to night club during the last 12 months. This could be the fact that, when people are under the influence of alcohol, they will lose control over their consciousness and they might become less concerned about the risk associated with their sexual behavior. This finding has been supported by other studies conducted in different countries¹⁹, 22, 26. Ethiopian Journal of Reproductive Health (EJRH) July, 2023 Volume 15, No. 3

CONCLUSION

More than one-third of students at Hawassa University, college of medicine and health science engaged in RSB. Alcohol consumption, watching pornography videos, history of childhood sexual violence, and religious engagement were predicting factors for RSB. The authority of the university should consider comprehensive behavioral intervention programs to reduce alcohol consumption, and improve the habit of media consumption among undergraduate university students. The authority of the university should work on internet access policies, to limit certain websites that exposed students to pornographic content. Sex education programs should rethink their approach to preventing RSB because the pornography influence is rarely considered. Future researcher should consider a qualitative study, to get a comprehensive understanding of the underlying factors.

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome,
CSA: Childhood Sexual Abuse,
CSW: Commercial Sex Workers,
EDHS: Ethiopian Demographic and Health Survey,
RSB: Risky Sexual Behavior,
SRH: Sexual and Reproductive Health,
STI: Sexually Transmitted Infections

DECLARATION

Competing interests

The authors declare that they have no competing interests.

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Authors' contribution

YS: Conceived the research idea, design questionnaire, data analysis, and wrote the manuscript. **GO** and **AA**: supervised the entire process of the research work, participated in the questionnaire design, analysis, and reviewed the

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SCHOOL-BASED EXTRACURRICULAR ACTIVITIES IMPROVE REPRODUCTIVE HEALTH KNOWLEDGE FOR HIGH SCHOOL STUDENTS: A STUDY IN TRA VINH PROVINCE, VIETNAM

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ABSTRACT

BACKGROUND: Reproductive health (RH) knowledge of high school students in Vietnam is poor. This study aimed to assess the effectiveness of school-based extracurricular activities in improving the RH knowledge for students in Tra Vinh province.

METHODS: A pilot intervention study was conducted on the control group (70 students) who had no the extracurricular activities on RH, and the intervention group (71 students) who participated extracurricular activities on RH with two sessions (90 minutes/session). Two forms of questionnaires were used for assessing student's level of knowledge change about RH that were built by researchers of the Department of Human and Animal Physiology, Biology Faculty, Hanoi National University of Education and evaluated by the Centre for RH Education and Family Planning.

RESULTS: There was no statistically significant difference in the pre-intervention test scores between the two groups (P = 0.319) while the post-intervention scores of the intervention group and control group were 7.11 and 5.77, respectively (P = 0.026). After adjusting for age, gender, ethnicity, participation in extracurricular activities still had a statistically significant relationship with students' scores (OR = 2.96, β = 1.09, P = 0.009). After participating in extracurricular activities, RH knowledge of students in the intervention group was dramatically improved.

CONCLUSION: High school students in Tra Vinh lacked school-based extracurricular activities in RH, therefore, their RH knowledge was still limited. Extracurricular activities provided students with accurate information and knowledge of RH.

KEYWORDS: Extracurricular Activities, Reproductive Health Education, High school Students, Vietnam

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INTRODUCTION

Adolescence is one of the strongest physical and mental development phases of humanity. It is not only a period of growth and physical change but also a period of change in emotion, psychology, society, and spirit. However, adolescence is also a period of increasing concerns about reproductive health (RH) issues¹. According to statistics, there are 86% of 1.2 billion adolescents living in developing countries whose access to RH services remains inadequate and incomplete². Adolescents' limited knowledge of sexuality has led to a range of healthrelated problems such as unwanted pregnancies, an increased risk of transmitted diseases, an increased risk of the rate of unsafe abortion, as well as limiting educational and employment opportunities³. In India, according to a 2020 report, over one-quarter of young women were married in childhood and the overwhelming majority of abortions take place outside of legally sanctioned provider and facility structures⁴. In Ethiopia, a cross-sectional study of 508 school children revealed that 30.3% of respondents were involved in early sexual debut. The absence of resources for information on RH increases the risk of early sexual debut as well as other risky sexual behaviors in adolescents⁵, 6.

In Vietnam, according to a report by the Ministry of Health, on average, each year there are about 300,000 to 400,000 abortions between the ages of 15 and 19 7. According to the General Office for Population and Family Planning, although the abortion rate in Vietnam has decreased in the past 10 years, the abortion rate among adolescents and young adults has shown signs of increasing - accounting for more than 20% of abortion cases ⁸. Thus, it can be seen that comprehensive sexuality education reaches few adolescents, and in general, RH promoting information needs were still poorly met.

Therefore, improving RH education and upgrading students' knowledge in this field is essential for promoting healthy attitudes, behaviors, and decisionmaking. There are some key ways to enhance RH

education and knowledge among students, such as comprehensive curriculum, qualified educators, evidence-based information, interactive teaching methods, skill-building activities, peer education and support, inclusion of diverse perspectives, collaboration with healthcare providers, and parental involvement.⁹ By implementing these strategies, educational institutions can enhance RH education, empower students with accurate knowledge, and promote healthy behaviors, ultimately contributing to the overall well-being and informed decision-making of young individuals. A meta-study has revealed compelling evidence supporting the implementation of comprehensive RH education programs in every school setting to ensure that all school-going adolescents are convinced of the importance of sexual and RH ¹⁰. Especially for adolescents in ethnic minority areas, RH education aims to reduce the incidence of early marriage, reduce the rate of pregnancy in adolescence, meet the needs of contraception, and decrease the prevalence of HIV/AIDS and other sexually transmitted diseases. However, the majority of studies focused on urban areas, whereas research in rural and mountainous areas is limited. According to the results of a survey on the knowledge of RH of more than 450 students at Trang Dinh high school in Lang Son province, where most students are ethnic minorities and living in rural areas, students' awareness of RH remains limited. According to statistics, 12.9% of students are not aware of the consequences of premarital sex; 30.4% students do not know if curettage and abortion is contraceptive or not, and 20.8% of students do not know any contraceptive methods. Meanwhile, the percentage of students knowing more than the three types of bacterial infectious sexually remains low (32.9%) and most of them misconstrued the path of sexually transmitted infections ¹¹. The literature on adolescent sexual behavior in Vietnam, conducted in six provinces among adolescents aged 15-22, revealed that the sexual behavior of unmarried adolescents in Vietnam jeopardizes their health and well-being ¹².

Tra Vinh is a province in the Mekong Delta, which is a part of southern Vietnam, with a population of over 1.1 million. With about one-third of the population being ethnic minorities (mainly Khmer ethnic group), Tra Vinh's economy still faces many difficulties. In Tra Vinh, most people live in rural areas (82.8%), while only 17.2% of the population live in urban areas 13. Besides, the current education in Tra Vinh is facing many difficulties. Students are lack opportunities to access reliable sources of information about RH¹⁴. Therefore, the knowledge of RH among students here still has many problems. This study aimed to assess the effectiveness of schoolbased extracurricular activities in improving the RH knowledge for students in Tra Vinh province, thereby helping students to protect themselves proactively..

METHODS

Research subjects

The research involved a sample of 141 high school students at the age of 16 years (11th grade) at two different high schools in Tra Vinh Province (Hoa Loi High School and Hoa Minh High School), excluding students with mental disorders and students who were not willing to participate and not willing to attend all extracurricular activities.Within the research sample, 22.5% of the high school students identify as Khmer ethnicity, reflecting the significant presence of the Khmer community in Tra Vinh Province. The remaining 76.9% of the participants belong to the Kinh ethnicity, which represents the majority population in the region.

Research design

A pilot intervention study was conducted on 141 students. Students were divided into two groups: the control group (70 students) and intervention group (71 students) that have the same number of students and the same results of learning Biology at school. The control group did not engage in any extracurricular activities, while the intervention group participated in two extracurricular activities. These extracurricular activities specifically focused on RH education and were conducted outside of regular class hours. Following a period of one week after the completion of these activities, all students, regardless of group affiliation, underwent a written test to assess their knowledge of RH.

The formula for calculating the sample size was 15:

$$= 2 x \left| \frac{(Z\alpha + Z\beta) x \sigma}{\Delta} \right|^2$$

 $Z\alpha$ is the Z-score corresponding to the desired significance level (1.96 for a 95% confidence level); $Z\beta$ is the Z-score corresponding to the desired statistical power (e.g., 0.84 for 80% power); σ is the estimated standard deviation of the outcome variable ⁷; Δ is the desired effect size (the difference in means between the groups, 3.5). Substituting the above formula and adding 10% non-responders, the estimated sample size was 69 students for each group.

High schools were selected by simple random sampling method. Students were selected by cluster sampling method.

Ethics statement

Ν

Students were explained about the purpose of the study and that they couldstop participating at any time. Students signed a written consent to participate in the study after receiving permission from the school administrator and their parents. To ensure confidentiality, participants were not required to provide personal information and any identifiable information was kept secure. The study was approved by the local ethics committee at the Centre for RH Education and Family Planning, Hanoi National University of Education.

Intervention contents

The educational content was built based on the research that investigates the students' wishes and consultation from parents and teachers. The research content was designed to cover students' knowledge gaps and the cultural sensitivity of parents and teachers. Research contents include the anatomy and physiology of reproductive system, hygiene, physical and psychological changes in puberty, contraceptives, the consequences of abortion, sexually transmitted infections, and HIV/

AIDS. All information used simple and delicate language.

Intervention process

The study was divided into three stages:

- Stage 1: The pre-intervention stage: A test was used for both control and intervention groups to assess students' knowledge level related to RH before participating in the extra-curricular activities. - Stage 2: The intervention stage: The RH education program was organized including two extra-curricular sessions (90 minutes/session). This program was prepared by researchers with extensive experience in RH teaching. In the extra-curricular process, teachers used positive teaching methods, including visual teaching facilities to increase student's interaction and acquisition of knowledge. At the same time, the presenter and the audience interacted through group discussion, mind map design, problem solving, games, and Q&A. For the control group, students did not participate in extracurricular activities and the lectures were conducted in the usual way used by the teachers.

- Stage 3: The post-intervention stage: Another test was given to the students of the control and intervention groups one week after finishing all learning contents in the RH education program.

Testing and evaluating intervention effectiveness Two forms of test that were built by researchers of the Department of Human and Animal Physiology, Biology Faculty, Hanoi National University of Education and evaluated by the Centre for RH Education and Family Planning were used for assessing student's level of knowledge change about RH. The test consisted of 20 multiple choice questions (according to Bloom's taxonomy levels). All of the questions were related to the changes in puberty, menstruation, hygiene, time of ovulation and fertilization, contraception, consequences of abortion, sexually transmitted infections, and HIV/AIDS. Students were not allowed to use any references or to discuss with others during the test. Statistical analysis

Data were managed using Epidata 3.1 software and analyzed by SPSS software version 16.0. For the

categorical variables presented as a percentage and used a Chi-square test to check the effectiveness of the intervention. For a continuous variable that follows the normal distribution represented by the mean and the standard deviation, we used the Student's T-test. Binary logistic regression analysis was used to examine the association between the participation in extracurricular activities with students' scores, and the results were given as odds ratios (OR) with 95% confidence intervals (CI). The difference was statistically significant when P < 0.05 on both sides.

RESULTS

Demographic characteristics and the reality of learning RH of the participants

There was no statistically significant difference between the control group and the intervention group in terms of mean age and ethnicity. Students were eager to participate in extracurricular activities about RH. The percentage of students who indicated interest and very interested in extracurricular courses accounts for 95.7% in control group and 94.3% in intervention group (P = 0.761). However, in reality, students in Tra Vinh have rarely had the opportunity to participate in extra-curricular activities in RH (Table 1). Respondents identified TV/radio/newspaper, school, peers as the main sources of information on RH. Meanwhile, most students rarely talk to their parents about RH and rarely search for relevant information on the internet (Table 1).

Table 1. Demographic characteristics and the reality of learning RH of the participants

| Characteristic | Control group (n = 70) | Intervention group (n = 71) | P-value | |
|---|---------------------------|--------------------------------|---------|--|
| Age (years) ^a | 16.4 ± 3.1 | 16.3 ± 2.8 | 0.917 | |
| Gender (n, %) ^b : | | | | |
| + Male | 37 (52.9%) | 35 (49.3%) | 0.672 | |
| + Female | 33 (47.2%) | 36 (50.7%) | | |
| Ethnicity (n, %) ^b : | | | | |
| + Khmer | 15 (21.4%) | 16 (22.5%) | 0.874 | |
| + Kinh | 55 (78.6%) | 55 (77.5%) | | |
| Interest in extracurricular activities in RH (n, %) ^b : | | | | |
| + Disinterest | 0 (0%) | 0 (0%) | | |
| + Uncertainty | 3 (4.3%) | 4 (5.6%) | 0.761 | |
| + Interest | 15 (21.4%) | 14 (19.7%) | | |
| + Very interest | 52 (74.3%) | 53 (74.6%) | | |
| Participation in extracurricular activities in RH (n, %) ^b : | | | | |
| + Never | 61 (87.1%) | 62 (87.3%) | 0.799 | |
| + Seldom | 5 (7.1%) | 6 (8.5%) | | |
| + Sometimes | 4 (5.7%) | 3 (4.2%) | | |
| + Regularly | 0 (0%) | 0 (0%) | | |
| Sources of RH knowledge (n, %) ^b : | | | | |
| + Parents | 7 (10.0%) | 6 (8.5%) | 0.893 | |
| + Peers | 56 (80.0%) | 52 (73.2%) | 0.712 | |
| + School | 64 (91.4%) | 61 (85.9%) | 0.704 | |
| + Internet | 6 (8.6%) | 6 (12.7%) | 0.811 | |
| + TV/newspaper/radio | 62 (88.6%) | 60 (84.5%) | 0.852 | |

RH: reproductive health

^aData are mean ± SD, P-values obtained by Students T-test.

^bData are n (%), P-values obtained by Chi-square test.

Cumulative frequency distribution of the test score before and after the intervention

The cumulative frequency of scores after the intervention provided a visual representation of how scores accumulate across a range of values (Figure 3B), while there was virtually no difference before the intervention (Figure 3A). The cumulative frequency curve for the control group did not show a noticeable shift towards higher scores, indicating that the control group's scores remained relatively unchanged. Meanwhile, the

cumulative frequency curve for the intervention group showed a relatively steep increase initially, indicating a higher concentration of lower scores. As the scores progress, the curve became less steep, suggesting a shift towards higher scores. This pattern suggests that the intervention might have positively impacted the scores of the group over time. Overall, these cumulative frequency distributions indicate that the intervention group has experienced a shift towards higher scores compared to the control group.



Figure 3. Cumulative frequency distribution of score before (A) and after (B) the intervention

The average scores before and after the intervention

In the pre-test, the average score of the study and control groups were nearly equal with the average score of 5.10 and 5.09, respectively (P = 0.319). After training, the average score of the intervention group was 7.11 while the score in the control group

was only 5.71 (P = 0.026). The average score of the control group before and after the intervention was almost unchanged (P = 0.622). Meanwhile, the average score of the intervention group increased nearly 1.4 times higher than the pre-test mean score (P = 0.017) (Figure 4).

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Figure 4. Average scores of reproductive health knowledge of control and intervention groups P-values obtained by Student's T-test. * P < 0.05; NS: Non-Significant

Average number of correct answers after intervention

The results of the interventional study indicate that the intervention group demonstrated a statistically significant increase in the average number of correct answers compared to the control group. This improvement was observed across various content areas, including menstruation, hygiene, physical and psychological changes in puberty, contraception, consequences of abortion, sexually transmitted infections, and HIV/AIDS (Table 2).

| Contents | Number of questions | Control groups (n = 70) | Intervention groups (n = 71) | P-value |
|---|------------------------|----------------------------|---------------------------------|---------|
| Menstruation | 3 | 1.44 ± 0.79 | 1.99 ± 0.95 | < 0.001 |
| Hygiene | 3 | 2.07 ± 0.93 | 2.51 ± 1.11 | 0.009 |
| Time of ovulation and fertilization | 3 | 1.83 ± 0.80 | 1.94 ± 0.75 | 0.111 |
| Physical and psychological changes in puberty | 3 | 2.13 ± 0.87 | 2.53 ± 0.88 | 0.006 |
| Contraception | 3 | 1.30 ± 0.84 | 1.95 ± 1.05 | < 0.001 |
| Consequences of abortion | 2 | 1.06 ± 0.79 | 1.31 ± 0.69 | 0.035 |
| Sexually transmitted infections and HIV/AIDS | 3 | 1.76 ± 1.00 | 2.01 ± 1.01 | 0.015 |

Table 2. Average number of correct answers after intervention

Data are mean ± SD, P-values obtained by Students T-test.

Univariate and multivariate analysis of association of participation in extracurricular activities with students' score

To assess the association of participation in extracurricular activities with students' scores, logistic regression analysis was conducted. The results showed that participating in extracurricular activities was associated with 2.9 times higher of getting good grades compared to students who did not participate in extracurricular activities, (95% CI: 1.30 - 6.53, P = 0.009). The logistic regression analysis did not find a statistically significant relationship between gender, ethnicity, and students' scores (Table 3).

| ties | | | |
|------------|--|---|--|
| 59 (56.2%) | 11 (30.6%) | 1 | 0.009 |
| 46 (43.8%) | 25 (69.4%) | 2.92 (1.30 - 6.53) | |
| | | | |
| 52 (49.5%) | 20 (55.6%) | 1 | |
| 53 (50.5%) | 16 (44.4%) | 0.79 (0.37 - 1.68) | 0.533 |
| | | | |
| 84 (80.0%) | 26 (72.2%) | 1 | |
| 21 (20.0%) | 10 (27.8%) | 1.54 (0.64 - 3.68) | 0.333 |
| | 59 (56.2%) 46 (43.8%) 52 (49.5%) 53 (50.5%) 84 (80.0%) 21 (20.0%) | 59 (56.2%) 11 (30.6%) 46 (43.8%) 25 (69.4%) 52 (49.5%) 20 (55.6%) 53 (50.5%) 16 (44.4%) 84 (80.0%) 26 (72.2%) 21 (20.0%) 10 (27.8%) | 59 (56.2%) $11 (30.6%)$ 1 $46 (43.8%)$ $25 (69.4%)$ $2.92 (1.30 - 6.53)$ $52 (49.5%)$ $20 (55.6%)$ 1 $53 (50.5%)$ $16 (44.4%)$ $0.79 (0.37 - 1.68)$ $84 (80.0%)$ $26 (72.2%)$ 1 $21 (20.0%)$ $10 (27.8%)$ $1.54 (0.64 - 3.68)$ |

Table 3. Univariate analysis of association of participation in extracurricular activities with students' score

P-values obtained by univariate logistic regression.

Bold values indicate a statistically significant.

95% CI: 95% Confidence interval, OR: odd ratio.

Table 4. Multivariate analysis of association of participation in extracurricular activities with students' score

| Models | OR (95% CI) | P-value | β | S.E |
|--|-------------------------|---------|------|------|
| Participation in extracurricular activities No Yes | 1 2.96 (1.32 - 6.68) | 0.009 | 1.09 | 0.42 |

P-values obtained by multivariate logistic regression and adjusted for age, gender, ethnicity.

Bold values indicate a statistically significant.

95% CI: 95% Confidence interval, OR: odd ratio.

The results in Table 4 showed that, after adjusting for age, gender, ethnicity, participation in extracurricular activities still had a statistically significant relationship with students' scores (OR = 2.96, $\beta = 1.09$).

DISCUSSION

The research results indicating a positive change and statistically significant relationship between participation in extracurricular activities and knowledge of RH among students in Tra Vinh is indeed an important finding. It suggests that engaging in extracurricular activities has a beneficial impact on students' understanding and awareness of RH. It can be affirmed that school is the most favorable environment to educate RH for adolescents. A study of 80 adolescents in Ghana also found teachers were an important source of information on RH³. However, extracurricular activities in RH were rarely organized, so students'

knowledge in Tra Vinh about RH was limited. Consistent with our research results, a cross-sectional study conducted on 350 female students selected from governmental secondary schools in Riyadh showed that more than two-thirds (66.3%) of the participants had inaccurate knowledge regarding RH¹⁶. A study of 372 school girls in Markos town, Ethiopia, showed that girls could be victims of sexual violence. The study also confirmed that more interventions are needed to raise awareness in the school environment for girls to help reduce the phenomenon of sexual violence¹⁷. Students in Tra Vinh Province did not have a chance to participate in educational extracurricular activities about adolescent RH. The reason for the lack of extracurricular activities about RH education may depend on the curriculum, as well as teachers'lack of time, skills and motivation to organize extracurricular activities in RH¹⁸. This can also be explained by the existence of cultural barriers to teaching RH topics in schools, especially in Eastern countries. Therefore, students' knowledge of RH was still vague, and misleading sometimes. The findings of the study, which indicate that the knowledge of participants regarding RH was poor in the pretest, shed light on an area of concern. This suggests a considerable knowledge gap in crucial aspects of RH among the adolescents in Tra Vinh.

The extra-curricular activities help fill the gaps in the knowledge of adolescents about pubertal changes, reproductive anatomy and physiology, hygiene contraception, consequences of abortion, sexually transmitted infections, and HIV/AIDS. The findings demonstrate that the intervention, consisting of school-based extracurricular activities, resulted in a substantial improvement in the RH knowledge of students. This implies that such activities can be an effective approach to enhancing students' understanding of RH. Similar to our study results, the findings from the school-based health education study, involving 416 adolescent female students aged 11-16 years indicate positive outcomes following the educational intervention on menstrual hygiene¹⁹. Research on middle school students at Rivers State (Nigeria) also found significant improvedment in students' knowledge. The intervention group had higher mean knowledge score than the control group (110.8 \pm 16.0 vs. 92 \pm 14.9, P < 0.05). This study also recommended that educational program developers should introduce extra-curricular activities in schools to enhance RH knowledge for adolescents 20. Similarly, an intervention study on 309 adolescent girls aged 14-19 years old at 3 secondary schools in Saudi

Arabiashowed that RH education positively changed adolescents' knowledge about puberty, menstruation, pregnancy, antenatal care and contraceptive intrauterine devices²¹.

The statistically significant difference in the average number of correct answers between the intervention and control groups implies that the intervention had a positive impact on knowledge acquisition. This outcome reinforces the importance of targeted RH interventions in improving RH knowledge among adolescents.

The school considered to be an ideal place for a multidisciplinary approach so the cooperation between schools, parents, health facilities, and local health institutes will bring effectiveness in raising awareness and helping prevent sex-related issues 22, 23, 24. There was evidence that schoolbased healthcare regarding RH was popular with adolescents and provides important mental and RH services²⁵, ²⁶. A meta-analysis from 8 qualitative analyzes that evaluated school-based programs aimed at improving the sexual and RH of adolescents showed that there was little evidence that educational curriculum-based programs alone are effective in improving sexual and RH outcomes for adolescents. These studies have shown significant positive outcomes in various areas, including sexually transmitted infections, contraception, HIV/AIDS, menstruation, and hygiene¹⁰. These findings suggest that age and sex-appropriate health education programs have the potential to promote the development of healthy reproductive and sexual behavior patterns among adolescents by improving knowledge and fostering the right attitude 27 . Similarly, the interventional study conducted on 200 randomly selected adolescents indicated that the majority of the students were unaware of reproductive organs, modes of transmission of HIV, and the prognosis of AIDS. The results show that the intervention improved the participants' knowledge and foster a more informed and positive attitude towards these topics 28 . Thus, it can be affirmed that school is a suitable environment for RH education and school-based activities would be a reliable source of RH information²⁹, 30.

However, it is important to consider several limitations of the study. First, the study design was a pilot intervention, which typically involves a smaller sample size and may not be representative of the entire population. Secondly, the study only focused on one province, Tra Vinh, which limits the generalizability of the findings to a broader population. To further validate the effectiveness of school-based extracurricular activities on RH knowledge, larger-scale studies involving diverse populations and a more comprehensive assessment of the intervention's components would be beneficial.

In conclusion, high school students in Tra Vinh lacked school-based extracurricular activities in RH, therefore, their RH knowledge was poor. Extracurricular activities provided students accurate information and knowledge of RH that would eventually build a positive view which would be the basis for their decision-making about their health. By participating in extracurricular activities in RH, the knowledge of students was significantly improved. Organizing extracurricular activities in RH needs to be extended to many schools in Tra Vinh province, especially for Khmer ethnic students in economically disadvantaged areas. Such interventions are essential for empowering adolescents to make informed decisions about their sexual and RH, protecting themselves and promoting overall well-being.

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EVALUATION OF THE QUALITY OF ETHIOPIAN JOURNAL OF REPRODUCTIVE HEALTH

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ABSTRACT

INTRODUCTION: The Ethiopian Journal of Reproductive Health (EJRH) is a local journal that has been published by the Ethiopian Society of Obstetrics and Gynecology (ESOG) for over 10 years. The objective of this study was to examine the quality of the journal.

METHODS: A mixed-methods approach that employed reviews of published editions of the journal, key informant interviews of those who have roles in the management of the journal, researchers who have the experience of publishing in EJRH and other journals, and editors-in-chief of other journals was conducted from September 1, 2017 – November 30, 2017. Self-appraisal of the journal using a standard checklist and office visits to assess staffing, infrastructure, manuscript follow-up, and coordination were also conducted. In addition, an online survey questionnaire was administered to assess perception and use of the EJRH by members of ESOG.

RESULTS: There have been 9 issues with 4-6 articles per issue in the last 10 years (2007 - 2017), giving 0.9 issues per year which is a 30% performance against plan. It has not been published in 2016 and 2017. The total number of issues was lower than average when compared to other local journals. Seven out of the nine issues of EJRH were available online. The journal has no online submission system and was yet to be indexed. The journal scored low in 19 of the 20 self-appraisal criteria. The majority of ESOG members knew about EJRH, but only 10% had a publication in the journal. Findings suggest that there are critical areas that need improvement for the journal to be reputable and influential.

CONCLUSION: A substantial reform with focus on having a fully functional editorial team, a webbased submission and peer review process, a well-equipped editorial office, and human resources were needed. Benchmarking experiences from other journals and adopting standard operating procedures were recommended. Strengthening collaboration with universities and research institutions will also be critical.

KEYWORDS: Ethiopian Journal of Reproductive Health, evaluation, quality

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INTRODUCTION

Robust medical evidence is essential for continuous quality improvement of medical practices. One approach that can be used to identify sound medical evidence is to rely on high-quality journals for information (Lavis et al., 2008). High-quality journals positively impact health policy decisions as they publish outstanding research that can inform policy decisions. Consequently, these journals have a positive reputation in medical and health science fields (Ana, 2004).

The quality of a journal is fundamentally evaluated by the peer review process, where an author's submission is subjected to the scrutiny of experts in the same field, prior to addition and publication in the journal. Other bibliometric techniques, such as the journal and article citation rates, impact factors, circulation, manuscript acceptance rates, and indexing on Medline or other bibliographic and citation databases, can also be used as quality assessment tools for journals (Rousseau, 2002; Durieux & Gevenois, 2010). Indexing of a journal in relevant databases contributes to its improved visibility and wider availability, and it is considered one of the key indicators of its impact on the international scientific production (Gasparac, 2006).

Most scientific papers are published in a small number of high-quality and prestigious journals, the majority of which are from the developed world. Journals from developing countries, however, are poorly visible in the scientific literature despite producing almost a quarter of the world's scientists (Marusic et al., 2004). For instance, analysis of documents published between 2011 and 2015 in biomedical journals, which were included in an internationally renowned citation database known as the Science Citation Index, indicated that only 9.3% of the papers published were led by authors from low-income countries (González-Alcaide et al., 2017). This difference is largely due to the fact that the vast majority of scientific research in the developing world is distributed through local or domestic scholarly and professional journals or other publication outlets with a geographically or linguistically restricted range of disseminations (Tijssen et al., 2006).

Africa is a region that faces the challenge of low visibility of its journals, which occurs due to the limited representation of its scientific publications in the international citation or bibliographic databases (Kebede et al., 2014). Bibliometric analysis by Hugo and Manuel in 2014, for instance, indicated that Africa's share of the world's scientific output only represented 2.6% of publications in open access journals (Confraria & Godinho, 2015). This finding confirmed the reality that many of the locally or domestically derived African journals are also challenged by inefficient review process, inadequate funding, and ineffective management of the journals' overall logistical operations (Gondwe, 2008).

In Ethiopia, only a handful of medical journals are published. Of those that exist, the oldest and most regularly published journal is Ethiopian Medical Journal (EMJ). EMJ is published by the Ethiopian Medical Associations (Magge et al., 2019). Another journal, the Ethiopian Journal of Health Sciences, is published by Jimma University. The Ethiopian Journal of Health Development (EJHD) is the most widely cited public health journal and is published by Ethiopian Public Health Association. In 2016, the Ethiopian Public Health Institute launched a new journal called the Ethiopian Journal of Public Health and Nutrition (EJPHN). Albeit a good number of biomedical journals are emerging in the country in recent years, very few of them are indexed on Medline (PubMed) or other internationally recognized databases.

The Ethiopian Journal of Reproductive Health (EJRH) is an organ of Ethiopian Society of Obstetrics and Gynecology (ESOG), which was

launched in May 2007. Since then, the EJRH published eight volumes and nine issues. Although the journal has been serving as an appropriate channel for dissemination of scientific information in reproductive health research in Ethiopia (Gautham et al., 2014), it faced several challenges during its first 10 years of its existence. As a result, its reviewing process and quality of published research had not been evaluated, and solutions for the prevailing challenges were not explored. Therefore, the objective of this study was to examine the quality of EJRH by comparing it with selected local and international journals and consider possible recommendations for its quality improvement.

METHODS

Study design

We used a mixed-methods approach that included a review of the journal against standard checklists, a comparison of randomly selected articles from EJRH with ones from other journals, key informant and in-depth interviews with different respondents, and a survey questionnaire with the members of ESOG. In order to evaluate the quality of the EJRH, a standard appraisal checklist that contains key quality measurement indicators developed by Beaubien and Eckard (2014) was also used. Data collection was conducted from September 1 – November 30, 2023.

Comparison with other journals

We also examined EJRH's publishing processes in comparison with the local journals in Ethiopia, namely EMJ, EJHS, and EJHD. Comparison of the publishing process was also made with international journals including BMC and PLOS ONE. Consequently, from each of the above journals, we randomly selected three papers that were published from 2010 onwards. The inclusion criteria for the selection was that the articles contain information on reproductive health and related issues.

To compare the articles from each journal, we used indicators such as the number of authors in the paper, submission system of the journal, open access or online availability of the paper, indexing services, presence of Digital Object Identifier, regularity of publications, the presence of RG journal impact, general attractiveness of the published papers, and information on the article processing charges.

Qualitative study

We interviewed both potential and actual users of the EJRH. The groups included those who have never published, those who have published in EJRH but not elsewhere, those who have published elsewhere but not in EJRH, those who have published in both journals, editors-in-chief, and previous editors. A total of 21 key informant interviews were conducted with different groups of ESOG members and non-members. All the interviews were recorded, transcribed, and translated by the research team. A thematic synthesis was used to summarize the findings.

Observation and benchmarking

We visited the offices of EJHS in Jimma University, Southwestern Ethiopia and EMJ in Addis Ababa and compared both locations with the office management of EJRH. For the office visits, a team of two data collectors used checklists with standardized indicators for an open access journal to document their observations. During the visits, all relevant components including infrastructures, human resources, electronic systems, guiding documents, and other related elements were observed and documented.

Online quantitative study

An online survey questionnaire was sent via email to all members of ESOG. The survey questions included background information; the participants' previous research practice and publication experiences, such as attendance of research methodology (other than at the undergraduate or graduate levels); manuscript writing training, whether having access to electronic journals, journal reading, and use habit; and their publication experience with EJRH and other local or international journals. The participants' perception of the quality of EJRH was also assessed. The resulting data were analyzed using Stata 14.0.

RESULT AND DISCUSSION Review of EJRH publications

The average number of authors was three for EJRH, five in EJHS, and as high as eight in BMC. EJRH did not have an online submission system. Therefore, submissions were made through email. The process of reviewing the papers for the EJRH journal is not clearly indicated when compared with the international journals (BMC and PLoS ONE). We have also learnt that the three local journals, including EJRH, lack important information about copyright of each journal, detailed description of author contribution, availability of data and materials, digital object identifier (DOI), and length of the process from acceptance to publication.

Review of the journal's home page showed that most of the local journals considered in this study, including EJRH, were not attractive and lacked essential elements when compared with BMC and PLOS ONE journals. It was also observed that EJRH published only eight volumes during its 10 years of existence—far less than the EJHD, EJHS, and EMJ, which produced 31, 27, and 55 volumes respectively.

Quality appraisal

At the time of this assessment, EJRH was not listed in the directory of Open Access Journals and did not have an article processing charge. The EJRH publisher was not under a creative commons license. The journal also was not a member of Open Access Scholarly Publishers Association. In addition, it was not indexed in any of the following databases: Science Citation Index (SCI), Science Citation Index Expanded (SCIE), Social Sciences Citation Index (SSCI), Medline, Inspec, or a specialized subject specific database.

EJRH publications did not have Digital Object Identifier (DOI) numbers. The journal was not a member of the STM Publishers Association or the Committee on Publication Ethics (COPE), and it was not being preserved in LOCKSS, CLOCKSS, Portico, PubMed Central, or at least one national archive or national library. Also, the journal was not regularly able to publish 10 or more papers per issue and was not offering keywords to a search engine. The editors did not swiftly respond to email inquiries sent to their institutional email address, and the publisher/publishing house was not clearly identified in the imprint.

Observation and benchmarking

EJRH had one editor-in-chief and eight associate editors. During our visit, we learned through documentation that the journal's editorial board used to meet every month; minutes were recorded for every session. However, the editorial board of EJRH was not functional at the time of our visit, and most of the activities were being performed by the editor-in-chief. The editor made decisions on his own, with limited consultation with the board. EJRH submissions were received via personal email, the tracking was through phone, and documented tracking and communication were nonexistent. Unlike the other journals, EJRH did not have an annual plan for the current fiscal year, but on its inception a decade ago, the journal aimed to publish four editions every year. However, that goal has never been implemented.

Findings from email survey

A total of 81 respondents who are all members of ESOG responded to the emailed questionnaire. Of these, 73 (90%) were male and 24 (32%) were earning below 15,000 ETB monthly. The majority (58%) of them were working at teaching hospitals. Nearly half (48%) worked in public facilities with limited private practice. More than a quarter or 22 (27.2%) ever published a manuscript in journals, and only 8 (9.9%) published in EJRH. Most (93%) knew about the existence of EJRH. The above characteristics are summarized in Table 1 below.

| Table | 1: | Research | and | publication | experience of | of study | participants |
|-------|----|----------|-----|-------------|---------------|----------|--------------|
| | | | | | | | |

| Variable | Subcategory | Number |
|----------------------|---------------------|----------|
| Knowledge of EJRH | Yes | 75(92.6) |
| | No | 6(7.4) |
| Published in EJRH | Yes | 8(9.9) |
| | No | 73(90.1) |
| Read EJRH article(s) | Yes | 66(81.5) |
| | No | 15(18.5) |
| Major challenge | Long review process | 5(62.5) |
| publishing in EJRH | Poor feedback | 1(12.5) |
| | Submission problems | 2(25.0) |
| Consider EJRH a | Yes | 35(43.2) |
| good impact journal | No | 46(56.8) |

Qualitative findings

Researchers who had published in EJRH expressed their experience as "not good" or "neutral" when asked about their general feelings on the publication process. Informants indicated that the call for papers was not regular, and there was a long turnaround period for submitted manuscripts. Lack of clear guidance, lengthy process, unpredictable timing, and lack of follow-up were repeatedly mentioned by the informants. Researchers found the EJRH publication process less explicit than and deviated from the experience provided by international journals. Learning opportunity and transparency of review process were considered as missed opportunities when publishing in EJRH. However, transparency was not considered a major problem.

Formatting was a recurrent quality problem with the papers, especially on the last editions. Tables were not well-placed, citations and references were not up to standard, and font types were not consistent. Researchers reflected that the issues were discouraging and would fail to attract authors to consider publishing in the journal. They suggested that EJRH needed to work on improving content, language, and article formatting. Although some of the respondents expressed that EJRH was in a unique position to reach local readers, the researchers who have published in EJRH and other journals predominantly stated their preference to publish in other journals. Many of the qualitative respondents believed that ESOG had missed many opportunities, including its original plan of publishing four times a year and using the various sources of support that were available in the early stages of the journal.

Many of the researchers considered EJRH the right platform for their publications as it is relevant to the OBGYN community in Ethiopia and is a specialized journal focusing on reproductive health. However, the opportunities were limited by the journal's current quality. Suggested areas to improve included creating a support structure at the ESOG office level with finance and technical support for research, strengthening collaboration with universities and research institutions, and finding ways to regularly publish articles in the journal to stimulate people to conduct more research in the reproductive health field. It was also suggested that the journal should have a web-based submission system and electronic copies of articles. Moreover, informants indicated that ESOG should provide active funding to support the editorial office. A related suggestion was for the journal to organize research methodology and writing workshops on a regular basis to enhance research capacity and promote its publications.

DISCUSSION

The EJRH is a great platform for sharing research findings among the OBGYN and other reproductive health communities. Members of ESOG value the platform as a specialized opportunity in the country. The office structure, management, and functions of EJRH are suboptimal The editorial board is not fully functional and is not guiding the journal. Many irregularities were present in the publication process of EJRH, with its volume and corresponding issues showing limited numbers, long and irregular intervals, and missed opportunities to qualify for a good level of prestige. Regardless of its poor quality and limited visibility, the members of ESOG have a positive perception of EJRH and highly value its existence as it is a good impact journal. The members also intend on publishing in the journal if its current gaps and challenges are addressed.

Substantial improvement is needed

The findings of this quality assessment of EJRH indicated that there are several areas that need to be improved for the journal to be competetive and influencial in the field of reprodutive health in Ethiopia, Africa, and worldwide. Although similar local publications also lack the important qualtities that are deficient in EJRH, the journal should nevertheless make rigrous improvments and become a high-impact journal at continental and international levels (Schoonbaert, 2009). Several other journals have achieved this milestone. However, doing so would require a progressive and continious effort from the professional society, reprodutive health researchers, and the journal management team. The main areas of focus for further improvement would be strengthening the editorial team and office; improving manuscript submission, review, and editorial process; and promotion of the journal articles in local and international media.

Strengtheining editorial team and office

Having a fully functional and well-equipped editorial office and a mulidisciplinary team of editorial members are key to ensure the quality of any journal (Gasparyan, 2013). The findings of this study have clearly indicated that the EJRH editorial office needs to be equipped with the modern hardware and software required for a quality journal review and editorial process. Beyond these, the assessment findings also indicated that a fully functional editorial team (consisting of editors and associate editors) as well as a pool of selected reviewers specialized in reproductive health need to be strengthened. These changes are critical for the quality of the publications of EJRH.

Improve submission, review, and editorial process Another key area in need of improvement was the system for article submission, peer review, and journal editing process (Ali & Watson, 2016). The findings of this assessment clearly indicated that potential authors need an online portal with a userfriendly interface for submission of manuscripts, an online invitation for potential reviewers and a similar system to receive reviewers' comments, a tracking system for real-time status of the manuscript, and a portal for copyediting and proofreading of the articles. As these features are common in many other journals, the findings of this assessment imply that EJRH would need to implement them in order to be competitive and impactful in the field of reproductive health. However, this process would require a step-wise approach that can yield the aspired goal overtime.

Promote the visibility of the journal and its publications

Promotion of the journal products in local and international media and through indexing in scientific databases is critical for wider visibility of the journal (Goehl & Flanagin, 2008). Only a handful of African journals were indexed in Science Citation Index, a multidisciplinary international bibliographic database. Moreover, the clear majority of local researchers in Africa choose to publish in Western journals and even predatory international journals in some cases, which, due to having higher impact factors and larger circulation, leave local journals with inadequate and poorquality submissions (Tarkang & Bain, 2019). One must note that local journals have the potential for stronger influence in local media and policy, and researchers need to be encouraged to submit to local journals. Doing so would enhance the likelihood of application of the findings at the local level. Mainstream media and social media can be used to present highlights of key publications in EJRH and thus improve the visibility of the journal. **Strengthen collaboration with universities and research institutions**

For a research journal, collaborating with universities and research institutions is critical (Breugelmans et al., 2019). First, a significant proportion of manuscripts originate from these institutions. Collaborating with them would foster submission of quality articles to the journal. Secondly, many potential peer reviewers are based in these institutions, and collaboration would encourage them to serve as trusted peer reviewers for the journal. Thirdly, libraries in the universities and research institutions are the most important areas to share the knowledge products of the journal with students, early-career researchers, and the wider scientific communities. Therefore, EJRH needs to strengthen its collaboration with universities and research institutions that conduct research in the reproductive health field.

Use the recommendations from the informants as inputs

This assessment used triangulated evidence to assess and describe the quality of EJRH and its processes. Findings from review of EJRH publications, suggestions from key informants, responses from ESOG members, and observations of the research team attained from visiting the EJRH office are factual sources of information intended to inform the journal to improve its systems and process, thereby becoming a competitive and impactful journal in the field of reproductive health. As with any evaluation, the findings should not discourage potential authors from submitting to this journal nor researchers from reading articles published in EJRH. Rather, the findings of this assessment need to trigger researchers to contribute to the quality improvement of this journal by submitting good

articles, joining the journal as associate editors and peer reviewers, and citing articles published in EJRH when necessary.

CONCLUSIONS AND RECOMMENDATIONS

Reproductive health problems account for a significant proportion of disease burden in Ethiopia. To address this public health challenge, there is a need for a scientific platform to share up-to-date, research-based evidence in the field of reproductive health. EJRH could function as an excellent platform to publish reproductive health research in Ethiopia and even the entirety of Africa. Addressing the identified areas for improvement in this study would help the journal achieve this goal. Accordingly, ESOG and EJRH teams can use the findings of this assessment to improve the systems, process, and outputs of this journal. More specifically, the following recommendations need EJRH's priority: the editorial team and editorial office need to be strengthened; manuscript submission, review, and editorial process must be improved; the journal needs to learn from the experiences of reputable reproductive health journals; the journal must promote its visibility at local and international levels; and the journal should strengthen collaboration with universities and research institutions.

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RUPTURED NONCOMMUNICATING RUDIMENTARY HORN PREGNANCY: A CASE REPORT

Demisew Amenu¹ and Getaneh Dejen¹

ABSTRACT

Pregnancy in the rudimentary horn is rare and carries grave consequences for the mother. Here, we report a case of 26year G3P2 with 17 weeks gestation who presented with lower abdominal pain. Ultrasound showed hemoperitoneum with suspicion of abdominal ectopic pregnancy. Intraoperatively the diagnosis of ruptured left rudimentary horn pregnancy made. Fetus and placenta was removed followed by excision of the horn with ipsilateral salpingectomy done

KEYWORDS: Ruptured rudimentary horn pregnancy, Unicornuate uterus, uterine anomalies

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INTRODUCTION

A unicornuate uterus with a rudimentary horn results from the incomplete development of one of the Müllerian ducts and an incomplete fusion with the contralateral side. About 85% of rudimentary uterine horns are non-communicating.^{1,2} Women with a unicornuate uterus have a significantly lower live birth rate, and higher rates of overall miscarriage, ectopic pregnancy, preterm delivery and cesarean delivery.³

Pregnancy in a rudimentary horn is a rare condition reported with an incidence of 1 in 100,000 to 140,000 pregnancies. Rudimentary horn pregnancies account for 26.9% of ectopic pregnancies in unicornuate uterus.^{3,4}

The incidence of rupture in rudimentary horn pregnancy is observed in 90% of cases, mostly in second trimester, which can lead to a life-threatening condition for the mother because of heavy intraperitoneal bleeding.⁵

We report a case of ruptured rudimentary horn pregnancy at 17 weeks of gestation which was diagnosed intraoperatively.

CASE REPORT

A 26-year-old gravida 3 para 2 (both alive) mother who was amenorrheic for the past 4 months, started ANC visits at the local health center. She presented to Jimma Medical Center after she was referred from the local primary hospital with the diagnosis of anemia secondary to ruptured ectopic pregnancy. Her chief complaint was lower abdominal pain of one-day duration which was crampy and non-radiating type. She had associated easy fatigability, tinnitus and vertigo, and otherwise had no fever chills or rigor. She had no history of chronic pelvic pain, ectopic pregnancy, or previous miscarriage. She had no personal or familial history of hypertension or diabetes.

On physical examination, she was acutely sick looking. Her vital signs were stable with the exception of slight tachycardia (pulse rate, 106 bpm). Her conjunctiva were pale and chest was clear and resonant. S1 and S2 were well heard, no murmur or gallop was heard. There was a 10cm ×10 cm ballotable non-tender subumbilical abdominal mass which was mobile and there were signs of fluid collection. On pelvic examination cervix was closed, smooth with no blood on the examining finger and no adnexal mass.

On ultrasound exam an empty uterus was seen (figure 1). A fetus with cardiac activity and aBPD measurement corresponding to 17 weeks was noted (figure 2). There was a significant intraperitoneal free fluid collection. Otherwise the liver and both kidneys were grossly normal. With the impression of abdominal ectopic pregnancy and moderate anemia, laparotomy was planned.



Figure 1 empty uterus



Figure 2 Alive fetus, BPD 17wks

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Intraoperatively a right unicornuate uterus with a normal ovary and fallopian tube was found. To the left there was a rudimentary horn of uterus with fetus and placenta inside but ruptured on the posterior wall with active bleeding. The ipsilateral fallopian tube, ovary, and round ligament were normal. (Figure 3, 4)



Figure 3 Unicornuate uterus with ruptured rudimentary horn pregnancy



Figure 4 Normal tubes and ovaries of unicornuate uterus and rudimentary horn



Figure 5 Fetus with placenta

The hemoperitonium was evacuated and the fetus and the placenta were removed (figure 5). Ipsilateral round ligament was clamped, cut and ligated. Mesosalpinx serially clamped, cut and ligated. The ruptured rudimentary horn was clamped and resected at its base and hemostasis was secured. After the resection the sample was checked and showed no communication between the rudimentary horn and Unicornuate uterus. The abdominal cavity was cleaned and closed in layers. Intraoperatively, a diagnosis of ruptured non-communicating rudimentary horn of unicornuate uterus was made. She was transfused with three units of whole blood. The ostoperative period was uneventful and she was discharged on her third postoperative day with ferrous sulfate tablets, advice and counseling.

DISCUSSION

According to the criteria from the American Fertility Society, unicornuate uteruses have 4 variants.⁶ Isolated unicornuate uteruses are the most common type, with a reported frequency of 35%. When a rudimentary horn is present, it is the noncavitary type in 33% of cases, the cavitary but noncommunicating type in 22% of cases which is typical of our case, and the cavitary and communicating type in 10% of cases.^{7,8} If

pregnancy occurs in cavitary rudimentary horn, the majority (80-90%) of cases occur in non-communicating type.

There is low preclinical and preoperative detection (14% overall) for rudimentary horn presentations.⁹ Therefore there should be a high index of suspicion. As in our case, the patient had two ANC visits to a rural health care center, and was followed there until rupture occurred and became symptomatic. She was referred later to our center as a case of ruptured ectopic pregnancy.

The early diagnosis of rudimentary horn pregnancy remains challenging even after the development of symptoms. In case series, reviewed by Li X et al. (2019) only one of 11 patients with rudimentary horn pregnancies (RHPs) was a known noncommunicating rudimentary horn. The other 10 patients received a false or misdiagnosis.⁹ Sometimes it was diagnosed after failed medical abortion.^{10,11} Even though ultrasound, hysterosalpingogram, hysteroscopy, laparoscopy, and MRI are the diagnostic tools ¹², ultrasound is more accessible, especially in developing countries, but its sensitivity only 26% which depends on a variety of factors.¹³ Tubal pregnancy, cornual pregnancy, intrauterine pregnancy and abdominal pregnancy are common sonographic misdiagnosis.¹⁴ Even though the ultrasound was operator-dependent, it was mistaken in our case as an abdominal ectopic pregnancy because as gestational age rises, myometrium thins and reduces ultrasound's sensitivity.

If the condition is diagnosed antenatally, the main strategy is excision of the rudimentary horn either via laparotomy or laparoscopically¹⁵⁻¹⁷. In early gestation with unruptured RHP, medical management by methotrexate followed by laparoscopic excision is an option¹⁸, but in the majority of the cases diagnosed after rupture occur,immediate laparotomy is needed. In our case, we resected the rudimentary horn with its fallopian tube by laparotomy.

CONCLUSION

As preoperative and pre-rupture diagnosis rates are low, early diagnosis is the key to successful management. To lower morbidity and death, a high index of suspicion is therefore required. It should always be considered as a differential diagnosis in a pregnant woman presenting with lower abdominal pain especially in developing countries where the possibility of detection before pregnancy or before the rupture is less likely.

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