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IN VITRO FERTILIZATION (IVF) OUTCOMES AND PREDICTING FACTORS IN A RESOURCE-LIMITED SETTING

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ABSTRACT

INTRODUCTION: Ethiopia has only one public In-vitro fertilization (IVF) center which was opened in 2019. The aim of the study is therefore to determine predictors of the outcome of IVF in the only public fertility center in Addis Ababa, Ethiopia.

METHOD: The study is conducted in the public IVF center in Ethiopia between; April 01, 2019, to March 30, 2020. A retrospective cross-sectional study design was employed. All IVF clients meeting the inclusion criteria were included in the analysis.

RESULT: There were a total of 199 couples included in the study. The clinical pregnancy rate was found to be 30.1%. The odds of getting pregnant is 61% less among participants with female partners age ≥35 years, AOR 0.39, CI 0.18-0.83 with a p-value of 0.015. Good responders ((≥4 oocytes retrieved) accounts for 152(76.4%) of the cases. Age of female partner, day 3 Follicle Stimulating Hormone (FSH), and Antral Follicle Count (AFC) count ≥5 were significantly associated with good ovarian stimulation response with a p-value of 0.050,0.002 and 0.005 respectively.

CONCLUSION: Even though near two-thirds of the study participants did not know their exact date of birth, the reported age of female partner <35 years is associated with both good ovarian response and occurrence of pregnancy, emphasizing its importance for clinical decision making. Day 3 FSH and AFC ≥5 were associated with good ovarian stimulation response. Therefore, we recommend the combination of female partner age, day 3 FSH, and AFC ≥5 to predict ovarian response in low resource settings, since variables can be readily available without much cost to patients. Furthermore, we recommend follow up studies with a large sample size and prospective cohort design to appropriately compare the different predictors of ovarian response in our setting to develop evidence-based set up specific IVF protocols and guidelines

KEYWORDS: Pregnancy rate, IVF, Resource limited setting, Predictors, Infertility, Ethiopia

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INTRODUCTION

One in every four couples in developing countries is affected by infertility[1]. Infertility, as such, is one of the major public health problems identified in Ethiopia. It is estimated that infertility affects 15 to 20% of couples in Ethiopia[2]. Realizing the magnitude of infertility in the country, Saint Paul's Hospital Millennium Medical College (SPHMMC), in collaboration with the Ministry of Health, has opened the first public Center for Fertility and Reproductive Medicine (CFRM) with functioning IVF in the country, which was inaugurated in February 2019. Before the inauguration of the center, only one private facility has been providing IVF services for over a hundred million population. In the last three decades, huge strides have been made in terms of improving pregnancy and live birth rates for IVF cycles. Previous studies have established predictors of ovarian response such as female age, antral follicle count (AFC), serum anti-Mullerian hormone (AMH), serum FSH, and serum LH concentrations[3]. Female fecundity signifcantly declines approximately at age 35 years and more sharply after age 37 years[4], and the chances of successful pregnancy become very low after the age of 40[5-7]. Accurate prediction of ovarian response and establishing a tailored treatment strategy for those patients would improve the IVF outcomes [9-11].

Basal follicle-stimulating hormone (FSH), anti-Müllerian hormone (AMH), inhibin B, and antral follicle count (AFC), have been used to predict ovarian response and IVF outcomes. Basal FSH and inhibin B were found to have low predictive power [12,13]. On the other hand, AMH and AFC seem to be the most reliable determinants of ovarian response. Some investigators concluded that the predictive accuracy of these two parameters was similar[14-17], whereas other studies have shown that AMH was superior to AFC in predicting ovarian response[18,19]. However, there is a limited number of studies that assessed AFC as a predictor of IVF outcomes in poor responders[20-22]. Mutlu et al. reported that AFC was the best and the only independent parameter to predict poor response, but the study had limited value in predicting pregnancy success[20]. In Ethiopia, there is no published research on IVF as the service was not available for the general public until recently. The aim of the study is, therefore, to determine outcomes and predictors of IVF among infertile couples managed at the SPHMMC CFRM, Addis Ababa, Ethiopia.

METHOD AND MATERIALS

Study setting, period, and design

A retrospective cross-sectional study design was employed to recruit study subjects. The study was conducted at the center for reproductive medicine (CFRM) which is a fertility center administered under the SPHMMC department of obstetrics and gynecology. SPHMMC is a tertiary teaching referral hospital under the Federal Ministry of Health (FMOH). The center is located in Addis Ababa, the capital city, and is the first public IVF center in Ethiopia. Since its inauguration in February 2019, more than 5000 infertile couples were evaluated, and more than 200 IVF cycles were provided in the center. All patients who underwent IVF at the center for reproductive medicine (CFRM, SPHMMC) from April 01, 2019, to March 31, 2020, were included in this study, except couples who have frozen embryo transfers. IVF outcomes were dependent variables. IVF outcomes were measures in terms of clinical pregnancy rate diagnosed by a serum pregnancy test and ovarian response measured by the number of oocytes retrieved. Patients with ≥4 oocytes retrieved were called good responders to controlled ovarian stimulation, while those with <4 oocytes were called poor responders. The independent variables were age, AFC, BMI, AMH, and day 3 FSH.

Treatment protocol

Treatment protocols included in the study were conventional long protocol, antagonist protocol (short protocol), and minimal stimulation protocols. For long protocol, either highly purified urinary FSH (Fostimon 75 IU) or recombinant

FSH (Gonal F 75 IU), were used for stimulation starting from day 3 of the cycle. The individual dose was calculated based on the age, BMI, and AFC of the client. Downregulation was achieved by depot Goserelin (Zoladex 3.6 mg) on the 21st day of the previous cycle. The menstrual cycles of all women using this protocol were synchronized by the use of COCs (combined oral contraceptives). A variable antagonist protocol was employed where downregulation was started with Cetrotide 0.25 mg whenever the leading follicle/s reached 12cm in diameter. For minimal stimulation protocol, Letrozole 5mg PO was started on day 2 of the cycle and continued for 5 days. On the 4th day, transvaginal ultrasound monitoring was done to assess the initial response and start hMG SC 150 mg. Once the leading follicle attained 14 mm in size, down-regulation with Cetrotide was instituted. Trigger for all three protocols was decided if 3 or more leading follicles reached 18mm or more in size or greater or equal to 5 follicles reach/exceed 16mm in size.

Data collection and measurement

Data were collected by two trained data collectors using pretested well-structured questionnaires. The medical record of patients who underwent IVF during the study period was identified from the CFRM IVF registration. The records of fertility care seekers were then reviewed, and the data were collected using an open data kit (ODK). The primary investigator supervised the data collection process on daily basis.

Data processing and statistical analysis

The data were on an open data kit (ODK) and were checked for completeness and then imported into Stata statistical software release 15 (StataCorp, College Station, TX, USA) for analysis. Univariate analyses were performed using proportions and means (standard deviation), or medians (interquartile range) when the distribution was not normal. The association of the pregnancy test result and independent variables were assessed using Fisher's exact test, independent t-test, or the non-parametric test of difference of means (Mann Whitney U test). Statistical significance was declared at p=0.05 and all tests were two-sided. A full model assessing the relationship between the pregnancy test result and predictor variables was constructed after which non-significant variables were removed by a backward procedure using the likelihood ratio test ($p<0.05$) "

Ethical Considerations

Ethical clearance and permission letter to conduct the study and publish the outcome was obtained from the Institutional Review Board (IRB) of SPHMMC. Confidentiality was maintained during data collection, analysis, and interpretation by avoiding recording of names and returning client records to their place after completion of data collection. All the datasets used and/or analyzed during the current study are included in the manuscript and available from the corresponding author on reasonable request

RESULT

There were a total of 208 couples who underwent IVF during the study period. Out of these, 9 women had their embryos frozen and did not have fresh embryo transfer making the total fresh embryo transfers during the study period 199. Semen analysis results were abnormal in 25% of male partners. Close to two-thirds of the women in the study did not know their exact date of birth (64.5%). The median reported age was 32.5 years (Table 1).

Table 1: Baseline characteristics of the study subjects

Characteristics (n=208)	No.	%
Date of birth known		
Yes	73.0	35.1
No	135.0	64.9
Female partner body mass index		
<18.3	6.0	2.9
18.3-24.9	133.0	63.9
25-29.9	44.0	21.2
30-34.9	21.0	10.1
>34.9	4.0	1.9
Marital status		
Married	208.0	100.0
Educational status of female partner		
No formal education	25.0	12.1
Completed primary level education	13.0	6.3
Completed secondary level education	70.0	33.8
Diploma and above	99.0	47.8
Male date of birth known		
Yes	30.0	14.4
No	178.0	85.6
Semen analysis result		
Normal	157.0	75.5
Abnormal	51.0	24.5
Male partner TESE done		
Yes	27.0	13.0
No	181.0	87.0

Clinical pregnancy rate and predicting factors

The long protocol was used for ovarian stimulation in 136(68.3%) of the cases. The overall pregnancy rate was found to be 30.1% (60/199). Among these, 5(25%) of them were already delivered, 21(35%) aborted and 24(40%) of the pregnancy were ongoing at the time of data collection. In bivariate analysis, significant associations were observed between the female partner age, antral follicular count (AFC), number of oocytes retrieved (good responders), one embryo transfer, grade one embryo transfer, and day 5 embryo transfer with a positive pregnancy test. However, there were no statistically significant associations between the pregnancy test result and BMI, Day 3 FSH, and AMH (Table 3).

Factors associated with controlled ovarian stimulation response

Good responders ((≥4 oocytes retrieved) accounts for 152(76.4%) of the cases. Age of female partner, day 3 FSH, and AFC count ≥5 were significantly associated with good ovarian stimulation response (Table 2).

Table 2: Bivariate analysis of factors associated with controlled ovarian stimulation response

Factor	Good responders (≥4 oocytes retrieved) n=152	Poor responders (<4 oocytes retrieved) n=56	P-value*
Age of female partner, median (IQR)	32.0 (29.0, 36.0)	35.0 (31.0, 37.0)	0.016
Age of female partner			
<35 years	95 (62.9%)	26 (47.3%)	
0.050			
≥35 years	56 (37.1%)	29 (52.7%)	
Female partner AFC status, median (IQR)	12.0 (8.0, 14.0)	7.0 (5.0, 10.0)	<0.001
Female partner AMH median (IQR)	0.9 (0.5, 2.6)	0.6 (0.4, 1.3)	0.110
Female partner day 3 FSH	5.5 (3.9, 6.7)	7.5 (4.3, 9.6)	0.002
Female partner AFC status categorized			
≥5	140 (95.2%)	44 (83.0%)	0.005
<5	7 (4.8%)	9 (17.0%)	
Female partner day 3 LH status, median (IQR)	5.3 (3.5, 7.7)	5.8 (4.3, 10.0)	0.230
Female partner day 3 estradiol, median (IQR)	122.4 (62.0, 243.0)	93.0 (50.4, 150.0)	0.089

**p-values are calculated based on Mann-Whitney U test for continuous independent variables and Fisher's exact test for categorical independent variables

Table 3. Bivariate analysis of independent variables by the pregnancy test result

Characteristics	Negative (n=139)	Positive (n=60)	p-value*
Age of female partner, mean	(SD)33.7 (4.5)	31.3 (4.4)	<0.001
Age of female partner			
<35 years	74 (53.2%)	44 (74.6%)	0.007
≥35 years	65 (46.8%)	15 (25.4%)	
Female partner body mass index			
<18.3	4 (2.9%)	2 (3.3%) 0.30	
18.3-24.9	86 (61.9%)	44 (73.3%)	
25-29.9	29 (20.9%)	11 (18.3%)	
30-34.9	17 (12.2%)	2 (3.3%)	
>34.9	3 (2.2%)	1 (1.7%)	
Age of male partner, mean (SD)	40.4 (6.4)	37.3 (5.2)	0.071
Male partner TESE done			
Yes	19 (13.7%)	7 (11.7%)	0.82
No	120 (86.3%)	53 (88.3%)	
Female partner day 3 FSH status, median (IQR)	6.0 (4.3, 7.8)	5.0 (3.5, 7.0)	0.060
Female partner day 3 LH status, median (IQR)	5.5 (3.8, 9.1)	5.5 (3.6, 7.1)	0.78
Female partner day 3 estradiol, median (IQR)	98.0 (51.6, 230.0)	150.0 (86.0, 279.0)	0.082
Female partner AFC status, median (IQR)	10.0 (6.0, 12.0)	12.0 (10.0, 15.0)	<0.001
Female partner AFC status categorized			
≥5	121 (90.3%)	56 (98.2%)	0.001
<5	13 (9.7%)	1 (1.8%)	
Female partner AMH serostatus, median (IQR)	0.7 (0.4, 1.2)	1.4 (0.6, 7.1)	0.061
Number of oocytes retrieved, median (IQR)	5.0 (3.0, 10.0)	10.0 (6.0, 13.0)	<0.001
Good responders	91 (65.5%)	56 (93.3%)	<0.001
Poor responders	48 (34.5%)	4 (6.7%)	
Number of embryos transferred			
1	37 (26.8%)	4 (6.7%)	0.001
2	79 (57.2%)	49 (81.7%)	
3	22 (15.9%)	7 (11.7%)	
Type of protocol used			
Long protocol	85 (62.5%)	51 (86.4%)	0.063
Short protocol	19 (14.0%)	2 (3.4%)	
Minimal stimulation	32 (23.5%)	6 (10.2%)	
Day of embryo transfer			
Day 5	68 (48.9%)	50 (83.3%)	<0.001
Day 3	71 (51.1%)	1	
Grades of embryos transferred			
1	99 (71.2%)	56 (93.3%)	0.004
2	32 (23.0%)	4 (6.7%)	
3	5 (3.6%)	0 (0.0%)	
Semen analysis result			
Normal	103 (74.1%)	47 (78.3%)	0.59
Abnormal	36 (25.9%)	13 (21.7%)	

*p-values are calculated based on independent t-test or Mann-Whitney U test for continuous independent variables and Fisher's exact test for categorical independent variables

Multivariable regression of factors associated with the pregnancy test result

Multiple logistic regression was run using variables associate with the pregnancy on bivariate analysis to control confounders. A full model assessing the relationship between the pregnancy test result and predictor variables was constructed after which non-significant variables were removed by a backward procedure using the likelihood ratio test ($p<0.05$). Likelihood ratio test (lrtest) was significant when variables number and grade of the embryo were removed by the backward procedure (see Table 4). The odds of getting pregnant is 61% less among participants with female partners age ≥35 years, AOR 0.39, CI 0.18-0.83 with a p-value of 0.015. Clients with Day 5 embryo transfer were 3.28 times more likely to get pregnant compared to those with day 3 embryo transfer, p-value=0.006, CI 1.42-7.62(see Table 4).

Table 4: Multiple logistic regression model

Pregnancy test	AOR	P>z	95% Confidence	Interval
Age				
<35				
≥35 years	0.39	0.015	0.18	0.83
AFC categorized				
≥5				
<5	0.34	0.326	0.04	2.94
Oocytes retrieved				
Good responders				
Poor responders	0.35	0.083	0.11	1.15
Embryo transfer day				
Day 3				
Day 5	3.28	0.006	1.42	7.62

DISCUSSION

Good responders ((≥4 oocytes retrieved) accounts for 76.4% of the cases in the current study. The IVF pregnancy rate at the center for reproductive medicine (CFRM, SPHMMC) was 30.1%. Good responders ((≥4 oocytes retrieved) accounts for 152(76.4%) of the cases. Age of female partner, day 3 FSH, and AFC count ≥5 were significantly associated with good ovarian stimulation response. However, given the very brief history of IVF in Ethiopia, much is to be done to contextualize the various nuisances in the field.

One unique challenge is knowing the age of women seeking the service. Although age is one of the most important predictors of ovarian response, its utility in our setting remains questionable. Most of our clients do not know their exact age and it is usually hard for the physician to ascertain the stated age as most women have no birth certificate. As described above, close to one-third (64.5%) of the study participants did not know their exact date of birth. In the literature, age has been consistently shown to be one of the most important predictors of IVF success and fertility in general [3-5]. Our study also depicted the reported age had a significant association with ovarian response and a positive pregnancy test. This underlines the importance of age, even in setups where the exact age cannot be ascertained.

In the current study day, 3 FSH was associated with a good response to ovarian stimulation. This is in line with many types of research done over the years. Muasher and collaborators[6] reported that the measurement of serum levels of FSH, LH, and E2 on day 3 of the basal menstrual cycle was a predictor of controlled ovarian hyperstimulation (COH) response and IVF outcome. Subsequent studies ascertained the clinical significance of defined thresholds for such hormones in addition to their relationship to the woman's age, thus further defining the concept of ovarian reserve[5,9-11]. It was reported that the combined use of age and basal FSH in counseling patients improved the accuracy of prognosis and provide an index of functional ovarian reserve[11].

Anti-Mullerian hormone (AMH), and antral follicular count (AFC) were also being used for predicting ovarian response (18, 19). Recently, much attention has been given to the measurement

of AMH[20]. AMH is produced solely by the granulosa cells of growing pre-antral and small antral ovarian follicles and shows little inter-and intra-cycle variability. AMH is an accurate predictor of excessive response to ovarian hyperstimulation [16,18]. However, our study failed to show a significant association. This can be explained by the small number of patients that had AMH tests done. Besides, since the investigation is expensive, we did it for those with diminished ovarian reserve to ascertain the assessment determined by antral follicle count examination. Thus, the AMH was almost exclusively done on possible poor responders which were unlikely to have a good IVF outcome. The current study showed AFC ≥5 was significantly associated with a good ovarian response which is congruent with most studies[16, 18, 19].

In the current study, multiple regression analysis showed that the reported age of female partner <35 years and day 5 embryo transfer were associated with positive clinical pregnancy rate. Female clients with age less than 35 were four times more likely to get pregnant. This reflects ovarian function and underlying ovarian response which is associated with age less than 35 in the current study. Moreover, the finding was in line with a systematic review and individual studies which showed young age to be associated with pregnancy occurrence[22-24]. The current study showed day 5 transfer to be more than three times more likely to result in pregnancy. However, many studies showed there is no difference in pregnancy rate between day 3 transfer and day 5 transfer, with fewer cycles with no transfer due to very poor-quality embryos or arrested development when pushing today 5 [25,26]. This might be because of the practice in our setting in which only patients with less number and quality of embryo undergo day 3 transfer compared to routine day 5 embryo transfer for those with good number and grade of the embryo resulting in more pregnancies. Cycle day 3 serum FSH, LH, and E2 levels, measurement of AMH, and the estimation of the basal AFC were not associated with pregnancy test result in our study. These tests are better at predicting the ovarian response than the pregnancy outcome and our study was not adequately powered to detect the relationship between these laboratory investigations and pregnancy outcome.

The current study is the first of its kind in Ethiopia and will contribute to the very few publications from the whole continent. The study explored possibly clinical parameters to predict ovarian response and pregnancy outcome in a resource-limiting setting. This will help reproductive endocrinologists to identify which parameters to use for clinical decisions. However, in the current study, we did not do multiple logistic to control confounders for outcome ovarian response because of missing values on fully model regression. Furthermore, because of the retrospective nature of the study, important variables like some demographic information, causes, and duration of infertility were difficult to retrieve from the electronic record and were not included in the analysis.

CONCLUSION

Even though nearly two-third of the study participants did not know their exact date of birth, the reported age of female partner <35 years is associated with both good ovarian response and occurrence of pregnancy emphasizing its importance for clinical decision making. Day 3 FSH and AFC ≥5 were associated with good ovarian stimulation response. Therefore, we recommend the combination of female partner age, day 3 FSH, and AFC ≥5 to predict ovarian response in low resource settings, since variables can be readily available without much cost to patients. Furthermore, we would like to recommend follow-up studies with a larger sample size and prospective cohort design to appropriately compare the different predictors of ovarian response in our setting to develop evidence-based set up specific IVF protocols and guidelines.

Abbreviations

AFC: Antral Follicular Count
AMH: Anti-Mullerian Hormone
BMI: Body Mass Index
CCCT: Clomiphene Citrate Challenge test
CFRM: Center for Reproductive Medicine
COH: Controlled Ovarian Hyperstimulation
E2: Estradiol
FSH: Follicle Stimulating Hormone
FMOH: Federal Ministry of Health.
IVF: In Vitro Fertilization
LH: Luteinizing Hormone
SPHMMC: St. Paul's Hospital Millennium Medical College

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Competing Interests.

The authors declare that they have no competing interests.

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PRECANCEROUS LESIONS OF THE CERVIX AND ASSOCIATED FACTORS AMONG WOMEN IN SUDE DISTRICT, OROMIA REGION, ETHIOPIA

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ABSTRACT

BACKGROUND: Cervical cancer is a leading cause of death among women in developing countries. In less developed countries, including Ethiopia, most women who develop cervical cancer live in rural areas. However, exact data on the prevalence of the disease is lacking.

OBJECTIVE: To assess the prevalence of precancerous lesions of the cervix and associated factors among women age 30-49 years in Sude district, Arsi Zone, Oromia Region, Ethiopia, 2020.

METHODS: Community based cross sectional study was conducted among 633 women. Data were collected using structured and pretested questionnaires. Visual inspection with acetic acid was performed for screening by trained and experienced midwives. The collected data were entered into Epi-Info-7 and analyzed using SPSS-21. Binary logistic regression model were conducted to determine the association between the study variables. Odds Ratio with its 95%CI was calculated and P- Value < 0.05 used as a cut off points to declare the significance.

RESULT: The prevalence of precancerous lesions of the cervix was 4.7% (95% CI: 3.2%, 6.5%). Being older age (AOR, 3.5; 95% CI: 1.32, 9.39), widowed/divorced (AOR, 7.96; 95% CI: 2.84, 22.32), polygamy (AOR, 4.4; 95% CI: 1.45, 13.47), wife inheritance (AOR, 5.83; 95% CI: 2.12, 16.4) and STI (AOR, 5.57; 95% CI: 2.07, 14.96) were significantly associated with precancerous lesions of the cervix.

CONCLUSION: Precancerous lesions of the cervix are prevalent in the study area, which has public health importance. Awareness creation on the associated factors and screening service should be strengthened.

KEY WORDS: Prevalence, rural, cancer, cervix

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INTRODUCTION

Cancers that originate in the female reproductive system are called women's reproductive cancers, which affect the cervix, breast, ovaries, vagina, vulva and endometrium[1,2]. Cervical and breast cancer are the leading cancers among women in developing countries[3]. Of all types of cervical cancer, squamous cell carcinoma (SCC) is the most common and account for about 80% to 90% of cancers[3,4]. It is estimated that 80% of cervical cancer cases and 95% of cervical cancer mortality occur in less developed countries, including Ethiopia, due to lack of information, early detection, and access to treatment facilities [5,6]. In less developed countries, including Ethiopia, most women who develop cervical cancer live in rural areas, though the exact prevalence is not yet detected[7, 8].

Ninety-nine percent of cervical cancer is caused by sexually transmitted infections (STIs) with human papilloma virus (HPV) the most common viral infection of the reproductive tract[9,10]. The peak of HPV infection in women occurs in the late teens and early twenties following sexual exposure[11]. However, studies showed precancerous cervical cancer lesion is also common during the late reproductive age groups[11,12]. Marital status[13] having multiple sexual partners[11,14] and education[15] is consistently associated with cervical cancer. The cultural practice of wife inheritance which is a practice whereby the brother of the deceased husband takes the widow on as his wife is significantly associated with cervical cancer[16].

Cervical cancer is potentially preventable using effective screening program because knowing the prevalence of the disease can lead to a significant reduction in the morbidity and mortality associated with it[15-18]. The World Health Organization (WHO) recommended screening programs for women between 30 and 49 years by visual inspection with acetic acid (VIA) which is the simplest, most efficient and cost-effective screening technique in low-resource countries for reducing the incidence rate of cervical cancer cases and mortality from the case[19]. Accordingly, Ethiopia has put in place a strategic plan to reduce cancer incidence and mortality by 15% by 2020. This ambitious plan aimed to reach 50% of the population with 80% coverage of VIA to detect precancerous cervical lesions among non-symptomatic women aged 30-49[9]. However, there is insignificant practical action to address the women of rural communities in Ethiopia and many of research findings and screening services aimed to detect the prevalence of cervical cancer were based on secondary and tertiary health care facilities located in urban settings [9,20, 21]. Hence, this study was aimed at assessing the prevalence of precancerous lesions of the cervix and associated factors among women of age 30-49 years found in the rural community of the study area.

METHOD AND MATERIALS

The study was conducted in Sude district, Arsi Zone of Oromia Region, Ethiopia. Sude district is located in South East of Ethiopia 217km far from Addis Ababa (the capital city of Ethiopia). The projected total population of the district was 192,797 according to the CSA of Ethiopia estimates of 2019 of which 42, 665 were women of reproductive age group and 20,973 were estimated between the ages of 30-49 [22]. Early marriage, early sexual activity, multi-parity, wife inheritance, and polygamy are highly prevalent in the district .

A community based cross-sectional study was conducted using quantitative data collection method from December 2019 to January 2020. Women age 30-49 years and residents of the study area for six and above months were included in the study.

A single population proportion formula was used to estimate the sample size using the prevalence of precancerous cervical cancer lesion in rural part of Ethiopia to be 50% in the absence of data at the community level, a confidence level of 95% and a 5% margin of error. Considering 10% possible non-response rate and design effect of 1.5, a minimum of 633 samples was calculated.

From all rural kebeles (the lower administrative

unit in government structure) in the district, seven were selected by the simple random sampling method. Sampling frame for the selected kebeles was prepared from the family folder found in health posts in consultation with Health Extension Workers (HEWs) and administrators in their respective kebeles. Then the total sample size was proportionally allocated to the number of women age 30-49 years. Finally, computer generated random number table method was used to select women for an interview and screening (Figure 1).

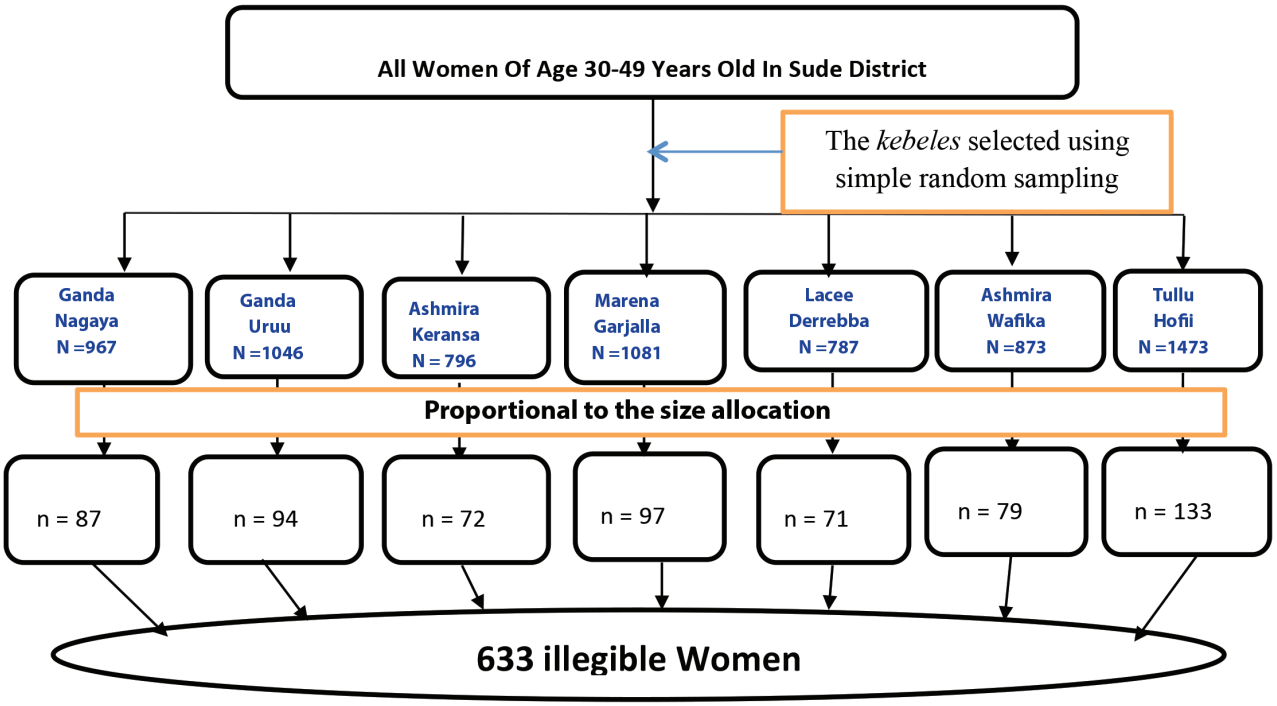

Figure 1: Schematic presentation of sampling procedure, Sude district, Oromia Region, Ethiopia, 2020.

A semi-structured questionnaire was used to collect data. Six trained Health Extension Workers and three midwife nurses administered a questionnaire using face-to-face interviews. The data collection was supervised by two trained and experienced Health Officers.

Screenings were done at each health post in the randomly selected kebeles by the trained and experienced midwives. For the procedure, un-lubricated speculum was inserted into the vagina and the cervix visualized using a focus lamp to identify the Squamous-Columnar Junction (SCJ). After cleaning away any excess mucus using dry sterile gauze, a five percent acetic acid solution of five milliliters for each client was applied to the cervical Oss at Squamous-Columnar Junction for visual inspection with acetic acid. The findings were visible one minute after application of acetic acid. Indeed the standard operational procedure (SOP) to be followed for cervical cancer screening was strictly followed. The collected data were entered and cleaned using Epi-Info version 7 and exported to SPSS version 21 for analysis. Principally, binary logistic regression model was used to show the association between the study variables and controlling the confounding factors. Variables having p-value ≤ 0.25 in the bivariable analyses were selected and entered into a multiple logistic regression model to control the confounding effect amongst the variables. Odds ratio with 95%

confidence intervals (CI) were computed. The statistical significance was declared with p-value < 0.05 in the final model. All the assumptions of the analysis were checked to be satisfied. Positive VIA Result: If these changes are seen in the transformation zone and have well-defined borders lasting for more than one minute[7].

RESULTS

A sample of 633 women was planned for the study and all completed the questionnaire making the 100% response rate. The mean (+SD) age of the study participant was 36.2 (+5.2) years. The majorities, 505 (79.8%) were Muslim followed by Christians 128 (20.2%).. The predominant ethnic groups were Oromo, 559 (88.3%) followed by Amhara, 74 (11.7%). The majority of the respondents 564(89.1%) were currently married. About 464(73.3) never attended formal education and 553(87.4) were housewives by occupation (Table 1).

Out of all screened study participant, 30 (4.7%) [95% CI: 3.2%, 6.5%] of them were found to be positive for a VIA test result. Among those found to be positive for a VIA test, two of them had a larger lesion suspicious for invasive cervical cancer and were sent to hospital for further investigation and treatment (Figure 2).

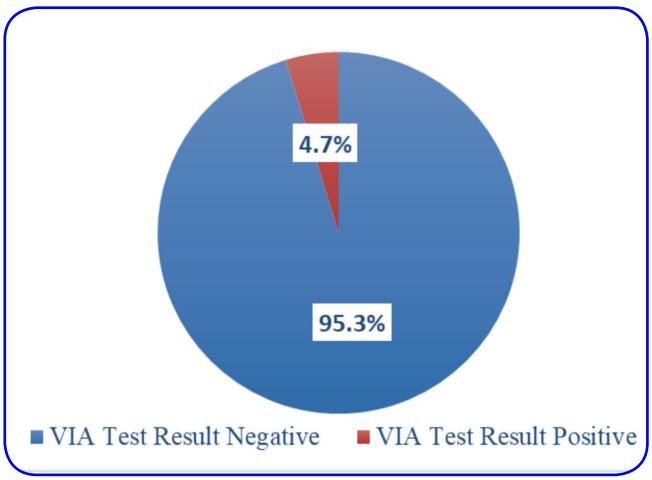

Figure 2: The prevalence of precancerous lesions of the cervix in Sude district, Arsi zone of Oromia Region, Eastern Ethiopia, 2020.

Table 1: Socio-demographic characteristics of study participants found in Sude district, Arsi zone, Oromia Regional state, Eastern Ethiopia, 2020.

Variables	Response Category	Frequency	Percentage (%)
Age	≤ 35	172	27.2(%)
	36-40	222	35.1(%)
	≥41	239	37.8(%)
Religion	Muslim	505	79.8(%)
	Christian	128	20.2(%)
Ethnicity	Oromo	559	88.3(%)
	Amhara	74	11.7(%)
Marital Status	Married	564	89.1(%)
	Widowed/Divorced	69	10.9(%)
Educational Status	Never attended formal education (Illiterate)	464	73.3(%)
	Literate	169	26.7(%)
Occupation	House Wife	553	87.4(%)
	Others*	80	12.6(%)

NB: Others include : *Daily laborer, trader, farmer and employ.

Table 2: Factors associated with precancerous lesions of the cervix among study participants in Sude District, Arsi Zone of Oromia Region, Eastern Ethiopia, 2020

Variables with category	VIA Test Result		COR (95% CI)	AOR (95% CI)
	Negative No (%)	Positive No (%)		
Age category				
≤ 35 years	281(96.6)	10(3.4)	1:00	1:00
36-40 years	194(99.5)	1(0.5)	0.15 (0.02, 1.14)	0.21(0.02,1.928)
≥ 41 years	128(87.1)	19(12.9)	4.17 (1.89, 9.23)	3.52(1.32, 9.39) *
Marital status				
Married	549(97.3)	15(2.7)	1:00	1:00
Widowed and Divorced	54(78.3)	15(21.7)	10.17(4.72, 21.92)	7.96 (2.84,22.32) **
Occupation				
House wife	537(97.1)	16(2.9)	1:00	1:00
Others	66(82.5)	14(17.5)	7.12(3.33, 15.25)	2.64(0.32, 21.63)
Age at first menses				
≤15 yrs.	521(96.3)	20(3.7)	3.17(1.44, 7.03)	0.64 (0.22, 1.90)
16-20 yrs.	82(89.1)	10(10.9)	1:00	1:00
Age at first marriage				
≤15 yrs.	71(86.6)	11 (13.4)	1.39(0.56, 3.58)	0.53(0.15, 1.94)
16-20 yrs.	451(97.8)	10 (2.3)	0.20(0.08, 0.51)	0.17 (0.05, 0.58)
≥ 21 yrs.	81(90.0)	9 (10)	1:00	1:00
Have more than one sexual partner				
No	479 (97.2)	14 (2.8)	1:00	1:00
Yes	124 (88.6)	16(11.4)	4.42(2.09, 9.29)	2.76(1.03, 7.36) *
Husband have wife other than you (Polygamy)				
No	554 (96.7)	19 (3.3)	1:00	1:00
Yes	49 (81.7)	11 (18.3)	6.55(2.95, 14.54)	4.42(1.45, 13.47) *
Had history of inheritance				
No	497(97.5)	13(2.5)	1:00	1:00
Yes	106(86.2)	17(13.8)	6.13(2.89, 13.01)	5.83(2.12, 16.4) **
Had history of pelvic infection				
No	510(97.3)	14(2.7)	1:00	1:00
Yes	93(85.3)	16(14.7)	6.27(2.96, 13.28)	2.74(0.89, 8.48)
Had history of STD/STI				
No	527(97.2)	15(2.8)	1:00	1:00
Yes	76(83.5)	15(16.5)	6.93(3.26, 14.75)	5.57(2.07, 14.96) **

N.B: * P< 0.05, ** P< 0.01, ***P< 0.001

*** Others incelude, daily labourer, trader, farmer and employee**

DISCUSSION

In this study, the prevalence of precancerous lesions of the cervix was found to be 4.7%, indicating a significant public health problem among women of reproductive age found in this rural community. Similar reports were observed in Rwanda (5.9%) and Nigeria (4.8-14%)[13,23]. Certainly, the estimated prevalence of precancerous lesions of the cervix among the general population of Ethiopia is as high as 13.4% [12]. The difference might be the data taken from facilities-based screening report and the finding of the current study is purely a community-based screening report. It is comparable to the studies in the facility level in Ethiopia which showed 14.1 % in Debre Markos, 22.1% in south Ethiopia among HIV- infected women, and 12.9% in Jimma town [5, 10, 24]. The differences might be due to the study setting (community vs. facility) and the clinical background of the screened women.

Being an older age group had higher odds of developing precancerous lesions of the cervix. Similar results were observed in Addis Ababa, Ethiopia, which found the odds of older age (40±49 years) were 2.4 times higher risk compared to women less than 40 years [12]. This might be due to the practice of sexual intercourse for more years and having given birth at an early age [11].

Widowed/divorced women were at higher risk of developing precancerous lesions of the cervix. This is corroborated by the reports from Rwanda and Debire Markos, Ethiopia, which demonstrated both divorced and widowed women have increased risk of developing precancerous cervical cancer lesions [11,13]. This might be due to the fact that divorced and widowed women may have risky sexual behavior with multiple partners when compared to married women [11]. Also, a woman who has more than one sexual partner was more likely to have precancerous lesions of the cervix. This result is supported by the finding of a study conducted in Uganda [14]. The association between precancerous cervical cancer lesion and multiple sexual partner behavior was also shown in a study done in Addis Ababa, Ethiopia[11-13]. Similar findings were reported in Debre Markos, Ethiopia [11]. This might be presumably because an increase in the number of sexual partners and sexual activity raises the risk of HPV transmission and the chance of infection with human papilloma virus (HPV) [11].

Women in polygamy were at higher risk of developing precancerous lesions of the cervix supporting the findings from Southwest Ethiopia[11]. This association is plausible given the women have a higher risk of acquiring HPV infection, presumably because of an increase in the number of the sexual partners [5]. Women who had a history of inheritance in their lifetime were more likely to develop precancerous cervical cancer lesion, supporting findings from Adama town, Ethiopia[11]. The possible justification could be that as the number and chain of sexual partner's increases, the risk of acquiring the HPV infection, the causative agent for precancerous lesions of the cervix, will increase. Similarly, women who had a history of STI were more likely to develop precancerous lesions of the cervix. It is consistent with findings from Adama, Ethiopia [9] and Yirgalem Hospital, south Ethiopia [10]. The association could be the result of HPV, which is the common cause of both STI and precancerous lesions of the cervix [10].

CONCLUSION

The prevalence of the precancerous lesions of the cervix in the study area was 4.7%. Older age of respondents, widowed and divorced, history of inheritance, having history of more than one sexual partner, polygamous husband, and having a history of STIs were associated with precancerous lesions of the cervix. Strategies like awareness creation and screening service at primary health care unit level is required. Also, special attention should be taken by the concerned bodies, including government, nongovernmental organizations, and other collaborative stakeholders to prevent the associated factors of precancerous lesions of the cervix.

LIMITATIONS

The study was conducted using a cross sectional study design which might not be possible to ascertain the direction of causality. Qualitative method was not considered as it is better in obtaining in-depth information about a sensitive issue and to complement the current quantitative findings. Moreover, social desirability bias is inevitable as the study involved a sensitive matter.

Ethics approval and consent to participate

The study was approved by the Ethics Review Board of Adama Hospital Medical College. The purpose and importance of the study were explained to the participants. Confidentiality and privacy were strictly assured. All the study participants were informed that they could participate voluntarily and that they had a full right to participate or decline from participating in the study at any time. Oral informed consent was obtained from all participants. For women with minor lesions, a treatment using cryotherapy was performed on the spot and those women found with larger lesion were referred to a nearby hospital for further investigation and treatment. Those women with cervical precancerous lesions and treated with cryotherapy were recommended to make follow up after three months for clinical evaluation and one year later for re-screening at their respective facilities where screening and treatment services are provided.

FUNDING OF THE STUDY

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COMPETING INTEREST

The authors have declared that no competing interests exist.

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KNOWLEDGE, AWARNESS AND WILLINGNESS OF WOMEN LIVING WITH HIV ON FOLLOW-UP AT JINKA GENERAL HOSPITAL REGARDING CERVICAL CANCER SCREENING: THE APPLICATION OF A HEALTH BELIEF MODEL

Selamawit Gebeyehu, MPH[1], Gurmesa Tura, PhD.[2], Bitiya Admassu, PhD.[2]

ABSTRACT

BACKGROUND: Cervical cancer is one of the leading causes of death in women worldwide. Women living with Human Immunodeficiency virus are at higher risk of acquire cervical cancer. Despite the importance of screening, the proportion of willingness for screening among these women is low in Ethiopia. Therefore, this study aimed to determine the magnitude of willingness for cervical cancer screening and its associated factors among women living with HIV.

METHODS: A facility-based cross-sectional study was conducted from March 14 to May 8, 2018. 341 women were selected by using systematic sampling method among adult HIV positive women attending treatment at Jinka General Hospital. The data were collected using an interviewer-administered questionnaire.
Bivariate and multivariable logistic regression analyses were used to determine the presence and the strength of association between dependent and independent variables by using odds ratio with 95% confidence interval.

RESULTS: The status of willingness for cervical cancer screening was 56.9% (95%CI; 51.6%, 62.1%). Women aged 40 years and above (AOR=2.58; 95% CI = 1.21-5.45), having two or less number of children (AOR=2.49; 95% CI =1.3-4.78), having awareness about cervical cancer screening (AOR = 4.85; 95% CI = 2.56-9.17), high perceived susceptibility (AOR=5.02;95%CI=2.74-9.18) and low perceived barrier (AOR=9.87; 95% CI = 5.34-18.31) were found to increase willingness for cervical cancer screening.

CONCLUSIONS: The finding of this study has important indications which call for a wide ranged public health approach directed to cervical cancer and its screening among HIV-positive women. The willingness, knowledge and awareness for cervical cancer screening is low. This calls for the need to create awareness and educate HIV-positive women about the availability of screening and usefulness of utilizing the screening service by using different mass media. Being young , having two or fewer number of living children, awareness about cervical cancer screening, perceived susceptibility, and perceived barriers were predictors of willingness for cervical cancer screening.

KEY WORDS: Cervical, Cancer, Willingness, screening, Jinka.

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INTRODUCTION

Cervical cancer is a cancer of the cervix which is the easiest gynecologic cancer to prevent and has a gradual onset with precancerous change. Globally, it accounts for 7.5% of all female cancer deaths[1–3]. Prevention and intervention at an early stage have a 100% cure rate and long survival. Persistent infection with one of the high-risk human papillomavirus (HPV) especially HPV 16 and 18 is the most common cause of cervical cancer cases [4–6].

Every year, more than 528,000 women develop cervical cancer and about 266,000 women die from the disease worldwide[2]. Over the past decades, the incidence and mortality had dropped in high-income countries. In contrast, similar success has not yet been achieved in low and lower-middle-income countries where the incidence is increasing. This drastic difference is due to the lack of access to effective screening and services that facilitate early detection and treatment [1,5,7].

Many countries that have a high rate of cervical cancer morbidity and mortality are also burdened with HIV, such as those in sub-Saharan Africa. Even if all women are at risk for cervical cancer, women infected with HIV have an increased risk for the development of cancer due to certain risky behavior like multiple sexual partners and HIV associated immunosuppression, which lead to decreased HPV clearance and accelerate malignant transformation[3,8]. This can put women in a devastating condition with a very high human, social and economic cost.[2].

Despite the high risk for acquiring cervical cancer in HIV positive women, willingness, awareness, knowledge, and acceptability of screening is low. In Nigeria for example, 34.5% of respondents were aware of cervical cancer screening but only 9.4% of respondents had ever been screened for cervical cancer [9]. In a study in Addis Ababa, Ethiopia, more than a third of participants (37.3%) were not willing to be screened due to fear of being positive for the test and assuming the test as time-consuming and high cost[10].

Even though HIV treatment guidelines of Ethiopia recommend prevention and screening of cervical cancer as a key element in chronic HIV care, only 1% of eligible women receive screening for cervical cancer. Similarly, cervical cancer screening remains very low across several countries in SSA because of low levels of awareness, challenges with health-seeking behavior, non-willingness among patients, and low accessibility of the screening services and health system barriers[11].

Moreover, there are very few studies done on cervical cancer and its screening in Ethiopia. However, These studies were limited by not addressing the behavioral determinants of willingness for cervical cancer screening. Similarly, no study has been done in the study area on willingness for cervical cancer screening and its determinates. So, this study aimed at determining the status of willingness for cervical cancer screening and determinant factors among HIV positive women on HIV care by using Health belief model in order to identify behavioral related determinants, with the hope that the findings of the study will be used by decision-makers to improve the program. (Figure 1).

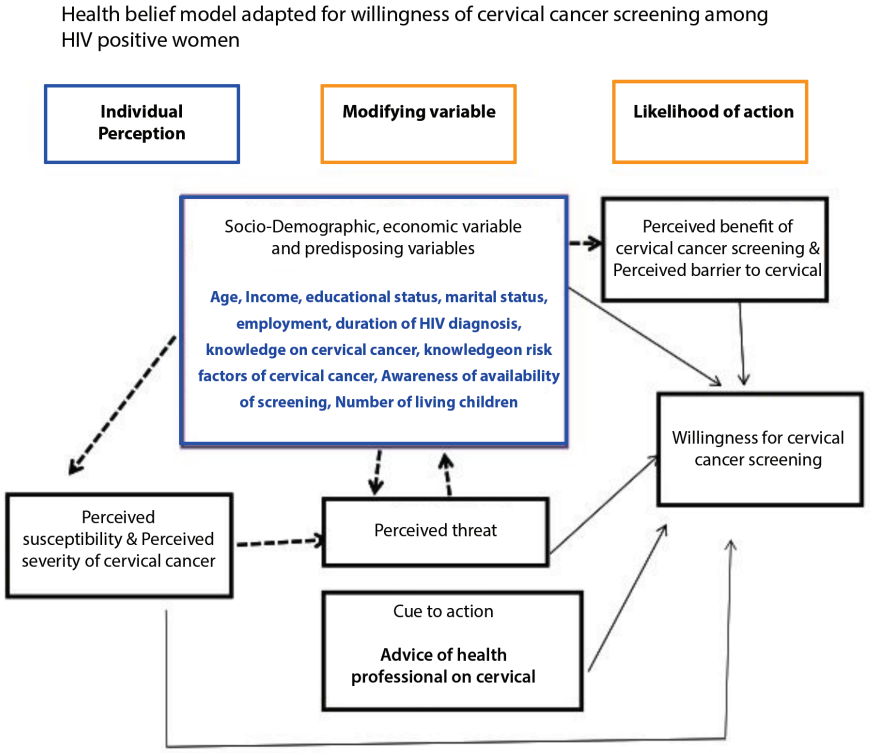

Figure 1 conceptual frame work for willingness to cervical cancer screening and associaed factor among HIV positive women on followup at Jimka General Hospital adapted from Stretcher V. Rosen stock I,M(1997)

METHOD AND MATERIALS

Study design and area: This facility-based cross-sectional study was conducted in ART treatment units of Jinka General Hospital from March 14 to May 8, 2018. Jinka General Hospital is found in Jinka town, South Omo Zone, Southern, Ethiopia.

Study population: The study population for this study were randomly selected women living with HIV/AIDS and on follow-up at Jinka General Hospital during the study period.

Inclusion and Exclusion criteria: Inclusion criteria considered for this study were all HIV positive women who were on follow- up at Jinka General Hospital and aged 18 years and above, Women who had screening for cervical cancer and had positive screening test were excluded from the study.

Sample size determination: A single population proportion formula was used to determine the required sample size based on the following assumptions. The proportion of HIV positive women willing to cervical cancer screening was assumed to be 62.7% (10) .With 95% level of confidence and, 5% margins of error, the required sample size was calculated to be 358.

Sampling technique: The respondents for this study were selected by using systematic random sampling technique.

Operational definitions

Willingness for cervical cancer screening: By asking the question, "Are you willing to be screened for cervical cancer?"If a woman responded yes, she was regarded as willing, otherwise she was regarded as not willing.

Awareness of cervical cancer screening: if a woman answers at least two and above awareness related questions correctly she was regarded as having awareness on cervical cancer testing, otherwise she was regarded as being not aware [9].

Knowledge of cervical cancer: if a woman answered correctly 6 and above questions out of 12 cervical cancer knowledge related questions, she was regarded as knowledgeable about cervical cancer, otherwise she was regarded as not knowledgeable.[9]

Perceived susceptibility: If a woman scored above

the mean score of perceived susceptibility related questions she was regarded as having high perceived susceptibility, otherwise she was regarded as having low perceived susceptibility.

Perceived severity: If a woman scored above the mean score of perceived severity related questions she was regarded as having high perceived severity, otherwise she was regarded as having low perceived severity.

Perceived benefit: If a woman scored above the mean score of perceived benefit related questions she was regarded as having high perceived benefit, otherwise she was regarded as having low perceived benefit.

Perceived barriers: If a woman scored above the mean score of perceived barrier related questions she was regarded as having high perceived barrier, otherwise she was regarded as having low perceived barrier.

Data collection instrument and procedures: Data were collected using interviewer administered structured-questionnaires. The questionnaire included socio-demographic and economic, knowledge on cervical cancer and awareness on cervical cancer screening, willingness for screening and perception of cervical cancer-related questions. To measure perception about cervical cancer, the Health Belief Model Scale for Cervical cancer and the Pap Smear Test' was used in four subscales: susceptibility, seriousness, benefits, and barriers [12]. The questionnaire was initially prepared in English and then translated into Amharic and back to English to ensure its consistency. Then it was pretested in Arba Minch hospital on 5% of the sample size (16 women).

Data quality management: In addition to the pretest, all the data collectors and supervisors were given 2 days training on data collection techniques and procedures. Two BSc Nurses for data collection and one Health Officer for supervision was recruited from ART clinic in the Hospital and trained for two days on data collection. Supervision was done by supervisors to check for completeness, and consistency of the collected data throughout the data collection period. Errors identified during data collection were corrected accordingly at the field and those errors occurred during/after data entry were corrected by revising the original questionnaire.

Data processing and Analysis: Data were coded and entered into EpiData version 3.1 and exported to SPSS version 23 for analysis. First, descriptive analysis was done to describe the variables involved in the study. Then the prevalence of willingness was computed. Chi-square test of association was conducted to assess the association between each categorical variable with the outcome variable and to identify candidate variables (with p-value ≤ 0.25) to be included in the multivariable logistic regression model. Then the multivariable logistic regression model was fitted using a backward stepwise variable selection method to identify variables independently associated with the outcome variable of interest at a 5% significance level. The AOR and the corresponding 95% CI for the variables in the final model were reported. The goodness of fit of the final model was assessed using Hosmer and Lemeshow goodness of fit test and the test had p-value of 0.73.

Ethical consideration: Ethical clearance was obtained from the Institutional Review Board (IRB) of the Institute of Health of Jimma University. Then, a formal letter was obtained to South Omo Zone Health Office and Jinka General Hospital. An informed consent was obtained from each study participant before conducting data collection. The names of respondents or any identifiers were not included in the questionnaire.

RESULT

Socio-demographic characteristics

A total of 341 respondents participated in this study with a response rate of 95.25%. The mean age of the participants was 32.8± 7.7 years. (Table 1).

Table 1: Socio-demographic, economic and obstetric characteristics of HIV positive women attending adult ART clinic in Jinka General Hospital , Southern Ethiopia, May 2018 (n=341).

Variable	Category	Frequency	Percent (%)
Age in years	18-29	99	29.0
	30-39	108	31.7
	≥40	134	39.3
Educational status	No formal education	207	60.7
	Primary	63	18.5
	Secondary	50	14.7
	College and above	21	6.2
Religion	Orthodox	194	56.9
	Protestant	101	29.6
	Muslim	33	9.7
	Other a	13	3.8
Ethnicity	Ari	168	49.3
	Amhara	82	24.0
	Mursi	51	15.0
	Oromo	19	5.6
	Tigray	13	3.8
	Otherb	8	2.3
Occupation	Housewife	93	27.3
	Daily laborer	75	22.0
	Government employee	64	18.8
	Merchant	31	9.1
	Student	29	8.5
	Farmer	26	7.6
	Private employee	23	6.8
Marital status	Married	184	53.9
	Divorced	63	18.5
	Single	58	17.0
	Widowed	36	10.6
Income	Have no regular monthly income	145	42.5
	Have regular monthly income	196	57.5
Number of pregnancy	Null gravida	72	21.1
	1-2	77	22.6
	3-4	109	32.1
	≥ 5	83	24.3
Number of deliveries	Nulliparous	4	1.5
	1-2	107	39.8
	3-4	94	34.9
	≥5	64	23.8
Living children	≤ 2	202	59.2
	≥ 3	139	40.8
Duration of HIV diagnosis	≤ 5 years	185	54.3
	6-10 years	143	41.9
	11-15 years	13	3.0

Others a = Catholic, Adventist, and Jewish; Others = Gofa, Gamo

Knowledge about cervical cancer

Overall, 91 (26.1%) of the respondents were knowledgeable about cervical cancer.

Table 2: Knowledge of cervical cancer among HIV positive women attending adult ART clinic in Jinka General Hospital , Southern Ethiopia, May 2018

Variable		Frequency	Percent
Did you hear about Cervical Cancer?	Yes	131	38.4
	No	210	61.6
Source of information	Health professional	108	31.7
	Other	231	68.3
Risk factor for cervical cancer	Having many sexual partners	99	81.1
	Early sexual initiation	37	30.3
	smoking cigarette	33	27
	using oral contraceptive	23	18.9
	Sexually transmitted infections	19	15.6
Symptoms of cervical cancer	vaginal discharge	85	81.7
	excessive vaginal bleeding	84	80.8
	lower abdominal pain, and	52	50
	minimal vaginal bleeding during sex	53	51
Do you believe Cervical Cancer is preventable?	Yes	117	89.2
	No	14	10.8

Table 3: Awareness, Perception of cervical cancer screening, and history of screening among HIV positive women attending adult ART clinic in Jinka General Hospital, Southern Ethiopia, May 2018

Variable		Frequency	Percent
Awareness of cervical cancer screening	Aware	140	41.1
	Not aware	201	58.9
Perceived susceptibility	High	215	63.1
	Low	126	36.9
Perceived severity	high	189	55.4
	Low	152	44.6
Perceived benefits	High perceived benefits of the screening services	190	55.7
	Low	151	44.3
Perceived barriers	High perceived barriers to use the screening.	167	49
	Low	174	51
Ever screened for cervical cancer	Yes	55	16.1
	No	286	83.9

Willingness for cervical cancer screening

Among the respondents, 194 (56.9%; 95%CI; 51.6%, 62.1%) were willing to be screened for cervical cancer.

Factors associated with the willingness of Cervical Cancer screening

In the multivariable analysis, age, number of living children, awareness on cervical cancer screening, perceived susceptibility and perceived barrier had statistically significant association with willingness for cervical cancer screening (Table 2).

Respondents who had two or fewer living children were more than two times (AOR=2.49; 95% CI: 1.3, 4.78) more likely willing to be screened for cervical cancer as compared with women who had three or more children. The odds of willingness for cervical cancer screening among women who were forty years or above were more than two times higher compared to women were less than 29 years (AOR=2.58;95% CI:1.21, 5.45). HIV positive women who had awareness of cervical cancer screening were nearly five times (AOR=4.85; CI: 2.56-9.17) more likely to be willing to be screened for cervical cancer compared to women who were not aware of cervical cancer screening. The odds of willingness to be screened for cervical cancer among women with low perceived barriers were about ten times higher compared with women with high perceived barriers (AOR= 9.87; 95% CI: 5.34, 18.31). Women with high perceived susceptibility were five times (AOR= 5.02; 95% CI: 2.74, 9.18) more likely willing to be screened for cervical cancer compared to women with low perceived susceptibility (Table 2).

Table 4: Bivariate and multivariable analysis of factors associated with willingness for Cervical Cancer screening among HIV positive women, Jinka General Hospital, Southern Ethiopia, May 2018 (n = 341).

Variables	Category	Willingness for Cervical cancer screening		COR(95%CI)	AOR(95%CI)
		Yes n(%)	No n(%)		
Age in year	18-29	52 (52.5)	47(47.5)	1	1
	30-39	40 (37.0)	68(63.0)	0.53(0.31-0.93)	0.52(0.26-1.05)
	≥40	102 (76.1)	32(23.9)	2.88(1.65-5.04)	2.58(1.21-5.45)
Education status	No formal education	90 (43.5)	117(56.5)	1	
	Primary	41 (65.1)	22 (34.9)	2.42 (1.35-4.35)	
	Secondary	45 (90.0)	5 (10.0)	11.7 (4.46-30.68)	
	Tertiary	18 (85.7)	3 (14.3)	7.8 (2.23-27.3)	
Income	No regular income	66 (45.5)	79 (54.5)	1	
	Regular income	128 (65.3)	68(34.7)	2.25 (1.45-3.5)	
Number of pregnancy	null gravida	46 (63.9)	26 (36.1)	2.31 (1.21-4.42)	
	1-2	50 (64.9)	27 (35.1)	2.42 (1.28-4.58)	
	3-4	62 (56.9)	47 (43.1)	1.85 (1.04-3.31)	
	≥5	36 (43.4)	47 (56.6)	1	
Number of living children	≤ 2	125 (61.9)	77 (38.1)	1.65 (1.06-2.55)	2.49(1.3-4.78)
	≥3	69 (49.6)	70 (50.4)	1	1
Knowledge of cervical cancer	Not knowledgeable	125 (50.0)	125 (50.0)	1	
	Knowledgeable	69 (75.8)	22 (24.2)	3.14 (1.82-5.38)	
Awareness of cervical cancer screening	**Not aware**	**87 (43.3)**	**114 (56.7)**	**1**	**1**
	Aware	**107 (76.4)**	**33 (23.6)**	**4.25(2.63-6.86)**	**4.85(2.56-9.17)**
History of cervical cancer screening	**Yes**	**41 (74.5)**	**14 (25.5)**	**2.55(1.33-4.87)**	
	No	**153 (53.5)**	**133 (46.5)**	**1**	
Perceived susceptibility	**Low**	**45 (35.7)**	**81(64.3)**	**1**	**1**
	High	**149 (69.3)**	**66 (30.7)**	**4.06(2.55-6.47)**	**5.02(2.74-9.18)**
Perceived severity	**Low**	**42(27.6)**	**110(72.4)**	**1**	
	High	**152(80.4)**	**37(19.6)**	**10.75(6.49-17.83)**	
Perceived benefit	**Low**	**41(27.2)**	**110(72.8)**	**1**	
	High	**153(80.5)**	**37(19.5)**	**11.09(6.68-18.48)**	
Perceived barrier	**Low**	**138 (79.3)**	**36 (20.7)**	**7.59(4.66-12.37)**	**9.87(5.34-18.31)**
	High	**56 (33.5)**	**111(66.5)**	**1**	**1**

DISCUSSION

The key contribution of this paper is to show the status of knowledge, awareness and willingness for cervical cancer screening and associated variables among HIV positive women on follow up at Jinka General Hosipital. The fndings have important implications, particularly in Ethiopia, where the burden of the disease is high but the utilization of secondary prevention services is still low, especially in high risk group HIV positive women[13].

This study showed that 56.9% of women were willing to have cervical cancer screening. This finding was lower as compared with a study done in Mozambique (84%) and in Addis Ababa, Ethiopia (62.7%) [10,14]. These differences could be due to differences in age and the knowledge level of the study participants. Participants in the Addis Ababa study were older [10]. Most of the participants of the Mozambique study were knowledgeable regarding cervical cancer. But, it is higher than a study done at Dabat district, Northwest Ethiopia in which 17.1% of the participants decided to be screened within the next two months [15]. This discrepancy might be due to the time differences which could cause the implementation of different interventions which might improve the accessibility of the service.

In this study 16.1% of the participants were ever screened for cervical cancer. The finding of this study is comparable with the pooled prevalence of cervical cancer screening among HIV-positive women in Ethiopia (18.17%)[16]. However, this is lower than the national target (80%) of cervical cancer screening[17].Similarly, its lower than a study done Hawassa town public health facilities where 40.1% of HIV positive women utilize cervical cancer screening and 24% HIV positive women attending adult anti-retroviral treatment clinics in Bishoftu town were ever screened for cervical cancer[13]. This might be due to the improved expansion and access of screening centers especially after the start of VIA in many health facilities, the enhanced nation-wide advocacy, media concern, community sensitization and awareness creation through expansion of urban health extension program about the CCS that has been put into effect in recent years (time difference)[18].

In this study 26.1% of the respondents were knowledgeable about cervical cancer, which is lower than the findings of studies done in Nairobi, Kenya (72%) and Mekelle, Ethiopia (82.5%) [19,13]. This difference may be due to difference in socio-demographic characteristics of participants, differences in access to mass-media or level knowledge.

According to this study, woman who were forty years and above were more than two times more likely to be willing to have cervical cancer screening compared to women less than 29 years. This finding is in line with studies done at Nairobi, Kenya, Dar es salaam, at Addis Ababa, Ethiopia and Mekelle, Ethiopia [19,15,10,13]. This may be explained by the fact that as the more one gets older, the more that they will be concerned about their health. Therefore, they see themselves as being at risk and seek care. However, this result is inconsistent with studies done in London, UK, in Nunavik Canada and Korea, where older women were less likely to be willing for cervical cancer screening [16,17,18]. This inconsistency may be due to the integration of cervical cancer screening with different services in the countries that result in the early engagement of women which might made the women reluctant due to a repeated hospital visit[16,17,18].

In this study, women who had two or fewer number of living children were more than two times more likely to be willing for cervical cancer screening as compared with those who had three or more children. This finding is in line with studies done in Dar es Salaam, Tanzania and Lagos, Nigeria[9,15]. In this study majority of the women were housewives and women with large family size, thus they will be likely to be engaged (preoccupied) with house hold activities and might not pay adequate attention for their health. Also, the possible reason could be lack of awareness or knowledge as most of the housewives are uneducated.

This study showed women who were aware of cervical cancer screening were nearly five times

more likely to be willing to have cervical cancer screening. This finding is in line with studies done in Dar es Salaam, Addis Ababa and Mekelle [15,10,13]. This may be due to the reason that when women are aware of the disease and its screening, they may have low perceived barrier and seek the screening.

In this study, women who had high perceived susceptibility to cervical cancer were more likely to be willing for its screening as compared with those who had low perceived susceptibility. This finding is consistent with the finding of a study conducted in Mildmay Uganda, in which respondents who perceived themselves as at risk of developing cervical cancer were more likely to seek its screening [25]. Another study done in Kenya at Nationwide and Mekelle zone northern Ethiopia showed women who had receptive perception of their potential susceptibility to develop cervical cancer were more likely to be screened, as compared with those who had non-receptive perception [24,26]. This could be explained by women having information about the disease and knowing their susceptibility are more likely undergo screening to protect themselves.

This study also revealed that women who had low perceived barriers were more likely to be willing for cervical cancer screening compared with women with high perceived barriers. This is consistent with studies done at London and Dar es Salaam in which fear of the test procedure and perceived barrier were the factors that prevent women from taking screening [17,15]. Similarly, in a study done at Mekelle in Ethiopia women who had no perceived barriers were 2.3 times more likely to be screened than those who have perceived barriers [13]. It was supported by a qualitative study done at Mildmay , Uganda, among HIV positive women, which found the major hindrances for screening included various fears and misconceptions about the screening procedures [20]. This may be due to perceived barriers of specific health problems are more powerful in affecting healthcare-seeking behavior [12]

CONCLUSIONS AND RECOMMENDATION

The findings of this study have important indications which call for a wide range public health approach directed to cervical cancer and its screening among HIV-positive women. The willingness, knowledge and awareness for cervical cancer screening is low. This calls for the need to create awareness and educate HIV-positive women about the availability of screening and usefulness of utilizing the screening service. Young age, having two or fewer number of living children, awareness on cervical cancer screening, perceived susceptibility and perceived barrier were all predictors of willingness for cervical cancer screening. South Omo Zone health office should increase awareness of HIV positive women about cervical cancer and its screening through different meetings and use of mass media. Also, it should develop different strategies that are targeted to women less than 40 years to increases their number involved in screening because early intervention is important for detecting and management of the disease and should encourage screening among women who had three or more children through campaigns at kebele level. Furthermore, studies should consider the possibility of exploring the problem from the health providers' perspective in order to come up with a better plan for intervention so as to address the problem.

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PREVALENCE AND DETERMINANT FACTORS OF UNINTENDED PREGNANCY AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINICS OF SHASHAMANE HOSPITALS

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ABSTRACT

BACKGROUND: Unintended pregnancy is defined as a pregnancy that is a sum of mistimed pregnancy (pregnancy wanted at a later time) and unwanted pregnancy (pregnancy which is not wanted at all). Unintended pregnancy remains a major public health problem in sub-Saharan countries, including Ethiopia. Therefore, the main aim of this study was to assess the magnitude and determinants of unintended pregnancy among pregnant women attending antenatal clinics of Shashemene hospitals.

METHODS: An institutional-based cross-sectional study was conducted among 380 pregnant women from March 25 to April 30/2019. A systematic random sampling technique was used to select the study participants. Data was collected through a pre-tested interviewer-administered questionnaire and it was entered into EPIdata 3.1 and exported to SPSS 24 for further analysis. Binary and multivariate logistic regression analysis was used to identify significant factors. Variables with P-value < 0.05 were used to declare statistical significance.

RESULT: The magnitude of unintended pregnancy was 31.1%. Age 35-45 years (AOR=0.2 95% CI; 1.057-0.8), parity ≥3 (AOR= 9.7 95% CI; 2.0-47.7), poor knowledge of family planning (AOR= 2.85 95% CI; 1.54-5.3), having rural residence (AOR = 1.27 95% CI; 2.15-4.5), and husbands' educational level (AOR= 4.34 95%CI; 2.16-9.73) were factors associated with unintended pregnancy.

CONCLUSION: The magnitude of unintended pregnancy is high in the study area. Low educational status of the husband, maternal age, parity, residence, and knowledge of mothers about family planning were the most important determinant factors of unintended pregnancy.

KEY WORDS: Unintended pregnancy, factors, Ethiopia

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INTRODUCTION

According to the World Health Organization, unintended pregnancy is defined as a pregnancy that is not wanted and/or not planned at the time of conception[1]. Unplanned pregnancy happens mainly due to the results of not using contraception or inconsistent or incorrect use of effective contraceptive methods[1]. Unintended pregnancy is one of the measures of quality of reproductive health service success or failure[2-3]. It can occur due to different reasons such as:; not using family planning, failure/lack of contraceptive methods, rape, and lack of knowledge regarding family planning[4-6]. Unintended pregnancy is a worldwide problem that affects women, their families, and societies at large. It is an important public health concern in both the developing and developed world because of its association with adverse social and health outcomes, for both mothers and children[7].

Among 208.2 million pregnancies in the world, 41% are unintended. Also, 213 million pregnancies occur each year, 89% of this occurs in developing countries, and 40% of these are unintended pregnancies; the majority of unplanned pregnancies end in abortion. Unintended pregnancies and births are most common among young unmarried women, especially teenagers and the most disadvantaged groups[1,3].

Unintended pregnancy has a direct relation with poor utilization of maternal health care services. Researches relate unintended pregnancy with poor antenatal care utilization, which is a risk factor for unfavorable pregnancy outcome and maternal morbidity and mortality [6-7]. In addition, unintended pregnancy results in unsafe abortion, which is the other main cause of maternal mortality and morbidity [6-7].

In less developed regions, in 1000 pregnancies, an average of 57 of them were unintended and the pregnancies resulted in unplanned birth, abortion, and miscarriage[8,9]. In Ethiopia, every year on average 620,296 induced abortions were performed; 103, 648 women were treated for complications of such abortions. Around 53% of abortions were legal and performed in the health facilities; whereas 47% of all abortions occurred outside of health facilities[10]. According to EDHS 2016, 22% of married women had an unmet need for family planning. On the other hand, 9% of births were not wanted and 16% of births were mistimed[11].

Unintended pregnancy is one of the most evident issues for the violation of women's sexual and reproductive rights in developing countries. Despite the availability of highly effective methods of contraception, different studies in Ethiopia revealed that there is a high level of unintended pregnancy[11].

This study was aimed at assessing the magnitude and associated factors of unintended pregnancy among pregnant women attending antenatal care in Shashemene public hospitals, Ethiopia.

METHOD

Study area and period

This study was conducted in Shashamane town public hospitals from Mar 25- April 30/2019. The town is located about 240 km from Addis Ababa. According to the 2007 national census report, the town has a total population of 100,454; out of which 49,800 were women. The town has two hospitals that serve at district and referral levels

Study design

An institutional-based cross-sectional study

Populations

Source population

All pregnant women attending antenatal care (ANC)

Sample size determination and sampling procedure

The required sample size was determined using a single population proportion formula by considering the proportion of unintended pregnancy from a previous study 34% [14], 95% confidence interval (CI), and 5% of margin of error. After adding 10% for the non-response rate, the final sample was 380 women.

Study Population To select study participants, systematic random sampling technique was used. From the registered 1 month ANC data of hospitals, the expected number of study population during the study period was 820 (440 at Shashemene referral and 380 at Melkaoda hospital). The Kth interval number approximates 2 and the first number was taken randomly between 1 and 2 that was 2, then the rest samples were taken every 2nd digit interval. Based on population size to proportional allocation, samples of 204 from Shashemene referral hospital and 176 from Melkaoda hospital were selected.

Data collection method and quality assurance

A structured interviewer-administered face-to-face interview was used to collect data. The questionnaire consisted of sociodemographic and economic characteristics, sexual behaviors, and behavioral characteristics of participants which were initially prepared in English and translated into local languages (Amharic) and back-translated to the English language by three language experts to check the consistency. A total of two diploma midwife data collectors were involved in the study. Data collectors received one day of training before data collection. A pretest was done on 19 (5%) of the sample at Shashemene health centers. The principal investigator and one BSc midwife had supervised the performance of the data collectors daily. The collected data were checked for completeness and consistency.

Data Processing and Analysis

The collected data were checked for completeness, coded, and entered into EPI data version 3.1, and analyzed using SPSS version 24. Summary statistics such as percentage and frequency were computed. Bivariate analysis, COR with 95% CI was used to see the association between each independent variable and the outcome variable. AOR with 95% CI was estimated to identify the factors associated with unintended pregnancy using multivariate logistic regression analysis. The level of statistical significance was declared at a p-value ≤ of 0.05.

Operational Definition

Unintended pregnancy: Is the combination of unwanted and mistimed at the time of conception. Knowledge of contraceptive methods: seven knowledge questions about modern contraceptive methods were used and those who answered five or more questions were categorized as good knowledge & those who answered less than five were grouped as poor knowledgeable

Ethical approval and consent to participant

Ethical clearance of the study was obtained from Arba Minch University and then Shashemene administrative town wrote a formal letter to each hospital and permission was taken from each hospital. After the purpose and objective of the study were given, informed verbal consent was obtained from each study participant. All the study participants were informed about the purpose of the study. Their information was kept confidential by excluding their names in the questionnaire

RESULT

Socio-demographic characteristics of respondents

A total of 380 respondents were involved in the study with a response rate of 100%. The mean age of the respondent was 25.02 with (SD± 5.213) with minimum and maximum age of 15 and 45 years respectively. The majority, 366(96.3%) of the respondents were married, and nearly half, 182(47.9%) of respondents had completed primary school. More than half, 210(55.3%) of the respondents had a family monthly income > 2000 Ethiopian Birr (Table 1).

Table 1: Socio-demographic and economic characteristics of pregnant women attending antenatal care in Shashamane hospitals, Ethiopia, 2019 (n = 380).

Characteristics	Classifications	Number	Percentage
Age group (in years)	15-19	58	15.3
	20-24	116	30.5
	25-29	126	33.2
	30-34	58	15.3
	35-39	20	5.2
	≥40	2	0.5
Marital status	Married	366	96.3
	Divorced	7	1.8
	Widowed	5	1.3
	Single	2	0.5
Religion	Orthodox Christian	63	16.6
	Muslim	245	64.5
	Protestant	68	17.9
	Others*	4	1.1
Ethnicity	Oromo	311	81.8
	Amhara	21	5.5
	Sidama	5	1.3
	Wolaita	18	4.7
	Others**	25	6.6
Residency	Urban	219	57.6
	Rural	161	42.4
The educational level of the mother	No formal education	57	15.0
	Primary (1-8)	182	47.9
	Secondary (9-12)	109	28.7
	College and above	32	8.4
Occupational status	Government Employees	30	7.9
	Non-governmental occupations	350	92.1
Families' monthly income level. The median income was 2000	Less or equal to 2000	170	44.7
	Greater than 2000	210	55.3

Obstetrics characteristics of respondents

Around, 177(46.6%) of respondents had more than or equal to three gravidities, and.78 (20.5%), of respondents, had a history of unwanted pregnancy. From unplanned current pregnancy, 58 (74.4%) of respondents were due to nonuse of family planning and 15(19.2%) were due to failure of family planning. More than half, 235(61.8%) of respondents had a history of institutional delivery and 345(90.8%) of respondents had a history of ANC follow-up (Table 2).

Table 2: Obstetric characteristics of pregnant women attending antenatal care in Shashamane hospitals, Ethiopia, 2019 (n = 380).

Characteristics	Classification	Number	Percent (%)
Gravidity	One	104	27.4
	Two	99	26
	Three and above	177	46.6
Parity	One	110	39.9
	Two	63	22.8
	Three and above	103	37.3
Is current pregnancy unplanned	Yes	118	31
	No	262	68.9
Cause of unplanned pregnancy	Failure of FP	15	19.2
	Nonuse of FP	58	74.4
	Rape	3	3.8
	Other	2	2.6
History of abortion	Yes	65	17.1
	No	315	82.9
History of stillbirth	Yes	44	11.6
	No	336	88.4
History of institutional delivery	Yes	235	61.8
	No	145	38.2
History of ANC follow up during first pregnancy	Yes	345	90.8
	No	35	9.2
Number of ANC follow up in current pregnancy	One	95	25
	Two	114	30
	Three	118	31.1
	Four and above	53	13.9

Prevalence of unintended pregnancy

The overall prevalence of unintended pregnancy was 31% (95% CI 25.5, 36.50).

Utilization of family planning

About half, 201(52.9%) of respondents had a history of contraceptive use and 8320(4.2%) had future intentions to use family planning. Of those who have a history of using contraceptives majority, 100(49.7) % of respondents used Injectables. Of nonusers, 98(54.7%) did not use it due to fear of abnormal bleeding (Table 3).

Table 3: History of family planning Utilization among pregnant women attending antenatal care in Shashemene hospitals, Ethiopia, 2019 (n = 380).

Characteristics	Classification		Number	Percent (%)
Have a history of using family planning	Yes		201	52.9
	No		179	47.1
Do they have future intention to use FP	Yes		320	84.2
	No		60	15.8
Types of FP used	Pills		48	23.9
	Emergency pills		9	4.5
	Condom		4	2
	IUCD		6	3
	Implants		30	14.9
	Injectables		100	49.7
	Others traditional methods		4	1.9
Reason for not using family planning	Fear of side effect	Yes	48	26.8
		No	131	73.2
	Believing that it could cause abnormal bleeding	Yes	98	54.7
		No	81	45.3
	Because her husband does not allow	Yes	22	12.3
		No	157	87.7
	Because of religion	Yes	44	24.6
		No	135	75.4
	Other reason	Yes	32	17.9
		No	147	82.1

Knowledge on contraceptives use as prevention of unintended pregnancy

The majority, 261(68.7%) of respondents reported that contraceptives can be used to prevent unplanned pregnancy and 163(42.9%) of respondents reported that contraceptives can be used to **prevent possible maternal death** (Table 4)

Table 4: Knowledge of use of contraceptives among pregnant women attending antenatal care in Shashemene hospitals, Ethiopia, 2019 (n = 380).

Characteristics	Classification	Values	Frequency	Percent (%)
Do you believe that contraceptives		Yes	347	91.3
help couples to become responsible parents		No	33	8.7
What are general uses of contraceptives	Prevent unwanted pregnancy	Yes	261	68.7
		No	119	31.3
	Prevent possible maternal death	Yes	163	42.9
		No	217	57.1
	Limiting the number of children	Yes	242	63.7
		No	138	36.3
	*Child spacing	Yes	261	68.7
		No	119	31.3

Factors associated with unintended pregnancy

In bivariable analysis, age of respondent, marital status, educational status of mothers, history of institutional delivery, number of parities, stillbirth, abortion, knowledge of FP, and ANC follow up were associated with unintended pregnancy at P < 0.2, but other variables were not significant.

Variables which had a significant level of P < 0.2 were inserted into the model in the multivariable logistic regression analysis process. The variables like mothers' knowledge towards family planning use, residency, age of the mother, parity, and husband's educational level were factors associated with an unintended pregnancy.

35-45 years old had 0.2 times less risk of unplanned pregnancy than those age groups from 15-24 years (AOR=0.2 95% CI 0.057-0.8). The high odds of unintended pregnancy were observed among women who lived in rural areas (AOR= 1.27, 95% CI 2.15-4.5), husband's educational level of primary (AOR=4.34 95% CI 2.16-9.7), parity of three and above (AOR= 9.7, 95% CI 2.0-47.7), and poor knowledge towards family planning use (AOR= 2.85, 95% CI 1.54-5.3 (Table 5)

Table 5: Bivariate and multivariable logistic regression analyses of unintended pregnancy among pregnant women attending antenatal care in Shashamane hospitals, Ethiopia, 2019 (n = 380).

Variables	Status of pregnancy		95% CI	
Age of mother	Intended	Unintended	COR	AOR
15-24	134	40	1	1
25-34	112	72	2.15(1.36-3.41)	0.86(0.43-1.76)
35-45	16	6	2.26(0.46-3.42)	0.2(0.057-0.8) *
Marital status				
Married	253	113	0.6(0.13-2.7)	0.38(0.05-2.7)
Divorced	5	2	0.5(0.06-4.9)	0.9(0.06-14.1)
Others #	4	3	1	1
Residence				
Urban	172	47	1	1
Rural	90	71	3.2(1.84-4.5)	1.27(2.15-4.5)*
Mother's level of education				
No formal education	35	22	1.43(0.75-2.75)	1.1(0.37-3.15)
Primary	129	53	0.94(0.58-1.51)	0.88(0.44-1.8)
Secondary and above	98	43	1	1
Husband's level of education				
No formal education	28	14	1.0(0.5-2.0)	0.6(0.2-2.0)
Primary	76	28	0.76(0.46-1.28)	4.34(2.16-9.7)*
Secondary and above	158	76	1	1
Parity				
One	79	31	1	1
Two	40	23	1.46(0.76-2.8)	3.1(0.64-14.99)
Three and above	51	51	2.5(1.44-4.49)	9.7(2.0-47.7) *
History of unwanted pregnancy				
Yes	41	37	2.46(1.5-4.1)	1.3(0.6-2.5)
No	221	81	1	1
History of abortion				
Yes	41	24	1.38(0.78-2.4)	1.6(0.74-3.5)
No	221	94	1	1
History of stillbirth				
Yes	30	14	1.04(0.53-2.04)	0.87(0.36-2.1)
No	232	104	1	1
History of institutional delivery				
Yes	151	84	1	1
No	111	34	0.55(0.35-0.87)	0.85(0.43-1.67)
History of ANC follow up				
Yes	234	111	1	1
No	28	7	0.53(0.2-1,24)	0.2(0.05-1.05)
Knowledge on general use of FP				
Poor knowledge	101	62	1.76(1.14-2.7)	2.85(1.54-5.3)*
Good knowledge	161	56	1	1

Key: * shows p-value < 0.05 others # belongs to widowed + single

DISCUSSION

The finding of this study showed that the magnitude of unintended pregnancy among women attending ANC in Shashemene hospitals was 31.1% with 95% CI (27.1-33.5). The finding is in line with other studies done in Ethiopia such as; Hosanna (34%) [17], Welkaite (26%) [18], and Mekelle town (28.6%) [19]. But, is lower than studies done in Addis Ababa (36.4%) [25], Kenya (50%) [20], and other part of Ethiopia (37%) [21]. The possible reason for the difference might be due to the difference in the study period and study area.

In this study, women who had three and above children were more likely to have an unintended pregnancy as compared to their counterparts. The same finding was observed in studies which were done in Felegahiwot hospital, Bahir Dar Ethiopia [23], Gelemso [20], Hosanna town, Ethiopia [18], rural Ghana [22], and Zambia [24]. This might be due to women having a large family size (children) spending time taking care of their children, which may result in missing appointments and even delay in seeking maternal health services

The odds of unintended pregnancies among women in the age group 35-45 was 0.2 times higher than those in the age group of 15–24 [24]. This is different from the study done in Kenya which showed that the prevalence of unplanned pregnancy was high in the age group of 15-19 years [15].

Respondents who had poor knowledge of family planning were 2.85 times more likely the risk of having the occurrence of unplanned pregnancies than those having good knowledge. The finding is consistent with the study conducted in Gelemso [20]. This might be due to those respondents who have more knowledge about unplanned pregnancy might have more information on preventive methods (family planning), and are more likely to be aware of the benefits of those methods which in turn will motivate them to use the family planning methods and be less likely to have an unplanned pregnancy.

CONCLUSION

The prevalence of unintended pregnancy was higher in the study area than study conducted in other area which confirmed the major public health problem in the Sheshemane area. Educational status of the husband, maternal age, parity, residence, and knowledge of mothers on family planning were the most important determinant factors of unintended pregnancy.

LIST OF ABBREVIATIONS

CI: confidence interval; ANC: Ante Natal Care; AOR: adjusted odds ratio; EDHS: Ethiopian Demographic Healthy Survey; FP: family planning; SPSS: Statistical Package for Social Sciences;

COMPETING INTERESTS

"The authors declared that they have no competing interests" in this section

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DETERMINANTS OF PREGNANCY AMONG LATE ADOLESCENTS VISITING PUBLIC HEALTH FACILITIES OF ARBA MINCH TOWN, SOUTHERN ETHIOPIA: A CASE CONTROL STUDY

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ABSTRACT

BACKGROUND: Adolescence is a critical period in human life with development of the reproductive organs, the onset of menarche, and the beginning of sexual activity. In many SSA countries including Ethiopia, a large amount of adolescent girls become pregnant. Pregnancy and childbirth during adolescence is a leading cause of maternal morbidity and mortality due to its adverse maternal and neonatal outcomes. However, little is known about risk factors for pregnancy among late adolescents. Therefore, the aim of this study was identify determinants of pregnancy among late adolescents who visit public health facilities of Arba Minch, Ethiopia.

METHOD: An institution - based unmatched case control study was conducted from February to April, 2019. Cases were pregnant adolescents (age 15-19 years) who came for delivery, abortion, or antenatal care. Controls were non-pregnant adolescents(age 15-19 years) who visited outpatient department or youth friendly service for other cases ruled out by history and urine human chorionic gonadotropin pregnancy test (HCG). The total sample size was 380 (85 cases and 285 controls) which were randomly selected. Data was collected by using face to face interview and entered to Epi-data version 3.4 then exported to SPSS version-23 for analysis. Binary logistic model was used to identify factors associated with the outcome variable. Variables with p-value <0.25 in bi-variable logistic analysis were selected for multivariable logistic regression model. The level of significance was declared at p-value <0.05.The final model was fitted with Hosmer and Lemesho (p-value<0.5).

RESULT: Finding of this study show that family monthly income less than one thousand Ethiopian birr (AOR=11.11; 95%CI=2.65-46.65), family history of pregnancy before age 19 (AOR=2.85; 95%CI=1.04-7.79), starting first sexual activity without desire (AOR=2.52; 95%CI =1.07-5.93), and poor modern contraceptive methods (AOR=4.84; 95%CI=2.09-11.20) were determinants of adolescent pregnancy in the study area.

CONCLUSION: Family income, family history of adolescent pregnancy, starting first sexual activity without desire, and poor modern contraceptive methods were determinants of adolescent pregnancy. Therefore facilitating income generating activities, strengthening adolescent girl life skill through adequate life skill training, and providing adequate information about family planning for adolescent girls through training and health information dissemination are recommended.

KEY WORDS: Late adolescent pregnancy; Determinants; Arba Minch town public health facilities.

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INTRODUCTION

The World Health Organization (WHO) defined adolescence as all persons aged 10 to 19 years. Older or late adolescents range from – 15 to 19 years [1]. There are 1.2 billion adolescents aged 10-19 around the world that makes up 16% of the world's population [2]. The majority (86%) of adolescents live in developing countries[3]. Adolescent pregnancy is a global phenomenon. Although it has declined substantially over the past two decades, the pregnancy rate among girls and women 15 to 19 years of age remains a stubborn public health problem. It is estimated that about 16 million girls 15–19 years old give birth each year, contributing nearly 11% of all births worldwide [4].

Adolescent pregnancy is also a very common problem in Ethiopia. Teenage childbearing is more common in rural than in urban areas (15 % versus 5%, respectively) and among women in Afar (23%) and Somali regions (19 %) compared with Addis Ababa (3 %) [5]. Findings from a study conducted in Arba Minch show that prevalence of teenage pregnancy among school-age adolescents was 7.7 % [6].

Globally, the leading cause of maternal deaths of girls aged 15 to 19 years was pregnancy and childbirth complications. The majority 99% of deaths were in low and middle-income countries[7]. Pregnancies that occur during adolescent age had negative social and economic consequences especially for unmarried pregnant adolescents who may face stigma or rejection by parents and peers and threats of violence. With regard to education attainment, the majority of girls drop out of school because of early pregnancy or marriage [8,9]. In addition, most of the adolescent mothers face higher risks of unsafe abortions and pregnancy-induced hypertension[10,11]. Evidence also showed that the majority of adolescent pregnancies were at higher risks of low birth weight, preterm delivery, and severe neonatal conditions[10]. A study done in Ethiopia showed that the proportion of children born to teenagers had higher low birth weight, diarrhea, fever, cough and death than those born to adult mothers [12].

Ethiopia has several policies that contribute to improved adolescent health, and prevent teen pregnancies. These include the National Youth Policy, the newly-developed Adolescent and Youth Health Strategy, and the School Health and Nutrition Strategy. Also, through health extension and school health programs, the Ministry of Health aims to improve adolescents' access to contraceptives and family planning. Additionally, child marriage is prohibited by law in Ethiopia but still, adolescent pregnancy is a burning public health and demographic challenge in Ethiopia [13]. Studies on late adolescent pregnancy are very limited in Ethiopia, especially in this study area, and most of them were cross sectional studies. Also, this study solves the limitation of previous researches (ruling out pregnancy and proper measurement of variables). The aim of this study was to identify determinants of pregnancy among late adolescents who visit public health facilities of Arba Minch town. Early adolescents are not included because the magnitude of pregnancy is high in late adolescents.

METHOD

Study design

An institution - based unmatched case control study was conducted to identify determinants of adolescent pregnancy.

Study setting and Population

This study was conducted in Arba Minch public health facilities. Arba Minch is a town and separate woreda in southern Ethiopia, ArbaMinch is located 435 km southwest of Addis Ababa, the capital city of Ethiopia, and 275 km southwest of Hawassa, the capital city of Southern Nations and Nationalities Regional state. According to the latest national population projection based on the population and housing census, the total population of the town was about 103,965 people (14). In the town, there is one public hospital and two health centers. This study was conducted from February 9 to April 9, 2019. The source population for case was all pregnant

late adolescents between 15 to 19 years who came to public health facilities for delivery, abortion, and ANC. For control were all the non-pregnant late adolescents between 15 to 19 years who came to public health facilities to OPD or youth friendly service for other cases.

The study population for the case was systematically selected pregnant late adolescents age between 15 to 19 years who came for delivery, abortion, or ANC (pregnancy confirmed from secondary data). The control group were systematically selected non-pregnant late adolescents age between 15 to 19 years who came to OPD and youth friendly service for other cases (ruled out by history and HCG pregnancy test).

Inclusion criteria

Late adolescent girls age (15-19 years) who visit Arba Minch public health facility at the time of data collection.

Sample size determination

Sample size was calculated by epi-info 7 using the following determinants (from previous research): having history of maternal teenage pregnancy, having self-reported low or average contraceptive knowledge, or sexual abuse during childhood [15, 16,17]. Based on following assumption: taking % of control exposed 2.8%, AOR=3.92 (from study done in Colombia)[17],1:3 ratio, at 95% confidence interval for a two-sided test, 80% power with a minimum detectable alternative of ± 5%. Accordingly, the sample size calculated was 344 (86 cases and 258 controls). Assuming 10 % non-response rate, the final sample size was approximately 380 (approximately 95 cases and 285 controls).

Sampling procedure and technique

First cases were proportionally allocated to one public hospital and two health centers. The case control ratio in each facility, which was 1:3, was maintained during proportional allocations. The cases in each public health facilities were again proportionally allocated to delivery, abortion, and ANC. Controls were also proportionally allocated to OPD and youth friendly service. Finally, study participants were selected by systematic random sampling technique (Figure 1)

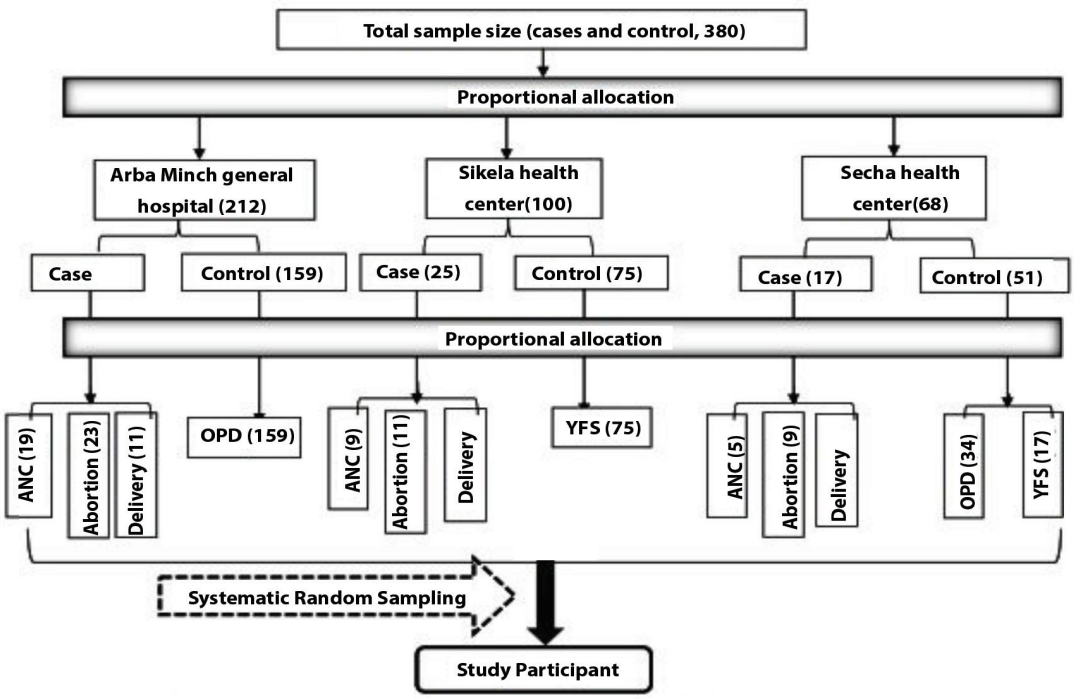

Figure 1: Presentation of sampling procedure on determinants of pregnancy among late adplescents age (15-19 years) who visit public health facilities of Arba Ninch town, Ethiopia 2019

Operational definition

Modern contraceptive knowledge: Respondents were asked 7 questions related to modern contraceptive knowledge and those who scored greater than the mean value were considered as having "good knowledge". Those who scored less than the mean value were considered as having "**poor knowledge**".

Substance use =Use of substances like alcohol/ cigarette/khat /Ganja/heroin/marijuana) [14].

Parent –daughter relationship = was measured by mean score from the four questions; computed (i.e.; 1) and leveled as '1= poor interaction (if scored < 1) and '2= good interaction (if scored ≥1) [14].

Sexual intercourse without desire: Sexual intercourses that happened without willingness which include rape and sex for money.

Data collection tool and technique

Face to face interview was used for data collection by structured close ended Amharic questionnaire. It was collected by 12 nurses and supervised by 3 public health officers who were all staff of the public health facilities. The questionnaire was developed based on different literature, and it was adapted to the data collection place context. The main components of the questionnaire were socio-demographic factors, socio-economic factors, family background, sexual and reproductive history, modern contraceptive knowledge, parent-daughter relationship, and substance use.

Data quality assurance

The questionnaire was translated to Amharic then back to English to check its consistency. Then 5% (20 which is 5 cases and15 controls) questionnaires were pretests for three days in Shele health center. Unclear questions were amended. Training was given to data collectors and supervisors for one day and was focused on objectives, procedures, tools, and ethics of the study. On-spot checking and reviewing the completed questionnaires were done by data collectors. The data was checked by supervisors and investigator for its completeness and consistency. Any incompleteness and error were corrected accordingly.

Data processing and Analysis

First data was checked for its completeness and consistency then it was entered to epi data version 3.4. Analysis was done by SPSS version 23. bivariate and multivariable analysis using logistic regression model with 95% confidence interval was done to assess the association between dependent and independent variables ($p \leq 0.25$) was used for inserting to multivariable analysis and finally the association was computed for ($p \leq 0.05$). Goodness of fit test was checked by using Hosmer and Lemeshow.

Ethical approval

Ethical approval was obtained from the Institutional Research Ethics Review Board (IRB) of Arba Minch University, College of Medicine and Health Science. Before the actual data collection, necessary communications about the overall purpose of the study were made with the town administrative bodies. Verbal assent was taken (for those aged <18) and permission was taken from families or health professionals if families were not available and written consent was taken (for those age 18 and above) after explaining the purpose of the study, the potential harm and benefit, confidentiality, and the rights of subjects. To maintain confidentiality, no personal identifiers were used on data collection forms and the recorded data was not accessed by a third person, except the principal investigators..

RESULT

Socio demographic Characteristics of the study participant

The response rate of the study participants was 100%. More than half 19(66.3%) of cases and 161(56.5%) of controls were aged between 18 and 19 years. A high proportion 285(75%) of study participants lived in urban areas. Thirteen percent 13(13.7%) of cases and 10(3.5%) controls did not receive formal education. More than half 59(62.1%) of cases and 38(13.3%) controls were married. Almost one third 27(28.4%) of cases and

33(11.6%) controls families earn <1,000 Ethiopian birr per month. Ethnicity included under other was Gurage, tigrie, and Ari (Table1).

Table-1: Socio demographic and economic characteristics assessed as determinants of pregnancy among late adolescents who visit public health facilities of Arba Minch Town, Southern Ethiopia.

Variables	Categories	Case N (%)	Control N (%)	Total N (%)
Age	15-17	32(33.7%)	124(43.5%)	156(41.1%)
	18-19	63(66.3%)	161(56.5%)	224(58.9%)
Residence	Urban	69(72.6%)	216(75.8%)	285(75%)
	Rural	26(27.4%)	69(24.2%)	95(25%)
Religion	Muslim	12(12.6%)	22(7.7%)	34(8.9%)
	Protestant	45(47.4%)	133(46.7%)	178(46.8%)
	Orthodox	37(38.9%)	128(44.9%)	165(43.4%)
	Catholic	1(1.1%)	2(0.7%)	3(0.8%)
Ethnicity	Gamo	71(74.7%)	179(62.8%)	250(65.8%)
	Goffa	7(7.4%)	22(7.7%)	29(7.6%)
	Wolitta	6(6.3%)	26(9.1%)	32(8.4%)
	Amhara	5(5.3%)	24(8.4%)	29(7.6%)
	Oromo	4(4.2%)	12(4.2%)	16(4.2%)
	Others*	2(2.1%)	22(7.7%)	24(6.3%)
Educational status of adolescents	No formal education	13(13.7%)	10(3.5%)	23(6.1%)
	Primary (1-8)	35(36.8%)	97(34.0%)	132(34.7%)
	Secondary (9-12)	36(37.9%)	109(38.2%)	145(38.2%)
	College and above	11(11.6%)	69(24.2%)	80(21.1%)
Marital status	Single	36(37.9%)	247(86.7%)	283(74%)
	Married	59(62.1%)	38(13.3%)	97(25.5%)
Average monthly income	<1,000	27(28.4%)	33(11.6%)	60(15.8%)
	1,000-1,500	10(10.5%)	19(6.7%)	29(7.6%)
	1,501-3,000	31(32.6%)	77(27.0%)	108(28.4%)
	3,100-4,500	12(12.6%)	41(14.4%)	53(13.9%)
	>4,500	15(15.8%)	115(40.4%)	130(34.2%)

Family related characteristics of study participant

More than one third 36(37.9%) mothers of adolescents among the cases and 116(40.7%) mothers of adolescents among the controls did not attend formal education. With regard to family size 29(30.5%) of adolescents from cases and 87(30.5%) of controls lived in the family size greater than or equal to seven. Thirty percent 29(30.5%) of adolescents among the cases and 18(6.3%) of the controls had family history of pregnancy before age 19 years (Table 2).

Table-2: Family backgrounds assessed for determinants of pregnancy among late adolescents who visit public health facilities of Arba Minch Town, Southern Ethiopia.

Variables	Categories	Case N (%)	Control N (%)	Total N (%)
Mother's educational status	No formal education	36(37.9%)	116(40.7%)	152(40.0%)
	Primary (1-8)	35(36.8%)	75(26.3%)	110(28.9%)
	Secondary (9-12)	15(15.8%)	57(20.0%)	72(18.9%)
	College and above	9(9.5%)	37(13.0%)	46(12.1%)
Fathers educational status	No formal education	20(21.1%)	74(26.0%)	94(24.4%)
	Primary (1-8)	28(29.5%)	74(26.0%)	102(26.8%)
	Secondary (9-12)	19(20.0%)	44(15.4%)	63(16.6%)
	College and above	28(29.5%)	93(32.6%)	121(31.8%)
Family size	≤3	17(17.9%)	38(13.3%)	55(14.5%)
	4-6	49(51.6%)	160(56.1%)	209(55.0%)
	≥7	29(30.5%)	87(30.5%)	116(30.5%)
Family history of pregnancy before age of 19 year	Yes	29(30.5%)	18(6.3%)	47(12.4%)
	No	66(69.5%)	267(93.7%)	333(87.6%)
Family member who has history of pregnancy before 19 year	Mother	21(72.4%)	3(16.7%)	24(51.1%)
	Sister	8(27.6%)	15(83.3%)	23(48.9%)

Sexual and reproductive history of study participants

Among the study participants 33(34.7%) of cases and 113(39.6%) controls see their menarche when their age is between 9 years and 13 years old. Approximately half 48(50.5%) of sexually active cases and 23(35.4%) controls had first sex at the age between 16 and 17 years old. Almost half 45(47.4%) of the cases and 15(23.1%) controls had their first sex without desire. Approximately half 49(51.6%) of case and 113(39.6%) of controls did not received sexual education. More than half 52(54.7%) of the cases and 96(33.7%) controls had poor modern contraceptive knowledge. More than half 59(62.1%) of cases and 247(86.7%) of the controls had poor daughter parent relationship. Concerning history of substance use 27(28.4%) of cases and 21(7.4%) controls ever used substance use (Table 3).

Table-3: Sexual and reproductive history of study participants among late adolescents who visit public health facilities of Arba Minch Town, Southern Ethiopia.

Variables	Categories	Case N (%)	Control N (%)	Total N (%)
Age of menarche	9-13	33(34.7%)	113(39.6%)	146(38.4%)
	14-19	62(65.3%)	172(60.4%)	234(61.6%)
Age at first sex(158)	8-15	20(21.1%)	15(23.1%)	35(21.9%)
	16-17	48(50.5%)	23(35.4%)	71(44.4%)
	18-19	27(28.4%)	27(41.5%)	54(33.8%)
Reason to have first sex(158)	With desire	50(52.6%)	50(76.9%)	100(62.5%)
	Without desire	45(47.4%)	15(23.1%)	60(37.5%)
Receive Sexual education	Yes	46(48.4%)	172(60.4%)	218(57.4%)
	No	49(51.6%)	113(39.6)	162(42.6%)
Previous history of pregnancy (380)	Yes	11(11.6%)	19(6.7%)	30(7.9%)
	No	84(88.4%)	266(93.3%)	350(92.1%)
Modern Contraceptive knowledge	Good	43(45.3%)	189(66.3%)	232(61.1%)
	Poor	52(54.7%)	96(33.7%)	148(38.9%)
Parent daughter relationship	Good	36(37.9%)	38(13.3%)	74(19.5%)
	Poor	59(62.1%)	247(86.7%)	306(80.5%)
Substance use	Yes	27(28.4%)	21(7.4%)	48(12.6%)
	No	68(71.6%)	264(92.6%)	332(87.4%)

DETERMINANTS OF ADOLESCENT PREGNANCY

In this study age of the participant, educational status of the participant, marital status, family average monthly income, mothers educational status, family history of pregnancy before age 19,age at first sex, starting first sex without desire, sexual education, previous pregnancy, knowledge of modern contraceptives, parent-daughter relationship, and substance use showed association in bivariate and entered to multivariable analysis, then family average monthly income, family history of pregnancy before age 19, starting first sex without desire and knowledge of modern contraceptives had shown association with adolescent pregnancy. The likelihood of being pregnant during late adolescence was 11 times more likely to occur among those adolescents whose family monthly income was less than one thousand Ethiopian birr, compared to those whose family monthly income was greater than 4,500 Ethiopian birr (AOR=11.11; 95%CI=2.65-46.65). Participants with family history of pregnancy before age 19 years were nearly three times more likely to be pregnant than their counterparts (AOR=2.85; 95% CI= 1.04-7.79). Adolescents who had start their first sex without desire were 2.52 times more likely to be pregnant than their counterparts (AOR=2.52; 95% CI=1.07-5.93). Those adolescents who had poor modern contraceptive knowledge were nearly 5 times more likely to be pregnant compared to than those who have good knowledge about modern contraceptive methods (AOR=4.84; 95%CI =2.09-11.20) times more likely to be pregnant than those who have good knowledge (Table 4).

Table -4: Determinants of pregnancy among late adolescents who visit public health facilities of Arba Minch town, Ethiopia 2019.

Variables	Categories	Case N (%)	Control N (%)	AOR (95%CI)	P –value
Average monthly income	<1,000	27(28.4%)	33(11.6%)	11.11(2.65-46.65)	0.001*
	1,000-1,500	10(10.5%)	19(6.7%)	3.137(0.78-12.59)	0.107
	1,501-3,000	31(32.6%)	77(27.0%)	1.59(0.59-4.28)	0.353
	3,100-4,500	12(12.6%)	41(14.4%)	2.17(0.69-6.79)	0.186
	>4,500	15(15.8%)	115(40.4%)	1	
Family history of pregnancy before age of 19years	Yes	29(30.5%)	18(6.3%)	2.85(1.04-7.79)	0.042*
	No	66(69.5%)	267(93.7%)	1	
Reason to have first sex	With desire	50(52.6%)	50(76.9%)	1	
	Without desire	45(47.4%)	15(23.1%)	2.52(1.07-5.93)	0.034*
Contraceptive methods knowledge	Good	43(45.3%)	189(66.3%)	1	
	Poor	52(54.7%)	96(33.7%)	4.84(2.09 - 11.20)	0.0001*
Educational status of adolescents	No formal education	13(13.7%)	10(3.5%)	2.171(0.345- 13.652)	0.409
	Primary (1-8)	35(36.8%)	97(34.0%)	2.956(0.748- 11.681)	0.122
	Secondary (9-12)	36(37.9%)	109(38.2%)	2.854(0.936-8.704)	0.065
	College and above	11(11.6%)	69(24.2%)	1	
Marital status	Single	36(37.9%)	247(86.7%)	1.545(0.593-4.025)	0.373
	Married	59(62.1%)	38(13.3%)	1	
Age	15-17	32(33.7%)	124(43.5%)	1	
	18-19	63(66.3%)	161(56.5%)	0.502(0.192-1.307)	0.158
Age at first sex	8-15	20(21.1%)	15(23.1%)	0.367(0.092-1.462)	0.155
	16-17	48(50.5%)	23(35.4%)	1.213(0.463-3.180)	0.694
	18-19	27(28.4%)	27(41.5%)	1	
Mother's educational status	No formal education	36(37.9%)	116(40.7%)	0.663(0.165-2.673)	0.564
	Primary (1-8)	35(36.8%)	75(26.3%)	2.087(0.531-8.200)	0.292
	Secondary (9-12)	15(15.8%)	57(20.0%)	0.816(0.194-3.431)	0.781
	College and above	9(9.5%)	37(13.0%)	1	
Previous history of pregnancy	Yes	11(11.6%)	19(6.7%)	0.563(0.174 -1.825)	0.338
	No	84(88.4%)	266(93.3%)	1	
Substance use	Yes	27(28.4%)	21(7.4%)	1.361(0.529-3.502)	0.523
	No	68(71.6%)	264(92.6%)	1	
Receive Sexual education	Yes	46(48.4%)	172(60.4%)	1	
	No	49(51.6%)	113(39.6)	0.760(0.266-2.170)	0.608
Parent daughter relationship	Good	36(37.9%)	38(13.3%)	1	
	Poor	59(62.1%)	247(86.7%)	1.012(0.398-2.572)	0.980

* P < 0.05; AOR: adjusted odds ratio; COR: crudes odds ratio; 1.00 reference category, CI confidence interval.

DISCUSSION

This study found that an average household monthly income, family history of adolescent pregnancy, desire to have first sexual intercourse, and contraceptive method knowledge were identified as the determinants of adolescent pregnancy among the adolescent women (15-19 years) who visit public health facilities of Arba Minch town.

The average monthly household income significantly associated with pregnancy during adolescence. Adolescents who have low (<1000 ETB) average monthly household income are more likely to experience pregnancy than adolescents with relatively high (>4,500 ETB) average monthly household income. This study finding is supported by the findings of the studies conducted in Degua, Northern Ethiopia; Orellana, Ecuador; Malaysia; Eastern Nepal and Mersin, Turkey[15,16,18,19, 20]. This might occur because low economic status commonly causes adolescents to marry early, while higher family monthly income might get adolescents to marry later, as they have more likely engaged in education and employment opportunities. Additionally, they may engage in premarital sex for the sake of economic survival.

The study participants who were from a family who had experienced adolescent pregnancy were more likely to be pregnant than study participants from family who had no history of adolescent pregnancy. This result is in line with the findings from the studies done in Mersin, Turkey; Bogota, Colombia and Degua, Northern Ethiopia[15,17,20]. This intergenerational effect might be because families with no history of adolescent pregnancy might perceive the bad consequence of pregnancy during early age. The direct effect of close family sexual and reproductive behaviors might influence their daughter not to get pregnant during adolescence. Additionally, the factors responsible for exposing the family member to adolescent pregnancy might persist in the family/surroundings and expose the adolescent.

In this study, being forced to engage in to first sexual intercourse was identified as determinant factor for pregnancy during adolescence. Being engaged in first sexual intercourse without desire increased the likelihood of having pregnancy during adolescence age more than having first sexual intercourse voluntarily. This finding concurs with findings of the studies in Orellana, Ecuador and Cape-town, South Africa [16, 21]. This may be due to the fact that an individual forced into first sexual intercourse may have less freedom and power to negotiate use of contraceptive methods.

Modern contraceptive knowledge was also identified as determinant of adolescent pregnancy; where adolescent girls who have poor knowledge about contraceptive methods were more likely get pregnant during their adolescence than adolescent girls with good knowledge of modern contraceptives. This finding corroborates the finding of the study conducted in Bogota, Colombia[17]. This might be due to the fact that having limited knowledge hampers adolescent's access to reproductive health services and accurate information about effective modern contraceptive methods.

CONCLUSION

Since family average monthly income (<1,000 Ethiopian birr), family history of pregnancy before age 19, first sexual intercourse without desire, and poor knowledge on contraceptive methods are all determinants of late adolescent pregnancy in the study area, then facilitating income generating activities, strengthening adolescent girl life skill through adequate life skill training and providing adequate information about the family planning for adolescent girls through training, and health information dissemination are recommended. In our study 60% of those who were married, so it better to intervene this early marriage.

COMPETING INTERESTS

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

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AUTHORS' CONTRIBUTIONS

All authors contributed to data analysis, drafting and revising the article, gave final approval of version to be published and agree to be accountable for all aspects of the worker

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A CASE REPORT OF UTERINE MYOMA CAUSING NON-PURPURAL UTERINE INVERSION

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ABSTRACT: Uterine inversion is a condition where the uterus is inverted downward with prolapse of the fundus in to the endometrial cavity and to the cervix. It is broadly classified as puerperal and non- puerperal based on cause of the uterine inversion with puerperal uterine inversion being the more common type of inversion. Here is a rare form of non-puerperal uterine inversion with fundal submucous myoma.

KEY WORDS: Haultain's method, Myoma, Uterine inversion.

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INTRODUCTION

Uterine inversion is a condition where the uterus is inverted downward with prolapse of the fundus into the endometrial cavity and to the cervix. It is broadly classified as puerperal and non-puerperal based on the cause for the inversion[1]. Non-purpeural uterine inversion occurs mainly when the uterus acts to expel a tumor located at the fundus. The inversion is due to the thinning and weakening of the uterine wall at the seat of the tumor implantation due to pressure atrophy, which will be more marked when the tumor is larger and when the uterine contraction is stronger [2].

Here we report a case of non-purpural uterine inversion caused by a submucus fundal myoma.

CASE REPORT

A 40 years old para one mother came to our tertiary hospital referred after she presented with protrusion of mass per vagina of 5 days duration. She had history of heavy menstrual bleeding for the past two years and for two weeks prior she started to have difficulty of defecation and difficulty and discomfort during sexual intercourse with progressive vaginal fullness worsened during coughing and straining. For the previous 5 days, she started to have protrusion of mass per vagina which was not reducible and associated with dull aching pain. She had a home delivery 10 years back where the baby died after 4 hours of stay and since then she had difficulty conceiving but never sought medical care. She went to a nearby hospital and was transfused with 4 units of blood and with a diagnosis of chronic uterine inversion with fundal uterine myoma, she was referred to our tertiary hospital.

Upon evaluation, she was comfortable with intermittent dull aching pain. There was no palpable uterus on abdominal examination. There was a 10 X 10 cm firm mass protruding per-vagina which was difficult to replace. The vaginal walls were palpable along the protruding mass and the cervical ring felt at the level of the ischial spines. It was difficult to pass a finger between the cervical ring and the mass; the fornices were normal. On rectal examination, the mass was felt in the vagina but uterus was not felt in the pelvic cavity (Fig 1).

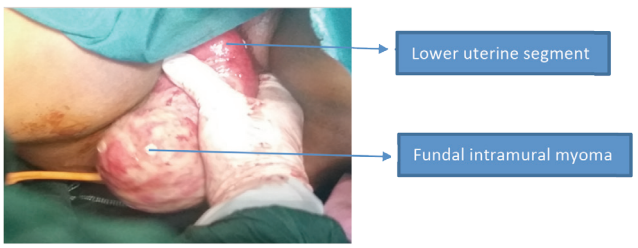

Fig 1: Preoperative vaginal finding of the chronic uterine inversion

After the diagnosis of chronic uterine inversion with fundal myoma was made, pre-operative evaluation and preparation was done and the patient was taken to the operative theater after informed written consent was taken.

Abdominal cavity entered via midline infra-umblical incision and there was a cup shaped depression at the level of the cervical ring with bilateral tubes and ovaries being pulled through the cup shape depression, giving a flower pot and "kissing ovaries" appearance (Fig 2).

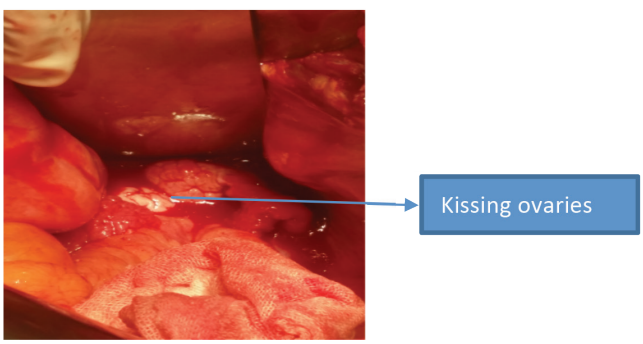

Fig 2: The intraoperative pelvic finding of the chronic uterine inversion

Vaginal myomectomy was done for the 6 x 8cm protruded submucosal myoma vaginally and then Haultain's method, transabdominal incision was made, then vertical incision was done over the posterior cervical ring, used to replace the prolapsed

uterus into the pelvic cavity by pulling the uterus upward and with assistance pushing the fundus of the uterus up though the vagina. The incision was repaired with vicryl no. 1 continuously and the abdominal cavity was closed layer by layer (Fig 3).

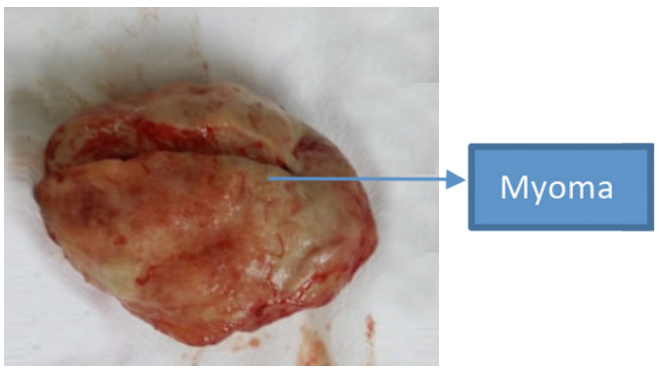

Fig 3: Intraoperative finding after vaginal mymectomy and uterine replacement

DISCUSSION

Uterine inversion is a rare clinical finding with diagnostic and management challenges and it is usually classified as puerperal and non-puerperal uterine inversion. Uterine inversion is also classified according to the severity of the inversion as: first degree: where the fundus is inverted but limited to intrauterine cavity; second degree: complete inversion of the uterine fundus through the cervix; third degree: the fundus is protruding through the vulva; and fourth degree: when the vagina is involved with complete inversion through the vulva. It is also classified as acute, when inversion occurs in the first 24 hours of delivery; sub-acute and chronic inversion when the inversion occurs between 24 hours and 4 weeks and after 4 weeks respectively [3,4].

The cause of non-puerperal uterine inversion ranges from non malignant causes like intramural or submucus myoma and endometrial polyp, to malignant causes like leiomyosarcoma and immature teratoma. Studies showed that around 80% of the causes for non;puerperal inversion were benign and 20% were malignant. Most of the reported cases of non-puerperal uterine inversion are caused by submucous myoma, such as in this case, which is pathology proven submucos myoma. The major factor that contributes to the occurrence of non-puerperal uterine inversion are the site of attachment of the tumor to the uterus, the thickness of the attachment, the size of the tumor, the thickness of the uterine wall, and the dilatation of the cervix [5 - 10].

Presentation of women with non-puerpural uterine inversion depends on the degree of inversion, the underlying cause of inversion, and the onset of inversion. Most women present with insidious onset, whereas very few patients present with a sudden onset of inversion. Most women with submucous myoma causing inversion present withprogressive protrusion of mass per vagina with dull aching pain and difficulty of sexual activities and defecation, whereas others present with a vaginal discharge,painless vaginal bleeding, and rarely with shock. Women with underlying malignant condition could present with sudden inversion with severe pain, vaginal swelling, and urinary and bowel difficulties [6 -10].

The uterus may appear as “target sign” with hyperechoic fundus on ultrasonography; ultrasound will also help to identify the underlying causes. MRI and CT have shown to be useful tools in inconclusive cases where MRI will demonstrate a U- shaped endometrial cavity and “bulls-eye” configuration in sagittal and axial images respectively [8 -11].

Management of uterine inversion depends on the degree of inversion and the cause of the inversion. Many surgical techniques like Huntington and

Haultain's, which are done abdominally, and Kustner and Spenelli procedures, which are completed vaginally, have been described for replacing the uterus into the pelvic cavity [2-14]. In this case, after we treated the cause of the inversion by vaginal myomectomy, we used Haultain's method and successfully replaced the uterus in to the pelvic cavity.

CONCLUSION

Non-purpural uterine inversion is a rare clinical condition which presents with different degree of severity and having different causes. Successful management of a case depends on high index of suspicion, proper physical examination, identifying the cause of the inversion, and treatment of the underlying cause.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE:

Informed written consent was obtained from the patient for treatment.

CONSENT TO PUBLISH:

Consent was taken for publication of the case and the accompanying images.

COMPETING INTEREST:

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

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AUTHOR'S CONTRIBUTIONS:

YF and SH identified, evaluated and diagnosed the case, reviewed literatures and wrote the case report while, EK and ST operated the patient. All authors have read and approved the manuscript.

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