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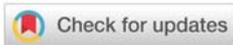***Corresponding author:** Berhanu Teshome Woldeamanuel, Lecturer, Department of Statistics, Salale University, P.O.Box 254, Fitche, Oromiya, Ethiopia, Email: berteshome19@gmail.com

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Research Article

Assessment of determinant factors of pregnancy termination among women of reproductive age group in Ethiopia: Evidence from 2016 Ethiopian Demographic and Health Survey

Abstract

Background: Pregnancy termination is a major public health globally in the highly important for maternal mortality. In this study, we have assessed cross-sectional data from Ethiopian Demographic and Health Survey to identify the occurrence of pregnancy termination and its risk factors from various women socioeconomic and demographic and characteristics.

Methods: The information collected from 15,683 women of the reproductive age group was considered in the study, and variables like maternal social and demographic characteristics were considered as risk factors of pregnancy termination. The study used descriptive statistics and binary logistic regression model to identify significant risk factors attributed to pregnancy termination.

Results: The descriptive statistics in the study revealed that out of total women aged 15-49 included in the study 7.9% were experienced pregnancy termination. Being illiterate (OR=1.773; 95% CI: (1.348, 2.331)) or only primary educational attainments (OR=1.462; 95% CI:(1.117,1.913)) younger age group (OR=1.359; 95% CI:(1.143, 1.617)) and lack of knowledge of contraceptive use were factors that are significantly associated with increased risk of pregnancy termination.

Conclusions: Maternal mortality should decline more rapidly to through reducing the rate of pregnancy termination achieve the Health Sector Transformation Plan target for maternal mortality in Ethiopia. Age education, knowledge about contraceptive methods use and occupation were the major significant factors associated with pregnancy termination. Thus, encouraging the use of contraceptives and improving women's education is the most intervention to prevent the problem.

Abbreviations

CI: Confidence interval; DHS: Demographic and Health Surveys; ENDHS: Ethiopian Demographic and Health Surveys; CSA: Central Statistical Agency; LRT: Likelihood Ratio Test; OR: Odds ratios; SNNPR: South Nations Nationalities and Peoples Region; USAID: United States Agency for International Development; VIF: Variance Inflation Factor.

Background

Abortion is the most common problem in both developing and developed countries. It is estimated that 56 million pregnancy terminations are performed annually globally [1] and an estimated 42-63 women per every 100,000 abortions die every year. These abortion complicated maternal mortality due unsafe abortions accounts about 8-9% of all maternal deaths in the world. In different Africa regions annual rate abortion ranges from 31 per 1,000 women of reproductive age to in west Africa to 38 per 1000 in northern Africa [2]. Overall, 15% of all pregnancies in Africa were ends in abortion in the years 2010-2014 [1].

Previous studies showed that pregnancy termination not only harm the women, but also adverse birth outcomes such as prematurity (preterm birth), low birth weight, placental complications and birth defects exist as a consequence of pregnancy termination [3,4]. Rates of abortion related maternal deaths declining by 42% for the last 25 years since 1990 - 2014 from 108 maternal deaths per 100,000 abortions to 63 deaths

per 100,000 abortions with the highest rate in Africa, 141 per 100,000 abortions [5,6]. About 9% of maternal deaths in Africa were due to unsafe abortion that resulted in the exclusive bleeding and infections [7].

Even though abortion rate in Ethiopia is lower compared to other East Africa countries, termination of pregnancy and the consequences are still major public health problems in Ethiopia. In Ethiopia Tessema et [8], at in their studies on the trends and cause of maternal death in Ethiopia during 1990-2013 found that, abortion is the second important cause of maternal mortality, accounting to 19.6% of maternal death following complications of anesthesia, embolism (air, amniotic fluid, and blood clot) and the condition of peripartum cardiomyopathy (25.7%). According to Sedgh G, et al [1], in Ethiopia, an estimated abortion is 24 per 1,000 women of reproductive age, while this is 34 per 1,000 women of reproductive age in the Eastern Africa region. In Ethiopia 38% of pregnancies were unintended, 47% of abortions were taking place in unsafe procedures and performed outside of health facilities. Among women undergo abortions outside of health facilities 40% were experiencing severe complications. The abortion rate was higher in urban areas, about 92 per 1,000 pregnancies [9].

The determinants of pregnancy termination are highly correlated with socioeconomic, demographic, behavioral factors of households and cultural factors. Several studies have investigated maternal age, and education is found to be strongly correlated with pregnancy termination [10-14]. Level of educational attainment is directly linked with pregnancy termination. Women of secondary and higher schooling were more likely to undergo an abortion [11,15-17]. Other determinants of pregnancy termination include maternal media exposure, contraceptive use, women's autonomy, [10,18], marital status [19,20], birth order, parity [10] and religion [11]. Women who have been exposed to the media and who were contraceptive non-user more are likely to undergo an abortion. There is also a strong association between Occupation and abortion [10,20].

The main objective of this study is to assess the prevalence of pregnancy termination and the risk factors attributed to abortion among women of the reproductive age group in Ethiopia based on Ethiopian Demographic Health Survey, 2016 data sets.

Methods

This study used the Ethiopian Demographic and Health Surveys (EDHS) 2016 dataset which is freely available online [21] and contains information on a various population, health indicators such as, mothers' and child health, use of family planning methods, nutritional status of women and children as well as household socioeconomic variables. The EDHS 2016 was conducted from January 18, 2016, to June 27, 2016, based on a nationwide representative sample that provides estimates at the national and regional levels and for urban and rural areas. The survey collects data on demographics, environmental, socioeconomic, family planning, infertility, nutritional and health status of children and their mothers from a nationally

representative sample of 15,683 women aged 15–49 years and 12,688 men aged 15–59 years in 16,650 households.

Sampling

The survey used a two-stage cluster sampling technique. The country was stratified into nine regions and two administrative cities. The first stage involved selecting 645 enumeration areas (202 in urban areas and 443 in rural areas) with probability proportional to size. In the second stage, a predetermined 28 households per cluster were selected with an equal probability systematic selection from the newly created household list. The EDHS 2016 has three parts: the household questionnaire, the woman's questionnaire and the man's questionnaire. The data for occurrence of pregnancy termination and associated factors was taken from a woman's survey. Data were collected by conducting face-to-face interviews with women who met the eligibility criteria (women aged 15–49 years). The study population in this study is all reproductive age group women (15-49 years) who had terminated a pregnancy five years preceding the survey those who responded to the women's EDHS questionnaire in 2016.

Measurement of variables

Determinants of pregnancy termination status in this study were selected from the available similar studies on the subject; the main predictors explored for pregnancy termination will be grouped into Demographic and Socioeconomic characteristics related to mother and households. Variables included in this study are grouped into explanatory variables and dependent or response variable.

Dependent variable

During the conduct of the DHS 2016 each woman was asked to provide a detailed history if she has any miscarriages, abortions or stillbirths that ended before 2011.

The dependent variable of this study is abortion dichotomized as: "yes", if a woman had undergone an abortion and "no" if the respondent had not undergone an abortion in the last five years. Thus, the response variable (pregnancy termination) of the of the ith woman Y_i is a binary indicator variable of the response, such that

$$Y_i = \begin{cases} 1 \; if \; the \; i^{th} \; woman \; had \; undergone \; an \; abortion \; in \; the \; last \; five \; years \\ 0 \; if \; the \; i^{th} \; woman \; had \; not \; undergone \; an \; abortion \; in \; the \; last \; five \; years \end{cases}$$

Statistical Analysis

Descriptive characteristics of the subjects are presented as frequencies and percentages. To estimate the effect of socioeconomic and demographic factors on pregnancy termination (odds ratios with their 95% confidence intervals), regression logistic analysis was performed using Stata 15. Bivariate analysis based on Pearson chi square test was used for testing association between the predictors and outcome variable pregnancy termination. All significant predictor variables ($p < 0.05$) in the bivariate analysis were included in the multivariate logistic regression analysis. Multicollinearity between covariates was checked using the variance inflation

factor (VIF) and VIF values greater than 10 indicates the existence of multicollinearity. The goodness of fit of the fitted models was checked using the likelihood ratio test (LRT).

Results

Descriptive Statistics

The descriptive statistics and the prevalence of pregnancy termination by socioeconomic and demographic characteristics of the women is presented in table 1. A total of 15,683 women of the reproductive age group was participating in this analysis. The prevalence of pregnancy termination five years before the survey period was 7.9% in this study population. The prevalence was higher among residents in Tigray region (10.3) followed by the Affar (9.5%), Amhara (9%) and Dire Dawa (9%). Concerning to place residence, the prevalence of pregnancy termination was consistent between rural and urban women. The five-year prevalence of pregnancy termination was lower among older age mothers 35 and older ages (6.5%) (Table 1).

Table1: Prevalence of pregnancy termination by socio economic and demographic characteristics of women.

Socio-economic and Demographic Characteristics	N=15683 n (%)	Prevalence of pregnancy termination, n (%)		Df	Chi-square	p-value
		Yes (1236)	No (14447)			
Region				10	77.601	<0.0001
Tigray	1682	174(10.3)	1508(89.7)			
Affar	1128	107(9.5)	1021(90.5)			
Amhara	1719	151(9)	1568(91)			
Oromiya	1892	147(8)	1745(92)			
Somali	1391	106(8)	1285(92)			
Benishangul-Gumuz	1126	49(4)	1077(96)			
SNNPR	1849	121(6.5)	1728(93.5)			
Gambela	1035	43(4)	992(96)			
Harari	906	59(6.5)	847(93.5)			
Addis Ababa	1824	181(10)	1643(90)			
Dire Dawa	1131	98(9)	1033(91)			
Residence				1	0.714	0.398
Rural	10335	801(8)	9534(92)			
Urban	5348	435(8)	4913(92)			
Mother age				4	15.790	0.003
15–19	3498	301(9)	3197(91)			
20-24	2903	251(9)	2652(91)			
25-29	2845	233(8)	2612(92)			
30-34	2241	177(8)	2064(92)			
≥ 35	4196	274(6.5)	3922(93.5)			
Mother education				3	63.316	<0.0001
No education	7033	680(10)	6353(90)			
Primary	5213	363(7)	4850(93)			
Secondary	2238	115(5)	2123(95)			
Higher	1199	1121(94)	78(6)			
Religion				3	22.401	<0.0001
Coptic orthodox	6413	564(9)	5849(91)			
Protestant	2814	167(6)	2647(94)			
Muslim	6209	488(8)	5721(92)			
Others	247	17(7)	230(93)			
Wealth index				4	3.889	0.421
Poorest	3894	311(8)	3583(92)			
Poorer	2046	164(8)	1882(92)			
Middle	2002	158(8)	1844(92)			
Richer	2042	139(7)	1903(93)			
Richest	5699	464(8)	5235(92)			
Knowledge of contraceptive use				1	12.609	0.002
No	720	32(4)	688(96)			
Yes	15683	1204(8)	13759(92)			
Distance from health facility				1	0.324	0.569
Big problem	7011	543(8)	6468(92)			
Not a big problem	8672	693(8)	7979(92)			
Marital status				1	277.165	<0.0001
Single	5859	190(3)	5669(97)			
Married	9824	1046(11)	8778(89)			
Mass media exposure				1	0.549	0.459
No	10024	778(8)	9246(92)			
Yes	5659	458(8)	5201(92)			
Respondent occupation				2	30.464	<0.0001
Unemployed	8045	541(7)	7504(93)			
Agricultural	2637	242(9)	2395(91)			
Non-agricultural	5001	453(9)	4548(91)			

The Pearson chi-square test result in table 1 revealed that among the covariates, region, women's age, education level, religion, knowledge of contraceptive use, marital status and occupation were found to have a significant association with pregnancy termination at the 5 % level of significance (p-values < 0.05).

Results of binary logistic regression analysis

We start here first by checking the overall goodness of fit using the likelihood ratio tests (LRT). We then proceed to test the significance of each covariate included in the model. Accordingly, the likelihood ratio test based on chi-square distribution, provided a chi-square value of 1408.432 with (p-value < 0.0001), which would imply good fit for the model. Thus, the null hypothesis that there is no difference between the model with no covariate and the model with explanatory variables was rejected.

Concerning the regional disparity in pregnancy termination, the results in table 2 show that women in Amhara (OR: 0.72, 95% CI: 0.532, 0.972), Oromiya (OR: 0.663, 95% CI: 0.501, 0.876) , Benishangul-Gumuz (OR: 0.322, 95% CI: 0.222, 0.467), SNNPR (OR: 0.579, 95% CI: 0.422, 0.796), Gambella (OR: 0.373, 95% IC: 0.250, 0.557), Harari (OR: 0.42, 95% CI: 0.456, 0.903) are at a lower risk of experiencing abortion than women in Dire Dawa city administration. The study also reveals that women residing in the Addis Ababa city administration had the highest probability of pregnancy termination than women in Dire Dawa (OR = 1.408, 95% CI: 1.061, 1.869) (Table 2).

Table 2: Odds ratio (OR) and their 95% confidence intervals (CIs) for pregnancy termination due to various socio demographic characteristics of women.

Covariates	n =1236	OR	95% C.I	df	p-value
Region				10	<0.0001
Tigray	174	0.973	0.723, 1.309	1	0.855
Affar	107	0.872	0.645, 1.178	1	0.371
Amhara	151	0.720	0.532, 0.972	1	0.32
Oromiya	147	0.663	0.501, 0.876	1	0.004
Somali	106	0.756	0.557, 1.026	1	0.073
Benishangul-Gumuz	49	0.322	0.222, 0.467	1	<0.0001
SNNPR	121	0.579	0.422, 0.796	1	0.001
Gambela	43	0.373	0.250, 0.557	1	0.011
Harari	59	0.642	0.456, 0.903	1	0.018
Addis Ababa	181	1.408	1.061, 1.869	1	<0.0001
Dire Dawa (Reference)	98				
Mother age				4	0.001
15–19	301	1.359	1.143, 1.617	1	0.001
20-24	251	1.404	1.171, 1.684	1	<0.0001
25-29	233	1.341	1.115, 1.614	1	0.002
30-34	177	1.272	1.042, 1.554	1	0.018
≥ 35 (Reference)	274				
Mother education				3	<0.0001
No education	680	1.773	1.348, 2.331	1	<0.0001
Primary	363	1.462	1.117, 1.913	1	0.006
Secondary	115	1.023	0.754, 1.388	1	0.885
Higher (Reference)	1121				
Religion				3	0.790
Coptic orthodox	564	1.026	0.607, 1.732	1	0.924
Protestant	167	0.952	0.563, 1.611	1	0.854
Muslim	488	0.935	0.555, 1.576	1	0.802
Others (Reference)	17				
Knowledge of contraceptive use					
Yes	32	0.569	0.389, 0.832	1	0.004
No (Reference)	1204				
Marital status					
Married	190	0.252	0.213, 0.298	1	<0.0001
Single (Reference)	1046				
Respondent occupation				2	<0.0001
Unemployed	541	0.619	0.537, 0.715	1	<0.0001
Agricultural	242	0.884	0.732, 1.068	1	0.200
Non-agricultural (Reference)	453				

Risk of pregnancy termination decreases as women age increases. The risk of a woman to terminate pregnancy is higher among teenagers relative (OR=1.359, 95% CI: 1.143-1.617) to those 35 and higher years old (reference category). Similarly, women aged 20-24 years had about 40% higher chance of terminating pregnancy (OR=1.404, 95% CI: 1.171, 1.684) , and those aged 25-29 years old the prevalence of abortion was 34% higher compared to the reference age group 35 and higher (OR = 1.341, 95% CI: 1.115, 1.614). This figure was about 27% higher

for those women 30-34 years old (OR = 1.272, 95% CI: 1.042, 1.554).

Educational attainment has a significant negative association with pregnancy termination. Women with no education are 1.77 times more likely to terminate pregnancy (OR = 1.773, 95% CI: 1.348, 2.331) and those with primary education have a 46% increased risk of terminating pregnancy (OR = 1.462, 95% CI: 1.117, 1.913), respectively, relative to women with higher education level. This finding reveals there is difference in pregnancy termination between women with secondary and higher education level.

The chance of abortion among women who had knowledge of contraceptive use as compared to those who had no knowledge of contraceptive use is 43% less likely. This means the risk pregnancy termination for women who had knowledge of contraceptive use is decreased more than by half compared to women who had no knowledge of contraceptive use (OR = 0569, 95% CI: 0.389, 0.832).

Marital status (single vs. married) is also a significant predictor of abortion. The 95% confidence interval suggests that the risk of abortion among single women is about 75% less likely compared those married women (OR = 0.252, 95% CI: 0.213, 0.298). The study also showed a significant association concerning the woman's occupation. It was found that the probability of pregnancy termination was less likely to occur among unemployed women compared to the employed counterpart (OR = 0.619, 95% CI: 0.537, 0.715).

Discussion

The data for this study were extracted from the EDHS 2016, which is the nationwide survey conducted in Ethiopia using a nationally representative sample. The questionnaires used are comparable to the reference standard to measure external validity. The response rate (98.0%) of this study was very high compared to other national level surveys [22].

The five-year prevalence of pregnancy termination was 7.9%. Concerning geographical region Addis Ababa and Dire Dawa city administrations had the highest probability of pregnancy termination. In line with evidence from Ethiopian demography and health survey 2016 report, the proportion of pregnancy termination is higher among Addis Ababa and Dire Dawa city administrations. This is consistent with findings of [19,23,24], from Ethiopian demographic and health survey 2011.

Experiencing abortion had also associated with women's knowledge of contraceptive use. Having knowledge of contraceptive use was a protective factor to reduce pregnancy termination. The odd of pregnancy termination is higher for women without knowledge of contraceptive use. Studies have shown that knowledge of contraceptive knowledge had significantly decreased the occurrence of unwanted pregnancies and abortion [25, 26]. This is because poor utilization of contraceptive methods is the basis of unintended pregnancy.

The findings of the study show that no difference in the risk

of pregnancy termination between urban and rural residents, which is similar to finding of [11], from Nepal Demographic and Health Survey 2011. But some studies found higher abortion rates among urban women [27]. In this study household economic status had no significant impact on pregnancy termination. Several studies also identified wealth index is not associated with pregnancy termination [3,11], while many other studies found a significant correlation between pregnancy termination and wealth index [26,28,29].

The findings of this study also show that woman's education level had inversely related to pregnancy termination. Educated women were less likely to undergo abortions and uneducated and women with only primary education were more likely to undergo an abortion. From various literatures and theories, illiterate women are significantly exposed to abortion [30–32]. This is due to the fact that educated women use modern contraceptive methods to protect unwanted pregnancy. Further, the odds of pregnancy termination among women of the younger age group were very high compared to those who were 35 and older. The finding revealed that this was consistent with reports from several studies previously conducted to examine the prevalence of pregnancy termination [25].

The study assessed the relation of marital status and occupation to pregnancy termination. Married women were less likely to terminate pregnancy. Some studies in literature also reported a significant association between marital status and abortion [27,33], in which the probability of pregnancy termination is higher among women who were single or not married. This study also found that the rate of pregnancy increases among employed women. The finding is in line with the study in literature [10,34], that revealed the likelihood of abortion is high among women who were employed.

Conclusions

The study found that pregnancy termination was significantly associated with the region, age, education, knowledge of contraceptive use, marital status and occupation at the 5% level of significance. Illiterate women or women with primary educational attainments, who had no knowledge of contraceptive use and those who were younger were more likely to terminate pregnancy. Therefore, reproductive health programs that focus on awareness creation of contraceptive methods use and family planning among women of the productive age group should give more attention to reduce pregnancy termination that is due to unwanted pregnancy. Furthermore, educating women who were illiterate would also be an important to decrease the burden maternal mortality as consequences pregnancy complications.

Limitations

The lower prevalence of pregnancy termination is this study might be due to unwillingness of women to report having had a pregnancy termination during the Ethiopia Demography and Health Survey or is a secret public health problem affecting the reproductive health outcome status of women.

Acknowledgments

Authors' contributions

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