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Full Length Research Paper

Prevalence and covariates of human immunodeficiency virus (HIV) risk behaviours among circumcised and uncircumcised men in Botswana: A national cross sectional study

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There is insufficient evidence documenting and comparing the prevalence and covariates of human immunodeficiency virus (HIV) risk behaviours among circumcised and uncircumcised men in Botswana. The main aim of this paper was to assess prevalence and covariates of HIV risk behaviours among circumcised and uncircumcised men in Botswana. Data used for this study was derived from the 2013 Botswana AIDS Impact Survey which was a nationally representative, population-based survey. Cross-tabulations and logistic regression analysis were used to assess covariates of HIV risk behaviours among circumcised and uncircumcised men. Mean age for participants in the study was 30.46 years. From a total sample of 3809 men, only 25% were circumcised, 90% had ever heard about safe male circumcision program, 9% were of the view that circumcised men should stop using condoms. Results show that 67% of men were circumcised in government health facility, 16% in private health facility, while 17% in a traditional setting. Logistic regression results show evidence of risk compensation (multiple sex partners) among circumcised men (OR=1.027; 95% CI: 1.002-1.053). On the other hand, circumcised men were less likely to have not used condoms consistently (OR=0.672; 95% CI: 0.531-0.753). Alcohol consumption was found to be a statistically significant covariate of having multiple sex partners (OR=2.101; 95% CI: 2.044-2.161) while in rural residence, Christianity, primary education and the belief that circumcised men should stop using condoms were associated with inconsistent condom use. Further research is needed to understand the complex relationship between men's circumcision status and HIV risk behaviours in order to design effective interventions.

Key words: Determinants, circumcised, un-circumcised, human immunodeficiency virus (HIV) risk behaviour, Botswana.

INTRODUCTION

In 2009, the government of Botswana adopted safe male circumcision (SMC) as one of the possible strategies to

prevent and reduce transmission of human immunodeficiency virus/acquired immune deficiency

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syndrome (HIV/AIDS). This came about because Botswana is among the top three countries in sub-Saharan Africa which have been highly affected by HIV/AIDS epidemic. Recently, HIV/AIDS and related sicknesses have been the leading causes of morbidity and mortality in Botswana. Meanwhile, the introduction of antiretroviral has led to substantial declines in HIV/AIDS related morbidity and mortality (Keetile and Rakgoasi, 2014). In 2004, the Botswana AIDS Impact Survey II (BAIS II) estimated a national HIV/AIDS prevalence rate of 17.1%, in 2008 BAIS III prevalence rate was estimated at 17.6% (Statistic Botswana, 2009), while in the latest BAIS IV (2013), the national HIV/AIDS prevalence rate was estimated at 18.5% in the general population, and at 15.6% among men (NACA, 2014).

Safe male circumcision in Botswana was introduced as a national response to HIV/AIDS epidemic and it serves to augment existing series of response plans adopted by the government of Botswana over the years. Some initial studies on safe male circumcision have identified SMC as an effective strategy to reduce HIV infection among hetero sexual men (Bailey, 2002; Largarde et al., 2003; Gray et al., 2007). These initial studies from Kenya, Malawi, Zimbabwe, Swaziland, South Africa, and also in Botswana, have evidently indicated that in settings where HIV prevalence is high there are also high levels of acceptability of SMC (Nnko et al., 2001; Bailey, 2002; Largarde et al., 2003; Kebaabetswe et al., 2003; Mattson et al., 2005).

Further, the three randomized clinical trials have shown that men who are circumcised are less than half as likely to become infected with HIV within the trial periods (Bailey et al., 2002; Largarde et al., 2003; Gray et al., 2007). A randomized controlled trial conducted among uncircumcised men aged 18 to 24 years in South Africa in 2005, showed that male circumcision reduced the risk of acquiring HIV by 60% (Auvert et al., 2005). Moreover, two more studies conducted in Uganda (Gray et al., 2012) and Kenya (Westcamp et al., 2017) showed similar results. Models based on data from the clinical trials have predicted that routine male circumcision across sub-Saharan Africa could prevent up to six million new HIV infections and three million deaths in the next two decades (Mattson et al., 2005; Agot et al., 2007; Bailey et al., 2002).

There is evidence on the efficacy of safe male circumcision in reducing risk of HIV infection among heterosexual men which has resulted in increased demand for male circumcision services in many African countries (Letamo, 2011; Shi et al., 2017).

In Botswana, available evidence indicates that the proportion of circumcised men stood at 11% in 2008 and it had increased to 25.4% in 2013 (NACA, 2014). BAIS IV results indicate that younger men showed lower circumcision rates than their older counterparts. About 23% of young men in the 15-19 and 20-24 year categories were circumcised compared to 27, 31 and 39%, respectively, among those in the 30-34 and 35-39

and 55-59 years groups (NACA, 2014). There is need to re-assess the current prevalence and covariates of HIV risk behaviors among circumcised and uncircumcised men in Botswana. Previous study using data derived from BAIS III survey of 2008 indicated that being circumcised, or expressing willingness to be circumcised, was associated with significant increase in the likelihood of having two or more current sexual partners, and having had sex with multiple partners during the year leading to the survey (Keetile and Rakgoasi, 2014).

Further, a study by Ayiga and Letamo (2011) found that 15% of circumcised men did not use condoms compared to 12% of uncircumcised men, and circumcision was not significantly associated with condom use and also that non-use of condoms was significantly affected by religious beliefs, low level of education, marriage, drunkenness, and misconceptions regarding antiretroviral therapy.

Although, the two mentioned studies were on SMC and HIV risk behaviours, none has specifically made a comparative analysis of the prevalence of HIV risk behaviours among circumcised and uncircumcised men in Botswana and both used BAIS III data, hence, there could have been changes in HIV risk behaviours during the inter survey period. This paper, therefore, uses a comparative approach to assess extensively the prevalence and covariates of HIV risk behaviours among circumcised and uncircumcised men in Botswana using the latest BAIS data.

MATERIALS AND METHODS¹

Data sources

Data used in this paper is from the 2013 Botswana AIDS Impact Survey (BAIS-IV), which is the fourth and latest among a series of nationally representative demographic surveys aimed at providing up to date information on the Botswana's HIV/AIDS pandemic. Some of the objectives of the BAIS IV included providing latest information on the national HIV prevalence and incidence estimates among the population 18 months and above; to provide indicative trends in sexual and preventive behavior among the population aged 10-64 years; and provide a comparison between HIV rate, behavior, knowledge, attitude, poverty and cultural factors that are associated with the pandemic with estimates derived from previous surveys.

Stratification

All districts and major urban centres became their own strata. Enumeration Areas (EAs) were grouped according to ecological zones in rural districts and according to income categories in cities/towns.

Geographical stratification along ecological zones and income categories was undertaken to improve the accuracy of the survey data because of the homogeneity of the variables within each stratum.

¹Methodology used for this paper was adapted and modified from the 2013 BAIS survey methodology

Sampling design

BAIS-IV employed a national two stage sample survey design. The first stage was the selection of Enumeration Areas (EAs) as Primary Sampling Units (PSUs) selected with probability proportional to measures of size (PPS), where measures of size (MOS) were the number of households in the EA as defined by the 2011 Population and Housing Census.

EAs were selected with probability proportional to size. In the second stage of sampling, the households were systematically selected from a fresh list of occupied households prepared at the beginning of the survey's fieldwork (that is, listing of households for the selected EAs) and households were drawn systematically. Data collection was done using smart phone tablets instead of the conventional paper based method. Estimates for response rates showed that 83.9% of persons aged 10 to 64 answered individual questions. The targeted sampled population (aged 10-64 years) for BAIS IV was 9,807 and from this, 8,321 individuals were successfully interviewed yielding a response rate of 83.9% (NACA, 2014).

Study sample

From a total of 8,321 individuals who were successfully interviewed during BAIS IV, a sample of 3809 males aged between 10 and 64 years who had successfully completed BAIS IV individual questionnaire was selected using SPSS data selection command and included for analysis.

Measurement of variables

Dependent variables

The main outcome variable for this paper is HIV risk Behaviour, measured by two related variables.

Multiple sexual partners: This was derived from a question which sought to find out the number of sexual partners a respondent had in the past 12 months preceding the survey.

Based on this question, respondents were requested to list the number of sexual partners they had, the responses ranged from 0 partner to many partners (denoted by the highest number of partners listed).

The variable was coded such that respondents who had 0 to 1 partner meant they had safe sexual behaviour in the past 12 months, while more than 1 partners meant multiple sexual partners, hence HIV risk behaviour. The outcome variable was coded such that, multiple sex partners yes=1 and no=0.

Inconsistent condom use: Inconsistent condom use was measured by responses to questions that sought to find out if the respondents had always used condoms with three different sexual partners.

A composite variable for condom use inconsistency with past three sexual partners was then derived from the three questions, which are as follows: did you always use condoms with most recent partner in the past 12 months (possible responses, yes=1 and no=2); did you always use condoms with next most recent partner in past 12 months (possible responses, yes=1 and no=2), and did you always use condoms with second most recent partner in past 12 months (possible responses, yes=1 and no=2)?

All the 'no' responses for an individual were summed up to indicate level of condom use inconsistency, while all 'yes' responses were summed up to denote consistent condom use. Inconsistent condom use therefore means that the respondent did not use condom consistently with their partner(s) in the past 12

months². The resultant variable was coded such that inconsistent condom use, yes=1 and no=0.

Explanatory variables

This paper assesses the effect of the following variables on men's HIV risk behaviour.

Male circumcision: Male circumcision was used as the key independent³ variable for HIV risk behaviour among men. This variable was gotten from the question, "Are you circumcised". Responses to this question were yes, no and don't know and the 'don't know' response was filtered out to remain with yes =1 and no = 2.

Control variables

Variables such as age, education, marital status, religion, and place of residence were used as control variables. Previous studies have used these variables as control variables (Rosenberg et al., 1999; Mah and Halperin, 2010) because conceptually these variables are likely to have an association with men's sexual and HIV risk behaviours. In order to hold constant their likely association with men's HIV risk behaviours, these variables were included in the regression models, so that the association between independent variables becomes isolated and clear.

Furthermore, the following behavioural variables have been used as extraneous variables⁴ which may influence the effect of male circumcision on HIV risk behaviours.

HIV status: The following question was used "What were the results of your test?" This was a follow-up question to the question "Have you ever been tested for HIV, the virus that causes AIDS?" This question on HIV results was asked of men who said yes they have been tested for HIV. Possible responses were HIV Negative=1, HIV Positive=2. The 'don't want to tell' and 'don't know' responses were dummy coded to derive a 'don't know and don't want to tell category=3'.

Do you think circumcised men should stop using condoms: This question was used to assess whether circumcised and uncircumcised men who thought that circumcised men should stop using condoms had HIV risk behaviour. Possible responses to this question were yes=1 and no= 2.

Alcohol consumption: This variable was derived from item asking respondents whether they have been taking alcohol in the past 12

²This means that if an individual reported that they have not always used condoms in the past 12 months they were at risk of HIV infection

³Male circumcision is the mediator variable. Rather than hypothesizing a direct relationship between HIV risk behaviour (dependent variable) and independent variables (socio-demographic and behavioural variables), a mediational model approach was used where male circumcision was treated as the mediator variable. Thus the independent variable influences the mediator variable, which in turn influences the dependent variable. Thus, male circumcision serves to clarify the nature of the relationship between the independent variables and HIV risk behaviours. In other words, mediating relationships occur when a third variable plays an important role in governing the relationship between the other two variables.

⁴Extraneous variables are any variables other than the independent or control variables which may typically influence the effect of male circumcision on HIV risk behaviour in a lesser way. Model 2 in logistic regression analyses include these variables to see whether there would be variation in the influence of male circumcision on HIV risk behaviours

months. The codes were such that yes=1 and no=2.

Information about circumcision: This was derived from the question asking men whether they have seen information about safe male circumcision in the last four weeks? Responses were coded such that yes=1 and no=2.

Statistical analysis

Bivariate and multivariate data analysis techniques were employed to assess the influence of independent variables on the dependent variables. Results for bivariate analysis were presented as percentages. Pearson χ^2 tests were used for testing the association between circumcision status, socio-demographic and behavioural variables, at $p < 0.05$. Binary logistic regression results were presented as Odds Ratios (OR) together with their 95% confidence intervals. Two logistic regression models were run to predict the association between male circumcision and HIV risk behaviours. Model 1 presents the probability of HIV risk behaviour among men while controlling for socio-demographic characteristics of respondents. Model 2 introduces behavioural variables to assess the probability of HIV risk behaviour among men while controlling for background and behavioural variables. The model includes male circumcision status, background, and behavioural variables. Data analysis was done using SPSS version 22 program. Complex samples modules in SPSS was used to control for cluster effects since the data analysed was collected using stratified cluster sampling.

RESULTS

Study sample

From a total sample of 3809 men aged 10 to 64 years, only 25% (960) of men were circumcised. Mean age for men who participated in the study was 30.7 years. Table 1 results show that men in ages 10-39 years represented about three quarter (74%) of the study participants, while respondents in ages 40-64 years accounted for about one quarter (26%) of the sample. Half (50%) of men in the sample had secondary education, more than one quarter (28%) had primary education while about one fifth (21%) had tertiary education. Men in the sample were predominantly from rural areas, accounting for 63%. Meanwhile, 82% of men were reported to be of Christian religion, 12% no religion, while the remaining 6% were from other non-Christian religions. More than one fifth (22%) have had multiple sex partners in the past 12 months prior to the study, while 12% reported inconsistent condom use in the past 12 months. A large percentage (96%) of men had once tested for HIV/AIDS, while more than two fifths (44%) of men reported to have taken alcohol in the past twelve months.

Prevalence of HIV risk behaviours among men by circumcision status, socio-demographic and behavioural variables

Table 2 show variables relating to male circumcision. Results indicate that about one quarter (25%) of

respondents was circumcised. More than 90% of men in the study had ever heard about the safe male circumcision program, while 64% of men had seen information about safe male circumcision in the last four weeks prior to the survey.

About 9% of men in the sample were of the view that circumcised men should stop using condoms. Among circumcised men 67% were circumcised in a health facility, 16% in a private health facility and 17% were circumcised in a traditional setting.

Table 3 results show statistically significant association between circumcision status and inconsistent condom use. About 39% of both circumcised and uncircumcised men reported inconsistent condom use with the past three sexual partners.

As age increases the proportion of men (both circumcised and uncircumcised) who reported inconsistent condom use also increased. Inconsistent condom use was significantly high among circumcised men with primary or less education (53%) compared to men in other education groups and it was also significantly high in rural areas (42%) than men in urban areas (40%).

Results show that 41% of men who were of the view that circumcised men should stop using condoms did not use condoms consistently, while 46% among HIV negative men did not use condoms consistently compared to 30% among HIV positive men.

A slightly high proportion among circumcised men (77.4%) than uncircumcised men (76.9%) reported multiple sex partners. Meanwhile as age increases the proportion of men reporting multiple sex partners among age groups declined for circumcised men. For example men in ages 10 to 19 years (21%) reported multiple sex partners than men in ages 50+ years (5%).

Furthermore results indicate that circumcised men with tertiary education (19%) had multiple sex partners than men of other education groups, while 18% among men in urban areas compared to 13% among men in rural areas also reported multiple sex partners. The proportion of men who were of the view that circumcised men should stop using condoms (15%) was lower than for the men who thought otherwise (17%). Multiple sex partners were also high among HIV negative men (16%) than HIV positive men (9%), while among men who had taken alcohol in the last 12 months (23%) reported to have had multiple sex partners.

Covariates of HIV risk behaviours among circumcised and uncircumcised men

This part of the article presents results on the association between male circumcision and HIV risk behaviours, mainly multiple sex partners and inconsistent condom use using logistic regression models. The results show the odds ratios for the effect of male circumcision on HIV risk behaviours. For each HIV risk behaviour, there were

Table 1. Socio-demographic characteristics of the study participants.

Characteristic	Percentage	Number (N=3809)
Age		
10-19	26.1	994
20-29	25.6	975
30-39	22.4	853
40-49	14.1	537
50+	11.8	449
Education		
Primary or less	28	1051
Secondary	50.4	1920
Tertiary	21.6	823
Residence		
Urban	36.8	1403
Rural	63.2	2406
Religion		
Christianity	81.9	3120
Other-non Christian	5.8	221
No Religion	12.3	468
Marital status		
Never married	62.8	2392
Ever married	17.6	670
Living together	19.6	747
Multiple sex partners		
Yes	21.9	834
No	78.1	2975
Inconsistent condom use?		
Yes	11.6	442
No	88.4	3367
HIV status?		
Negative	30.6	708
Positive	9.6	222
Don't know and don't want to tell	59.8	1383
Have you ever taken alcohol in the past 12 months?		
Yes	43.5	1657
No	56.5	2152

*Mean age =30.46.

two models run; Model 1⁵ and Model 2⁶.⁵Model 1 include the dependent variable, male circumcision and background characteristics of respondents⁶Model 2 include the dependent variable, male circumcision, background variables and behavioural characteristics of respondents**Male circumcision and multiple sex partners**

Table 4 shows logistic regression odds ratios of the association between male circumcision and having multiple sex partners. Bivariate results (Table 3) have shown significant association between circumcision

Table 2. Study participants' circumcision status related variables.

Characteristic	Percentage	Number (n=3809)
Are you circumcised?		
Yes	25.2	960
No	74.8	2849
Have you ever heard of safe male circumcision program?		
Yes	90.4	3444
No	9.6	365
In the last four weeks have you seen information about safe male circumcision?		
Yes	64.0	2438
No	36.0	1371
Do you think circumcised should stop using condoms?		
Yes	8.5	324
No	91.5	3485
Where were you circumcised?		
Government health facility	66.9	642
Private health facility	16.1	155
Traditional	17.1	162

status and HIV risk behaviours. Furthermore, logistic regression results also show statistically significant association between socio-demographic, behavioural variables and HIV risk behaviours. Controlling for background variables (in Model I) circumcised men were more likely (OR=1.027; CI: 1.002-1.053) to have multiple sex partners compared to uncircumcised men. Meanwhile, socio-demographic variables such as age, education, residence, and religion were found to be significantly associated with having multiple sex partners. Results show that as age increases the odds of multiple sex partners decline. Men of other-non Christian religious affiliation were more than 1.5 times (OR=1.597; CI: 1.359-1.484) more likely to have multiple sex partners than men with no religious affiliation. Meanwhile Christian men were less likely (OR=0.706; CI: 0.685-0.728) to have multiple sex partners compared to men with no religion.

Model II introduces behavioural variables which may have an effect on the association between male circumcision and having multiple sex partners. Results indicate that even after introducing behavioural variables, the positive association between male circumcision and multiple sex partners is still maintained. Circumcised men were observed to be more likely (OR=1.056; CI: 1.027-1.086) to report multiple sex partner than uncircumcised men. Even after introducing behavioural variables, socio-demographic variables such as age, education, residence, religion and marital status maintained their significant association with multiple sex partners.

No statistical association was found between having

multiple sex partners, marital status, and the view that circumcised men should stop using condoms. Results however, indicate significant association between having multiple sex partners and alcohol consumption, information about safe male circumcision and HIV status. For instance men who consume alcohol were 2 times (OR=2.101; CI: 2.044-2.161) more likely to report multiple sex partners than men who do not consume alcohol, while men who did not see any information about safe male circumcision in the past four weeks were also more likely (OR=1.143; CI: 1.066-1.226) to have multiple sex partners compared to those who had seen information. HIV positive men were less likely (OR=0.631; CI: 0.594-0.671) to have multiple sex partners compared to HIV negative men.

Male circumcision and inconsistent condom use

Table 5 shows logistic regression odds ratios of the association between male circumcision and inconsistent condom use among men. Results indicate that circumcised men were 53% less likely (OR=0.472; CI: 0.404-0.550) to use condoms inconsistently compared to uncircumcised men. Men with secondary (OR=0.077; CI: 0.064-0.093), and tertiary education (OR=0.564; CI: 0.540-0.589) were likely to report inconsistent condom use compared to those with primary or less education. When considering residence respondents in rural areas were 11 times (OR=11.567; CI: 8.584-15.586) more likely

Table 3. Prevalence of HIV risk behaviours among men by circumcision status, socio demographic and behavioural variables.

Variable	Inconsistent condom use (%)	Total	Multiple sex partners (%)	Total
Circumcised				
Yes	38.8*	960	77.4*	960
No	38.9	2849	76.9	2849
Age				
10-19	26.7*	994	20.7*	994
20-29	37.5	975	19.6	975
30-39	39.6	853	15.5	853
40-49	43.9	537	7.5	537
50+	59.2	449	5.1	449
Education				
Primary or less	47.7	1066	3.1*	1066
Secondary	36.7	1920	9.6	1920
Tertiary	43.5	823	15.5	823
Residence				
Urban	40.1*	1403	17.7*	1403
Rural	42.1	2406	13.3	2406
Religion				
Christian	40.8*	3120	13.4*	3120
Other non-Christian	51.1	221	22.7	221
No religion	40.8	468	17.6	468
Marital status				
Never married	26.2	2392	22.1*	2392
Ever married	27.6	670	16.1	670
Living together	27.3	747	18.2	747
Do you think circumcised men should stop using condoms?				
Yes	41.0*	324	14.7*	324
No	39.9	3485	17.0	3485
HIV status				
Negative	46.1*	708	15.6*	708
Positive	30.0	222	9.4	222
Don't know and don't want to tell	39.9	1383	13.7	1383
Have you ever taken alcohol in the past 12 months?				
Yes	39.5*	1657	23.4*	1657
No	43.1	2152	8.0	2152
Seen information about safe male circumcision in the past four weeks?				
Yes	40.7*	2438	15.1*	2438
No	42.9	1371	13.3	1371

*p<0.05.

to report inconsistent condom use than men from urban areas. Results indicate that men of Christian religion were more likely (OR=1.125; CI: 1.069-1.184) to report

inconsistent condom use than men of no religion, while men of other non-Christian religion were less likely to report inconsistent condom use. There is no significant

Table 4. Logistic regression coefficients showing the likelihood that the respondent had multiple sex partners.

Variable	Model I ^a			Model II ^b		
	Exp (B)	95% C.I		Exp (B)	95% C.I	
		Lower	Upper		Lower	Upper
Circumcised						
Yes	1.027*	1.002	1.053	1.056*	1.027	1.086
No	1.000	-	-	1.000	-	-
Age						
10-19	1.000	-	-	1.000	-	-
20-29	0.451*	0.430	0.473	0.492*	0.457	0.529
30-39	0.433*	0.413	0.455	0.517*	0.480	0.557
40-49	0.492*	0.457	0.529	1.441*	1.201	1.728
50+	0.517	0.480	0.557	0.125*	0.101	0.154
Education						
Primary or less	1.000	-	-	1.000	-	-
Secondary	0.994	0.967	1.023	0.447*	0.421	0.475
Tertiary	0.781	0.747	0.816	0.955*	0.929	0.982
Residence						
Urban	1.000	-	-	1.000	-	-
Rural	1.747*	0.729	0.766	0.672*	0.653	0.691
Religion						
Christianity	0.706*	0.685	0.728	0.606*	0.585	0.627
Other-non Christian	1.597*	1.359	1.484	1.699*	1.614	1.788
No Religion	1.000	-	-	1.000	-	-
Marital Status						
Never Married	0.604	0.576	0.633	0.917	0.890	0.944
Ever Married	0.833	0.834	0.783	0.919	0.892	0.947
Living together	1.000	-	-	1.000	-	-
Do you think that circumcised men should stop using condoms?						
Yes				3.336*	2.799	3.976
No				1.000	-	-
Have you ever taken alcohol in the past 12 months?						
Yes				2.101*	2.044	2.161
No				1.000	-	-
Seen information about safe male circumcision in the past four weeks?						
Yes				1.000	-	-
No				1.143*	1.066	1.226
HIV Status						
Negative				1.000	-	-
Positive				0.631*	0.594	0.671
Don't know and don't want to tell				1.448	0.865	2.426

*P<0.05, 1.00 is reference category. ^aModel 1=Male circumcision and background variables. ^bModel 2= Male circumcision, background and behavioural variables.

Table 5. Logistic regression coefficients showing the likelihood that respondents had used condoms inconsistently.

Variable	Model I			Model II		
	Exp (B)	95% CI		Exp (B)	95% CI	
		Lower	Upper		Lower	Upper
Circumcised						
Yes	0.472*	0.404	0.550	0.672*	0.531	0.753
No	1.000	-	-	1.000	-	-
Age						
10-19	1.000	-	-	1.000	-	-
20-29	2.012	1.679	2.411	0.998	0.971	1.026
30-39	3.783	3.431	4.171	0.585	0.558	0.613
40-49	2.858	2.596	3.145	0.489	0.432	0.554
50+	0.374	0.312	0.448	0.374	0.312	0.448
Education						
Primary or less	1.000	-	-	1.000	-	-
Secondary	0.077*	0.064	0.093	0.073*	0.061	0.091
Tertiary	0.564*	0.540	0.589	0.471*	0.403	0.459
Residence						
Urban	1.000	-	-	1.000	-	-
Rural	11.567*	8.584	15.586	12.282*	8.686	17.368
Religion						
Christianity	1.125*	1.069	1.184	1.123*	1.066	1.183
Other-non Christian	0.941*	0.916	0.967	0.564*	0.540	0.589
No Religion	1.000	-	-	1.000	-	-
Marital status						
Never married	0.584	0.558	0.613	0.541	0.518	0.566
Ever married	0.848	0.823	0.873	0.669	0.548	0.688
Living together	1.000	-	-	1.000	-	-
Do you think that circumcised men should stop using condoms?						
Yes				1.772*	1.086	2.891
No				1.000	-	-
Have you ever taken alcohol in the past 12 months?						
Yes				1.441	1.201	1.728
No				1.00	-	-
Seen Information about safe male circumcision in the past four weeks?						
Yes				1.00	-	-
No				1.210*	1.179	1.242
HIV status?						
Negative				1.00	-	-
Positive				1.407	1.370	1.446
Don't know and don't want to tell				1.713	1.158	2.535

*P<0.05, 1.000 is reference category; ^Amodel 1=Male circumcision and background variables; ^Bmodel 2= Male circumcision, background and behavioural variables.

association between education and inconsistent condom use.

Model II results show that even after introducing behavioural variables, results indicate that circumcised men were less likely (OR=0.672; CI: 0.531-0.753) to report inconsistent condom use compared to uncircumcised men. Meanwhile men with secondary and tertiary education were less likely to report inconsistent condom use compared to men with primary or less education. There was residential difference in inconsistent use of condoms. For instance, men who reside in rural areas were 12 times more likely (OR=12.282; CI: 8.686-17.368) to report inconsistent use of condoms than men in urban areas. Christian men were also more likely (OR=1.123; CI: 1.066-1.183) to report inconsistent condom use than men with no religion. Men who were of the view that circumcised men should stop using condoms were more likely (OR=1.772; CI: 1.086-2.891) to have used condoms inconsistently than men who thought otherwise. Moreover, men who had seen information about safe male circumcision in the past four weeks were more likely (OR=1.210; CI: 1.179-1.446) to have not used condoms consistently. Age, marital status, alcohol consumption and HIV status were not significantly associated with inconsistent condom use.

DISCUSSION

Results in this study show that one quarter (25%) of men were circumcised and about 9% were of the view that circumcised men should stop using condoms. Circumcised men were less likely to have not used condoms consistently compared to men who were uncircumcised. This is not consistent with findings from other studies (Kibira et al., 2016; Shi et al., 2017) which have revealed that circumcision often gives circumcised men more freedom to have unprotected sex and in some instances to have many sexual partners. Decline in condom use is the most consistently expressed concern regarding male circumcision promotion and uptake, although our findings show the contrary. However, in Botswana there is need for more information and education about the actual benefits and disadvantages of circumcision to maintain consistent condom use.

It was found out that circumcised men were more likely to report multiple sex partners than uncircumcised men, when controlling for socio-demographic variables. Moreover, the odds of reporting multiple sex partners increased further with inclusion of behavioural variables. Some studies attribute HIV risk behaviours such as having multiple sex partners to behaviour risk compensation, where men change their sexual behaviours for the worse with the knowledge that their risk of infection is reduced (Riess et al., 2010; Andersson et al., 2011; Westercamp et al., 2017; Wilson et al., 2014). A study by Riess et al. (2010) also showed that

some men increased the number of sexual partners after undergoing male circumcision as part of the new program in Kisumu, Kenya, while others stopped using condoms consistently.

Evidence of risk compensation was also observed in the three randomized clinical trials that gave rise to the circumcision recommendation by UNAIDS in 2007. In another trial, circumcised men reported inconsistent condom use than uncircumcised men at the 4-12 and 13-21 months recall periods (Kibira et al., 2013). Further investigation into risk compensation in the Kenya trial (Mattson et al., 2008) demonstrated no marked increase in sexual risk behaviour among circumcised men, while in Uganda, inconsistent condom use was higher among circumcised men (Gray et al., 2012). In Botswana, a study on men's willingness to undergo circumcision found that expressing willingness to be circumcised was associated with significant increase in the likelihood of having multiple sex partners (Keetile and Rakgoasi, 2014). The observation that circumcised men in this study had multiple sex partners is a notable possibility of behaviour risk compensation.

Meanwhile, men who were of the view that circumcised men should stop using condoms were more likely to have multiple sex partners and report inconsistent condom use. This also could be attributed to perceived risk compensation among these men. Risk compensation can result when perceived risks for HIV infection are lowered due to certain attitudes and beliefs about the protective benefits of circumcision (Eaton et al., 2011) among these men. These results clearly imply wrong beliefs and attitudes of men towards male circumcision's protective benefits. Conversely, results from a study by Kong et al. (2012) in Uganda showed that uncircumcised men became significantly more likely than circumcised men to report multiple sex partners in the previous year and non-use of condoms at last sex with a non-marital partner. The magnitude to which risk compensation will moderate the protective benefits of a widespread scale-up of MC, such as that occurring in Botswana, need to be coupled with robust information, education and communication strategy. There is need to dispel some myths, attitudes and beliefs about safe male circumcision which may fuel risky behaviours. Sabone et al. (2013) observed that some wrong beliefs, myths and attitudes are key impediments to uptake of safe male circumcision among men in Botswana. They (Sabone et al., 2013) suggested the need for further information, education and communication about SMC to reduce the level to which risk compensation could moderate the protective effects of SMC.

Alcohol consumption was positively linked with having multiple sex partners and not with inconsistent condom use. Some studies have shown that alcohol consumption is the key driver of HIV/AIDS in Africa, especially through risk behaviours such multiple sex partnerships and inconsistent condom use (Leclerc-Madlala, 2009;

Morojele, 2013; Braithwaite et al., 2014). Moreover, recent systematic reviews and meta-analyses have shown that alcohol use was found to be associated with HIV risk behaviours especially having multiple sex partners (Scott et al., 2013; Sales et al., 2012).

Furthermore, our findings indicate that HIV positive men were less likely to have multiple partners compared to HIV negative men. This indicates awareness of the possibility of re-infection among HIV positive men. Circumcised HIV negative men on the other had reported having multiple sex partners. Given this evidence, promotion of the SMC program without increased education and counselling among men may hinder progress in further HIV reduction (WHO, 2015), since circumcised men engage in risky sexual behaviour. Anderson and Cockroft (2012) observed that the belief in an exaggerated protective effect of SMC might lead to risk compensation.

They found that young men who held the misconception that MC provides full protection against HIV infection were more prone to have multiple sex partners. Despite the campaign about SMC having begun long time in Botswana, misconceptions about SMC are still common. This may undermine the efforts in the fight against HIV/AIDS, or even reverse the gains made in reducing HIV incidence.

There should be more studies designed to monitor post-circumcision risk compensation over time, in a context of active promotion of male circumcision as an HIV prevention strategy. This should be done within a context of providing free information, education and communication materials that dispel myths and beliefs about SMC promptly.

The emphasis should not only be on the protective benefits of male circumcision but also that risk compensation could significantly reduce or negate the protective effects of circumcision against HIV if certain attitudes and beliefs are unchecked.

According to Westercamp et al. (2014), it is very possible that the behavioural changes observed in circumcised men may reflect a form of cognitive dissonance in which the psychological state of conflict between attitudes, beliefs or behaviours result in realignment to decrease discomfort caused by the conflict-in which men re-evaluate their behaviours in light of the personal investment involved in getting circumcised.

Conclusion

Circumcised men showed high propensity of having multiple sex partners and not inconsistent condom use. Although this analysis is based on data derived from a cross-sectional survey and this has precluded conclusions about causal associations between circumcision and risk behaviours, results indicate the need for further information about actual benefits of SMC.

Limitations of the study

Although our findings provide vital insights about the association between male circumcision and HIV risk behaviours in Botswana where there is rapid scale up of male circumcision, there are some limitations. The main limitation of the study is the use of secondary data which has limited us to the variables within dataset. There is need for further qualitative investigation on male circumcision and HIV risk behaviours, especially that there are differentials in the association of male circumcision and two HIV risk behaviours variables-multiple sex partner and inconsistent condom use. The second limitation is that since data is derived from cross sectional survey, it limits this analysis because data on each participant are recorded only once, hence it would be difficult to infer the temporal association between a risk factor and an outcome.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Emergency contraceptive use and associated factors among undergraduate female students in Wollo University, Dessie, Ethiopia

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Unwanted pregnancy can occur due to unprotected sexual intercourse and condom breakage. To prevent such problem, emergency contraceptives is the only method that can be used after unprotected sex. This study aimed to assess emergency contraceptive utilization and associated factors among regular undergraduate female students of Wollo University. A cross sectional study was conducted from April 1 to 15, 2017. Simple random sampling was used and 508 study subjects participated with response rate of 100%. Among the total respondents, 41.9% had sexual intercourse at least once prior to this study. Of those who had sexual intercourse, 19.7% had sexual intercourse without condom/contraception. From all respondents, 68.1% of the respondents have ever heard about emergency contraception, but only 30.9% used emergency contraception after unprotected sexual intercourse. Currently, unmarried students were 3.8 times more likely to use emergency contraceptive than currently married students (AOR: 3.8, 95% CI: 0.904 to 0.269). Those students who began sexual intercourse at age 13 years or less were 4.7 times more likely to use emergency contraceptive than those students who began sexual intercourse above age 13 years (AOR: 4.7, 95% CI: 1.403 to 15.769). Emergency contraceptive utilization was low among sexually active students after unprotected sexual debut. Sexual and reproductive health education program should be set up for the university students to avail accurate information about emergency contraception.

Key words: Emergency contraceptive use, Wollo University, female students.

INTRODUCTION

Emergency contraception refers to a group of birth control modalities that, when used after an unprotected sexual intercourse or contraceptive failure within defined

time limits and can prevent an unwanted pregnancy (Kassa et al., 2012; WHO, UNICEF, UNFPA, 2007). Sex during the fertile period without a modern form of

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contraceptive was most common in the student population. When used properly, emergency contraception can prevent unwanted pregnancy (Wambugu and Njeri, 2013; Manena, 2007). Widespread use of emergency contraception could be a potential strategy to reduce the incidence of unwanted pregnancies and unsafe abortions (Wambugu and Njeri, 2013). Worldwide, annually, over 500,000 women die as a result of childbirth or complication due to unintended pregnancy. Almost all or 99% of these deaths occur in developing countries (Tarekegn et al., 2014). Asia and Africa alone take 95% of the share of the world's maternal death (Birmeta et al., 2013). World Health Organization (WHO) estimates that 13% of worldwide maternal deaths are due to unsafe abortions secondary to unintended/unwanted pregnancy. Some women with unintended pregnancies obtain abortions and many of which are performed in unsafe conditions and others carry their pregnancies to term, incurring risks of morbidity and mortality higher than those for adult women (Ethiopian Central Statistics Agency and Calverton, 2016).

Ethiopia is one of the top five countries with the highest number of maternal deaths worldwide. The data show a steady decline in the Maternal Mortality Ratio (MMR) for the 7-year period preceding the surveys: from 871 deaths per 100,000 live births in the 2000 Ethiopian demographic and health survey (EDHS), to 673 deaths per 100,000 live births in the 2005 EDHS, and to 676 deaths in the 2011 EDHS, to reach 412 deaths per 100,000 live births in the 2016 EDHS (Nasir, 2010). Despite the availability of highly effective methods of contraception, many pregnancies are unplanned and unwanted. Adolescent pregnancy can lead to serious social stigma, school dropout and decreased school performance and health consequences for both mother and child. The adverse social and economic consequences for an adolescent who becomes pregnant will depend on her particular marital, cultural, familial, and community situation. By preventing unwanted pregnancy, emergency contraceptives can help avert the risks to the mother and child associated with unwanted/unintended pregnancy and childbearing (Habtamu et al., 2014).

The practice of emergency contraception is rare in Ethiopia. As a result of this, the health consequences related to unintended pregnancy and its complications are devastating the lives of adolescents (Kawakatsu et al., 2014). There are few studies which document the extent of emergency contraception use and the influencing factors on its use among university female students in Ethiopia. This study was carried out to determine emergency contraceptive use and its associated factors among undergraduate regular female students of Wollo University to assist policy makers in developing appropriate evidence-based strategies to promote the need based use of emergency contraceptive methods amongst eligible individuals at higher institutions

to prevent unintended pregnancy, unsafe abortions, related social stigma, school dropout, maternal morbidity and mortality in Ethiopia.

MATERIALS AND METHODS

Study design, population, period and area

A cross sectional study design was deployed among Wollo University undergraduate female students from April 1 to 15, 2017. Wollo University is one of government universities in Ethiopia which is located 401 km from Addis Ababa to the north at Dessie town and was established in 2007. According to the statistics obtained from student service center, currently, the University run 50 undergraduate and 8 post graduate programs in Dessie campuses, and it has a total of 8,585 students with female students accounting for 2,643 (30.8%). The university has one clinic which provides health services to students and there is one government referral hospital in Dessie town which provides service to the population of surrounding areas including Wollo University students. The University has five colleges, two schools and one institute. The source populations for this study were all regular undergraduate female students of wollo University and randomly selected regular undergraduate female students were the study population. Regular undergraduate female students were included and those female students who attend Extension and summer programs in Wollo University were excluded from the study.

Sample size determination and technique

The sample size was calculated using single population proportion formula. By taking into consideration, 18.4% of proportion of emergency contraception practice (Dejene et al., 2009), 95% confidence level, 5% tolerable margin of error, possible non-response rate of 10% and design effect of 2, a total sample of 508 was taken. To check for the adequacy of the sample size, Epi info was used by considering factors associated with emergency contraceptive (EC) use. By comparing sample size based on single population proportion formula and Epi-info, the sample size determined by single population proportion was greater than that of the Epi-info. Therefore the largest sample size of 508 was taken.

After calculating the sample size, all colleges and departments according to their year of study were considered in the sampling process for the selection of the study subjects. Total regular undergraduate female students in Wollo University were stratified into their respective year and colleges, and the sample size was distributed to each department in all colleges using proportional allocation to their size. The study subjects were selected from each department using simple random sampling from active list of each college registrar.

Data collection tools, procedures and quality control

Structured self-administered questionnaire was adapted after review of different literatures in English and translated into Amharic and back translated to English to check its consistency. Ten clinical nurse data collectors' two health officer supervisors were recruited and underwent one day training on how to organize and orient the study subjects in the arranged room. Pre-test was done on 26 (5%) of sample size at Dessie Health Science College female students and necessary correction was made on the questionnaire based on findings of pre-test before actual data collection. To avoid information exchange, cheating, and bias, all sampled students

were gathered in 10 class rooms and sat separately on different seats in Wollo University at the same time, and then structured self-administered questionnaires were distributed after orientation on how to fill the questionnaire.

Finally, the sample students completed filling the questionnaire and returned them to the carton-boxes which were prepared for collection of the filled-questionnaire to minimize social desirability bias. At the end of the data collection, the questionnaires were reviewed and cross checked for completeness by supervisors and the investigator.

Data processing and statistical analysis

Data were entered into Epi-Data 3.02 and exported, cleaned and analyzed by SPSS version 21. The collected data were processed by categorizing the questions, coding computerization and preparation of tables and diagrams; the above procedure helps to minimize data error. Missed data were explored and normality for variables was checked by p-p plot. Descriptive statistics for continuous variables, proportion for categorical variables, Odds ratio to check for the strength of association, bivariate and multiple logistic regression analysis were performed. Candidate variables with P-value less than 0.25 in the bivariate analysis was included in the multiple logistic regression analysis using backward stepwise method to develop model and identify predictor factors for emergency contraceptive use. Then, variables P-value of less than 0.05 was taken as significant. The result was organized and presented using tables, graphs, charts and statement.

Ethical consideration

Ethical clearance was obtained from Research Ethics Committee of Wollo University College of Medicine and Health Sciences Department of Public Health. Informed consent from study subjects prior to interview was obtained. The study participants were informed about the purpose of the study and the importance of their participation in the study by contributing information that may help in assessing the practices of female students towards emergency contraceptives. Also the study subjects were informed that they can skip question that they did not want to answer fully or partly and also to stop at any time if they want to do so. Confidentiality of the information was assured by not including their name and ID number and privacy of the respondents was maintained by using self-administered questionnaire.

Operational definition

Emergency contraception (EC):

This is a contraception method that can be used within 72 h following unprotected intercourse to reduce risk of pregnancy.

Unwanted/intended pregnancy

This is a pregnancy that has occurred when the woman does not want to have children, which may be because she already had the desired number of children or it may not be time.

Knowledge

By using index measurement, the graph was skewed to the right, so the data was not distributed symmetrically; the median index was used to classify mothers with good knowledge and poor knowledge.

Attitude

By using index measurement, the graph was distributed symmetrically; so the mean was used to classify mothers with positive attitude and negative attitude.

Women with unmet need for contraception

Women that want to avoid a pregnancy but are not using any method.

Emergency contraceptive use

A study subject who have ever used it to prevent unplanned pregnancy after unprotected sex, or regular contraceptive method failure.

RESULTS

Socio-demography characteristics of participants

A total of 508 students completed the questionnaire with overall response rates of 100%. The age of the study participants ranged from 18 to 29 years, with mean age of 21.1 years and ± 2.09 SD. Most of the respondents (367, 72.2%), were within the age group of 20 to 24 years. Majority of the respondents (455, 89.6%) were not married currently and 313 (61.6%) were from urban origin (Table 1).

Sexual and reproductive related factors

Among the total respondents who were asked about sexual intercourse, 213 (41.9%) of them had sexual intercourse at least once. The mean and median ages of starting sexual intercourse were 18 years old. Of those who had sexual intercourse, 42 (19.7%) of them had sexual intercourse without condom/contraception. Number of sexual partner in life among regular undergraduate female students showed that 79.5% had 3 and above sexual partner. This indicates risky sexual behavior. Regarding pregnancy of the total sexually experienced respondents, 42 (8.3%) reported ever experiencing pregnancy. Of the participants who experienced pregnancies, 35 (10.6%) and 7 (89.4%) experienced two or less times and three or more times pregnancies, respectively.

From these, 38 (90.5%) of pregnancies were unplanned, and the major reason for these unplanned pregnancies was unavailability of contraception methods which accounts for 19 (50%), followed by condom breakage/slippage and infrequent sexual intercourse without condom which accounts for 18.4 and 15.8%, respectively. Some female respondents reported experiencing abortion due to unwanted pregnancy. From the total number of ever had pregnancy, 33 (86.8%)

Table 1. Socio economic characteristics of participants among Wollo University students, 2017

Variables	Categories	Frequency(%)
College of the student	Natural science	94(18.5)
	social science	107(21.1)
	law	15(3.0)
	Agriculture	69(13.6)
	Medicine and health	96(18.6)
	Business and economics	103(20.3)
	Teacher institute	24(4.7)
Age	15-19	97(19.1)
	20-24	367(72.2)
	25-29	44(8.7)
Marital status	Currently married	53(10.4)
	Currently unmarried	455(89.6)
Place of the student	Urban	313(61.6)
	Rural	195(38.4)
Educational status of mother	Illiterate	160(31.5)
	Reading and Writing	205(40.4)
	Primary Education	48(9.4)
	Secondary Education	28(5.5)
	Above Secondary Education	67(13.2)
Educational status of father	Illiterate	109(21.5)
	Reading and Writting	223(43.9)
	Primary Education	69(13.6)
	Secondary Education	27(5.3)
Year of study	Above secondary Education	80(15.7)
	Second year and below	415(81.7)
	Above second year	93(18.3)

experienced abortion for a maximum of two times, and 20 (60.6%) and 13 (39.4%) had their abortions in a health facility and traditional place/home, respectively. As respondents noted, the reasons for the abortion were fear of families and not to discontinue their education, which accounts for 17 (51.5%) and 16 (49.5%), respectively.

Knowledge and previous practices of contraception

All the respondents have ever heard about at least one contraception method, 116 (22.8%) have heard about less than four types of contraception methods and 392 (77.2%) have heard about four and more types of contraception methods.

The major source of information about contraception was health professionals (76%) followed by teachers (8.5%). From all respondents, 434 (85.4%) believed on contraceptive methods as they are protective of pregnancy and 346 (68.1%) knew the methods of contraception to prevent unwanted pregnancy after

unprotected sexual intercourse. From all respondents, 346 (68.1%) have ever heard about emergency contraception method.

Attitude towards emergency contraceptive

Among all respondents, 158 (31.1%) did not consider the university clinic as convenient for emergency contraceptive usage. For inconveniency of emergency contraceptive usage in the university, 52 (33%) of the respondents' reason were un-respectful approach of health workers who worked in the university clinic, followed by other reasons (30.4%), inconveniency of time (18.0%), unavailability of drugs (8.2%), lack of privacy (6.3%), and health workers unwilling/unfriendly nature (3.2%). Most of the students have positive attitude towards using emergency contraceptive after unprotected sexual intercourse. Some of the positive attitudes reported by the respondents were: 417 (82.1%) respondent support use of EC after unsafe sex by all

Table 2. Factors associated with Emergency contraceptive use among regular female undergraduate Wollo University students, 2017.

Dependent Variable	EC Utilization		COR (CI 95%)	AOR (CI 95%)
	Yes (%)	No (%)		
Sex without condom or contraceptives	Yes	21(21)	0.066(0.034-0.126)**	8.85(0.051- 0.247)*
	No	182(79.5)		
Heard about Emergency contraceptive methods	Yes	257(70.6)	0.637(0.411-0.988)*	0.899(0.311-2.604)
	No	19(13.2)		
Time to take EC pill after unprotected sexual intercourse	Immediately	30(58.8)	0.516(0.415-0.642)*	4.678(1.073-2.039)*
	Within 24 h	2(5.4)		
	Within 72 h	94(27)		
Marital status	Currently married	39(73.6)	0.078(0.038-0.160)*	3.77(0.904-0.269)**
	Currently unmarried	87(19.1)		
Age at first sexual intercourse	<=13 year	11(50)	1.396(0.911-2.139)*	4.704(1.403-15.769)*
	14 – 18 year	51(54.8)		
	>= 19 year	64(65.3)		

1 reference; * p value < 0.05; **p<0.01.

female, and 352 (69.3%) of the respondents support availing EC for all females in the university but 91 (17.9%) of the respondents disagreed with recommendation of other female students to use emergency contraception after unprotected sexual intercourse due to religious prohibition (66%), fear of side effects (32.9%), and fear of friends, providers, parents.

Emergency contraceptive utilization

About 449 (88.4%) of the respondents had knowledge of taking emergency contraception after unprotected sexual intercourse but only 157 (30.9%) used emergency contraception after unprotected sexual intercourse to prevent unwanted pregnancy. The commonly used emergency contraceptives were combined oral contraceptive (COC) pills (82.8%) followed by progestogen-only pills (POP) (5.1%) and did not remember (12.1%). Of those who did not use emergency contraception methods (351, 69.1%), 278 (54.7%) was due to fear of side effects, 51 (10.0%) was due to lack of privacy, 16 (3.1 %) was due to lack of knowledge, and 5 (1.0%) was due to fear of parental disapproval. Time of intrauterine contraceptive device (IUCD) insertion among respondents within 72 h was 131 (25.8%), within 5 days was 87 (17.1%), and "I do not know" was 290 (57%). Regarding to the efficiency of EC pills, 46 (57.1%) responded that the efficiency of emergency contraception to prevent unwanted pregnancy was 50%, but 160 (25.8%), 54 (17.1%), and 51 (10%) of the respondents said it was 99, 75, and below 30% efficient in preventing unwanted pregnancy. The remaining 197 (38.8%) of the

respondents did not know the efficiency of emergency contraception to prevent unwanted pregnancy.

Bivariate and multivariate analysis of factors associated with emergency contraceptive use

Sex without condom/contraceptives, time to take emergency contraceptive pill after unprotected sexual intercourse, marital status, and age at first sexual intercourse, have significant association with students of EC utilization in multivariate analysis. Currently, unmarried students were 3.8 times more likely to use emergency contraceptive after unprotected sexual intercourse than currently married students (AOR: 3.8, 95% CI: 0.904 to 0.269). Those students who began sexual intercourse at age 13 years or less were 4.7 times more likely to use emergency contraceptive than those students who began sexual intercourse above age 13 years (AOR: 4.7, 95% CI: 1.403 to 15.769) (Table 2).

DISCUSSION

Although emergency contraception is not recommended as a regular family planning method, it is a useful method after unprotected sexual intercourse to reduce the chance of unwanted pregnancies. Emergency contraception is most useful when there is a failure of barrier methods such as slippage and breakage of condoms, or when sexual intercourse was unplanned (Munro et al., 2012). The overall emergency contraceptive utilization among the study participant was

157 (30.9%), which is greater than the results from the studies conducted in South African (1%) (Manena, 2007), hostels of the University of Nairobi, Kenya (4.4%) (Manena, 2007), Debremarkos University (11.4%) (Habtamu et al., 2014), Jima University (22.2%) (Nasir, 2010), and Addis Ababa University and Unity University College (5%) (Wegene and Fikre, 2007) but lower than the results of the studies conducted in Kampala University, Uganda (45.1%) (Nsubuga, 2016), Jimma University (41.9%) (Nasir, 2010), Princeton University students (8%) (Wambugu and Njeri, 2013) and Adama University (34.8%) (Dejene et al., 2009). The possible reason for such higher prevalence of EC use in this study could be time variation related with currently accelerated RH promotion activities and youth friendly programs in the country and increasing availability of EC in many government and non-government health institutions.

Three hundred and forty eight (68.5%) students had identified the correct timing of administration of the pills after unexpected sexual contact within 72 h, which is higher than the reports from Jimma University (30%) (Nasir, 2010) and Addis Ababa and Unity University college (10%) (Wegene and Fikre, 2007). The possible reason may be linked to the source of information; health personnel/institutions that have good information on the subject than peers/friends and time difference may also be one reason. In addition to this, marital status can also be one reason.

The findings of this study showed that 68.1% of the respondents heard about emergency contraception to prevent unwanted pregnancy after unprotected sexual intercourse which is higher than a study in AAU (43.5%) Wegene and Fikre, 2007; Jimma University (41.9%) (Nasir, 2010) and Haramaya University (25.7%) (Berhanu and Nigatu, 2011). Findings from this study showed that majority of the respondents (46%) started first sexual intercourse at age 19 and above, with the mean and median age of 18.35 and 18, respectively, which is almost similar to the study at Debremarkos University in which 74% of respondents started sex between the ages 15 and 19 years, and the mean age at first sex was 18.7 years (Habtamu et al., 2014) and Haramaya University with mean and median ages of starting sexual intercourse at 18.18 and 18, respectively (Berhanu and Nigatu, 2011). In this study, currently unmarried students were 3.7 times more likely to use emergency contraceptive after unprotected sexual intercourse than currently married students which is lower than a study done at Debremarkos University (Habtamu et al., 2014) in which married respondents were 7 times more likely to utilize EC than those never married respondents, but in a study done at AAU, married students response was compared to not married (Wegene and Fikre, 2007). The possible reason may be that the service sites may not be convenient to married clients. This study showed that students who have sex without condom or contraceptives were 8.85 times more

likely to use emergency contraceptive than those who had sex with condom or contraception. Based on this study, students who use emergency contraceptive were 4.678 times more likely to take it immediately after unprotected sexual intercourse than those who took it within 24 h, within 72 h, or within 4 to 6 days.

Conclusion

From this study, risky sexual practices among female students were so high. Knowledge and attitude towards emergency contraceptive among the regular under graduate female students in this University was good. Even if students heard about emergency contraceptive their utilization after unprotected sex was low. Even among those who were aware, utilization and timing of emergency contraceptive was very low. Sex without condom/contraceptives, time to take emergency contraceptives after unprotected sexual intercourse, marital status, and age at first sexual intercourse are determinant factors for utilization of emergency contraceptives.

Limitations

Self-reported information is subjected to reporting biases. Since the study touches sensitive issues the possibility of underestimation cannot be excluded.

RECOMENDATIONS

Based on the findings and conclusions of the study, the researchers present the following recommendations:

For Wollo University College of Medicine and Health Sciences

- (i) More information on human sexuality, conception, and contraception should be made available to female students once they join the university to eliminate misconceptions about contraceptives.
- (ii) A similar research has to be undertaken to include male students in the study.

For Wollo University Clinic

- (i) Female students should be empowered to take responsibility for the use of contraceptives, by enlightening them with proper and adequate information about their function, usage and methods.
- (ii) Girls should have access to confidential counseling and quality contraceptive information and service, including emergency contraception, where appropriate.

For Female Affaire Office

(i) Effort should be put to promote active involvement and participation of male students/partners in the reproductive health services. They could do this through education and participating in campaigns organized by the Department of Health.

(ii) There is a need to educate adolescents about emergency contraceptives, with emphasis on available methods and correct timing of use. There should be promotion of emergency contraceptives to enhance their use and easy accessibility in hospital, pharmacies and student clinic.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Proportion of safe abortion and associated factors among women who seek abortion care services in family guidance and Marie Stopes International Clinic in Dessie Town, North East Ethiopia

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In Ethiopia, abortion is illegal except in cases where the mother's and fetal life is in danger. As such, little is known about safe abortion. This study aimed to assess proportion of safe abortion and associated factors among women who seek abortion care services in Family Health Guidance and Marie Stopes International Clinics, Dessie town, North East Ethiopia. Cross-sectional study was conducted among 422 mothers who sought abortion care services from March to May 2017. The samples were taken consecutively in the study period by considering random client flow. Bivariate and multivariable logistic regression was done. From 422 patients who got abortion care services in the study period, 265 (62.8%) practiced safe abortion. Severe health problems during pregnancy [AOR 12, 95% CI, (3.080, 48.364)], surgical method of abortion [AOR 6, 95% CI, (2.379, 14.374)] and positive attitude of the study group to safe abortion [AOR 1.9, 95% CI, (1.084, 3.182)] were potential predictors of safe abortion. It was found that while the majority of participants were coming to access safe abortion services, there are still a large number of women engaging in unsafe methods for abortion. Thus, there is need for strong pregnancy follow up and behavioral change programs towards safe abortion..

Key words: Safe abortion, Marie Stopes International Clinic, family guidance clinic, abortion care services.

INTRODUCTION

Abortion is the termination of pregnancy by the expulsion of a fetus or embryo from the uterus. It can occur spontaneously due to complications or can be induced (Leveno et al., 2007). By convention, induced abortion is usually defined as pregnancy termination prior to 20

weeks for developed countries and 28 weeks for developing countries (World Health Organization (WHO), 2012). Abortion can also be classified as safe or unsafe. World Health Organization defines safe abortion as a procedure for terminating unwanted pregnancy by trained

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health professionals who have the necessary skills and in an environment that fulfills minimal medical standards (Sedgh et al., 2008).

Among the direct cause of maternal death in the world, unsafe abortion accounts for 8% of overall maternal deaths and as much as 25% in some countries and developing world (Gemzell et al., 2014). More than 40% of the total deaths due to unsafe abortion have occurred in Africa making it a cause of maternal mortality in the region (Tsfaye and Oljira, 2013). Reasons for procuring induced abortions are typically characterized as either therapeutic or elective (Tsfaye and Oljira, 2013). Therapeutic abortion is performed to save the life of the pregnant woman; prevent harm to the woman's and fetal physical or mental health (Central Statistical Agency (CSA), 2012). An abortion is referred to as an elective or voluntary abortion when it is performed at the request of the woman for non-medical reasons (Federal Minister of Health (FMH), 2006).

The World Health Organization (WHO) estimates that at least 33% of all women seeking hospital care for complication related to abortion are less than 20 years of age. Since illegal abortions have high mortality and morbidity rates, legalizing abortion is highly debatable issue among health policy makers worldwide (Mpangile et al., 1992). In developing countries, the risk of death following complications of unsafe abortion procedures is several hundred times higher than that of an abortion performed professionally under safe conditions (Wilson, 1994; Khasiani and Baker, 1990).

In Ethiopia, abortion is illegal except in cases where the mother's and fetus life is in danger, rape and incest and cannot be done with the woman request but illegal abortions are easy to obtain and widespread (Federal Minister of Health (FMOH), 2006). According to Ethiopian demographic and health survey report, unwanted and teenage pregnancy accounts for 25% (Central Statistical Agency, 2012). Knowledge and practice of safe abortion are practically important because of high rate of unwanted and teenage pregnancy (Madebo and G/Tsadik, 1993).

Even if all the above facts occurred, proportion of safe abortion, associated facilitators and barriers at abortion care health facilities have not been fully investigated in Ethiopia. So, this study provides information for local planners and policy makers as baseline to other researchers also.

MATERIALS AND METHODS

Study area, study design and participants

Health facility based on cross sectional study design was conducted at Family Health Guidance and Marie Stopes International Clinics in Dessie town from March to May 2017. Dessie is Zonal city of South Wollo located in Amhara Region North East Ethiopia which is located 401 km from Addis Ababa. All women who seek abortion care services at Family Health Guidance

and Marie Stopes International Clinics in Dessie town were source population and all women who got abortion care services at FHGC and Marie Stopes International Clinic in the study period were study populations. All pregnant women less than 28 weeks gestational age who attended abortion care services in FHG and Marie stops clinics during the study period were invited to participate in the study. Women who were severally ill thus could not respond and gestational age greater than 28 weeks were excluded.

Sample size and sampling procedure

A total of 422 sample size was calculated, using single population proportion formula by considering the following assumptions, proportion of safe abortion (P) 50%, confidence level (Z) 95%, precision (d) 5%, and finally by considering 10% none response rate. Family Guidance and Marie Stopes International Clinics with comprehensive abortion care facilities in Dessie town were selected purposively. The samples were taken consecutively from the study population in the study period by considering the assumption client flow in the health facility as random.

Data collection and quality control

Data by trained data collectors during exit face to face interview were collected using structured and validated close ended questionnaires in which the questionnaire was developed after reviewing different literatures (Central Statistical Agency, 2012; Federal Minister of Health (FMOH), 2006) and customized based on the study setting and objectives. It was first prepared by English and translated to local language Amharic version by language experts. Pretest was conducted on 5% calculated sample size at Gynecology and Obstetrics clinic which was not selected in the study to check validity and consistency of the tool in which necessary modifications were incorporated before commencing the actual data collection. Six BSc midwife nurses' data collectors and two BSc nurses supervisors were trained on clarification of the questionnaire and methods of data collection.

For the purposes of this study, safe abortion was defined as termination of pregnancy initiated/induced by a skilled health care provider with proper equipment's and in a study health facilities while unsafe abortion was defined as termination or try to terminate but failed of unwanted pregnancy either by a person lacking necessary skills or in an environment lacking minimal standard or both. Also, spontaneous abortion was defined as the unintentional expulsion of an embryo or fetus before the 24th week of gestation for developed country and before 28 weeks for developing countries.

For the purposes of this study, knowledge was measured by asking participants, seven knowledge related questions to assess their knowledge about safe abortion and developed a knowledge score (index) by using principal component analysis, taking those who had a mean score and above as good knowledge, and those who scored below the mean score as poor knowledge.

For the purposes of this study, attitude was measured by asking participants, five likely attitude related questions to assess the attitude of study participants toward safe abortion and developed attitude score (index) by using principal component analysis. We took mean and above score as having positive attitude and below mean score as having negative attitude.

In relation to this study, abortion care services were defined as women who came to FHG and Marie stops clinics to seek essential abortion care services which includes; pre abortion counseling, safe abortion to complete incomplete abortions induced by traditional healers and failed treatment of sepsis due to unsafe abortion, post abortion care and post abortion family planning after safe and unsafe abortions.

Table 1. Distribution of the study subjects by socio demographic characteristics in FHG and Marie Stopes International Clinic in Dessie town, North East Ethiopia, 2017.

variable	Responses	Frequency	Percentage
Age	15-19	81	19.2
	20-24	151	35.8
	25-29	95	22.5
	30-34	67	15.9
	35+	28	6.6
Marital status	Married	174	41.2
	Single	248	58.8
Occupation	Farmer	36	8.5
	Employer	113	26.8
	Student	125	29.6
	Commercial sex worker	79	18.7
	Others	69	16.4
Place of residence	Dessie	234	55.5
	Out of Dessie	188	44.5
Educational status	Do not read and write	29	6.9
	Read and write	21	5
	Grade 1-8	92	21.8
	Grade 9 – 12	142	33.6
	Above	138	32.7
Live together with your husband	Yes	140	33.2
	No	282	66.8

Ethical consideration

Ethical clearance was obtained from Wollo-University College of Medicine and Health Sciences ethical review committee. An official letter of co-operation was taken to the respective departments and to managers of study areas (FHG and Marie Stopes International Clinics) after both managers were accepted, where the study had been undertaken in their organizations. Informed consent was taken from study participants. Privacy and confidentiality was kept throughout the process.

Data analysis

Data were first checked for completeness, edited and coded daily. The extracted data were cleaned and checked for accuracy and consistency, entered to Epi data 3.1 and exported to SPSS version 21.0 software for analysis. Descriptive analysis for continuous variables and proportion to categorical variables were done. Bivariate and multivariable logistic regression was also done. Those variables p-value less than 0.25 in bivariate were entered in multiple variable logistic regressions to identify independent factors for safe abortion utilization. Those variables less than 0.05 with 95% confidence interval had been taken as significance in the final model.

RESULTS

Socio demographic characteristics of participants

In this study, 422 women were involved which yields 100% response rate. Among those, 151 (35.8%) of them were in the age group of 20 to 24 years and 28 (6.6%) of them were in the age group of 35 and above years. From the total of 422 respondents, 174 (41.2%) were married and 188 (44.5%) of them came out of Dessie town. Concerning respondents occupation, 125 (29.6%) were students and 142 (33.6%) accounts for grade 9 to 12 (Table 1)

Awareness about safe abortion services

Among study participants, 337 (79.9%) reported that the pregnancy was unplanned and unwanted in which majority of respondents (301, 71.3%) had heard about safe abortion before their current pregnancy. The major sources of information mentioned by respondents were 228 (54%) health professionals, 119 (28.3%) mass

Table 2. Knowledge related responses for safe abortion among study participants in Marie stops and FHGC in Dessie town, north east Ethiopia 2017.

Variable	Responses	Frequency	Percentage
Heard about safe abortion	Yes	301	71.3
	No	121	28.7
Unsafe abortion is major health problem in Ethiopia	Yes	416	98.6
	No	6	1.4
Ethiopia has an abortion law	Yes	366	86.7
	No	56	13.3
Abortion is not allowed for any reason	Yes	128	30.3
	No	294	69.7
Abortion allowed for rape and incest pregnancy	Yes	307	72.7
	No	115	27.3
Abortion allowed for fetal death	Yes	308	73
	No	114	27
Abortion allowed for severe maternal health problems	Yes	304	72
	No	118	28

media, 63 (14.9%) parents and 12 (9.8%) friends. Respondent were ask preferable gestational age to do safe abortion in which 378 (89.6%) said before three month, 35 (8.3%) said three to six month and 9 (2.1%) said any time of pregnancy. According to the study participants, 300 (71.1%) said safe abortion is permitted in their society culturally and 244 (57.8%) knew where safe abortion is done. For importance of safe abortion from the women perspective, to save mothers life was 187 (44.3%), if pregnancy is due to rape or incest was 50 (11.8%) and to prevent school disruption was 84 (20%). Major complications during abortion mentioned by participants were death (137, 32.5%), bleeding (206, 48.8%), infection (56, 13.3%) and pain (23, 5.4%) (Table 2).

Attitude towards safe abortion

Based on the composite index measurement, 162 (35.7%) of the study participants had negative attitude towards safe abortion. Of the total study participants, 412 (97.6%) agreed that safe abortion saves mothers' lives and 151 (35.8%) women disagreed about the statement elective abortion should be legal and accessible for any reason. From total respondents, 369 (90%) agreed they were more comfortable with medical abortion than surgical abortion. Out of the total study participants, 396 (93.7%) agreed every program addressing mother's health should include abortion care service information. Of respondents, 53 (12.5%) disagreed with the statement that "mothers choose abortion because of fetal congenital anomalies".

Pregnancy and family planning history

From the total study participants 418 (99.1%) think family planning prevents unwanted pregnancy and 405 (96%) ever used contraceptive before pregnancy. Common contraceptive methods ever used by women were pills (113, 26.8%) injectable (189, 44.8%), implants (79, 18.7%) and condom 41 (9.7%). Among respondents 294 (69.7%) were primigravida and 382 (90.5%) were terminating a pregnancy for the first time while the rest (n=40(9.5%)) for the second time. A significant portion of participants (98, 23.2%) had habit of substance abuse and alcohol.

Proportion of safe abortion and reasons

Out of 422 clients who got abortion care services in the study period, 265 (62.8%) practiced safe abortion while the rest (157, 37.2%) practiced unsafe abortion by traditional health workers at home and came to abortion care health facilities with incomplete abortion, sepsis and for post abortion family planning. The mothers were interviewed anonyms and informed about the objective of the study to respond with the truth about unsafe abortion practice.

The methods of safe abortion techniques applied to terminate the pregnancy for mothers were 8.5%. Those who involved in the study were medical abortion (138, 52.0%), surgical abortion (53, 19.5%) and combination of both (74); two major reasons mentioned for safe abortion were health problems (120, 28.4%) followed by attending schools (116, 27.5%) (Figure 1).

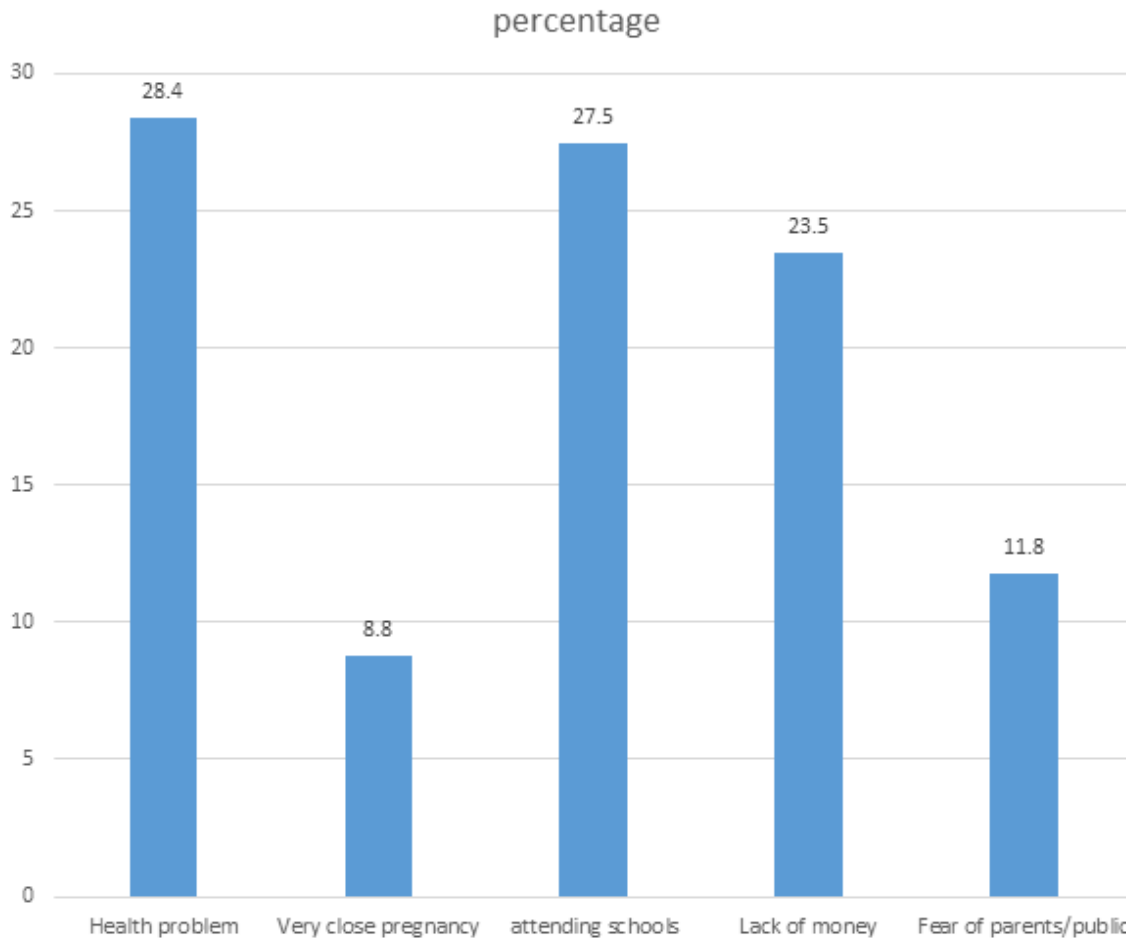


Figure 1. Shows reasons for abortion of those had got abortion care services in the study period in FHG and Marie Stopes International Clinics, Dessie, north east Ethiopia, 2017.

Factors associated with safe abortion

Health problems during pregnancy, surgical abortion practice, knowledge about safe abortion, and positive attitude to safe abortion were associated with safe abortion practice in the study area. Women who had reasons for abortion having severe health problems during pregnancy were 12 times more likely to practice safe abortion as compared to those women who mentioned that their reasons are due to shortage of money to care for the new born after birth [AOR 12, 95% CI, (3.080, 48.364)]. Those women who had surgical method of abortion were six times more likely to utilize safe abortion as compared to women who practiced both medical and surgical abortion [AOR 6, 95% CI, (2.379, 14.374)]. Women who tried to abort pregnancy at home were 57% less likely to practice safe abortion than who do not try at home [AOR 0.435, 95% CI, (0.229, 0.829)]. Having positive attitude toward safe abortion was found to increase the usage of safe abortion by 1.9 times as compared to those who had a negative attitude and

believed abortion to be socio culturally unacceptable [AOR 1.9, 95% CI, (1.084, 3.182)] (Table 3).

DISCUSSION

Safe abortion accounted for 62.8% of abortion care services at the FHG and Marie Stopes International Clinics in Dessie town whereas, in other study, it was found that the Eastern Europe sub region has the highest safe abortion rate (98.5%) of any sub region (Madebo and G/Tsadik, 1993; Nojomi et al., 2006). When compared to this study it shows that prevalence of safe abortion in this region was low, which could probably be explained by variation in legalization of the safe abortion. A previous study done at Mizan tepi showed the prevalence of safe abortion was 1.18% in all the study groups (Andualem, 2015). There was also another study done at Wolayta Sedo University and the proportion of safe abortion was 16% (Amha et al., 2014). This may be due to difference in study period and setting and also

Table 3. Bivariate and multivariate analysis for factors associated with safe abortion care in FHG and Marie Stopes International Clinic Dessie, North East Ethiopia, 2017.

Variables	Category	Safe abortion (%)		COR (95% CI)	AOR (95% CI)
		Yes	No		
Reason for abortion	Health problem	65 (54.2)	55 (44)	4.19 (1.960, 8.954)*	12.2 (3.080,48.364)***
	Close pregnancy	1 (2.7)	36 (97)	0.09 (0.012, 0.802)	0.203 (0.014,2.858)
	Student	52 (44.8)	64 (55)	2.881 (1.344, 6.176)	0.760 (0.122,4.747)
	Lack of money	28 (28.3)	71 (72)	1.398 (0.629, 3.110)	3.169 (0.716, 14.030)
Method of abortion	Surgical	62 (74.7)	21 (25)	7.16 (3.929,13.052)*	5.9 (2.379,14.374)***
	Medical	48 (27)	130 (73)	0.896 (0.557,1.439)	0.890 (0.425, 1.865)
	Both	47 (29.2)	114 (70.8)	1	
Try to abort at home	Yes	86 (27.5)	227 (72.5)	1	
	No	71 (65.1)	38 (35)	0.20 (0.127, 0.323)*	0.435 (0.229, 0.829)**
knowledge	Good	86 (?)	174 (?)	1.6 (1.054,2.364)*	1.8 (0.646, 5.209)
	Poor	71 (43.8)	91 (56)	1	
Attitude	Positive	89 (32.6)	184 (67.4)	1.74 (1.152,2.615)*	1.857 (1.084, 3.182)*
	Negative	68 (45.6)	81 (54)	1	

1= Reference group *p<0.05, **p<0.01 ***P<0.001.

might be because of more mothers are having information about safe abortion currently from different sources.

This study showed significant association between reasons to abortion category of having a severe health problem during pregnancy. This makes the odds of having safe abortion increased by 12 times, for this reason when compared to the reason mentioned above (lack of money to care the new born after delivery). This may be due to poor regular ANC follow up of those pregnant mothers to relive health problems during pregnancy. Surgical method of abortion was found to increase the usage of safe abortion by five times as compared to medical abortion; this could be also due to the drug side effects during medical abortion. The major reasons mentioned for safe abortion were health problems, followed by attending schools, lack of money to raise the child and fear of the public. It is consistent with the study conducted in Ghana and Addis Ababa (Mote et al., 2011; Tadesse et al., 1994).

The study also found significant association with the place of abortion; those having tried to abort at home their pregnancy was 60% less likely to practice safe abortion. This could be due to cultural influence and lack of information about safe abortion. The other facilitator for safe abortion that was identified in this study was positive attitude of the study group for safe abortion which was found to increase the usage of safe abortion by 1.8 times as compared to those have negative attitude. This study is consistent with the study at Wolayta Sedo University (Amha et al., 2014). This may be due to having a positive

attitude toward safe abortion practice of the study population by improving their culture, getting enough information; improving their knowledge and understanding the complications of unsafe abortion bring behavioral changes.

Limitation of the study

Some social desirability bias may not be eliminated.

Conclusion

In this study, it was found that while the majority of participants in these two clinics were coming to access safe abortion services, there are still a large number of women engaging in unsafe methods for abortion. This has public health importance among those attended for abortion care services in the Family Health Guidance and Marie Stopes International Clinics. The knowledge of the study participants on safe abortion care service was good, that most participants properly stated all the conditions for safe abortion care service and its legalization in Ethiopia. Women who had negative attitude towards safe abortion and culturally unacceptable practiced less likely to practice abortion. Even if there was contraceptive ever used report, it shows failure to proper use that leads unintended pregnancy and abortion. Health problem during pregnancy, surgical method of safe abortion and positive attitude to safe abortion were predictors to practice safe abortion.

RECOMMENDATIONS

It is recommended that sustainable extension of safe abortion care services to other public health institution which provide quality service like family planning to prevent unsafe abortion should be provided. Furthermore, support and extension of safe abortion care service to other public health facilities and creating accessibility of the service to the nearby health facility is recommended. Additionally, they should be focus on proper utilization of birth control methods through information, education, communication and attitude behavior change to safe abortion care services in the community and also strong follow up of all pregnant women to early detection of health problems and management is recommended. Lastly, it is recommended that socio cultural barriers should be explored and accessibility of safe abortion care services should be provided in the community.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Abbreviations: WHO, World Health Organization; WU, Wollo University; CSA, Central Statistical Agency of Ethiopia; DHS, demographic health survey; FHG, family health guidance, FMOH, Federal Ministry of Health; FP, family planning; GA, gestational age; MMR, maternal mortality ratio.

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A close-up photograph of a person's nose. A white nasal swab is inserted into the nostril. The background is dark and out of focus.

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