

ORIGINAL ARTICLE**Premarital Sex in the Last Twelve Months and Its Predictors among Students of Wollega University, Ethiopia****Tesfaye Regassa¹, Dereje Chala², Emiru Adeba¹****ABSTRACT**

BACKGROUND: *Premarital sex increases the risk of unintended pregnancy and sexually transmitted infections including HIV if unprotected and contraception is not used. Thus, the objective of this study was to assess premarital sex in the last twelve months and its predictors among regular undergraduate students of Wollega University.*

METHODS: *A cross-sectional survey using pretested, structured questionnaire was conducted on a total of 704 regular undergraduate students of Wollega University from February to March, 2014. We used multistage sampling technique to recruit study participants. Binary and multivariable logistic regressions were performed using SPSS version 20 to assess predictors of premarital sex. Statistical significance was determined through a 95% confidence level.*

RESULTS: *Wollega University youths who had premarital sex in the last twelve months were 28.4%; 55.5% of them did not use condom during last sex while 31.3% engaged in multiple sex. Being male [Adjusted Odds Ratio (AOR)(95% Confidence Interval(CI))=2.7(1.58-4.75)], age 20-24 years [AOR(95%CI)=2.8(1.13-7.20)], training on how to use condom [AOR(95%CI)=1.7(1.17-2.46)], being tested for HIV [AOR(95%CI)=2.3(1.48-3.53)], using social media frequently [AOR(95%CI)=1.8(1.14-2.88)], having comprehensive knowledge of HIV [AOR(95% CI)=1.5(1.01-2.10)], alcohol use [AOR (95%CI)=2.2(1.31-3.56)] were associated with increased odds of premarital sex in the last twelve months.*

CONCLUSION: *Nearly one-third of regular undergraduate students of the university were engaged in premarital sex in the last twelve months. Being male, using social media frequently and alcohol use were associated with increased odds of premarital sex in the stated period. Thus, higher institutions have to deliver abstinence messages alongside information about self-protection.*

KEYWORDS: *Premarital sex, students, Wollega University*

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INTRODUCTION

It is common to begin intimate relationships and become sexually active, including premarital sex, during young age. The sexual activity is initiated while young people are still physically, emotionally and cognitively developing (1).

In many countries, an average of 29% of boys and 23% of girls are sexually active including premarital sex. Premarital sex was

associated with unmet need for contraception and unintended pregnancy (1-5). It is also associated with different reproductive health problems. Among these, age specific HIV prevalence indicates that young people are more infected than others (6,7).

Studies indicated that age (8), using social media (9,10) and being male (11,12) were predictors of premarital sex. Other studies indicated that onset of sexual activity is associated with alcohol use (13,14). Comprehensive knowledge of HIV/AIDS

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was an inconsistent predictor of premarital sex (12,15).

HIV is transmitted mainly through heterosexual contacts in Ethiopia. More than 87% of HIV cases are transmitted sexually in Ethiopia like in other developing countries (3,16). Despite the acceptance and knowledge of HIV/AIDS and risk of abortion, young people engage in premarital sex, multiple sexual partnership, casual sex and unprotected sex (15,17). However, premarital sex in the last twelve months along with its predictors, i.e. multiple sexual partners, casual sex and unprotected sex has not been well understood in higher teaching institutions of Ethiopia (12).

Thus, the objective of this study was to assess premarital sex in the last twelve months and its predictors among regular undergraduate students of Wollega University, Ethiopia. Results of this study could assist higher education institutions and implementers to design appropriate strategies to address premarital sex among university students in this setting.

MATERIALS AND METHODS

A cross-sectional survey was conducted from February to March 2014 at Wollega University, Ethiopia. The total number of regular undergraduate students of Wollega University was 7813 males and 1823 females (18). The source population was all regular undergraduate students of Wollega University, aged 15- 24 years. We included students who were never married at the time of the study.

Sample size was calculated using EPI info 3.5.2 based on single population, sexually active youths at Mada Walabu University (42.3%) (19), 95% confidence level ($Z_{\alpha/2}$), 2 design effect and 5% margin of error. The estimated total sample size was 750 students. However, the final sample size included in the analyses was 704; incomplete questionnaires were excluded from analysis.

Multistage sampling method was used to recruit study participants. First, departments were selected proportionally from each college. Nineteen departments were selected from six colleges of the university randomly. The final sample from each department was taken

proportionally by using systematic random sampling technique. Lists of students from each department were obtained from the registrar of the university and every second student from the selected department was included.

The questionnaire had items on socio-demographic characteristics and questions related to premarital sexual behaviour. The structured questionnaire was pilot tested on 5% of the sample at Ambo University. Then, some skip patterns were corrected and the consent form was modified. Health care providers who had Bachelor of Science degree administered the pretested, structured questionnaire after they took a two days' training on the objective and relevance of the study. Supervisors were trained and followed up the data collection process closely.

The dependent variable was premarital sex in the last twelve months while the independent variables were age, sex, place of origin, educational background of family, parental employment, khat use, alcohol use and social media use. Social media use was categorized into four levels: *always*, *sometimes*, *rarely* and *never used*. Khat and alcohol use were measured if the participants had practiced khat or alcohol in one year prior to the study. According to the national indicator of HIV/AIDS, people are considered knowledgeable about HIV/AIDS if they have acceptable response to five questions assessing HIV knowledge (17).

After data entry and cleaning using Epi info 3.5.2 software, data were imported to SPSS version 20.0 for analysis. Bivariate analyses between dependent and independent variables were performed using binary logistic regression. To control for possible confounding variables, multivariable logistic regression was done. All variables which had association in bivariate analysis (P -value < 0.05) were included in the multivariate model. The strength of association between premarital sex in the last twelve months and independent variables was expressed in odds ratio (OR) through a 95% confidence interval. Data quality was ensured during data collection, entry and cleaning. The purpose of the study was clearly explained to concerned bodies. Ethical approval was obtained from Ethical Review Committee of Wollega University. Written informed consent was obtained from all

participants. Anonymity of data was ensured by excluding name and identification number of students.

Characteristics of study participants: Of the 704 respondents, 529 (75.1%) were males. The median age of respondents was 21 years (Table 1).

RESULTS

Table 1: Socio-demographic characteristics of the study participants (n=704)

Variables	Categories	Frequency (%)
Sex	Male	529(75.1)
	Female	175(24.9)
Year of study	I	142(20.2)
	II	253(35.9)
	III	167(23.7)
	IV	90(12.8)
	V	52(7.4)
Educational level of father	No formal education	205(29.1)
	Primary	232(33.0)
	Secondary	134(19.0)
	College/University	133(18.9)
Educational level of mother	No formal education	270(38.4)
	Primary	253(35.9)
	Secondary	117(16.6)
	College/University	64(9.1)
Occupation of father	Farmer	404(57.4)
	Private	101(14.3)
	Government employee	127(18.0)
	NGO employee	20(2.8)
	Father not alive	43(6.1)
	Others*	9(1.3)
Occupation of the mother	Farmer	353(50.1)
	Private	164(23.3)
	House wife	122(17.3)
	Governmental employee	48(6.8)
	Nongovernmental employee	17(2.4)
	Others**	

*daily laborer, unemployed; ** Mother not alive, daily laborer

Premarital sex among undergraduate regular students: Concerning sexual practice, 211(30.0%) of the respondents ever had premarital sexual practice; 131(62.1%) of them started between 15-19 years of age, 19% after joining university. One hundred twenty-four

(62.0%) of them had used condom in the last 12 months, and 79(63.7%) of them used condom consistently. Among those engaged in premarital sex in the last 12 months, 111(55.5%) did not use condom during the last sex while 66(31.3%) practiced multiple sex (Table 2).

Table 2: Premarital sex among regular undergraduate students of Wollega University

Variable	Categories	frequency(%)
Ever experienced premarital sexual intercourse n =704	Yes	211(30.0)
	No	493(70.0)
Premarital sex in the last year (n =704)		200(28.4)
Age at first sexual intercourse n=211	10-14	14(6.6)
	15-19	131(62.1)
	20-24	66(30.3)
Educational level when started sex n=211	Primary	75(35.5)
	Secondary	40(19.0)
	Preparatory	56(26.5)
	University	40(19.0)
Number of sexual partner in 12 months n =200	1	145(68.7)
	2	46(21.8)
	>2	20(9.5)
Condom used in 12 months n =200	Yes	124(62.0)
	No	76 (38.0)
Frequency of condom use n =124	Always	79(63.7)
	Sometimes	17(13.7)
	Rarely	28(22.6)
Condom used at last sex n =200	Yes	89(44.5)
	No	111(55.5)
Paying money or gifts in exchange for sexual intercourse (n =704)		38(5.4)
Receiving money or gifts in exchange for sexual intercourse (n =704)		39(5.5)

Alcohol use was reported among 56(28%) of the respondents while social media (Facebook, Twitter and other social medias) use was reported among 58(29%) respondents who were engaged in premarital sex in the last 12 months (Table 3).

Factors associated with premarital sex: In binary logistic regression, being male [AOR(95%CI)=3.7(2.29-6.12)], fourth year in the university [AOR(95% CI)=1.9(1.07-3.41)], fifth year in the same venue [AOR(95%CI)=3.3(1.69-6.44)], age 20-24 years [AOR(95%CI)=4.0(1.71-9.53)], training on how to use condom [AOR(95%CI) =2.5(1.78-3.49)], being tested for HIV [AOR(95%CI)=2.3(1.62-3.51)], using social media frequently [AOR(95%CI)=2.5(1.56-4.30)], chewing khat [AOR(95%CI)=2.2(1.41-3.48)], having comprehensive knowledge of HIV [AOR(95%CI)=1.4(1.04-2.00)], alcohol use [AOR(95% CI)=2.7(1.84-4.16)] and watching

pornographic films [AOR(95%CI)=2.1(1.56-3.08)] were associated with premarital sex in the last 12 months.

In multiple logistic regression, being male [AOR(95%CI)=2.7(1.58-4.74)], fifth year university stay [AOR(95% CI)= 2.4(1.12-5.30)], age 20-24 years [AOR(95%CI)=2.8(1.12-7.20)] training on how to use condom [AOR(95% CI)=1.6(1.17-2.45)], being tested for HIV [AOR (95%CI)=2.2(1.47-3.53)] and having comprehensive knowledge of HIV [AOR(95% CI)=1.4(1.01-2.10)] were significantly associated with premarital sex in the last 12 months.

Using social media like face book, Twitter and others frequently [AOR(95%CI)=1.8(1.13-2.87)] was significantly associated with increased odds of practicing premarital sex in the last 12 months. Alcohol use was about two times [AOR (95%CI)=2.1(1.31-3.55)] at increased odds of engaging in premarital sex.

Table 3: Predictors of premarital sex in the last 12 months

Variables	Categories	Premarital sex in the last 12 months		Crude OR (95% CI)	Adjusted OR (95% CI)
		Yes (%)	No (%)		
Sex	Male	179(89.5)	350(69.4)	3.8(2.30-6.12)	2.7(1.58-4.75)
	Female	21(10.5)	154(30.6)	1	1
Year of study	I	33(16.5)	109(21.6)	1	1
	II	66(33.0)	187(37.1)	1.2(0.72-1.88)	1.3(0.73-2.23)
	III	42(21.0)	125(24.8)	1.1(0.66-1.87)	0.8 (0.46-1.52)
	IV	33(16.5)	57(11.3)	1.9(1.07-3.41)	1.5(0.80-2.98)
	V	26(13.0)	26(5.2)	3.3(1.69-6.45)	2.4(1.12-5.31)
College	Engineering and technology	98(49.0)	205(40.7)	1	1
	Natural and Computational Sciences	19(9.5)	61(12.1)	0.7(0.37-1.15)	0.8(0.41-1.61)
	Medical and Health Sciences	28(14.0)	107(21.2)	0.5(0.34-0.89)	0.5(0.27-0.78)
	Business and Economics	34(17.0)	85(16.9)	0.8(0.53-1.33)	0.9(0.49-1.49)
	Social Science and Education	21(10.5)	46(9.1)	0.9(0.54-1.69)	1.2(0.62-2.36)
Age	15-19	6(3.0)	56(11.1)	1	1
	20-24	194(97.0)	448(88.9)	4.0(1.71-9.54)	2.8(1.13-7.20)
Training on how to put condom on penis	Yes	120(60.0)	189(37.5)	2.5(1.79-3.50)	1.7(1.17-2.46)
	No	80(40.0)	315(62.5)	1	1
Tested for HIV	Yes	159(79.5)	312(61.9)	2.4(1.62-3.52)	2.3(1.48-3.53)
	No	41(20.5)	192(38.1)	1	1
Facebook/twitter/other social media used	Always	58(29.0)	90(17.9)	2.4(1.60-3.70)	1.8(1.14-2.88)
	Sometimes	69(34.5)	138(27.4)	1.9(1.28-2.79)	1.4(0.94-2.21)
	Never/rarely	73(36.5)	276(54.8)	1	1
Khat chewing	Yes	40(20.0)	51(10.1)	2.2(1.41-3.49)	1.2(0.72-2.14)
	No	160(80.0)	453(89.9)	1	1
Alcohol use	Yes	56(28.0)	62(12.3)	2.8(1.85-4.17)	2.3(1.31-3.56)
	No	144(72.0)	442(87.7)	1	1
Comprehensive knowledge on HIV transmission	Yes	111(55.5)	234(46.4)	1.4(1.04-2.00)	1.5(1.01-2.10)
	No	89(44.5)	270(53.6)	1	1
Ever watched pornographic film	Yes	130(65.0)	231(45.8)	2.2(1.56-3.08)	1.2(0.83-1.80)
	No	70(35.0)	273(54.2)	1	1

DISCUSSION

This study assessed premarital sex in the last twelve months and its predictors among regular undergraduate students of Wollega University. Proportion of youths who had premarital sex in the last twelve months was 28.4%. It was higher than a study from Ghana (14) but lower than studies from Uganda (20), Hong Kong (8),

Papua New Guinea and Mada Walabu University (19). This could be explained by cultural norms as sexual practice is contextually driven. This implies that premarital sex in the last twelve months was not uncommon. Thus, efforts to address the issue of premarital sex are crucial.

Multiple sexual partners in the last twelve months was consistent with a study from Ghana (14) but lower than a study among university students of Nepal, 55% (21). In this study, 62% of the respondents who were engaged in premarital sex in the last twelve months were using condom (63.7% consistently, 44.5% during their last sex). Condom use during last sex was lower compared with study done at Brazil which indicated that the overall level of condom use at last sex was 60% (22). The study from Ghana showed that a little over 50% of youths used condom at their last sexual encounter (23). In Kenya, among sexually active respondents, 42% had ever used condom, and 23% had used condom over the past twelve months (24,25). Considering high level of non-condom use and multiple sexual partnership, addressing issues of premarital sex is crucial for prevention of STI/HIV and unintended pregnancy. The school-based peer education intervention should put further effort to decrease premarital sex and multiple sexual partnership thereby improving condom use.

This study revealed that males were nearly three times more likely to engage in premarital sex. It was consistent with studies from developing countries like Rwanda and Vietnam (9,11) including Ethiopia (12,26-28). Males had more freedom in sexual activity than their female counterparts. This may be due to cultural norms that encourage and approve sexual experimentation of boys in Ethiopia.

Also, our study indicated that fifth year students were about 2.5 more likely to engage in premarital sex compared with first year students. Larger proportion (40.8%) practised their first sex during the third year compared with 34% who had it during the first year at Wollayita Sodo University (12). Higher year students' engagement in premarital sex may be explained by longer period of partnership during campus stay.

Another predictor of premarital sex was age of respondents. Students aged 20-24 years were about three times more likely to engage in premarital sex. It was consistent with a study which indicated that being less than 18 years was found to be protective against premarital sex (26). Also, it was consistent with studies from other developing countries (8,14,25) and studies

from Ethiopia (27-29). Youthful periods are times in which the youth exhibit youthful tendencies; hence, it is expected that age will cause a significant difference.

This study indicated that training on how to use condom was about two times at increased odds of premarital sex in the last twelve months. Youth may be more interested to know how to use condom if they have sexual partner and maybe if they want to experiment sex. Training on how to use condom should thus be supported by positive behaviour change intervention.

This study indicated that being tested for HIV was about two times at increased odds of premarital sex in the last twelve months. It is a common belief that boyfriend and girlfriend, once they know each other's HIV status, they are likely to engage in sexual practice including unprotected sex.

Another predictor of premarital sex was use of social media. Students who were using social media frequently were nearly two times more likely to engage in premarital sex in the last twelve months. It is consistent with a study from Vietnam (9). It is supported by research from several Asian cities which indicated that many adolescents learn about sex from the internet (10). More university students are exposed to new ideas including information about sex through internet. Thus, it is important to make internet services selective and to use such services in the university compound for academic purposes. In addition, awareness on consequences of social media has to be created.

Youth who had comprehensive know- of HIV were about 1.5 more likely to practice premarital sex. Despite the acceptance and knowledge of HIV/AIDS, people still engage in premarital sex (15). However, it disagrees with a study which showed that students with better knowledge on HIV/AIDS were 6.6 times more likely to abstain from sexual intercourse than their counterparts (12). It is supported by a study from Ethiopia which indicated that the quality of information among young people is a concern (30). The reason may be the students are likely to use condom more than the abstinence options. It implies that further study needs to be conducted on the effect of comprehensive knowledge of HIV on premarital sex.

Alcohol use was strongly associated with premarital sex in the last twelve months. It is consistent with studies from Uganda, Ghana, WHO studies (1,14,25) and a study from rural Ethiopia (29). This could be because risk perception decreases with alcohol use, indicating that individuals who use alcohol were at higher risk of HIV.

The Limitation of this study was that bias introduced by under-reporting is possible as premarital sex is a sensitive issue and may be considered socially unacceptable especially in countries like Ethiopia. However, an attempt was made to minimize this bias by ensuring privacy and using the anonymous self-administered questionnaire. It is difficult to generalize the result of the study for the general community. It is cross-sectional study, which precludes assessing the temporality, causality and direction of the associations described.

The universities and stakeholders should work on comprehensive sexuality education. Higher institutions have to deliver abstinence messages alongside information about self-protection for the youth who find themselves in sexual situations. Our findings suggest that it is important to reinforce reproductive and sexual health education. The intervention has to focus on the risk factors among university undergraduate regular students and provide them with convenient and optional services that are easily accessible.

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REFERENCES

1. WHO. Sexual health: why pay attention to this issue during adolescence? Copenhagen WHO Regional Office for Europe; 2012 [cited November, 2014. Available from: <http://www.nuigalway.ie/hbsc/documents/internationalfactsheetsexualactivity.pdf>.
2. Richey C, Setty V. Family Planning Choices for Women With HIV. 2007 [updated January 2010]; Available from: <http://www.populationreports.org/115/>.
3. Askew I, Berer M. The Contribution of Sexual and Reproductive Health Services to the Fight against HIV/AIDS: A Review. *Reproductive Health Matters* 2003;11(22):51–73.
4. Collins C, Coates TJ, Curran J. Moving beyond the alphabet soup of HIV prevention. *AIDS* 2008;22(suppl 2):5-8.
5. Bizuneh G, Shiferaw S, Melkamu Y. Unmet Need and Evaluation of Programme Options to Meet Unmet Need for Contraception in Ethiopia, 2000 and 2005: Further Analysis of the 2005 Ethiopia Demographic and Health Survey. Calverton, Maryland, USA: *Macro International Inc.*; 2008. p. 9-18.
6. UNAIDS. UNAIDS World AIDS Day Report 2012 [cited November, 2014. Available from: http://www.unaids.org/sites/default/files/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/JC2434_WorldAIDSday_results_en.pdf]
7. Collins C, Alagiri P, Summers T. Abstinence Only vs. Comprehensive Sex Education: What are the arguments? What is the evidence? San Francisco: *Policy Monograph Series*; 2002 [cited November, 2014. Available from: <http://ari.ucsf.edu/science/reports/abstinence.pdf>]
8. Yip PS, Zhang H, Lam T-H, Lam KF, Lee AM, Chan J, et al. Sex knowledge, attitudes, and high-risk sexual behaviors among unmarried youth in Hong Kong. *BMC Public Health* 2013;13:691.
9. Gibbs SE, Le LC, Dao HB, Blum RW. Peer and community influences on the acceptance of premarital sex among Vietnamese adolescents. *Journal of Paediatrics and child health* 2014;50:438-43.
10. Lou C, Cheng Y, Gao E, Zuo X, Emerson MR, Zabin LS. Media's contribution to sexual knowledge, attitudes, and behaviors for adolescents and young adults in three Asian cities. *J Adolesc Health* 2012;50(S):26-36.
11. Ntaganira J, Hass LJ, Hosner S, Brown L, Mock NB. Sexual risk behaviors among youth heads of household in Gikongoro,

- south province of Rwanda. *BMC Public Health* 2012;12:225.
12. Gelibo T, Belachew T, Tilahun T. Predictors of sexual abstinence among Wolaita Sodo University Students, South Ethiopia. *Reproductive Health* 2013;10:18.
 13. Chiao C, Yi C-C, Ksobiech K. Exploring the relationship between premarital sex and cigarette/alcohol use among college students in Taiwan: a cohort study. *BMC Public Health* 2012;12:527.
 14. Doku D. Substance use and risky sexual behaviours among sexually experienced Ghanaian youth. *BMC Public Health* 2012;12:571.
 15. Maliki AE, Omohan ME, Uwe EA. HIV/AIDS and Use of Condom: The Role of Counsellors. *Stud Tribes Tribals* 2006;4(2):151-5.
 16. EPHA. Ethiopian Public Health Association: Identifying HIV/AIDS, Sexually transmitted Infection and Tuberculosis Research Gaps and Priority Setting Agenda in Ethiopia. 2004 [cited November, 2014. Available from: <http://etpha.org/publications/other-publications.html?download=398>].
 17. EDHS. Ethiopian Demographic and Health Survey. Addis Ababa, Ethiopia: CSA; 2011 [cited November, 2014. Available from: http://www.unicef.org/ethiopia/ET_2011_EDHS.pdf].
 18. WU. *Wollega University Registrar*. 2013.
 19. Mengistu TS, Melku AT, Bedada ND, Eticha BT. Risks for STIs/HIV infection among Madawalabu University students, Southeast Ethiopia: a cross sectional study. *Reproductive Health* 2013;10:38.
 20. Agardh A, Odberg-Pettersson K, Östergren P-O. Experience of sexual coercion and risky sexual behavior among Ugandan university students. *BMC Public Health* 2011;11:527.
 21. Adhikari R, Tamang J. Premarital Sexual Behavior among male college students of Kathmandu, Nepal. *BMC Public Health* 2009;9:241.
 22. Calazans G, Araujo TW, Venturi G, Junior IF. Factors associated with condom use among youth aged 15-24 years in Brazil in 2003. *AIDS* 2005;19(suppl 4):42-50.
 23. Fiaveh DY. Male perspective(s) on condom use: Context of STI/HIV prevention in the University of Ghana community. *Journal of Public Health and Epidemiology* 2011;3(1):17-27.
 24. Papo JK, Bauni EK, Sanders EJ, Brocklehurst P, Jaffe HW. Exploring the condom gap: is supply or demand the limiting factor - condom access and use in an urban and a rural setting in Kilifi district, Kenya. *AIDS* 2011;25:247-55.
 25. Asante KO. HIV/AIDS knowledge and uptake of HIV counselling and testing among undergraduate private university students in Accra, Ghana. *Reproductive Health* 2013;10:17.
 26. Seme A, Wirtu D. Premarital Sexual Practice among School Adolescents in Nekemte Town, East Wollega. *Ethiop J Health Dev* 2008;22(2):167-73.
 27. Bogale A, Seme A. Premarital sexual practices and its predictors among in-school youths of Shendi town, west Gojjam zone, North Western Ethiopia. *Reproductive Health* 2014;11:49.
 28. Sendo EG. Premarital Sexual Practice among Unmarried First Year Undergraduate Students in Alkan University College in Addis Ababa, Ethiopia. *Global Journal of Medicine and Public Health* 2014;3(2):1-10.
 29. Molla M, Berhane Y, Lindtjørn B. Traditional values of virginity and sexual behaviour in rural Ethiopian youth: results from a cross-sectional study. *BMC Public Health* 2008;8:9.
 30. Tesso DW, Fantahun MA, Enqueslassie F. Parent-young people communication about sexual and reproductive health in E/Wollega zone, West Ethiopia: Implications for interventions. *Reproductive Health* 2012;9:13.