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Effect of Premarital Sexual Practice and Associated Factors Among Adolescent Students in Wolaita Sodo Preparatory School

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Abstract
Sexual intercourse during adolescent's period is unprotected and it has a lot of health risks and physical and psychological hazards. The purpose of this study was to assess the effect of premarital sexual practice and associated factors among WolaitaSodo preparatory school adolescents in 2018. The study was conducted WolaitaSodopreparatory school in WolaitaSodo, which is Western Ethiopia. The study design was cross sectional. A total of 144 participants were included. Data were collected using self-administered questionnaire and analyses using SPSS version 21. Descriptive, bivariate and multivariate analysis was used to report the study results. From the total of 144 participants, 88(61.1%) of adolescents have had premarital sexual practice. In multiple logistic regressions associated factors were age, grade level, living arrangement, alcohol use and viewing pornography.
Keywords: premarital sexual practice, adolescents, WolaitaSodo preparatory school, Binary logistic regression

1.1 Background of the study

According to World Health Organization (WHO) definition adolescent comprises individuals between the age group of 10–19 years old. Adolescence is the time of transition from childhood to adulthood during which young people experience changes following puberty (9). United Nations International Children's Emergency Fund (UNICEF) categorizes adolescents in to three stages; 10-13 years old as early adolescents, 14-16 years old as middle adolescents, and 17-19 years old as late adolescents. Sexual activities among adolescents have been reported to be increasing worldwide. Several studies in Sub-Saharan Africa have also documented high and increasing premarital sexual activities among adolescents (WHO, 2011). There are more than one billion adolescent people worldwide in which seventy percent of them live in developing nations. They are disproportionately affected by HIV that is particularly higher in sub-Saharan Africa (Hindan and Fetus, 2009). Sixteen million late adolescent girls give birth every year, in which 95 percent of births occur in developing countries (WHO, 2009).

Rates of sexual initiation during young adulthood are rising or remaining unchanged in many developing countries, and high HIV prevalence adds to the risks associated with early sexual activity (Hindan and Fetus, 2009).About two-third of the Ethiopia's population are young and they are the ones whose reproductive health service. Health services utilization is low and is the perpetrated with various sexual and reproductive health problems (Berhane et al, (2005).The 2011 Ethiopia Demographic and Health Survey (EDHS) report indicated that 0.2% of females and 0.1% of males within the age 15–19 year were infected with HIV and sexually transmitted infections (STIs) among females was 1% and 0.2% among males (CSA 2011). Further, about one–third of pregnancies occurring during this age are unintended (Tebekew, et.al, 2014)

Statistics mean the branch of natural science which study about the collecting, organizing, interpretation and presentation of data. It plays important role in the design and analysis of the field studied in vegetation science, the field of statistics is divided in to two major divisions, descriptive and inferential statistics (Hold, Anders (2003).The most popular model for binary data is called logistic regression model.Logistic regression is widely uses to model the outcomes of a categorical dependent variable. It used when the regressed, the dependent variable or response variable is qualitative in nature or categorical. Binary logistic regression to perform logistic regression on a binary response variable. A binary variable only has two possible values**,** such as presence or absence of a particular event. A binary logistic regression has also been used to classify observations in to one of two categories.Binary logistic is used when the response or dependent variable is categorical. The independent variable may be quantitative, categorical and combination of the two. Logistic regression can be used to predict a dependent variable on the basis of continuous and (categorical independent variables. Logistic regression is a special case of generalized linear models in which the mean of the response variable is related to explanatory variables through a regression equation. Logistic regression model in a sequential fashion based on statistical criterion that checks for the importance of variables,(Basic Statistics, (1993)

1.2 Statement of the problem

Sexual intercourse during adolescence period is unprotected and it has a lot of health risks and physical and psychological hazards.The early sexual initiation may predispose young people to HIV/AIDS as their chances of having several partners before marriage increases. The life skill based education enable them to develop ability in critical thinking, problem solving, self-management inter personal communication skills in order to adopt

health behavior. Because when sexuality discussed openly and when young people learn more about their body and their emotions, they are better able to cope with sexual maturation. Actual this needs integrated efforts of adolescent, school teachers, the family and other prevalent body. (Adolescent Med state Art Rev 2015).

At the end of our study, the following question was addressed. With this back ground this research was identifying the following research questions.

- ✓ Does the premarital sex of adolescent student depend on living arrangement?
- ✓ What is the relationship between abuse alcohol and premarital sex?
- ✓ What is the relationship between previous residence and premarital sex?

1.3 Objective of the study

1.3.1 General objective

The main objective of this study is to assess the effect of premarital sexual practice and associated factors among Wolaita Sodo preparatory school adolescents' students in 2018.

3. Data Source and Methodology

3.1 Data source

The most crucial methods of data collection in this study was primary data collected from the grade 11th and 12th students in WolaitaSodo preparatory school and secondary data collected from registers. The primary data can be collected by designing and distributing the information using questionnaires and interviews on the sampled students or to the respondents. Where, the secondary data can be obtained from the registers or schools. These help to get understand of the current state of the problem under investigation by examining and describing to find out the factors affect premarital sexual practice on adolescent students.

A method of sampling design that involves the division of a population into smaller groups known as strata. In stratified random sampling, the strata are form based on members' share attributes or characteristics. A random sample from each stratum will be taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata are the pooled to form a random sample. The population consists of N elements. Thus, assume that the categories of the adolescent students are the take as strata based on sex. The main advantage with stratified sampling is how it captures key population characteristics in the sample. Similar to a weighted average, this method of sampling produces characteristics in the sample that are proportional to the overall population. The main disadvantage of a stratified sample is that it may require more administrative effort than a simple random sample.

Determining the sample size is the key on the overall statistical process. The researcher must find the correct balance between the reliability of the result and cost of obtaining these results. An appropriate sample size is one the means of gaining high precision, accuracy and confidence minimum cost.

In this study the total population size is known, then the sample size will be calculated as follows: $n_0= (Z_{\alpha/2})^2pq/d^2$

P=a/n = 6/10 = 0.6 Total number of Grade 11 students

Q=1-p = 1-0.6 = 0.4

Then

$n_0 = (Z_{\alpha/2})^2pq/d^2$

$no = (1.96)^2*0.6*0.4/ (0.08)^2$

no =0.921984/0.0064 = 144.06 =144

When $\frac{no}{N}$ <5%, n=n0 but here 144/3784 =0.0332 which is less than 0.05, therefore, we must not adjust the sample size. To determine actual sample size (n), we consider the following two cases:

Case 1

If $\frac{no}{N}$ < 5%, then n=no

Case 2

If $\frac{no}{N}$ ≥ 5%, then n =no/1+no/N

so, we use 1st case n=no

n=144

Where, n=over all sample size

N=total number of students=3784 (WolaitaSodo preparatory school,

Sample size of each stratum is

Nh = Nh*n/N n_h -number of sample size in h strata

n1, number of sample size in (strata 1) or Grade 11th student.

n1 =N1*n/N 144*403/3784 =15.34 =15
n2, number of sample size in (strata 1) or Grade 12th student.
N2 = N2*n/N 144*3381/3784 = 128.66 =129

3.5 Method of Data Analysis

After using different methods for collect data the next step was the analysis of data, editing, summarizing and interpreting the appropriate data. The most useful statistical methods that we are used to analysis the data are as follows: -

- Descriptive statistics
- Inferential statistics

3.5.1 Descriptive Statistics

Descriptive statistics is a collection, organization, summarization and presentation of data in a meaning full form by using tables, and percentage. Frequency distribution is a way of displaying of numbers in organized manner or tabular arrangements are the data is grouped in to different interval.

3.5.2 Inferential statistics

Inferential statistics is statistical method deals with making inference or conclusion about population based on data obtained from eliminated number of observation that comes from population. The most appropriate inferential statistics which was used on this study is: -

- Chi-square test of independence and binary logistic regression analysis.

3.5.2.1 Chi-square Test

Chi-square(x^2) is a statistical measure with the help of which it is possible to access the significance of the different between the observed frequencies and expected frequencies obtained from some hypothetical universe.The test that mainly used to test the independence or inter correlated of two variables are called chi-square analysis. Here chi-square test used for the test of independent. In case or contingency tables (cross tabulation) of data, the null hypotheses are the two attributed (variable) are independent.

- We was check whether there is association between premarital sex and determinanits

Assumption of chi-square test of Independence.

- The observation must be independent of each other.
- Each member of qualifies for one and only one cell.
- It required sufficiently large expected frequency for each cell.
- The sample size was large.
- It is always positively skewed.
- Each variable under study are categorized.

The following procedures are put to test the association or relationship between two attributes.
The formula will be given as follow:
The chi-square test statistic is given by

$$\chi^2_{cal} = \sum_{i=1}^{R} \sum_{j=1}^{C} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where, Oij- observed frequency
E_{ij} – expected frequency
The critical value
$\boldsymbol{X^2_{tab} = X^2_{\alpha}(r-1)(c-1)}$Degree of freedom
r= number of row
C= number of column

Decision Rule: Reject H0 if $\boldsymbol{X^2_{cal} > X^2_{tal} = X^2_{\alpha}(r-1)(c-1)}$ Or Reject Ho if p-value< (α) level of significance, there we have been used p-value to our decision

3.5.2.2 Logistic regression model

Logistic regression is a special case of generalized linear models in which the mean of the response variable is related to explanatory variables through a regression equation. The elements of such a model are a distribution for the response variable and a function that links the distribution to the explanatory variables called a link function. Logistic regression can be binary, multinomial and ordinal logistic regression. The response variable is usually dichotomous for the response taken as success and failure.Ordinal logistic regression is a type of regression which used to when the dependent variable is more than two variable.

Logistic regression model in a single explanatory variable x for binary response variable (yes =1, as probability of success and no= 0, as probability of failure) and when is probability of success at value x. The binary logistic regression is a type of regression which used to when the dependent variables dichotomous and the independent variables are any type.

Logistic regression is used when the regressed, the dependent variable or response variable is qualitative in nature or categorical. Qualitative response variables are either binary (dichotomous variable) or multiple category.

Binary logistic regression

Binary logistic is used when the response or dependent variable is categorical. The independent variable may be quantitative, categorical and combination of the two. Logistic regression can be used to predict a dependent variable on the basis of continuous and (categorical independent variables) and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independent variables; to assess the interaction effect and to understand the impact of covariate control variables. But in logistic regression our objective is to find the probability of something happening (probability of success)

Model: - Logit [p(x)] = $\frac{\pi(x)}{1-\pi(x)} = \beta_0+\beta_1x_1+\ldots.\beta_kx_k$

$$Y = \begin{cases} 1 \text{ if he/she experienced premarital sex} \\ 0 \text{ if he/she has not experienced premarital sex} \end{cases}$$

Where: π- the probability of success (probability of something happened)

1-π _ the probability of failure

β_0-is constant term

x_i - Independent (explanatory) variables

β_1- Coefficients of independent variables

Binary logistic is used when the response or dependent variable is categorical. The independent variable may be quantitative, categorical and combination of the two.

Assumption of Binary Logistic regression.

- The dependent variable (outcome) variable is dichotomise.
- The outcomes are independent and mutually exclusive.
- It requires large sample to be accuracies all models.
- No multi collinearity between independent variable.

3.6 Methods of Parameter Estimation for Logistic Regression

3.6.1 Maximum likelihood ratio

The maximum likelihood and non-iterative weighted least squares are the two most competing estimation methods used in fitting logistic regression model (Hosmer -Lemeshow, 1989; Greene, 1991, Collets, 1991 and others). When the assumption of Normality of the predictors does not hold, the non-iterative weighted least squares method is less efficient (Mandala, 1997). In contrast, the maximum likelihood estimation method is appropriate for estimating the logistic (logit) model parameters due to this less restrictive nature of the underlying assumptions (Hosmer- Lemeshow, 1989). Hence, in this study the maximum likelihood estimation technique will be applied to estimate parameters of the model.

$P(Y = y_i) = p^{y_i}(1-p)^{1-y_i}$,

Assuming the n observations are independent, the likelihood function is:

$$l(\beta) = \prod_{i=1}^{n} \mathrm{P}^{y_i}(1-\mathrm{P})^{1-y_i} = \prod_{i=1}^{n}\left(\frac{1}{1+e^{-x^t\beta}}\right)^{y_i}\left(\frac{e^{-x^t\beta}}{1+e^{-x^t\beta}}\right)^{1-y_i}$$

And the log likelihood function is given as:

$$\log l(\beta) = \sum_{i=1}^{n} y_i \log(p_i) + \sum_{i=1}^{n}(1-y_i)\log(1-p_i)$$

$$\Rightarrow \log l(\beta) = \sum_{i=1}^{n} y_i \log\left(\frac{1}{1+e^{-x^t\beta}}\right) + \sum_{i=1}^{n}(1-y_i)\log\left(\frac{e^{-x^t\beta}}{1+e^{-x^t\beta}}\right)$$

It can be written as: $L(\beta) = \sum_{i=1}^{n} y_i \log\left(\frac{1}{1+e^{-x^t\beta}}\right) + \sum_{i=1}^{n}(1-y_i)\log\left(\frac{e^{-x^t\beta}}{1+e^{-x^t\beta}}\right)$

Where L (β) =logl (β)

Hence by maximizing (4) above we can theoretically estimate the parameter β. To find an estimate of β that maximizes L (β), we differentiate L (β) with respect to each component of β and set the resulting (p+1) equations to zero. Solutions are obtained by iterative algorithms that are programmed in available statistical packages

Odds ratio

The odds ratio is a value which measures the strength of effect of each independent variable in the model on the log odds of the dependent variable. Odds of some event happening is defined as the ratio of the number of occurrence to the number of non-occurrences. That is, the odds of the event are given by:

Odds ratio=$\frac{odds\ 1}{odds\ 2}$

Where, Odds =$\frac{p1}{1-p1}$ Odds2=$\frac{p2}{1-p2}$

RESULTS AND DISCUSSION

4.1 Descriptive Analysis

The data comprised a sample of 144 adolescents, who were WolaitaSodo preparatory school students in WolaitaSodo, Southern Ethiopia.Data collection period was March to April 2016, the response variable considered in this study was ever had premarital sexual practice. According to the table 4.1 below,the total 144 of respondents, 74(51.4%) were males, and 70(48.6%) were females. About 38 (26.4%) of the respondent was age <=18, 60(41.7) of the respondent was age 19-21, 28(19.4)of the respondent was age 22-24 while 18(12.5%) was >25years old. About 56 (38.9%) respondents were from grade 11th while 88(61.1%) from grade 12th at the time of survey.About 59(41.0%) respondents were from chat chewing says (no) and 85(59.0%) respondents were from chat chewing says (yes).About 61(42.4%) and 83(57.6%) ofrespondents were drinking alcohol says no and yes respectively.

About 47(32.6%) of participants were orthodox followers, protestant and Muslim were accounted about 62(43.1%) and 35(24.3%) respectively.About 53(36.8%) of urban residents and 91(63.2%) of rural residents were participated in this study. About 51(35.4%) of the respondent's family were Illiterate, 37(25.7%)of the respondent's family were primary,31(21.5%)of the respondent's family were secondary and 25(17.4%)of the respondent's family were above. About 61(42.4%) and 83(57.6%) of respondents were from tested for HIV says (no) and (yes) respectively. About 49(34.0%)of the respondents were living with both parent, 49(34.0%)of the respondents were living with single parent, 29(20.1%)of the respondents were living with relative friend and 17(11.9%)of the respondents were living with above. About 44(30.6%) of respondent's pocket money were less than or equal to three hundred, 51(35.4%) of respondents pocket money were three hundred one up to six hundred and 49(34.0%) of respondents pocket money were greater than six hundred.

4.2.1. Chi-square test analysis

Chi-square measures association between dependent variable and independent variable, so the overall summary information on study variables is presented using chi-square given below.

Table 4.4 Variables evaluated for possible association with premarital sexual intercourse among WolaitaSodo preparatory school adolescents

(Table 4.4.) Chi-Square Test of Association between response and other predictor variable

Variable	Categories	X^2-Value	d.f	P-value	Variable	Categories	X^2-Value	d.f	P-value
Age	<=18	5.409	3	0.144	Place of living	Urban	0.019	1	0.890
	19-21					Rural			
	22-24								
	>=25								
Sex	Male	0.006	1	1.000	Monthly money	<=300	2.328	2	0.312
	Female					301-600			
Grade	Grade 11	1.277	1	0.025		>600			
	Grade 12								
Living arrangement	Both parent	4.908	3	0.179					
	Single parent				Religion	Orthodox	5.015	2	0.081
						Protestant			
	Relative friend					Muslim			
	Alone				Family education	Illiterate	4.708	3	0.002
Alcohol drinking	Yes	6.847	1	0.01		Primary			
						Secondary			
	No					Above			
Chat chawing	Yes	8.774	1	0.001					
	No								
Watch pornographic film	Yes	0.389	1	0.013	Tested HIV	Yes	5.984	1	0.014
	No					No			

(Table 4.4) Above shows Chi-square test of association between dependent variable and independent variables evaluated for possible association with premarital sexual intercourse. From Table 4.4, the possible associated variables were grade level, alcohol drinking, watch pornographic, chat chewing, family education and HIV tested has p-value less than α-level of significance(α=0.05). Therefore, we conclude that there is association between the different possible associated variables and with the premarital sexual intercourse at 5% level of significance (i.e. those different possible predictor variables have significant effect on premarital sexual intercourse). On the other hand, age, sex, living arrangement, place of living, religion and monthly income has p-value greater than α-level of significance. Therefore, we conclude that there is no association between the different possible associated variables and with the premarital sexual intercourse at 5% level of significance.

Goodness fit of model

As described in the methodological part, the recommended test for overall fit of a logistic regression is the Homer and Lemeshow test also called the chi-square test.

Table 4.7hosmer and lemeshowtest

Step	Chi-square	Df	Sig.
1	2.442	8	.964

According to (**table 4.7)**above implies the following interpretationsThe Hosmer and Lemeshow goodness of fit test divides cases into deciles based on predicted probabilities and then computes chi-square value from observed and expected frequencies.

The SPSS output shows the non-significance of the chi-square value. Hence, we reject the null hypothesis that there is no difference between the observed and expected frequencies.

Goodness of fit:

H_0: the model is well fitted H_a: lack of fit

P=.964α=5%

Decision: p value=.964> α=5% , we do not reject H_0

Conclusion: at 5% level of significant, we conclude that the model adequacy was well fitted

4.2.1.2.1 Binary Logistic Regression Analysis

An inter binary logistic regression analysis is carried out to select the most important covariates among the 12 covariates provided from the bivariate analyses. As a result, 6 of the variables are found to be significant using the inter selection Binary logistic regressions procedure at significance level of 0.05.

Table 4.8 Binary and multiple logistic regression indicating factors associated with premarital sexual practice among WolaitaSodo preparatory school adolescent students

Variables	Categories	B	Parameter estimate (S.E)	Wald	p-value	Odds ratio	95.0% C.I. for EXP(B)	
							Lower	Upper
Grade level	Grade 12	-9.572	3.231	8.778	.003**	.001	.000	.039
	Grade11(ref)							
Sex	Male	-.611	1.177	.270	.604	.543	.054	5.448
	Female(ref)							
Alcohol use	Yes	-10.679	3.146	11.520	.001**	.010	.000	.011
	No(ref)							
Watch pornographic film	Yes	4.859	2.117	5.270	.022*	28.957	2.035	81.941
	No(ref)							
Chat chewing	Yes	-12.339	3.828	10.30	.001**	.002	.000	.008
	No(ref)							
HIV test	Yes	5.937	2.111	7.913	.005**	37.821	6.052	11.320
	No(ref)							
Constant		2.883	3.575	.651	.042*	17.875		

Interpretation of Odds ratio

The significance of the Wald statistic indicates the importance of the predictor variable in the model. The odds ratio of doing sex before marriage for adolescent grade 12th is decreased by -9.572, after adjusting other covariate. The odds ratio of adolescents from grade 12th students is 0.001 times more likely to practice sex before marriage than grade 11th students. The odds ratio of living arrangement belongs to alone is 7.854 times more likely to had premarital sex as compared to those both parent of living arrangement. The odds ratio practice sex before marriage who is alcohol user is decreased by -10.679, after adjusting other covariate. The odds ratio of adolescents those are ever use alcohol are 0.01 times more likely to had premarital sex as compared to those not use alcohol. increment to the odds ratio practice who is pornography user is 4.859, after adjusting other covariate. The odds ratio of adolescents those viewing pornography are 28.957 times more likely to had premarital sex as compared to not viewing pornography. The odds ratio of adolescents those chat chewing are decreased by -12.339 times more likely to had premarital sex as compared to not chat chewing. The increment to the odds ratio of adolescents those tested for HIV are 5.937 times more likely to had premarital sex as compared to not tested for HIV. The odds ratio of family education level belongs to primary education level is 6.530 times more likely to had premarital sex as compared to those who above family education level.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The main objective of this study was to study factors that affect of premarital sexual practice among adolescents students. A large number of school adolescents were engaged in sexual practice before marriage. The majority of sexually active respondents seem to have started sex when they are preparatory level. Accordingly, only 43.2% of sexually active adolescents reported using a condom during their first sexual practice and the main reason they start sexual practice before marriage was personal desire and peer pressure. Majority of adolescents were males. In the bivariate analysis, grade level, primary education level, alone living arrangement, tested for HIV, ever drinking alcohol, chat chewing, and watch pornographic film were found to be significantly associated with premarital sex.

5.2 Recommendations

Based on the study of the results we would like to recommend the following recommendations.

- The effects of premarital sexual practice was high; therefore, community and school health interventions are needed to reduce the premarital sexual practice among school adolescents to prevent sexuality related health problems.
- Increasing awareness about the health care problem beside sexual practice before marriage, Moreover, further studies to explore the predictor variables are highly recommended.
- The organization body or Wolaita Sodo preparatory school should have to play important roles to protect the effects of premarital sexual practice.
- The organization should have given advice/to share enough essential information for students those who

don't effectsthe premarital sexual practice.

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