

Risky sexual behavior and associated factors among secondary and above-education-level students in Ethiopia: A systematic review and meta-analysis

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ABSTRACT

Background: Risky sexual behavior is defined as the behavior that increases the susceptibility of an individual to problems related to sexuality and reproductive health. The main aim of this study was to determine the pooled prevalence of risky sexual behavior and its associated factors in Ethiopia. **Methods:** Systematic review and meta-analysis (PRISMA) rules were used. During the searching period, MEDLINE, PUBMED, Cochrane Library, EMBASE, Google Scholar, and CINAHL were used with search terms. The STATA form 14 program was utilized to perform the meta-analysis. I^2 statistics was used to test heterogeneity, and publication bias was assessed using Begg's and Egger's tests. Odds ratio (OR) with a 95% confidence interval (CI) was presented using forest plots. **Results:** There were 24 studies, and 13,440 study participants were included in this meta-analysis. The pooled prevalence of risky sexual behavior in Ethiopia was 40% (95% CI: 32%, 48%). The associated factors for risky sexual behavior were substance use [OR: 2.41 (95% CI: 1.49, 3.89)], watching pornography [OR: 2.59 (95% CI: 1.01, 6.69)], and night club visit, [OR: 2.53 (95% CI: 1.64, 3.90)]. **Conclusion:** Risky sexual behavior among secondary school and above-education-level Ethiopian students was high.

Keywords: College, Ethiopia, high school, risky sexual behavior, students, university

Background

Risky sexual behavior is defined as the behavior that increases the susceptibility of an individual to problems related to sexuality and reproductive health, which include having sex at an early age, having multiple sexual partners, having sex while under the influence of alcohol or drugs, and unprotected sexual behaviors.^[1,2]

One-third of the world's population is the youth population, who are the productive force.^[3] Eighty-five percent of this population

live in developing countries, and around 25% of this population are found Sub-Saharan Africa; Ethiopia has 11% adolescent and 20% youth people from the total population, and the majority are students of different education levels.^[4]

Globally, a large portion of the population are adolescents and youths and often viewed as being at higher risks to acquire human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) infection, and they are categorized under the most at-risk population segments because of their inclination to be engaged in risky sexual behavior (RSB).^[2,5-10]

Students having a chance far from their family need to be relaxed, and they want to be independent and want to test everything with freedom, which leads them toward risky activities.^[11,12] Such

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activities more probably lead to engagement of risky sexual activities such as multiple partnerships, inconsistent use of condoms, sexual initiation at an early age, and having sex with commercial sex workers (CSWs).^[6,7,13]

The magnitude of risky sexual practice was 14.7% among Jiga preparatory and high school students^[14], 30.5% in private college students in Mekelle town,^[15] and 83.5% among Axum, Shire campus, university students.^[16] In spite of an increased risky sexual behavior of the students, low attention is given to them. Thus, this study was conducted to determine the pooled prevalence of risky sexual behavior and its associated factors in Ethiopia.

Methods

Study design and search strategy

We searched articles by using systematic review and meta-analysis (PRISMA) rules.^[17] MEDLINE, PUBMED, Cochrane Library, EMBASE, Google Scholar, CINAHL, and African Journal Online databases were used for literature search from March 2009 to March 25, 2018 by using the following terms and keywords: prevalence of risky sexual behavior OR prevalence of risky sexual prevalence OR prevalence hazardous sexual behavior OR unprotected sexual practice AND factors related to risky sexual behavior OR factors related to risky sexual practice OR factors related to unprotected sexual practice AND Ethiopia. We also used Google to search unpublished literature studies.

Eligibility criteria

This review included studies that were conducted on risky sexual behaviors and their determinants at high school and preparatory students, college students, and university students. Published articles, master's theses, and ponders in English were included in the study. Studies that had methodological issues and incomplete articles were avoided from the survey.

Quality assessment and data collection

Articles were searched by utilizing their titles and abstracts, and a full review of the manuscripts was performed before the inclusion of articles in the final meta-analysis. The basic evaluation was conducted utilizing the Joanna Briggs Organized Meta-Analysis of Measurements Appraisal and Survey Instrument (JBI-MAStARI).^[18]

Two researchers freely assessed articles some time recently in consideration within the last review utilizing this instrument. A mean quality score was used to assess the quality of included studies in the meta-analysis. Studies that scored above the mean of the quality score were grouped as the high-quality scores, and those below the mean were grouped as the low-quality scores.

Data extraction

Three researchers extracted the data by using a data extraction tool. This tool included information on the title, author, year of

survey and publication, study design, sample size, data collection procedure, study participants, study area, response rate, sampling method, and the definition used for risky sexual behavior.

Heterogeneity and publication bias

The heterogeneity of studies was checked utilizing I^2 test statistics and comparing P values. A P value of less than 0.05 showed that there was heterogeneity. I^2 statistics of 25, 50, and 75% were utilized to announce low, moderate, and high heterogeneity.^[19] Egger's and Begg's tests were used to assess publication bias, and a P value of less than 0.05 was used to interpret as it had statistical significance.^[20] The Duval and Tweedie non-parametric trim and fill analysis using the random-effect analysis was conducted for meta-analysis results, which showed the presence of publication bias (Egger test, $P < 0.05$).^[21]

Statistical methods and analysis

The extracted data were entered into Microsoft Excel sheets and then were exported to STATA version 14 software for meta-analysis. To calculate the overall pooled prevalence, the prevalence of risky sexual behavior and the standard error (SE) from each study were used. Forest plots were used to present the pooled prevalence of risky sexual behavior with 95% CI.

Odds ratio (OR) with 95% CI was also presented in the forest plot to show the factors associated with the risky sexual behavior of study participants. Sub-group analysis was conducted by the level of education, the region of the institution, and the study period. The meta-analysis was conducted using the random-effect model of analysis because it minimizes heterogeneity of the included studies.^[22]

Results

Study selection

A total of 1312 published and nine unpublished records were retrieved through electronic database searching. From this, 343 duplicates were rejected and 952 articles were excluded by their titles and abstracts. Then, 26 articles were assessed for eligibility, and two articles were excluded because the outcome of interest was not reported and because of their methodological problem in the study. Finally, 24 articles were included in this meta-analysis [Figure 1].

Characteristics of included studies

All included articles were cross-sectional studies, and two of the included studies were unpublished.^[23,24] A total of 13,440 participants were included within the review. The studies were conducted from March 2009 to March 2018 at the different education levels of the country [Table 1]. All the studies included in the final analysis were cross-sectional study designs. Fourteen studies were conducted in universities; two studies were conducted in colleges, and eight were conducted in high schools and preparatory schools.

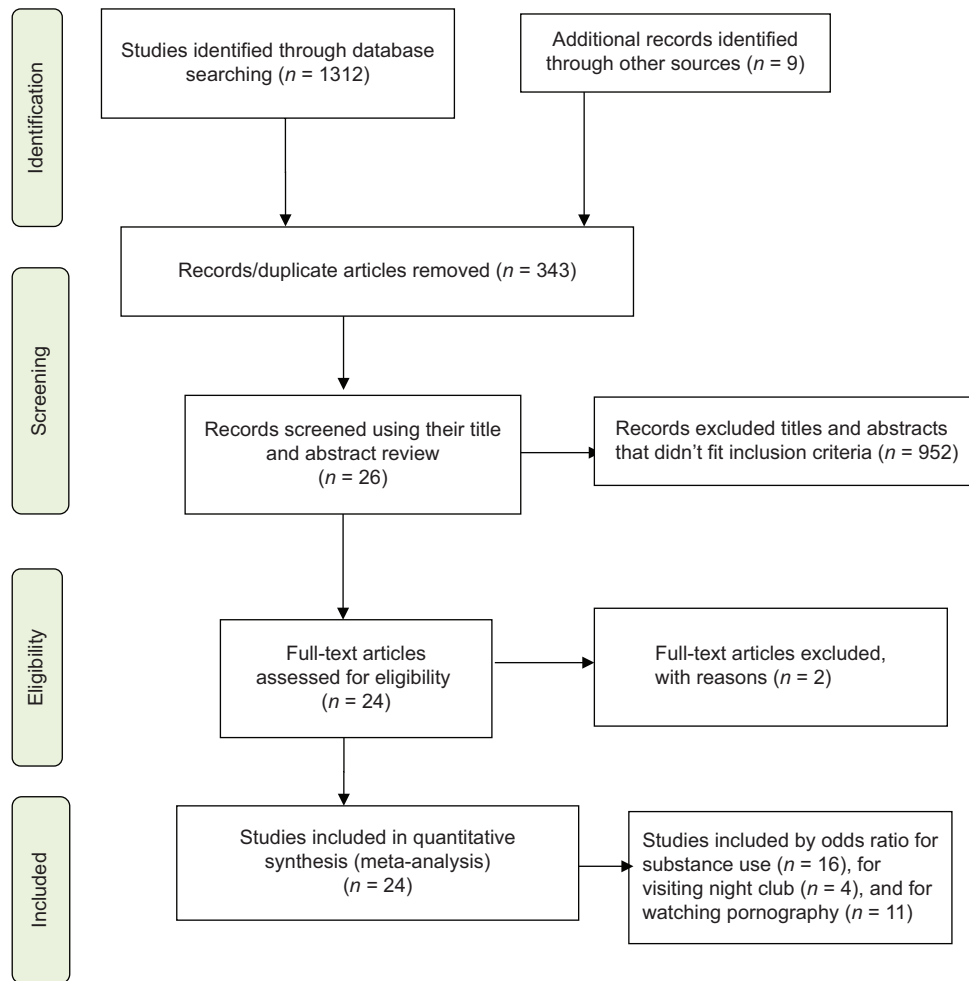


Figure 1: Flow diagram of the studies included in the meta-analysis

Prevalence of risky sexual behavior

The overall pooled prevalence of risky sexual behavior among Ethiopian secondary and above-education-level students was 40% (95% CI: 32, 48) [Figure 2].

Sub-group analysis

The sub-group analysis by institution showed the highest prevalence of risky sexual behavior among university students [42.8% (95% CI: 31.8, 53.8)], followed by college students [35.6 (25.7, 45.5)] [Table 2].

Factors associated with risky sexual behavior

Substance use and risky sexual behavior

Approximately 9,331 study members were included from 16 studies in this portion of meta-analysis. The meta-analysis showed a positive association between substance use and risky sexual behavior [OR: 2.41 (95%CI: 1.49, 3.89)].

Their Begg's and Egger's tests for publication bias also showed no statistical evidence of publication bias. The I^2 heterogeneity test indicated the presence of high heterogeneity ($I^2 = 92.2\%$, P value ≤ 0.001) [Figure 3].

Watching pornography and risky sexual behavior

About 6,916 study participants were included from 11 studies in this part of meta-analysis to assess the association pornography watching and risky sexual behavior. Accordingly, the pooled meta-analysis showed that study participants who were watching pornographic films were 2.59 times more likely to practice risky sexual behavior [OR: 2.59 (95% CI: 1.01, 6.69)].

The Begg's and Egger's tests for publication bias showed no statistical evidence of publication bias. There was a high variation within OR, $I^2 = 97.8\%$, p value ≤ 0.001) [Figure 3].

Visiting night clubs and risky sexual behavior

About 2,110 study participants were included from four studies in this part of meta-analysis to assess the association between visiting night clubs and risky sexual behavior. The pooled meta-analysis showed that those who were visiting night clubs were 2.53 times more likely to practice risky sexual activities

[OR: 2.53 (95% CI: 1.64, 3.90)]. The Begg's and Egger's tests showed no statistical evidence of publication bias. There was a high heterogeneity ($I^2 = 95.2\%$, P value ≤ 0.001) [Figure 3].

Table 1: Summary characteristics of studies included in the meta-analysis of the prevalence of risky sexual behavior among secondary and above-education-level students, Ethiopia, 2020

Author	Year	Study period	Institution	Design	Sample	P (%)
(Alamraw Z. et al., 2013)	2013	March 1 2012	College	cross-section	790	40.6
(Derbie A. et al., 2016)	2016	February to March 30, 2014	University	cross-section	394	28.6
(Fantahun A. et al., 2015)	2015	April to June 2013	University	cross-section	258	47.4
(Fantahun N. et al., 2014)	2014	February 14–30/2012	High school	cross-section	520	37.9
(Fisseha H. et al., 2014)	2015	March 13	University	cross-section	636	17
(Kassahun E. et al., 2019)	2019	On March 7, 2016	High school	cross-section	723	18.4
(Kassa G. et al., 2016)	2016	April to May 2014	High school	cross-section	311	14.7
(Kebede A. et al., 2018)	2018	April 1 to May 1, 2017.	University	cross-section	173	83.5
(Tura G. et al., 2012)	2012	November 2009	University	cross-section	267	28.3
(Mulatu A. et al., 2015)	2015	May 10th to 20th, 2012 G.C	High school	cross-section	374	82.2
(Mavhandu-Mudzusi A. et al., 2016)	2016	January 2014	University	cross-section	236	30.14
(MAMO K. et al., 2016)	2016	November 2015 to March 2015	University	cross-section	631	58.15
(Dingeta T. et al., 2012)	2012	March to April, 2010	University	cross-section	1286	60
(Gebresilasie F. et al., 2017)	2017	February to March 2013	College	cross-section	627	30.5
(Girmay A. et al., 2019)	2019	March 18 to 25/2018	University	cross-section	498	19.6
(Abebe M. et al., 2013)	2013	February 14–28/2012	High school	cross-section	273	42.1
(BELETE M. et al., 2016)	2016	March 2016 to April 2016	University	cross-section	422	58.2
(Dadi A. et al., 2014)	2014	February to April 2014	High school	cross-section	422	13.7
(Desale A. et al., 2016)	2016	June, 2014	High school	cross-section	1362	46.5
(Gizaw A. et al., 2016)	2016	April 7–25, 2014	High school	cross-section	836	26.7
(Guta D. et al., 2016)	2016	December to January 2015	University	cross-section	392	20.4
(Negeri E. et al., 2014)	2014	April 01 to 30, 2013.	University	cross-section	883	50.2
(Wordofa D. et al., 2015)	2015	Feb 1st to 30th, 2014	University	cross-section	634	70.9
(Yigzaw M. et al., 2014)	2014	November to December 2013	University	cross-section	1012	27.4

1 High school stands for studies performed from grade 9 to grade 12 in this study

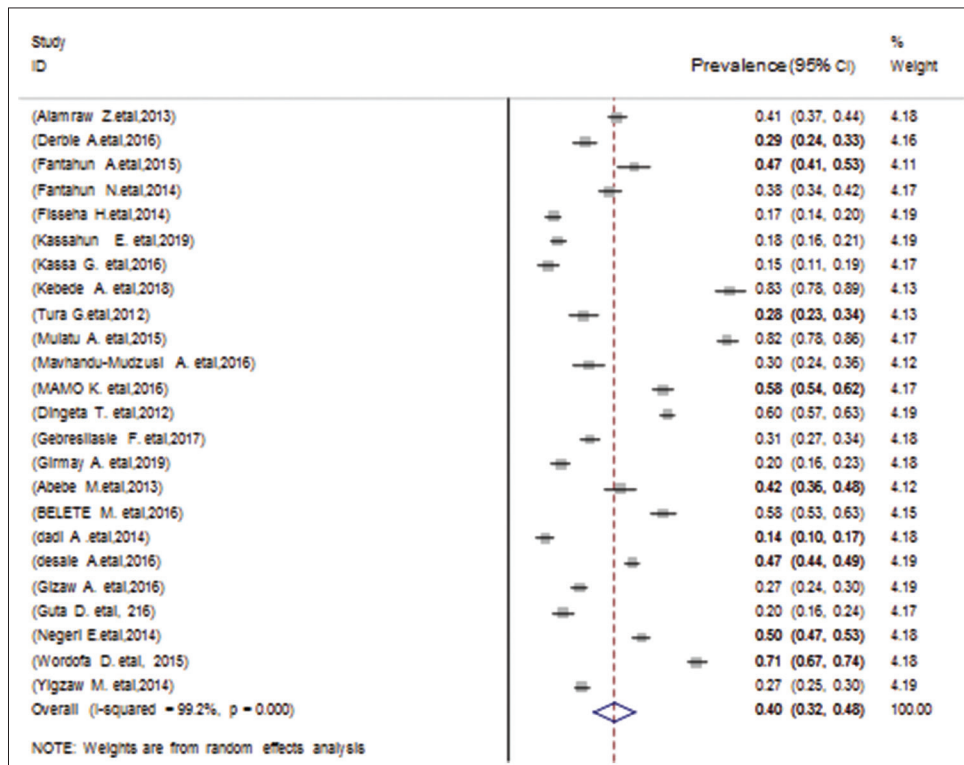


Figure 2: The pooled estimated prevalence of risky sexual behavior among secondary and above education level students, in Ethiopia 2020

Table 2: Sub-group analyses for the prevalence of risky sexual behavior among secondary and above-education-level students, Ethiopia, 2020

Sub-group	Number of studies	Sample size	Prevalence (95% CI)	Heterogeneity statistics		
				Tau-Squared	I ²	P
By the region						
Tigray	6	2614	35.2 (18.5, 51.88)	0.0430	99.1%	≤0.001
Amhara	6	4211	34.5 (21.1, 47.9)	0.0276	98.9%	≤0.001
Oromia	5	235	35.8 (24.2, 47.4)	0.0169	97.2%	≤0.001
Addis Ababa	3	2270	37.3 (21.0, 53.6)	0.0204	98.6%	≤0.001
Gummuz	1	267	82.2 (78.3, 86.1)	0.00	-	-
SNNPR	1	634	70.9,(67.4, 0.744)	0.00	-	-
Somalia	1	23	30.1 (24.3, 36.0)	0.00	-	-
Ethiopia	1	1286	60.0 (57.3, 62.7)	0.00	-	-
By study period						
Before 2016	20	11,624	38.7 (30.2, 47.1)	0.0367	99.1%	≤0.001
After 2016	4	1,816	39.7 (31.7, 47.7)	0.0399	99.2%	≤0.001
By institution						
University	14	7,722	42.8 (31.8, 53.8)	0.0435	99.1%	≤0.001
College	2	1,417	35.6 (25.7, 45.5)	0.0048	93.7%	<0.001
High school	8	4,301	35.3 (20.2, 50.3)	0.0399	99.2%	<0.001

2 High school stands for studies done from grade 9 to grade 12 in this study

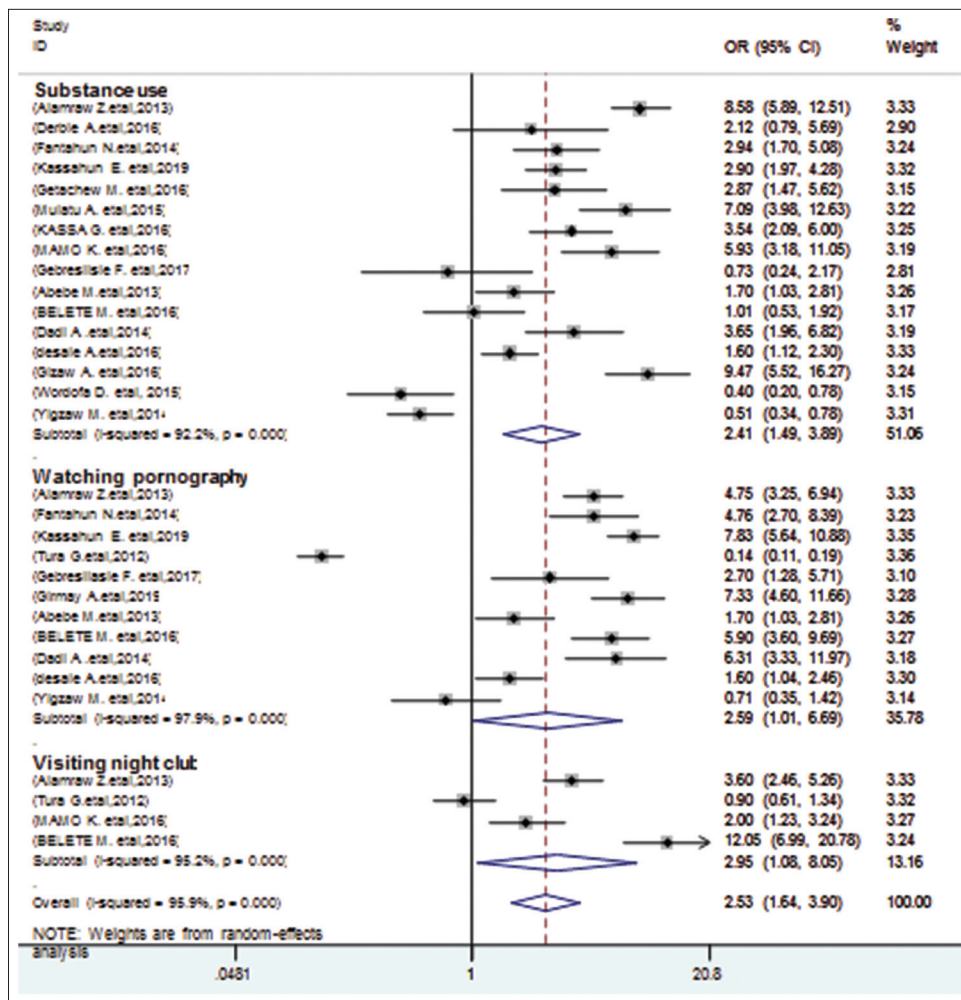


Figure 3: Forest plot presenting pooled random effect size (OR) of substance use related to the non-substance user, watching pornography related to not watching pornography and visiting night club related to not visiting night club among secondary and above education level students in Ethiopia, 2020

Discussion

The overall estimated pooled prevalence of risky sexual behavior was 40% (95% CI: 32, 48). This finding was in line with the study performed in Ethiopia among college and university students (41.62%).^[25] Again, the result of this study was also in line with another study in Ethiopia among the general population (42.80%).^[26] The possible reason for this similarity might be the presence of similar reproductive health care services.

On the other hand, the finding of this study was lower than that of the study performed in southern Nigeria (54%),^[27] South Africa (54%),^[28] and Botswana (45%).^[27] The possible explanation for this finding might be because of differences in the study period, health care service, and social contrasts just like the opportunity to conversation about sexuality.

However, the finding of this study was higher than that of the study performed in sub-Saharan countries^[29] and Uganda.^[30] The possible explanation for this difference might be variation in sample size and differences in the study population.

Different significant factors were associated with risky sexual behavior among Ethiopian secondary and above-level education. Individuals who used substances were 2.41 times more likely to practice risky sexual behavior as compared to non-substance users [OR: 2.41 (95% CI: 1.49, 3.89)]. This finding was supported by the cross-cultural study performed in eight countries^[31] and a study performed in Latin America. The possible explanation for this might be the fact that substances have the power to distort thinking ability and lead to risky sexual activities.

Similarly, study participants who were watching pornography were 2.59 times more likely to be engaged risky sexual behavior as compared to individuals who were not watching pornography [OR: 2.59 (95% CI: 1.01, 6.69)]. This finding was supported by the study performed by the World Health Organization in developing countries^[32] and Uganda.^[30] The possible reason for this might be the fact that pornography may motivate to be engaged in risky sexual activities.

Again, students who were visiting night clubs were 2.53 times more likely to have risky sexual practices as compared with students who were not visiting night clubs [OR: 2.53 (95% CI: 1.64, 3.90)]. This finding was supported by the study performed in Eastern Cape South Africa^[33] and Sri Lanka.^[34] The possible reason for this might be the fact that visiting night clubs may expose individuals to drink more, which pushes toward risky sexual activities. The other explanation might be the situation itself because it is night, which leads to risky sexual activities.

Conclusion

Risky sexual behavior among secondary school and above-education-level Ethiopian students was high. Higher educational institutions should have a special concern on

substance use and pornographic films and follow the presence of the students in the dormitory at night. Similarly, parents and school managers should follow students' daily activities.

List of abbreviations

- AYRH: Adolescent and youth reproductive health
- CI: Confidence Interval
- CSW: Commercial sex worker
- FMOH: Federal Ministry of Health
- HIV/AIDS: Human immunodeficiency virus/acquired immune deficiency syndrome
- RH: Reproductive Health
- STIs: Sexually transmitted infections
- WHO: World Health Organization.

Author contributions

BYA, AAA, LBZ, and GMK were involved in the design, selection of articles, data extraction, statistical analysis and manuscript writing of this review.

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Conflicts of interest

There are no conflicts of interest.

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