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Gender-based violence and associated factors among high school female students in Ethiopia: Systematic review and meta-analysis

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Gender-based violence is a serious public health problem. The prevalence of sexual violence against female students in Ethiopia has not been systematized, according to many dispersed studies. Therefore, the purpose of this systematic review and meta-analysis estimate cumulative prevalence of sexual violence and associated factors among high school female students, in Ethiopia. A systematic review and meta-analysis conducted. Different primary articles that assessed violence against high school female students in Ethiopia extracted by using Microsoft excel and exported to STATA version 11 for further analysis. Random-effect model meta-analysis was used to estimate the pooled prevalence and effect of each study with a 95% confidence interval. Funnel plots analysis and egger test regression were conducted to detect the presence of publication bias. A sensitivity test and sub-group analysis were conducted. A total of studies with 5,441 participants were included. Estimated pooled prevalence of violence against high school female students in Ethiopia was 45.25, with a 95% CI (34.59-55.91). Female students who had a history of sexual intercourse were about 7 (OR=7.23; 95% CI: 1.03-51.02) times more likely to have gender-based violence when compared with females who had no sexual intercourse history. In our systematic review and meta-analysis, magnitude of violence against female students is high in Ethiopia. It is recommended for high school directors, the regional education office, and the ministry of education to give special attention and work on female students to minimize gender-based violence.

Key words: Gender-based violence, violence, female students, sexual violence.

INTRODUCTION

A type of violence known as gender-based violence is one that targets individuals or a group of individuals based on their gender and is anticipated to result in sexual, physical, or psychological pain or suffering. This includes threats of such crimes, coercion that takes place in private or public life (Gurman et al., 2014). Worldwide, sexual violence is a serious public health problem that affects a lot of females each year. Sexual violence includes everything from forced rape to psychological coercion that forces girls to have sex against their will. This leads to decrease academic performance, depression, school withdrawal, unwanted pregnancy, and usually committing suicide and may be trying abortion.

Gender-based violence is linked to major health issues

that affect both women and children, including injuries, gynecological disorders, mental health disorders such as depression and post-traumatic stress disorder, negative pregnancy outcomes, and sexually transmitted infections such as HIV and AIDS (Sugg, 2015).

In low and middle-income counties, the estimated prevalence of gender-based violence among women ranges from 28 to 29% in the East and Southern Africa countries (Hook and Valentiner, 2002) One in five women has been abused sexually or physically by a man at one time in their lives (Venis and Horton, 2002).

In the Ethiopia review and meta-analysis, the pooled prevalence of lifetime sexual violence against female students was around 48.93% (Mekonnen and Wubneh, 2021) and for about 49.4% among university students, the one year pooled prevalence gender-based violence was accounts for 36.02% (Kefale et al., 2021). In sub-Saharan countries the lifetime pooled prevalence of gender-based violence in systematic review and meta-analysis was 44% and the one year pooled prevalence of violence against female students was 35.5% (Muluneh et al., 2020).

Numerous solitary studies have been carried out in Ethiopia to evaluate the frequency of sexual violence against high school female students. The prevalence of sexual violence among female students in Ethiopia, as described in these dispersed studies, has not been systematized, though. Additionally, no national study was conducted to determine the prevalence of sexual violence among female students.

Therefore, the purpose of this systematic review and meta-analysis was to determine the cumulative prevalence of sexual violence among Ethiopian female students. The results of this study will aid stakeholders, legislators, and other interested parties in developing strategies to prevent sexual assault against female students. It will also assist in developing appropriate interventions and policies that address sexual assault in educational settings.

MATERIALS AND METHODS

Searching strategy and study selection

This study was conducted to estimate the pooled prevalence of gender-based violence and its associated factors among high school female students in Ethiopia. Searching for literature was conducted by an information specialist.

Literature was identified by searching the following online databases up to early June 2022: Medline, Pub-Med, Hinari, Scopus, Science direct, and other gray literature were conducted by searching Google, Google Scholar, and other internet search engines to search for any additional articles until early June 2022. Snowballing was used to screen the references of identified articles for possibly relevant studies.

Medical Subject Heading (Mesh), keywords, and free text search terms were used. To find the available literature, we include different terms for gender-based violence and combined terms by using Boolean operators searching terms. The querying terms used

in these studies are ("Sexual violence" OR "Violence against women" OR "Gender-based violence") AND ("associated factors" OR "determinants").

Eligible criteria

Inclusion criteria

(1) Study design type cross-sectional
(2) Articles published in English
(3) A study was done in Ethiopia
(4) Studies that reported prevalence and associated factors of sexual violence among high school female
(5) Publication date before June 1, 2022
(6) All publications fulfilled more than 90% of the criteria included

Exclusion criteria

(1) Reviews and meta-analysis
(2) International studies

Methods for data extraction and quality assessment

Three reviewers (TT, WG, and SS) evaluated the relevant articles by using the title and abstract before the retrieval of the full articles. Additional screening was done on publications that had been retrieved in full text using predetermined inclusion and exclusion criteria. We talked with the fourth reviewer to settle the disagreements.

For the listed research, the data extraction procedure was employed in its standardized form. First author, publication year, study design, contributing factors, sample size, study settings, the adjusted odds ratio for risk estimate (OR), and the 95% confidence interval were all extracted for each included study.

The quality of the included studies was evaluated using the Newcastle-Ottawa Scale (NOS) (Almirall et al., 2017). The domains of NOS utilized to rate the quality of each study were sample representativeness and size, participant comparability, detection of sexual violence, and statistical quality. Four reviewers' agreement was assessed using unweight Kappa, actual agreement, and agreement beyond chance. The values of <0 no agreement, between 0-0.2 slight agreement, 0.21-0.4 as having a fair agreement, 0.41 to 0.60 as having a moderate agreement, 0.61 to 0.80 as having a substantial agreement, and 0.81 to 1.00 as having practically perfect agreement. The actual agreement beyond chance in this review was 0.88 to 1, which is practically perfect agreement.

Data synthesis and analysis

STATA version 11 software application was used for meta-analysis. Funnel plot that showed pooled effect size and magnitude of each recruited study with 95% CI to indicate a graphic summary of the data. Heterogeneity was evaluated by using I^2 statistics (Borenstein et al., 2010), and sensitivity analysis was done to check the heterogeneity of this result by omitting one author step by step to check the effect of each study on the overall prevalence of this systematic meta-analysis. For the variables, the random effect size (OR) model was used. The magnitude of statistical heterogeneity between studies was assessed using I2 statistics and considered a value of 25% as low, 50% as a medium, and 75% as high (Higgins et al., 2003). In this review data, the value of the I2 statistics was 95.1% with a p-value of 0.001, which showed there was high heterogeneity. Therefore, the overall pooled prevalence was

estimated by the random effect model meta-analysis (Borenstein et al., 2010).

Variables' gender-based sexual violence yes/no

Independent variables were having sexual history vs. no sexual history, alcohol abuse vs. no alcohol abuse, parents not living together vs. parents living together, and witness of parental violence vs. non-witness of parental violence

RESULTS

Identification of the studies

Our search strategy and selection of publication for the review was conducted in accordance with the PRISMA. In the database search, artic 49,740 articles were found. Of these, 52,865 articles were excluded because the title and the abstract do not fit the inclusion criteria. Nineteen articles were retrieved for full screening. However, seven studies were excluded because there was incomplete data. Therefore, twelve studies were included in this systematic review and meta-analysis guidelines (Figure 1).

Characteristics of the studies

In this systematic review and meta-analysis, 12 articles were included. All studies were conducted with a cross-sectional study design in Ethiopia (Table 1).

Qualities of included studies

The Newcastle-Ottawa Scale (NOS) was used to assess the quality of the studies methodologically. In the evaluation, we concluded that 12 studies satisfy the quality assessment in terms of selection, outcome measurement, and non-response bias. The risk of bias in each study was assessed by using kappa values, which range from 0.88 to 1, almost perfect.

Publication bias

No evidence of publication bias was found by the funnel plot and Egger's regression test of gender-based violence against female students (Figure 2). In the sensitivity analysis, there is no single study that is influencing the overall meta-analysis estimate (Figure 3).

Data processing and analysis

The extracted data were entered into Microsoft Excel and then exported to STATA version 11 for further analysis. Random-effect model meta-analysis was used to estimate pooled effect size and effect of each study with their 95% confidence interval (CI). A Forest plot was used to determine the pooled effect size and magnitude of each recruited study with 95% CI to indicate a graphic summary of the data. The index of heterogeneity (I2 statistics) was used to measure the degree of heterogeneity among the included studies. The potential sources of heterogeneity were identified through sub-group analysis by region and sensitivity analysis was also conducted to determine I2. Funnel plots analysis and Egger weighted regression tests were conducted to detect the estimated value of the analysis.

Identified studies there were nine thousand and three hundred eighty studies identified by finding in the searching 7 engine and another four studies were added through the additional records. Eight hundred and three were removed after the duplications and seven hundred and eighty studies were excluded. Another, ten papers were excluded after full-text assessment, finally, twelve studies were included in this systematic review and meta-analysis.

The results of an estimated pooled meta-analysis

The prevalence of sexual violence

A total of studies with 5,441 participants were included in this meta-analysis. In Ethiopia, the prevalence of gender-based violence ranged from 11 to 68.2%. The 12 publications were combined using the random-effect model to display the estimated pooled prevalence of gender-based violence. The estimated pooled prevalence of violence against high school female students in Ethiopia was 45.25, with 95% CI (34.59-55.91) significant heterogeneity existed among the studies ($I2 = 98.6\%$; $Q= 348.99$, df =11 and $p \leq 0.001$) (Figure 2).

Sub-group analysis was done by using an assessment tool. Around three articles were conducted in the Amhara region, five in Oromia, and four in SNNP. The prevalence of gender-based violence in Amhara, Oromia, and SNNP scores was 46.79% with a 95% CI (36.25-57.30), 28.22% with a 95% CI (7.27-49.18) and 53.90% with a 95% CI (40.44-67.36), respectively. In each region, Amhara, Oromia, and SNNPS had a significant heterogeneity (I^2=88.8%,   P-value ≤ 0.001),   (I^2=99.2%, $p \leq 0.001$), and (I^2=97.6%, P≤ 0.001), respectively.

Heterogeneity and publication bias

Heterogeneity was detected in this systematic review and meta-analysis with an I^2 of 98.2% and a p-value < 0.00. The presence of potential publication bias was checked by funnel plot in the included studies. The distribution is
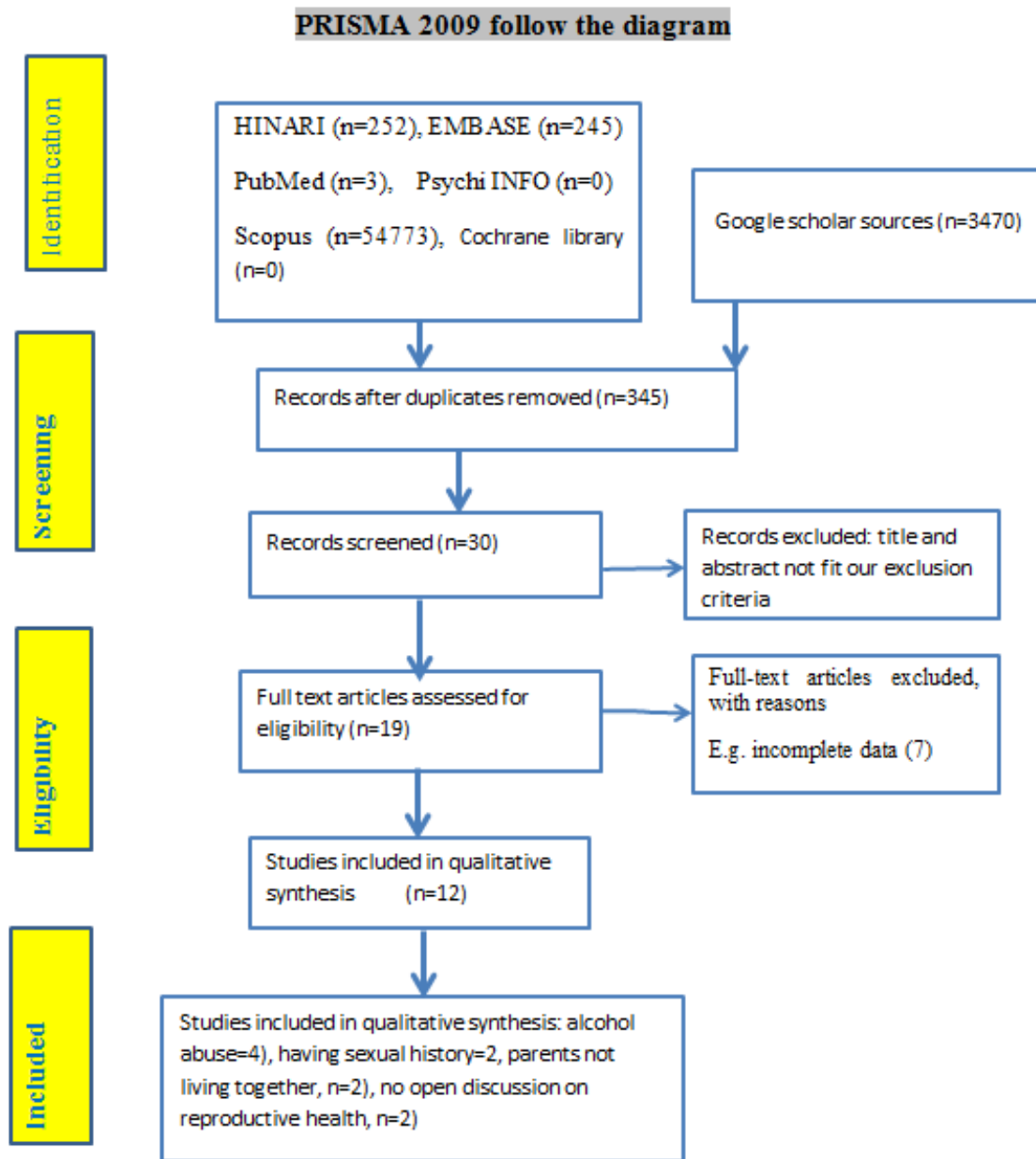
PRISMA 2009 follow the diagram

Figure 1. Chart showing how the research was searched 2021. (Moher et al., 2009)
Source: Author

symmetric all the funnel plots fall within the triangle indicating the absence of publication bias within the studies incorporated (Figure 3). The other evidence was Egger's regression test result also indicates there is no publication bias (P= 0.080) (Table 2).

prevalence based on region. From the studies included in this review the pooled prevalence of gender-based violence in the Oromo region was 34.36%, in Amhara region 46.79%, in SNNP region 53.90% and in Hareghe region 49.00% (Figure 4).

Subgroup analysis

The heterogeneity was detected as discussed earlier; therefore, sub-group analysis was conducted to identify

Sensitivity test

The sensitivity analysis was done to check the heterogeneity of this result by omitting one author step by

Table 1. Characteristics of studies included in gender-based violence and associated factors in Ethiopia.

Author	Years of publication	Region	Study population	Study design	Sample size	Gender violence (%)
Wegu et.al (Namani and Hamdela, 2020)	2020	SNNP	Female students	Cross-sectional	332	32.8
Abaneh et.al (Disasa et. al., 2020)	2019	SNNP	Female students	Cross-sectional	370	68.2
Temesgen et.al(Tantu et.al, 2020)	2020	SNNP	Female students	Cross-sectional	604	52.2
Taye et.al (Leta et.al,2014)	2020	SNNP	Female students	Cross-sectional	801	62.2
Eshetu et al.(18)	2015	Oromia	Female students	Cross-sectional	414	35.5
Taye et.al(Lamb et.al.,2020)	2020	Oromia	Female students	Cross-sectional	362	11
Jemal et.al(Dufera et.al, 2021)	2021	Oromia	Female students	Cross-sectional	540	28.6
Abonesh et.al(Disasa et.al.,2020)	2020	Oromia	Female students	Cross-sectional	423	62.5
Legese et.al (Abera et.al, 2021b)	2021	Haraghe	Female students	Cross-sectional	794	49
Getachew(Mullu et.al, 2015)	2015	Amhara	Female students	Cross-sectional	311	37
Getachew(Mullu et.al, 2015)	2015	Amhara	Female students	Cross-sectional	140	57.3
Alemu et al(Mingude and Dejene, 2020)	2020	Amhara	Female students	Cross-sectional	350	47.2

Source: Author

Table 2. Egger's test gender-based violence among high school female students in Ethiopia.

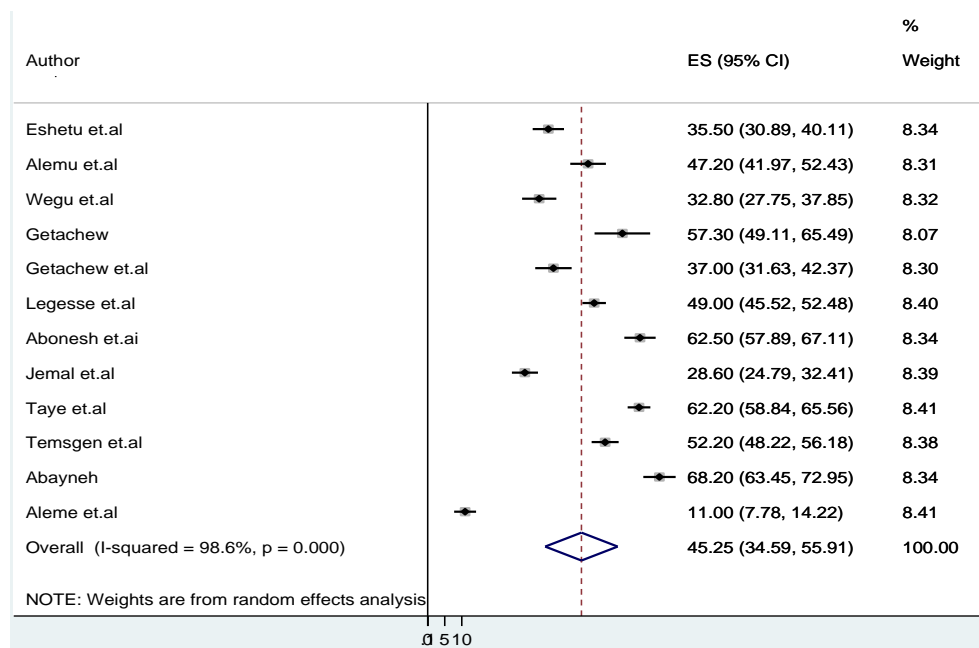| Std_Eff	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Slope	23.87839	24.67286	0.97	0.356	-31.09617	78.85294
Bias	9.142094	11.36979	0.80	0.440	-16.19137	34.47556

Source: Author

Figure 2. The pooled prevalence of gender-based violence among high school female students in Ethiopia.
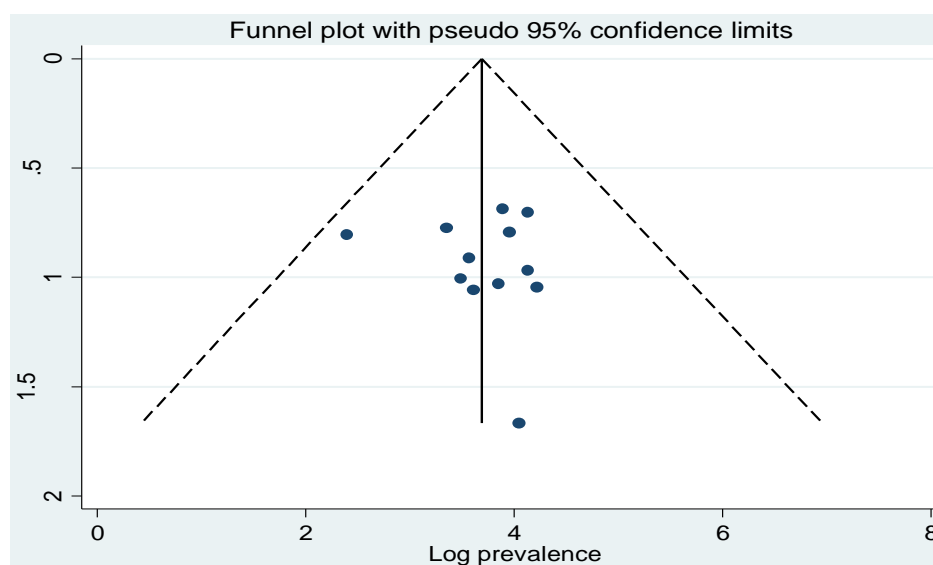Source: Author

step to check whether one study affect the overall prevalence of this systematic analysis.

Table 3. Sensitivity test gender-based violence among high school female students in Ethiopia.

Study omitted	Estimate 95% CI	Heterogeneity	
		I-squired (%)	P-value
Wegu et al	46.38 (34.97-57.79)	98.7	≤0.001
Abayneh et al	43.16 (32.41-53.90)	98.6	≤0.001
Temsgen et al	44.62 (33.00-56.23)	98.6	≤0.001
Taye et al	43.69 (32.41-54.62)	98.5	≤0.001
eshet et al	46.14 (34.61-57.67)	98.8	≤0.001
Aleme et al	48.38 (40.28-56.48)	97.2	≤0.001
Jemal et al	46.77 (35.41-58.14)	98.7	≤0.001
Abonesh et al	43.68 (32.59-54.77)	98.6	≤0.001
Legesse et al	44.91 (33.04-56.78)	98.8	≤0.001
Getachew et al	46.00 (34.55-57.41)	98.8	≤0.001
Getachew	44.19 (33.00-55.39)	98.8	≤0.001
Alemu et al	45.07 (33.58-56.57)	98.8	≤0.001

Source: Author

Figure 3. Forest plots presenting publication bias of gender-based violence among high school female students in Ethiopia.
Source: Author

As the result evidenced all the values within the estimated 95% CI, which indicates the omission of a single study had no significant overall value difference of the prevalence of this systematic and meta-analysis (Table 3).

Factors associated with violence against high school female students in Ethiopia
Having sexual intercourse initiation history and gender-based violence

Two studies were included in the analysis. There was a significant association between having previous sexual intercourse history and gender-based violence. Female students who had a history of sexual intercourse were about 7 (OR=7.23; 95% CI: 1.03-51.02) times more likely to have gender-based violence when compared with females who had no sexual intercourse history (Figure 5).

DISCUSSION

The pooled prevalence of gender-based violence among high school female students, in Ethiopia, in our systematic
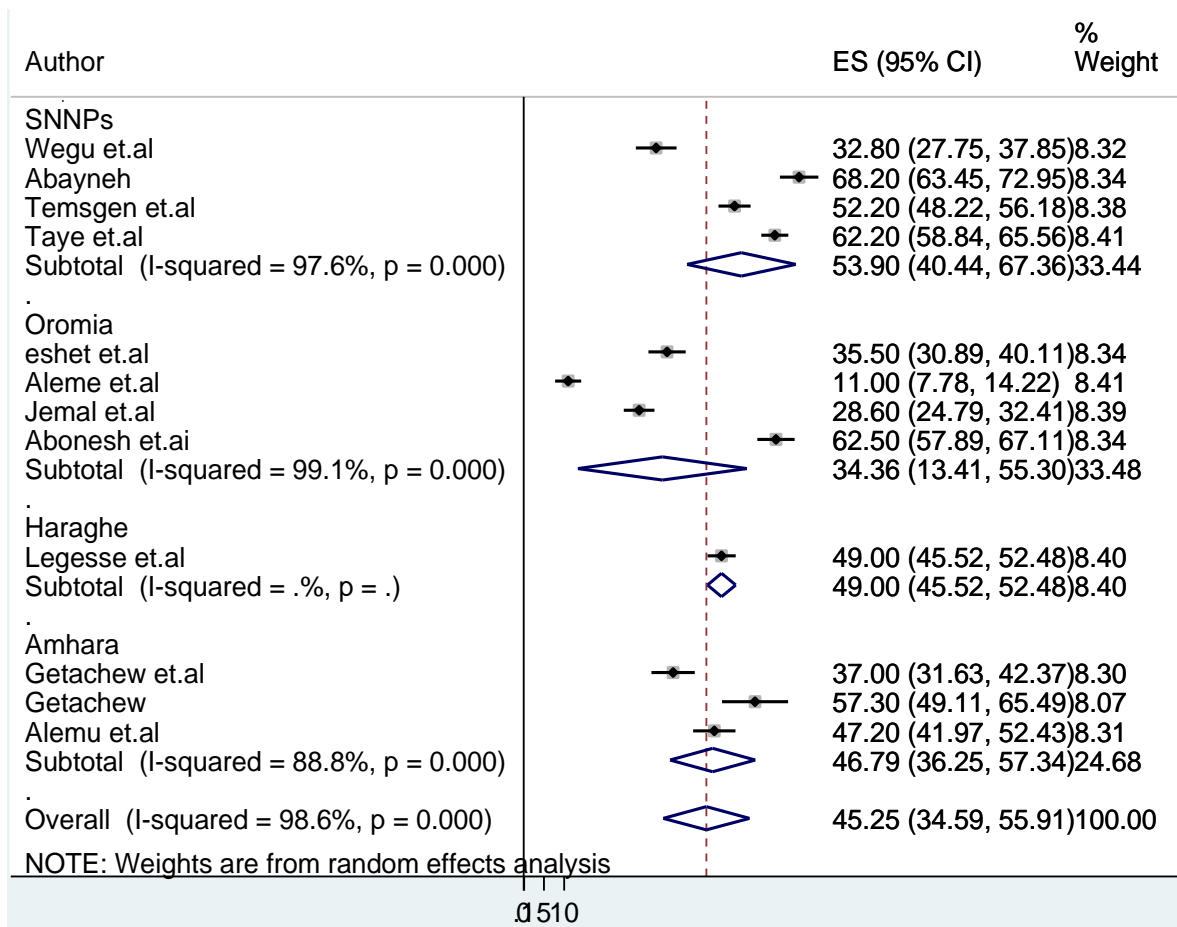
Figure 4. Forest plot presenting of sub-group analysis of the pooled estimated prevalence of gender-based violence among high school female students in Ethiopia.
Source: Author

review and meta-analysis was 45.25, with 95% CI (34.59-55.91). This study is in line with a review and meta-analysis done in Ethiopia among university and primary/secondary female students 49.4% (95% CI: 37.59-55.91) (Kefale et al., 2021) and 48.93% (95% CI: 37.61, 60.25) (Mekonnen and Wubneh, 2021; Amare et al., 2019). This shows that gender-based violence among female students is common in Ethiopia. The result of this review and meta-analysis is less than a study done in Ethiopia among female students who follow at private college, which is reported at 57.7%. This variation may be due to the study population. The result of our pooled prevalence is higher than another pooled prevalence, which accounts for 27.53% (95% CI: 20.52, 34.54) (Mekonnen, 2020). This variation is due to the study population. Our review included only female students but the other review and analysis included both female and male students.

The odds of having sexual violence among high school female students who have a previous sexual history were higher than for female students who have no previous

sexual history. Other systematic and meta-analysis shows similar findings (Kefale et al., 2021).

LIMITATION

Even though this meta-analysis has its significance to show the magnitude and determinant of gender-based violence among high school female students, it has some limitations. One of the limitations of this meta-analysis included only literature done by a cross-sectional study design. Another weakness of this review and meta-analysis includes Ethiopian high school female students.

Conclusion

In our systematic review and meta-analysis, the magnitude of violence against female students is high in Ethiopia. Having previous sexual intercourse history was associated with gender-based violence among high
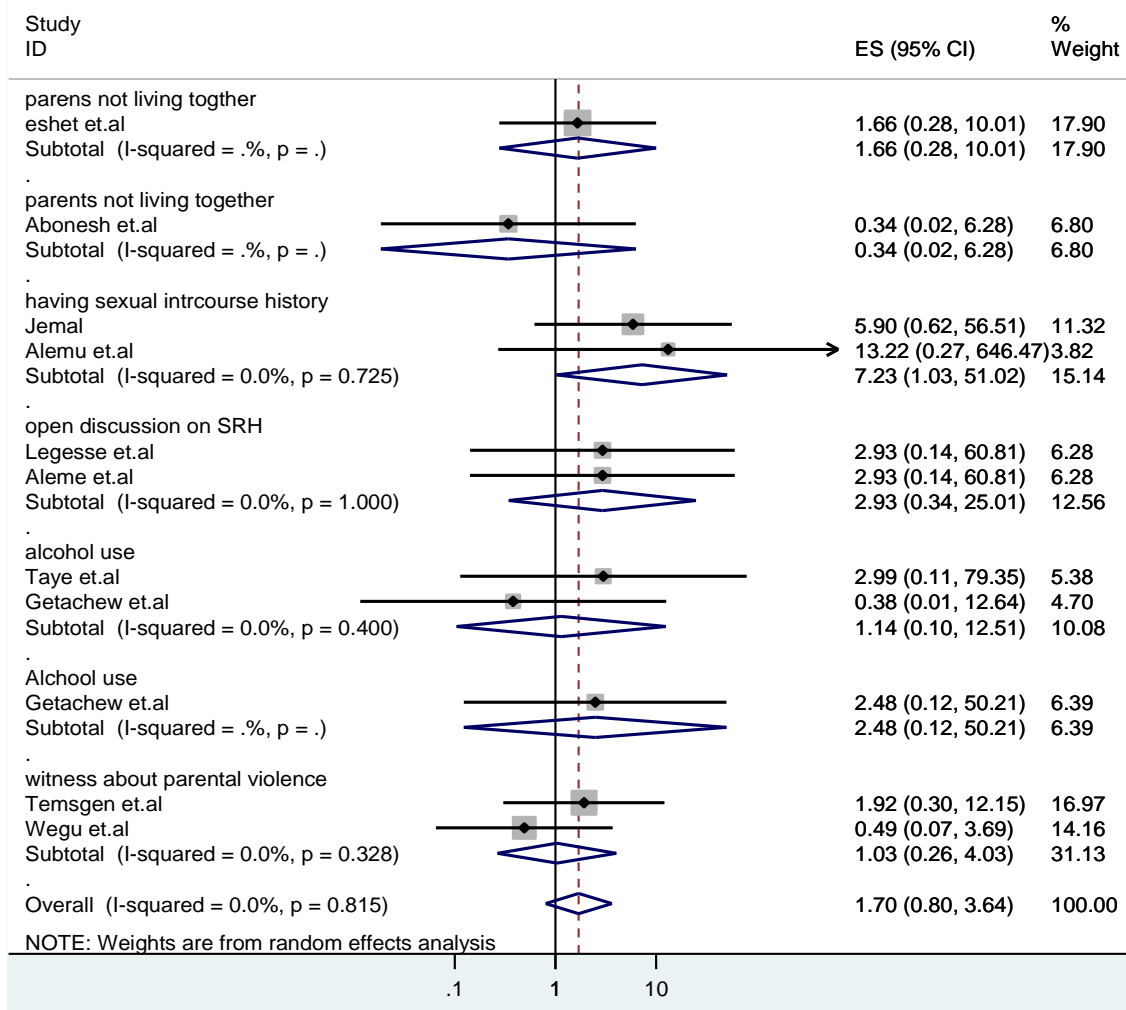
Figure 5. Forest plot presenting associated factors of gender-based violence among high school female students in Ethiopia.
Source: Author

school female students. It is recommended for high school directors, the regional education office, and the ministry of education to give special attention and work on female students to minimize gender-based violence.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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