

Current alcohol consumption and associated factors among school adolescents and youths in Ethiopia: A systematic review and meta-analysis

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Abstract

Background: The use of alcohol is an alarmingly growing public health concern worldwide, and it has an impact on younger generations. There are a few large scale and comprehensive nation-wise surveys conducted on the subject matter and study groups. Hence, the purpose of this study was to render strong evidence for policymakers and researchers on the prevalence of alcohol consumption and its associated factors among school adolescents and youths in Ethiopia.

Methods: Systematic searching was conducted using electronic (Medline, EMBASE, PubMed, CINAHL, Web of Science, Scopus, PsycINFO, and Science direct), and grey literature sources. Cross-sectional studies conducted among adolescents and youths (12–24 years old) were included. Joanna Briggs Institute critical appraisal tool was used to assess the quality of studies. Heterogeneity was examined by using forest plot and I^2 heterogeneity tests. Publication bias was also assessed by inspecting the funnel plot and Egger's regression test. Stata/MI6.0 for windows was used for the analysis.

Results: A total of 26 studies were included in the final analysis with a total of 17,880 participants. The pooled prevalence of current alcohol consumption was 27.0% (95% CI = 22.0–32.0). In the subgroups, the prevalence of current alcohol consumption among high school, college, and university students was 23%, 27%, and 29%, respectively. The pooled data revealed that being a male (odds ratio = 1.93; 95% CI = 1.24–2.99), *khat* chewing (odds ratio = 6.65; 95% CI = 2.52–17.52), family members alcohol consumption behavior (odds ratio = 3.20; 95% CI = 2.08–5.17), and peer pressure (odds ratio = 3.79; 95% CI = 2.64–5.42) were significantly associated with alcohol consumption.

Conclusion: The pooled analysis of 26 studies indicate that over a quarter of school adolescents and youths consume alcohol in Ethiopia. Hence, we recommend designing and implementing community and school-based intervention programs to tackle the growing problems of alcohol consumption and its multifaceted impacts.

Keywords

Prevalence, alcohol consumption, associated factors, adolescents and youths, Ethiopia, systematic review, meta-analysis

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Background

Drinking alcohol-containing beverages is a common behavior practiced by school adolescents and youths and it remains a prominent public health problem worldwide.¹ In 2018, the World Health Organization (WHO)² reported that more than 26.5% of adolescents aged 15–19 years are current alcohol drinkers. A study conducted in four sub-Saharan African countries showed that the magnitude of adolescent alcohol consumption is 9%,³ and the prevalence of current alcohol consumption in east Africa is 26%.⁴ In Ethiopia, the prevalence of current alcohol consumption among university and college students is 26.65%⁵ and 32.4%,⁶ respectively.

Previous study findings reported that alcohol consumption is implicated in a wide variety of disorders and it contributes to over 200 diseases and injury-related health conditions.^{7,8} The most recurrently reported problems include chronic

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non-communicable diseases such as liver disorders, cancer, stroke, renal damage, diabetes,^{8,9} and increased risk of infectious diseases like HIV/AIDS and tuberculosis (TB).⁸ Besides, alcohol consumption significantly increases the crime rate, risky sexual behavior, disability, unemployment, and decreased productivity.¹⁰

Alcohol consumption is a strong contributing factor to the mental and behavioral disorders of school adolescents and youths. It is attributable to increased depressive signs and symptoms accompanied by drinking as a coping mechanism,¹¹ suicidal behaviors, deliberate self-harm, and develop antisocial behavior (domestic violence).¹² About one in four college students report academic consequences from drinking, including missing class, falling behind in class, doing poorly in exams or papers, and receiving lower grades (poor academic performance).¹³ In a vicious cycle, students with lower grades are more likely to engage in alcohol and other drug use behaviors.^{14–18}

Although the minimum legal drinking age across Ethiopia is 18 years, recent studies indicated that alcohol consumption increases dramatically among school adolescents and youths.¹⁹ Some of the most studied risk factors for alcohol consumption among school adolescents and youths include low self-esteem, academic workload,¹⁸ being a male,²⁰ peer pressure, having family members who drink alcohol, sensation seeking, living alone, and psychopathology.⁵ The problem is believed to be on the rise, and it has become a source of concern to various stakeholders, especially due to its adverse impact on students' education and well-being.²¹

Given that alcohol consumption is an imminent danger to the overall well-being of school adolescents and youths (high school, college, and university students) in Ethiopia, there are few nationally representative studies conducted.^{6,20,22} Hence, we have conducted this systematic review and meta-analysis to provide conclusive and comprehensive evidence on the prevalence of current alcohol consumption and its associated factors among school adolescents and youths in Ethiopia and to formulate recommendations for policymakers, programmers, researchers, and clinical practitioners.

Materials and methods

Study protocol and registration

The protocol for the systematic review and meta-analysis has been registered in the International Prospective Register of systematic reviews (PROSPERO) with ID: CRD42018108887. The methodology of this systematic review and meta-analysis was developed per the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA)²³ (see Additional File 1 in the Supplemental Material).

Sources of studies and searching strategies

An electronic search was performed on electronic databases and directories including PubMed/ Ovid-MEDLINE, PsycINFO, EMBASE (Ovid), Google scholar (advanced

search), WorldCat catalog, CINAHL (EBSCOhost), Web of Science, Scopus, and Science direct. Also, a hand (manual) search was made to retrieve unpublished studies (PhD dissertation and master's thesis) from the official website of Addis Ababa University institutional repository and grey literature.²⁴ We used indexed terms, key terms, and search strings, which were extracted from the review questions to search in the databases mentioned above independently. The searched string was derived from the keywords (((prevalence OR magnitude OR epidemiology) AND alcohol OR substance OR Substance Abuse OR alcohol use OR alcohol use disorder OR psychoactive substance use Oral[Mesh]) OR Substance-Related Disorders[Mesh]) OR Alcohol Drinking[Mesh]) AND (factors OR risks OR risk factors OR determinants OR deterrents OR contributing factors) AND Adolescents[Mesh]) OR Youths) AND High school OR College OR University) AND Ethiopia[Mesh]) were applied for advanced search in each database. The detail of searching strategies was presented as an additional file (see Additional File 2 in the Supplemental Material). The overall search results were imported to EndNote X8 citation manager software.

Eligibility criteria

During the initial screening and eligibility assessment of full texts, there was predefined inclusion–exclusion criteria to arrive at the final inclusion. Observational studies (Case–control, cohort, or cross-sectional) addressing the prevalence and factors associated with current alcohol consumption among school adolescents and youths, written in English and conducted in Ethiopia were considered for inclusion. Also, studies (published or unpublished) conducted between 2000 and 2019 were eligible for inclusion. Studies with irretrievable full texts (after requesting full texts from the corresponding authors via email and/or ResearchGate) and articles with missing or insufficient outcomes were excluded. Also, studies conducted in nonhuman subjects, reviews, commentaries, editorials, and case series/reports were excluded.

The selection process of studies

The authors (T.A. and T.W.) did data extraction using a structured data extraction checklist. We used PICOS (participant, interventions/exposure, comparison, outcome, and study setting) criteria to review the studies. The terms that were included in the extraction checklist were: Name of the author & publication year, Aim of the study, Study design and participants, Sample size, Data collection methods, Prevalence of current alcohol consumption (Events), and associated factors. All search results (studies) were exported to the EndNote X8 citation manager and duplicate studies were removed. Then studies were screened by a careful reading of the title and abstract by the authors (T.A. and T.W.) autonomously. The titles and abstracts of studies that mentioned the outcomes of the review were considered for further evaluation. The authors

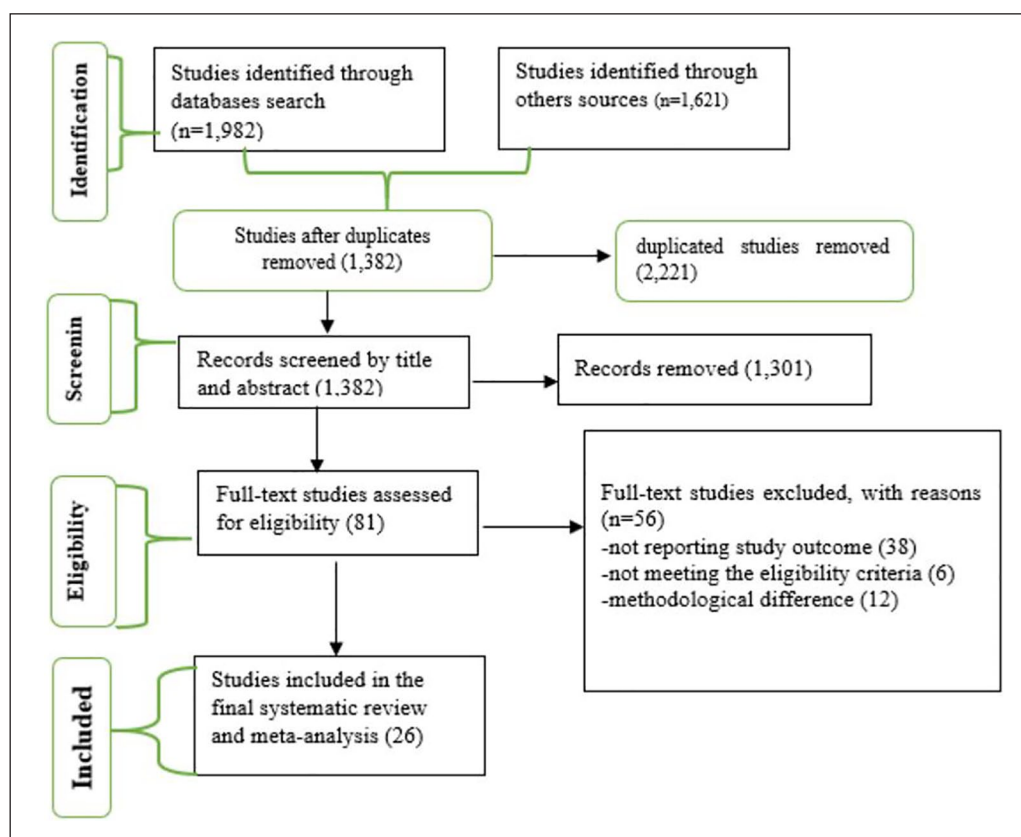


Figure 1. PRISMA flow diagram showing the selection process of retrieved studies.

independently collect full texts and evaluate the eligibility of them for final inclusion by considering study subjects, study designs, quality, and outcome. Finally, the full texts of the selected studies were reviewed. The overall study selection process is presented using the PRISMA flow diagram²⁵ (Figure 1).

Data extraction and recording

The included studies were abstracted into a structured data extraction checklist in the MS excel sheet (Table 1). The findings such as quantitative data (the number of participants who consumes alcohol (event) and total sample size (n)) were extracted by the authors independently and stored using a data extraction template prepared in Microsoft Excel (2016) for meta-analysis. We used unconverted proportional data to calculate the prevalence and associated factors of current alcohol consumption using Stata/M16.0 for Windows.

Critical appraisal of studies

The methodological reputability and quality of the findings of the included studies were critically evaluated using the Joanna Briggs Institute (JBI) quality assessment tool (checklists) for cross-sectional studies.²⁶ To ensure quality, a comprehensive strategy was employed (using both electronic

databases and manual search) to include published and/or unpublished studies. Retrieved studies were screened by T.A. and T.W. independently using clear objective eligibility criteria. The authors independently evaluated the quality of the studies (see Additional File 3 in the Supplemental Material). The mean score of the two authors was taken for a final decision. The differences (disagreements) in the inclusion of the studies were resolved by consensus. The included studies were evaluated against each indicator of the tool and categorized as high, moderate, and low quality. High-quality scores were above 80%, moderate quality between 60% and 80%, and low-quality scores below 60%. Studies with a score greater than or equal to 60% were included.

Outcome(s) description

The primary outcome variable was the prevalence of current alcohol consumption. The outcome variable was measured either by a direct report from the included studies or indirectly based on the statistics reported in the individual studies.

Data processing and analysis

Data synthesis and statistical analysis were carried out by the authors (T.A. and T.W.). The findings of the included studies

Table 1. Description of studies included in the systematic review and meta-analysis.

Authors	Aim of the study	Study design and participants	Sample size	Data collection methods	Prevalence of current alcohol consumption (Events)	Associated factors	Quality
Mekonen et al. ¹⁴	To assess substance use as a strong predictor of poor academic achievement	Cross-sectional University students	725	Self-administered questionnaire	179 (24.7%)		Medium
Hagos et al. ⁴¹	To assess prevalence of substance abuse	Cross-sectional University college students	271	Structured, self-administered questionnaire	33 (12%)		Low
Tsegay et al. ³⁰	To assess psychoactive substances use (<i>khat</i> , alcohol, and tobacco) and associated factors	Cross-sectional University Students	800	Self-administered questionnaire	271 (33.8%)	Male = alcohol drinking (200/468) Female = alcohol drinking (70/332) Ever chewed <i>khat</i> = alcohol drinking (186/244) Never chewed <i>khat</i> = alcohol drinking (84/556) Family alcohol use = alcohol drinking (180/480) Family does not use alcohol = alcohol drinking (90/320) Peer who drinks alcohol = alcohol drinking (200/520) Peer who does not drink alcohol = alcohol drinking (70/280)	Medium
Samuel and Angamo ⁴²	To assess substance use and sexual risk behavior and factors associated	Cross-sectional College students	423	Semi-structured, self-administered questionnaire	92 (21.7%)		Low
Berihun ⁴⁵	To assess exploring the trends & challenges of substance abuse	Cross-sectional High school students	114	Self-administered questionnaire	1 (0.8%)		Low
Abrha ³¹	To assess psychoactive substance abuse and intention to stop	Cross-sectional–mixed University students	601	Structured, self-administered questionnaire	247 (41.1%)	Peer pressure; substance use (106/292) No peer pressure; substance use (15/205) Availability; substance use (55/111) Not available; substance use (66/386) Community pressure; substance use (19/62) No community pressure; substance use (102/435) Model person; substance use (28/64) No model person; substance use (93/433)	High
Kumburi et al. ³²	To assess psycho-active substances use and determining factors	Cross-sectional University students	915	Structured, self-administered questionnaire	549 (60%)		Medium
Teshome and Gedif ⁴⁶	To assess determinants of alcohol drinking and its association with sexual practices	Cross-sectional High school students	2551	Structured, self-administered questionnaire	676 (26.5%)		Medium

(Continued)

Table 1. (Continued)

Authors	Aim of the study	Study design and participants	Sample size	Data collection methods	Prevalence of current alcohol consumption (Events)	Associated factors	Quality
Gobeje et al. ⁵²	To assess prevalence of substance use and associated factors	Cross-sectional Preparatory school students	502	Self-administered questionnaire	118 (23.5%)	Friend substance use; substance use (147/232) Friend does not substance use; substance use (27/370) Father substance use; substance use (87/124) Father does not substance use; substance use (87/378) Sibling substance use; substance use (107/160) Sibling does not substance use; substance use (67/340)	Low
Yismaw and Kebede ⁴³	Prevalence and associated factors of alcohol consumption	Cross-sectional College students	454	Structured, self-administered questionnaire	120 (26.4%)		Low
Assefa et al. ⁴⁷	Substance use and factors associated with risky sexual practice	Cross-sectional Secondary/prep students	598	Structured, self-administered questionnaire	125 (20.9%)		Low
Abebe et al. ⁴⁸	Living with parents and risky sexual behaviors	Cross-sectional study-mixed type Preparatory school students	273	Self-administered questionnaire, in-depth interview	101 (37%)		Medium
Adere et al. ³³	To assess determinants of psychoactive substances use	Cross-sectional study University students	655	Self-administered questionnaire	183 (27.9%)	Male; alcohol drinking (167/454) Female; alcohol drinking (46/201) Ever <i>khat</i> user; alcohol drinking (60/85) Did not ever chew <i>khat</i> ; alcohol drinking (153/570) Average monthly pocket money > 500; alcohol drinking (79/195) < 250; alcohol drinking (43/174) < 250; cigarette smoking (16/186)	Medium
Aklog et al. ⁴⁴	Assessment of substance abuse and associated factors	Cross-sectional study College students	410	Semi-structured, self-administered questionnaire	145 (35.4%)	Male; substance abuse (49/225) Female; substance abuse (9/185) Peer pressure; substance abuse (54/198) No peer pressure; substance abuse (4/55) Availability of the drugs; substance abuse (36/93) Not available; substance abuse (22/160) Family drug use; substance abuse (31/95) Family does not use drug; substance abuse (27/315) Personal pleasure; substance abuse (51/178) Not for personal pleasure; substance abuse (7/75) Academic dissatisfaction; substance abuse (20/52) No academic dissatisfaction; substance abuse (38/201)	High

(Continued)

Table 1. (Continued)

Authors	Aim of the study	Study design and participants	Sample size	Data collection methods	Prevalence of current alcohol consumption (Events)	Associated factors	Quality
Birhanu et al. ⁴⁹	To assess prevalence of substance use and associated factors among high school adolescents.	Cross-sectional High school students	651	Self-administered questionnaire	266 (40.9%)	Male; substance use (206/358) Female; substance use (106/293) Have sibling use of substance; use substance (179/248) No sibling substance abuse; substance use (133/403) Community norms favorable to substance use; substance use (133/240) Community norms not favorable to substance use; substance use (107/313) Have family history of alcohol and substance use; substance use (129/173) No family history of alcohol and substance use; substance use (183/478) Poor academic performance; substance use (220/380) Good academic performance; substance use (92/271) Friend's use of substance; substance use (182/267) Friend does not use substance; substance use (130/384) Being religious; substance use (92/291) Not religious; substance use (220/360)	Medium
Dereese et al. ³⁴	Assessment of substance use and risky sexual behavior	Cross-sectional University students	725	Self-administered questionnaire	127 (17.5%)		Medium
Deressa and Azazi ³⁵	Substance use and its predictors among undergraduate medical students	Cross-sectional University students	622	Structured, self-administered quantitative questionnaire	137 (22%)	Male; alcohol drinking (107/426) Female; alcohol drinking (28/196) Father currently drinks alcohol; having alcohol (61/167) Father does not currently drink alcohol; drink alcohol (74/455) Friend currently drinks alcohol; having alcohol (89/236) No friend currently drinks alcohol; alcohol use (46/386) Ever smoked cigarette; drinking alcohol (41/54) Never smoked cigarette; drinking alcohol (94/568)	Medium

(Continued)

Table 1. (Continued)

Authors	Aim of the study	Study design and participants	Sample size	Data collection methods	Prevalence of current alcohol consumption (Events)	Associated factors	Quality
Dida et al. ⁵⁰	Substance use and associated factors	Cross-sectional study Preparatory school students	603	Pre-tested, structured questionnaire, self-administered	142 (23.6%)	Male; substance use (180/373) Female; substance use (30/228) Father drinks alcohol; substance use (98/192) Father does not drink alcohol; substances use (111/409) Father chews <i>khat</i> ; use substance (55/89) Father does not chew <i>khat</i> ; substance use (154/509) Sibling(s) smoke cigarette; use substance (20/26) Sibling(s) do not smoke cigarette; substance use (115/369) Best friend smokes cigarette; use substance (27/42) Best friend does not smoke cigarette; substance (183/560) Best friend drinks at least once a week; uses (46/67) Best friend does not drink at least once a week; use (164/535) Best friend chews <i>khat</i> ; uses substance (77/105) Best friend does not chew <i>khat</i> ; substance (133/498)	High
Gebremariam et al. ³⁶	Substance use and associated factors	Cross-sectional University students	617	Structured, pre-tested, self-administered questionnaire	105 (17%)	Male; substance use (50/325) Female; substance use (12/230) Feeding out of the university café; substance use (35/216) Feeding at university café; substance use (27/339) Being from private preparatory school; substance use (18/58) Being from public preparatory school; substance use (42/490) Having higher monthly income; substance use (17/44) Having low monthly income; substance use (25/280) Having substance user families; substance use (15/35) Do not have family substance use; substance use (42/492) Having friends who uses substance; substance use (44/120) Do not have friends who uses substance; substance use (10/397)	Low

(Continued)

Table 1. (Continued)

Authors	Aim of the study	Study design and participants	Sample size	Data collection methods	Prevalence of current alcohol consumption (Events)	Associated factors	Quality
Gebreslassie et al. ³⁷	Psychoactive substances use and associated factors	Cross-sectional University students	756	Self-administered questionnaires	248 (32.8%)	Male; alcohol drinking (197/444) Female; alcohol drinking (64/312) Ever chewed <i>khat</i> ; drink alcohol (135/217) Never chewed <i>khat</i> ; alcohol use (126/539) Ever smoked cigarette; drink alcohol (64/72) Never smoked cigarette; drink alcohol (197/684) Family member's alcohol use; alcohol use (111/167) No family members use alcohol; alcohol use (150/589) Peer friends's alcohol use; alcohol use (236/389) Peer friends do not use alcohol; alcohol use (25/369)	Medium
Kassa et al. ³⁸	Determinants of alcohol use and <i>khat</i> chewing	Cross-sectional study University students	590	Self-administered	174 (29.5%)	Male; alcohol drinking (208/479) Female; alcohol drinking (31/107) Lived alone during school age; drink alcohol (9/10) Did not live alone during school age; alcohol (230/576)	Low
Mekonen et al. ²⁹	Problematic alcohol use	Cross-sectional University students	725	Self-administered questionnaire	83 (11.4%)	Alcohol user close friend; use alcohol (53/238) No alcohol user close friend; alcohol (30/487) Lifetime substance use; use alcohol (66/240) No lifetime substance use; alcohol use (17/485)	Medium
Melaku et al. ³⁹	Stress among medical students and its association with substance use and academic performance	Cross-sectional University students	317	Self-administered questionnaire	113 (35.6%)		Low
Meressa et al. ¹⁷	Effect of substance use on academic achievement of health officers and medical students	Cross-sectional University students	239	Self-administered questionnaire	87 (36.4%)		Low
Reda et al. ⁵¹	Alcohol drinking patterns	Cross-sectional High school students	1721	Structured, self-administered questionnaire	179 (10.4%)		High
Tesfaye et al. ⁴⁰	Substance use and associated factors	Cross-sectional study University students	1022	Structured, self-administered questionnaire	204 (20%)	Male; substance use (524/777) Female; substance use (114/245) Ever married; substance use (71/94) Never married; substance use (567/928) Third year; substance use (175/249) First year; substance use (213/352) Depression; substance use (221/274) No depression; substance use (417/748)	Medium

were first presented using a narrative synthesis. Meta-analysis was carried out using Stata/M16.0 for Windows software to compute the pooled prevalence of current alcohol consumption and associated factors in the percentage and odds ratio (OR), respectively. The meta-analysis results were presented using a forest plot. Heterogeneity among studies was examined using forest plot and I^2 heterogeneity tests. The I^2 values were interpreted as 25% (low), 50% (medium), and 75% (high) heterogeneity. For this study, $I^2 \geq 75\%$ and $p < 0.05$ (two-tailed) heterogeneity was declared and justified. To minimize heterogeneity; subgroup analysis and sensitivity analysis were done. The subgroup analysis was done with the assumption that exposure to alcohol use was different in high school, college, and university. Also, random effect models were used by 95% confidence interval (CI) in the analysis. The DerSimonian and Laird²⁷ random-effects models were employed for the final analysis. Publication bias was explored using visual inspection of the funnel plot and Egger's regression test.²⁸ To confirm, Egger's regression test was done and the result showed publication bias (the intercept (B0) is -4.982 (95% CI = -13.1288 to 3.1633), with $t = 1.262.52$, DF = 24.000. The p-value (one-tailed) was 0.109, and the p-value (two-tailed) was 0.2189).

Results

Description of retrieved studies

We identified 1,982 articles from the electronic databases and 1,621 studies were found from other grey literature sources. Of these, 2,221 were removed due to duplication, and the remaining 1,382 articles were screened by title and abstract. Following the screening by title and abstracts, 1,301 studies were excluded. The full texts of the 81 studies were reviewed for eligibility and 56 of them were excluded because the studies did not present main study outcome(s), absence of full article, and methodological difference. Finally, 26 studies were critically appraised and included in the final analysis (Figure 1 and Table 1).

A total of 26 studies were included in computing the pooled prevalence of current alcohol consumption with a total of 17,880 participants.^{14,17,29-52} The prevalence of current alcohol consumption among students ranges from 0.9%⁴⁵ to 41%.⁴⁹

Prevalence of current alcohol consumption

In our meta-analysis, the pooled prevalence of alcohol consumption among school adolescents and youths was 27.0% (95% CI = 22.0–32.0). In subgroup analysis (university, college, and high school), around 29.0% (95% CI = 22.0–36.0) were from the universities and 23.0% (95% CI = 14.0–32.0) were from high schools. The heterogeneity test for the pooled estimate was ($I^2 = 98.7\%$, $p = 0.000$). To minimize heterogeneity, random effect models were used. The DerSimonian and Laird random-effects models were used (Figure 2). Even though we identified and included similar studies, because of

differences in the study settings, the included studies were found to be highly heterogeneous and publication bias was detected (Figure 3). Therefore, the random effect models were employed for analysis. Besides, sensitivity (Figure 4) and subgroup analyses were conducted to minimize heterogeneity.

Factors associated with current alcohol consumption

Eight studies^{29,30,33,35-38,50} reported different factors that have a significant association with current alcohol consumption were included in the analysis. Among these factors, alcohol use among the family members, peer pressure, *khat* chewing, being male, availability of alcohol, academic performance, detachment from the family (living alone), and monthly pocket money (income) were the main driving factors for current alcohol consumption of school adolescents and youths.

Family members who consume alcohol

Six included studies^{30,35-38,50} pinpointed that alcohol use among the family members was a driving factor for alcohol consumption of school adolescents and youths. Our meta-analysis result showed that school adolescents and youths who had alcohol-consuming family members were 3.20 (OR = 3.20; 95% CI = 2.08–5.17) times more likely to drink alcohol than those who did not (Figure 5).

Sex

Five studies^{30,33,35,37,38} with a total of 2,271 participants were included in the meta-analysis. Of these, four studies^{30,35,37,38} reported that there was an association between being male and current alcohol consumption. On the contrary, one study pinpointed that being female was a predictor of alcohol consumption.³³ Our meta-analysis finding showed that male adolescents and youths were 1.93 times at greater risk for alcohol consumption in comparison with females, (OR = 1.93; 95% CI = 1.24–2.99). The heterogeneity is high ($I^2 = 84.32\%$, $p < 0.00001$). So, the investigators assume to employ a DerSimonian and Laird random-effects model (Figure 6).

Khat chewing

The association between *khat* chewing and current alcohol consumption among school adolescents and youths were reported by four studies^{29,30,33,37} involving 1,155 school adolescents and youths. All the included studies revealed that *khat* chewing was positively associated with current alcohol consumption (OR = 6.65; 95% CI = 2.52–17.52; Figure 7).

Peer pressure

In seven studies, the association between peer pressure and current alcohol consumption among school adolescents and

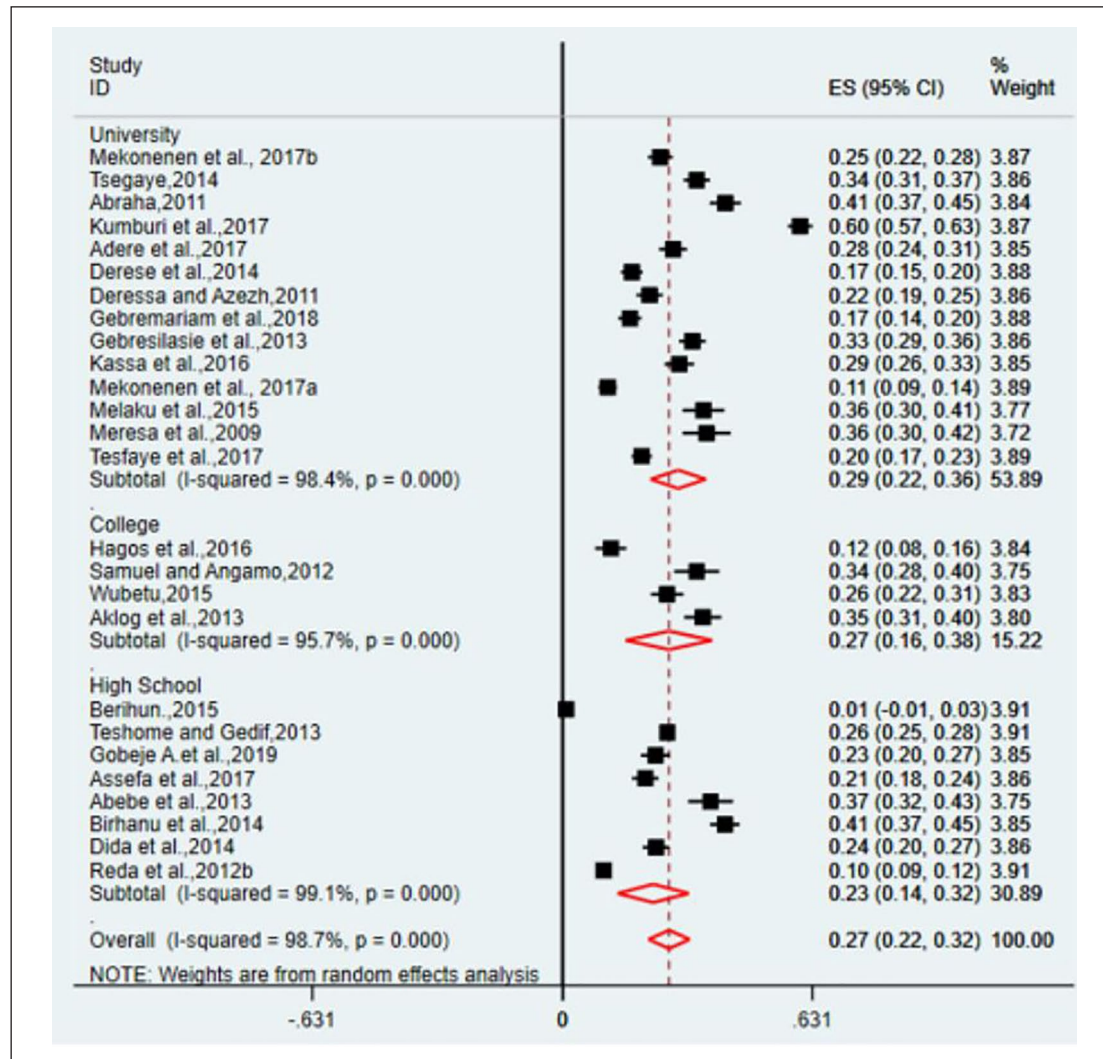


Figure 2. Prevalence of alcohol consumption among school adolescents and youths in Ethiopia, 2019.

youths was reported.^{29,30,35–38,50} All the included studies revealed that peer alcohol use was significantly associated with current alcohol consumption among school adolescents and youths. In this meta-analysis, those who had friends/peers who drink alcohol were 3.79 (OR=3.79; 95% CI = 2.64–5.42) times more likely to drink than those who did not (Figure 8).

Other factors associated with current alcohol consumption

There were additional significantly associated factors with current alcohol consumption that were not included in the analysis (due to a small number of studies reporting on these factors). Some of the factors were availability of alcohol, academic performance, detachment from the family (living alone) that makes them free to do whatever they like, and monthly pocket money (income).^{31,33,36,49}

Discussion

To the best of our knowledge, this is the first comprehensive systematic review and meta-analysis on the current alcohol use and associated factors among school adolescents and youths in Ethiopia, which was conducted across 26 studies. In this meta-analysis, we investigated the pooled prevalence of current alcohol consumption and associated factors among school adolescents and youths in Ethiopia. The pooled current alcohol consumption estimate revealed that the prevalence of alcohol consumption was significantly higher in the study participants. Further subgroup analyses based on university, college, and high school samples indicated that studies from university samples showed a statistically significant difference.

The results of the meta-analysis revealed that the pooled prevalence of current alcohol consumption was 27.0% (95% CI = 22.0–32.0). Moreover, being a male, peer pressure, alcohol use among family members, *khat* chewing, availability of alcohol, academic performance, detachment from the

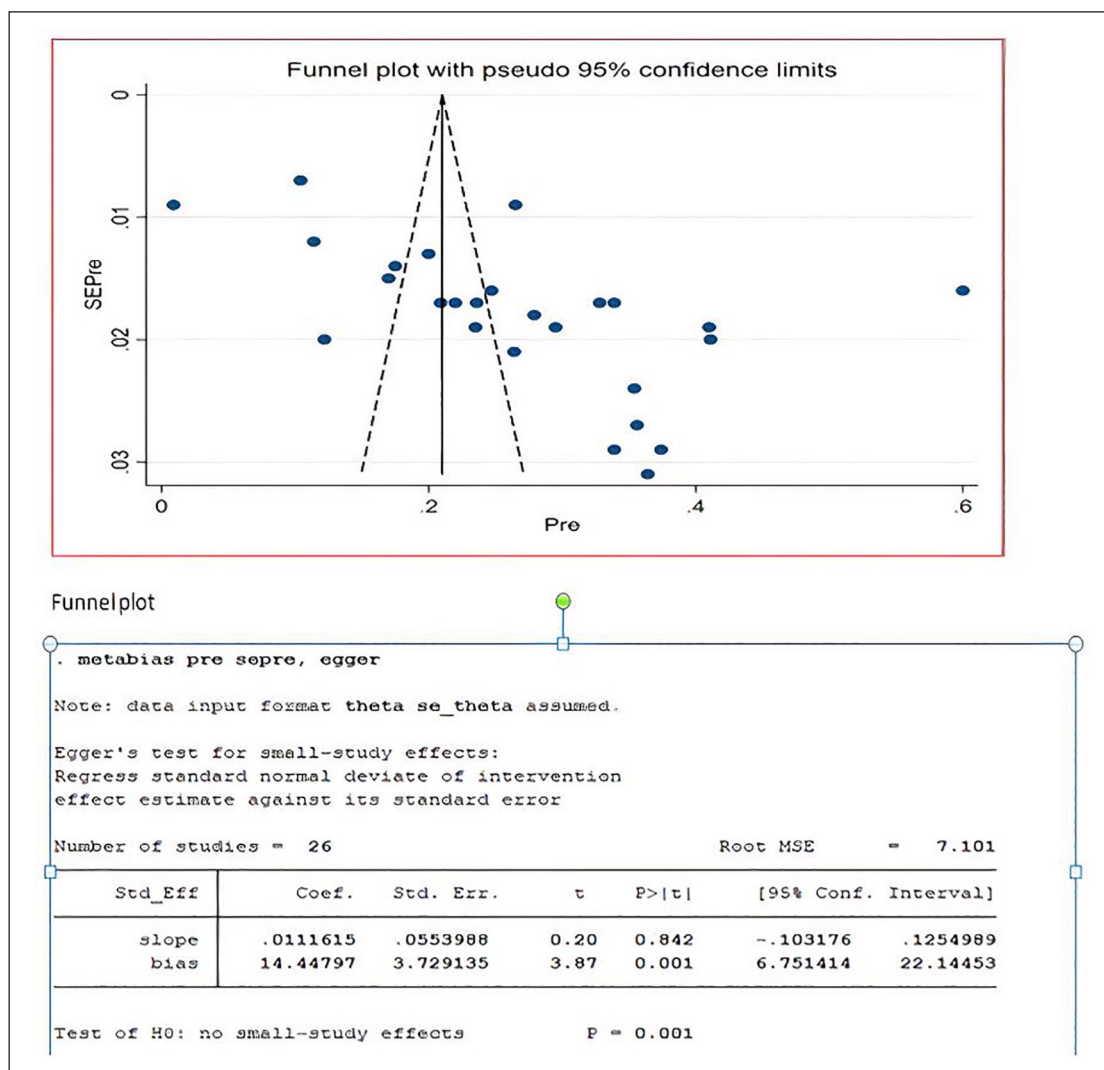


Figure 3. Funnel plot and Egger’s regression tests showing the possible bias of included studies.

family (living alone), and monthly pocket money (income) were found to be significantly associated with current alcohol consumption.

The risk-taking behavior of adolescents and youths is crucial to decide their future fate. Their productivity status in this age group determines where they will be in the future. The mental health of adolescents and youths, mainly affected by drug/substance misuse and alcohol consumption, is the leading one in Ethiopia. According to this study finding, alcohol consumption was a rising threat for adolescents and youths with limited effort to tackle the problem. The consumption of alcohol by university adolescents and youths (29.0%) was meaningfully higher than high school (23.0%) and college (27.0%) adolescents and youths. The reason for the high prevalence at the university might be related to peer pressure⁵³ and detachment from family control.⁵⁴ The other reason for the high prevalence of alcohol consumption among all the study participants is the recent

increment of brewery beverage factories with their advertisement (expansion of the alcohol industries in Ethiopia).^{55–57} In this study, the identified contributing factors for current alcohol consumption were peer pressure, family member alcohol use behavior, *khat* chewing, and being a male.

In this meta-analysis, the pooled prevalence of current alcohol consumption among university students was found to be 29.0% (95% CI = 22.0–36.0), which is in line with a systematic review and meta-analysis done among university students in Ethiopia.⁵¹ And it is also in agreement with a systematic review and meta-analysis that was conducted among adolescents in sub-Saharan Africa (SSA), which reported the prevalence of current alcohol consumption as 32.80%.⁵⁸ Another study conducted in 20 African countries reported 23.80% of Ethiopians were current alcohol users.⁵⁹ The findings of our meta-analysis were also in agreement with a systematic review done on Ethiopian university students

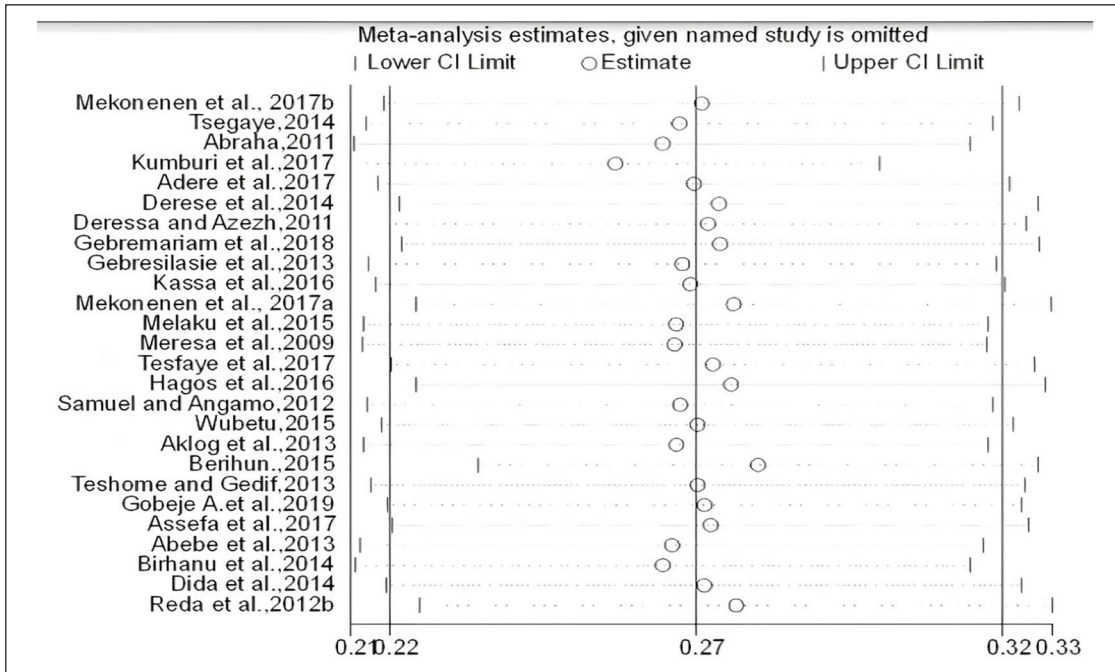


Figure 4. Sensitivity analysis with random effect model.

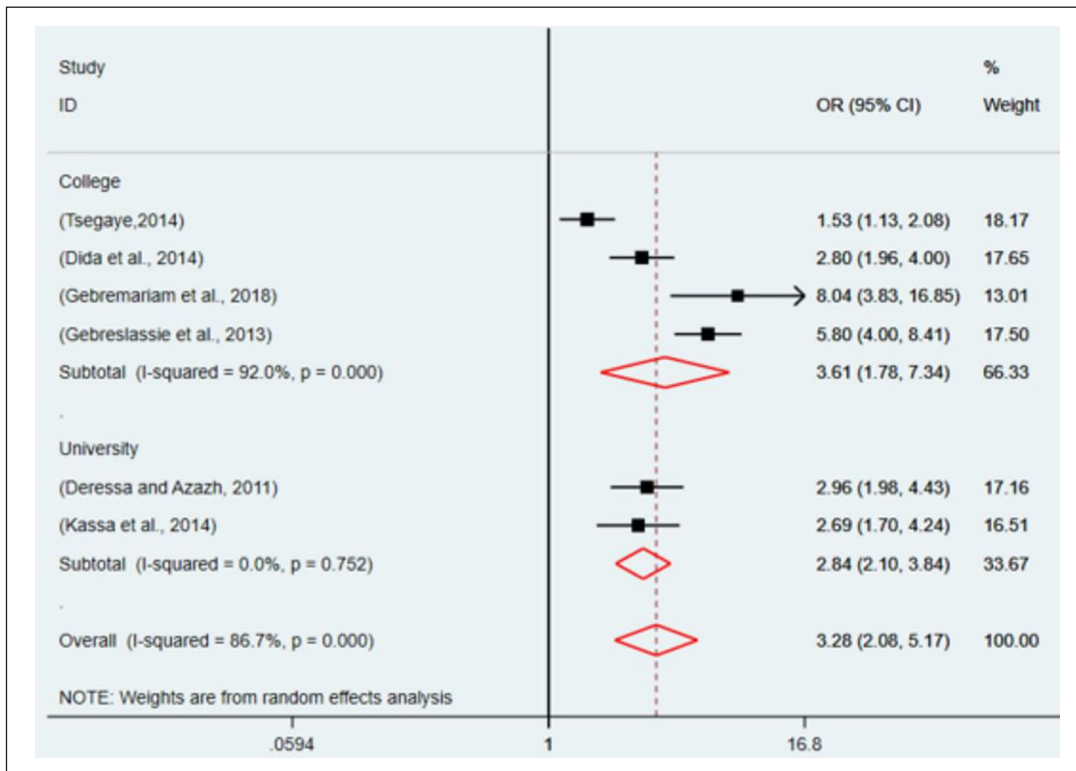


Figure 5. The association between family alcohol use and alcohol consumption among school adolescents and youths, 2019.

(26.65%)⁵ and Brazilian adolescents, according to the National Adolescent School-based Health Survey (26.1%) (PeNSE 2012).⁶⁰

Our study finding was lower than the national average for current drinking by participants aged 15–29 years in Ethiopia (40.70%). According to the 2015 NCD STEPS survey, this

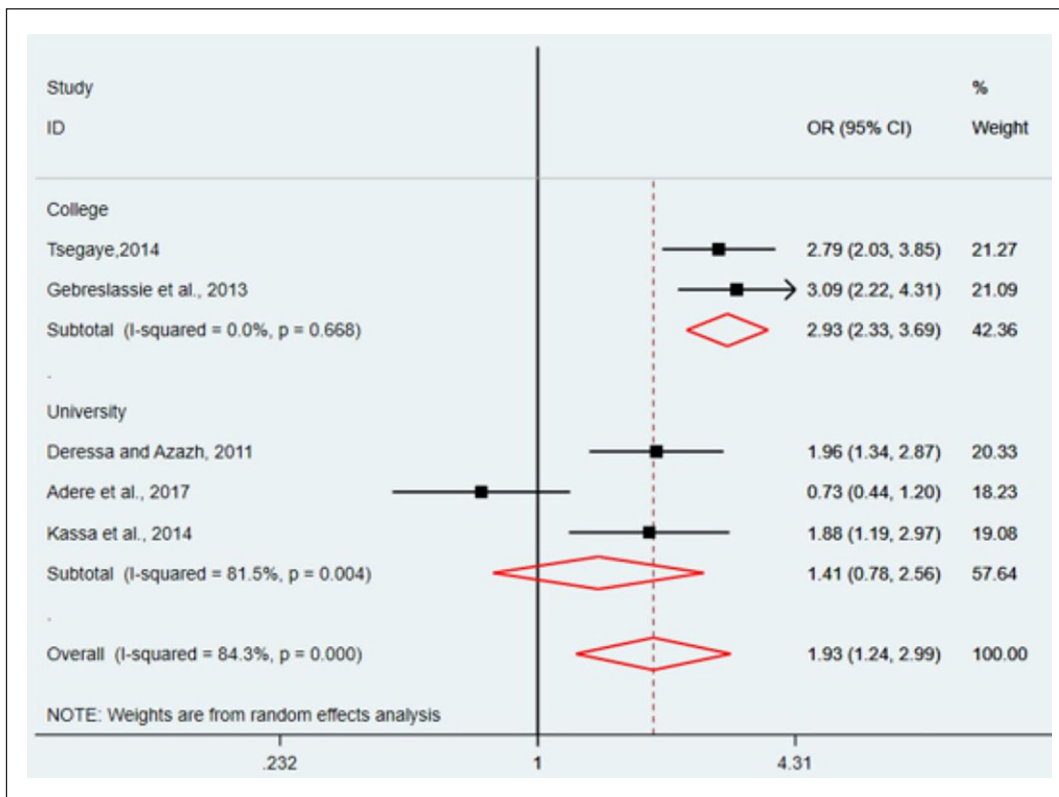


Figure 6. The association between sex and alcohol consumption among school adolescents and youths in Ethiopia, 2019.

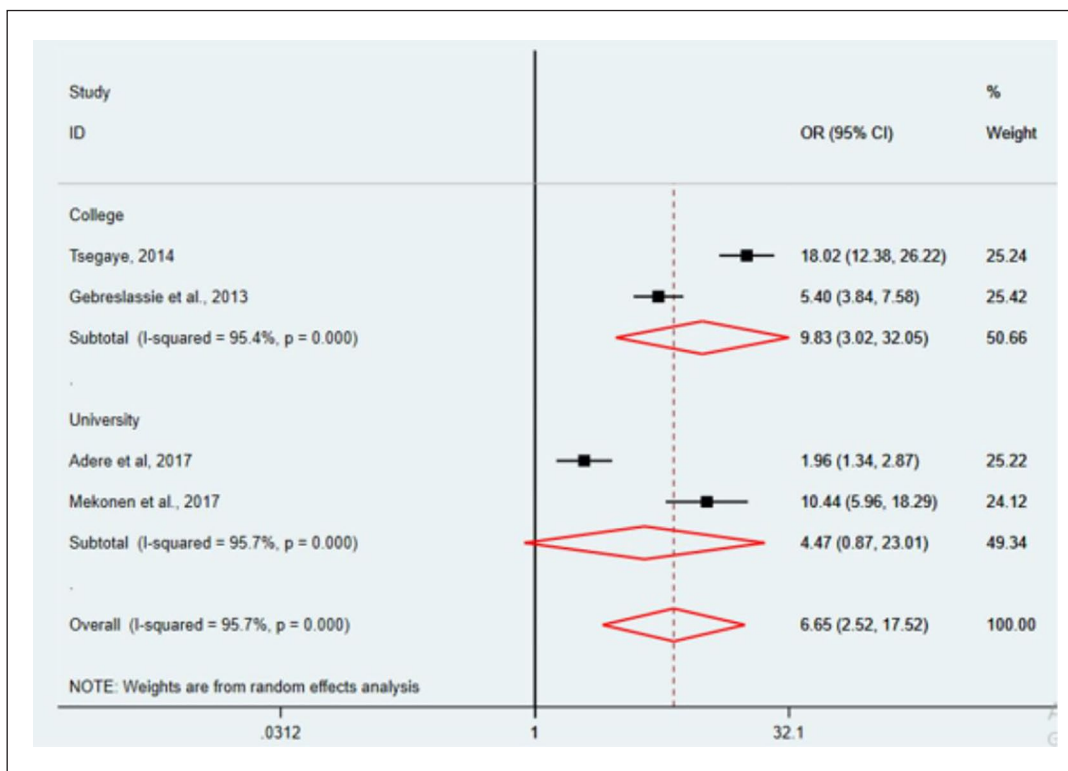


Figure 7. The association between khat chewing and alcohol consumption among school adolescents and youths in Ethiopia, 2019.

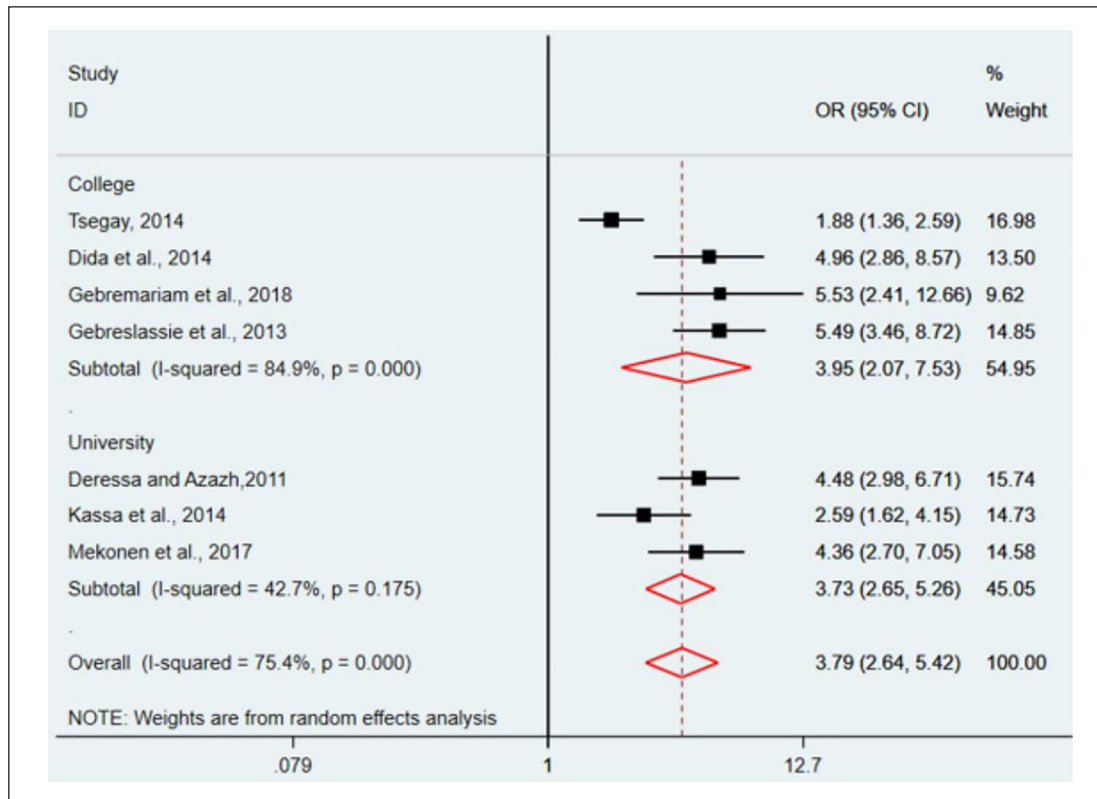


Figure 8. The association between peer/friend alcohol use and alcohol consumption among school adolescents and youths in Ethiopia, 2019.

involved nationally representative participants aged 15–69 years and excluded students in higher learning institutions.⁶¹ A possible reason for the discrepancy might be under-reporting by the students because most studies of alcohol use in adolescents and youths use self-report. This finding was also slightly lower than studies done among school adolescents (33% and 31%) of university youths in Eastern African countries,⁴ 50.70% in Kenya,⁶² 39.10% in South Africa,⁶³ 41.80% in the USA,⁶⁴ China,^{65,66} and other western countries.⁶⁷ The primary reason for the comparatively lower alcohol drinking level in this study could be due to differences in the study setting, access, socioeconomic, and cultural reasons across the countries.

Our study finding was higher than studies done on adolescents in Morocco,^{68,69} Algeria,⁷⁰ Zimbabwe,⁷¹ and Thailand.⁷² The probable explanation for this discrepancy may be the current expansion of alcohol industries and massive alcohol advertisements^{73,74} in Ethiopia, and another reason may be that Muslim countries belonging to the Mediterranean region such as Morocco and Algeria have lower prevalence rates of alcohol consumption among adolescents compared to other regions in the world because of the religious prohibition of alcohol drinking as reported by WHO.² In addition, many Arab countries forbid alcohol use by law.

Current alcohol consumption among school adolescents and youths was significantly associated with multiple factors. In this systematic review and meta-analysis, being male

was associated with current alcohol consumption, which is supported by other previous studies conducted in Ethiopia,⁶ South Africa,⁷⁵ Tanzania,⁷⁶ and four sub-Saharan African countries.³ This could be due to more exposures to alcohol in males; more tolerant social attitude toward male alcohol consumption; and cultural influences such as alcohol-related norms, values, and constraints, which may interact with biological factors (men had greater dopamine release than women) may be some of the cited reasons for the higher prevalence of alcohol consumption in males. In addition, it could be due to the fact that being male is associated with higher risk of substance use.

The other significantly associated factor with current alcohol consumption among the study participants was family member alcohol use behavior. This could be justified by the fact that sharing the behaviors and learning from families, which increases social interaction.^{77,78}

Similarly, peer pressure was the other significantly associated factor with current alcohol consumption. This could be justified by the fact that sharing the behaviors from friends, which increases social interaction. Peers can encourage friends to use alcohol or tease them for being afraid to try them, which can lead to the initiation of drinking alcohol.^{79–84}

This study also revealed that *khat* chewing was significantly associated with current alcohol consumption. There are also similar findings, which supported that *khat* chewing

might be a gateway to other psychoactive substances such as alcohol.^{37,85,86} Therefore, *khat* is an antidote for alcohol and can counter drunkenness.

Strength and limitations

All efforts were made to include both published and unpublished (grey literature) articles. In addition, the use of predefined search strategies, conducting data extraction, critical appraisal, screening, careful exclusion of studies, and quality evaluation by two reviewers independently to minimize the possible reviewer bias.

The limitations of this systematic review and meta-analysis were the inclusion of a small number of studies that were used in our subgroup analysis, which reduces the precision of the estimate. The included studies were highly heterogeneous and publication bias was detected. Only cross-sectional studies were included in this study and might be subjected to recall bias.

Conclusion

The pooled analysis of 26 studies indicated that over a quarter of school adolescents and youths consume alcohol in Ethiopia. The most important factors that worsen the problem were peer pressure, the family member culture of alcohol consumption, concurrent use of psychostimulants such as *khat*, and being a male. Currently, there are no organized guidelines or standards implemented to protect adolescents and youths from long-term effects of alcohol consumption. Therefore, policymakers and other stakeholders should design and implement strict binding regulations to curb the widespread use of alcohol around educational institution premises at the national level. Besides, the issue warrants regular national-level educational institution-based studies focusing on the prevention of alcohol misuse, magnitude, trajectory, and consequences of alcohol consumption among students. In addition to that, school and community-based interactive programs that specifically target alcohol consumption are effective methods for reducing substance use.

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Author contributions

T.A. and T.W. conceived and designed the review; prepared the search strings, screened, and selected the studies; rigorously reviewed the manuscript; and also did the analysis and interpretation. T.A. prepared the draft of the manuscript and is the guarantor of the review. The final version of the manuscript was approved by the two authors.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Supplemental material

Supplemental material for this article is available online.

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