RESEARCH ARTICLE

Depression and its determinants among adolescents in Jimma town, Southwest Ethiopia

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Abstract

Objectives

To determine the prevalence and socio-demographic and parental-related factors of depression among school adolescents in Jimma town, southwest Ethiopia.

Methods

Using a cross-sectional survey, 546 school adolescents were screened for depression using the patient health questionnaire (PHQ-9) from five randomly selected public and private schools. Oslo social support scale, adverse childhood experience tool, and socio-demographic questionnaire were used to gather data on risk factors. Linear regression analysis was used, and unstandardized beta (β) coefficients with 95% confidence intervals (CI) were reported to declare statistical significance.

Results

A total of 546 adolescents participated in the study, with a response rate of 97.3%. The mean (±SD) age of participants was 16.8 ± 1.3 years. The majority (81%) of the adolescents were attending day classes at public schools. The prevalence of depression was found to be 28% using the patient health questionnaire. Based on the PHQ-9 depression severity scale, 18.5% and 8.2% of the adolescent had moderate and moderate to severe depression while 1.3% had severe depression. In the final multivariate linear regression analysis, it was found that sex, rural residence, low social support, being in higher grade level, and adverse childhood experience were found to be independently associated with a higher score of depression.

Conclusion

One in three adolescents was found to have a depressive syndrome. We recommend schools to integrate school mental health service that contains routine screening and intervention services. Moreover, efforts are needed to sensitize and educate the communities on

child protection, social support, and safeguarding to effectively tackle the magnitude of adolescent depression.

Introduction

Adolescence, a developmental period between ages 10–19 years, is a period in which individuals transit from childhood to adulthood. It involves the main transformations in the domain of physical, psychological, social, and cognitive development. This change is associated with a state of role confusion, high-level stress, and emotional instability [1]. Global mental health burden indicated that 10–20% of adolescents were affected by at least one type of mental disorder [2]. In 2018, World Health Organization (WHO) reported that more than 1 million adolescents died from preventable causes [3], and depression is a significant contributor to mortality and morbidity in these age groups [4]. Studies from different parts of the world showed that depression among adolescents is rising and becomes the most common psychiatric disorder among adolescents [5].

Studies regarding adolescent depression are mainly limited to high-income countries. A study conducted in the United States found out that 14% and 12.5% of study participants met the criteria for a mood disorder and depressive disorder, respectively [6]. A study done on young Europeans found out one in ten adolescents showed significant depressive symptoms [7], and a similar rate was reported in Germany [8]. There have been few studies in low-and middle-income countries (LAMICs) on adolescent depression. Studies on adolescent depression in sub-Saharan African countries documented a magnitude of 15.3–37% in Egypt [9, 10], 14.7–72% in Iran [11, 12], 40% in India [13], and 31.5% in Malaysia [14]. A few studies done in Eastern Africa showed a higher prevalence; it was 26.4% in Kenya [15], and 21% in Uganda [16].

Available literature indicated that parental and socio-demographic factors such as age, parents' occupational status [17], female sex [18], lower parental education and economic status [19], and risky behaviors (substance use) [20] were independently associated with adolescent depression. Evidence from the systematic review has shown that depression at an earlier age is associated with poor illness outcomes, impaired social and academic functioning, and recurrent depressive episodes during adulthood [21]. More than 40% of disability-adjusted life years (DALYs) attributed to mental and substance use disorders [22] and increased mortality due to suicide [23].

Though the magnitude of adolescent depression and its consequence on adult health and wellbeing is high, depression symptoms in adolescents are rarely recognized and managed. The symptoms are considered as either a familiar life experience or naturalist behavioral transition [24]. Diagnosis of adolescent depression is also challenging as the predominant presentation is somatic or physical symptoms [25]. Furthermore, the nature of the presentation is characterized by prominent irritability, mood reactivation, and the fluctuation of symptoms unlike typical depressive presentation in an adult [26].

In Ethiopia studies on adolescent depression are very limited and those available are focused on a vulnerable group of adolescents such as orphans, and adolescents living with human immunodeficiency virus (HIV) [27–29]. This study is the first in its type to address factors like adverse childhood experience (ACE), social support, and substance use with adolescent depression. Therefore, the purpose of this study was to determine the prevalence of depression and identify socio-demographic and parental-related factors among school-going adolescents in Jimma town.

Methods and materials

Study design and study setting

A school-based cross-sectional study design was employed from 2, April to 30, May 2018. This study was conducted in Jimma town, Oromia regional state. The region has diverse agro-ecological zones. The community in the region is mainly engaged in rain-fed agriculture and livestock rearing. The poverty headcount ratio in the region was 23.9% [30]. The primary school net enrolment rate (Grades 1–8) in the region is 94.7% and the illiteracy rate (15-17years) is 47.6% [31]. The town is situated in the southwest of Ethiopia and covers a total area of 4,623 hectares and the daily mean temperature of the town ranges from 20˚c to 25˚c year-round and the average annual rainfall is 1500mm. Coffee farming is the most favored and dominant form of livelihood in the area [32]. The town has six public and eight private high schools (grades 9–12) with a total of 9,383 students registered for the academic year of 2018/2019. More than three-fourths of students, 7,292 were from public and the remaining 2,091 were from private schools.
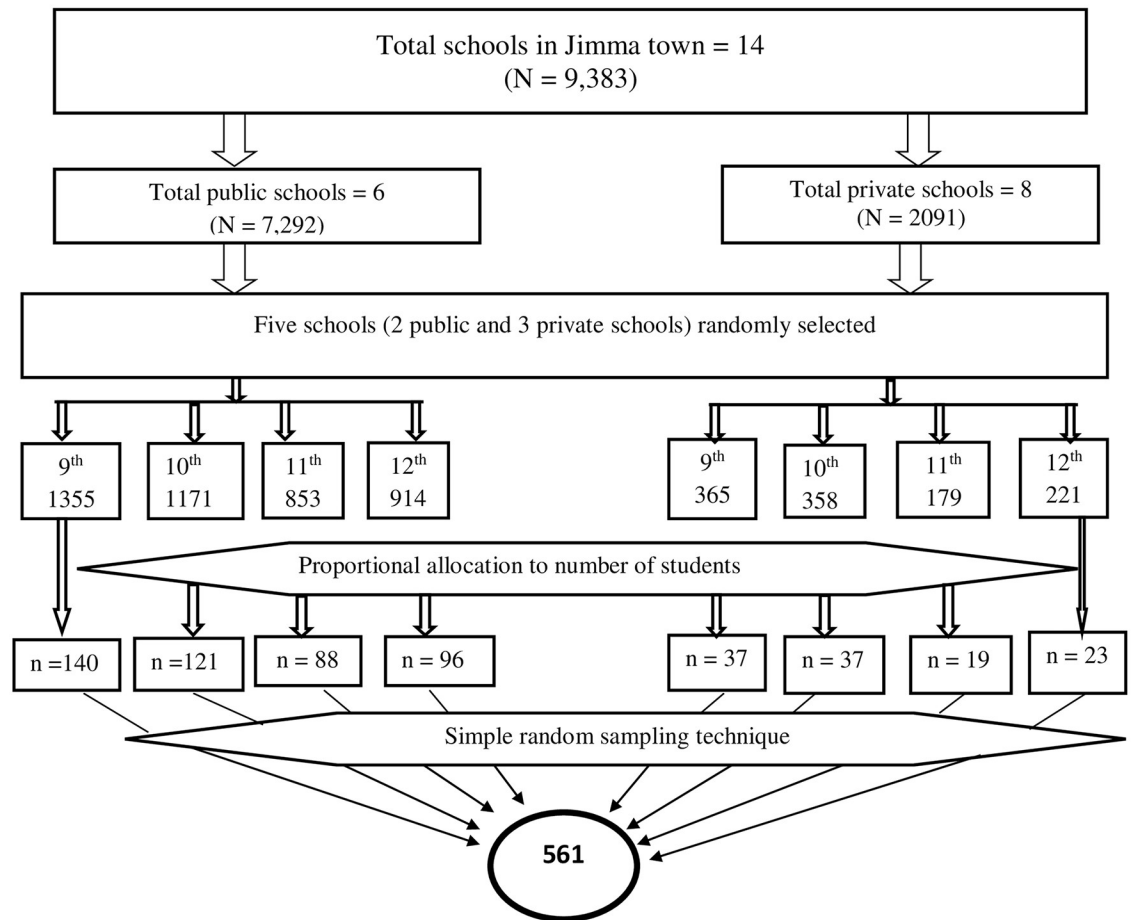
Population

All adolescents aged 10–19 years who were attending secondary school education in Jimma town were considered the source population. The study population was 546 randomly selected students from two public and three private secondary schools that were aged 10–19 years.

Sample size determination and sampling techniques

The sample size was calculated using a single population proportion, taking into account the following assumptions: the prevalence of depression among adolescent students 21.0% [16], a margin of error 5%, 95% confidence interval, 10% non-response rate, and a multi-stage effect of two. Thus, the minimum sample size required for the study was found to be 561. A multi-stage sampling technique using simple random sampling was used in this study. At the first stage, schools were stratified into public and private. The public schools in the town were six in number, and the private schools were eight. Schools are stratified into public and private schools with the assumption that there is a socio-economic difference between study subjects attending public and private schools. Two public schools and three private schools were randomly selected. In the second stage, students from randomly selected schools were stratified into grade levels from grades 9 to 12. Following the proportional allocation of study participants based on class size, students were randomly selected from each grade level using student registers. The likelihood of adolescents attending private and public schools being selected into the study was 0.05% and 0.06%, respectively (Fig 1).

Data collection procedure and measurements

The data were collected using a structured self-administered questionnaire. The questionnaire included socio-demographic characteristics, substance use, social support, adverse childhood experience, and depressive symptom assessment. Adolescent depression assessed using a patient health questionnaire (PHQ-9A) [33]. PHQ-9A is a depression screening tool that has nine items. The tool was previously translated into several languages, including Afaan Oromo and Amharic, and it was validated in both languages in the Ethiopian adult population and showed a sensitivity of 86% and specificity of 67% [34]. PHQ-9 score >10 had a sensitivity of 89.5%, and specificity of 77.5%. The cut-off score allows consistency in diagnosing depression with the Diagnostic Statistical Manual (DSM-V) criteria for major depression [35]. The tool demonstrated high reliability in this study, with Cronbach's alpha (α = 0.84). An adverse

Total schools in Jimma town = 14
(N = 9,383)

Total public schools = 6
(N = 7,292)

Total private schools = 8
(N = 2091)

Five schools (2 public and 3 private schools) randomly selected

| 9th 1355 | 10th 1171 | 11th 853 | 12th 914 | | 9th 365 | 10th 358 | 11th 179 | 12th 221 |

Proportional allocation to number of students

| n =140 | n =121 | n = 88 | n = 96 | | n = 37 | n = 37 | n = 19 | n = 23 |

Simple random sampling technique

561

1

Fig 1. Schematic representation used in the selection of school-going adolescent in Jimma town, Southwest Ethiopia (n = 546).

childhood experience (ACE) questionnaire was used to evaluate adolescents' childhood experiences. The tool is a self-report instrument that has ten items intended to rate the severity of emotional abuse, neglect, physical abuse, and sexual abuse [36]. Each student also reported to self—rated health questions, on a Likert scale with five points ("poor" = 0, "fair" = 1, "good" = 2, "very good" = 3, "excellent" = 4). Substance use assessed using the World Health Organization Alcohol, Smoking, and Substance Involvement Screening test (WHO ASSIST) version

3.1. It has 8-items and is culturally neutral and useable across a variety of cultures to assess the use of psychoactive substances [37]. The Oslo 3-items social support scale was used to assess social support [38]. An index was made by summarizing the sum of raw scores, and the total score ranged from 3 to 14. The ethical aspect ensured by providing information to the adolescents and information sheet together with the consent form was sent to the family to obtain the consent of the family days before data collection. Classroom teachers facilitate the distribution of study questionnaires for selected students during school hours. The tool was self-administered in a local language.

Statistical analysis

Data were entered into EpiData version 3.1 and exported to Statistical Package for Social Sciences (SPSS) version 23.0 for analysis. Descriptive statistics, such as frequency, mean, and standard deviations were computed. Linear regression analysis was used to determine independent predictors of depression. Assumptions for linear regression assessed: linearity was checked by a scatter plot, and it depicted no significant outlier; normality of distribution checked by a histogram, and well fitted the normal distribution curve. Furthermore, multicollinearity was checked, and the Pearson correlation coefficient and variance inflation factor (VIF) found to be < 1. Bivariate/simple linear regression analysis done and variables with p-value < 0.25 were considered for multiple linear regression. Multiple linear regression analyses were used to identify factors independently associated with depression. Variables that had a P-value < 0.05 were declared significantly associated with depression. Unstandardized beta (β) coefficients with 95% confidence intervals (CI) were computed to assess the level of association and statistical significance in multiple linear regression analyses.

Ethical approval and consent to participate

Ethical approval was obtained from the Institutional Review Board (IRB) of Jimma University Institute of Health. The ethical approval letter was submitted to all the schools and permission obtained from the school governing bodies. Following permission from the school directors, students took the parent/guardian information sheet and were told to return after the parent or guardian complete the consent form prepared in the local language (Amharic or Afaan Oromo) days before data collection. A detailed participant information sheet given to each student, and they completed an assent form to indicate a willingness to participate. Only students who completed an assent and parental/guardian consent form were eligible to participate. Adolescents were found to have moderate and severe depression linked to school counselors and Jimma Medical Center psychiatry clinic.

Result

Sociodemographic characteristics of the participants

From a total of 561 adolescents invited to participate, 546 adolescents completed the questionnaire. Fifteen participants submitted either incomplete or inconsistent survey questionnaire, and it was not included in the analysis. Thus, the response rate of the study was 97.3%. Four-fifth of study participants 442 (81%) were from public schools. The mean age of adolescents was 16.83 years, standard deviation (SD) ±1.3 years, and ranged from 14 to 19 years. About half (44%) were Muslim. In terms of participants' parental occupation, 219 (40.1%) of the fathers and 135 (24.7%) mothers were merchants and housewives, respectively. Almost all of the fathers attended formal education, while one-tenth of the mothers had no formal education (Table 1).

Table 1. Sociodemographic characteristics of school-going adolescents in Jimma town, Southwest Ethiopia (n = 546).

Variables	Category	Frequency	Percent
Age	14	13	2.4
	15	84	15.4
	16	114	20.9
	17	153	28.0
	18	137	25.1
	19	45	8.2
Sex	Female	329	60.3
	Male	217	39.7
Grade	9	174	31.9
	10	153	28.0
	11	103	18.9
	12	116	21.2
Religion	Muslim	240	44.0
	Orthodox Christian	212	38.8
	Protestant	75	13.7
	Others (catholic and wakefata)	19	3.5
School	Governmental	442	81.0
	Private	104	19.0
Occupation of father	Merchant	219	40.1
	Governmental	163	29.9
	Private	124	22.7
	Laborer	40	7.3
Occupation of mother	Government	147	26.9
	Private	137	25.1
	Housewife	135	24.7
	Merchant	93	17.0
	Laborer	34	6.2
Educational status of the father	No formal education	40	7.3
	1–4	69	12.6
	5–8	124	22.7
	9–12	163	29.9
	certificate and above	150	27.5
Educational status of the mother	No formal education	51	9.3
	1–4	96	17.6
	5–8	159	29.1
	9–12	138	25.3
	certificate and above	102	18.7
Place of residence	Urban	450	82.4
	Rural	96	17.6

Prevalence of depression and experience of depressive symptoms

The prevalence of depression was 28%, 95% CI (24.5, 32.1) using a PHQ-9 cut-off point $\geq$ 10. Based on the PHQ-9A severity scale, 18.5% and 8.2% of the adolescents had moderate and moderate to severe depression, while, 1.3% had severe depression (Fig 2). Regarding suicidal behavior, 6.4%, 95% CI (4.4, 8.8) had at least one suicidal attempt, while 7%, 95% CI (5.2, 9.8) had a suicidal thought for the last two weeks before the study.
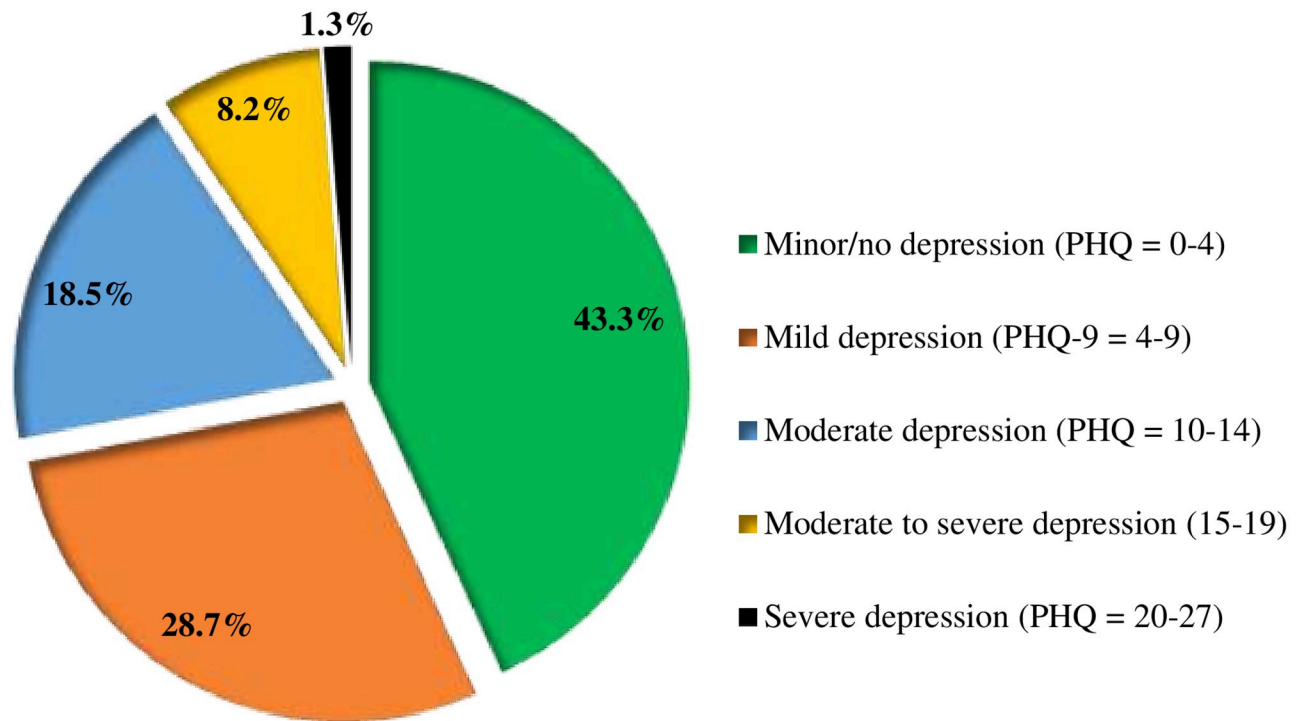
Fig 2. Magnitude and severity of depression among school-going adolescent in Jimma town, Southwest Ethiopia (n = 546).

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Factors associated with depression

In the bivariate linear regression analysis, 13 variables such as age, sex, ownership of shools, place of residency, grade level, paternal occupation, maternal occupation, paternal educational status, maternal educational status, co-morbid physical illness, poor self-rated health, adverse childhood experience, and social support were found to be statistically significantly associated with a higher score of adolescent depression. However, in the final adjusted (multiple) linear regression model, only sex, rural residence, social support, grade level, and childhood adverse experience showed statistical significance with a higher score of adolescent depression. While male sex and social support were associated negatively, rural residency, higher school grade, and childhood adverse life experience associated positively with a higher score of adolescent depression. Being male decreased depressive symptoms by 1.09 units (β = -1.09, 95% CI (-0.02, -0.49) compared to female. Residing in rural areas of the town increased the PHQ-9A score by 0.89 (β = 0.89, 95% CI (0.13, 1.65). Moreover, being in grade 12 and having negative childhood life experience increased the PHQ-9A score by 1.14 (β = 1.14, 95% CI (1.29, 1.97) and 0.51 (β = 0.51, 95% CI (0.34, 0.69), respectively. Regarding social support, a unit increase in Oslo-3 social support score decreased PHQ-9A score by 0.27 (β = -0.27, 95% CI (-0.37, -0.17) (Table 2).

Discussion

The prevalence of depression in the present study is 28%, of whom 18.5%, 8.2%, and 1.3% were found to have moderate, moderate to severe, and severe depression, respectively. In the final multivariate linear regression analysis, female sex, rural residence, low social support, being in higher grade level, and adverse childhood experience found to be independently associated with a higher score of depression.

Table 2. Adjusted multiple linear regression model showing factors independently associated with depression among school-going adolescent in Jimma town, Southwest Ethiopia (n = 546).

Explanatory variables		Simple linear regression		Multiple linear regression	
		Beta coefficients (β)	95% CI for β	Beta coefficients (β)	95% CI for β
Chronological age		0.59	0.20 to 0.99	0.23	-0.02 to 0.49
Sex	Female	Reference group			
	Male	-0.66	-1.35 to 0.03	-1.09	-1.63 to -0.56
Ownership of school	Private school		0		0
	Public school	0.55	-0.32 to 1.4	-0.32	-0.99 to 0.36
Place of residence	Urban	Reference group			
	Rural	1.46	0.57 to 2.34	0.89	0.13 to 1.65
Grade level	Grade 9	Reference group			
	Grade 10	0.63	-.12 to 1.38	0.52	-0.12 to 1.16
	Grade 12	0.95	0.12 to 1.77	1.14	0.29 to 1.97
Occupation of father	Governmental	Reference group			
	Merchant	-1.43	-2.29 to -.56	-0.21	-0.94 to 0.53
	Private	1.12	0.35 to 1.89	-0.04	-0.72 to 0.63
Occupation of mother	Government	Reference group			
	Daily laborer	0.87	-0.53 to 2.27	0.54	-0.63 to 1.72
	Private	0.54	-0.24 to 1.32	0.25	-0.45 to 0.96
	House wife	-0.59	-1.37 to .19	-0.67	-1.34 to -0.01
Educational status father	No formal education	Reference group			
	Primary	0.34	-0.12 to 1.68	0.18	-0.44 to 0.81
	Tertiary	0.71	0.41 to 1.17	0.08	-0.72 to 0.87
Educational status of the mother	No formal education	Reference group			
	Tertiary	-0.59	-1.46 to 0.27	0.05	-0.81 to 0.91
Co-morbid illness		2.86	1.22 to 4.49	0.70	-0.59 to 2.0
Poor self-rated health	Poor	Reference group			
	Fair	0.67	0.29 to 1.04	0.18	-0.13 to 0.49
	Excellent	-0.55	-0.73 to -0.37	-0.16	-0.32 to 0.01
Adverse childhood experience		2.85	2.23 to 3.46	0.51	0.34 to 0.69
Oslo social support		-0.62	-0.73 to -0.49	-0.27	-0.38 to—0.17

The overall prevalence of depression in the current study (28%) is in line with previous research findings done in Kenya (26.4%) [5], and Iran (31.30%) [13]. However, the prevalence in the current study is lower than the findings from other studies in India [39], Saudi Arabia [16], and Bangladesh [40], which had reported 57.7%, 46.9%, and 36%, respectively. On the contrary, the prevalence of depression in a study done in the United States of America among school adolescents was 18% [14], whereas, it was 21% and 15.3% in central Uganda [18] and Egypt [9] respectively. Such a degree of difference in the prevalence of depression across the different parts of the world could originate from variations in the depression screening tools used. A study done in central Uganda used the Children Depression Inventory (CDI), and a systematic review of Iranian studies used the Beck Depression Inventory (BDI) and CDI. Furthermore, the difference might be due to the variation in population characteristics. A study done in Bangladesh targeted urban and semi-urban school-going adolescents, and the central Ugandan study included non-boarding, a boarding school for male, and boarding schools for females. Moreover, cultural differences in the different study settings might have also contributed for the variation.

The present study showed variation in the prevalence rate of depression across different socio-demographic variables. Previous studies revealed a disparity in rates of depressive symptoms across sex, where girls experienced depressive symptoms twice more than boys [18, 41]. In line with these findings, our research showed that males experience fewer depressive symptoms (β = -1.09, 95% CI (-1.63, 0.56) than girls. This variation is explained by the biological theory and the differences in the physical makeup of males and females after puberty. Fluctuations in hormonal levels and age-related behavior change put females at risk [42]. Regarding the relationship between age and depression, this study did not find a significant linear relationship between the age of students and depression (β = 0.24, 95% CI (-0.06, 0.06). The finding is in agreement with the study done by Ekundayo *et al.* did not find any variation in the prevalence of depression with age [43].

Studies have persistently reported the association between social support and mental health problems among adolescents [44–46]. Scientific evidence revealed that poor relationships with schoolmates, feeling of insecurity, and adverse life events increase the risk of mental disorders in adolescents [47, 48]. Moreover, a longitudinal study revealed the feeling of connectedness, absence or low levels of conflict, and social environment, which is encouraging to express once the emotion is protective against the occurrence of emotional and behavioral disorders [49, 50]. Another longitudinal study conducted in the USA also revealed a strong effect of life adversities and the negative consequences on adolescent health [51]. In line with this evidence, the current study found out a unit increase in the Oslo-3 social support scale decreases PHQ-9A score by 0.27 (β = -0.27, 95% CI (-0.38, -0.17). This finding is supported by a study done in central Uganda [18], Malaysia [34], and Saudi Arabia [52].

Adverse childhood experiences (abuse, neglect, and household dysfunction) had a significant association with depression. A unit increase in ACE score increased the PHQ-9 score by 0.51 (β = 0.51, 95% CI (0.34, 0.69). Similar findings were reported from the Netherlands and Colombia [53, 54]. Evidence from previous findings showed the existence of a relationship between adolescent socio-emotional and behavioral problems with adverse childhood experiences [55, 56]. This is explained by the psychological insult to the brain that could have impacted the neurobiological and behavioral development during childhood and adolescence. Evidence indicates that exposure to violence and stressors during early life results in a smaller prefrontal cortex and its function, impaired response to stressors, increased inflammatory mediators [57, 58], and gene modification [59]. The major strength observed in this study was the maximum effort exerted to ensure a random selection of study participants. Thus, generalization to adolescent students in the study area is possible. Aside from this, this study is the first in type to address the association of adolescent depression with social support and childhood adverse life experiences in the locality. The cross-sectional nature of the study poses difficulty in evaluating the time temporal relationship between predictors and outcome variables. Tools used for depression tend to overestimate depression at a cut-off point of 10. The subjective assessment of some factors was prone to recall bias, and some of the parental-related factors such as parenting style were not addressed in this study. Furthermore, the sampling was not adjusted for sex.

Conclusions

One in three adolescents was found to have depression in Jimma town. Female sex, rural residence, low social support, higher grade level, and ACE score were independent predictors of depression. We recommend schools institute routine screening services and implement appropriate interventions to initiate and improve access to school-based mental health services. The

local administration needs to exert more efforts to sensitize and educate communities on the importance of social support, child and adolescent protection, and safeguarding.

Supporting information

S1 Dataset.
(XLS)

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References

1. World Health Organization. Mental health status of adolescents in South-East Asia: evidence for action. Geneva: World Health Organization; 2017.

2. Kieling C, Baker-Henningham H, Belfer M, Conti G, Ertem I, Omigbodun O, et al. Child and adolescent mental health worldwide: evidence for action. Lancet. 2011; 378(9801):1515–25. https://doi.org/10.1016/S0140-6736(11)60827-1 PMID: 22008427

3. World Health Organization. Adolescents: health risks and solutions. Geneva: World Health Organization; 2018.

4. World Health Organization. Fact sheet on adolescent mental health. Geneva: World Health Organization; 2018.

5. A Khasakhala L, N. D., Mutiso V, Mbwayo A, Mathai M. The prevalence of depressive symptoms among adolescents in Nairobi public secondary schools: association with perceived maladaptive parental behavior. Afr J Psychiatry. 2012; 15(2):106–13.

6. Merikangas KR, H. J., Burstein M, et al. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication—Adolescent Supplement (NCS-A). J Am Acad Child Adolesc Psychiatry. 2010; 49(10):980–989. https://doi.org/10.1016/j.jaac.2010.05.017 PMID: 20855043

7. Balazs J, M. M., Kereszteny A, et al. Adolescent subthreshold depression and anxiety: psychopathology, functional impairment and increased suicide risk. J Child Psychol Psychiatry. 2013; 54(6): 670–677. https://doi.org/10.1111/jcpp.12016 PMID: 23330982

8. Bettge S, W. N., Barkmann C, Schulte-Markwort M, Ravens-Sieberer U, BELLA study group. Depressive symptoms of children and adolescents in a German representative sample: results of the BELLA study. Eur Child Adolesc Psychiatry. 2008; 17(Suppl 1):71–81.

9. El-Missiry A, S. M., Abdel Hadi M, Sabry W. Screening for depression in a sample of Egyptian secondary school female students. Journal of affective disorders. 2012 Jan; 136(1–2).

10. Rodrigo C, W. S., Gurusinghe J, Wijeratne T, Jayananda G, Rajapakse S. Symptoms of anxiety and depression in adolescent students; a perspective from Sri Lanka. Child Adolesc Psychiatry Mental Health. 2010; 4:10.

11. Janboozorgi M. Prevalence of depression among students of Tehran. Pajohandeh, 200; 6(48), 379–383.

12. Monirpour N. Demographic characteristics associated with depression among students. Social welfare Quarterly. 2005; 4(14), 178–183.

13. Sajjadi H, Hossein S, Kamal M, Rafiey H, Vameghi M. A Systematic Review of the Prevalence and Risk Factors of Depression among Iranian Adolescents. Glob J Health Sci. 2013; 5(3):16–27. https://doi.org/10.5539/gjhs.v5n3p16 PMID: 23618471

14. Saluja G, Iachan R, Scheidt PC. Prevalence of and Risk Factors for Depressive Symptoms Among Young Adolescents. JAMA Netw. 2017; 273:1–33.

15. Erskine HE, Baxter AJ, Patton G, Moffitt TE, Patel V, Whiteford HA, et al. The global coverage of prevalence data for mental disorders in children and adolescents. Epidemiol Psychiatr Sci. 2017; 26(4):395–402. https://doi.org/10.1017/S2045796015001158 PMID: 26786507

16. Fattah A, Fattah MMA. Prevalence, symptomatology, and risk factors for depression among high school students in Saudi Arabia. Eur J Psychol. 2017; 2(3):1–11.

17. Sokratous S, Merkouris A, Middleton N, Karanikola M. The prevalence and socio-demographic correlates of depressive symptoms among Cypriot university students: a cross-sectional descriptive correlational study. BMC Psychiatry. 2014; 14(1):235.

18. Nalugya-Sserunjogi J, Rukundo GZ, Ovuga E, Kiwuwa SM, Musisi S, Nakimuli-Mpungu E. Prevalence, and factors associated with depression symptoms among school-going adolescents in Central Uganda. Child Adolesc Psychiatry Ment Health. 2016; 10:39. https://doi.org/10.1186/s13034-016-0133-4 PMID: 27800012

19. Raheel H. Depression and associated factors among adolescent females in Riyadh, Kingdom of Saudi Arabia, a cross-sectional study. Int J Prev Med. 2015; 6:90. https://doi.org/10.4103/2008-7802.165156 PMID: 26445637

20. Gelaye Bizu, Williams Michelle A., Lemmac Seblewengel, Deyessad Negussie, Bahretibebd Yonas, Shibred Teshome, et al. The validity of the Patient Health Questionnaire-9 for Depression Screening and Diagnosis in East Africa. NIH Public Access. 2014; 210(2).

21. Clayborne ZM, V. M., Colman I. Systematic review, and meta-analysis: adolescent depression and long-term psychosocial outcomes. J Am Acad Child Adolesc Psychiatry. 2019; 58(1):72–79. https://doi.org/10.1016/j.jaac.2018.07.896 PMID: 30577941

22. Whiteford HA, D. L., Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. Lancet. 2013; 382(9904):1575–86. https://doi.org/10.1016/S0140-6736(13)61611-6 PMID: 23993280

23. Cook MN, P. J., Sheldon C. Adolescent depression: an update and guide to clinical decision making. Psychiatry. 2009; 6(9):17–31. 6. PMID: 19855857

24. Petersen A. C., B. E.C., Brooks-Gunn J., Stemmler M., Ey S., and Grant K. E., "Depression in Adolescence," American Psychologist, vol. 48, no. 2, pp. 155–168, 1993. https://doi.org/10.1037//0003-066x.48.2.155 PMID: 8442570

25. Thapar A, Collishaw S, Pine DS, Thapar AK. Depression in adolescence. Lancet. 2012; 379 (9820):1056–1067. https://doi.org/10.1016/S0140-6736(11)60871-4 PMID: 22305766

26. Birmaher B, Williamson D. E, Dahl R. E, Axelson D. A, Kaufman J, Dorn L. D, Ryan N. D. Clinical presentation and course of depression in youth: does onset in childhood differ from the onset in adolescence? J Am Acad Child Adolesc Psychiatry, 2004; 43, 63–70. http://dx.doi.org/10.1097/00004583-200401000-00015 PMID: 14691361

27. Getachew H, Ambaw F, Abebe L, Kasahun W. "Psychological distress and its predictors in AIDS orphan adolescents in Addis Ababa city: a comparative survey," Ethiopian Journal of Health Development. 2011; 25(2): 135–142.

28. Shekimnesh A, Aregay A, Berihe H. "Prevalence of psychosocial distress and associated factors among AIDS orphan adolescent in Mekele city, Tigray, Northern Ethiopia: cross-sectional study," Greener Journal of Medical Sciences, 2013.

29. Assefa A. Prevalence and Factors of Behavioral Disorders among Orphans in Selam and SOS Children Villages, Addis Ababa University, 2015.

30. United Nations International Children's Emergency Fund (UNICEF). Ethiopia regional situation analysis of children and women: Oromia region, 2018. https://www.unicef.org/ethiopia/reports/regional-situation-analysis-children-and-women.

31. Ethiopia Ministry of Education (MoE). Education statistics annual abstract (ESAA), 2018. http://www.moe.gov.et/web/guest/statistics//asset_publisher/mlyNlPkHf57h/document/id/62797.

32. Milas S, Aynaoui KE. Four Ethiopia's: A Regional Characterization Assessing Ethiopia's Growth Potential and Development Obstacles. Washington, DC: World Bank; 2004. http://siteresources.worldbank.org/INTETHIOPIA/Resources/PREM/FourEthiopiasrev6.7.5.May24.pdf.

33. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001; 16(9):606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x PMID: 11556941

34. Ibrahim N, Sidik SM, Phang CK, Mukhtar F, Awang H, Ang JK, et al. Prevalence and predictors of depression and suicidal ideation among adolescents attending government secondary schools in Malaysia. Med J Malaysia. 2017; 72(4):221–7. PMID: 28889133

35. Maslow GR, Dunlap K, Chung RJ. Depression and Suicide in Children and Adolescents. 2018; 36(7).

36. Stikkelbroek Y, Bodden DHM, Kleinjan M, Reijnders M, van Baar AL. Adolescent Depression and Negative Life Events, the Mediating Role of Cognitive Emotion Regulation. PLoS One. 2016; 11(8):61–75. https://doi.org/10.1371/journal.pone.0161062 PMID: 27571274

37. World Health Organization. Alcohol, Smoking, and Substance Involvement Screening Tool Version 3.1: For health professionals Aust. Clinical Form. 2010.

38. Meltzer H. Development of a common instrument for mental health. In: Nosikov A, Gudex C, editors. EUROHIS: developing common instruments for health surveys. Amsterdam: IOS Press; 2003.

39. Kalappanavar NK, Vinodkumar CS. prevalence and association of depression and the suicidal tendency among adolescent students. international J Biochem. 2012; 03:714–9.

40. Afifa A, Sahadat H, Tajuddin S, Md Elias U, Dewan A. Investigating the prevalence of and factors associated with depressive symptoms among urban and semi-urban school adolescents in Bangladesh: a pilot study, International Health, ihz092.

41. Trivedi D, Dhakappa N, Ghildiyal P, et al. Depression among adolescent students in South India: how serious is the issue? Indian J Psychiatry. 2016; 58(3):349–50. https://doi.org/10.4103/0019-5545.191997 PMID: 28066023

42. Gibe G. Assessment of Prevalence and Risk Factors of Depression among Adults. J Depress Anxiety. 2017; 6(1):1–11.

43. Bansal V, Goyal S, Srivastava K. Study of the prevalence of depression in adolescent students of a public school. Ind Psychiatry J. 2017; 18(1):43–6.

44. Hussong AM. Perceived peer context and adolescent adjustment. J Res Adolesc 2000; 10:391e415.

45. Newman BM, Newman PR, Griffen S, et al. The relationship of social support to depressive symptoms during the transition to high school. Adolescence 2007; 42:441e59. PMID: 18047232

46. Peirce RS, Frone MR, Russell M, et al. A longitudinal model of social contact, social support, depression, and alcohol use. Health Psychol 2000; 19:28. https://doi.org/10.1037//0278-6133.19.1.28 PMID: 10711585

47. Purper-Ouakil D, Michel G, Mouren-Siméoni MC. Vulnerability to depression in children and adolescents: Updates and perspectives. Encephale 2002; 28(3 Pt 1):234e40.

48. Abela JR, Hankin BL, Haigh EA, et al. Interpersonal vulnerability to depression in high-risk children: The role of insecure attachment and reassurance seeking. J Clin Child Adolesc Psychol 2005; 34:182e92. https://doi.org/10.1207/s15374424jccp3401_17 PMID: 15677292

49. Patel V, Flisher AJ, Hetrick S, et al. Mental health of young people: A global public-health challenge. Lancet 2007; 369:1302e13. https://doi.org/10.1016/S0140-6736(07)60368-7 PMID: 17434406

50. Joiner TE, ed. Mood disorders: Diagnostic & therapeutic issues. Tallahassee, FL: Center Circle Press; 2002.

51. Flaherty EG, Thompson R, Dubowitz H, et al. Adverse childhood experiences and child health in early adolescence. *JAMA Pediatr*. 2013; 167(7):622–629. https://doi.org/10.1001/jamapediatrics.2013.22 PMID: 23645114

52. Raheel H. Depression and associated factors among adolescent females in Riyadh, Kingdom of Saudi Arabia, a cross-sectional study. Int J Prev Med. 2015; 6:90. https://doi.org/10.4103/2008-7802.165156 PMID: 26445637

53. Maslow GR, Dunlap K, Chung RJ. Depression and Suicide in Children and Adolescents. 2018; 36(7).

54. Stikkelbroek Y, Bodden DHM, Kleinjan M, Reijnders M, van Baar AL. Adolescent Depression and Negative Life Events, the Mediating Role of Cognitive Emotion Regulation. PLoS One. 2016; 11(8):61–75. https://doi.org/10.1371/journal.pone.0161062 PMID: 27571274

55. Hussey JM, Chang JJ, Kotch JB. Child Maltreatment in the United States: Prevalence, Risk Factors, and Adolescent Health Consequences. Pediatrics. 2006; 118(3):933–942. https://doi.org/10.1542/peds.2005-2452 PMID: 16950983

56. Lansford JE, Dodge KA, Pettit GS, Bates JE, Crozier J, Kaplow J. A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. Arch. Pediatr. Adolesc. Med. 2002; 156(8):824–830. https://doi.org/10.1001/archpedi.156.8.824 PMID: 12144375

57. Essex MJ, Shirtcliff EA, Burk LR, et al. Influence of early life stress on later hypothalamic–pituitary–adrenal axis functioning and its covariation with mental health symptoms: A study of the allostatic process from childhood into adolescence. Dev. Psychopathol. 2011; 23(Special Issue 04):1039–1058. https://doi.org/10.1017/S0954579411000484 PMID: 22018080

58. Shalev I, Moffitt TE, Sugden K, et al. Exposure to violence during childhood is associated with telomere erosion from 5 to 10 years of age: a longitudinal study. Mol.Psychiatry. 2012; 1:16. https://doi.org/10.1038/mp.2012.32 PMID: 22525489

59. Murgatroyd C, Patchev AV, Wu Y, et al. Dynamic DNA methylation programs persistent adverse effects of early-life stress. Nat. Neurosci. 2009; 12(12):1559–1566. https://doi.org/10.1038/nn.2436 PMID: 19898468