

Association Between Sexual Behaviour and Depression in South Korean Adolescents: A Cross-sectional Study

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Abstract

Background: Depression and suicide in adolescents have become leading problems both from the public health and socioeconomic aspects. In this context, determining the connection between adolescent behaviour and depression, which can serve as the basis of strategies to reduce the prevalence of depression, is important. Here, we investigated the association between sexual behaviour and depression in a sample of South Korean adolescents.

Methods: Korea Youth Risk Behavior Web-based Survey data from 2017 to 2019 served as the basis of this cross-sectional study. The data of 178,664 participants were analysed using chi-square tests and multivariate logistic regression.

Results: After adjusting for covariates (adjusted odds ratio: 1.71, 95% confidence interval: 1.59–1.83 in males, adjusted odds ratio: 1.47, confidence interval: 1.33–1.61 in females), the prevalence of depression was higher in participants with experience of sexual intercourse. On categorising subjects into two groups based on suicidality, subjects with sexual intercourse experience had higher odds ratios for severe depression with suicidality than milder depression.

Conclusion: In this study, we identified the relationship between sexual behaviour and the prevalence of depression; adolescents with experience of sexual intercourse were more likely to have severe depression with suicidality. Further research using prospective designs should serve as the basis of appropriate sex education policies to manage the relationship between sexual behaviour and depression.

Background

Globally, depression and suicidal behaviour in adolescents are becoming a major social problem with huge economic repercussions [1]. In the United States, 13.3% of adolescents reported more than one symptom of major depressive episodes, and the prevalence of depression in older adolescents stood at 25% [2, 3]. A cross-national study in the United States reported high rates of suicidal ideation in youths, ranging from 24% to 29.8%, with between 3.1% and 8.8% having made suicide attempts [4]. As demonstrated by these statistics, suicide is a serious concern, one that is now the second leading cause of death in the United States [5, 6].

The situation in the Republic of Korea is similar. In a 2016 survey, 19.7% of male students and 27.8% of female students reported that they had experienced depression [7]. The 2018 cause of death statistics by the South Korean government showed that suicide was the first cause of death in teenagers, with a prevalence of 5.8 in 100,000 [8]. Thus, the appropriate management of depression and suicide is an important public health concern. Adolescence is a period of physical, mental, and emotional growth when values and personality are malleable to change; therefore, the identification and management of factors affecting the occurrence of depression in this population is of the utmost significance.

As previously mentioned, adolescence is a critical period for not only physical growth but also psychosexual development, including sexual identity and orientation. Thus, sexual behaviours during this period can have significant mental and social impacts. In the past, studies have examined the physical and psychological effects of adolescent sexual behaviour. In this context, Vasilenko et al. suggested a conceptual framework for the effects of sexual behaviour on mental, physical, and social health [9]. They posited that sex could be a more negative experience for early adolescents than older teenagers. Another study on 7th to 12th graders in the United States reported that sexual behaviour increased the odds ratios (ORs) of depression and suicidality, and that this effect

was compounded when combined with drug abuse [10]. These studies, though limited in scope and sample sizes, suggest that sexual behaviour in adolescents can result in depression.

Sexual behaviour can have a greater impact on adolescents than other age groups, and the intensity can vary depending on the cultural and social climate. South Korea is relatively conservative with regard to sex; sexual activity among youths is viewed particularly negatively, as demonstrated by a survey comparing the sexual behaviours and consciousness of South Korean and Dutch adolescents [11]. The concept of chastity is important to South Koreans, and there is a general trend toward the suppression of sexual desires. However, considering the rise in sexual activity among adolescents, as demonstrated by the decrease in the average age for the initiation of sexual activity in middle and high school students from 14.3 years in 2011 to 13.3 years in 2014, the impact of adolescent sexual behaviour on psychiatric symptoms such as depression is increasing [12]. Thus, it is necessary to conduct a detailed and large-scale examination of the relationship between sexual behaviour and depression in adolescents.

The aim of this study was to investigate the association between sexual behaviour and depression in a large sample of South Korean adolescents, after adjusting for covariates associated with depression prevalence. Furthermore, we aimed to identify differences in the severity of depression based on the presence or absence of sexual behaviour.

Methods

Study population and data

The data analysed in this study were obtained from the 2017–2019 Korea Youth Risk Behavior Web-based Survey (KYRBS), conducted by the Ministry of Education, Ministry of Health and Welfare, and Centers for Disease Control and Prevention. The purpose of this survey, which targets middle and high school students, is to evaluate the health status and health behaviour of South Korean adolescents in order to provide basic data for the formulation of health policies. The anonymous survey is conducted annually with about 400 high schools and 400 middle schools. Survey items are variable to change slightly every year, and weight values are suggested for combined analysis for several years.

Design

The study employed a cross-sectional design.

Measures

Depression

Participants were asked whether they had experienced depressive feelings that interfered with daily life for more than two weeks in the previous year. As the KYRBS did not directly measure depression severity, we divided participants into depression severity groups based on suicidality: a) those with mild depression, who had not experienced any suicidal ideation, planning, or attempts, and b) those with severe depression, who had experienced suicidal ideation, planning, or attempts within the previous 12 months.

Sexual behaviour

Sexual behaviour was assessed through questions such as whether the participants had ever engaged in sexual intercourse and whether they had received sex education through any means in the previous 12 months. Participants who indicated that they had experience of sexual intercourse were asked about contraceptive methods.

Covariates

Age, socioeconomic status, academic grades, and family structure were included in the sociodemographic covariates. Socioeconomic status was categorised as high, middle, or low, and based on family structure, we classified participants as either having one or both parents or none. The analysis was also adjusted for health-related covariates including smoking status, alcohol use, perceived stress level, and self-reported health status.

Statistical analysis

Chi-square tests were used to analyse and compare the variables. To examine the relationship between sexual behaviour and depression, we conducted a multivariate logistic regression analysis after adjusting for covariates. Subgroup analyses were performed to investigate the combined associations of sexual behaviour and other covariates with depression. Subjects with depression were divided into two groups, and the difference in the relationship of sexual intercourse with the two severity groups was analysed. The results are presented as ORs and 95% confidence intervals (CI) to compare the prevalence of depression. The analyses were performed with stratified sampling variables (strata) and weighted variables suggested by the KYRBS. All analyses were carried out using SAS software version 9.4 (SAS Institute, Cary, North Carolina, USA), and p-values < 0.05 were considered statistically significant.

Results

The general characteristics of the study population stratified by gender are presented in Table 1. A total of 178,664 participants including 91,309 males and 87,355 females were included in the analysis. Among them, 20.7% of males and 31.3% of females reported having experienced depression in the previous year. Participants who had sexual intercourse experience reported higher rates of depression regardless of gender. Older students reported higher rates of depression than their younger counterparts. Low socioeconomic status was associated with a higher prevalence of depression than middle and high socioeconomic status. Higher perceived stress was associated with a greater prevalence of depression. Family structure, school grade, alcohol status, smoking status, physical activity, and self-reported health status were additionally identified as being statistically significantly associated with depression. Experience of sex education was not statistically correlated with depression.

Table 2 shows the results of the multivariate logistic regression analysis between depression and sexual intercourse experience. After adjusting for covariates, the prevalence of depression was higher in participants of both genders with sexual intercourse experience (adjusted OR: 1.71, 95% CI: 1.59–1.83 in males, adjusted OR: 1.47, CI: 1.33–1.61 in females). After adjusting for covariates, higher age was associated with lower depression. Regardless of gender, the absence of both parents was statistically associated with depressive experience. Other covariates including socioeconomic status, school grade, alcohol/smoking status, physical activity, perceived stress level, self-reported health status, and sex education experience were also correlated with depression, as shown in Table 3.

Subgroup analyses were conducted to assess the combined associations of sexual intercourse experience and other sociodemographic variables with depression, as shown in Table 3. Sexual experience was correlated with a

high prevalence of depression in every subgroup except sex education. Participants with sexual intercourse experience showed higher ORs for depression whether they attended sex education. However, this was not statistically significant in females without sex education experience (OR: 1.16, CI: 0.95–1.43).

The results of multivariate logistic regression analyses, conducted after dividing participants into the mild and severe depression groups, are presented in Table 4 and Figure 1. Regardless of gender, participants with sexual intercourse experience showed higher ORs for severe depression with suicidality than milder depression.

Discussion

In this investigation of a sample of South Korean adolescents, we identified that depression was associated with experience of sexual intercourse. Furthermore, we found that sexual intercourse experience had a stronger association with severe depression with suicidality than with milder depression without suicidal ideation, planning, and attempts. These results did not differ by gender and remained consistent after adjusting for covariates and subgrouping by sociodemographic variables.

Previous studies have demonstrated associations between sexual behaviour and depression or suicidal ideation in smaller samples. Hallfors et al. reported a statistically significant relationship between sex dabbler with depression (OR : 2.65) and suicidal ideation (OR: 2.53) [10]. Depression was assessed with the Center for Epidemiologic Studies Depression scale, with the questions pertaining to the past year, similar to our study.

Depression in youths has different characteristics comparing to adults, including conduct behaviours. It is widely known that risky behaviours, including sexual activity and drug abuse, are consequences of depression. In fact, Kessler et al. hypothesised that such behaviours act as self-medication in adolescents with depression [13]. Conversely, studies suggest that these behaviours have biological and psychological effects that increase the risk of depression [14]. According to Hallfors et al., it is more reasonable to conclude that depression occurs later and as a consequence of sex and drug abuse because depression itself did not increase the risk of sex and drug abuse; instead, those with more risky behaviours had a stronger association with depression [15]. In our study, while we could not deduce causality in the relationship between sexual intercourse and depression in adolescents, it is reasonable to conclude that depression occurred after sexual intercourse because the survey asked about depression only within the past year while there was no such limitation on their reports of sexual intercourse.

As the KYRBS did not use an instrument to measure depression severity, we divided the participants into two groups based on suicidality: milder depression without suicidality and severe depression with suicidal ideation, planning, and attempts. The higher ORs of severe depression indicate a possible positive correlation, in that greater sexual behaviour could increase the severity of depression. Thus, the appropriate management of adolescents with sexual experience is important to prevent them from experiencing severe depression. Previous studies have suggested the need for abstinence programmes for students; these include delaying sexual intercourse in early adolescents on the grounds that it is associated with depression [16]. Conversely, some researchers are of the opinion that just abstinence is not effective, and that there is a need for more comprehensive research to plan proper sexual education that prevents depression in adolescents [17]. In the present study's subgroup analysis, there was no difference in depression prevalence between participants in early and late adolescence, which also supports the idea that just delaying sexual experience is not the solution. Also, in subgroup analysis with sex education, the prevalence of depression was higher in the group that had received sex education than the group that had not. Thus, conventional sex education in South Korea might not be successful at preventing depression associated with

sexual intercourse. Simply delaying sexual intercourse or portraying it as something negative cannot prevent depression but even induce the symptom. Therefore, there is a need for appropriate sex education that can alleviate the risk of depression in adolescents.

This study has several limitations. First, the use of cross-sectional data prevents causal inferences regarding the relationship between sexual intercourse and depression prevalence in adolescents. Second, as the data were collected through a self-reported web-based survey, the possibility of recall bias or the participants having misunderstood some questions cannot be eliminated. Especially, the answers about socioeconomic status might lack accuracy because of the participants' lack of understanding of their parents' economic condition. Conversely, the results are based on subjectively reported economic status, which can more accurately reflect depressive feelings than objectively reported data. Third, as the survey targeted youths, questionnaire was kept deliberately simple and did not include a scale for assessing depressive symptoms.

Conclusions

In conclusion, this study identified the relationship between sexual behaviour and the prevalence of depression; adolescents with experience of sexual intercourse were more likely to have severe depression with suicidality. There is a need for further research using prospective designs to identify cause and effect in this relationship. Further, the formulation of appropriate sex education policies based on a comprehensive understanding of the relationship between the variables is necessary to alleviate the effect of sexual intercourse on depression in adolescents.

Abbreviations

CI: confidence interval

KYRBS: Korea Youth Risk Behavior Web-Based Survey

OR: odds ratio

Declarations

Ethics approval and consent to participate

KYRBS survey provided informed consent to every participant. As the KYRBS provides de-identified and publicly accessible data, ethical approval was not required for the current study.

Consent for publication

Not applicable

Availability of data and materials

The data analysed in this study were obtained from the 2017–2019 KYRBS, which is available to the public. All data can be downloaded from the KYRBS official website (<https://www.kdca.go.kr/yhs/home.jsp>).

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

YSK conceived, designed, and directed the study. HK and WJ conducted the statistical analysis. HK interpreted the data and wrote the first draft of the manuscript. ECP and SIJ were in charge of revising the manuscript. All authors participated sufficiently in the work and take public responsibility for appropriate portions of the content.

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Tables

Table 1. Socioeconomic and health-related characteristics according to the presence/absence of depression

Variables	Male (n = 91309)				Female (n = 87355)				p-value	
	Depression		No depression		p-value	Depression		No depression		
	n	(%)	n	(%)		n	(%)	n	(%)	
Sexual intercourse experience					< 0.0001					< 0.0001
No	16607	(19.5)	68468	(80.5)		27063	(32.0)	57470	(68.0)	
Yes	2252	(36.1)	3982	(63.9)		1510	(53.5)	1312	(46.5)	
Age					< 0.0001					< 0.0001
12–15	10116	(19.0)	43194	(81.0)		16126	(31.5)	35017	(68.5)	
16–18	8743	(23.0)	29256	(77.0)		12447	(34.4)	23765	(65.6)	
Parents					< 0.0001					< 0.0001
Both	15064	(20.1)	59742	(79.9)		24400	(32.2)	51434	(67.8)	
Single	969	(24.4)	3001	(75.6)		1456	(38.1)	2365	(61.9)	
Neither	2826	(22.5)	9707	(77.5)		2717	(35.3)	4983	(64.7)	
Economic Status					< 0.0001					< 0.0001
Low	3423	(29.1)	8351	(70.9)		5329	(43.6)	6889	(56.4)	
Middle	7754	(19.2)	32716	(80.8)		13355	(30.9)	29799	(69.1)	
High	7682	(19.7)	31383	(80.3)		9889	(30.9)	22095	(69.1)	
Grade					< 0.0001					< 0.0001
High	6795	(18.4)	30044	(81.6)		9238	(28.4)	23274	(71.6)	
Middle	4978	(19.3)	20796	(80.7)		8275	(31.0)	18383	(69.0)	
Low	7086	(24.7)	21610	(75.3)		11060	(39.2)	17125	(60.8)	
Alcohol Consumption					< 0.0001					< 0.0001
Never	8293	(16.0)	43477	(84.0)		15277	(27.2)	40845	(72.8)	
Yes	10566	(26.7)	28973	(73.3)		13296	(42.6)	17937	(57.4)	
Smoking Experience					< 0.0001					< 0.0001
No	13617	(18.3)	60710	(81.7)		25159	(31.1)	55830	(68.9)	
Yes	5242	(30.9)	11740	(69.1)		3414	(53.6)	2952	(46.4)	
Physical					<					<

Activity						0.0001		0.0001	
Low	9196	(20.0)	36811	(80.0)		21619	(32.2)	45589	(67.8)
High	9663	(21.3)	35639	(78.7)		6954	(34.5)	13193	(65.5)
Perceived Stress Level		< 0.0001						< 0.0001	
Low	1376	(5.9)	21977	(94.1)		871	(7.7)	10477	(92.3)
Middle	5919	(14.9)	33675	(85.1)		6844	(19.9)	27608	(80.1)
High	11564	(40.8)	16798	(59.2)		20858	(50.2)	20697	(49.8)
Self-Reported Health Status		< 0.0001						< 0.0001	
High	12567	(17.9)	57755	(82.1)		15307	(26.6)	42194	(73.4)
Middle	4429	(27.3)	11799	(72.7)		9166	(40.5)	13458	(59.5)
Low	1863	(39.1)	2896	(60.9)		4100	(56.7)	3130	(43.3)
Sex Education		0.2458						0.3517	
Yes	14310	(20.6)	55267	(79.4)		22897	(32.6)	47262	(67.4)
No	4549	(20.9)	17183	(79.1)		5676	(33.0)	11520	(67.0)
Participants	18859	(20.7)	72450	(79.3)		28573	(31.3)	58782	(64.4)

Variables are presented as numbers and percentages.

Table 2. Results of the multivariate logistic regression analysis of the association between sexual behaviour and depression

Variables	Male		Female	
	Depressed		Depressed	
	Adjusted OR	95% CI	Adjusted OR	95% CI
Sexual intercourse experience				
No	1.00		1.00	
Yes	1.71	(1.59 – 1.83)	1.47	(1.33 – 1.61)
Age				
12–15	1.00		1.00	
16–18	0.95	(0.91 –0.99)	0.83	(0.79 –0.86)
Parents				
Both	1.00		1.00	
Single	1.05	(0.96 –1.15)	1.03	(0.94 –1.13)
Neither	1.13	(1.07 –1.20)	1.09	(1.02 –1.16)
Economic Status				
Low	1.00		1.00	
Middle	0.79	(0.74 –0.83)	0.80	(0.76 –0.84)
High	0.90	(0.85 –0.96)	0.91	(0.86 –0.96)
Grade				
High	1.00		1.00	
Middle	1.07	(1.02 –1.13)	1.13	(1.08 –1.18)
Low	1.18	(1.13 –1.24)	1.32	(1.27 –1.38)
Alcohol Consumption				
Never	1.00		1.00	
Yes	1.47	(1.41 –1.53)	1.60	(1.54 –1.66)
Smoking Experience				
No	1.00		1.00	
Yes	1.34	(1.27 –1.41)	1.51	(1.41 –1.62)
Physical Activity				
Low	1.00		1.00	
High	1.25	(1.20 –1.31)	1.23	(1.18 –1.28)

Perceived Stress Level				
Low	1.00		1.00	
Middle	0.28	(0.27 –0.29)	0.28	(0.27 –0.29)
High	0.10	(0.10 –0.11)	0.10	(0.09 –0.11)
Self-Reported Health Status				
High	1.00		1.00	
Middle	1.27	(1.21– 1.33)	1.39	(1.34 –1.45)
Low	1.77	(1.64 –1.90)	2.11	(1.99 –2.24)
Sex Education				
Yes	1.00		1.00	
No	0.93	(0.88 –0.97)	0.92	(0.88 –0.97)

OR: odds ratio, CI: confidence interval

Table 3. Subgroup analysis of the association between sexual behaviour and depression stratified by sociodemographic variables

Variables	Male			Female		
	Sexual intercourse (-)	Sexual intercourse (+)		Sexual intercourse (-)	Sexual intercourse (+)	
	Adjusted OR	Adjusted OR	95% CI	Adjusted OR	Adjusted OR	95% CI
Age						
12–15	1.00	1.79	(1.58 – 2.01)	1.00	1.46	(1.22 – 1.75)
16–18	1.00	1.69	(1.55 – 1.84)	1.00	1.51	(1.34 – 1.69)
Parents						
Both	1.00	1.70	(1.57 – 1.84)	1.00	1.49	(1.34 – 1.65)
Single	1.00	2.40	(1.81 – 3.19)	1.00	1.69	(1.19 – 2.40)
Neither	1.00	1.56	(1.33 – 1.84)	1.00	1.23	(0.93 – 1.62)
Economic Status						
Low	1.00	1.93	(1.64 – 2.26)	1.00	1.45	(1.20 – 1.74)
Middle	1.00	1.73	(1.54 – 1.94)	1.00	1.57	(1.35 – 1.82)
High	1.00	1.60	(1.45 – 1.78)	1.00	1.36	(1.14 – 1.63)
Grade						
High	1.00	1.81	(1.61 – 2.04)	1.00	1.42	(1.18 – 1.70)
Middle	1.00	1.57	(1.36 – 1.80)	1.00	1.65	(1.36 – 2.00)
Low	1.00	1.71	(1.52 – 1.91)	1.00	1.40	(1.22 – 1.61)
Alcohol Consumption						
Never	1.00	1.75	(1.51 – 2.03)	1.00	1.65	(1.33 – 2.06)
Yes	1.00	1.72	(1.59 – 1.85)	1.00	1.44	(1.29 – 1.60)
Smoking Experience						

Never	1.00	1.90	(1.72 – 2.10)	1.00	1.56	(1.37 – 1.78)
Yes	1.00	1.59	(1.45 – 1.75)	1.00	1.39	(1.20 – 1.60)
Physical Activity						
Low	1.00	1.82	(1.64 – 2.01)	1.00	1.38	(1.24 – 1.54)
High	1.00	1.62	(1.47 – 1.78)	1.00	1.76	(1.44 – 2.15)
Perceived Stress Level						
Low	1.00	1.59	(1.44 – 1.75)	1.00	1.39	(1.22 – 1.57)
Middle	1.00	1.69	(1.51 – 1.89)	1.00	1.51	(1.28 – 1.79)
High	1.00	2.31	(1.91 – 2.80)	1.00	1.76	(1.19 – 2.58)
Self-Reported Health Status						
High	1.00	1.66	(1.52 – 1.80)	1.00	1.49	(1.31 – 1.70)
Middle	1.00	1.90	(1.63 – 2.23)	1.00	1.52	(1.28 – 1.81)
Low	1.00	1.72	(1.35 – 2.20)	1.00	1.27	(0.98 – 1.63)
Sex Education						
Yes	1.00	1.79	(1.65 – 1.94)	1.00	1.58	(1.41 – 1.77)
No	1.00	1.52	(1.33 – 1.73)	1.00	1.16	(0.95 – 1.43)

OR: odds ratio, CI: confidence interval

Table 4. Subgroup analysis of association between mild and severe depression and sexual behaviour

Variables	Male				Female			
	Mild depression (n = 6290)		Severe depression (n = 12569)		Mild depression (n = 11290)		Severe depression (n = 17283)	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Sexual intercourse experience								
No	1.00		1.00		1.00		1.00	
Yes	1.49	(1.37–1.61)	2.16	(1.95–2.38)	1.25	(1.12–1.40)	1.80	(1.57–2.06)

OR: odds ratio, CI: confidence interval

Figures

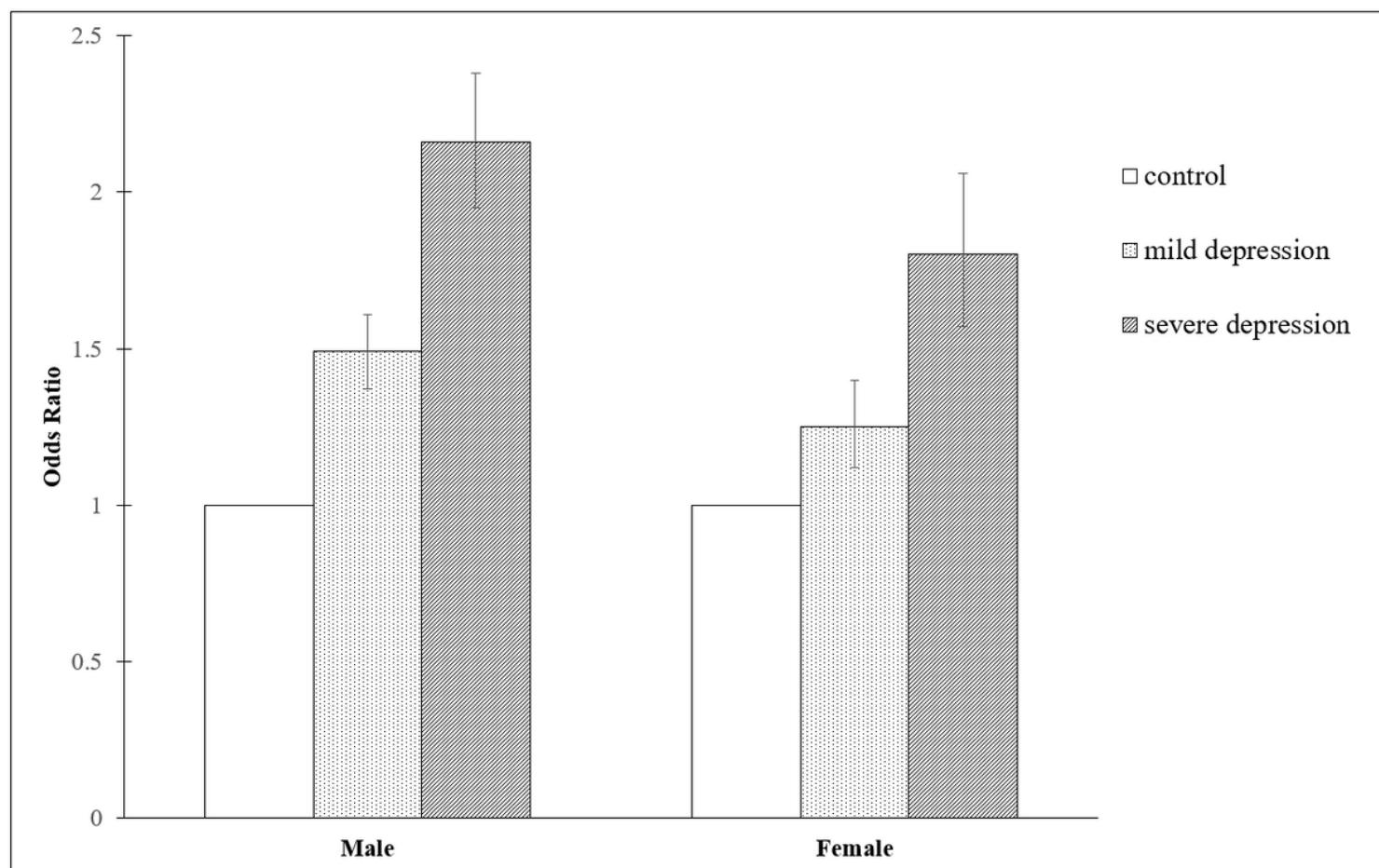


Figure 1

Odds ratios of mild depression without suicidality and severe depression with suicidal ideation, planning, and attempt history. The group without depression serves as the reference.