Article

Gender and Age Differences in the Association Between Depression and Alcohol Use in Young Adulthood

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Abstract

Background: The underlying mechanisms of the association between depression and alcohol use are unclear. This study examines the pathway between depression and alcohol use in the context of different sociodemographic characteristics.

Methods: This study used the National Longitudinal Survey of Youth 1979 Children and Young Adults (NLSY79-CHYA). A total of 4072 young adults were selected for the final sample. Ordinary least squares (OLS) analysis and multiple linear regression were used to identify sociodemographic factors associated with depression and to explore the association between depression and alcohol use.

Results: Depression was associated with a higher daily consumption of alcoholic drinks. Gender and age moderated the relationship between depression and alcohol use. Women's alcohol use was less influenced by depression compared to men's. Participants who were older reported consuming more alcoholic drinks compared to the younger participants, regardless of their levels of depression.

Conclusions: Higher levels of depression were associated with greater alcohol use among young adults, suggesting that depressive symptoms may be an important factor to consider when examining alcohol consumption in this population. The association between depression and alcohol use was stronger among young adult men than among women, indicating that gender differences should be considered when interpreting this relationship. In addition, the stronger association observed among participants in their late 20s to early or mid-30s suggests that age may also be an important contextual factor in understanding the relationship between depression and alcohol use during young adulthood.

Keywords

depression; alcohol use; young adulthood; gender differences; age differences; mental health

Introduction

There is substantial evidence to suggest a comorbidity between depression and problematic alcohol use, such as binge drinking, an alcohol use disorder (AUD) diagnosis, etc., with evidence to support that not only does depression lead to higher alcohol use (sometimes referred to as the self-medication hypothesis), but also that alcohol use can lead to increased depression [1–4]. There are also differences by gender for rates of depression and alcohol use, with women more likely to experience depression and men more likely to exhibit problematic alcohol use [5–8], as well as variability related to age [9–12]. However, fewer studies have examined the moderating impact of age and gender on the relationship between depression and alcohol use; thus, in this study, we will examine how age and gender concurrently affect the relationship between depression and frequency of alcohol use.

There is ample evidence to suggest a co-occurrence between depression and problematic alcohol use [13,14]. First, in a secondary analysis of the 2018 National Health Interview Survey, among adults who regularly felt depressed, the rate of past-year heavy drinking (defined as consuming more than fourteen alcoholic drinks per week

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for men and seven for women) was significantly higher than among adults who did not regularly feel depressed (7.6% vs. 5.0%, respectively) [9]. In another secondary analysis of the 2001–2002 National Epidemiologic Study on Alcohol and Related Conditions (NESARC), 14.1% of participants who were diagnosed with major depression disorder (MDD) in the past year also had an AUD diagnosis, and 40.3% of participants who were ever diagnosed with MDD also had an AUD diagnosis [15]. Further, in a longitudinal analysis of participants' history of AUD and MDD diagnose from adolescence through young adulthood (16 to 30 years), most participants with a history of AUD or MDD were also diagnosed with the other disorder [1]. More specifically, if a participant was diagnosed with AUD in adolescence, they were more likely to be diagnosed with MDD in early adulthood, and if they were diagnosed with MDD in early adulthood, they were more likely to be subsequently diagnosed with an AUD [1]. Last, in a longitudinal analysis of children in New Zealand from birth to their mid-20s, the relationship between AUD and MDD was significant, and structural equation models revealed that the best fitting model was one wherein AUD was associated with later depression [2].

Researchers have also demonstrated the relationship between alcohol use and depression in systematic reviews and a meta-analysis [13,14,16]. In a systematic review of articles published in English from the 1980s to the 2010s, depression was significantly predicted concurrent alcohol use, but the effect sizes were small [16]. Moreover, in a systematic review of cohort studies published between 1959 and 2019, the random-effects pooled estimate of the effect of AUD on subsequent depression symptoms was 1.57, and the effect of heavy drinking on subsequent depression symptoms was 1.13 [14]. Last, in a meta-analysis of longitudinal and cross-sectional studies, the overall pooled adjusted odds ratio (OR) estimates were between 2.00 and 2.09 [13].

Much research has also examined the trajectory of depression over the lifespan, or how depression rates differ by age [10,12,17,18]. Overall, depression prevalence seems to be highest in young adulthood before decreasing in midlife and increasing again in later life [12,17]. In a 2023 Gallup poll, lifetime depression prevalence was similar for adults aged 18 to 29 years (34.3%) and 30 to 44 years (34.9%), before decreasing among adults aged 45 to 64 years (26.1%) and 65 years and older (21.3%) [8]. Moreover, in a cross-sectional analysis of more than three million adults in the U.S., depression prevalence was significantly higher among adults aged 18 to 39 years (33%), compared to adults aged 40 to 59 years (24%) [10]. Last, in another secondary analysis of the Baltimore Longitudinal Study of Aging, researchers estimated that depression symptoms were highest in young adulthood, before decreasing during middle adulthood, and then increasing in late life [12].

Gender is another of the most researched factors affecting depression. In a 2023 Gallup poll, 36.7% of women were ever diagnosed with depression, compared to 20.3% of men, and between 2017 and 2023, women's depression rates increased nearly twice as much as men's (a 10.5% increase vs. a 5.7% increase) [8]. Research on the effects of age and gender on depression suggests that sex hormones play a role in the difference, considering that the gender difference emerges during puberty, and that women may experience a secondary increase in depression in their late forties and early fifties, when they are expected to enter menopause [6]. More specifically, researchers have found that, before puberty, boys and girls exhibit similar rates of depression, while after puberty and through much of adulthood, girls and women have significantly higher rates than boys and men [6,19]. In one meta-analysis, the gender difference in MDD diagnosis emerged at age 12 years, with girls more than twice as likely as boys to receive an MDD diagnosis at that time (OR = 2.37), with the overall gender difference the starkest between the ages of 13 and 15 years (OR = 3.02) [11]. Overall, these findings indicate that gender differences in depression emerge early and may vary across age groups.

Several studies have examined the effect of gender on the relationship between alcohol use and depression [20–22]. First, in a longitudinal sample of participants interviewed four times between the ages of 21 and 30 years, a latent class growth analysis revealed four groups of AUD: low disorder symptoms, decreasing, increasing, and chronic disorder. There were gender differences for only two of the groups, with women having higher rates of depression in the chronic and decreasing AUD symptom groups [22]. Moreover, in a longitudinal sample of American adults, depressive symptoms positively predicted alcohol problems at three-year and four-year follow-up, but not at seven-year follow-up, for women, while there were no significant associations for men [23]. Further, in a four-year longitudinal study of adolescents, there was no significant relationship between depression and alcohol use for boys, but there was a significant bidirectional association among the girls [20]. Further, in a longitudinal analysis of adults who completed an alcohol detoxification program, depression at six-month follow-up was positively associated with alcohol relapse at 12-month follow-up for women only [24]. Last, in a secondary analysis of the Korea National Health and Nutrition Examination Survey, moderate alcohol consumption (defined as consuming alcohol one to four times per month) was associated with lower depres-

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sion symptoms, while consuming at least seven alcoholic drinks on one occasion was associated with higher depression symptoms for women only [21].

The impact of gender on the relationship between depression and alcohol use has also been examined in cross-sectional studies with college students. First, in a group of male college students, higher depressive symptoms were associated with more frequent daily alcohol use and a higher risk for compulsive drinking; in a group of female college students, higher depressive symptoms were associated with a higher risk for compulsive drinking, but not daily alcohol use [25]. Moreover, in another study, heavy episodic drinking (defined as men consuming at least five alcoholic drinks and women four on a single occasion) was more common among all college students who had been diagnosed with MDD, but the relationship was particularly strong for female students diagnosed with MDD, compared to their male counterparts [26]. Thus, overall, it seems that the relationship between problematic alcohol use and depression is stronger for women than for men.

Despite substantial evidence of an association between depression and alcohol use, the direction and mechanisms of this relationship remain unclear. Depressive symptoms may be associated with alcohol use as a coping strategy [4], and this association may vary by age and gender [20,21]. Thus, this study examines the pathway between depression and alcohol use in the context of different sociodemographic characteristics. The specific research questions are: (1) to examine the sociodemographic factors associated with depression among young adults; (2) to investigate the underlying link between depression and alcohol use among young adults; and (3) to explore the moderating effects of sociodemographic characteristics on the relationship between young adults' depression and alcohol use.

Materials and Methods

Data and Sample

This study used the National Longitudinal Survey of Youth 1979 Children and Young Adults (NLSY79-CHYA), which was administrated by the U.S. Department of Labor. Participants were interviewed every two years from 1994 to 2012, and we used a wave of data collected in 2012 for this study. The data set includes demographic information and socioeconomic status (SES) and provides other information about health, such as depression and alcohol use. As the target sample in this study is young adults, we limited the sample to participants between the ages of 18 and 35 years. A total of 4072 young adults were selected for the final sample and their average age was 26.3 years old.

Measures

Alcohol Use

Alcohol use was measured as the usual number of alcoholic drinks consumed on a drinking day during the past 30 days. The specific question is as follows: "During the past 30 days, on the days that you drank, about how many drinks did you usually have in a day?" They provided the amount of alcohol drunk, but those who were in jail or prison were excluded for the responses. This variable represented the usual number of alcoholic drinks consumed per drinking day during the past 30 days, with higher values indicating greater alcohol consumption per drinking occasion (mean = 2.66; standard deviation [SD] = 2.44).

Depression

Depressive symptoms were measured using the 11-item Center for Epidemiologic Studies Depression Scale (CES-D) administered in the 2012 NLSY79 Child and Young Adult survey [27]. Each item was scored from 0 to 3, and the positively worded item ("I was happy") was reverse-coded. Total scores were computed by summing the scores of all items with higher scores indicating greater depressive symptoms (mean = 5.04; SD = 4.87). Further, the CES-D used in this study is highly correlated with other scales measuring depression [28].

Possible Socioeconomic and Demographic Moderators

Gender and age were considered as possible mediators. Men were coded as 0, whereas women were coded as 1. Further, race and ethnicity, which included White, Black, and Hispanic, were regarded as possible moderators. Black and Hispanic participants were compared to White participants, who were coded as the reference group in this study. This study also addressed marital status and education as potential moderators. Marital status was classified into two groups: those who were married (coded = 1) and those who were not married, such as those who were divorced, separated, widowed, or never married (coded = 0). Education was also classified into two groups: those who had not received post-secondary or other higher education (coded = 0) and those who had received post-secondary or other higher education (coded = 1). Participants' income was also considered. Total amount income included "wages, salary,

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commission or tips from all jobs, any income from military service, farm or business income, unemployment compensation or child support payments." Income was reported in units of $10,000.

Analysis Strategies

Ordinary least squares analysis and multiple linear regression were used to identify sociodemographic factors associated with depression (research question 1) and to explore the association between depression and alcohol use (research question 2), as well as to explore the moderating effects of sociodemographics (gender, age, marital status, education, and race/ethnicity) on the relationship (research question 3). As possible moderators were identified in model 1, the statistically significant sociodemographic factors were considered moderators in model 2. Continuous variables such as age and depression were mean-centered before constructing the interaction terms. The present study was designed as a cross-sectional analysis of the 2012 wave, and ordinary least squares (OLS) regression was used to estimate associations between the continuous alcohol-use outcome and the explanatory variables. A longitudinal cross-lagged analysis was not conducted because the alcohol-use measures were not consistently operationalized across waves and therefore could not be treated as directly comparable repeated measures. All analyses were conducted by using the IBM SPSS Statistics (Version 29.0; IBM Corp., Armonk, NY, USA). The distributions of the continuous variables were examined using histograms and skewness and kurtosis statistics. Alcohol use and depressive symptoms were not normally distributed. Because OLS regression does not require the observed variables themselves to follow a normal distribution and the sample size was relatively large, the original regression models were retained.

Results

Descriptive and gender differences in study variables are provided in Table 1. There was no gender difference in age. Participants' average age was 26.3 years old and 25.4% received any higher education. Men in the sample were less likely to receive higher education compared to the women. For marital status, 18.6% were married, and women were more likely to be married than men. For race/ethnicity, 48.8% of the sample were White, 29.2% were Black, and 22.0% were Hispanic. There were gender differences in income, alcohol use, and depression. Participants' average income was $20,360.62, with the men having a higher average income than the women. The average number of alcoholic drinks consumed per day was 2.66, with men consuming more on average than women. Last, the average depression score was 5.04, with women having higher scores on average than the men.

Findings for Research Question 1

What sociodemographic factors are associated with depression among young adults?

Table 2 presents the sociodemographic factors associated with depression. Compared to the men in the sample, the women had significantly higher depression scores (β = 0.70, $p < 0.001$). Older age was also related to a higher risk of depression ($\beta = 0.06$, $p = 0.012$), while marital status and higher educational attainment were negatively associated with depression score ($\beta = -1.32$, $p < 0.001$; $\beta = -1.06$, $p < 0.001$). In addition, Black young adults had higher depression scores than their White counterparts (β = 0.55, $p = 0.016$), and having a higher income was related to a lower risk of depression ($\beta = -0.17$, $p < 0.001$).

Table 1. Regression results of unstandardized coefficients (standard error) predicting young adults' alcohol use.

Variable	Men (n = 2024)	Women (n = 2048)	Total (n = 4072)	*p*
Alcohol use, mean (SD)	3.28 (2.86)	2.05 (1.73)	2.66 (2.44)	0.001
Depression, mean (SD)	4.67 (4.68)	5.41 (5.02)	5.04 (4.87)	0.001
sociodemographics				
Age, mean (SD)	26.23 (4.25)	26.45 (4.31)	26.34 (4.28)	
Married, n (%)	340 (16.8)	418 (20.4)	758 (18.6)	0.004
Higher education, n (%)	425 (21.0)	610 (29.8)	1035 (25.4)	0.001
Race/Ethnicity, n (%)				
White	1000 (50.3)	988 (49.7)	1988 (48.8)	
Black	553 (46.4)	638 (53.6)	1191 (29.2)	
Hispanic	471 (52.7)	422 (47.3)	893 (22.0)	
Income, mean (SD)	2.24 (2.38)	1.83 (2.13)	2.04 (2.27)	0.001

Significant difference between men and women. SD, standard deviation.

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Table 2. Regression results of unstandardized coefficients (standard error) predicting young adults' depression.

Variables	Depression	*p*
Constant	3.74 (0.55)	
Gender (woman)	0.70 (0.19)	<0.001
Age	0.06 (0.02)	0.012
Married	−1.32 (0.28)	<0.001
Higher education	−1.06 (0.24)	<0.001
Race/Ethnicity		
Black	0.55 (0.23)	0.016
Hispanic	−0.13 (0.24)	
Income	−0.17 (0.05)	<0.001

Findings for Research Question 2 and 3

How does depression influence alcohol use among young adults and how does the relationship between depression and alcohol use differ across sociodemographics?

As presented model 1 in Table 3, depression was associated with a higher daily consumption of alcoholic drinks ($\beta = 0.03$, $p < 0.001$). For other sociodemographic variables, being a man and being older were associated with more frequent daily alcohol use ($\beta = -1.19$, $p < 0.001$; $\beta = 0.03$, $p = 0.026$). Marital status and higher education were inversely related to alcohol use ($\beta = -0.67$, $p < 0.001$; $\beta = -0.51$, $p < 0.001$). Further, Black participants drank less alcohol compared to White participants ($\beta = -0.91$, $p < 0.001$). Moreover, interaction effects were found between depression and sociodemographics predicting alcohol use (see model 2 in Table 3). When moderating effects of sociodemographic variables were included in model 2, the sociodemographic factors were still significant. Gender and age moderated the relationship between depression and alcohol use ($\beta = -0.05$, $p = 0.009$; $\beta = 0.01$, $p = 0.025$). Other sociodemographic variables, such as marital status, education, and race/ethnicity did not moderate the association.

Fig. 1 showed that women's alcohol use was less influenced by depression compared to men's. For instance, depending on low or high levels of depression, there were few differences in the number of alcoholic drinks consumed by women (2.05 vs. 2.18). However, there was relatively a big gap in the consumption of alcoholic drinks between men who were more depressed and those who were less depressed (3.07 vs. 3.69). Further, as presented in Fig. 2, participants who were older (relative to our sample) reported consuming more alcoholic drinks compared to the younger participants, regardless of their levels of depression. However, the gap in alcohol use by age was significant depending on whether they were more or less depressed (0.30 vs. 0.15, respectively). In other words, alcohol use among older participants was more influenced by levels of depression compared to that among younger participants.

Discussion

This study identified sociodemographic factors associated with depression among young adults and the relationship between depression and alcohol use. Further, the effects of sociodemographic characteristics on the association between depression and alcohol use among young adults were examined. The current study indicated that depression was associated with gender, age, marital status, education, race/ethnicity, and income. Further, high levels of depression were related to more frequent use of alcohol among young adults. Moderating effects of sociodemographic factors were also found, in that gender and age moderated the association between young adult's depression and alcohol use.

Findings in this study confirmed that demographics and SES influenced levels of depression, consistent with previous studies' findings [8,11,29]. Along with findings in different age groups [11,19], young adult women were more likely to be depressed compared to young adult men. Although this study was not conducted utilizing a longitudinal approach, this may indicate the possibility that high levels of depression among women during young adulthood may continue through subsequent life stages, such as middle adulthood and late adulthood. Thus, this implies that providing more interventions and programs is critical for women to decrease depression in their young adulthood. Older participants and Black participants were also higher factors associated with depression in our study. Given that the participants' ages ranged from 18 to 35 years, we posit that the older participants may have been at higher depression scores because of more potential life stressors, such as full-time jobs, financing supporting oneself and possibly family, etc. [30]. There are confounding results regarding whether Black people are more depressed than people in other racial/ethnic groups, with some researchers examining SES as a potential mediator [31]; however, in the current study, Black young adults were more likely to have factors associated with depression compared to White young adults. Thus, this suggests that we need to pay more attention to the specific/unique needs of Black individuals when constructing mental health policies for young adults. On the other hand, this study revealed that being unmarried, not having higher education, and having a lower income were additional factors that increase levels of depression. Having a positive relationship with a spouse may serve as a protective factor against depression. In addition, as higher

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Table 3. Regression results of unstandardized coefficients (standard error) predicting young adults' alcohol use.

Variables	Alcohol use			
	Model 1	*p*-value	Model 2	*p*-value
Constant	2.92 (0.27)		−0.63 (1.56)	
Gender (woman)	−1.19 (0.09)	<0.001	−0.94 (0.13)	0.001
Age	0.03 (0.01)	0.026	0.16 (0.06)	0.009
Married	−0.67 (0.14)	<0.001	−0.79 (0.19)	0.001
Higher education	−0.51 (0.12)	<0.001	−0.55 (0.16)	0.001
Race/Ethnicity (white)				
Black	−0.91 (0.11)	<0.001	−1.04 (0.16)	0.001
Hispanic	0.15 (0.12)		0.14 (0.12)	
Income	0.00 (0.02)		0.01 (0.02)	
Depression	0.03 (0.01)	<0.001	0.05 (0.02)	0.002
Moderators				
Depression × gender			−0.05 (0.02)	0.009
Depression × age			0.01 (0.00)	0.025
Depression × marital status			0.03 (0.03)	
Depression × higher education			−0.01 (0.03)	
Depression × blacks			0.02 (0.02)	

education is associated with employment in higher-paying jobs [32], and that higher SES tends to be inversely associated with depression symptoms [33,34], working to ensure that everyone has equal opportunities to pursue higher education may be an important step to reduce young adult's depression.

This study also revealed that depression was associated with alcohol use. A large body of previous studies found that alcohol use influences depression, both concurrently and longitudinally (in both directions) [1,9,13]. This study contributes empirical evidence showing that depression was associated with more frequent use of alcohol. Individuals who are depressed may depend on substance use to relieve their mental health symptoms [4]. This implies that decreasing levels of depression is one way to reduce alcohol use in young adulthood. As it is well-known that excessive drinking leads to chronic diseases and threatens physical health [35], it is important to identify and address factors that increase one's risk for problematic alcohol use, such as depression.

Further, the current study indicated that gender and age moderated the association between depression and alcohol use among young adults. Although the interaction effects of gender and age were statistically significant, the coefficients were small. Therefore, these findings suggest modest differences in the association between depression and alcohol use across gender and age groups, and their clinical significance should be interpreted cautiously. For gender differences, the alcohol quantity per drinking day among young adult men was much more influenced by depression compared to young adult women. Generally, men are less frequently diagnosed with depression and report fewer symptoms of depression than women [6,8,11], which is consistent with this study's findings. Although young adult men were at lower depression scores in our study, the effect of depression on alcohol use was strong for young adult men. Several mechanisms may help explain the observed gender difference. Men may be more likely to use alcohol as a coping strategy when experiencing depressive symptoms, whereas women may use a broader range of coping and help-seeking strategies [36,37]. Social norms that discourage emotional disclosure among men may also be associated with maladaptive coping strategies, such as alcohol use, and non-disclosure of depressive symptoms when such symptoms occur [38,39]. Thus, it is of interest to develop prevention efforts that address not only young adult men's depressive symptoms, but also the social norms and maladaptive coping strategies that may make them less likely to seek help and more likely to use alcohol, as compared to women experiencing depression [36–39].

Moreover, regarding the moderating effect of age, both younger (less than 26 years) and older young adults (more than 26 years) showed increased alcohol use if they were at a high depression score. The stronger association observed among older young adults may reflect differences in life circumstances across young adulthood. Individuals in their late 20s and early 30s may experience greater employment, financial, marital, or caregiving responsibilities

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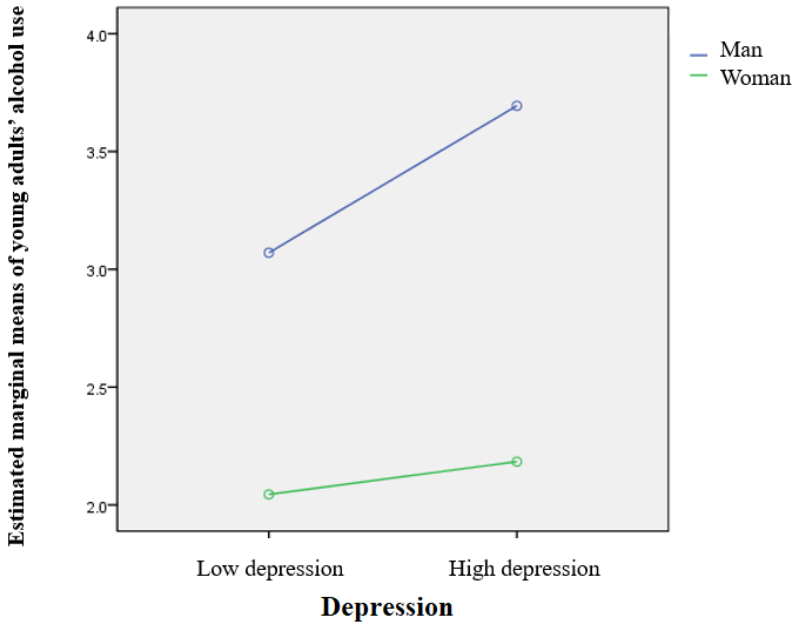


Fig. 1. Depression and gender on alcohol use among young adults.

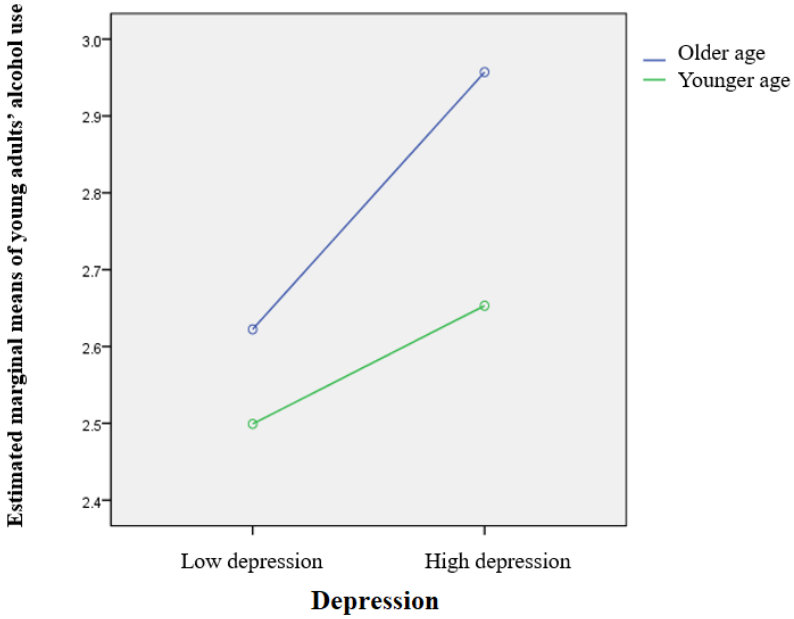


Fig. 2. Depression and age on alcohol use among young adults.

or stressors, which could increase the likelihood that depressive symptoms and alcohol use occur, either separately or concurrently [40,41]. However, in the current study, alcohol use among participants in the older age group was more influenced by levels of depression compared to participants in the younger age group, while there were smaller differences in alcohol use by depression in the younger age group. Thus, these findings indicate that it may be more beneficial to target the relationship between alcohol use and depression among adults in the late 20s or early to mid-30s, rather than adults in their early to mid-20s.

From a practical perspective, the findings support screening for depressive symptoms when addressing alcohol consumption among young adults. However, because the interaction coefficients were small, the results indicate

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modest group differences rather than large or clinically established effects. Gender and age should therefore be considered alongside other individual and contextual factors rather than used as independent criteria for intervention.

Findings in this study should be understood in the context of some limitations. First, although we considered five sociodemographic factors as possible moderators, additional factors may influence alcohol quantity per drinking day. Thus, we recommend that future studies address additional factors and potential moderators. Second, this study was conducted based on a cross-sectional approach so that it is limited in the ability to conclude that depression affects alcohol use in different life stages. The present study used the 2012 wave and therefore could not establish temporal ordering or reciprocal relationships between depression and alcohol use. In addition, alcohol use was not measured consistently across waves, which limited the feasibility of constructing comparable repeated measures for a cross-lagged panel model. Future studies should harmonize alcohol-use measures across waves, where possible, and apply longitudinal approaches. Third, the questions measuring alcohol use and depression were administrated via self-report survey. Participants might show social desirability bias to decrease their frequency of using alcohol and levels of depression. Thus, the possibility of such bias should be considered. Fourth, the available alcohol-use measure did not distinguish former drinkers from lifetime abstainers or participants who had not consumed alcohol during the past 30 days. Lastly, alcohol use and depressive symptoms were not normally distributed. Although the large sample size may reduce the sensitivity of the estimates to departures from normality, the findings should still be interpreted cautiously.

Conclusions

This study highlights the importance of considering sociodemographic differences in the association between depression and alcohol use among young adults. Depression was positively associated with alcohol use, and this association varied by gender and age. These findings suggest that gender and age are important contextual factors in understanding how depressive symptoms are related to alcohol use during young adulthood. Overall, the study contributes to a more nuanced understanding of the relationship between depression and alcohol use across sociodemographic groups.

Availability of Data and Materials

The datasets analyzed during the current study are available in the National Longitudinal Surveys repository (https://www.nlsinfo.org/content/cohorts/nlsy79-children).

Author Contributions

JL: Study design, Data analysis, Writing—original draft, Writing—review & editing. JA: Writing—original draft, Writing—review & editing. All authors contributed to editorial changes in the manuscript. All authors have read and approved the final version of the manuscript. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethics Approval and Consent to Participate

This study used publicly available secondary data from the National Longitudinal Survey of Youth 1979 Children and Young Adults (NLSY79-CHYA), which is administered by the U.S. Bureau of Labor Statistics. The NLSY79-CHYA is a longitudinal survey of the biological children of women in the NLSY79, and the public-use data are available through the NLS Investigator. Because this study used only publicly available and de-identified data, the researchers could not identify individual participants, and no new human subjects were recruited or contacted. The confidentiality of participants in the NLSY79 and its associated Child and Young Adult surveys is protected under the U.S. Bureau of Labor Statistics. Therefore, additional institutional review board approval and informed consent were not required for the present secondary analysis. Access to and use of the data followed the procedures specified by the NLS Investigator public-use data platform.

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Conflict of Interest

The authors declare no conflict of interest.

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