ORIGINAL RESEARCH

Time-Varying Effects of Parental Alcoholism on Depression

Sunita Thapa, MPH[1]; Arielle S. Selya, PhD[2]; Yvonne Jonk, PhD[2]

PEER REVIEWED

Abstract

Introduction

Children of alcoholic parents are at increased risk for lifetime depression. However, little is known about how this risk may change in magnitude across age, especially in mid-adulthood and beyond.

Methods

We used a nationally representative sample (N = 36,057) of US adults from the National Epidemiologic Survey on Alcohol and Related Conditions, wave III. After adjusting for demographic characteristics, we examined the relationship between parental alcoholism and outcomes of 1) major depressive disorder, Diagnostic and Statistical Manual of Mental Disorders-5th edition (DSM-5) and 2) DSM-5 persistent depressive disorder. To examine continuous moderation of this relationship across participants' age, we used time-varying effect models.

Results

Parental alcoholism was associated in general with a higher risk for both major depressive disorder (odds ratio [OR], 1.98, 95% confidence interval [CI], 1.85–2.11; $P < .001$) and persistent depressive disorder (OR, 2.28, 95% CI, 2.04–2.55; $P < .001$). The association between parental alcoholism and major depressive disorder was stable and positive across age, but the association with persistent depressive disorder significantly declined among older adults; respondents older than 73 years old were not at increased risk for persistent depressive disorder.

Conclusions

Findings from this study show that the risk of parental alcoholism on depression is significant and stable among individuals of a wide age range, with the exception of a decline in persistent depressive risk among older adults. These findings highlight the importance of screening for depression among adults with parental alcoholism.

Introduction

Parental alcoholism has various negative physical, mental, and social consequences. Chief among these is depression; offspring of alcoholics are at heightened risk of depressive mood symptoms (1,2). The evidence for heightened depression among those exposed to parental alcoholism is particularly strong among young, college-aged adults (3,4).

Much of the research on the association between parental alcoholism and depression focuses on the question of resilience among adult children of alcoholics; that is, whether these individuals are ever able to overcome the challenges of parental alcoholism. Although some evidence suggests that older adults (those in their late 20s and early 30s) are more resilient than are young adults (those aged 18 through their early 20s) (5), there is little research on the effects of parental alcoholism among offspring of alcoholics in mid- to late adulthood, making their longer-term resilience unknown. Furthermore, the question of increased resilience at older ages assumes that the magnitude of the effect of parental alcoholism changes with increasing age; however, such age-varying effects have not yet been examined.

This study examined 1) the association between parental alcoholism and lifetime outcomes of both major depressive disorder (MDD) and persistent depressive disorder (PDD) among a full range of adults after controlling for demographic characteristics and 2) the age-varying effects of these associations (ie, how they may change in strength across participants' ages). We used data from wave III of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III), a large nationally representative data set.

Methods

NESARC-III was sponsored, designed, and directed by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and conducted during 2012–2013. NESARC-III is a nationally representative sample of the civilian noninstitutionalized population of the United States aged 18 years or older; it had a 61.1% response rate and an original sample size of 36,309. The NIAAA collected information via questionnaires on alcohol and drug use and disorders, related risk factors, and associated physical and mental disabilities on the basis of NIAAA's Alcohol Use Disorder and Associated Disabilities Interview Schedule. This study excluded respondents with missing information on parental alcoholism; the final sample size for this study was 36,057. We used existing data from human participants in NESARC, and the study was approved by the University of North Dakota institutional review board. We completed the final analyses in May of 2016.

Measures

Parental alcoholism

Parental alcoholism was based on the self-reported answer to the question "Before you were 18, parent/other adult living in home was a problem drinker/alcoholic?" as a binary response variable (yes or no).

Depression

We analyzed 2 depressive disorders, lifetime MDD and lifetime PDD, as separate outcomes. Each outcome was derived from detailed self-reported responses to questionnaire items on the basis of corresponding criteria from the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5)(6). Briefly, lifetime MDD is characterized by one or more discrete episodes of at least 2 weeks during which respondents had either a depressed mood or a loss of interest in nearly all activities at some time during their adult lives (6). Lifetime PDD is a milder but more chronic form of depression and can be diagnosed when the mood disturbance continues for at least 2 years at some time during an adult's life (6). Both MDD and PDD exclude mood or anxiety disorders that are either substance-induced or due to a general medical condition.

Demographic characteristics

Age and sex were self-reported. Race/ethnicity was self-reported as white, black, Hispanic, American Indian, or Asian. Full-time employment was self-reported as working 35 or more hours per week or less than 35 hours per week.

Marital status was self-reported according to 6 response options, which were re-categorized as currently married (ie, married or living with someone as if married), not currently married (ie, widowed, divorced, or separated), and never married.

Education was self-reported with 14 response levels ranging from "no formal schooling" to "completed Master's degree or higher," and we re-categorized these into 3 levels: less than a high school diploma, high school diploma, and some college or more.

Annual household income was self-reported with 21 response categories ranging from less than $5,000 to $200,000 or more. We recoded these into a new numeric variable on the basis of midpoints of each category up to level 20; level 21 (≥$200,000) was recoded as $250,000, which is approximately the median income among households earning $200,000 or more (7).

Statistical analyses

We conducted weighted regressions using the statistical software R (The R Foundation) and its survey package to examine the association between parental alcoholism and outcomes of MDD and PDD, after adjusting for demographic characteristics.

We used time-varying effect models (TVEMs), an extension of regression modeling that allows coefficients to vary continuously over time (8), to assess how the association between parental alcoholism and depression outcomes varied across age of participants. In other words, TVEMs examine moderation across some continuous measure of time (eg, historical time, age, time from event). TVEMs are spline-based regression models, which estimate a lower-order polynomial trend within equal intervals on the basis of user-specified number of knots, k. On the basis of established standards for this methodology (9), 10 knots were specified, and P-spline estimation, which automatically finds the most parsimonious model ($k \leq 10$), was used. We ran separate logistic TVEM models for outcomes of MDD and PDD after controlling for demographic characteristics. Each model included a time-varying intercept (to adjust for the overall prevalence of depression across age) and the time-varying predictor of age (to examine continuous moderation of the effect of parental alcoholism across ages). We performed TVEM analyses in SAS 9.3 (SAS Institute Inc) using a publicly available SAS macro (9), version 3.1.0. TVEM analyses were interpreted with respect to 1) overall significance of the effect at a given value of age (ie, whether the confidence bands overlap the odds ratio (OR) of 1.0), and 2) the change in the effect across different ages (ie, whether the confidence bands exclude each other at different ages). Although these methods of establishing significance are more conservative than conventional significance tests, we did this because P values were available only for time-invariant covariates.

Results

Approximately 23% of respondents (n = 8,407) reported parental alcoholism. Respondents who reported parental alcoholism were significantly more likely than adults who did not report parental alcoholism to meet DSM-5 criteria for both MDD (29.6% vs 17.7%, *P* < .001) and PDD (9.3% vs 4.4%, *P* < .001) (Table). People who reported parental alcoholism were slightly but significantly younger (mean age, 44.8 y vs 45.9 y, *P* < .001); were more likely to be female (59.4% vs 55.4%, *P* < .001); had lower annual household incomes (median $32,500 vs $37,500, *P* < .001); were less likely to be never married (25.8% vs 28.4%, *P* < .001); were more likely to be not currently married (27.6% vs 25.4%, *P* < .001); were more likely to be white (57.8% vs 51.4%) or American Indian (2.1% vs 1.2%); and were less likely to be black (18.2% vs 22.3%) or Asian (1.9% vs 5.9%). The 2 groups did not significantly differ by education level (approximately 15% had <high school diploma, 22% high school diploma, and 62% some college or more), or full-time employment status (approximately 43%).

Additionally, compared with respondents who did not report parental alcoholism, those who reported parental alcoholism were slightly but significantly younger when they first had the first episode of MDD (median age, 27.8 y vs 30.5 y, *P* < .001) and PDD (median age, 27.9 y vs 30.6 y, *P* < .001) and had a significantly higher number of MDD episodes (median no., 4.6 vs 3.5, *P* < .001) and a nonsignificantly higher number of PDD episodes (median no., 2.1 vs 1.9). Respondents who reported parental alcoholism also talked to any health professional or therapist significantly more often to help improve their mood caused by MDD (63% vs 58%, *P* < .001) and nonsignificantly more often to help improve their mood caused by PDD (68% vs 64%) compared with respondents who did not report parental alcoholism. Respondents who reported parental alcoholism were significantly more likely to have symptoms of suicidal ideation (13% vs 8%, *P* < .001) and also meet DSM-5 criteria for other mental comorbidities such as anxiety (21% vs 11%, *P* < .001), personality disorders (27% vs 12%, *P* < .001), eating disorders (3% vs 1.5%, *P* < .001), substance use disorders (57% vs 37%, *P* < .001), and posttraumatic stress (12% vs 5%, *P* < .001).

Weighted regression analyses showed that parental alcoholism was associated with an approximately twofold increase in the odds of both MDD (OR, 1.84; 95% confidence interval [CI], 1.72–1.96; *P* < .001) and PDD (OR, 2.11; 95% CI, 1.88–2.37; *P* < .001), after controlling for demographics.

Parental alcoholism had a positive and stable effect on MDD across individuals throughout most of the age range of respondents aged 18 to 85 years (Figure 1). Participants between these ages were approximately 2 times as likely to have MDD as were participants who reported no parental alcoholism. Because of the small sample size of participants older than 85 years and the resulting widening of the confidence band (ie, the lower limit of the confidence band is less than the OR of 1), the relationship was no longer significant among these individuals, even though the point estimate remained stable.
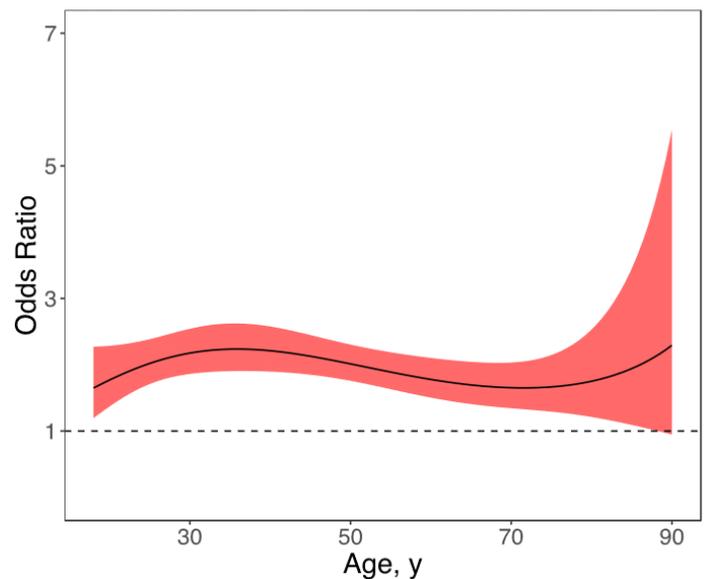
Figure 1. Age-varying effects of parental alcoholism on lifetime major depressive disorder for respondents aged 18–90 years, National Epidemiologic Survey on Alcohol and Related Conditions, Wave III, 2012–2013. Age-varying effects are presented as odds ratios (ORs) across ages; the solid line represents the OR point estimates, and the surrounding shading represents 95% confidence intervals. The horizontal line represents an OR of 1.00.

Similarly, parental alcoholism had a positive effect on PDD across a wide age range (Figure 2). Participants aged 18 to 73 years were approximately 2 times as likely to have PDD as were participants who reported no parental alcoholism. The association was nonsignificant for those aged 74 years and older. Additionally, the effect of parental alcoholism among older individuals (eg, OR of 0.8 for participants aged 80 y) was significantly weaker than the effect among younger individuals (eg, OR of 2.3 for participants aged 60 y).
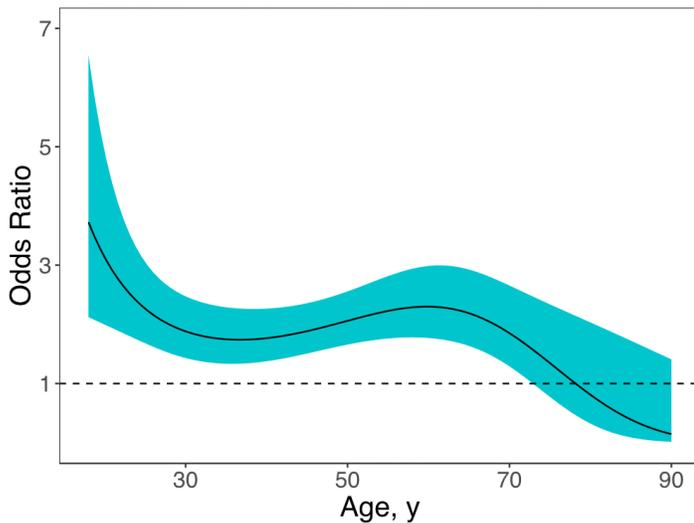
Figure 2. Age-varying effects of parental alcoholism on lifetime persistent depressive disorder for respondents aged 18–90 years, National Epidemiologic Survey on Alcohol and Related Conditions, Wave III, 2012–2013. Age-varying effects are presented as odds ratios (ORs) across ages; the solid line represents the OR point estimates, and the surrounding shading represents 95% confidence intervals. The horizontal line represents an OR of 1.00.

Discussion

This study examined how the relationship between parental alcoholism and depression outcomes may change across individuals of different ages. Respondents who reported being exposed to parental alcoholism as children had approximately twice the risk of meeting criteria for lifetime MDD and PDD. Parental alcoholism had a positive and stable effect on the odds of lifetime MDD throughout most of the age range of the participants, although this association was no longer significant for those aged 85 years old or older. However, although the association with PDD was positive and stable across individuals in early and late adulthood, it significantly decreased in strength for those older than 73, such that parental alcoholism was no longer associated with a heightened risk for PDD.

Results of this study also showed that 23% of adults had a parent with alcohol problems before the age of 18; the 1988 National Health Interview Survey estimated that 18.1% of adults had a parent with alcohol problems before the age of 18 (10). Although there is a large gap in timeline, the prevalence of adults growing up with a parent with alcohol problems seems comparable. Although current data on the prevalence of adults who grew up with a parent with alcohol problems are not available, it is estimated

that an annual average of 7.5 million US children (10.5% of all children) live with a parent who had an alcohol use disorder in the past year (11). Although this figure is lower than we report here, it includes only past-year alcohol use disorder, a severe form of problem drinking. Hence, assuming that this prevalence will increase under NESARC's inclusion of other, less severe forms of problem drinking, the current prevalence rates are more consistent with those of previous reports.

Our findings confirm those of previous research that established that parental alcoholism is associated with an increased risk of depression among offspring (2,12,13). This study also extends this research in 2 important ways, given that many previous studies are limited to younger adults (2,3). Here, we examined the effects of parental alcoholism on depression among adults across a wide age range, and we rigorously examined the age-varying effects of parental alcoholism, showing that its effect is largely stable across individuals from early to late adulthood.

This study has limitations. First, the measure of parental alcoholism is limited in several ways. The single question that assessed parental alcoholism was proxy-reported by offspring. As a result, both the timing and the nature of the question may have created recall bias, in which those with depression are more likely to remember the drinking of their parents as problematic than those with no depression. Additionally, the wording of the question included parents as well as non-parental adults living in the household, although most participants reported living only with one or more biological parents. Thus, the wording of this question may have affected the results in unknown ways. Second, this study used cross-sectional data and thus cannot conclude that parental alcoholism causes depression among offspring.

Third, because we used cross-sectional data, the findings do not distinguish between true age and cohort when considering the age-varying effect of parental alcoholism. A true age-varying effect would capture data on the change in the effect of parental alcoholism as an individual ages, but these analyses examined the effect across individuals of different ages. This analysis introduces a cohort effect: the association between parental alcoholism and depression may change across individuals born in different years as a result of differences across time periods in, for example, the prevalence of parental alcoholism, the threshold at which participants consider alcohol consumption "problem drinking," the prevalence of depression, or other associated risk and protective factors. It is likely that both an age effect (5) and a cohort effect (14,15) contribute to our findings, but this study cannot distinguish between them. Thus, the findings should not be interpreted as effects for a given individual across time. Future studies using longitudinal data are needed to separate true age-varying effects from cohort effects.

Strengths of this study include the large, nationally representative sample, the use of rigorous and well-validated DSM-5 measures of MDD and PDD, and the use of TVEMs, an innovative methodology for examining continuous moderation across age.

Parental alcoholism is stably associated with depression outcomes among offspring across a range of ages from early to late adulthood, with a decline in PDD among older adults. This finding implies that the effect of parental alcoholism on PDD may weaken among older adults (aged ≥60 y), making them more resilient than middle-aged and younger adults for PDD. Conversely, we found no evidence of resilience to MDD, as shown by a similar effect across ages. Despite this long-term effect of parental alcoholism, many adults with depression do not seek treatment because of a desire for self-reliance and the perceived stigma of mental health difficulties (16). Children of alcoholics often desire secrecy about their parents' alcoholism (17), and this additional stigma may further compound the lack of treatment seeking among adult offspring of alcoholics. Our findings highlight the importance of screening for depression among offspring of alcoholics in health care settings to provide them with services and support to ultimately manage this mental health burden.

Acknowledgments

Author Information

Corresponding Author: Sunita Thapa, MPH, Department of Health Policy, Vanderbilt University School of Medicine, 2525 West End Ave, Suite 1200, Nashville, TN 37203. Telephone: 615-343-2934. Email: sunita.thapa@vanderbilt.edu.

Author Affiliations: [1]Department of Health Policy, Vanderbilt University School of Medicine, Nashville, Tennessee. [2]Master of Public Health Program, Department of Population Health, University of North Dakota, Grand Forks, North Dakota.

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Table

Table. Descriptive Statistics of Sample (N = 36,057), Study on Effects of Parental Alcoholism on Depression, National Epidemiological Survey on Alcohol and Related Conditions, Wave III, 2012–2013

Measure	Parental Alcoholism[a]	
	Yes	No
Major depressive disorder[b]	29.6	17.7
Persistent depressive disorder[b]	9.3	4.4
Median (IQR), age, y[c]	44.0 (32–56)	44.0 (30–59)
Sex[b]		
Female	59.4	55.4
Male	40.6	44.6
Education		
<High school diploma	15.7	14.8
High school diploma	22.4	22.7
Some college or more	61.9	62.4
Median (IQR) annual household income, $[c]	32,500 (17,500–65,000)	37,500 (17,500–65,000)
Full-time employment (≥35 h/wk)	43.2	44.2
Marital status		
Currently married	46.6	46.2
Not currently married[b]	27.6	25.4
Never married[b]	25.8	28.4
Race/ethnicity		
White[b]	57.8	51.4
Black[b]	18.2	22.3
American Indian[b]	2.1	1.2
Asian[b]	1.9	5.9
Hispanic	19.9	19.2

Abbreviation: IQR, interquartile range.

[a] Numeric variables presented as median (IQR), and categorical variables presented as percentages.

[b] χ^2 significant in parental alcoholism status at $P < .05$. MDD is characterized by discrete episodes of at least 2 weeks during which respondents experienced either depressed mood or a loss of interest in nearly all activities in adults at some time in their lives. Lifetime PDD is a milder but more chronic form of depression and can be diagnosed when the mood disturbance continues for at least 2 years in adults at some time in their lives (6).

[c] Analysis of variance significant in parental alcoholism status at $P < .05$.