Contributing Factors to Heterogeneity in the Timing of the Onset of Nonfatal Suicidal Behavior: Results From a Nationally Representative Study

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ABSTRACT

Background: It remains unclear whether specific clinical factors contribute to heterogeneity in the timing of the onset of nonfatal suicidal behavior. This knowledge could have important implications for suicide prevention.

Methods: Using a nationally representative US adult sample, the second wave of the National Epidemiologic Survey on Alcohol and Related Conditions (2004–2005; n = 34,629), we compared the characteristics of 4 different suicide attempter groups: those who first attempted (1) before 18 years, (2) from 18 to 34 years, (3) from 35 to 49 years, and (4) at 50 years or older. Specifically, *DSM-IV* psychiatric disorders that occurred before the first suicide attempt, childhood maltreatment experiences, parental history of psychiatric disorders, and sociodemographic characteristics were examined.

Results: Most first nonfatal suicide attempts (85.3%) occurred before age 35 years. Compared with suicide attempts occurring from 18 to 34 years, suicide attempts occurring before 18 years were more strongly associated with childhood maltreatment and less strongly linked to lifetime prior psychiatric disorders, whereas first suicide attempts occurring at 35 years and older were more strongly associated with a prior lifetime history of substance use disorders, including alcohol use disorder and nicotine dependence, and mood disorders, including mania/hypomania and dysthymic disorder between 35 and 49 years and major depressive episode at 50 years and older (all $P < .05$).

Conclusions: These results suggest age differences in risk factors for first nonfatal suicide attempt. Improving early detection and treatment of psychiatric disorders and preventing childhood maltreatment may have broad benefits to reduce the burden of suicidal behavior at all ages.

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Suicide continues to be a leading cause of preventable death,[1] accounting for an estimated 800,000 deaths worldwide,[2] and there are many more suicide attempts, which are associated with significant morbidity.[2] Prior research[2–7] suggests substantial age differences in suicide and suicide attempt rates. Although older adults attempt suicide less often than younger ones, suicide completion rates increase as a function of age for both men and women to a peak in old age.[2] Understanding the factors that contribute to heterogeneity in the timing of the onset of nonfatal suicidal behavior may help clinicians identify individuals who are at greater risk for a first attempt, which is particularly important in older adults, for whom a large percentage of first attempts are fatal,[8] and help refine prevention interventions for this major public health problem.[9]

Several lines of evidence support potential age differences in risk factor profiles of suicide attempt. First, while the prevalence of most psychiatric disorders is lower in older than in younger adults,[10–13] psychiatric disorders are among the strongest predictors of suicide attempt and completion across all ages.[9,14–21] Prior studies[3,4,18,22,23] have suggested age differences in the strength of associations between psychiatric disorders and suicide risk. For example, major depression may be associated with a stronger risk of suicide in older than in younger adults, whereas substance use disorders may play a lesser role in later life suicide risk. Second, the male-to-female ratio of suicide attempts and completions is higher in older than in younger adults.[19] Third, neurodegenerative, cerebrovascular, and other chronic diseases may play a stronger contributing role in suicide risk in older than in younger adults.[23,24] Finally, the detrimental effect of certain socioeconomic and environmental factors, such as loneliness, financial and social difficulties, and the loss of loved ones, on suicide risk may differ in magnitude between younger and older adults.[25–28]

However, little is known about the similarities or differences between adults who first attempted

Clinical Points

- It remains unclear whether specific factors may influence the timing of the onset of nonfatal suicidal behavior.
- First suicide attempts occurring before 18 years of age may be more strongly associated with childhood maltreatment and less strongly linked to prior lifetime psychiatric disorders.
- First suicide attempts occurring at or after 35 years of age may be more strongly associated with prior lifetime substance use disorders and mood disorders.

suicide at an older or younger age. Because a substantial proportion of older adults who attempt suicide have a prior history of suicide attempt,[12] this distinction may help disentangle risk factors specifically related to emerging suicide risk in later life and progress in the understanding of suicidal behavior across the life span.[29] This knowledge may also have important implications for suicide prevention by informing identification of adults at greater risk for suicide attempt according to their age and may help refine specific assessment and service provision according to the age at the first suicide attempt.

In this study, we investigated whether specific factors may explain differences in the timing of first suicide attempt across different age at first attempt groups. Specifically, we hypothesized that factors contributing to differences in the timing of first suicide attempt would include sociodemographic characteristics (sex, race/ethnicity, nativity, and education), lifetime prior psychiatric disorders (ie, disorders that occurred before the first/single suicide attempt), childhood maltreatment experiences, and parental history of psychiatric disorders.

METHODS

Sample

Data were drawn from Wave 1 and Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative face-to-face survey of the US adult population, conducted in 2001–2002 (Wave 1) and 2004–2005 (Wave 2) by the National Institute on Alcoholism and Alcohol Abuse (NIAAA) and described in detail elsewhere.[30] The target population included the civilian population aged 18 years and older residing in households and group quarters. Face-to-face interviews were conducted with 43,093 respondents. The overall survey response rate was 81%. In Wave 2, attempts were made to conduct face-to-face re-interviews with all 43,093 respondents of the Wave 1 interview. The Wave 2 response rate was 86.7%, reflecting 34,653 completed Wave 2 interviews. The cumulative response rate at Wave 2 (ie, the product of the Wave 2 and Wave 1 response rates) was 70.2%,. The Wave 2 NESARC data were weighted to be representative of the US civilian population based on the 2000 census.[30] The research protocol, including informed consent procedures, received full human subjects review and approval from the US Census Bureau and the Office of Management and Budget.[30] The present analysis included the 34,653 participants who completed both NESARC waves.

Measures

Assessment of suicide attempts and age at first suicide attempt. All NESARC respondents were asked the following questions: (1) "Did you ever attempt suicide?" and (2) "How old were you the first time it happened?" On the basis of prior research that identified age differences in suicide attempts rates[5,12] and a preliminary analysis of the distribution of age at first suicide attempt in NESARC and assuming that we needed at least 40 suicide attempts by age group for adequate statistical power, we defined 5 mutually exclusive groups: participants who first attempted suicide (*i*) before 18 years, (*ii*) between 18 and 34 years, (*iii*) between 35 and 49 years, and (*iv*) at 50 years or older and (*v*) those who never attempted suicide.

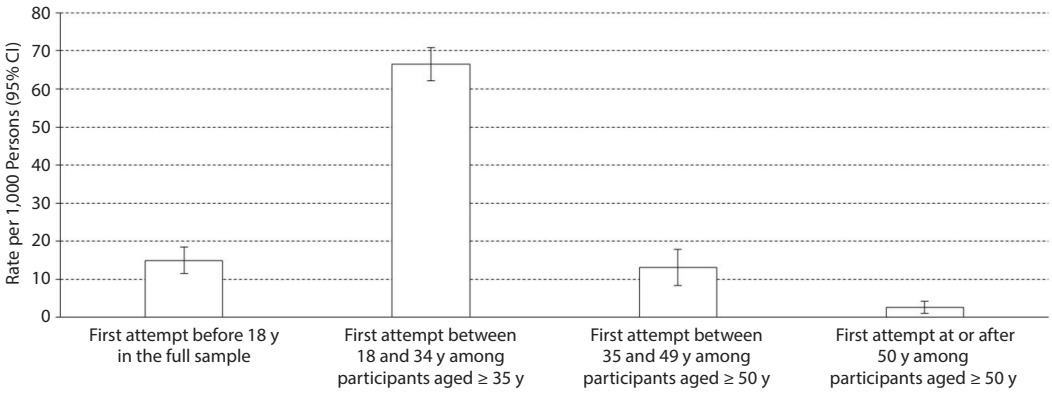
Sociodemographic characteristics. Sociodemographic characteristics included age, sex, race/ethnicity (white vs non-white), nativity, education, and family poverty, which was considered present if participants reported that their family received money from any government assistance program before they were 18 years of age.

Assessment of DSM-IV Axis I and II disorders. Axis I and II disorders were assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule, *DSM-IV* version (AUDADIS-IV), a structured diagnostic instrument administered by trained lay interviewers, as detailed elsewhere.[30] All respondents with a lifetime history of Axis I psychiatric disorders were questioned about the age at onset of disorders to determine whether these disorders occurred before the first suicide attempt. The test-retest reliability and validity of AUDADIS-IV measures of *DSM-IV* psychiatric disorders is good to excellent for substance use disorders and fair to good for other disorders.[30]

Childhood traumatic experiences. Five types of childhood maltreatment were examined: emotional neglect, physical neglect, emotional abuse, physical abuse, and sexual abuse. Respondents completed 19 questions regarding exposure to the types of maltreatment occurring before age 17 years adapted from the Childhood Trauma Questionnaire (CTQ)[31] and the Conflict Tactics Scale (CTS).[32] Test-retest reliability of these items was adequate, with Cronbach α coefficients ranging from 0.78 for physical abuse to 0.90 for sexual abuse.[33] Consistent with prior work,[9,10,34,35] participants were considered to have suffered a type of childhood maltreatment if they reported frequent exposure (sometimes, often, or very often), except for sexual abuse, which was considered present if they indicated at least 1 episode.

Parental history of psychiatric disorders. Parental histories of alcohol use disorder, drug use disorder, major depression, and antisocial personality disorder were ascertained in separate modules of the AUDADIS[30] and defined in our study as having at least one parent with the disorder. All respondents were prompted with a definition

Figure 1. Rates of Suicide Attempts by Age at First/Single Attempt per 1,000 Persons Older Than the Age Group Considered in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (n = 34,629)[a]



[a]Because whether individuals at younger ages will attempt suicide at later ages is unknown, stratified rates of first nonfatal suicide attempts were calculated per 1,000 persons older than the age group considered. Specifically, first attempt before 18 years in the full NESARC sample of participants aged ≥ 18 years, first attempt between 18 and 34 years among participants aged ≥ 35 years, first attempt between 35 and 49 years among participants aged ≥ 50 years, and first attempt at or after 50 years among participants aged ≥ 50 years.

that included examples for each condition.[36] The test-retest reliability of AUDADIS family history diagnoses is very good to excellent.[37]

Statistical Analyses

Percentages and their standard errors (SEs) were estimated using SUDAAN (Version 8.1; Research Triangle Institute; Research Triangle Park, North Carolina) to adjust for the complex design of the NESARC. Binary logistic regression analyses were performed to compare the sociodemographic and clinical characteristics of each age at first suicide attempt group with the reference group of individuals who attempted suicide between 18 and 34 years. Because sex, age, and race/ethnicity have been shown to influence the risk for attempting suicide,[9,16,38] all analyses were adjusted for these variables. Statistical significance was evaluated using a 2-sided α set a priori set at .05.

RESULTS

Sample Characteristics

Of the 34,654 participants, 25 (< 0.1%) were excluded from our analyses because of missing data for age at first suicide attempt. Of the remaining 34,629 participants, 1,240 (3.6%) reported a lifetime history of suicide attempt. Among these individuals, 519 (45.2% [SE = 1.8]) made a first/single suicide attempt before the age of 18 years, 535 (40.1% [SE = 1.8]) between 18 and 34 years, 145 (11.7% [SE = 1.2]) between 35 and 49 years, and 41 (3.0% [SE = 0.6]) at 50 years and older. However, because we do not know if individuals at younger ages will attempt suicide at later ages, we calculated stratified rates of first nonfatal suicide attempts per 1,000 persons older than the age group considered. For example, the first suicide attempt rate among participants aged 18–34 years are calculated among those aged 35 years or older (Figure 1). We found that first suicide attempts were significantly more common between 18 and 34 years of age than in other age groups ($P < .001$), with no significant differences between the age groups < 18 years and 35–49 years, whereas first suicide attempts were significantly less frequent among individuals aged 50 years and older than in other age groups ($P < .01$) (Figure 1).

Characteristics Associated With Age at First Suicide Attempt

There were no significant differences across age-at-first-suicide-attempt groups in sociodemographic characteristics (ie, sex, race/ethnicity, nativity, education, and family poverty) (Table 1).

Compared to respondents who first attempted suicide between 18 and 34 years, those who first attempted suicide before 18 years were significantly less likely to have a prior lifetime history of psychiatric disorders, including substance use disorders, major depressive episode, mania or hypomania, panic disorder with or without agoraphobia, and generalized anxiety disorder, while those who attempted suicide at or after 35 years were significantly more likely to have a prior lifetime history of alcohol use disorder and nicotine dependence (Table 2). Furthermore, individuals who first attempted suicide between 35 and 49 years were more likely to have a prior lifetime history of mania or hypomania and dysthymic disorder, and individuals who first attempted suicide at 50 years and older were significantly more likely to have a prior lifetime history of major depressive episode compared to respondents who first attempted suicide between 18 and 34 years.

All childhood maltreatment types (Table 3) were significantly more frequent among individuals who first attempted suicide before 18 years than in those who first attempted suicide between 18 and 34 years (Table 4). There were no significant differences across the other age at first suicide attempt groups. There were no significant differences across groups in family history of psychiatric disorders (see Table 4).

Table 1. Sociodemographic Characteristics and Prevalence Rates of Prior Lifetime Psychiatric Disorders by Age at Onset of First/Single Suicide Attempt Group in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (n = 34,629)[a]

Variable	No History of Suicide Attempt (n = 33,389)	Age at First/Single Suicide Attempt			
		< 18 y (n = 519)	18–34 y (n = 535)	35–49 y (n = 145)	50–77 y (n = 41)
Sociodemographics					
Age, mean (SE), y	48.4 (0.2)	36.3 (0.6)	43.8 (0.6)	50.0 (0.9)	60.4 (1.3)
Male	48.5 (0.4)	28.2 (2.6)	34.0 (2.7)	37.9 (5.6)	51.8 (9.9)
Race/ethnicity					
White	70.9 (1.6)	71.0 (2.7)	73.1 (2.2)	75.0 (3.9)	72.7 (7.9)
Nonwhite	29.1 (1.6)	30.0 (2.7)	26.9 (2.2)	25.0 (3.9)	27.3 (7.9)
Nativity					
US-born	85.8 (1.4)	92.1 (1.9)	91.3 (1.5)	90.9 (2.3)	85.9 (6.0)
Foreign-born	14.2 (1.4)	7.9 (1.9)	8.7 (1.5)	9.1 (2.3)	14.1 (6.0)
Education					
Less than high school	5.7 (0.3)	2.4 (0.7)	3.7 (0.9)	9.4 (3.7)	13.8 (5.9)
High school graduate	37.9 (0.6)	42.9 (3.1)	40.0 (2.7)	27.3 (4.2)	45.2 (9.4)
Some college or higher	56.3 (0.7)	54.7 (3.1)	56.3 (2.7)	63.3 (5.1)	41.1 (9.7)
Family poverty	12.7 (0.4)	30.5 (2.5)	29.1 (2.6)	23.2 (5.1)	20.2 (7.3)
Prior Lifetime Psychiatric Disorders					
Substance use disorders					
Alcohol use disorder		3.5 (1.1)	27.7 (2.6)	41.8 (5.4)	39.5 (9.8)
Drug use disorder		4.8 (1.2)	17.4 (2.1)	16.6 (4.3)	15.1 (8.7)
Nicotine dependence		1.6 (0.6)	14.0 (1.8)	25.3 (5.2)	26.0 (8.2)
Mood disorders					
Major depressive episode		18.9 (2.3)	33.6 (2.6)	40.0 (5.2)	43.7 (9.7)
Mania or hypomania		5.9 (1.5)	12.7 (1.7)	22.8 (4.8)	11.6 (6.2)
Dysthymic disorder		7.5 (1.6)	10.7 (1.5)	23.1 (4.6)	13.7 (8.7)
Anxiety disorders					
Panic disorder with or without agoraphobia		4.0 (1.4)	9.0 (1.7)	12.7 (3.3)	14.0 (6.4)
Social anxiety disorder		14.3 (2.1)	13.2 (1.8)	21.0 (5.1)	11.5 (5.4)
Specific phobia		18.8 (2.4)	20.2 (2.3)	26.2 (5.2)	16.5 (8.6)
Generalized anxiety disorder		3.7 (1.3)	9.4 (1.8)	11.6 (2.9)	9.3 (4.6)
Posttraumatic stress disorder		16.5 (2.0)	20.5 (2.0)	29.2 (5.2)	19.0 (7.7)
Attention-deficit/hyperactivity disorder		15.4 (2.1)	13.2 (1.8)	9.0 (2.4)	7.1 (5.2)
Pathological gambling		0.0 (0.0)	0.1 (0.1)	1.4 (1.0)	1.4 (1.4)
Conduct disorder		12.7 (2.1)	11.8 (1.9)	11.6 (4.2)	12.9 (6.6)
At least 1 Axis I disorder		54.7 (3.0)	56.6 (2.8)	70.5 (4.5)	70.5 (4.5)

[a]Values are shown as % (SE) unless otherwise noted. Percentages are weighted.

DISCUSSION

In a large, nationally representative sample of adults, most first nonfatal suicide attempts (85.3%) occurred before age 35 years. Our results suggest that several clinical factors influence the timing of the onset of nonfatal suicidal behavior. Compared with first suicide attempts occurring between 18 and 34 years, first suicide attempts occurring at < 18 years were more strongly associated with childhood maltreatment and less strongly linked to prior lifetime psychiatric disorders, whereas first suicide attempts occurring at 35 years and older were more strongly associated with a prior lifetime history of substance use disorders, including alcohol use disorder and nicotine dependence, and mood disorders, including mania/hypomania and dysthymic disorder between 35 and 49 years and major depressive episode at 50 years and older. Finally, we did not find any significant associations between family history of psychiatric disorders and sociodemographic characteristics (ie, gender, race/ethnicity, nativity, education, and family poverty) with age at first/single suicide attempt.

Almost half (45.2%) of individuals with a lifetime history of suicide attempt first attempted before 18 years, and most of them (85.3%) first attempted before 35 years. Several factors may contribute to explain the elevated incidence of suicide attempt in young people. First, childhood and adolescence constitute an important phase of neuropsychological development, including the development and the maturation of physical and cognitive abilities and emotional self-awareness. For example, a study[39] found that the dorsolateral prefrontal cortex (linked to important behavioral changes such as the ability to inhibit impulses and to evaluate consequences of decisions) does not reach adult dimensions until the age of 20 years. This lag may explain why certain vulnerable children and adolescents are prone to maladaptive emotional (eg, emotional coping), cognitive (eg, self-criticism), and social (eg, isolation) strategies,[40] which may increase their risk of suicide attempt. Second, adolescence is a period marked by new social stressors (eg, peer-rejection, bullying, academic pressure),[41] less perceived support from adults,[42] and, for certain adolescents, major identity developments (eg, sexual, social).[43] Finally, the decrease in incidence of suicide attempts after 35 years may be explained by the greater case-fatality rate associated with suicide attempts in later life, as the ratio between suicide and suicide attempt tends to rise as a function of age for both men and women to a peak in old age[2,44] and by the fact

Table 2. Comparing Sociodemographic Characteristics and Prior Lifetime Psychiatric Disorders by Age at Onset of First/Single Suicide Attempt Group in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (n = 34,629)[a]

Variable	No History of Suicide Attempt vs First Suicide Attempt Between 18 and 34 y	First Suicide Attempt Before 18 y vs First Suicide Attempt Between 18 and 34 y	First Suicide Attempt Between 35 and 49 y vs First Suicide Attempt Between 18 and 34 y	First Suicide Attempt Between 50 and 77 y vs First Suicide Attempt Between 18 and 34 y
	OR (95% CI), *P* Value	OR (95% CI), *P* Value	OR (95% CI), *P* Value	OR (95% CI), *P* Value
Sociodemographics				
Age	**1.02 (1.01–1.02), <.001**	**0.95 (0.94–0.96), <.001**	**1.04 (1.03–1.06), <.001**	**1.11 (1.08–1.14), <.001**
Male	**1.82 (1.44–2.31), <.001**	0.76 (0.53–1.10), .14	1.19 (0.71–1.97), .51	2.08 (0.93–4.67), .08
Race/ethnicity				
White	0.90 (0.72–1.11), .31	0.90 (0.67–1.22), .51	1.10 (0.69–1.76), .68	0.98 (0.45–2.13), .96
Nonwhite	1.00	1.00	1.00	1.00
	AOR (95% CI)/*P* value[b]	AOR (95% CI), *P* value[b]	AOR (95% CI), *P* value[b]	AOR (95% CI), *P* value[b]
Nativity				
US-born	1.00	1.00	1.00	1.00
Foreign-born	**1.75 (1.25–2.45), .001**	0.72 (0.38–1.38), .32	1.09 (0.60–1.99), .76	1.54 (0.35–6.73), .56
Education				
Less than high school	1.15 (0.67–1.97), .61	0.71 (0.30–1.67), .43	2.43 (0.76–7.74), .13	NA
High school graduate	0.90 (0.72–1.13), .36	0.96 (0.67–1.36), .80	0.64 (0.39–1.04), .07	1.69 (0.62–4.58), .30
Some college or higher	1.00	1.00	1.00	1.00
Family poverty	**0.39 (0.30–0.50), <.001**	0.90 (0.65–1.26), .60	0.89 (0.48–1.64), .70	0.94 (0.35–2.53), .90
Prior Lifetime Psychiatric Disorders				
Substance use disorders				
Alcohol use disorder		**0.10 (0.05–0.21), <.001**	**2.11 (1.21–3.68), .009**	**2.57 (1.05–6.27), .039**
Drug use disorder		**0.24 (0.13–0.42), <.001**	1.32 (0.67–2.60), .40	1.39 (0.29–6.68), .70
Nicotine dependence		**0.10 (0.04–0.23), <.001**	**2.37 (1.22–4.61), .011**	**3.65 (1.66–9.47), .008**
Mood disorders				
Major depressive episode		**0.44 (0.31–0.63), <.001**	1.53 (0.91–2.57), .11	**3.01 (1.20–7.56), .019**
Mania or hypomania		**0.41 (0.22–0.77), .006**	**2.26 (1.21–4.25), .011**	1.27 (0.38–4.27), .70
Dysthymic disorder		0.67 (0.39–1.14), .14	**2.84 (1.52–5.32), .001**	2.25 (0.49–10.2)/.30
Anxiety disorders				
Panic disorder with or without agoraphobia		**0.39 (0.20–0.79), .009**	1.52 (0.77–3.00), .20	2.28 (0.61–8.46), .20
Social anxiety disorder		1.09 (0.69–1.71), .70	1.85 (0.92–3.75), .09	1.15 (0.34–3.91), .80
Specific phobia		0.88 (0.59–1.32), .50	1.68 (0.92–3.09), .09	1.44 (0.39–5.40), .60
Generalized anxiety disorder		**0.37 (0.19–0.75), .006**	1.35 (0.70–2.63), .40	1.45 (0.45–4.62), .50
Posttraumatic stress disorder		0.78 (0.54–1.12), .18	1.78 (0.99–3.19), .053	1.44 (0.49–4.30), .50
Attention-deficit/hyperactivity disorder		1.17 (0.73–1.88), .50	0.71 (0.35–1.42), .30	0.78 (0.15–4.19), .80
Pathological gambling		NA	NA	NA
Conduct disorder		1.13 (0.66–1.93), .70	1.05 (0.41–2.72), .90	1.41 (0.45–4.41), .50
At least 1 Axis I disorder		0.85 (0.61–1.17), .30	**2.08 (1.29–3.36), .003**	1.17 (0.48–2.86), .70

[a]Boldface indicates statistical significance.
[b]Adjusted for sex, race/ethnicity (white vs nonwhite), and age at Wave 2.
Abbreviations: AOR = adjusted odds ratio, NA = not applicable, OR = odds ratio.

that those who completed suicide in earlier attempts do not reach older age.

Although it is noteworthy that most psychiatric disorders increase the risk of suicide attempt at all ages,[12,14,16,17,45–48] we found that several disorders may be associated with heterogeneity in the timing of the onset of nonfatal suicidal behavior. Specifically, compared with first suicide attempts occurring between 18 and 34 years, first suicide attempts occurring in later life (ie, at 35 years and older) were more strongly associated with mood disorders and substance use disorders, whereas first suicide attempts occurring early in life (ie, at < 18 years) were less strongly related to psychiatric disorders.

Our results are in line with those of prior studies[3,4,18,22,23,49,50] that have suggested that mood disorders are more strongly associated with suicide risk in older than in younger adults. There is evidence that the brain circuitry and neurochemical abnormalities related to mood disorders can disrupt the underlying neurobiological structures involved in stress response and susceptibility to environmental influences.[51] Longer exposure to depression may account at least in part for the increased suicide risk in older adults,[52] possibly through greater neuroinflammation.[53–55]

Contrasting with prior studies suggesting that substance use disorders may play a lesser role in later life suicide risk, we found that first suicide attempts occurring in later life (ie, at 35 years and older) may be more strongly associated with alcohol use disorder and nicotine dependence than those occurring between 18 and 34 years. Our use of a general population sample and our focus on age at first suicide attempt may partly explain these discrepancies since prior studies have often relied on clinical samples and their results might have reflected differences related to multiple suicide attempts rather than to age at first suicide attempt. A greater vulnerability to deleterious neurologic effects of nicotine and alcohol in older adults—which may result from physiologic changes that occur with aging, such as reduced kidney clearance and volume of distribution,[56,57]—might

Table 3. Prevalence Rates of Childhood Maltreatment Experiences and Parental History of Psychiatric Disorders by Age at Onset of First/Single Suicide Attempt Group in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (n = 34,629)[a]

Variable	No History of Suicide Attempt (n = 33,389)	Age at First/Single Suicide Attempt Before 18 y (n = 519)	Age at First/Single Suicide Attempt Between 18 and 34 y (n = 535)	Age at First/Single Suicide Attempt Between 35 and 49 y (n = 145)	Age at First/Single Suicide Attempt Between 50 and 77 y (n = 41)
Childhood maltreatment					
Physical neglect	6.0 (0.0)	8.4 (0.2)	7.7 (0.2)	7.8 (0.4)	8.2 (0.9)
Emotional abuse	4.3 (0.0)	7.7 (0.2)	6.8 (0.2)	6.9 (0.4)	6.7 (0.7)
Physical abuse	2.8 (0.0)	4.9 (0.2)	4.3 (0.1)	4.5 (0.3)	4.3 (0.5)
Sexual abuse	4.3 (0.0)	7.2 (0.2)	6.4 (0.2)	6.1 (0.4)	5.4 (0.5)
Emotional neglect	8.1 (0.0)	12.2 (0.3)	10.9 (0.3)	11.4 (0.6)	11.3 (0.9)
Family history of psychiatric disorder					
Alcohol abuse	21.3 (0.4)	48.7 (2.7)	41.4 (2.7)	51.7 (5.7)	39.3 (9.5)
Drug abuse	3.4 (0.1)	18.0 (2.3)	10.5 (1.7)	9.0 (3.3)	5.2 (5.0)
Major depression	23.5 (0.5)	56.9 (3.0)	53.6 (3.0)	54.0 (6.3)	33.6 (10.4)
Antisocial personality disorder	8.1 (0.3)	31.2 (2.9)	24.6 (2.3)	30.6 (5.3)	16.3 (8.0)

[a]Values are shown as % (SE); percentages are weighted.

Table 4. Comparing Childhood Maltreatment Experiences and Parental History of Psychiatric Disorders by Age at Onset of First/Single Suicide Attempt Group in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (n = 34,629)[a]

Variable	No History of Suicide Attempt vs First Suicide Attempt Between 18 and 34 y	First Suicide Attempt Before 18 y vs First Suicide Attempt Between 18 and 34 y	First Suicide Attempt Between 35 and 49 y vs First Suicide Attempt Between 18 and 34 y	First Suicide Attempt Between 50 and 77 y vs First Suicide Attempt Between 18 and 34 y
Childhood maltreatment				
Physical neglect	**0.85 (0.84–0.87), <.001**	**1.03 (1.01–1.06), .009**	1.00 (0.96–1.04), >.90	1.02 (0.95–1.10), .60
Emotional abuse	**0.78 (0.76–0.80), <.001**	**1.06 (1.02–1.10), .003**	1.01 (0.96–1.07), .70	1.02 (0.93–1.12), .60
Physical abuse	**0.70 (0.67–0.73), <.001**	**1.02 (1.04–1.16), <.001**	1.02 (0.94–1.12), .60	1.02 (0.89–1.17), .80
Sexual abuse	**0.78 (0.76–0.80), <.001**	**1.04 (1.01–1.07), .009**	0.99 (0.94–1.05), .80	0.98 (0.88–1.08), .60
Emotional neglect	**0.89 (0.88–0.91), <.001**	**1.04 (1.02–1.07), .001**	1.01 (0.97–1.04), .70	1.00 (0.95–1.05), >.90
Family history of psychiatric disorder				
Alcohol abuse	**0.42 (0.34–0.52), <.001**	1.28 (0.94–1.74), .12	1.59 (0.96–2.65), .07	1.15 (0.48–2.75), .70
Drug abuse	**0.39 (0.26–0.58), <.001**	1.36 (0.83–2.24), .20	1.13 (0.45–2.84), .80	1.09 (0.14–8.43), .90
Major depression	**0.30 (0.24–0.37), <.001**	1.02 (0.76–1.38), .90	1.10 (0.64–1.90), .70	0.60 (0.22–1.60), .30
Antisocial personality disorder	**0.31 (0.24–0.40), <.001**	1.17 (0.82–1.68), .40	1.57 (0.89–2.75), .12	0.88 (0.27–2.79), .80

[a]Values are shown as AOR (95% CI), *P* value; adjustment was made for sex, race/ethnicity (white vs nonwhite) and age at Wave 2. Boldface indicates statistical significance.
Abbreviation: AOR = adjusted odds ratio.

explain their stronger effect on suicide risk in older than in younger adults.

We found that all childhood maltreatment types were significantly more common among individuals who first attempted suicide before 18 years than in those who first attempted suicide between 18 and 34 years. These findings are in line with prior research showing that exposure to childhood maltreatment, which affects developmental processes related to the strengthening of interpersonal and emotion regulation,[58,59] possibly though epigenetic modifications,[60] can have detrimental long-term effects on suicide risk,[10,34] particularly when it occurs at a younger age.[61] The effect of maltreatment might also be less intense later in life because people may develop coping strategies as they age, decreasing its detrimental effect on suicide risk.

Although family history of psychiatric disorders and many psychosocial and environmental factors are established risk factors for suicide,[62,63] we found that neither family history of alcohol and drug use disorders, antisocial personality disorder, or major depression nor sex, race/ethnicity, nativity, education, or family poverty differentially influenced the timing of the first nonfatal suicide attempt. This result is consistent with prior work that showed that genetic risk profiles associated with increased risk for suicide attempt may be shared to a large degree in older and younger adults and may have enduring effects on this risk[64,65] and that socioeconomic and environmental factors are important risk factors for suicidal behavior at all ages.[66,67]

Our findings have important implications. First, our results support the importance of assessing age at onset of first nonfatal suicide attempt because we found substantial age differences in associated risk factors. Second, given that almost half of individuals attempted suicide before 18 years and that these individuals were frequently exposed to childhood maltreatment, all children and adolescents who attempt suicide should be systematically assessed for childhood maltreatment. Preventing child maltreatment with evidence-based interventions[68] could strongly decrease

the burden of suicidal behavior. Finally, older adults with mood disorders and substance use disorders should be systematically assessed for suicide risk, particularly because a large percentage of first attempts are fatal in this population.[8]

This study has several limitations. First, the participants included in our study had experienced exclusively nonfatal suicide attempts; thus, the results could not be extrapolated to individuals who died by suicide. Second, we cannot establish a causal relationship between explored contributing factors and initial suicide attempts.[69] Third, the NESARC survey relies on retrospective self-reports, and reporting of suicide attempts, history of psychiatric disorder, and childhood maltreatment experiences may be subject to recall bias. Particularly, a prior study[70] conducted among 3,021 respondents aged 14 to 24 years found that one-third of baseline suicide attempters did not report their suicide attempt again at an assessment 4 years later, possibly because of a bias toward negative memory retrieval or autobiographical memory impairments.[71] Fourth, the number of participants who first attempted suicide at 50 years of age or older was relatively modest (n = 41), resulting in limited statistical power, and the subgroup of participants who first attempted suicide after 65 years (n = 4) was too small to be the subject of a specific analysis. Fifth, several disorders (eg, psychotic disorders, major neurocognitive disorders) known to be linked to suicide attempts were not assessed in the NESARC. Sixth, differences in clinical characteristics observed across age-at-first-suicide-attempt groups may reflect differences between multiple and single suicide attempters,[72,73] as early first suicide attempt (ie, at < 18 years) was significantly associated with increased risk of suicide attempt repetition (prevalence from the youngest to the oldest age at first suicide attempt group were 37.5% [SE = 2.4], 24.6% [SE = 4.8], 22.3% [SE = 4.8], and 8.6% [SE = 4.5]; $P < .001$). Finally, certain environmental risk factors such as loneliness and stressful life events and factors of suicide risk reduction such as connectedness with family and community organizations[4,74,75] were not assessed in the NESARC.

CONCLUSION

Our results suggest substantial age differences in risk factors for first nonfatal suicide attempt. Improving early detection and treatment of psychiatric disorders and preventing childhood maltreatment may have broad benefits to reduce the burden of suicidal behavior at all ages.

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