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Original Investigation

The Relationship Between Trauma Exposure and Adult Tobacco Use: Analysis of the National Epidemiologic Survey on Alcohol and Related Conditions (III)

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Abstract

Introduction: Previous research has examined cigarette smoking in trauma exposed populations. However, the relationships between trauma exposure and use of other tobacco products (eg, cigars, e-cigarettes) and specific trauma exposure characteristics that may be associated with tobacco use are understudied.

Aims and Methods: Using the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($N = 36\,151$ adults), we conducted weighted bivariate analyses of tobacco use among participants with no trauma exposure, trauma exposure, and trauma exposure with post-traumatic stress disorder (trauma + PTSD), stratified by tobacco product use. We also performed weighted logistic regressions testing relationships between trauma exposure and tobacco use, controlling for behavioral health (BH) conditions (mood, anxiety, substance use, personality disorders) and sociodemographics.

Results: Approximately 44% of participants had experienced trauma; 6% experienced trauma + PTSD. Trauma exposed participants had a higher prevalence of tobacco use (30%—46% vs. 22%) and poly-tobacco use (34%—35% vs. 28%) than unexposed participants. Cigarettes were the most used tobacco product; trauma + PTSD (19%), and trauma (15%) participants had a higher prevalence of e-cigarette use than unexposed participants (11%). Trauma exposure was associated with current tobacco use (AOR = 1.36 trauma + PTSD; 1.23 trauma) (but not former use), particularly among participants exposed to violence/abuse (AOR = 1.23). Personality and substance use disorders were strongly associated with current and former tobacco use.

Conclusions: Trauma exposure, PTSD, and experiences of violence/abuse are associated with current tobacco use. BH conditions may also play a role in current and former tobacco use. Recognizing and addressing trauma exposure and BH conditions among tobacco users may improve cessation rates in these populations.

Implications: This study contributes to research on tobacco use disparities in behavioral health populations by providing a comprehensive examination of tobacco use in trauma exposed individuals. Prior research has examined cigarette smoking, but not other tobacco product use in these populations. This study presents findings on multiple tobacco use behaviors (tobacco

product, poly-tobacco use, cessation attempts) in trauma exposed populations and characteristics of trauma exposure (severity, type of traumatic event) associated with tobacco use. These findings underscore the importance of further examining the implications of trauma exposure for tobacco use and of screening and addressing trauma in cessation treatment.

Introduction

Behavioral health populations (BH), which include people living with psychological distress, mental health conditions (MH), and substance use disorders (SUD),[1] have an elevated prevalence of tobacco use. For example, in 2017, cigarette smoking prevalence was an estimated 33.3% in MH populations and 25%–44% in SUD populations, compared to 14% in the general U.S. population.[2–4] Exposure to trauma—experiencing or witnessing a life-threatening event, serious injury or illness, or sexual violence—can have serious, detrimental effects on BH.[5–7] Trauma exposure is common in the United States, with approximately 83% of adults reporting trauma exposure during their lifetime.[8] Post-traumatic stress disorder (PTSD), a BH condition characterized by prolonged re-experiencing of a traumatic event, avoidance of reminders of the event, negative affect, and hyperarousal, represents a severe response to trauma.[5] Approximately 1%–7% of trauma exposed individuals develop PTSD,[9,10] and the prevalence of both trauma exposure and PTSD are elevated in women and other marginalized sociocultural groups.[11] For example, one study found that women are more than twice as likely as men to experience PTSD.[11]

Cigarette smoking prevalence among people with PTSD is twice that of the general population,[12,13] and people with PTSD have lower smoking cessation rates than the general population.[14–17] Some evidence suggests that trauma exposure alone (without PTSD) is associated with cigarette smoking, but findings have been mixed.[18,19] Trauma exposure often co-occurs with other BH conditions (eg, depression, SUD), which are associated with tobacco use.[6,7,20,21]

Having a BH condition is also associated with the use of other (non-cigarette) tobacco products, including e-cigarettes, cigars, and pipes.[21–23] There is also growing concern about poly-tobacco use, because using multiple tobacco products may have compounding negative health effects.[24,25] However, few studies have examined other tobacco product use in people with PTSD,[26] and, to date, none have examined this in trauma exposed individuals without PTSD, who represent the majority of trauma exposed populations.[9,26] This is potentially problematic as trauma exposed and PTSD populations may differ in their tobacco use behaviors. PTSD, a diagnosable BH condition, represents a severe psychological response to trauma exposure and is strongly associated with tobacco use,[5] but it is unclear as to whether those with trauma exposure absent PTSD have similar tobacco use patterns to the general population or mirror the patterns of PTSD populations.

Although tobacco use behaviors may differ between trauma exposed individuals who develop PTSD and those who do not, there has yet to be a comprehensive examination of tobacco use in both populations.[27,28] Research on specific characteristics of trauma exposure that may influence tobacco use is also lacking. Additionally, despite trauma exposure being common in the United States,[8] studies of trauma exposure and tobacco use have seldom been conducted using U.S.-based, nationally representative surveys.[27–29]

This study aimed to: (1) examine relationships between trauma exposure and current and former tobacco use (cigarettes, other tobacco products) in a nationally representative U.S. sample, (2) examine tobacco use patterns (products used, poly-use, past-year quit attempts, daily vs. non-daily tobacco use), among trauma exposed and unexposed populations, and (3) examine relationships between trauma exposure characteristics (type of trauma, number of traumatic event types experienced) and current and former tobacco use.

This study contributes an in-depth, nuanced examination of trauma exposure and tobacco use by incorporating analyses of trauma exposure severity (trauma exposure vs. PTSD), types of traumatic events, potential implications of a variety of BH conditions, and an exploration of the use of multiple tobacco product types among both trauma exposed and PTSD populations, which has yet to be represented in the literature. This can potentially contribute knowledge about the ways in which trauma exposed populations use a variety of tobacco products, while considering the complexities of trauma characteristics (eg, type of trauma, number of traumatic events) and BH comorbidities to better inform both tobacco cessation and BH treatments. Analyzing tobacco use patterns in trauma exposed individuals with no PTSD (the majority of trauma exposed individuals) along with people with PTSD may help to further elucidate factors contributing to tobacco use disparities.

Methods

Data Source

This study analyzed data from the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III). The U.S.-based, nationally representative NESARC-III used complex multistage probability sampling, incorporating clustering and oversampling of Black/African American, Hispanic/Latino, and Asian/Asian American populations. Participants (N = 36 309; response rate = 60.1%) were civilian, noninstitutionalized adults aged 18 and older. Detailed sampling methodology has been published previously.[30]

Measures

Data included in these analyses were sociodemographic characteristics (age, sex, race/ethnicity, marital status, family income, and sexual orientation), tobacco use behaviors, trauma exposure, and BH conditions. Participants with incomplete trauma exposure data (N = 158) were omitted from the analyses.

Tobacco Use Status

The NESARC-III dataset included a tobacco use status variable, which classified participants as current, former, or never tobacco users. The tobacco use status variable classified participants as current tobacco users if they reported using one or more of the following five tobacco products in the past 12 months: cigarettes, cigars, pipes, smokeless tobacco (snuff, chewing tobacco), and/or e-cigarettes/e-liquid. Participants were classified as former tobacco users if they had ever used any of the five tobacco products but had not used them in the past 12 months. Participants

were classified as never users if they reported never having used any of the five products. Poly-tobacco use (a variable defined by the authors) was defined as the current use of more than one tobacco product. We also examined daily versus non-daily tobacco use among current users. Participants were asked how often they used tobacco, and answer choices ranged from every day to once a month or less. We recoded this into a variable that measured daily (those who reported using tobacco every day) versus non-daily use (those who reported using tobacco less frequently than every day).

Past-year quit attempts were assessed in current users, who were asked if they had, in the past 12 months, "more than once [tried] to stop or cut down on [their] tobacco or nicotine use but found [they] couldn't do it." Individuals who answered "yes" to this question were determined to have made more than one past-year quit attempt. This question was not asked of former tobacco users, and the frequency of past-year quit attempts was not assessed in this survey.

Trauma Exposure

To assess direct trauma exposure, all participants were asked, "In your entire life, have any of these stressful or traumatic events ever happened to you personally?" and were provided with a list of 20 potential events to assess their experiences (see NESARC-III flashcard 45A).[31] To assess indirect trauma exposure, all participants were asked "In your entire life, have you ever personally witnessed any of these traumatic or stressful events happening to a friend, relative, or any other person?" and were provided with the same list of events. Participants were then asked which of the listed events they would "single out as the most stressful and upsetting" to them, and a variable was included in the NESARC-III dataset for most stressful trauma type, which was a mutually exclusive variable that recorded one trauma type for each participant.

Given that 20 traumatic event types were represented in the survey, the authors sought to condense this variable for statistical modeling. Using an adapted classification of traumatic events from the U.S. Department of Veterans Affairs National Center for Posttraumatic Stress Disorder,[32] traumatic event types were grouped into six categories: (1) war and combat (four event types in this category), (2) violence and abuse (adulthood) (six event types), (3) disaster, mass violence, and terrorism (two event types), (4) childhood physical/sexual abuse (two event types), (5) other trauma (included serious/life-threatening illness or injury, saw dead body or body parts, kidnapped, refugee, juvenile detention/jail, and other [not specified]), unknown (seven total event types), and (6) indirect trauma (witnessed any of the aforementioned traumatic/stressful events happening to another person). We adapted our categories using the U.S. Department of Veteran's Affairs categorizations, because this provided the opportunity to include all trauma types in a concise manner, while also adapting from categories that are accepted at a federal government level. This categorization was devised under the supervision of one of the authors who is a clinical psychologist. See Supplementary Table 2 for details. A variable was also included in the NESARC-III dataset for the number of traumatic event types experienced (1, 2, 3, or 4 or more types of events).

PTSD diagnosis was an existing variable in the NESARC-III dataset and was assessed through self-reported experiences of Diagnostic and Statistical Manual of Mental Disorders (DSM-V) diagnostic criteria for PTSD.[5] These items were asked in reference to the single traumatic event type that participants deemed "most stressful and upsetting." Responses to these questions were aggregated by the NESARC-III researchers to ascertain whether participants met the DSM-V diagnostic criteria for PTSD. Further details about the existing PTSD variable in the dataset are documented in the NESARC-III data notes, which are publicly available on https://www.niaaa.nih.gov/research/nesarc-iii.

Other BH Conditions

Other BH conditions (which were also existing variables in the NESARC-III dataset) were measured through self-reported experiences of DSM-V BH symptoms, which were aggregated by the NESARC-III researchers to assess whether participants met criteria for diagnosable BH conditions. Individual lifetime diagnoses as described in the NESARC-III Diagnostic Variable Codebook were collapsed by the authors into four separate variables: lifetime mood (major depression, dysthymia, bipolar), anxiety (agoraphobia, social phobia, specific phobia, and generalized anxiety), and personality disorders (borderline, schizotypal, antisocial), which followed the higher-level disorder categories listed in the NESARC-III data notes and diagnostic codebook, as well as substance use (alcohol and/or drug) disorders (defined separately in NESARC-III but collapsed by the authors into a broader substance use disorder variable).

Statistical Analysis

We used survey weighting procedures in STATA 15 to conduct these analyses using the svyset command to accommodate the complex survey design used in the NESARC-III. We utilized the existing weighting variable provided in the dataset for all analyses, which represented a final person-level weight constructed to compensate for the probability of selection and nonresponse, differential response, and poststratification of nonresponse weights. As recommended in the NESARC-III methodology report, we specified the stratum variable included in the dataset and set the variance estimation to Taylor Linearization. We conducted weighted univariate and bivariate analyses of tobacco use status for three trauma exposure groups: no trauma exposure ("no trauma" group), trauma exposure with no PTSD ("trauma" group), and trauma exposure with PTSD ("trauma + PTSD" group). We then conducted stratified bivariate analyses of trauma exposure and tobacco use status by trauma exposure characteristics (type of trauma; number of discrete event types), sociodemographic variables, current tobacco use characteristics (poly-use; past-year quit attempts; type of tobacco product; daily/non-daily use), and BH conditions.

We conducted weighted logistic regressions to test relationships between trauma exposure and two tobacco use variables (current and former use), while controlling for age, sex, race/ethnicity, marital status, income, sexual orientation, trauma characteristics, and individual BH conditions (entered independently from trauma exposure status [ie, do not directly represent comorbidity]). For statistical modeling, former and never tobacco users were collapsed into a "noncurrent tobacco user tobacco user" category to compare with current use. The first logistic regression analysis examined the odds of being a current tobacco user, compared to a noncurrent user, and the second assessed the odds of being a former tobacco user, compared to a current user. Models were constructed iteratively, with the preliminary models containing sociodemographic characteristics and trauma characteristics but not BH conditions. Our final models contained these variables and BH conditions.

Results

NESARC-III Sample

The study sample was comprised of 36 151 participants; most participants were female (51.9%), married or living with someone (57.9%), and heterosexual (95.9%). The sample was 66.2% White, 14.7% Hispanic/Latino, and 11.8% Black/African American. Supplementary Table 1 contains further information about the study sample.

Trauma Exposure

Half of participants (50.4%) had never experienced trauma, 43.9% had experienced trauma but did not develop PTSD, and 5.7% experienced trauma and developed PTSD (see Table 1). Many trauma exposed participants had experienced four or more traumatic event types (36.0% of trauma vs. 60.9% of trauma + PTSD; $p < .001$). Indirect trauma was the most prevalent event type in the trauma group (30.5%; $p < .001$ vs. other trauma types), while childhood physical/sexual abuse was the most prevalent in the trauma + PTSD group (28.0%; $p < .001$ vs. other trauma types) (Supplementary Figure 1).

Trauma Exposure and Tobacco Use

The prevalence of current tobacco use in the trauma group (30.4%) was higher than the no trauma group (22.3%), but lower than the trauma + PTSD group (45.6%; $p < .001$). The no trauma group also had the highest prevalence of never use (62.1% vs. 47.4% trauma, 36.6% trauma + PTSD; $p < .001$). The trauma group had the highest prevalence of former tobacco use (22.3% vs. 15.6% no trauma, 17.8% trauma + PTSD; $p < .001$) (see Table 1).

BH Conditions, Trauma Exposure, and Tobacco Use Status

Other BH conditions were common among trauma exposed participants, and the trauma + PTSD group had an extremely high prevalence of other BH comorbidities (92.1%) (Supplementary Figure 2). Across tobacco use groups, the prevalence of any other BH condition (not including PTSD) was highest among current tobacco users (55.3% no trauma, 75.1% trauma, 96.0% trauma + PTSD; all $p < .001$ vs. other tobacco use groups). The most common BH condition across current users in all trauma exposure groups was SUD (43.4% of no trauma tobacco users with BH conditions; 58.3% of trauma, 75.2% of trauma + PTSD) (Table 2).

Current Tobacco Users

Current tobacco users in the no trauma and trauma groups were predominantly male (60.7% no trauma; 61.2% trauma) and had a $40 000—$79 999 income (31.5% no trauma; 31.3% trauma). In contrast, current users in the trauma + PTSD group were predominantly female (64.3%) and had a <$20 000 income (42.2%). See Table 1 for further details.

Most current tobacco users across trauma exposure groups reported smoking cigarettes (86.2% of no trauma current users, 85.8% of trauma, and 92.0% of trauma + PTSD); e-cigarettes were the second most commonly used product among trauma exposed participants (15.3% of trauma, 18.8% of trauma + PTSD; $p < .001$ vs. no trauma); cigars were the second most used product in the no trauma group (11.8% of no trauma $p < .001$ vs. other trauma groups). Poly-tobacco use was common across all groups but higher in the trauma groups (28.2% no trauma, 33.7% trauma, 34.8% trauma + PTSD $p < .001$). Trauma + PTSD current users also had the highest prevalence of daily tobacco use (82.8% vs. 73.7% no trauma, 78.9% trauma; $p < .001$). Trauma + PTSD current users had the highest prevalence of having made more than one past-year quit attempt (53.8% of trauma + PTSD vs. 41.4% trauma, 38.3% no trauma; $p < .001$) (see Table 1).

Regression Analyses

In the preliminary regression model testing relationships between trauma exposure and current (vs. noncurrent) tobacco use (excluding BH conditions), both trauma and trauma + PTSD were associated with current use (AOR = 1.28 trauma, AOR = 1.95 trauma + PTSD; $p < .001$ vs. no trauma) (data not shown). After accounting for BH conditions in the full model, the relationships between trauma exposure and trauma + PTSD and current use remained significant but were attenuated (AOR = 1.23 trauma [$p < .001$], AOR = 1.36 trauma + PTSD [$p = .001$]). Experiencing (adulthood) violence/abuse (AOR = 1.23; $p = .002$) and experiencing four or more traumatic event types (AOR = 1.17; $p = .002$) were associated with current use. Personality disorder (AOR = 1.52; $p < .0001$) and SUD (AOR = 2.66; $p < .001$) were associated with current use (Table 3). Sociodemographic characteristics associated with current use were bisexual identity (AOR = 1.37; $p = .02$ vs. heterosexual), being 30–39 years old (AOR = 1.15; $p = .02$ vs. <30 years), and being divorced/separated/widowed (AOR = 1.38; $p < .001$ vs. married/living with someone).

In the preliminary regression model of former tobacco use (vs. current), (excluding BH conditions), trauma + PTSD (AOR = 0.73, $p = .009$) and experiencing four or more event types (AOR = 0.83, $p = .004$) were negatively associated with former use. In the full model, none of the trauma exposure variables were significantly associated with former use. Personality disorder (AOR = 0.79; $p = .002$) and SUD (AOR = 0.77; $p < .001$) were negatively associated with former use (see Table 4). Sociodemographic factors that were negatively associated with former use were Black/African American race/ethnicity (AOR = 0.64; $p < .001$ vs. White), being divorced/separated/widowed (AOR = 0.70; $p < .001$), or never married (AOR = 0.63; $p < .001$).

Discussion

Our study examined tobacco use among trauma exposed adults in a U.S.-based, nationally representative sample and found that participants with trauma exposure and trauma + PTSD were more likely to be current tobacco users than unexposed participants. Moreover, experiencing violence and abuse (adulthood), as well as experiencing four or more traumatic event types, were associated with current tobacco use. Neither trauma exposure, nor trauma + PTSD were associated with former use. Two BH conditions, personality disorder and substance use disorder were strongly associated with current and former tobacco use.

Tobacco Use by Trauma Exposure Status

Tobacco use patterns varied by trauma exposure group. Compared with unexposed participants, trauma exposed participants had a higher prevalence of poly-tobacco use and daily tobacco use (particularly in the trauma + PTSD group), which represents a more severe tobacco use profile.[25,33,34] Although most tobacco users used

Table 1. Sample Characteristics of NESARC-III Study Sample by Trauma Exposure and Tobacco Use Status ($N = 36\,151$)

	No Trauma ($N = 18\,646$; 50.4% of sample)						Trauma ($N = 15\,324$; 43.9% of sample)						Trauma + PTSD ($N = 2181$; 5.7% of sample)					
	Current		Former		Never		Current		Former		Never		Current		Former		Never	
	N	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]
Total	4197	22.3***	2512	15.6***	11937	62.1***	4807	30.4***	3024	22.3***	7493	47.4***	990	45.6***	362	17.8***	829	36.6***
Age																		
<30	1146	29.0***	153	5.3***	3519	29.5***	1045	21.5***	124	3.6***	1621	20.2***	258	27.2***	22	6.3***	201	26.9***
30—39	914	20.7***	288	9.9***	2392	17.6***	1032	19.8***	308	9.4***	1465	16.8***	225	22.0***	45	10.3***	202	19.1***
40—49	758	17.1***	340	13.9***	2125	17.5***	958	21.1***	422	13.9***	1413	19.7***	247	24.3***	70	19.0***	179	22.9***
50—59	754	17.6***	480	19.1***	1628	14.6***	1083	23.0***	639	21.1***	1355	19.4***	170	17.6***	97	28.9***	139	16.8***
60+	625	15.7***	1251	51.8***	2273	20.7***	689	14.7***	1531	51.9***	1639	24.0***	90	8.9***	128	35.7***	108	14.3***
Sex																		
Male	2398	60.7***	1289	53.6***	4314	40.7***	2735	61.2***	1562	56.4***	2886	42.7***	326	35.7***	107	32.0***	180	23.7***
Female	1799	39.3***	1223	46.4***	7623	59.3***	2072	38.8***	1462	43.6***	4607	57.3***	664	64.3***	255	68.0***	649	76.4***
Race/ethnicity																		
White	2281	68.1***	1669	78.0***	4869	54.6***	3001	75.2***	2264	83.2***	3797	63.7***	611	72.5***	236	74.8***	380	59.5***
Black/African American	1019	12.9***	353	7.2***	2876	13.9***	992	10.9***	331	5.8***	1715	13.0***	199	11.8***	48	7.3***	198	14.3***
American Indian/Alaska Native	59	1.5***	20	0.8***	95	0.9***	100	2.4***	40	1.5***	119	1.7***	33	4.1***	17	6.7***	27	3.7***
Asian/Native Hawaiian/Pacific Islander	171	4.7***	97	3.6***	884	9.0***	108	2.5***	57	1.9***	442	7.1***	11	1.2***	4	1.0***	23	3.9***
Hispanic/Latino	667	12.9***	373	10.5***	3213	21.6***	606	9.0***	332	7.7***	1420	14.4***	136	10.5***	57	10.2***	201	18.6***
Marital status																		
Married/living w/someone	1688	50.6***	1397	69.7***	5633	57.1***	1930	51.8***	1655	69.3***	3593	59.6***	343	43.7***	159	56.2***	329	49.5***
Widowed/divorced/separated	1066	20.0***	796	21.8***	2368	14.5***	1475	24.7***	1051	24.1***	1888	18.9***	345	29.6***	157	33.9***	235	22.4***
Never married	1443	29.3***	319	8.5***	3936	28.5***	1402	23.6***	318	6.6***	2012	21.4***	302	26.7***	46	10.0***	265	28.2***
Family income																		
<$20 000	1494	28.7***	581	16.0***	3373	22.2***	1698	29.0***	670	16.1***	1867	19.0***	481	42.2***	123	25.9***	292	28.1***
$20 000—$39 999	966	21.7***	501	17.9***	2657	18.9***	1137	21.5***	580	16.9***	1520	16.7***	208	22.7***	65	15.0***	185	20.4***
$40 000—$79 999	1226	31.5***	846	34.8***	3610	31.5***	1375	31.3***	1071	37.7***	2414	33.0***	243	26.2***	110	34.6***	242	32.1***
>$80 000	511	18.0***	584	31.3***	2297	27.4***	597	18.2***	703	29.4***	1692	31.3***	58	9.0***	64	24.6***	110	19.5***
Sexual orientation																		
Heterosexual	3960	94.6***	2435	97.4***	11508	96.6***	4514	94.8***	2916	96.9***	7186	96.5***	875	90.1	339	94.2	761	91.9
Gay/lesbian	77	1.8***	31	1.0***	130	1.0***	114	2.1***	58	1.7***	113	1.3***	27	2.0	9	3.1	24	2.6
Bisexual	73	1.6***	10	0.3***	107	0.8***	134	2.3***	30	0.9***	102	1.2***	65	5.9	9	1.7	33	4.3
Not sure/missing	87	2.1***	36	1.3***	192	1.6***	45	0.8***	20	0.6***	92	1.0***	23	1.9	5	1.0	11	1.2
Current tobacco users																		
Type of product used																		
Cigarette	3696	86.2***	—	—	—	—	4226	85.8***	—	—	—	—	920	92.0***	—	—	—	—
Cigar	459	11.8***	—	—	—	—	633	14.7***	—	—	—	—	117	12.2***	—	—	—	—
Pipe	70	1.7***	—	—	—	—	118	2.6***	—	—	—	—	24	3.1***	—	—	—	—
Snuff/chewing tobacco	423	12.7***	—	—	—	—	513	13.4***	—	—	—	—	69	9.4***	—	—	—	—
E-cigarette	416	11.2***	—	—	—	—	650	15.3***	—	—	—	—	168	18.8***	—	—	—	—
Daily vs. non-daily use																		
Daily tobacco use	3147	73.7***	—	—	—	—	3741	78.9***	—	—	—	—	812	82.8***	—	—	—	—
Non-daily tobacco use	1050	26.26***	—	—	—	—	1066	21.1***	—	—	—	—	178	17.2***	—	—	—	—
Poly-tobacco user	1029	28.2***	—	—	—	—	1417	33.7***	—	—	—	—	300	34.8***	—	—	—	—
Current quit attempts	1637	38.3***	—	—	—	—	1978	41.4***	—	–	–	–	540	53.8***	–	–	–	–

[a]Weighted percentage.

***$p < .001$; **$p < .01$; *$p < .05$.

Table 2. Trauma Exposure Characteristics and BH Comorbidities by Tobacco Use Status

	No Trauma						Trauma						Trauma + PTSD					
	Current		Former		Never		Current		Former		Never		Current		Former		Never	
	N	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]	*N*	%[a]
Type of traumatic event																		
War/combat	–	–	–	–	–	–	122	2.5***	110	4.2***	179	2.4***	25	3.4	18	5.3	32	4.6
Violence/abuse	–	–	–	–	–	–	746	14.0***	400	11.2***	1089	12.5***	219	19.7	75	16.9	184	21.2
Disaster/mass violence/terrorism	–	–	–	–	–	–	236	5.1***	160	5.1***	554	7.7***	13	1.8	4	1.6	17	1.7
Childhood physical/sexual abuse	–	–	–	–	–	–	513	10.3***	261	7.9***	703	8.8***	293	29.4	93	24.1	234	28.1
Other trauma	–	–	–	–	–	–	1827	38.8***	1218	41.7***	2694	36.9***	259	26.6	84	23.0	223	27.1
Indirect trauma	–	–	–	–	–	–	1363	29.2***	875	30.0***	2274	31.6***	181	19.2	88	29.1	139	17.3
# of traumatic event types																		
One	–	–	–	–	–	–	1091	21.5***	692	23.0***	2203	27.6***	89	8.5**	31	8.2**	109	12.1**
Two	–	–	–	–	–	–	934	19.5***	701	23.2***	1811	24.1***	117	12.9**	43	13.1**	126	15.2**
Three	–	–	–	–	–	–	783	16.3***	512	17.9***	1172	16.5***	137	12.7**	60	14.9**	153	19.5**
Four or more	–	–	–	–	–	–	1999	42.7***	1119	35.9***	2307	31.7***	647	65.9**	228	63.8**	441	53.2**
Lifetime BH conditions																		
Any BH condition	2233	55.3***	1080	44.4***	3451	30.4***	3548	75.1***	1794	58.6***	1794	48.7***	946	96.0***	324	88.5***	738	88.9***
Mood disorder	738	17.8***	426	17.1***	1488	12.9***	1517	31.9***	777	24.1***	1838	24.2***	671	69.6*	215	59.5*	547	66.8*
Anxiety disorder	505	12.9***	294	12.3***	1018	9.0***	1041	22.2***	626	20.1***	1207	16.4***	602	62.9*	193	53.7*	432	51.7*
Personality disorder	492	11.7***	161	6.4***	626	5.0***	1438	30.0***	557	17.1***	1051	12.7***	722	73.1***	193	48.1***	444	51.5***
Substance use disorder	1733	43.4***	659	27.4***	1672	15.4***	2709	58.3***	1125	37.9***	1677	23.1***	736	75.2***	216	58.6***	331	38.1***

[a]Weighted percentage.

***$p < .001$; **$p < .01$; *$p < .05$.

Table 3. Logistic Regression Analysis of Current Tobacco Use

	OR	95% CI
CURRENT TOBACCO USER		
Trauma exposure status		
No trauma	REF	
Trauma no PTSD	1.23***	1.10–1.36
Trauma + PTSD	1.36**	1.14–1.62
Trauma type		
Indirect trauma	REF	
War/combat	1.00	0.78–1.27
Violence/abuse	1.23**	1.07–1.41
Disaster/mass violence/terrorism	0.93	0.77–1.14
Childhood physical/sexual abuse	1.14	0.98–1.33
Other	1.08	0.99–1.19
Number of traumatic event types		
One event	REF	
Two events	0.94	0.85–1.04
Three events	0.99	0.86–1.14
Four of more events	1.17**	1.06–1.30
Age		
<30	REF	
30–39	1.15*	1.02–1.30
40–49	1.02	0.88–1.18
50–59	0.96	0.85–1.08
60+	0.40***	0.35–0.45
Sex		
Male	REF	
Female	0.55***	0.51–0.59
Race/ethnicity		
White, non-Hispanic	REF	
Black, non-Hispanic	0.77***	0.70–0.86
Alaskan Native, American Indian, non-Hispanic	0.89	0.69–1.15
Asian, Hawaiian, or Other Pacific Islander, non-Hispanic	0.50***	0.41–0.61
Hispanic, any race	0.54***	0.48–0.60
Marital status		
Married/living with someone	REF	
Widowed/divorced/separated	1.38***	1.25–1.53
Never married	0.92	0.84–1.01
Income		
<$20 000	REF	
$20 000—$40 000	0.79***	0.71–0.89
$40 000—$80 000	0.52***	0.47–0.58
>$80 000	0.32***	0.28–0.37
Sexual orientation		
Heterosexual	REF	
Gay/lesbian	1.08	0.84–1.40
Bisexual	1.37*	1.05–1.77
Not sure or missing	0.99	0.72–1.37
Mood disorder		
No	REF	
Yes	1.04	0.95–1.13
Anxiety disorder		
No	REF	
Yes	1.05	0.95–1.17
Personality disorder		
No	REF	
Yes	1.52***	1.37–1.68
Substance use disorder		
No	REF	
Yes	2.66***	2.43–2.91
NONCURRENT TOBACCO USER	REF	

***$p < .001$; **$p < .01$; *$p < .05$.

cigarettes, e-cigarette use was common among trauma exposed groups, especially in the trauma + PTSD group. The NESARC-III survey was conducted before the dramatic increase in e-cigarette use in the United States,[35,36] suggesting that BH populations were early adopters of e-cigarettes. One study found that people with BH conditions are more likely to use e-cigarettes than people without BH

Table 4. Logistic Regression Analysis of Former Tobacco Use

	OR	95% CI
FORMER TOBACCO USER		
Trauma exposure status		
No trauma	REF	
Trauma no PTSD	0.96	0.82–1.12
Trauma + PTSD	0.86	0.68–1.10
Trauma type		
Indirect trauma	REF	
War/combat	1.08	0.77–1.52
Violence/abuse	0.86	0.69–1.05
Disaster/mass violence/terrorism	0.98	0.77–1.23
Childhood physical/sexual abuse	1.08	0.85–1.36
Other	1.03	0.90–1.18
Number of traumatic event types		
One event	REF	
Two events	1.05	0.91–1.20
Three events	1.03	0.85–1.24
Four of more events	0.90	0.79–1.03
Age		
<30	REF	
30–39	2.10***	1.68–2.64
40–49	2.85***	2.23–3.64
50–59	4.02***	3.22–5.02
60+	15.04***	11.96–18.91
Sex		
Male	REF	
Female	1.48***	1.31–1.68
Race/ethnicity		
White, non-Hispanic	REF	
Black, non-Hispanic	0.64***	0.56–0.74
Alaskan Native, American Indian, non-Hispanic	0.94	0.61–1.47
Asian, Hawaiin, or Other Pacific Islander, non-Hispanic	0.81	0.58–1.14
Hispanic, any race	1.28**	1.10–1.50
Marital status		
Married/living with someone	REF	
Widowed/divorced/separated	0.70***	0.61–0.80
Never married	0.63***	0.55–0.72
Income		
<$20 000	REF	
$20 000—$40 000	1.32**	1.09–1.60
$40 000—$80 000	2.02***	1.74–2.35
>$80 000	2.94***	2.43–3.56
Sexual orientation		
Heterosexual	REF	
Gay/lesbian	1.24	0.90–1.72
Bisexual	0.70	0.44–1.12
Not sure or missing	0.84	0.55–1.30
Mood disorder		
No	REF	
Yes	0.88	0.77–1.01
Anxiety disorder		
No	REF	
Yes	1.01	0.87–1.17
Personality disorder		
No	REF	
Yes	0.79**	0.68–0.92
Substance use disorder		
No	REF	
Yes	0.77***	0.68–0.86
CURRENT TOBACCO USER	REF	

***$p < .001$; **$p < .01$; *$p < .05$.

conditions,[22] suggesting that specific characteristics of e-cigarettes or product marketing strategies may appeal to BH populations. The elevated prevalence of other tobacco product use and poly-tobacco use in trauma exposed participants emphasizes the need for continued study of tobacco use patterns in these populations.

Trauma Exposure and Current Tobacco Use

Both trauma exposure and trauma + PTSD were associated with current tobacco use. Cigarette smoking in both groups has been studied previously, but findings on the association between trauma exposure alone (absent PTSD) and cigarette smoking have been mixed.[19,37] Therefore, this finding expands on existing studies by showing that trauma exposure (absent PTSD) may be a risk factor for tobacco use. Additionally, experiencing violence or abuse was associated with current use. This trauma type was more common in trauma + PTSD participants than trauma (absent PTSD) participants, suggesting that experiences of violence or abuse may be associated with stronger psychological responses and a propensity for tobacco use than other trauma types. No other traumatic event types were associated with current use, and further study on tobacco use by traumatic event type is needed.

Trauma Exposure and Former Tobacco Use

Neither trauma exposure alone, nor trauma + PTSD were associated with former use after controlling for BH conditions. However, current tobacco users with trauma + PTSD were found to have a higher prevalence of making past-year quit attempts than other trauma exposure groups.[12,28] Despite this finding, research has demonstrated that people with PTSD have poorer cessation rates than the general population.[14–17] The 2020 Surgeon General's report on smoking cessation explains that population-level cessation is driven by the rate of quit attempts and the rate of quitting success among those who try to quit.[38] The finding that current tobacco users with trauma + PTSD had the highest prevalence of quit attempts suggests that this population is taking actions to quit, but previous study findings imply that they may be less successful than other populations.[12,38]

Other BH Conditions, Trauma Exposure, and Tobacco Use

Having SUD was more strongly associated with current and former use than any of the trauma exposure characteristics. This relates to research showing that SUD and tobacco use commonly co-occur[3,39] and that SUD may create barriers to tobacco cessation.[40] Moreover, it has been well documented that trauma exposure and SUD frequently co-occur,[20,21] as was found in this sample. Given that both PTSD and SUD were associated with current tobacco use, comorbid trauma exposure and SUD (which was common in this sample) may be a particularly strong driver of tobacco use.

There was also an association between personality disorder and tobacco use, which may be related to the high comorbidity between PTSD and personality disorder in this sample. The high rates of comorbidity may have been influenced by Borderline Personality Disorder, which is so closely linked in diagnostic characteristics and comorbidity to PTSD that some mental health researchers have recommended that Borderline Personality Disorder be considered a trauma-related disorder or complication of PTSD.[41,42] PTSD and Borderline Personality Disorder commonly co-occur, with studies finding that between 24% and 58% of people with either PTSD or Borderline Personality Disorder have comorbid Borderline Personality Disorder/PTSD.[43,44] Furthermore, the relationship between personality disorders and tobacco use in this study may have been influenced by a proclivity for substance use in Borderline Personality Disorder populations,[45] which has been found to be especially prevalent in those with comorbid Borderline Personality Disorder and PTSD.[43] To our knowledge, there have yet to be comprehensive examinations of tobacco use in Borderline Personality Disorder populations. However, given the clinical overlaps and common comorbidity between PTSD and Borderline Personality Disorder, as well as the proclivity for substance use in people with Borderline Personality Disorder, we theorize that the relationship between personality disorders and tobacco use in this sample may have been influenced in part by co-occurring Borderline Personality Disorder and PTSD.

A Trauma-informed Approach to Tobacco Cessation Treatment

A trauma-informed approach to tobacco cessation treatment may help reduce tobacco use in trauma exposed populations. This approach emphasizes understanding tobacco use as a coping response to trauma exposure, promotion of health care consumer agency, and stigma reduction during cessation treatment.[46] It is also important that individuals seeking cessation services be screened for trauma exposure and referred to services specific to treating responses to trauma exposure.[47] Given that trauma exposure is prevalent in the United States, and is likely to be under-reported, trauma-informed treatment would ideally be provided universally, regardless of self-reported trauma exposure status.[47] Additionally, trauma-informed cessation resources may be further enhanced by tailoring resources to sociodemographic characteristics (eg, gender, race/ethnicity, sexual orientation).[48] For example, given that we found that women with PTSD had higher rates of smoking than men (despite men in the general population having higher smoking rates[4]) and research has demonstrated that women are more likely to experience PTSD than men,[11] trauma-informed cessation services may consider moving beyond a gender-neutral approach by specifically acknowledging women's unique traumatic experiences and the role of tobacco use in women's efforts to cope with trauma exposure.[48] Considering potentially high comorbidity between trauma exposure and other BH conditions, trauma-informed cessation treatment should also include screening for and attending to other BH needs, in order to promote more successful cessation outcomes.

Limitations

This study has several limitations. The NESARC survey is cross-sectional, and therefore, causal relationships between trauma exposure and tobacco use cannot be established. NESARC relies on self-report; trauma exposure, tobacco use, and BH symptoms may have been underreported due to stigma or inability to recall. Additionally, the assessment of trauma exposure did not include multiple exposures to one event. Consequently, we were not able to analyze the relationship between tobacco use and the number of exposures to a single type of event. Moreover, NESARC did not assess gender identity, and therefore non-cisgender populations were not identified. NESARC-III was conducted in 2012–2013, and the results may not reflect more recent tobacco use patterns. Despite these limitations, NESARC-III is one of the few nationally representative U.S. surveys that measures tobacco use, trauma exposure, and BH conditions.

Conclusions

Trauma exposure in this sample was associated with current tobacco use as well as the elevated prevalence of poly-tobacco use and daily tobacco use, which presents a more severe, complex tobacco use profile than was found in unexposed participants. The severity in tobacco use profile was particularly prevalent among tobacco users with trauma + PTSD. Experiences of violence and abuse, as well as experiencing four or more traumatic event types were also associated with current use. Among current tobacco users with trauma + PTSD, the high frequency of quit attempts among current tobacco users suggests that this population is motivated to quit, but evidence has shown that this population faces barriers to cessation. BH conditions frequently co-occurred with trauma exposure in this sample, and SUD and personality disorder were strongly associated with both current and former tobacco use. Recognizing and addressing trauma exposure and the potential role of other comorbid BH conditions may improve cessation rates in these populations, thus contributing to reducing tobacco-related health disparities.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at https://academic.oup.com/ntr.

Disclaimer

The opinions expressed by the authors/speakers are their own and this material should not be interpreted as representing the official viewpoint of the U.S. Department of Health and Human Services, the National Institutes of Health or the National Cancer Institute.

Declaration of Interests

None declared.

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