The Association of Posttraumatic Stress Disorder with Fast Food and Soda Consumption and Unhealthy Weight Loss Behaviors Among Young Women

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Abstract

Objective: This study examines the association of posttraumatic stress disorder (PTSD) symptoms with fast food and soda consumption, unhealthy dieting behaviors, and body mass index (BMI) in a group of young women.

Methods: This study was conducted on cross-sectional data gathered from 3181 females 16–24 years of age attending five publicly funded clinics in Texas. The associations among PTSD, fast food consumption frequency, soda consumption frequency, unhealthy dieting behaviors, and BMI were examined using binary and ordinal logistic regression.

Results: PTSD symptoms were associated with an increased frequency of consumption of fast food and soda as well as unhealthy dieting behaviors but not with increased body mass index (BMI).

Conclusions: PTSD symptoms adversely affect both eating and dieting behaviors of young women. These behaviors may have negative long-term consequences for the health of females with PTSD symptoms.

Introduction

POSTTRAUMATIC STRESS DISORDER (PTSD) is associated with a high level of functional impairment and increased costs in healthcare as well as high societal costs.¹ Reproductive-aged women may be particularly vulnerable to this condition, as it has been estimated that close to one third of U.S. women have experienced traumatic abuse related to intimate partner violence (IPV) during their lifetime, and two thirds of these will develop at least some PTSD symptoms.² Overall, about 10% of women living in the United States will develop PTSD at some point in their lifetime.³

The development of PTSD causes persistence of painful memories and reliving the traumatic event on a daily basis. According to the model described by Ehlers and Clark,⁴ the development of PTSD is due to an inability to appraise the traumatic situation in a way that reduces its effect, thereby inhibiting a return to normal activities that were engaged in before the trauma occurred. If the appraisal of the trauma or its sequelae remains negative and persists, it causes the victim to perceive the current threat level as more pronounced than it really is.⁴

Unhealthy eating and weight loss behaviors may be used by women suffering from PTSD to decrease unpleasant symptoms or to control how the memory of the trauma makes

them feel. Furthermore, negative appraisal of trauma may lead to victims neglecting their health because those who have experienced traumatic events view themselves in a negative light, which can include an increased consumption of unhealthy foods and beverages. The victims of trauma may find themselves coping with recurring unpleasant symptoms of PTSD with stress-induced eating and consumption of soda. Viewing themselves negatively may cause trauma victims to ignore habits they might consider healthier under normal circumstances or might be a method of avoiding a routine that increases PTSD symptom onset. Excessive amounts of caffeine from soda may help trauma victims to avoid sleep-related symptoms but may also increase feelings of hyper-vigilance. This situation may lead, in turn, to unhealthy dieting practices when these individuals notice or fear an increase in weight or possibly as a result of trying to maintain control in their lives.

Examination of these behaviors among reproductive-aged women is especially important because excessive intake of fast food and soda increases the likelihood of becoming obese and developing associated comorbidities that may affect future pregnancies or the health of children. Moreover, lower-income minority women may be particularly at risk because they must rely on fast food restaurants that offer food of poor nutritional quality in communities with large minority

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populations, where there may not be convenient access to stores that sell more nutritious foods.^{5,6} Fast food restaurants offer calorie-dense food that is relatively inexpensive when compared to more nutritious alternatives, and women in communities with low access to stores with more nutritious food may find it cheaper and more convenient to eat fast food more often.

Currently, data are not available on the association between PTSD and dietary behaviors among young, ethnically diverse women in the United States. The goal of this study was to address this gap in the literature by exploring the association between PTSD and the frequency of consumption of fast food, sugary sodas, and disordered dieting behaviors as well as body mass index (BMI) among a large sample of ethnically diverse young women who visited a publicly funded reproductive clinic in south Texas. We hypothesized that PTSD symptoms would be positively associated with frequency of fast food and soda consumption, unhealthy weight loss behaviors, and BMI.

Materials and Methods

Participants and procedure

A self-administered questionnaire with questions about health behaviors was given to 3181 women, aged 16–24 years (mean age 20.8, standard deviation [SD] 2.5), who visited one of five publicly funded reproductive clinics in southern Texas. Each respondent who completed the survey was compensated \$5 for her time. Methods were used to ensure that repeat surveys were not administered to the same individual. The survey study was approved by the Institutional Review Board of the University of Texas Medical Branch, Galveston.

To be included in the analyses for this study, the women who responded to the survey must have indicated being either Hispanic, black, or white. Respondents who indicated they were of Asian, American Indian/Alaskan Native, or Native Hawaiian or other Pacific Islander were excluded because there were not enough respondents in these categories to include them in the analyses. Forty-six percent of this sample ($n = 1447$) were Hispanic, 26% ($n = 808$) were black, and 28% ($n = 899$) were white. Thus, this study included 3154 of the original 3181 participants who met the criteria.

Measures

PTSD symptoms. The measure used in this study to assess PTSD symptoms is an altered subscale from the Psychiatric Diagnostic Screening Questionnaire (PDSQ), which was developed to screen for the symptoms of different *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) axis I disorders. The original version of the subscale included in the PDSQ was intended to screen for PTSD symptoms, with a sensitivity of 92% and good reliability and validity.^{7–9} The PTSD measure for this study consists of 9 items, with a possible score range of 0–9. Each question had a yes/no response. The PTSD measure had good internal consistency, with a Cronbach's alpha of 0.89. Factor analysis conducted on the 9 symptoms of PTSD identified a single common factor because the shape of the scree plot and eigenvalues < 1 suggested a one-factor solution. The rate of decline of eigenvalues was very fast after the first factor (4.46 for the first factor vs. 0.24 for the second factor) and then leveled off.

It is important to note that this altered version of the PDSQ subscale has not been validated, and the survey is not intended to diagnose PTSD but to act as a count of symptoms that are part of the PTSD diagnosis. The questions about PTSD symptoms addressed in this study fulfill criterion A1, that the symptoms are a result of trauma, and include symptoms that are part of criterion B and criterion C. Criterion B deals with reexperience of the trauma through thoughts, dreams, or feelings that cause distress. Questions that reflect criterion C involve questions about avoidance of stimuli that are associated with the trauma, such as thoughts, activities, or a feeling of detachment.

Fast food consumption. Questions about fast food consumption were included in the survey. The first question that asked about fast food consumption was: Yesterday, how many times did you eat fast food (like MacDonalds, Burger King, Taco Bell)? The respondent checked a box corresponding to one of four possible answers, ranging between 0 and 3. For the second question about fast food, the survey question was: In the past 7 days, on how many days did you eat at least one meal from a fast food place like MacDonalds, Burger King, Taco Bell? There were five possible responses: 0 days, 1 day, 2–3 days, 4–6 days, and every day. These responses were coded 0–5, respectively, for analyses.

Soda consumption. Three questions asked about soda consumption. The first question asked: Do you usually drink diet or regular soda, such as Coke, Pepsi, Sprite? Answers consisted of: I usually drink regular soda (not diet.). I usually drink diet soda. I usually don't drink soda. The second question was: Yesterday, did you drink regular soda, such as Coke, Pepsi, Sprite? The third question was: Yesterday, how many glasses or cans of regular soda did you drink? Possible answers were: 1, 2, 3 or more; I drank diet soda yesterday; I did not drink any soda yesterday. To capture responses from women who were more likely to be chronic drinkers of sugary sodas, only those who answered: I usually drink regular soda (not diet) to the first question and Yes for the second question were included in the analyses that used the third question. Respondents who reported drinking more than one glass or can of regular soda were assigned a 1. Others were coded as 0 for binary analysis. For the purposes of this study, regular and not diet soda was considered in the analyses.

Unhealthy dieting behaviors. This study evaluated different unhealthy dieting practices. The six questions that addressed unhealthy dieting practices, and had yes/no answers were: In the past 30 days, did you do any of the following things to lose weight or keep from gaining weight? Check all that apply.

1. Used diet pills, powders, or liquids
2. Used laxatives (like Ex-lax)
3. Used diuretics (water pills)
4. Made yourself throw up after eating
5. Skipped meals
6. Smoked more cigarettes

The answers to these questions were coded as binary, with a Yes assigned a 1 and a No coded as 0. For analyses that included more than one dieting method, respondents who listed more than one unhealthy dieting method were assigned a 1, and all others were assigned a 0.

Body mass index. Height and weight were obtained by a clinician during each woman's visit and extracted from each patient's chart. The normal category consisted of women with a BMI <25, overweight for a BMI between 25 and 30, and obese for a BMI $\geq$ 30. BMI may be associated with consumption of fast food and soda and unhealthy dieting behaviors, and it is possible that BMI could affect the magnitude of the associations. Therefore, BMI was included in the analyses that examined the associations between PTSD and fast food consumption, PTSD and soda consumption, and PTSD and unhealthy dieting methods.

Demographic variables. Other variables included in the study are marital status, education, and household income. Marital status had four possible categories: married, single, separated (including divorced and widowed), and living with partner. Education had three categories: currently enrolled or not graduated from high school, high school completed or GED earned, and some college or more. Income was categorized as a household income of <\$15,000, between \$15,000 and \$29,999, and >\$30,000.

Statistical analysis

SAS software version 9.2 was used for analysis. Descriptive statistics are compared using chi-square statistics. Relationships between PTSD and fast food consumption, as well as PTSD and BMI, were compared using ordinal logistic regression, with PTSD included in the models as a continuous variable. The associations between PTSD and consumption of sugary soda as well as PTSD and six unhealthy dieting methods were tested using binary logistic regression. The binary logistic regression tests the odds of engaging in each behavior with each additional symptom of PTSD that was endorsed. PTSD was included in the binary logistic regression as a continuous variable. Cases with missing response or explanatory variables were not included in the analyses.

Results

Descriptive statistics

Descriptive data were stratified into three categories according to PTSD scores (Table 1), and between-group differences were tested using chi-square analysis. In this sample of 3154 women, PTSD symptoms varied by race and marital status but not by income or education. A higher proportion of white women than black or Hispanic women from this sample endorsed more PTSD symptoms. A higher proportion of women who reported they were divorced, separated, or widowed reported experiencing more PTSD symptoms than those married, single, or living with a partner.

The mean BMI for all females in this sample is 26.98, indicating that this sample is, on average, overweight. For women aged $\geq$ 18 years, the average BMI is 27.24, and for females age <18 years, the average BMI is 25.73. PTSD symptoms did not vary by BMI category, although PTSD scores did vary by the amount of soda drunk on the previous day. Women who drank more than one soda reported more PTSD symptoms, and a higher proportion of women who reported a higher frequency of fast food eaten on the previous day reported experiencing more PTSD symptoms. Although PTSD symptoms did not differ among those who used laxatives or

diuretics as a diet method in the past 30 days, a higher number of PTSD symptoms were present among the women who reported they had vomited, skipped meals, used pills, powders, or liquids, and smoked more cigarettes in the past 30 days to lose or maintain weight.

Fast food consumption. PTSD symptoms are positively associated with the frequency of fast food consumption both on the previous day and during the past week (Table 2). The results of this study indicate that PTSD symptoms were associated with a 3.3% increase in the likelihood of eating fast food more frequently yesterday (confidence interval [CI] 0.2%-6.5%). PTSD symptoms were also associated with a 5.1% increase in the likelihood of eating more fast food in the past week (CI 2.1%-8.2%).

Soda consumption. PTSD symptoms are positively associated with the frequency of consuming sugary soda. Binary logistic regression reveals that PTSD symptoms in this study are associated with a 5.0% increased likelihood of consuming more than one soda in a day (CI 0.9%-9.2%) (Table 3).

Unhealthy dieting behaviors. PTSD symptoms were associated with 17.6% (CI 13.5%-21.9%) increased odds of skipping meals in the past 30 days to lose or maintain weight (Table 4). Women reported 22.4% (CI 16.5%-28.6%) increased odds of using smoking as a way to lose or maintain weight for each additional PTSD symptom experienced. It was also reported that the odds of using laxatives to decrease or maintain weight increased by 10.2% (CI 0.3%-21.0%) for each additional PTSD symptom. For this sample, PTSD symptoms increased the odds of inducing vomiting by 17.9% (CI 5.3%-32.1%) during the past 30 days. The use of diuretics was not significantly associated with PTSD symptoms. PTSD symptoms increased the odds of using diet pills, powders, or liquids by 9.3% (CI 3.5%-15.4%). This study also used binary logistic regression to examine if PTSD symptoms were associated with using more than one unhealthy diet method. PTSD symptoms were associated with 20.7% (CI 15.3%-26.4%) increased odds of using more than one of the six unhealthy dieting methods to maintain or lose weight.

Pearson correlation coefficients were used to examine the correlation between PTSD symptoms and the total number of dieting methods (Table 5). PTSD symptoms that were examined in this study are significantly correlated ($p < 0.001$) with the total number of unhealthy dieting behaviors engaged in over the past 30 days across categories of race/ethnicity, marital status, education, income level, and BMI.

BMI. Ordinal logistic regression indicated that there was not a significant association between PTSD and BMI category (odds ratio [OR] 1.015, CI 0.986-1.045) (Table 6). Analyses were also conducted using a general linear model (not shown), with BMI included as a continuous variable, and PTSD was not associated with an increased BMI ($\beta = 0.002$, standard error [SE] = 0.002, $p < 0.05$). However, respondents who reported using laxatives (OR 0.433, CI 0.259-0.723), diuretics (OR 0.256, CI 0.125-0.524), diet pills, powders, or liquids (OR 0.373, CI 0.281-0.495), smoking more cigarettes (OR 0.712, CI 0.539-0.939), or skipping meals (OR 0.534, CI 0.446-0.640) to maintain or reduce weight had lower odds of

TABLE 1. CHI-SQUARE ANALYSES DESCRIBING POSTTRAUMATIC STRESS DISORDER SYMPTOMS AND DESCRIPTIVE STATISTICS (N=3154)

	Total n (%)	No symptoms n (%)	1–3 symptoms n (%)	4+ symptoms n (%)	Chi-square	df	p value
Race/ethnicity							
White	899 (28.5)	428 (49.1)	225 (25.8)	219 (25.1)	70.35	4	<0.001
Black	808 (25.6)	492 (63.2)	133 (17.1)	153 (19.7)			
Hispanic	1447 (45.9)	893 (65.4)	268 (19.6)	205 (15.0)			
Marital status							
Married	155 (5.0)	295 (65.6)	88 (19.5)	67 (14.9)	16.86	6	0.01
Single	1845 (58.9)	1072 (60.0)	356 (20.0)	356 (20.0)			
Divorced, seperated, widowed	471 (15.0)	75 (50.7)	35 (23.6)	38 (25.7)			
Single, living with partner	662 (21.1)	361 (58.4)	145 (23.5)	112 (18.1)			
Missing	154						
Education							
Less than high school	1210 (39.1)	694 (61.2)	228 (20.1)	212 (18.7)	1.45	4	0.84
High school or GED	1015 (32.8)	586 (59.6)	204 (20.7)	194 (19.7)			
Some college or more	870 (28.1)	500 (58.7)	184 (21.6)	168 (19.7)			
Missing	184						
Household income							
<\$15,000	1617 (58.1)	928 (59.8)	312 (20.1)	313 (20.2)	5.29	4	0.26
\$15,000–\$29,999	751 (27.0)	416 (57.1)	162 (22.3)	150 (20.6)			
\$30,000+	417 (14.9)	251 (61.8)	89 (21.9)	66 (16.26)			
Missing	369						
BMI							
≤24.9		855 (60.5)	296 (21.0)	262 (18.5)	3.92	6	0.69
25–29.9		441 (61.7)	138 (19.3)	136 (19.0)			
30+		455 (57.9)	176 (22.4)	155 (19.7)			
Missing	240						
Drank sugary soda							
Drank >1 soda yesterday		484 (58.0)	165 (19.7)	186 (22.3)	2.87	2	0.002
Drank 1 or 0 soda yesterday		691 (62.2)	242 (21.8)	178 (16.0)			
Missing	1208						
Daily fast food behavior							
Fast food 0 times yesterday		1089 (62.1)	344 (19.6)	322 (18.3)	19.77	6	0.003
Fast food 1 times yesterday		529 (57.8)	219 (23.9)	167 (18.3)			
Fast food 2 times yesterday		136 (53.7)	50 (19.8)	67 (26.5)			
Fast food 3 times yesterday		48 (64.9)	10 (13.5)	16 (21.6)			
Missing	157						
Weekly fast food behavior							
Fast food 0 times this week		487 (64.8)	140 (18.6)	125 (16.6)	14.98	8	0.06
Fast food 1 day this week		536 (60.1)	180 (20.2)	176 (19.7)			
Fast food 2–3 days this week		533 (56.8)	219 (23.3)	187 (19.9)			
Fast food 4–6 days this week		130 (58.8)	47 (21.3)	44 (19.9)			
Fast food every day this week		76 (54.3)	30 (21.4)	34 (24.3)			
Missing	210						
In the past 30 days did you do any of the following things to lose weight or keep from gaining weight?							
Skipped meals							
Yes		271 (43.5)	152 (24.4)	200 (32.1)	10.874	2	<0.001
No		1526 (64.3)	472 (19.9)	375 (15.8)			
Missing	158						
Smoked more cigarettes							
Yes		71 (33.2)	56 (26.2)	87 (40.6)	86.4	2	<0.001
No		1718 (62.0)	568 (20.5)	484 (17.5)			
Missing	170						
Used laxatives							
Yes		31 (50.0)	14 (22.6)	17 (27.4)	3.42	2	0.18
No		1770 (60.2)	612 (20.8)	557 (19.0)			
Missing	153						
Made self throw up							
Yes		18 (43.9)	8 (19.5)	15 (36.6)	8.44	2	0.01
No		1777 (60.2)	618 (20.9)	558 (18.9)			
Missing	160						

(continued)

TABLE 1. (CONTINUED)

	Total n (%)	No symptoms n (%)	1–3 symptoms n (%)	4+ symptoms n (%)	Chi-square	df	p value
Used diuretics							
Yes		18 (45.0)	11 (27.5)	11 (27.5)			
No		1781 (60.2)	615 (20.8)	561 (19.0)	3.88	2	0.14
Missing	157						
Used pills, powders, or liquids							
Yes		103 (47.2)	54 (24.8)	61 (28.0)			
No		1700 (61.0)	572 (20.6)	513 (18.4)	17.81	2	<0.001
Missing	151						

BMI, body mass index; df, degree of freedom.

increased BMI compared to those who did not report those behaviors.

Discussion

In this study, we observed an association between PTSD symptoms and drinking more than one serving of soda per day. In addition to increasing the risk of weight gain, drinking more sugary soda may be detrimental to the health of women with PTSD, as it increases the risk of developing dental ero-

sion and dental cavities.^{10,11} There is evidence that increased consumption of sugary drinks and soda may also contribute to an increased risk of developing diabetes and gout.^{12–14} Overindulgence in sugary substances, such as soda, has also been linked to an increased risk of developing addiction to other substances, such as alcohol and narcotics.¹⁵ Women surveyed in this study were young; thus, health risks related to soda consumption have the potential to accumulate for an extended period of time. This may further add to the health burden that PTSD represents.

We also observed that women with PTSD symptoms were more likely to consume fast food more often. These results may be supported indirectly by findings in other studies. For example, one study observed that white and black non-Hispanic women with prior trauma reported a higher level of binge eating.¹⁶ Another study found that half of all bingeing episodes among women occur at restaurants, where peer pressure and the exposure to large amounts of food may reduce self-control.¹⁷ Women in this study may have eaten more fast food to reduce trauma-induced PTSD symptoms, and

TABLE 2. ORDINAL LOGISTIC REGRESSION ESTIMATING FREQUENCY OF FAST FOOD CONSUMPTION PREVIOUS DAY AND DURING PAST WEEK

Demographics	Ate fast food yesterday ^a OR (95% CI)	Ate fast food last week ^b OR (95% CI)
Age	0.968 (0.931–1.005)	0.906 (0.875–0.939)
Black ^c	1.680 (1.366–2.066)	1.428 (1.175–1.735)
Hispanic ^c	0.901 (0.743–1.093)	0.821 (0.689–0.978)
Living together, not married ^d	0.928 (0.701–1.230)	1.090 (0.851–1.395)
Single ^d	1.388 (1.080–1.784)	1.518 (1.212–1.902)
Divorced/widowed/ separated ^d	1.329 (0.892–1.982)	1.171 (0.811–1.692)
Currently attending, or has less than high school education ^e	0.716 (0.575–0.892)	0.449 (0.367–0.550)
High school diploma or GED ^e	0.926 (0.761–1.125)	0.844 (0.704–1.012)
Income ≤\$15,000 ^f	0.907 (0.725–1.135)	0.648 (0.526–0.798)
Income >\$15,000– <\$30,000 ^f	0.907 (0.708–1.163)	0.806 (0.679–0.957)
BMI ≥25–<30 ^g	0.847 (0.697–1.030)	0.750 (0.627–0.896)
BMI >30 ^g	0.982 (0.816–1.182)	0.806 (0.679–0.957)
PTSD ^h	1.033 (1.002–1.065)	1.051 (1.021–1.082)

^aAte fast food 0, 1, 2, or 3 times yesterday; estimates the odds of increased consumption.

^bAte at least one meal from a fast food place 0 days, 1 day, 2–3 days, 4–6 days, or every day this week; estimates the odds of increased consumption.

^cCompared to non-Hispanic white.

^dCompared to married.

^eCompared to some college and college degree.

^fCompared to ≥\$30,000.

^gCompared to BMI <25.

^hPosttraumatic stress disorder (PTSD) variable is continuous.

CI, confidence interval; OR, odds ratio.

TABLE 3. BINARY LOGISTIC REGRESSION ESTIMATING LIKELIHOOD OF DRINKING MORE THAN ONE SUGARY SODA DURING PREVIOUS DAY

Demographics	Sugary Sodas ^a OR (95% CI)
Age	1.012 (0.965–1.061)
Black ^b	0.745 (0.569–0.975)
Hispanic ^b	0.582 (0.457–0.743)
Single, living with Partner ^c	1.200 (0.847–1.699)
Single ^c	1.201 (0.877–1.645)
Divorced/Widowed/Separated ^c	1.034 (0.610–1.752)
Currently attending or has less than high school education ^d	0.989 (0.749–1.307)
High school diploma or GED ^d	1.126 (0.872–1.455)
Income ≤\$15,000 ^e	1.147 (0.854–1.541)
Income >\$15,000, <\$30,000 ^e	0.939 (0.675–1.305)
BMI ≥25–<30 ^f	0.992 (0.775–1.269)
BMI >30 ^f	1.024 (0.806–1.302)
PTSD ^g	1.050 (1.009–1.092)

^aMore than one serving of soda compared to 0–1 soda per day.

^bCompared to non-Hispanic white.

^cCompared to married.

^dCompared to some college and college degree.

^eCompared to ≥\$30,000.

^fCompared to BMI <25.

^gPTSD variable is continuous.

TABLE 4. BINARY LOGISTIC REGRESSION TO ESTIMATE THE ODDS OF USING UNHEALTHY DIETING METHODS TO LOSE WEIGHT IN PAST 30 DAYS

Demographics	Skipped meals ^a OR (95% CI)	Smoked more cigarettes ^a OR (95% CI)	Used laxatives ^a OR (95% CI)	Made self throw up ^a OR (95% CI)	Used diuretics ^a OR (95% CI)	Used diet pills, powders, or liquids ^a OR (95% CI)	Used more than 1 method ^b OR (95% CI)
Age	0.958 (0.912-1.006)	1.041 (0.968-1.120)	1.090 (0.961-1.236)	0.984 (0.835-1.160)	1.013 (0.851-1.206)	1.002 (0.930-1.079)	1.005 (0.939-1.076)
Black ^c	0.980 (0.755-1.273)	0.372 (0.246-0.563)	1.833 (0.902-3.725)	1.624 (0.628-4.204)	1.093 (0.416-2.875)	0.714 (0.470-1.086)	0.729 (0.504-1.055)
Hispanic ^c	0.945 (0.743-1.203)	0.393 (0.275-0.562)	0.805 (0.388-1.669)	1.081 (0.445-2.624)	1.047 (0.432-2.541)	0.827 (0.578-1.185)	0.660 (0.472-0.922)
Living together, not married ^d	1.461 (0.997-2.140)	1.031 (0.594-1.791)	2.002 (0.762-5.262)	2.108 (0.553-8.036)	1.854 (0.479-7.180)	1.282 (0.772-2.128)	1.320 (0.798-2.183)
Single ^d	1.864 (1.317-2.639)	1.231 (0.748-2.026)	1.160 (0.448-3.006)	1.214 (0.317-4.639)	1.633 (0.446-5.983)	0.943 (0.584-1.523)	1.161 (0.727-1.854)
Divorced/widowed/separated ^d	2.067 (1.248-3.423)	1.241 (0.593-2.599)	0.868 (0.171-4.421)	4.792 (1.102-20.844)	1.905 (0.308-11.778)	1.841 (0.955-3.546)	1.605 (0.830-3.101)
Currently attending, or has less than a high school education ^e	0.579 (0.439-0.764)	1.396 (0.895-2.180)	1.867 (0.884-3.944)	1.892 (0.719-4.982)	0.857 (0.309-2.375)	0.585 (0.381-0.899)	0.751 (0.506-1.114)
High school diploma or GED ^e	0.697 (0.546-0.890)	1.804 (1.222-2.664)	1.231 (0.599-2.528)	1.041 (0.391-2.773)	1.144 (0.480-2.725)	0.936 (0.653-1.343)	0.997 (0.709-1.402)
Income ≤\$15,000 ^f	1.043 (0.779-1.397)	1.303 (0.819-2.072)	0.950 (0.430-2.100)	1.133 (0.323-3.974)	0.719 (0.256-2.024)	1.099 (0.695-1.737)	1.161 (0.758-1.778)
Income >\$15,000- <\$30,000 ^f	1.107 (0.804-1.524)	1.012 (0.603-1.698)	0.658 (0.259-1.669)	2.306 (0.650-8.182)	0.986 (0.329-2.958)	1.038 (0.628-1.713)	1.011 (0.631-1.620)
BMI ≥ 25- < 30 ^g	1.359 (1.055-1.750)	1.044 (0.703-1.549)	2.621 (1.268-5.418)	1.586 (0.673-3.737)	1.972 (0.631-6.163)	2.764 (1.836-4.160)	1.711 (1.197-2.445)
BMI > 30 ^g	2.079 (1.652-2.617)	1.471 (1.036-2.090)	2.993 (1.502-5.964)	1.496 (0.646-3.466)	5.434 (2.142-13.783)	3.694 (2.524-5.405)	2.116 (1.520-2.946)
PTSD ^h	1.176 (1.135-1.219)	1.224 (1.165-1.286)	1.102 (1.003-1.210)	1.179 (1.053-1.321)	1.068 (0.938-1.217)	1.093 (1.035-1.154)	1.207 (1.153-1.264)

^aDichotomous outcomes, with No as comparison category.^bDichotomous outcome, with 0-1 method as comparison category.^cCompared to non-Hispanic white.^dCompared to married.^eCompared to some college and college degree.^fCompared to ≥\$30,000.^gCompared to BMI < 25.^hPTSD variable is continuous.

TABLE 5. PEARSON CORRELATION COEFFICIENTS DESCRIBING CORRELATION BETWEEN TOTAL POSTTRAUMATIC STRESS DISORDER SYMPTOMS AND TOTAL NUMBER OF UNHEALTHY DIETING METHODS USED

	<i>Total dieting methods</i>	
	<i>Correlation coefficient (n)</i>	<i>p value</i>
Total PTSD symptoms	0.218 (3006)	<0.001
Total PTSD symptoms by		
Race/ethnicity		
Black	0.189 (778)	<0.001
Hispanic	0.189 (1357)	<0.001
White	0.251 (871)	<0.001
Marital status		
Married	0.217 (447)	<0.001
Living together, not married	0.215 (615)	<0.001
Single	0.208 (1780)	<0.001
Divorced/widowed/separated	0.266 (148)	<0.001
Education		
Currently attending or has less than high school education	0.160 (1128)	<0.001
High school Diploma or GED	0.272 (980)	<0.001
Some college	0.223 (852)	<0.001
Income level		
≤\$15,000	0.225 (1547)	<0.001
>\$15,000–\$29,999	0.225 (726)	<0.001
\$30,000+	0.162 (404)	<0.001
BMI		
<25	0.284 (711)	<0.001
25–29.9	0.205 (784)	<0.001
≥30	0.185 (1409)	<0.001

exposure to a restaurant environment may encourage bingeing. The overall low household income in this sample indicates that fast food may be a more affordable choice to use as a coping mechanism. Fast food is less nutritious and consists of higher-calorie meals than these women might make for

TABLE 6. ORDINAL LOGISTIC REGRESSION ESTIMATING BODY MASS INDEX CATEGORY

<i>Demographics</i>	<i>BMI category^a OR (95% CI)</i>
Age	1.088 (1.051-1.126)
Black ^b	1.463 (1.203-1.780)
Hispanic ^b	1.250 (1.048-1.492)
Single, living with partner ^c	1.147 (0.899-1.464)
Single ^c	0.940 (0.752-1.175)
Divorced/widowed/Separated ^c	0.934 (0.649-1.344)
Currently attending or has less than high school education ^d	1.014 (0.831-1.238)
High school diploma or GED ^d	0.927 (0.772-1.112)
Income ≤\$15,000 ^e	1.060 (0.860-1.307)
Income >\$15,000–<\$30,000 ^e	1.024 (0.813-1.290)
PTSD ^f	1.015 (0.986-1.045)

^aBMI categories: underweight (BMI <18.5), normal (≥18.5, <25), overweight (≥25, <30), obese (≥30).

^bCompared to non-Hispanic white.

^cCompared to married.

^dCompared to some college and college degree.

^eCompared to ≥\$30,000.

^fPTSD variable is continuous.

themselves if they ate at home. The fact that women with more PTSD symptoms frequent fast food restaurants more often may also account for the increase in soda consumption we observed among women with PTSD symptoms, as soda is usually offered at fast food restaurants and refills frequently are free of charge.

Fast food consumption and sugary soda consumption are both associated with weight gain in the literature.^{12,18} Thus, we expected women with more PTSD symptoms in this study to exhibit higher BMIs. In fact, a prior study did find this association among US male veterans of the Vietnam War; 84% of those with PTSD were overweight or obese, which is much higher than the rate in the general population.¹⁹ A study in Germany reported that PTSD was associated with obesity among women, but not men, in both cross-sectional and longitudinal analyses,²⁰ whereas a study of Croatian male veterans found no association between PTSD and obesity,²¹ similar to our findings. One possible explanation for differences in findings between studies is a difference in the populations studied. In our investigation, women were younger (16–24 years of age) than those included in the studies by Vieweg et al.¹⁹ and Perkonig et al.²⁰ An association between PTSD and obesity could become apparent as these women age and their metabolism slows, which would be consistent with the finding of Duffey et al.¹⁸ that time is an important factor in the association between fast food intake and an increase in BMI.

Another finding that may explain the lack of association between PTSD symptoms and BMI is that women with PTSD symptoms were more likely to participate in unhealthy dieting behaviors, such as smoking more cigarettes, skipping meals, using diuretics, using diet pills, powders, or liquids, and using laxatives—all methods that were found to be associated with reduced odds of having a higher BMI. PTSD symptoms may initiate the process of overindulging in unhealthy food and beverages in an attempt to compensate for the way trauma-induced memories make trauma victims feel. These overindulgences may lead to negative feelings about weight gain and a dissatisfaction with how the body looks, which may trigger women with PTSD symptoms to try to reduce the effects of bingeing with unhealthy dieting behaviors and possibly develop eating pathology, consistent with the model in the study by Stice and Shaw.²² The results in this study are consistent with theories that unhealthy dieting behaviors, such as vomiting and laxative abuse, are linked to PTSD.^{23,24} Such behaviors are erosive to health but may be effective in maintaining or reducing weight, at least in the short term. Among young women with PTSD symptoms, these behaviors may be a more subtle threat to health than has been recognized in the past because women who occasionally use unhealthy dieting methods are still affecting their health in a negative manner, even if the behavior is not considered a serious eating disorder. Unhealthy dieting behaviors could lead to more serious eating disorders and may contribute to the poor health and reduced immunity observed in PTSD sufferers in other studies.^{25–29}

This study illustrates that young women who experience PTSD symptoms are at risk of developing behaviors that may lead to serious eating disorders if those disorders are not already present. One major finding of this study was that women experiencing more PTSD symptoms are more likely to report more than one unhealthy dieting behavior, similar to

recent work that found that the number of purging strategies was related to the lifetime occurrence of PTSD.³⁰ This study also revealed that the correlation between PTSD symptoms and the total number of unhealthy dieting behaviors remained strong for every category of demographics and BMI. This suggests that no single variable that was examined in this study was protective against the association between PTSD symptoms and unhealthy dieting behavior. However, future research should be done to confirm this finding.

The sample in this study was multiethnic, and there may be various pathways that cause these women to engage in unhealthy weight loss behaviors other than the need to be thin. Root³¹ suggests that there is need for further study of unhealthy weight loss behavior among young multiethnic women in the United States. Women from diverse backgrounds may engage in unhealthy dieting behaviors in order to cope with inner conflicts that arise when they enter settings that are not reflective of their own cultural background, and they do not wish to abandon the values of their family.³¹ Multiethnic women may also struggle with a desire to fill the traditional European American standards of beauty and, at the same time, may struggle to resist this view of beauty.³² This internalized struggle may manifest as the development of an eating disorder.³²

The findings from this study have serious implications for psychologic and healthcare treatment for young women. Young women who are identified as engaging in these unhealthy dieting practices should be clinically evaluated for the existence of an eating disorder. In addition, young women with PTSD symptoms and unhealthy eating behaviors should be evaluated for related comorbidities, such as depression, substance abuse, and other anxiety disorders. Treatment for women in this sample must be sensitive to multiethnic identity and focus on cultural conflicts that may be the cause of these behaviors among women from culturally diverse backgrounds.

The high proportion of women in this sample who engaged in unhealthy dieting behaviors and reported consuming fast food frequently indicates that there are many diet-related problems that need to be addressed among this population of women. Clinicians at publicly funded clinics should be encouraged to talk with their patients about healthy diets or to offer educational brochures that can help to engage them in a discussion with their patients. Other activities that could encourage healthier eating behaviors are offering recipes tailored to appeal to a multiethnic low-income population and programs that subsidize healthy food.

This study has some limitations. First, we used a questionnaire that was designed to screen for PTSD symptoms but does not diagnose the disorder. The original screening device was found to reliably predict PTSD symptoms among a group of patients diagnosed with PTSD in a clinical setting, however, and although the set of questions used in this study was not meant to diagnose PTSD, it indicates the existence of PTSD symptoms from criteria B and C from the DSM-IV manual as a result of trauma.^{8,9} These results may not be generalizable to all women because the majority of this sample was young and from poor households in one region of Texas. However, it was conducted on a large community-based sample of ethnically diverse young women, which is an important addition to the literature on this topic.

Conclusions

This study suggests that PTSD symptoms are associated with food and drink choices among women. PTSD symptoms are also associated with unhealthy dieting behavior. Further study on the relationship between this disorder and food choices should focus on how these behaviors interrelate and if the symptoms of unhealthy eating and dieting we observed lead to an increased prevalence of clinically recognized eating disorders among women with PTSD symptoms. Longitudinal studies should also address the potential relationship between PTSD and BMI over time, as this may demonstrate an even greater adverse effect of these unhealthy dietary practices on the overall health of these women as they age.

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