Depressive symptoms and self-reported fast-food intake in midlife women

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Abstract

OBJECTIVE—To examine the association between depressive symptoms and fast-food intake in midlife women.

METHODS—Data were analyzed from a cross-sectional study of 626 women aged 45–54 years conducted from 2000–2004 in Baltimore, Maryland. Presence of depressive symptoms was measured using the Center for Epidemiologic Studies–Depression scale and defined as a score of 16 or greater. The frequency of fast-food intake was assessed using self-reported questionnaire data, and was categorized as "at least weekly", "at least monthly, but less than weekly" and "less than monthly".

RESULTS—Approximately 25% of the study sample reported depressive symptoms; 14% consumed fast-food "at least weekly," and 27% "at least monthly, but less than weekly". Compared to their counterparts, women with depressive symptoms had significantly greater odds of reporting higher fast-food intake (confounder-adjusted odds ratio: 1.54; 95% confidence interval: 1.06–2.25). Other covariates associated with a higher frequency of fast-food intake included black race and body mass index ≥ 30 kg/m^2.

CONCLUSIONS—Findings from this study indicate that the presence of depressive symptoms is positively associated with fast-food intake in midlife women. These results may have important health implications given that both depression and dietary consumption patterns are risk factors for a number of diseases.

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CONFLICT OF INTEREST
The authors declare that there are no conflicts of interest.

INTRODUCTION

Depressive symptoms have been found to be associated with food consumption patterns in multiple studies, and in different populations and cultures (Jeffery et al., 2009; Akbaraly et al. 2009; Jacka et al. 2010; Liu et al., 2007; Mikolajczyk et al., 2009, Sánchez-Villegas et al., 2009, Kuczmarksi et al., 2010, Nanri et al., 2010, Pagoto et al. 2009). It is hypothesized that depression itself may contribute to patterns of dietary consumption: depressive symptoms may decrease an individual's motivation to engage in healthy dietary habits and thus may lead to a poor diet (Anton and Miller, 2005). Previous studies have also documented a relationship between depression and overeating (Kubzansky et al., 1998; Carney et al., 1995). However, it should be noted that causal evidence is largely lacking, and the association between depression and dietary patterns/intake may be bidirectional.

The risk of depression appears to increase among females during the menopausal transition (Cohen et al., 2006; Steinberg et al. 2008; Accortt et al., 2008). As such, the relationship between depression and diet has serious health implications given the identification of certain dietary consumption patterns as risk factors for obesity and other co-morbid conditions (Fung et al., 2004; Fung et al., 2001; Heidemann et al., 2008). Limited data exists exploring the relationship between depression and food consumption patterns *specifically* in midlife women. To address this gap in the literature, the present analysis was undertaken to test the hypothesis that the presence of depressive symptoms is associated with and increased frequency of fast-food intake in midlife women.

MATERIALS AND METHODS

The Midlife Health Study is a cross-sectional study that was conducted during 2000–2004 in the Baltimore metropolitan region. Detailed methods of this study have been published (Gallicchio et al., 2008; Visvanathan et al., 2005). Participants gave written informed consent according to procedures approved by the University of Maryland School of Medicine, University of Illinois, and Johns Hopkins University Institutional Review Boards.

Briefly, women aged 45 to 54 years of age were recruited by mass mailing an invitation to area households in the Baltimore metropolitan region. Women who were interested in participating were invited to call the clinic for more information. To be eligible for the study, women had to be between 45 and 54 years of age, have intact uterus and ovaries, and report at least three menstrual periods in the last 12 months. Women were excluded if they were pregnant, taking hormonal therapy or contraception, or had history of cancer of the reproductive organs.

At the clinic visit, women completed a 26-page questionnaire and had their height and weight measured. In total, 639 women completed the questionnaire and clinic visit.

Depressive symptoms were assessed using the Center for Epidemiologic Studies – Depression scale (CES-D), a 20-item, validated, self-report scale (Radloff, 1977). Participants scoring 16 or greater were categorized as "depressive symptoms present" and those scoring 15 or less were categorized as "depressive symptoms absent" (Radloff, 1977). The frequency of fast-food intake was measured by self-report using the question "How often did you eat foods from the following restaurants during the past year?" Participants were asked to score the frequency of food consumption for the following types of fast-food restaurants: "fried chicken", "burgers", and "fried fish" on a six-point scale (0, "never in past year"; 1, "1–4 times in past year"; 2, "5–11 times in pass year"; 3, "1–3 times a month"; 4, "once a week"; 5, "2–4 times a week"; or 6, "almost every day"). The responses were converted to median number of restaurant visits per month, and then added to yield total number of fast-food restaurant visits per month. Based on the distribution of the data, this

variable were categorized as "at least weekly", "at least monthly, but less than weekly" and "less than monthly."

The following factors were considered as possible confounders in the analysis: age, race, marital status, education, annual household income, body mass index (BMI), current smoking, leisure physical activity, current alcohol use, and antidepressant use. The collection of data pertaining to these covariates has been reported previously (Gallicchio et al., 2008; Visvanathan et al., 2005).

Participants missing data on either depressive symptoms (n=6) or fast-food intake (n=7) were excluded, leaving 626 participants in the analytic dataset. Bivariate analyses were conducted using chi-square tests. Variables that were associated either with depressive symptoms or with fast-food intake in bivariate analyses at p<0.1 were considered potential confounders and inserted into the regression model. Ordinal logistic regression analysis was used to examine both the unadjusted and confounder-adjusted associations between depressive symptoms and the frequency of fast-food intake. Statistical analyses were performed using SAS version 9.2 (Cary, North Carolina).

RESULTS

Approximately 25% of the women reported depressive symptoms and 13.7% reported consuming fast-food "at least weekly". Women with depressive symptoms were more likely to report being divorced/separated/widowed, to have a lower level of education and income, to be current smokers, to report less leisure physical activity, and to be using an anti-depressant medication compared to women without depressive symptoms (Table 1).

Women who reported depressive symptoms had statistically greater odds of reporting a higher frequency of fast-food intake compared to women who did not report depressive symptoms (odds ratio (OR) 1.54, 95% confidence interval (CI) 1.08–2.18) (Table 2). After adjustment for potential confounders, this association did not change (OR 1.54, 95% CI 1.06–2.25). Other variables that were significantly associated with a higher frequency of fast-food intake were black race and a BMI of 30 kg/m^2 or greater.

DISCUSSION

The results of this study demonstrate a statistically significant positive association between the depressive symptoms and the frequency of fast-food intake in midlife women. These findings are consistent with recent publications that showed significant associations between self-reported depression and dietary patterns (Akbaraly et al., 2009; Jacka et al., 2010; Jeffrey et al., 2009; Liu et al., 2007, Sanchez-Villegas et al., 2009, Kuczmarksi et al., 2010, Nanri et al., 2010, Pagoto et al., 2009), although these other studies did not specifically examine the association investigated in this study in midlife women.

A number of plausible mechanisms exists to explain the association between depressive symptoms and food consumption patterns, including an effect of diet on subsequent onset of depression (Akbaraly et al., 2009), conversely, depression leading to poor diet (Anton and Miller, 2005), and finally, a combination of the two contributing to and facilitating the development of the other (Jacka et al., 2010). Evidence for a causal pathway is unclear, and the association is perhaps bidirectional, as data suggest that depression contributes to the development of certain eating patterns (Anton and Miller, 2005; Liu et al., 2007; Mikolajczyk et al., 2009) and that food consumption is a risk factor for depression (Akbaraly et al., 2009; Jacka et al., 2010; Jeffery et al., 2009). Most of the literature exploring the relationship between food consumption patterns and depression is based on cross-sectional data, with the exception of two studies that utilized prospective data

(Akbaraly et al., 2009; Sanchez-Villegas et al., 2009). Akbaraly et al. (2009) demonstrated that a "processed food" dietary pattern was associated with CES-D score 5 years later; however dietary pattern was measured only at time 1 and depressive symptoms were measured only at time 2. Hence, reverse causation remains an alternative interpretation of the findings (Akbaraly et al., 2009). Sanchez-Villegas et al. (2009) demonstrated that adherence to the Mediterranean dietary pattern was associated with a lower incidence of depression over a median follow-up time of 4.4 years. However, the possibility of reverse causality exists if subclinical depression preceded dietary adherence (Sanchez-Villegas et al., 2009). Given current data, including the results of this cross-sectional study, causal inferences regarding the association of depressive symptoms with food consumption patterns are limited.

Midlife women are at elevated risk for developing depression, with a number of studies exploring the risk of depression during the menopausal transition (Cohen et al., 2006; Steinberg et al., 2008; Accortt et al., 2008). Depression causes significant psychological and social morbidity, and is an independent risk factor for further morbidity and mortality due to many chronic diseases, including cardiovascular disease (Carney et al., 2008). It may be that dietary factors, including fast-food intake, mediate this association. Given the gravity of potential health implications, especially in the population of midlife women, future prospective investigation is encouraged.

ABBREVIATIONS

95% CI	95% confidence interval
BMI	Body mass index
CES-D	Center for Epidemiologic Studies – Depression scale
OR	Odds ratio

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Table 1

Characteristics of the study sample, Baltimore, Maryland, 2000–2004

Variable	Depressive Symptoms		P-value[a]
	Present (n, %)	Absent (n, %)	
Sample size	155	471	
Age (years)			
45–49	109 (70.3)	296 (62.9)	0.09
50–54	46 (29.7)	175 (37.1)	
Race			
White	131 (84.5)	391 (83.0)	0.46
Black	19 (12.3)	72 (15.3)	
Other[b]	4 (2.6)	7 (1.5)	
Missing	1 (0.6)	1 (0.2)	
Marital status			
Single	18 (11.6)	64 (13.6)	0.05
Married	96 (61.9)	324 (68.8)	
Widowed/Divorced/Separated	41 (26.5)	82 (17.4)	
Missing	0 (0.0)	1 (0.2)	
Education			
<College graduate	77 (49.7)	187 (39.7)	0.03
College graduate or greater	78 (50.3)	284 (60.3)	
Annual household income ($)			
<50,000	55 (35.5)	120 (25.5)	0.02
≥50,000	99 (63.9)	346 (73.5)	
Missing	1 (0.6)	5 (1.0)	
Body mass index (kg/m^2)			
≤24.9	61 (39.4)	206 (43.7)	0.37
25 to 29.9	40 (25.8)	131 (27.8)	
≥30	53 (34.2)	134 (28.5)	
Missing	1 (0.6)	0 (0.0)	
Smoking status			
Current	26 (16.8)	32 (6.8)	<0.001
Former/Never	129 (83.2)	438 (93.0)	
Missing	0 (0.0)	1 (0.2)	
Leisure physical activity			
Inactive/Light	85 (54.8)	201 (42.7)	0.008
Moderate/Heavy	70 (45.2)	270 (57.3)	
Current alcohol use			
Yes	145 (93.6)	446 (94.7)	0.59
No	10 (6.4)	25 (5.3)	
Current anti-depressant use			
Yes	39 (25.2)	85 (18.1)	0.05

Variable	Depressive Symptoms		P-value[a]
	Present (n, %)	Absent (n, %)	
No	116 (74.8)	386 (81.9)	
Frequency of fast-food intake			0.047
< monthly	79 (51.0)	293 (62.2)	
≥ monthly, < than weekly	50 (32.2)	118 (25.1)	
≥ weekly	26 (16.8)	60 (12.7)	

[a]P-values reflect χ^2 comparisons.

[b]Includes responses categorized as "Hispanic/Latino", "Asian/Indian" and "Other".

Table 2

Unadjusted and adjusted associations between depressive symptoms (and other covariates) and frequency of fast-food intake in midlife women, Baltimore, Maryland, 2000–2004

Variable	Frequency of fast food intakes				
	Less than monthly	At least monthly, less than weekly	At least weekly	Unadjusted OR	Adjusted OR
	(n, %)	(n, %)	(n, %)	(95% CI)[a]	(95% CI)[a,b]
Depressive Symptoms					
Absent	293 (62.2)	118 (25.1)	60 (12.7)	1 (reference)	1 (reference)
Present	79 (51.0)	50 (32.2)	26 (16.8)	1.54 (1.08–2.18)	1.54 (1.06–2.25)
Age (years)					
45–49	241 (59.5)	106 (26.2)	58 (14.3)	1 (reference)	1 (reference)
50–54	131 (59.3)	62 (28.1)	28 (12.7)	0.98 (0.71–1.36)	0.98 (0.69–1.38)
Race					
White	337 (64.6)	129 (24.7)	56 (10.7)	1 (reference)	1 (reference)
Black	29 (31.9)	36 (39.6)	26 (28.5)	3.65 (2.39–5.57)	2.61 (1.65–4.15)
Other[c]	5 (45.4)	3 (27.3)	3 (27.3)	2.50 (0.82–7.61)	2.47 (0.79–7.68)
Marital status					
Married	261 (62.1)	108 (25.7)	51 (12.2)	1 (reference)	1 (reference)
Single	44 (53.7)	26 (31.7)	12 (14.6)	1.38 (0.87–2.18)	1.08 (0.63–1.87)
Widowed/Divorced/Separated	67 (54.5)	34 (27.6)	22 (17.9)	1.42 (0.96–2.09)	1.14 (0.71–1.82)
Education					
<College graduate	138 (52.3)	78 (29.5)	48 (18.2)	1 (reference)	1 (reference)
College graduate or greater	234 (64.6)	90 (24.8)	38 (10.5)	0.58 (0.43–0.80)	0.81 (0.57–1.14)
Annual household income ($)					
<50,000	95 (54.3)	47 (26.9)	33 (18.8)	1 (reference)	1 (reference)
≥50,000	274 (61.6)	119 (26.7)	52 (11.7)	0.70 (0.49–0.98)	1.07 (0.69–1.66)
Body mass index (kg/m²)					
≤24.9	187 (70.0)	60 (22.5)	20 (7.5)	1 (reference)	1 (reference)
25–29.9	105 (61.4)	45 (26.3)	21 (12.2)	1.50 (1.01–2.23)	1.39 (0.92–2.10)
≥30	79 (42.2)	63 (33.7)	45 (24.1)	3.32 (2.28–4.84)	2.43 (1.62–3.66)
Smoking Status					

Frequency of fast food intakes

Variable	Less than monthly	At least monthly, less than weekly	At least weekly	Unadjusted OR	Adjusted OR
	(n, %)	(n, %)	(n, %)	(95% CI)[a]	(95% CI)[a,b]
Never/Former	347 (61.2)	145 (22.6)	75 (13.2)	1 (reference)	1 (reference)
Current	25 (43.1)	22 (37.9)	11 (19.0)	1.90 (1.14–3.16)	1.25 (0.72–2.16)
Leisure physical activity					
Moderate/Heavy	227 (66.8)	74 (21.7)	39 (11.5)	1 (reference)	1 (reference)
Inactive/Light	145 (50.7)	94 (32.9)	47 (16.4)	1.86 (1.36–2.55)	1.38 (0.98–1.93)
Current anti-depressant use					
No	292 (58.2)	140 (27.9)	70 (13.9)	1 (reference)	1 (reference)
Yes	80 (64.5)	28 (22.6)	16 (12.9)	0.79 (0.53–1.17)	0.75 (0.49–1.15)

[a]Derived using ordinal logistic regression where the outcome variable, fast-food intake, was coded in the analyses as 0 = less than monthly; 1 = at least monthly, less than weekly; 2 = at least weekly.

[b]Each OR is adjusted for all other variables listed on the table

[c]Includes responses categorized as "Hispanic/Latino", "Asian/Indian" and "Other"