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Depression Symptoms among Homeless Smokers: Effect of Motivational Interviewing

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Abstract

Background—Tobacco use is higher among homeless individuals than the general population. Homeless individuals are also more likely to have symptoms of depression. Depression symptoms may add to the burden of homelessness by increasing psychological distress and serve as a barrier to quitting smoking.

Objectives—The primary goal of this study was to assess the impact of depression symptoms on psychological distress in homeless smokers. The effect of depression symptoms on abstinence and the effect of Motivational Interviewing (MI) on cessation among smokers was also explored.

Methods—Homeless smokers (N=430) enrolled in a smoking cessation study were randomized to Motivational Interviewing (MI) or standard care (SC). Participants received nicotine replacement therapy and were followed for 26 weeks. Participants were categorized into a depression symptoms (DS) group or control group using the Patient Health Questionnaire-9. Between group differences of perceived stress, hopelessness, confidence, craving and abstinence were assessed at weeks 8 and 26. The interaction between depression symptoms (levels: DS and control) and the intervention (levels: MI and SC) was also assessed.

Results—Homeless smokers in the DS group reported higher levels of hopelessness, perceived stress, and craving. There was no effect of DS status on abstinence at week 8 or week 26. There was no significant interaction between depression symptoms (DS vs. Control) and the intervention (MI vs. SC).

Conclusion—Despite reporting greater psychological distress, homeless smokers with depression symptoms in this sample had abstinence levels similar to the control group. Future research should explore protective factors among depressed smokers.

Keywords

Cessation; Depression symptoms; Homeless Smokers; Nicotine; Tobacco

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Tobacco use is the leading cause of death and preventable disease in the U.S (Center for Disease Control, 2012). Among homeless adults, the prevalence of tobacco use is three to four times greater than the general population (Lee et al., 2005). Research on smoking cessation among homeless individuals is limited (Shelley, Cantrell, Warn, & Wong, 2010) and homeless smokers encounter barriers to cessation such as poor mental health. Studies

suggest the prevalence of Major Depression Disorder (MDD) among homeless is 11.4% (Fazel et al., 2008). The prevalence may be higher among homeless smokers due to the association between depression and smoking (Butler, Okuyemi, Jean, Nazir Ahluwalia, & Resnicow, 2002). Unfortunately, few studies have examined MDD among homeless smokers.

Research also suggests that depressed smokers have greater difficulty quitting than the general population (Weinberger, Mazure, Morlett, & McKee, 2013). However, little is known about symptoms of depression and cessation among the homeless. Moreover, homeless smokers are a vulnerable population, but few studies have examined interventions that are efficacious for homeless smokers with symptoms of depression.

Okueymi and colleagues (2006) recently applied Motivational Interviewing (MI), an evidenced-based treatment for smoking cessation (Lai, 2010), to homeless smokers. The MI approach involves exploring motivations for quitting and helping smokers resolve their ambivalence about quitting (Miller, Rollnick, & Moyers, 1998). Although the mechanisms of MI are not well understood (Apodaca & Longabaugh, 2009), it is plausible that MI targets motivation and confidence in homeless smokers with depression symptoms, thereby improving cessation outcomes.

Accordingly, the current study examined the relationship between depression symptoms in homeless smokers and psychological variables (e.g., perceived stress, hopelessness, and craving). The authors hypothesized that smokers with depression symptoms would report greater distress on the psychological variables assessed. The authors also hypothesized that participants with significant depression symptoms would be less likely to quit. Lastly, the research team hypothesized that homeless smokers with depression symptoms in the MI group would be more likely to quit than those receiving standard care (SC).

This study is a secondary data analysis from a community-based sample enrolled in *Power to Quit*, a randomized clinical trial for smoking cessation. Data and detailed methods are reported in Okuyemi et al. (2013)

METHOD

The study procedures were approved by the University of Minnesota's Institutional Review Board. Homeless smokers were recruited from shelters in Minneapolis/St. Paul, Minnesota. Participants were included in the study if they were adults aged 18 or older, lived in Minneapolis/St. Paul for at least 6 months, smoked at least one cigarette per day in the past 7 days and at least 100 cigarettes in their lifetime, and were willing to receive counseling and nicotine patches. Participants were excluded from the study if their exhaled carbon monoxide was less than 5 part per million, they were pregnant, used tobacco cessation aids in the last 30 days, had cognitive impairment, reported suicidal ideation in the last 14 days, had a major medical condition within the prior month, or were actively psychotic.

Participants (N=430) enrolled in the study and were randomized either to the MI group or the standard control (SC) group. All participants attended a baseline session and follow-up sessions every two weeks, up to week 26. During these sessions the participants were

administered psychosocial measures and an assessment of abstinence. During these visits the MI group participated in six 20-minute counseling sessions and the SC group participate in one 15-minute health education session on smoking cessation. All participants received nicotine replacement therapy for 8 weeks and a 23-page educational guide on smoking cessation. Nicotine replacement therapy adherence was assessed at each session by the study staff. Nicotine adherence did not differ between participants with depression symptoms compared to those without depression symptoms. At week 8 adherence was 100% versus 99.6% respectively, $p = 0.51$, Fisher's exact test.

Measures

At baseline ethnicity, age, gender, and monthly income were assessed. Symptoms of MDD were assessed with the Patient Health Questionnaire (PHQ-9) for depression (Kroenke, Spitzer, & Williams, 2001). Confidence was assessed with a one-item Likert scale rated from 0 to 10. The four-item Perceived Stress Scale assessed stress in the past 30 days (Cohen, Kamarack, & Mermelstein, 1983). The 10-item Brief Questionnaire of Smoking Urges [(QSU); Cox, Tiffany, & Christen, 2001] was used to assess craving. Hopelessness was assessed with a two-item likert scale measure rated from 1 to 5 (Everson et al., 1996). Abstinence was defined as 7-day point prevalence abstinence. Participants were defined as abstainers if they denied smoking and had a CO level < 10 ppm (SRNT Subcommittee for Biochemical Verification, 2002). Participants who reported abstinence but had CO levels greater than 10 ppm submitted saliva samples for cotinine testing. A cut-off of 20 ng/ml of cotinine was used to verify abstinence.

Statistical Methods

Depression symptoms were evaluated with the PHQ-9 as a dichotomous variable (primary analysis) and as a continuous variable (supplemental analysis). Consistent with previous research (Otte, Zhao, & Whooley, 2012), PHQ-9 scores ≥ 10 were considered as significant depression symptoms (DS) and <10 was control. Chi-square analyses and *t*-tests were conducted to test the differences between DS and control for demographic and psychological variables. Fisher's exact test was used to assess the relationship between depression status and cessation at weeks 8 and 26. Logistic regressions were used to assess the relationship between cessation and intervention group (levels: MI and SC), Depression symptoms (levels: DS and control), and other covariates. Demographic variables that differed between groups were included as covariates in the model.

RESULTS

Demographic and smoking history variables are reported in Table 1. The DS group had significantly more Latino participants and the control group had significantly more White participants.

At the baseline assessment, the DS group had significantly higher levels of perceived stress, hopelessness, and craving. At week 8, DS participants had higher levels of depression symptoms (Table 2). At week 26, DS participants had higher levels of hopelessness and depression symptoms.

There was no effect of depression symptoms on cessation at week eight (Table 3). The interaction between the intervention group (MI vs. SC) and depression symptoms (DS vs. Control) was not significant (Table 3).

For continuous PHQ-9 scores there was an association with craving ($r = .24$ $p < .0001$), perceived stress, ($r = .17$, $p = .0002$), and hopelessness ($r = -.27$, $p < .0001$) at baseline. At week 8 the PHQ-9 was associated with craving ($r = .28$ $p < .0001$) and perceived stress, ($r = .22$, $p = .0001$). At week 26 the PHQ-9 was associated with craving ($r = .26$ $p < .0001$), perceived stress, ($r = .14$, $p = .013$), hopelessness ($r = -.33$, $p < .0001$), and less confidence in quitting ($r = .26$, $p = .0002$).

DISCUSSION

The primary goal of this study was to assess the impact of depression symptoms on psychological distress in homeless smokers. As predicted, the DS group had higher levels of psychological distress as measured by perceived stress, hopelessness, and craving. The relationship between depression symptoms and psychological distress was consistent across dichotomous and continuous PHQ-9 scores. The association between craving and depression symptoms may have clinical implications in smoking cessation treatment. Interventions that focus on behavioral techniques such as urge surfing may be particularly beneficial for this group (Bowen & Marlatt, 2009).

Counter to the study hypotheses, the DS group did not differ in cessation compared to the control group. Also, MI did not improve cessation outcomes in the DS group. The lack of relationship between depression symptoms and smoking cessation may be explained protective factors among homeless smokers. For instance, homeless smokers with depression symptoms may have access to social services or programming for individuals with psychiatric disorders. Alternatively, the relationship between depression symptoms and cessation may not exist among homeless smokers. This finding is consistent with research on other groups of smokers with depression symptoms and added stressors. For example, a previous study of MI in smokers in a methadone-maintenance program reported no effect of depression symptoms on cessation [Stein et al., 2007; see Hayes et al. (2010) for opposing findings among medically ill patients]. Future research should examine if the relationship between smokers with depression symptoms and cessation can be replicated in homeless populations with other stressors (e.g., comorbid drug abuse).

This study had several limitations. First, the study measured MDD symptoms. It is unclear if these findings will generalize to smokers meeting DSM-V criteria for MDD. Second, the study did not have measures of variables that capture potentially protective factors among smokers with depression symptoms (e.g., access to social service programs). Third, a non-homeless sample was not present to determine if these effects are specific to homeless smokers. Fourth, there was no adjustment for multiple comparisons. The authors took an exploratory approach given limited research in this area. Lastly, the authors were unable to separate the effect of NRT and the MI intervention.

In summary, there appears to be evidence that homeless smokers with depression symptoms experience greater psychological distress. Additional research is needed to determine how psychological distress impacts smoking cessation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographics and Smoking Characteristics

	Total n = 428	**Control n = 255**	**DS n = 173**	**t/χ2**	***p***
Age	44.3 (10.0)	44.1 (9.9)	44.7 (9.9)		
Gender, Female, n (%)	109 (25.3)	56 (22.0)	53 (30.6)	3.64	.06
Ethnicity, n (%)					
Black	242 (56.3)	135 (52.9)	107 (61.8)	2.98	.08
Hispanic/Latino	10 (2.3)	2 (0.8)	8 (4.6)	5.08*	.02
Native American	10 (2.3)	6 (2.4)	4 (2.3)	0.00	1.00
White	153 (35.6)	103 (39.6)	50 (28.9)	4.72*	.03
Other	15 (3.5)	11 (4.3)	4 (2.3)	0.70	.40
Income >= $400 n (%)	137 (31.9)	80 (31.4)	56 (32.4)	0.01	.91
Education >= High School (%)	330 (76.7)	202 (79.2)	126 (72.8)	2.00	.16
CPD	19.3 (13.7)	19.0 (15.2)	19.7 (11.3)	−0.60	.55
Age Started	16.2 (5.9)	16.1 (5.5)	16.1 (5.5)	−0.62	.53
Quit Attempts	2.5 (5.2)	2.6 (4.8)	2.6 (4.8)	0.12	.90

Note. Values are means and standard deviation except for gender and ethnicity which are frequencies and percentages; *t* = *t*-value, χ2 = chi-square,

* *p* <. 05; CPD = Cigarettes Per Day, Age Started = Age Started Smoking. Sample sizes are noted above except: Total CPD = 427; DS CPD = 252.

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Table 2

Psychological Variables by Depression Symptoms

Measure	Baseline					Week 8					Week 26				
	Total n = 428	**Control n =255**	**DS n = 173**	***t***	***p***	**Total n = 325**	**Control n = 197**	**DS n = 128**	***t***	***p***	**Total n = 322**	**Control n =183**	**DS n = 139**	***t***	***p***
Confidence	7.3 (2.4)	7.3 (2.4)	7.2 (2.4)	0.52	0.60	8.4 (2.0)	8.4 (2.1)	8.4 (1.9)	−0.06	0.95	7.7 (2.4)	7.9 (2.3)	7.6 (2.3)	1.08	.28
Hopeless[#]	3.9 (1.2)	4.2 (1.3)	3.4 (1.3)	5.81**	<.0001	–	–	–	–	–	4.0 (1.4)	4.1 (1.3)	3.8(1.4)	2.07*	.04
QSU	4.0 (1.8)	3.7 (1.7)	4.4 (1.7)	−4.47**	.0001	1.8 (1.2)	1.8 (1.2)	1.9 (1.2)	−1.20	0.23	2.0 (1.3)	1.9 (1.3)	2.0 (1.4)	−1.01	.31
PSS	2.1 (0.6)	2.0 (0.6)	2.2 (0.5)	−2.53*	0.01	2.1 (.06)	2.1 (0.6)	2.2 (0.6)	−1.28	0.20	2.1 (0.6)	2.2 (0.6)	2.1 (0.6)	0.65	.51
PHQ-9	–	–	–	–	–	6.4 (6.3)	4.4 (5.7)	9.4 (6.1)	−7.32**	<.0001	6.6 (6.4)	4.5 (5.3)	9.3 (6.7)	−7.06**	<.0001

Note. Values are means and standard deviations;

*$p < .05$;

**$p < .001$;

[1]For Hopeless lower values indicate greater hopelessness.

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Table 3

Logistic Regression: Effect of Depression Symptoms and Motivational Interviewing on Cessation

Predictor Variable	Week 8 *n* = 318			Week 26 *n* = 315		
	OR	***95% CI***	***p***	***OR***	***95% CI***	***p***
DS	1.34	(0.49, 3.64)	.56	0.32	(0.07, 1.59)	.16
MI	1.36	(0.56, 3.33)	.50	1.06	(0.40, 2.81)	.91
DS × MI	0.61	(0.15, 2.48)	.49	3.95	(0.62, 25.28)	.15

Note. *OR* = odds ratio; CI = confidence interval; DS = Depression Symptoms group; MI = Motivational Interviewing group. For DS reference group is the control (minimal depression symptoms). For MI reference group is SC (standard care). All models controlled for age, gender, and income and ethnicity.