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The Moderating Effect of Perceived Social Support on the Relation Between Heaviness of Smoking and Quit Attempts Among Adult Homeless Smokers

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Abstract

Introduction: Over 70% of homeless adults smoke cigarettes. Despite desire to quit, this group rarely receives the external support to make or maintain a successful quit attempt (SQA; intentional quit attempt lasting ≥ 24 hours). The Heaviness of Smoking Index (HSI) is a cigarette dependence measure that independently predicts SQAs among domiciled adults. For homeless adults, social support may be a way to buffer the impact of cigarette dependence on SQAs.

Methods: The association of the HSI and past-year SQAs, and the potential moderating role of social support, was examined among 445 homeless smokers ($M_{age}=43.2\pm11.8$, 65% male, 57.5% white). Support was measured by the International Support Evaluation List (ISEL-12) and its 3 subscales: tangible, belonging, & appraisal support.

Results: The HSI was negatively correlated with SQAs ($r=-.283$, $p<.01$) and in a regression model controlling for age, sex, and race/ethnicity, appraisal support significantly moderated this relationship ($p<.05$). The HSI was significantly related to SQAs across low, moderate, and high levels of appraisal support [mean, ± 1 SD; low ($\beta=-.657$, $p<.001$), medium ($\beta=-.457$, $p<.001$), and high ($\beta=-.258$, $p<.05$)]. Neither the ISEL-12 total nor the other subscales were moderators.

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Declaration of Interests

The authors declare that they have no conflicts of interest.

Conclusion: The perceived availability of someone to talk to about one's problems appeared to attenuate the strength of the inverse relationship between heaviness of smoking and SQAs. Fostering appraisal support for homeless smokers through group treatment may reduce the impact of cigarette dependence on making quit attempts. Social support coupled with the increased availability of empirically-supported cessation aids may improve dismal quit rates among homeless adults.

Keywords

Homeless; Smoking; Cigarette Dependence; Social Support; Appraisal Support; Quit Attempts

1. INTRODUCTION

The prevalence of cigarette smoking among homeless adults in the United States is strikingly high (>70%) (Baggett and Rigotti, 2010; Businelle, Michael S et al., 2015; Neisler et al., 2018). Relative to their domiciled counterparts, homeless smokers experience more smoking-related illnesses and deaths (Baggett et al., 2015; Butler et al., 2002; Kanjilal et al., 2006). Notably, most homeless smokers report a desire to quit (Arnsten et al., 2004; Businelle, Michael S et al., 2015; Connor et al., 2002), but have limited access to the smoking cessation support they need to succeed (Baggett et al., 2013; Chen et al., 2016). Consequently, both lifetime and initial quit success rates [defined as intentionally quitting for at least 24-hours, (Bailey et al., 2011)] are markedly low among homeless smokers (Baggett and Rigotti, 2010; Businelle et al., 2014; Reitzel et al., 2014). Considering that research consistently identifies initial quit success, or a successful quit attempt (SQA), as the necessary first step towards long-term abstinence (Burns et al., 2000; Marlatt et al., 1988), additional work is needed to understand factors that impede SQAs among homeless smokers.

One of the most robust predictors of a SQA within domiciled populations is the Heaviness of Smoking Index [HSI, (Kozlowski et al., 1994)]. The HSI is an index of cigarette dependence informed by smoking rate and latency to first cigarette of the day. Among domiciled smokers, higher HSI scores are independently predictive of fewer SQAs and less successful prolonged smoking abstinence (Borland et al., 2010; Zawertailo et al., 2018). Although this provides initial evidence for the importance of HSI in conceptual models of initial quit success, the generalizability of these findings to vulnerable subgroups, including homeless smokers, remains unknown. Considering the specificity, strength of predictive validity, and brevity of the HSI relative to other indices of cigarette dependence (Courvoisier and Etter, 2010; Fidler et al., 2011; Kozlowski et al., 1994), there may be important clinical implications gained from elucidating how HSI relates to SQAs among homeless smokers.

Another factor that may be particularly relevant to SQAs among homeless smokers is social support. Homeless smokers generally experience low social support for quitting based on known contextual factors such as high use prevalence, social and organizational acceptance of tobacco use, and limited access to interventions (Businelle, M. S. et al., 2015; Chen et al., 2016; Okuyemi et al., 2006; Twyman et al., 2014). At least one study suggests that those with greater perceived social support for quitting are more likely to be ready to quit than

those with less social support (Connor et al., 2002). Thus, social support may serve as a buffer against factors that impede a SQA, including potentially HSI. To date, the precise role social support plays in the initial stages of active quitting (i.e., SQAs), and the potential for social support to buffer against factors known to impede SQAs (e.g., HSI), has not yet been investigated among homeless smokers.

Given the financial limitations of this population and the lack of access of cessation services (Neisler et al., 2018), identifying factors that may protect against the deleterious effect of HSI on initial quit success, such as social support, may suggest low-cost directions for current and future cessation interventions. The current study aimed to explore the potential moderating effect of social support on the evidence-supported relationship between HSI and SQAs among homeless adult smokers.

2. METHOD

2.1 Participants

Participants were recruited from 6 homeless-serving agencies and/or shelters in Oklahoma City, OK, via posted fliers in July and August 2016. The posted fliers advertised the need for study volunteers for a study focused on the identification of “common health problems and unhealthy behaviors among adults who receive services at Oklahoma City homeless shelters.” The flyer listed dates during which study staff would be on site. Interested participants could sign up by being present on one of those dates and approaching study staff at a registration table. Names of individuals interested in participation were cross-checked to ensure no overlap across recruitment sites, and participants were then screened for eligibility. Study inclusion criteria were: 18 years of age, receiving services from one of the targeted agencies/shelters, and >6th grade English literacy level as indicated by a score of 4 on the Rapid Estimate of Adult Literacy in Medicine-Short Form (Arozullah et al., 2007). If eligibility criteria were met, participants were enrolled following the informed consent process.

Overall, 648 individuals were screened for the study, 38 of whom were ineligible due to insufficient literacy. Of the 610 enrolled participants, 29 self-reported that they were housed and were therefore excluded from analyses. Of the remaining 581 participants, 457 (78.7%) were current smokers [i.e., smoked ± 100 cigarettes over the lifetime and smoked within the last 30 days, (Centers_for_Disease_Control_and_Prevention, 2002)]. Finally, 12 individuals had missing values on predictor variables and were excluded from analysis, yielding a final analytic sample of 445 participants.

2.2 Procedures

The Institutional Review Boards at the University of Houston and the University of Oklahoma Health Sciences Center approved this study. Participants were enrolled following an informed consent process. Data collection occurred at each targeted agency/shelter in July/August, 2016. Enrolled participants completed questionnaires via tablet computer where survey items were visible on the screen and read aloud to the participants over headphones. Study personnel were available for assistance in the case of unfamiliarity with a

tablet computer, though none were reported. Individuals received a \$20 department store gift card as remuneration for study participation.

2.3 Measures

2.3.1 Participant Characteristics.—Age, sex, and race/ethnicity were collected via self-report questionnaire.

2.3.2 Cigarette Dependence.—The Heaviness of Smoking Index (HSI) is a 2-item measure commonly used to assess cigarette dependence (Fagerstrom, 2012; Kozlowski et al., 1994). The HSI includes the average number of cigarettes smoked per day (10 or less, 11 to 20 per day, 21 to 30 per day, 31 or more per day) and the time to first cigarette after waking (within 5 min, 6 to 30 min, 31 to 60 min, and after 60 min). The range for the HSI is 0–6, with higher values indicating greater heaviness of smoking.

2.3.3 Successful Quit Attempts.—The number of intentional past-year quit attempts lasting 24 hours, excluding times where the individual wanted to smoke but did not have money to buy cigarettes, was measured via self-report.

2.3.4 Perceived Social Support.—The Interpersonal Support Evaluation List is a 12-item self-report measure of the perceived availability of social support, which contains 3 subscales [ISEL-12, (Cohen and Hoberman, 1983)]. The tangible support subscale measures the perceived availability of material aid (e.g., able to borrow money if needed; $\alpha=.78$), the belonging subscale measures the perceived availability of others with whom one may engage in activities ($\alpha=.81$), and the appraisal subscale measures the perceived availability of others with whom one can talk about problems ($\alpha=.70$). Items are rated on a four-point scale with a range of 4 to 16 on each subscale; thus, 12 to 48 for the overall ISEL-12 scale ($\alpha=.89$), with higher scores indicating greater perceived social support.

2.4 Data Analysis

Mplus version 8 was used to examine sample characteristics via descriptive statistics; Pearson product-moment correlations among the HSI, SQAs, and the ISEL-12 scale and subscales; and a multivariate path model to evaluate moderation. A maximum likelihood estimation with robust standard errors was utilized to account for non-normal predictor variables. The ISEL-12 appraisal subscale was found to be a significant moderator, and to probe the interaction, simple slopes for the relationship between HSI and SQAs were investigated for ISEL-12 appraisal values at the mean and ± 1 standard deviation above and below the mean. Statistical significance was considered at $p .05$.

3. RESULTS

3.1 Sample Descriptives

Participants ($n=445$; 65% male) were on average 43.2 (± 11.8) years old and mostly white (57.5%). Participants reported an average of 2.2 (± 2.8) past-year SQAs lasting at least 24 hours. The average HSI score was 2.8 (± 1.5). The average ISEL-12 score was 32.8 (± 8.8)

with subscale score means as follows: 10.2 (± 3.4) for tangible, 11.5 (± 3.2) for belonging, 11.1 (± 3.2) for appraisal.

Results of correlation analyses indicated significant negative correlations between HSI and SQAs ($r = -.283$, $p < .01$), HSI and the ISEL-12 belonging subscale ($r = -0.094$, $p < .05$), and the ISEL-12 appraisal subscale and SQAs ($r = -.121$, $p < .05$). See Table 1.

3.2 Moderation Analysis

In a multivariate path model controlling for age, sex, and race/ethnicity, the relationship between HSI and SQAs was significantly moderated by the ISEL-12 appraisal subscale ($p < .05$). This moderation model accounted for 14.2% of the variance in SQAs. Although simple slope analysis indicated that the HSI was significantly related to SQAs across low, moderate, and high levels of perceived appraisal support (mean, ± 1 SD), the relationship was stronger for those who reported lower levels of social support: low ($\beta = -.657$, $p < .001$), moderate ($\beta = -.457$, $p < .001$), and high ($\beta = -.258$, $p < .05$). See Figure 1. The ISEL-12 total score and 2 other subscales were not significant moderators.

4. DISCUSSION

An inverse relationship existed between Heaviness of Smoking Index (HSI) and Successful Quit Attempts (SQAs), and across all three levels of social support (low, moderate, and high) where the perceived availability of someone to talk to about one's problems appeared to attenuate the strength of this relationship. Domiciled adults report that greater social support is particularly beneficial for maintaining abstinence in the early stages of a quit attempt (Lawhon et al., 2009; Mermelstein et al., 1986) and is associated with a greater likelihood of long-term quit success (Scholz et al., 2016; Westmaas et al., 2010); the current results support the potential extension of social support benefits on initial quit success to homeless adults. Although more research is needed, results suggest that fostering social support among homeless smokers may reduce the impact of cigarette dependence on initial quit success. A meta-analysis of 53 smoking cessation studies that included interventions suggested that group therapy was more effective than self-help or other less intensive interventions (Stead et al., 2017), a key factor in treatments for the underserved homeless populations in the United States. Group therapy may have the benefit of fostering social support while being particularly cost-effective (relative to an individual counseling approach, for example). Moreover, including social support components to group-based smoking cessation interventions has been shown to increase abstinence for domiciled smokers in Canada (Carlson et al., 2002; Pakhale et al., 2016), and could be extended to currently used smoking cessation protocols for homeless smokers in the United States.

Research consistently demonstrates that social support reduces psychological distress during times of stress and promotes positive psychological adjustment to chronically stressful situations (Taylor, 2011). These may be the mechanisms accounting for a potential positive effect of social support on a quit attempt (Businelle et al., 2014). Moreover, smokers self-report that smoking is a way to regulate mood and reduce tension caused by excessive emotional and physical stress (Okuyemi et al., 2006) and is used to manage stress (Twyman et al., 2014). Despite that it is quitting smoking that may ultimately result in reducing stress

(Taylor et al., 2014), appraisal support may fulfil the same perceived benefit that is attributed to cigarette smoking (i.e., stress-relief), and thus may protect against the impact that cigarette dependence has on a quit attempt. Moreover, this may provide an explanation as to why the ISEL-12 belonging and tangible support subscales were not significant; they do not provide the same mechanism fulfillment, and thus do not significantly buffer against cigarette dependence.

Limitations include the use of an adult homeless sample from one city, so results may not be generalizable to other cities or states. A report from the Oklahoma City Planning Department indicates that in January 2016, there were approximately 1,511 homeless adults in Oklahoma City (Oklahoma_City_Planning_Department_-_Housing_&_Community_Development_Division, 2016). This suggests that roughly 40% of the homeless population in Oklahoma City participated in this study, but given the study criteria, the sample was likely more stable/sheltered, literate, and English-speaking than those who did not participate. Finally, given the cross-sectional nature of the study, the prospective effects of social support on quit attempts is unknown. Moreover, the authors recognize that many people relapse during the early stages of quitting, but the findings presented here suggest that social support, in particular, may help with increasing the early success in quitting. Study limitations are balanced by strengths, including recruitment from multiple sites coupled with a large sample size for this population, high representation of homeless women, and the expansion of current literature on domiciled adults to homeless adults.

5. CONCLUSION

Given the high prevalence of cigarette smoking and the financial limitations of homeless adults, low-cost recommendations and directions for current and future cessation interventions are needed to address the associated health disparities in this vulnerable population (Baggett et al., 2015; Baggett et al., 2013). The current results indicate that perceived appraisal support, specifically the ability to talk to someone about one's problems, impacted the association between level of cigarette dependence and successful quit attempts. Coupled with the availability of empirically-supported cessation aids, dismal quit rates among this group may be improved by offering or facilitating opportunities for increased peer, family, and professional support at homeless serving shelters or agencies via group cessation programs or support groups before and during quit attempts.

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Highlights

- Cigarette dependence was negatively associated with successful quit attempts
- Appraisal support may reduce the impact of cigarette dependence on quit attempts
- Enhanced social support may facilitate quit attempts among homeless adult smokers

Figure 1:
Moderating Effect of ISEL-12 Appraisal Subscale on Heaviness of Smoking and Successful
24 Hour Past-Year Quit Attempts

Table 1:

Correlations of Variables of Interest among Homeless Smokers (N=445)

Variable	SQA's	HSI	ISEL-12	ISEL-12 Tangible Subscale	ISEL-12 Belonging Subscale	ISEL-12 Appraisal Subscale
SQA's	--					
HSI	−0.283 **	--				
ISEL-12	−0.077	−0.072	--			
ISEL-12 Tangible Subscale	−0.042	−0.086	.900 **	--		
ISEL-12 Belonging Subscale	−0.042	−0.094 *	.889 **	.708 **	--	
ISEL-12 Appraisal Subscale	−0.121 *	−0.011	.881 **	.687 **	.668 *	--

Note:

*
 $p < .05$ **
 $p < .01$.

SQA = Successful quit attempt lasting 24 hours. HSI = Heaviness of Smoking Index. ISEL-12 = Interpersonal Support Evaluation List.