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Short communication

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

Background: Over 70% of homeless adults smoke cigarettes. Despite the desire to quit, this group rarely receives the external support to make or maintain a successful quit attempt (SQA; intentional quit attempt lasting > 24 h). 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 + 11.8, 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.

Conclusion: The perceived availability of someone to talk to about one's problems appeared to attenuate the strength of the inverse relationship between the 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.

1. Introduction

The prevalence of cigarette smoking among homeless adults in the United States is strikingly high (> 70%) (Baggett and Rigotti, 2010; Businelle 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 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 h, (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 an 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

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smoking rate and latency to the 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 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 an 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 the 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 was available for assistance in the case of unfamiliarity with a tablet computer, though no issues 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, 11–20 per day, 21–30 per day, 31 or more per day) and the time to first cigarette after waking (within 5 min, 6–30 min, 31–60 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 h, 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 4–16 on each subscale; thus, 12–48 for the overall ISEL-12 scale ($\alpha = .89$), with higher scores indicating greater perceived social support.

2.4. Data analysis

M*plus* 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 h. The average HSI score