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Brief Report: Valued Life Activities and Readiness to Quit Smoking among Mobility Impaired Smokers

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Abstract

Objective—People with physical disabilities smoke at a higher rate than their non-disabled peers, with rates as high as 28–40% among non-elderly adults with functional impairments. One possible explanation for these findings is that restriction of valued life activities (social, professional, pleasurable or otherwise meaningful) due to mobility impairment interferes with smoking cessation.

Methods—Forty-seven smokers (48.9% female; $M^{\text{age}} = 48.91$) with chronic mobility impairments (i.e., regularly use equipment to ambulate) were interviewed over the telephone. We assessed demographics, self-efficacy to quit smoking, stage of change, current engagement in valued activities, current restriction of valued activities due to physical limitations, and efforts to replace restricted valued activities in a cross sectional design.

Results—Bivariate results indicate that 74% of those in the preparation stage had satisfactory replacements for their most valued restricted activity, while only 27% in the contemplation stage and 17% in the pre-contemplation stage had such satisfactory replacements. Multinomial ordinal regression analyses revealed that (a) having satisfactory replacements for activities restricted due to physical disability was significantly associated with higher stage of change and (b) more current valued activities and, to a lesser extent, fewer restricted activities were significantly associated with higher levels of self-efficacy to quit smoking.

Conclusions—These results support the need for the development of treatments for smoking cessation that aim to increase engagement in valued activities, such as Behavioral Activation.

Keywords

Activity restriction; cigarette smoking; mobility impairment

In the United States, cigarette smoking is more common among individuals with physical disabilities, with rates as high as 28–40% among non-elderly adults with functional impairment (Altman & Bernstein, 2008). Smokers with disabilities appear to be more motivated to quit than smokers without disabilities (Washington State Department of Health, 2006). One barrier to quitting in this population could be the restriction of valued life activities due to physical limitations and the inability to find viable replacements for these lost activities.

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Several lines of evidence suggest that restriction of valued activities may impact smoking. First, low levels of engagement in valued activities, restriction of valued activities due to physical condition, and the inability to find replacements for restricted valued activities have all been linked to depressed mood (Manos, Kanter, & Busch, 2010). Depressed mood, in turn, is more common among smokers and interferes with smoking cessation (Anda et al., 1990). Second, Behavioral Activation (BA), a counseling treatment that explicitly aims to increase engagement in valued life activities through guided goal setting in order to increase contact with positive reinforcement, has shown promise for facilitating smoking cessation (MacPherson et al., 2010). Finally, people with disabilities that restrict social or professional activities are especially likely to smoke (Altman & Bernstein, 2008). Taken together, these findings suggest that restriction of valued life activities may be a substantial barrier to smoking cessation among smokers with physical disabilities. Specifically, smokers with physical disabilities may engage in few positively reinforcing activities (other than smoking) in their daily lives. In this context, it is difficult for them to move toward giving up cigarettes, which are easy to access and reliably produce reinforcement.

To date, smoking cessation among those with physical disabilities causing impairment in mobility have been relatively neglected by researchers, and health care providers less often address smoking in people with mobility impairments (Francis & Adams, 2010). We hypothesize that restriction of valued activities is a barrier to smoking cessation in this population. As a first step in exploring this hypothesis, we tested whether higher valued activity engagement, lower valued activity restriction, and the ability to find satisfactory replacements for restricted activities are associated with higher stage of change and greater self-efficacy to quit smoking.

We measured valued activity engagement (rather than only activity restriction) because some individuals have chronically low levels of valued activity engagement and thus would have little to “give up”. This may be particularly true among those with life-long disabilities. We also chose to measure the replacement of restricted activities to capture personal resilience in the face of restriction, which could be a target of counseling treatment. We chose stage of change and self-efficacy to quit smoking as dependent variables because they have both been linked to later smoking cessation (e.g., Abrams, Herzog, Emmons, & Linnan, 2000).

Method

Sample

This sample consisted of 47 smokers with chronic mobility impairments who were interviewed over the phone as part of a larger study (R01 CA137616). Participants were recruited through referrals from independent living centers, mailings, and public advertisements. Inclusion criteria were (a) regular use of equipment to ambulate (e.g., prosthetic leg, wheel chair, cane, walker, etc.) for ≥ 1 year, (b) ≥ 18 years of age, (c) smoking ≥ 3 cigarettes per day and ≥ 100 lifetime, (d) English fluency, (e) lack of major cognitive deficits and major psychiatric illness (i.e., passed a brief psychotic screen and denied current diagnosis of psychotic disorder, borderline personality disorder, and bi-polar disorder), and (f) self-reported that ≥ 1 valued activity was restricted by mobility or other medical issues. Those who expected their mobility impairment to be temporary were excluded.

Measures

All measures were given via telephone interview which included questions on demographics, medical history, smoking history, and nicotine dependence (Fagerstrom Test for Nicotine Dependence; FTND; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991).

The valued activity engagement, restriction, and replacement questions described below were developed by the authors for the current study.

Valued activity engagement—Participants were asked, “What activities do you currently engage in that bring you meaning, pleasure, or a sense of accomplishment?” and were allowed to list up to nine activities. Activity engagement was measured as a count of these responses. Example valued activities from this sample include playing chess, volunteering, outings with family, art, cooking, and woodworking.

Valued activity restriction—Participants were asked to list any “social, work related, pleasurable, or otherwise meaningful activities” that they “had to give up or severely restrict due to medical or mobility issues.” Activity restriction was measured as a count of these responses. Example restricted activities from this sample include sports, exercise, employment, visiting family, attending events (sporting, concerts, etc), and cooking.

Satisfactory replacement of restricted activities—Participants were also asked which restricted activity was the most important to them, if they had found a replacement for this activity (yes/no), and to rate their degree of satisfaction (0–10 scale; 0 = “not at all satisfied” to 10 = “extremely satisfied”) with any such replacement. Participants who rated satisfaction with any replacement as ≥ 5 were considered to have found a satisfactory replacement (e.g., a participant who could no longer perform her previous job now attends trade school; a participant who could no longer play basketball with friends now plays poker with them).

Stage of change—Stage of change was determined using the following algorithm (DiClemente et al., 1991): (a) *Pre-Contemplation*: not seriously considering quitting in the next 6 months, (b) *Contemplation*: seriously considering quitting in the next 6 months, but not planning to quit in the next 30 days and/or had not made a quit attempt in the last year, and (c) *Preparation*: planning to quit in the next 30 days and had made a quit attempt in the last year.

Self-efficacy to quit smoking—To assess self-efficacy to quit smoking, participants were asked “How confident are you that you can quit smoking in the next three months?” (1–10 scale; 1 = *Not at all confident*, 10 = *Extremely confident*). Self-efficacy ratings indicated some non-normality (Kurtosis = -1.1 , SE = $.68$) and the frequency of some individual Likert scale values approached zero. Thus, self-efficacy ratings were divided into ordinal categories (*Low*, *Moderate*, and *High Self-efficacy*) based on a tertiary split to allow for analysis.

Analytic plan

The relationships between all independent variables (valued activity engagement, valued activity restriction, and satisfactory replacement of restricted activities) and dependent variables (stage of change and self-efficacy to quit smoking) were investigated on the bivariate level (Spearman correlations and Mann-Whitney U tests) and the multivariate level using ordinal logit regressions controlling for age and level of nicotine dependence. Satisfactory replacement of restricted activities was added as a covariate in a second model for each dependent variable in order to determine if the addition of replacement activities added to the models. Thus, we conducted two ordinal regression models for each dependent variable.

Results

Our sample ($N = 47$; 48.9% female; $M^{\text{age}} = 48.91$, $SD = 8.15$) was ethnically diverse (59.6% Caucasian, 23.4% African American, 6.4% American Indian, 2.1% Hispanic, and 8.5% multi-ethnic), low income (86.6% earned $< \$20,000/\text{year}$), and unlikely to be employed (12.8% working full or part time). Participants smoked an average of 14.40 ($SD = 7.38$) cigarettes per day, had been smoking an average of 31.85 ($SD = 9.87$) total years, and were moderately dependent on nicotine ($M^{\text{FTND}} = 4.47$, $SD = 2.03$). Participants had been using equipment to ambulate for an average of 8.89 ($SD = 9.16$) years. In terms of equipment used, 70.2% used a cane, 23.4% a wheelchair, 12.8% a prosthetic leg, 12.8% leg or foot braces, 10.6% a walker, and 8.5% crutches. Conditions contributing to mobility limitations were highly varied (e.g., arthritis, amputation, multiple sclerosis, spina bifida, fibromyalgia, and musculoskeletal trauma).

We explored the need to control for age, education, and minority status in our models¹. Only age was significantly related to either dependent variable (r_s , with stage of change = .40, $p < .01$; r_s , with self-efficacy = .31, $p < .05$) and thus it was controlled for in all models. Table 1 presents bivariate relationships between all a priori independent and dependent variables. Valued activity engagement was positively correlated with both stage of change and self-efficacy. The presence of a satisfactory replacement activity was associated with higher stage of change.

We tested for multicollinearity among independent variables. Valued activity engagement was significantly correlated with satisfactory replacement of restricted activities ($r_s = .42$; $p < .01$) and age ($r = .29$, $p < .05$). This level of association does not preclude entry of these variables into the same models. Table 2 presents results of four multivariate ordinal regression models.

Greater valued activity engagement and older age were associated with higher stage of change in the initial model. In the second model, only satisfactory replacement of restricted activities was significantly related to stage of change, such that replacement of restricted activities was associated with higher stage of change. The addition of satisfactory replacement of restricted activities in the second model increased pseudo R-squared by .10. Participants predicted by the second stage of change model to be in the contemplation stage reported 1.82 ($SD = .98$) current valued life activities and 14.29% of them had found a satisfactory replacement. Participants predicted by the second stage of change model to be in the preparation stage reported 3.50 ($SD = .92$) current valued life activities and 94.44% of them had found satisfactory replacement. In this model, a single participant, reporting two current valued life activities and not having a satisfactory replacement, was predicted to be in the pre-contemplation stage.

Regarding self-efficacy to quit smoking, both greater valued activity engagement and less valued activity restriction were significantly associated with higher levels of self-efficacy in the initial model. The addition of satisfactory replacement of restricted activities in the second model did not change Pseudo R-squared. Valued activity engagement continued to be significantly associated with self-efficacy in the second model, but valued activity restriction was only marginally associated ($p = .06$). Participants predicted by the second self-efficacy model to have Low Self-Efficacy reported 1.72 ($SD = .94$) current valued life

¹We did not include household income as a potential co-variate because there was very little variability in income (86.6% earned $< \$20,000/\text{year}$) and that question was refused by multiple participants ($n = 3$), thus including it would have lowered our sample size for regression models. Among those who provided income information ($n = 44$), income was not related to any of the independent variables or stage of change. Income was significantly negatively correlated with self-efficacy ($r_s = -.44$, $p < .01$). However, when income is added to the four regression models in Table 2, pseudo R^2 values and conclusions do not change significantly.

activities and 3.72 ($SD = 1.54$) restricted activities. Participants predicted by the second self-efficacy model to have High Self-Efficacy reported 3.32 ($SD = .99$) current valued activities and 2.82 ($SD = 1.30$) restricted activities. In this model, no participants were predicted to be in the Moderate Self-Efficacy category.

Conclusion

Results suggest a strong cross-sectional relationship between valued life activities and readiness to quit smoking. The ability to find satisfactory replacements for activities restricted due to physical disability was strongly related to concurrent stage of change. In addition, activity engagement and (to a lesser extent) activity restriction were significantly related to self-efficacy.

The current study was cross sectional and thus one cannot conclude that valued activity variables were the cause of differing levels of readiness to quit smoking. However, there are two logical explanations for such a causal relationship. Low levels of valued life activities may increase depressed mood and reduce positive affect, which in turn interferes with readiness to quit smoking. Alternatively, those with few valued life activities may have fewer choices of positively reinforcing activities that do not involve smoking. Thus, quitting smoking may represent a particularly large loss of environmental positive reinforcement.

These preliminary results suggest that readiness to quit smoking in physically disabled populations may be enhanced by building more active, rewarding lives. This is consistent with a Behavioral Activation (BA) approach, which explicitly seeks to increase access to positive reinforcement through values driven activity scheduling. A recently completed trial suggests that BA may have promise as a treatment for smoking cessation in depressed smokers (MacPherson et al., 2010). Another study is underway that uses BA for smokers with mobility impairments (B. Borrelli, PI, R01 CA137616), which will allow for an analysis of whether increasing engagement in valued life activities facilitates smoking cessation. Any program designed to increase engagement in valued activities in people with physical disabilities should be sensitive to barriers commonly encountered by this community, including the built environment (e.g., handicap accessibility), access to resources (e.g., transportation, medical insurance for assistive devices), and low socio-economic status (e.g., income, education level).

Due to a small sample, this study had limited power, thus only large effects are statistically significant, and smaller, but meaningful effects may have been missed. In addition, while it is widely applied, there is growing controversy regarding the validity of the stage of change model and its usefulness in predicting cessation (West, 2005). Nonetheless, these findings indicate that future research on the relationship between valued life activities and smoking in physically disabled populations may be fruitful.

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Table 1**Bivariate Relationships**

	Stage of change			
	Pre-contemplation (n = 6)	Contemplation (n = 22)	Preparation (n = 19)	
Valued activity engagement	1.67 (SD = .82)	2.27 (SD = 1.12)	2.95 (SD = 1.35)	$r_s = .35, p < .05$
Valued activity restriction	3.83 (SD = .41)	3.05 (SD = 1.50)	3.42 (SD = 1.68)	<i>NS</i>
Satisfactory replacement of restricted activities	1/6 (16.7%)	6/22 (27.3%)	14/19 (73.7%)	$Z = -3.21, p = .001$
	Self-efficacy to quit smoking			
	Low Self-efficacy (n = 17)	Moderate Self-Efficacy (n = 12)	High Self-efficacy	
Valued activity engagement	2.06 (SD = 1.03)	2.00 (SD = .85)	3.17 (SD = 1.38)	$r_s = .37, p = .01$
Valued activity restriction	3.88 (SD = 1.58)	2.83 (SD = 1.53)	3.06 (SD = 1.26)	<i>NS</i>
Satisfactory replacement of restricted activities	6/17 (35.3%)	3/12 (25.0%)	12/18 (66.7%)	$Z = -1.88, p < .10$

Table 2**Ordinal Regression Models**

	Cox and Snell pseudo R ²	Beta	SE	Wald	Significance
Stage of Change model 1	.23				
Age		.09	.04	4.78	<i>p</i> < .05
FTND		.03	.16	.04	NA
Valued activity engagement		.55	.28	3.90	<i>p</i> < .05
Valued activity restriction		-.03	.20	.02	NA
Stage of Change model 2	.33				
Age		.08	.04	3.54	<i>p</i> < .10
FTND		.12	.17	.50	NA
Valued activity engagement		.35	.29	1.39	NA
Valued activity restriction		.05	.22	.06	NA
Satisfactory replacement of restricted activities		1.80	.74	6.02	<i>p</i> < .05
Self-Efficacy to quit model 1	.27				
Age		.05	.04	1.55	NA
FTND		-.09	.15	.35	NA
Valued activity engagement		.71	.28	6.61	<i>p</i> = .01
Valued activity restriction		-.45	.23	3.83	<i>p</i> = .05
Self-Efficacy to quit model 2	.27				
Age		.05	.04	1.38	NA
FTND		-.08	.16	.27	NA
Valued activity engagement		.66	.29	5.22	<i>p</i> < .05
Valued activity restriction		-.43	.23	3.44	<i>p</i> < .10
Satisfactory replacement of restricted activities		.33	.64	.27	NA