A pilot study of a brief smoking cessation intervention at the student health center.

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A PILOT STUDY OF A BRIEF SMOKING CESSION INTERVENTION AT THE
STUDENT HEALTH CENTER

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Abstract

Objective

This study evaluated the feasibility and efficacy of a brief smoking intervention among college students presenting at a Hispanic Serving Institution student health center.

Participants and Methods

Participants (N = 115) completed measures assessing demographics, smoking history, nicotine dependence, decisional balance, and readiness to quit smoking. The motivationally-based counseling session lasted approximately 30 minutes. Two weeks later, participants completed the same measures and a satisfaction / intention to quit survey.

Results

Results indicated participants were predominantly light and intermittent smokers. At follow-up, participants indicated high levels of satisfaction and significant increases in intention to quit smoking. Quit rates were low; however, 37% reduced their cigarettes per day or categorical smoking status. Reduction was significantly associated with satisfaction, knowledge, and intention to quit smoking.

Conclusions

A brief intervention in college smokers was well-received and increased intentions to quit smoking. A larger smoking intervention study in Hispanic college smokers is needed.

Key Words: Tobacco use, Smoking cessation, College students, Hispanic
A Pilot Study of a Brief Smoking Cessation Intervention at The Student Health Center

Despite declines in smoking prevalence, college smoking rates remain high; estimates are that 31% of college students have smoked in the past thirty days.\(^1\) College remains a susceptible time for both smoking onset and continued smoking.\(^2,3\) While many students attempt to quit smoking, few succeed.\(^4\) College students also report low rates of being screened for tobacco use.\(^5\) Because of the need to develop and implement more efficacious smoking interventions and the increased likelihood of connecting with students who engage in high risk behaviors, utilization of university student health centers to screen for smokers has been recommended\(^6\) and offers a window for cessation treatment.

Within healthcare settings, brief interventions that include motivational enhancement components have been shown to reduce alcohol and tobacco use among college students.\(^7,8,9\) The transtheoretical model (TTM) suggests the importance of assisting clients to increase readiness toward behavior change through five stages (precontemplation, contemplation, preparation, action, and maintenance).\(^10\) Motivational enhancement in which pros and cons toward change are tipped in favor of increased readiness is consistent with TTM tenets.\(^11\)

**Aims and Hypotheses**

This study had three aims. First, the study assessed the profile of student smokers at a Hispanic Serving Institution who agreed to participate in a brief cessation intervention at the student health center. Second, satisfaction with the intervention and intention to quit smoking post intervention among all participants was explored. Finally, quit rates, reduction rates, and potential predictors of reduction among those who smoked at least weekly at baseline were assessed. It was hypothesized that smokers would be low level smokers, satisfaction with the intervention would be high, intention to quit post intervention would also be high, smoking rates
from baseline to follow-up would decrease, and participants would progress in the anticipated direction through the stages of change.

**Methods**

**Participants**

The inclusion criterion was having smoked within the past thirty days. Over a period of 12 months, a convenience sample of 1,752 students were seen at the student health center; 270 reported smoking in the past 30 days. A total of 125 consented to participate, and 82 returned a two-week follow-up survey. Ten participants were excluded from analyses because of data discrepancies (i.e., indicating “quitter” at baseline). Participants were 53% female, 54% and 17% self-identified as Hispanic and Mexican National respectively, and the mean age was 23.6 years ($SD = 5.8$).

**Measures**

**Tobacco History Assessment.** Participants reported on current and past tobacco use in a standard smoking intake. At baseline and follow-up, participants were defined as “daily” if they smoked on a daily basis (49%), “weekly” if they smoked less than daily but at least weekly (26%), “experimental” if they had smoked in the past month (11%) or tried cigarettes but did not report smoking weekly (14%), and “quitter” if they reported quitting subsequent to smoking. “Reducers” were defined as follow-up change to a lesser smoking category or reduction of frequency of daily smoking.

**Fagerström Test of Nicotine Dependence.** Participants completed this six item questionnaire, which assessed nicotine dependence at baseline. The questionnaire yields a score between 1 and 10, with higher scores indicating greater nicotine dependence. This scale has been shown to have adequate reliability, and Cronbach’s alpha was 0.53 for this study.
University of Rhode Island Change Assessment (URICA). To assess stage of change, participants rated their level of agreement with statements about smoking attitudes. Four 8-item scales that assess stage of change were used; each item measures level of agreement on a scale of 1 to 5, in which higher scores indicate characteristics related to each stage. The scales have demonstrated adequate reliability, and for the present study, Cronbach’s alphas were 0.72 for Precontemplation, 0.87 for Action, and 0.89 for Contemplation and Maintenance. This measure was completed at baseline and follow-up to detect stage movement.

Smoking Decisional Balance (Long Form). This 20-item questionnaire includes two scales measuring pros and cons of smoking. Each scale produces total scores ranging from 10 to 50 with higher scores reflecting higher levels of importance of smoking pros and cons respectively. Internal consistency for both scales was adequate, and for the present study, Cronbach’s alphas were calculated at 0.81 and 0.80 for the pros and cons scales. This measure was completed at baseline and follow-up.

Bedfont Scientific EC50 - Micro III Smokerlyzer. Participants’ carbon monoxide level (CO) was measured at baseline using a CO Monitor.

Satisfaction and Intention Follow-Up Survey. A satisfaction and intention to quit smoking survey was self-administered at the two week follow-up to assess participant satisfaction with and potential benefits of the program. The measure rates responses from 1 (e.g., less satisfied, not likely) to 6 (e.g., more favorable, more likely), and questions assessed participant overall satisfaction, satisfaction with cessation advice, knowledge of smoking costs and cessation benefits, thinking about costs and benefits subsequent to intervention, thinking about quitting, desire to quit, confidence in ability to quit, and the likelihood of quitting in the next week, month, and three months.
Intervention

The intervention was a single, individual counseling session lasting approximately 30 minutes. Components included: CO feedback; exploration of interest and confidence in quitting; assessment of personal motivators to continue or quit smoking; tipping the scales in favor of quitting; handout review of smoking costs, quitting benefits, and external resources for cessation; and setting a quit date if appropriate.

Procedure

Graduate-level counselors were present at the student health center weekdays between 10:00 am and 2:00 pm, and an appointment request sheet was permanently placed in the lobby (to indicate interest when counselors were not present). In an attempt to recruit students who may not identify as smokers, counselors asked, “How many cigarettes have you smoked in the past 30 days?” If eligible, participants completed a consent form, completed the survey, and participated in the brief intervention. Follow-up surveys were mailed and to be completed two weeks post-intervention for a $10 participant payment. Those who did not respond to the initial survey mailing were contacted three times in an effort to retain them in the study.

Approach to Analyses

Descriptives were employed to provide participant characteristics at baseline. Chi square and t-tests were used to assess potential differences between those smoking at least weekly and those smoking less than weekly.

Participants were analyzed as to satisfaction with the intervention (t-tests) and follow-up reports of intentions (e.g., to quit smoking in the next week, month, and 3 months) (Friedman’s $\chi^2$). Wilcoxon sign rank post hoc tests determined between group differences in intention to quit.
Intention to Treat (ITT) analysis was employed for those who did not provide follow-up data. Because the 2 week follow-up period was not long enough to enable valid reports of quitting or reducing smoking in those who smoke less than weekly, they were excluded from inferential analyses of cessation and reduction. Cessation and reduction rates were calculated.

Reductions were examined with a test of symmetry of baseline with follow-up within the categorical variable assessing smoking status (daily / weekly, or experimental) and analyzed for differences in baseline characteristics and in follow-up survey satisfaction and impact of intervention. Those who reduced either categorically or in cpd were compared to non-reducers with a median $\chi^2$ test which enables exact $p$ values to be calculated to account for small cell frequencies.

Finally, because of the conceptual and empirical relationships among the URICA and Decisional Balance measures within the Transtheoretical model, MANOVA was employed to test multivariate differences between baseline and follow-up scores on those measures.

**Results**

Table 1 provides baseline characteristics by smoking status (daily and weekly smokers, $n = 86$, vs. experimental smokers, $n = 29$). At baseline, experimental smokers had significantly lower CO levels lower levels of nicotine dependence, lower contemplation scores, higher precontemplation scores, and lower decisional balance pros scores. Attrition was not predicted by smoking status (daily or weekly vs. experimental) gender, ethnicity, age, nicotine dependence, CO, or age of first use (all $p$’s > .14).

Follow-up survey items assessing satisfaction and the perceived impact of the intervention on participants’ likelihood of quitting were all rated significantly higher than the midpoint of the scale (all $p$’s < .001). Compared to experimental smokers, daily and weekly
smokers reported less likelihood of quitting in the next week, month, and 3 months (see Table 2), as well as less desire and confidence in quitting.

The likelihood of quitting within the next week, month, or 3 months within the experimental smokers was not significant, $\chi^2 (2) = 2.47, p > .29$; however, for daily and weekly smokers, there were significant differences between likelihood of quitting over time, $\chi^2 (2) = 32.35, p < .001$. Post-hoc comparisons revealed that individuals reported less likelihood of quitting in the next week relative to the next month, $Z = -3.36, p < .001$, and the next three months, $Z = -4.36, p < .001$, as well as less likelihood of quitting within the next month relative to the next three months, $Z = -3.99, p < .001$.

Of daily and weekly smokers, 3.5% reported quitting smoking at follow-up, 37% reduced their smoking, yet categorical smoking status change was also not significant, $\chi^2 (4) = 7.33, exact p = .10$. Reducers did not differ from non-reducers on relevant baseline characteristics. Differences between those who reported reduction with those who did not at follow-up indicated reducers reported higher than median ratings in satisfaction with cessation advice, reported learning more about the costs and benefits of smoking, reported a higher than median likelihood of quitting in the next month and the next three months, and reported higher than median endorsement of having been influenced to think about quitting more as a result of the intervention. Given the low cessation rate at follow-up, potential predictors of cessation were not possible to examine.

The MANOVA simultaneously comparing the baseline and follow-up scores in each of the URICA measures indicated no significant differences, $\lambda = .87, F (4, 39) = 1.40, ns$. The differences between baseline and follow-up decisional balance scores were also not significant, $\lambda = .99, F (2, 44) = .20, ns$. 

Results of this study indicate participants were predominantly Hispanic light smokers. Consistent with previous research suggesting both Hispanic and college students smoke relatively infrequently,16,17 those in this study had extremely low levels of CO and nicotine dependence. Higher levels of precontemplation, more pros to smoking, and lower levels of contemplation among experimental smokers suggest that these individuals may benefit from cognitive focused interventions, such as motivational enhancement, to advance cessation readiness.

Indeed, all smokers indicated a greater likelihood of quitting smoking in the next week, month, and three months, and these effects were more pronounced for experimental smokers relative to those smoking at least weekly. Further, daily/weekly smokers demonstrated a pattern for greater intention to quit over time. Three implications are noteworthy. First, although the link between intention and future behavior may be modest,18 studies demonstrate this relationship exists.19,20 Evidence suggests the focus on both the motivational and volitional processes associated with intention to promote cessation;21 thus, adding volitional elements to the intervention may promote capitalizing on observed intention rates to enhance cessation rates.

Second, given the episodic nature of experimenter smoking, their quit and reduction rates could not be assessed in the current short-term follow-up pilot study. It may be that experimenters in this study actually quit smoking, consistent with reported intentions, and this was unable to be observed. Third, that those smoking at least weekly indicated increasing intentions to quit smoking over time, similarly suggests that the follow-up length in this study was too short to observe cessation in those planning to quit but not at present. The utilized student health center approach seems feasible and satisfying to participants and promotes intention to quit smoking,
suggesting the transition from pilot to larger scale studies with longer follow-up periods is warranted.

Over one-third of participants reported reduced smoking and reduction was significantly associated with program satisfaction, increased knowledge of intervention constructs, and intention to quit smoking. Though reduction may be less meaningful with regard to health consequences for light and intermittent smokers, smoking reduction for these individuals may translate to increased cessation in the long term, as has been shown in other smoking populations. The observed relationships between reduction and increases in satisfaction and knowledge suggest that future interventions may wish to include intervention content checks to ensure participant understanding, and the relationship between reduction and intention to quit smoking again indicates the need to adopt longer follow-up periods.

The quit rate in this study is far lower than meta-analytic estimated longer term abstinence rates for one intervention session (12.4%) indicating the need to continue refining the intervention to improve effectiveness. As a pilot study, the same intervention was used on all smokers to measure general efficacy. Given that the sample consisted of light and intermittent, predominantly Hispanic smokers, a more tailored treatment might prove more efficacious. For example, highlighting the costs of even low levels of smoking and the benefits of eliminating even intermittent or light use of tobacco may prove more relatable and thus more efficacious to this and similar groups of smokers. In addition, the reduction of non-trivial attrition rates within the context of intent to treat analyses will likely result in increased abstinence rates. Use of other follow-up modalities in a college population (e.g., e mail surveys, web based surveys, cell phone follow-ups) will likely increase retention rates.
Results from the intervention showed increases in intention to quit smoking. Despite these changes, TTM measures failed to differ from baseline to follow-up, which is consistent with a recent study, which failed to find significant movement between TTM measures over a 24-month follow-up period.\textsuperscript{25} The null results in the current study may be attributed to limited research of TTM measures in this population, the dearth of knowledge regarding light smoking and its association to transtheoretical constructs, and/or the need for stronger readiness and decisional balance foci in future intervention efforts.

Limitations

Limitations of the study include the categorical approach to analysis of smoking status, short follow-up time, and lack of a control group. Due to the low levels of smoking and short follow-up period, categorical analysis of smoking was employed. Due to the pilot nature of the study, follow-up time was limited, and no comparison group was assessed.

Conclusions

Future studies should develop and implement more tailored light smoking brief interventions, utilize longer follow-up periods, increase focus on enhancing the links between cessation and both intentions to quit and smoking reduction, include appropriate comparison groups, and make every attempt to reduce attrition. Given high rates of smoking on college campuses, yet low levels of smoking in college students, such studies appear warranted, as this pilot study suggests the feasibility of implementing minimal contact cessation interventions in college student health centers.
Acknowledgements

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We would also like to acknowledge the University of Texas at El Paso Student Health Center staff for their participation in this study.
References


Table 1: Baseline Characteristics of Participants ($N = 115$)

<table>
<thead>
<tr>
<th>Smoking Status</th>
<th>Categorical Demographic Variables</th>
<th>Daily / Weekly</th>
<th>Experimental</th>
<th>Difference</th>
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<td></td>
<td>Gender</td>
<td>$N$</td>
<td>$%$</td>
<td>$n$</td>
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<tr>
<td></td>
<td>Male</td>
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<tr>
<td></td>
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<td>46</td>
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<tr>
<td></td>
<td>Ethnicity</td>
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<tr>
<td></td>
<td>Mexican National</td>
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<td></td>
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<td>Other</td>
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<td>$\chi^2 (4) = 5.99, p = ns$</td>
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<tr>
<td></td>
<td>None</td>
<td>11</td>
<td>13</td>
<td>6</td>
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<tr>
<td></td>
<td>1 Time</td>
<td>6</td>
<td>7</td>
<td>4</td>
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<td>2 Times</td>
<td>11</td>
<td>13</td>
<td>2</td>
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<tr>
<td></td>
<td>3 Times</td>
<td>9</td>
<td>10</td>
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<td>More than 3 times</td>
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<td>57</td>
<td>15</td>
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<td></td>
<td>Attempted to Quit Without Aid</td>
<td>$\chi^2 (1) = .00, p = ns$</td>
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<td>70</td>
<td>14</td>
<td>70</td>
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<td></td>
<td>Attempted to Reduce</td>
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<td>Continuous Demographic Variables</td>
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<td>Mean</td>
<td>SD</td>
</tr>
<tr>
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<td>15.48</td>
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<td>Cigarettes Per Day</td>
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<td>5.26</td>
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<td>Nicotine Dependence</td>
<td>1.85</td>
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<td>Transtheoretical Model Measures</td>
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<td>URICA</td>
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<td>3.46</td>
<td>0.81</td>
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<td></td>
<td>Action</td>
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<td>Maintenance</td>
<td>2.74</td>
<td>0.77</td>
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<tr>
<td>Decisional Balance</td>
<td>Pros</td>
<td>2.60</td>
<td>0.75</td>
<td>2.15</td>
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<tr>
<td></td>
<td>Cons</td>
<td>3.25</td>
<td>0.84</td>
<td>3.13</td>
</tr>
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</table>

Note: Categorical $n$'s may not sum to overall total because of missing values.
Table 2: Daily and Weekly Vs. Experimental Smokers Satisfaction and Perceived Impact of Intervention

<table>
<thead>
<tr>
<th>Post-Intervention Survey Question</th>
<th>Daily / Weekly</th>
<th>Experimental</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
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<tr>
<td>Satisfaction with Intervention</td>
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<td>1.29</td>
<td>4.50</td>
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<td>Satisfaction with Advice to Quit</td>
<td>4.41</td>
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<td>Thinking More about Costs Now</td>
<td>4.22</td>
<td>1.37</td>
<td>4.10</td>
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<td>Likelihood of Quitting:</td>
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<tr>
<td>In the next week</td>
<td>3.13</td>
<td>1.84</td>
<td>4.57</td>
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<tr>
<td>In the next month</td>
<td>3.40</td>
<td>1.83</td>
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<td>In the next 3 months</td>
<td>3.83</td>
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<td>Program Influenced Thoughts of Quitting</td>
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<td>1.54</td>
<td>3.76</td>
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<td>Desire to Quit</td>
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<td>2.78</td>
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<td>Confidence in Quitting</td>
<td>7.40</td>
<td>2.51</td>
<td>8.95</td>
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