Smoking Cessation in Adolescents

The Role of Nicotine Dependence, Stress, and Coping Methods

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Objectives: To compare perceived reasons for continued smoking and withdrawal symptoms between current smokers and quitters in an inner-city adolescent population. To examine the relationship of nicotine dependence, stress, and coping methods between smokers and quitters and, using the Transtheoretical Model of Change, among adjacent smoking cessation stages.

Design: A cross-sectional study using a self-administered questionnaire.

Participants: The study comprised 354 clinic patients between the ages of 12 and 21 years who reported past or present smoking.

Main Outcome Measures: Demographic characteristics, smoking status, perceived reasons for continued smoking, attempts to quit, and withdrawal symptoms, as well as standardized scales assessing nicotine dependence, stress, and coping methods.

Results: The overall prevalence of smoking in this population was 26%. Smokers were significantly more likely to report smoking more cigarettes per day as well as higher levels of physical addiction ($P < .01$), greater levels of perceived stress ($P < .02$), and less use of cognitive coping methods ($P < .02$) than quitters ($P < .005$). However, comparison of consecutive stages revealed a significant difference only between precontemplation and contemplation in cognitive coping methods ($P < .01$). Three of 20 withdrawal symptoms (cravings, difficulty dealing with stress, and anger) were reported more frequently among current smokers who had attempted to quit in the last 6 months than among former smokers ($P < .01$).

Conclusion: Interventions for inner-city adolescents who smoke should be designed to target those with the highest levels of nicotine dependence, stress, and decreased use of cognitive coping methods because they are the least likely to quit on their own, rather than developing stage-specific models.

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In 1998, more than 4 million adolescents in the United States were current cigarette smokers. Although only 5% of daily smokers enrolled in high school think that they will be smoking in 5 years, 75% of these adolescents still smoke 5 to 7 years later. Most report that they would like to quit but are unable to do so. In fact, among high school students who had smoked daily at some point, 72.9% had tried to quit smoking, and 13.5% were former smokers. Most research on smoking and adolescents has concentrated on factors that lead to smoking, to develop more effective primary prevention programs. However, our understanding of why adolescents quit and how we can influence this behavior is limited.

Once smoking behavior becomes established, regular smokers are more likely than beginning smokers to report that they smoke because they are addicted. Among adolescents, nicotine dependence is related to both the intensity and duration of smoking. Studies among adults suggest that lighter smokers and those who have smoked for a shorter period of time are more likely to quit than heavier smokers and those who have smoked for a longer period of time. However, despite this relationship between continued smoking and nicotine dependence, cessation studies using medication for nicotine dependence have had limited success in adolescents. Therefore, it is important to address other factors that are responsible for continued smoking.

Stress is associated with continued use of cigarettes in both adults and adolescents. When adolescents are given 2 choices (“It relaxes or calms me” and “It’s really hard to quit”) and asked why they continue to smoke, they frequently report that they use smoking to relax. Among adults, stress levels are inversely related to the duration of smoking cessation, and those who continue to smoke report higher levels of stress. In another study, the degree of perceived stress was the only variable that prospectively predicted success with quitting, with lower levels associated with higher quit rates.
Coping processes have been defined as ongoing cognitive and behavioral strategies to manage external and internal demands.19,20 Among adult quitters, studies have noted that any productive attempt to cope with relapse crises is better than no coping attempt.20 Others have indicated that all coping strategies are equally effective and that using multiple cognitive or multiple behavioral strategies is just as effective as using a combination of these methods.21,22

In designing cessation studies, it has been suggested that rather than classifying smokers into groups (ie, smokers vs quitters), interventions should be tailored to match the individual smoking cessation stage of change using the Transtheoretical Model of Change (TMC).23,24 Unfortunately, only a limited number of studies have evaluated the adult data on smoking cessation and were classified into the following stages: (1) seriously tempted to quit for 24 hours or more in the last 6 months (by definition, all those in the P stage said yes to this question); (2) seriously tempted to quit for 24 hours or more in the last 6 months; (3) who or what would help them quit. The choices were compiled from reasons given by adolescents during previous work with this population by the first author (L.M.S.). Former smokers and those who had made an attempt to quit were asked to pick, from a list of 20 items, withdrawal symptoms they had experienced. These symptoms included those listed in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Former smokers were asked to recall the average number of cigarettes smoked per day. Then each subject completed standardized measures of nicotine dependence, perceived stress, negative life events, and coping methods. Finally, subjects were asked about their current stage of smoking cessation and were classified into the following stages: (1) not seriously considering quitting in the next 6 months, or precontemplation (PC; n=119); (2) seriously

Some adolescents served are African American or African Caribbean, 46% are Hispanic, 3% are white, and 2% are Asian or Pacific Islanders. Eleven percent are younger than 15 years, 45% are between 15 and 17 years, 31% are between 18 and 19 years, and 13.6% are age 20 years and older. Eighty-two percent of the patients are female. Eighty-two percent of the patients are female.

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considering quitting in the next 6 months, or contemplation [C; n=83]; (3) able to quit for 24 hours or more in the last 6 months and planning on quitting in the next 30 days, or preparation [P; n=73], (4) completely stopped smoking within the last 6 months, or action [A; n=33]; (5) completely stopped smoking more than 6 months ago, or maintenance [M; n=46].

MEASURES

The Perceived Stress Scale is a 10-item measure of perceived stressful life situations assessed on a 5-point Likert scale and is a commonly used research instrument.26,27 As an example, one item asked subjects how often in the last 30 days they had been upset by an unexpected event. Scoring was from 0 to 4 on a 5-point scale, and the scores ranged from 0 to 40.26 This scale has been shown to have reliability and validity in previous studies with adolescents.28,29

The Negative Life Events Scale is a 20-item checklist of which 11 events involve family members (eg, “somebody in my family had a serious illness”) and 9 involve the adolescent (eg, “I had a serious accident”: the scale concerns events that took place during the last year. This scale has been shown to have reliability and validity in previous research studies with adolescents. Based on a total set of 20 items, the score ranges from 20 to 40.30

We used a 47-item scale to assess 8 coping measures developed by Wills et al,31 which uses a 5-point Likert scale and has also served as a research instrument to measure coping strategies. These strategies have been divided into positive and negative methods by the developers of the measure, who have used these scales in school-based studies of adolescents. Positive coping methods include parental support, behavioral coping, and cognitive coping. Higher scores on these subscales suggest that the probability of substance use or abuse is reduced (protective). The negative or ineffective methods of coping are avoidance, anger, helplessness, substance use, and peer support coping. Higher scores reflect increased risk of substance use. We excluded substance use coping from further analysis because it includes the use of cigarettes, which was related to the outcome variables.

The Fagerstrom Test for Nicotine Dependence (FTND) is a 6-item self-report measure of nicotine dependence.12 It is a revision of the Fagerstrom Tolerance Questionnaire, which was developed to assess self-reported nicotine dependence and has demonstrated strong correlations with cotinine levels.10 This questionnaire and a modified version of it have been used to assess nicotine dependence among adolescents.9,13 A score of 7 to 10 on the FTND scale is considered to represent a high degree of nicotine dependence; a score of 4 to 6, moderate dependence; and below 4, light dependence. We added the past tense to each of the questions posed to former smokers to obtain a retrospective report of their nicotine dependence.

ANALYSIS

χ² Analysis was used to examine the associations between categorical demographic variables and both smoking status (smokers and quitters) and smoking cessation stages (P, C, P, A, and M). The Mann-Whitney rank sum test was used to compare age and the scores on the standardized scales between the 2 smoking groups. The Kruskal-Wallis nonparametric analysis of variance with contrasts was used to compare scale values between smokers and quitters and then to compare age and scale values among contiguous stages. A significance level of P<.05 was employed for decision making in our statistical analyses using 2-tailed tests, and the Bonferroni adjustment was made for multiple comparisons. Data were analyzed on a personal computer using BMDP statistical software (Los Angeles, Calif).34

RESULTS

Although adolescent smokers and quitters did not differ significantly by sex, race, educational level, employment status, or subjective assessment of religiosity (Table 1), smokers as a group were slightly younger than quitters (mean±SD, 17.6±2.1 years vs 18.2±1.7 years; P<.05). The demographics of the study sample did not differ significantly from that of the clinic population.

SMOKING ATTITUDES AND BEHAVIORS AMONG SMOKERS AND QUITTERS

The major reasons smokers acknowledged for continuing to smoke were as follows: “relaxes me,” 73%; “have a habit,” 56%; “I am addicted,” 29%; “I’m bored,” 22%; and “everyone around me smokes,” 17%. Fifteen percent or less said that it was to help them concentrate, was for the pleasure of smoking, or was due to peer pressure. Quitters asked to recall the reasons they smoked were significantly less likely (P<.01) to say that they had a habit (31%) or were addicted (11%).

Sixty-nine percent of the current smokers had attempted to quit for 24 hours or more in the last 6 months, and more than half (58%) of these smokers felt that they were unlikely to succeed if they tried to quit in the following month. Of those who had attempted to quit but were still smoking, a larger percentage than that of former smokers reported experiencing 3 of the 20 withdrawal symptoms (Table 2). These included cigarette cravings (47% vs 18%; P<.001), difficulty dealing with stress-
When subjects were asked why they started smoking again after attempting to quit, significant differences between smokers and quitters were obtained for 2 responses: 83% of smokers vs 17% of quitters chose “because of stress” (P <.001), and 25% vs 9% chose “after a fight” (P <.005). No significant differences were obtained for “because my friends smoke” or “I was bored.”

Among the reasons for quitting or wanting to quit, quitters more frequently acknowledged that others wanted them to quit than did current smokers (P <.01). There were no differences in concerns regarding current or future health or cost.

When asked who or what would help them if they chose to quit smoking or who had helped them quit, “doing it on my own” was the most common choice by both groups (82% of quitters vs 72% of current smokers). Only 10% of current smokers said that they would use a program, and 8% chose “with the help of medication.” Only 33% of current smokers and 28% of quitters acknowledged being advised to quit by a health professional.

### STRESS, COPING, AND NICOTINE DEPENDENCE AMONG SMOKERS AND QUITTERS

In comparing all scale values between smokers and quitters, we found a significant difference in each of the measures used. Although most of these adolescents had mild nicotine dependence on the FTND scale, there was a significant difference between groups (mean ± SD, 2.9 ± 2.4 vs 1.7 ± 2.3; P <.001). Measures of stress included the Perceived Stress Scale (mean ± SD, 21.6 ± 6.6 vs 19.1 ± 6.7; P <.01) and the Negative Life Events Scale (mean ± SD, 25.8 ± 3.4 vs 24.6 ± 3.0; P <.01). Among the coping subscales, only cognitive coping (positive method) was significantly different between these groups (mean ± SD, 18.5 ± 5 vs 20 ± 5.5; P <.05).

### STRESS, COPING, AND NICOTINE DEPENDENCE AMONG STAGES OF SMOKING CESSATION

We then compared demographics and median scores on the standardized scales between each pair of adjacent smoking cessation stages. Those in the various stages did not differ significantly by age, sex, race, educational level, employment status, or subjective assessment of religiosity.

Sixty-two percent of those in the PC and 74% in the C stage had attempted to quit for 24 hours or more in the last 6 months. A significantly larger percentage of those in the PC than the C stage recalled having had intense cravings (P <.001), difficulty dealing with stress, subjective depression, irritability, and feelings of sadness and anxiety (P <.05).

There was no significant difference in the FTND scores between adjacent stages (Figure 1) despite the visual difference between stages C and P. Those in the PC stage reported smoking an average of 10 cigarettes a day in the last month (range, 0–30). Those in the C

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Table 1. Demographic Characteristics by Stages of Change*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Smoker (n = 119)</th>
<th>C (n = 83)</th>
<th>P (n = 73)</th>
<th>Quitter (n = 33)</th>
<th>M (n = 46)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD age, y†</td>
<td>17.7 ± 2.1</td>
<td>17.7 ± 2.1</td>
<td>17.7 ± 1.9</td>
<td>18.1 ± 1.8</td>
<td>18.4 ± 1.5</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>98 (82)</td>
<td>62 (75)</td>
<td>60 (82)</td>
<td>29 (88)</td>
<td>38 (84)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
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</tr>
<tr>
<td>Black</td>
<td>38 (32)</td>
<td>30 (36)</td>
<td>16 (22)</td>
<td>11 (33)</td>
<td>14 (32)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>57 (48)</td>
<td>39 (47)</td>
<td>43 (60)</td>
<td>16 (49)</td>
<td>23 (52)</td>
</tr>
<tr>
<td>White</td>
<td>10 (8)</td>
<td>5 (6)</td>
<td>6 (8)</td>
<td>5 (15)</td>
<td>. . .</td>
</tr>
<tr>
<td>Asian</td>
<td>6 (5)</td>
<td>2 (2)</td>
<td>2 (3)</td>
<td>. . .</td>
<td>2 (5)</td>
</tr>
<tr>
<td>Other‡</td>
<td>8 (7)</td>
<td>7 (8)</td>
<td>5 (7)</td>
<td>1 (3)</td>
<td>5 (11)</td>
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<tr>
<td>School enrollment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤12th grade</td>
<td>96 (81)</td>
<td>64 (77)</td>
<td>60 (82)</td>
<td>27 (82)</td>
<td>37 (80)</td>
</tr>
<tr>
<td>&gt;12th grade</td>
<td>23 (19)</td>
<td>19 (23)</td>
<td>12 (16)</td>
<td>6 (18)</td>
<td>9 (20)</td>
</tr>
<tr>
<td>Not in school</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td></td>
<td>. . .</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>26 (22)</td>
<td>19 (23)</td>
<td>20 (27)</td>
<td>8 (24)</td>
<td>10 (22)</td>
</tr>
<tr>
<td>Part-time</td>
<td>34 (29)</td>
<td>20 (24)</td>
<td>14 (19)</td>
<td>6 (18)</td>
<td>16 (35)</td>
</tr>
<tr>
<td>Not employed</td>
<td>59 (50)</td>
<td>44 (53)</td>
<td>39 (53)</td>
<td>19 (58)</td>
<td>20 (44)</td>
</tr>
<tr>
<td>Religiosity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No religion</td>
<td>26 (22)</td>
<td>13 (16)</td>
<td>19 (27)</td>
<td>5 (16)</td>
<td>10 (22)</td>
</tr>
<tr>
<td>A little</td>
<td>47 (40)</td>
<td>35 (43)</td>
<td>33 (47)</td>
<td>16 (50)</td>
<td>23 (50)</td>
</tr>
<tr>
<td>Moderate</td>
<td>39 (33)</td>
<td>27 (33)</td>
<td>15 (21)</td>
<td>10 (31)</td>
<td>12 (26)</td>
</tr>
<tr>
<td>Very religious</td>
<td>6 (5)</td>
<td>6 (7)</td>
<td>4 (6)</td>
<td>1 (3)</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>

* Denominator term varies across variables because of missing data. Percentages may not total 100% because of rounding. PC indicates precontemplation; C, contemplation; P, preparation; A, action; M, maintenance; and ellipses, not applicable. Variables are not significantly different by smoking cessation stage or by group unless otherwise indicated. Data are presented as number (percentage) unless otherwise indicated.

†Variable is significantly different by group (smokers vs quitters) at P <.05.

‡The “other” category under ethnicity is composed mainly of those who considered themselves of mixed African and Hispanic ethnicity.
and P stages used an average of 3 cigarettes (range, 0-30). Quitters, all in either the A or M stage of smoking cessation, reported having used an average of 3.5 cigarettes a day (range, 0-20). Those in the PC stage had smoked the longest (mean±SD, 3.5±2.5 years), current smokers in other groups were intermediate (mean±SD, 2.6±2.4 years), and quitters had smoked for the least amount of time (mean±SD, 2.2±1.9 years) (P<.001).

Although there was no significant difference between adjacent stages, there was a gradual decline in the scores for the scales assessing stress along the continuum (Figure 2).

We found a significantly lower score for cognitive coping between subjects in the PC and C stages when looking at contiguous stages (mean±SD, 18.4±5.9 vs 20±4.7; P<.05). There was no significant difference between adjacent stages for any of the other coping strategies studied (Table 3).

All smokers acknowledged that having a “habit” or being “addicted” kept them smoking, in addition to showing dependence on the FTND scale and reporting withdrawal symptoms. As in adults, those using the least number of cigarettes, those with lower levels of addiction, and those smoking for shorter periods of time were more likely to quit on their own. Despite the controversy around the definition of cravings in those who abstain, this symptom was the most commonly reported and has been associated with failure in smoking cessation.2,35,36 Most of these inner-city adolescents wanted to quit on their own rather than with the use of medication. A study of adolescents’ attitudes toward methods of quitting showed that teens rated the likelihood of success as the most important criteria for choosing a particular method.37 However, although most of the adolescents we studied acknowledged that they would be unlikely to succeed if they attempted to quit in the near future, they indicated that they would choose to quit without assistance.

It is disturbing that only a third of the subjects who smoked reported being asked by a physician to quit. Studies in adults have shown that 10% to 25% of smokers who are advised to quit by their physicians may quit or reduce the amount they smoke, stressing the need for pediatricians and other health professionals to address the issue.6,38 Several national medical organizations have guidelines to help provide anticipatory guidance, screening, and referrals.39,40 Given that most adolescents want to quit on their own, developing skills in motivational interviewing and brief office interventions may be the most effective means to enhance quit rates.41-43

The adolescents in this study most often attributed the role of cigarettes in helping them to relax as the reason to continue smoking (73%). Stress was also acknowledged as a common cause for relapse after previous quit attempts (49%). The perceived stress score was signifi-

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### Table 2. Withdrawal Symptoms Stratified by Smoking Status*

<table>
<thead>
<tr>
<th>Withdrawal Symptom</th>
<th>Quitters (n = 79)</th>
<th>Smokers With Past Quit Attempts (n = 190)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frustration</td>
<td>15 (21)</td>
<td>33 (28)</td>
<td>.24</td>
</tr>
<tr>
<td>Weight gain</td>
<td>14 (19)</td>
<td>16 (14)</td>
<td>.30</td>
</tr>
<tr>
<td>Cravings</td>
<td>13 (18)</td>
<td>55 (47)</td>
<td>.001</td>
</tr>
<tr>
<td>Increased appetite</td>
<td>13 (18)</td>
<td>34 (29)</td>
<td>.08</td>
</tr>
<tr>
<td>Anxiety</td>
<td>10 (14)</td>
<td>24 (21)</td>
<td>.24</td>
</tr>
<tr>
<td>Irritability</td>
<td>10 (14)</td>
<td>29 (25)</td>
<td>.07</td>
</tr>
<tr>
<td>Restlessness</td>
<td>9 (13)</td>
<td>15 (13)</td>
<td>.93</td>
</tr>
<tr>
<td>Difficulty with stress</td>
<td>8 (11)</td>
<td>38 (33)</td>
<td>.001</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>7 (10)</td>
<td>7 (6)</td>
<td>.35</td>
</tr>
<tr>
<td>Nervousness</td>
<td>6 (8)</td>
<td>13 (11)</td>
<td>.52</td>
</tr>
<tr>
<td>No energy</td>
<td>6 (8)</td>
<td>12 (10)</td>
<td>.65</td>
</tr>
<tr>
<td>Depression</td>
<td>5 (7)</td>
<td>20 (17)</td>
<td>.04</td>
</tr>
<tr>
<td>Anger</td>
<td>4 (6)</td>
<td>22 (19)</td>
<td>.01</td>
</tr>
<tr>
<td>Trouble sleeping</td>
<td>4 (6)</td>
<td>15 (13)</td>
<td>.10</td>
</tr>
<tr>
<td>Trouble concentrating</td>
<td>4 (6)</td>
<td>9 (8)</td>
<td>.56</td>
</tr>
<tr>
<td>Crying easily</td>
<td>3 (4)</td>
<td>10 (9)</td>
<td>.24</td>
</tr>
<tr>
<td>Sweating</td>
<td>3 (4)</td>
<td>2 (2)</td>
<td>.31</td>
</tr>
<tr>
<td>Sadness</td>
<td>2 (3)</td>
<td>14 (12)</td>
<td>.03</td>
</tr>
<tr>
<td>Constipation</td>
<td>2 (3)</td>
<td>5 (4)</td>
<td>.99</td>
</tr>
<tr>
<td>Muscle cramps</td>
<td>2 (3)</td>
<td>3 (3)</td>
<td>.94</td>
</tr>
<tr>
<td>None reported</td>
<td>36 (50)</td>
<td>32 (28)</td>
<td>.002</td>
</tr>
</tbody>
</table>

* Denominator term varies across variables because of missing data. Percentages may not total 100% because of rounding. Data are presented as number (percentage).

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**COMMENT**

The adolescents in this study most often attributed the role of cigarettes in helping them to relax as the reason to continue smoking (73%). Stress was also acknowledged as a common cause for relapse after previous quit attempts (49%). The perceived stress score was signifi-

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**Figure 1.** Fagerstrom Test for Nicotine Dependence by smoking cessation stage. A significant difference is noted between groups (P<.001), but not between adjacent stages.

**Figure 2.** Perceived Stress Scale and Negative Life Events Scale by smoking cessation stage. A significant difference is noted between groups (P<.001), but not between adjacent stages.
cantly higher in smokers than in quitters but not signifi-
cantly different between consecutive stages. Unfortu-
nately, the measures employed in our study to evaluate stress
do not provide numeric cutoffs to guide the health care pro-
vider about when counseling may be required, especially
for the adolescent smoker. Therefore, it is difficult to de-
termine the clinical significance of our findings. However,
our data are consistent with reports suggesting that indi-
viduals with higher perceived stress scores and more nega-
tive life events are less likely to quit smoking.14,20,29 Reports
justifying why people continue to smoke may be subject to strong rationalization bias.44 Although smokers
may state that they smoke to relieve stress, a study by
Cohen and Lichtenstein45 suggests that quitting smoking
results in decreased stress, at least in those who want to
quit. Whether the higher level of perceived stress among
current smokers is related to withdrawal symptoms (when
not smoking) followed by a subjective sense of relaxation
(when smoking) remains to be determined. Prospective
studies should be conducted to determine the direction of
the relationship between stress and continued smoking.

Cognitive coping was the only coping method that
showed a significant difference between smokers and quir-
ters. The measure used, which is consistent with other
research in this area, does not guide the health care pro-
vider to select this coping strategy as opposed to an-
other. We believe that using this coping method possi-
bly aids adolescents attempting to quit smoking to reframe
stressful events or tempting situations; the method re-
duces their need to reach for a cigarette to cope with stress-
ors. The scope of strategies in this method include think-
ing about the health benefits of not smoking, evaluating
the social benefits of quitting (eg, pleasing a parent or
loved one), using distraction strategies such as thinking
about alternative pleasant activities, or a simple delay in
smoking cigarettes. Increased use of cognitive coping may
effect a move from precontemplation to contemplation
among these minority adolescents and may keep those
in maintenance from relapsing.

Using the TMC model, we noted that a smaller per-
centage of inner-city adolescents were in the earliest stage
of change (PC) than that reported in studies with the white
population, but that the percentages were similar for the
C and P stages and higher for the A and M stages.26 These
data are consistent with results of surveys demonstrating
that white youths have lower quit rates than youths from
minority backgrounds.45,46 This relationship may, how-
ever, be related to the younger age of initiation among whites.47 Among our minority adolescents, even those who
reported that they were not seriously considering quitting
in the next 6 months (PC) had made spontaneous at-
ttempts to quit in the recent past. This “desire not to quit”
may therefore be related more to feelings of lower self-
efficacy in quitting than a desire to continue smoking.

Because scores on the standardized scales for nico-
tine dependence and stress were higher among all sub-
stages of smokers (PC, P, and C) than quitters (A and M)
and were not significantly different between adjacent stages,
interventions for these factors could possibly be designed
for smokers as a group. A recent study noted that inter-
ventions mismatched to stages were as likely to be suc-
cessful as matched interventions, and questioned the va-

didity of this model in designing interventions.48 We
therefore suggest that for those smokers least likely to quit
on their own (ie, those with higher levels of addiction and
stress), improving motivation and feelings of self-efficacy
while teaching stress reduction techniques and improved
use of cognitive coping skills may improve quit rates. This
should include a discussion of the possible role of ciga-
rettes in inducing stress symptoms and the reduction of
these symptoms after quitting smoking.

Certain limitations in this study require comment. Be-
cause the sample is composed mainly of inner-city adoles-
cents from minority backgrounds, these results cannot nec-
essarily be generalized to adolescents residing in other
geographic areas. However, no other study has looked at
stages of smoking cessation in minority adolescents, nor
at the role of nicotine dependence, stress, and coping in
the ability to quit in this population. Because this was a cross-
sectional study, the number of cigarettes used and the level
of nicotine dependence among former smokers were elic-
ted by recall. Although we did not use any biochemical
assessments of smoking status, studies have shown little
discrepancy between self-reports and biochemical assess-
ments of adolescent cigarette smoking.49-51 However, re-
call bias by former smokers is possible, so the number of
cigarettes smoked and number of withdrawal symptoms
may have been underreported. Therefore, the results of
former smokers should be cautiously interpreted. In ad-
dition, our sample was composed mainly of women, and

Table 3. Coping Methods and Stages of Smoking Cessation*

<table>
<thead>
<tr>
<th></th>
<th>PC</th>
<th>C</th>
<th>P</th>
<th>A</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 119)</td>
<td>(n = 83)</td>
<td>(n = 73)</td>
<td>(n = 33)</td>
<td>(n = 46)</td>
</tr>
<tr>
<td>Positive coping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive†</td>
<td>18.0 (6-30)</td>
<td>20.0 (6-30)</td>
<td>19.0 (6-30)</td>
<td>20.0 (12-28)</td>
<td>19.5 (7-30)</td>
</tr>
<tr>
<td>Behavioral</td>
<td>24.0 (6-30)</td>
<td>24.0 (6-30)</td>
<td>23.0 (11-30)</td>
<td>22.0 (12-30)</td>
<td>24.0 (9-30)</td>
</tr>
<tr>
<td>Parental</td>
<td>8.0 (4-20)</td>
<td>10.0 (4-20)</td>
<td>10.5 (4-20)</td>
<td>10.0 (4-20)</td>
<td>9.0 (4-20)</td>
</tr>
<tr>
<td>Negative coping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>13.0 (7-35)</td>
<td>11.0 (7-35)</td>
<td>13.0 (7-35)</td>
<td>10.0 (7-35)</td>
<td>13.0 (7-29)</td>
</tr>
<tr>
<td>Helplessness</td>
<td>8.0 (4-20)</td>
<td>8.0 (4-20)</td>
<td>7.0 (4-20)</td>
<td>7.0 (4-15)</td>
<td>7.0 (4-14)</td>
</tr>
<tr>
<td>Peer support</td>
<td>16.0 (4-20)</td>
<td>15.0 (4-20)</td>
<td>15.0 (4-20)</td>
<td>16.0 (4-20)</td>
<td>16.0 (4-20)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>40.0 (12-58)</td>
<td>39.0 (21-60)</td>
<td>39.5 (25-60)</td>
<td>39.5 (12-57)</td>
<td>39.0 (20-58)</td>
</tr>
</tbody>
</table>

*Data are presented as median (range). PC indicates precontemplation; C, contemplation; P, preparation; A, action; and M, maintenance.
†Significant difference noted only between C & P at P < .05.
future studies will need to evaluate differences between the sexes in stress, coping, and nicotine addiction as they relate to smoking cessation in minority youths. Finally, because our study was cross-sectional, it is limited in its ability to predict progression.

CONCLUSIONS

These inner-city adolescent smokers did have nicotine dependence as evidenced by their reports of withdrawal symptoms and scores on the FTND scale. Smokers least likely to quit on their own were those who reported more withdrawal symptoms during their attempts to quit, higher levels of perceived stress, and less use of cognitive coping. Our results suggest that interventions for these factors should be designed for smokers as a group, rather than by stages of change on the TMC model.

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REFERENCES


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