

Smoking Cessation Behavior Among Intermittent Smokers Versus Daily Smokers

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Nondaily intermittent smokers (ITS) are common, but their cessation behavior remains elusive. We examined cessation of native-ITS (n=2040), converted-ITS (n=1808), and daily smokers (DS; n=25344). All ITS were more likely than were DS to make a quit attempt (native-ITS adjusted odds ratio [AOR]=1.60, 95% confidence interval [CI]=1.42, 1.80; converted-ITS AOR=3.33, 95% CI=2.93, 3.78). Native-ITS (18%) and converted-ITS (27%) were more likely than were DS (13%) to quit smoking (native-ITS AOR=1.34, 95% CI=1.07, 1.67; converted-ITS AOR=2.36, 95% CI=2.01, 2.78), but the low cessation rates of ITS challenge their nonaddicted status. (*Am J Public Health*. 2011;101:e1–e3. doi:10.2105/AJPH.2011.300186)

Most studies of smoking behavior focus on daily smokers,¹ and models of smoking and dependence assume daily smoking.^{2,3} However, up to 33% of US smokers now smoke less than daily,^{4–6} and this proportion increased 40% from 1996 to 2001.⁷

Models of nicotine dependence posit that smokers need to maintain near-constant nicotine levels to avoid withdrawal,³ which makes the smoking of nondaily intermittent smokers (ITS) puzzling and suggests that ITS should have little trouble quitting smoking. We used population data on US smokers to assess quit attempts, quit success, and use of cessation aids among ITS. Given the heterogeneity of ITS,^{8–11} we included both native-ITS (ITS who had never smoked daily) and converted-ITS (ITS who had smoked daily in the past), and we compared them to daily smokers (DS).

METHODS

We obtained data from the 2003 Tobacco Use Supplement to the Current Population Survey, a large household tobacco survey of the US civilian noninstitutionalized population,^{12,13} weighted to reflect the US population (for more details on the survey, see <http://riskfactor.cancer.gov/studies/tus-cps>). We excluded proxy data; the primary respondent response rate was 65%.

ITS smoked on some days when surveyed (current ITS) or in the year prior to quitting (abstinent ITS). Converted-ITS had previously smoked daily for at least 6 months; native-ITS had not. DS smoked daily when surveyed (current DS) or in the year prior to quitting (abstinent DS). Those who reported smoking a year ago but being abstinent for at least 90 days at survey were considered quitters. The smoking relapse curve begins to flatten after 90 days,¹⁴ and short-term success predicts long-term success.¹⁵ Smokers who had made a quit attempt in the past year stated whether they had used quitting aids. Measures of dependence (first cigarette smoked within 30 minutes on smoking days, cigarettes per day on smoking days, and years of smoking) were also assessed.¹⁶ We analyzed 29192 ever-smokers (27401 current and 1791 quitters), distributed among 2040 native-ITS, 1808 converted-ITS, and 25344 DS.

We compared personal characteristics, quit attempts, quit success, and use of quit aids among groups. We compared converted-ITS and native-ITS with DS and to each other. Current smokers reported on visits to a health professional (i.e., doctor, dentist, nurse, other) within the last year and receipt of advice to quit. We used multivariable logistic regression models (SUDAAN version 10, RTI International, Research Triangle Park, NC) to test whether demographic and dependence measures could explain group differences in quit attempts and success.

RESULTS

Most ITS (53%) were native-ITS. Native-ITS resembled converted-ITS on some measures and DS on others (Table 1). The majority of native-ITS (53%) and converted-ITS (69%) had made a past-year quit attempt, and both

were more likely than were DS (39%) to have attempted. Among attempters, there was low use of behavioral and pharmacological aids among native-ITS (6% and 11%, respectively), converted-ITS (11% and 21%, respectively), and DS (12% and 33%, respectively). With regard to abstinence, 18% of native-ITS and 27% of converted-ITS had been abstinent for at least 90 days at survey; DS had the lowest quit rates, at 13% (all statistics $P < .001$ except for native-ITS vs converted-ITS for use of behavioral aids, which was statistically nonsignificant).

Table 2 shows the adjusted multivariable comparisons of quit attempts and 90-day abstinence. Adjustment did not eliminate group differences. Finally, only 27% of native-ITS reported receiving advice to quit smoking, compared with 40% of converted-ITS and 45% of DS ($P < .001$ native-ITS vs DS and native-ITS vs converted-ITS; $P < .01$ DS vs converted-ITS).

DISCUSSION

Contrary to expectations that ITS would have little trouble quitting, most native-ITS (82%) and converted-ITS (73%) failed in their quit attempts (i.e., abstinent for <90 days). This is surprising because ITS do not seem to show other signs of nicotine dependence,¹⁷ and they regularly engage in voluntary abstinence. As another indicator that ITS have significant difficulty quitting, we found that some of these individuals sought help for quitting.

Converted-ITS were much more likely than were both native-ITS and DS to quit smoking. Converted-ITS resembled DS demographically, but they resembled native-ITS on dependence measures, consistent with their history of DS and transition to ITS. This finding suggests that converted-ITS may be individuals who have taken up nondaily smoking as a transition from DS to quitting.

Most ITS make quit attempts each year, but most ITS quit attempts end in failure. This high failure rate challenges their nonaddicted status. It is not clear why ITS should find quitting so difficult and demonstrate such poor success, particularly for native-ITS. Perhaps for ITS the drive to smoke may not be derived from the internal need to maintain nicotine levels for homeostasis (i.e., through maintenance

TABLE 1—Characteristics of Ever-Smokers: Tobacco Use Supplement to the Current Population Survey, United States, 2003

Descriptive Variables	Native-ITS, % (n = 2040)	Converted-ITS, % (n = 1808)	DS, % (n = 25 344)
Age, y			
18–29	40	26	24
30–39	24	22	20
40–49	21	23	26
50–59	9	16	18
≥60	6	14	14
Race			
White	74	82	86
Other	26	18	14
Education			
<high school	19	15	19
Completed high school	31	29	41
Beyond high school	51	56	40
Gender			
Men	57	51	54
Women	43	49	46
Time to first cigarette on smoking days: ≤30 min	9	13	64
Cigarettes per day on smoking days			
<10	87	74	12
10–19	11	19	32
20–29	2	6	41
≥30	<1	<1	15
Smoking, y			
<10	34	13	17
10–19	25	22	20
20–29	23	25	25
≥30	18	40	39

Note. DS = daily smoker; ITS = intermittent smoker. Converted-ITS are intermittent smokers who had formerly smoked daily for at least 6 months; native-ITS are intermittent smokers who had never smoked daily for at least 6 months. DS versus native-ITS comparisons were all significant at $P < .001$ except gender ($P < .01$). Native-ITS versus converted-ITS comparisons: age, cigarettes per day, years of smoking, race, gender, and time to first cigarette were all significant at $P < .001$; education was significant at $P < .05$. DS versus converted-ITS comparisons: education, time to first cigarette, and cigarettes per day were significant at $P < .001$; race and years of smoking were significant at $P < .01$; age was significant at $P < .05$; gender was statistically insignificant. All analyses used SAS-callable SUDAAN software to obtain variance estimates using a balanced repeated replication method that accounted for the complex sampling design. Results are weighted to reflect the US population. Column percentages may not sum to 100 because of rounding.

and withdrawal avoidance¹⁸) but is rather cued by external stimuli. In the absence of craving and withdrawal caused by dependence, these external cues may play a particularly significant role in the difficulties that ITS have with quitting. Such cue effects deserve further study and may suggest novel smoking-cessation treatments for ITS. Finally, native-ITS reported very low rates of professional advice. Larger, prospective ITS studies are needed. Understanding how and why ITS find quitting difficult, and how to help them

quit, are important research and public health questions. ■

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Contributors

H.A. Tindle conceptualized the study design and performed the programming and analyses. S. Shiffman refined the study design. Both authors participated in writing all drafts of the article.

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Human Participant Protection

No protocol approval was required because we used deidentified data obtained from a public-access use data set.

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TABLE 2—Multivariable Adjusted Odds Ratios of Making a Quit Attempt and Quitting Smoking Among Native-ITS, Converted-ITS, and DS: Tobacco Use Supplement to the Current Population Survey, United States, 2003

Smoker Type	Making a Quit Attempt, OR (95% CI)	Quitting Smoking, OR (95% CI)
Unadjusted		
DS (Ref)	1.00	1.00
Native-ITS	1.80 (1.60, 2.03)	1.37 (1.11, 1.71)
Converted-ITS	3.48 (3.07, 3.95)	2.44 (2.07, 2.86)
Within ITS		
Converted-ITS (Ref)	1.00	1.00
Native-ITS	0.52 (0.43, 0.62)	0.56 (0.43, 0.75)
Adjusted for demographics		
DS (Ref)	1.00	1.00
Native-ITS	1.60 (1.42, 1.80)	1.34 (1.07, 1.67)
Converted-ITS	3.33 (2.93, 3.78)	2.36 (2.01, 2.78)
Within ITS		
Converted-ITS (Ref)	1.00	1.00
Native-ITS	0.48 (0.40, 0.57)	0.57 (0.43, 0.75)
Adjusted for demographics and dependence		
DS (Ref)	1.00	1.00
Native-ITS	1.19 (1.03, 1.36)	1.53 (1.17, 2.01)
Converted-ITS	2.52 (2.17, 2.92)	2.69 (2.15, 3.38)
Within ITS		
Converted-ITS (Ref)	1.00	1.00
Native-ITS	0.47 (0.39, 0.46)	0.57 (0.43, 0.76)

Note. CI = confidence interval; DS = daily smokers; ITS = intermittent smokers; OR = odds ratio. Converted-ITS are intermittent smokers who had formerly smoked daily for at least 6 months; native-ITS are intermittent smokers who had never smoked daily for at least 6 months. All analyses used SAS-callable SUDAAN software to obtain variance estimates using a balanced repeated replication method that accounted for the complex sampling design. Results were weighted to reflect the US population. Sample sizes are as follows: DS = 25 344, native-ITS = 2040, converted-ITS = 1808. Note that analyses for quitting smoking were performed in the subgroup of individuals who had made a past-year quit attempt: DS = 9746, native-ITS = 1112, converted-ITS = 1235. Multivariable models are adjusted for age, race, gender, and education (demographics, middle section) and cigarettes per day and time to first cigarette (dependence measures, lower section).

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