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M. L. Wieland and S. T. Wu conceptualized the study, oversaw the analysis, and led the writing of the article. V. C. Kaggal performed the analysis and contributed to writing the article. B. P. Yawn conceptualized and supervised the study and contributed to writing the article. All authors edited and approved the article.

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Human Participant Protection

The study procedures were approved by the institutional review board at Mayo Clinic.

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Young Adult Smoking Cessation: Predictors of Quit Attempts and Abstinence

Lori M. Diemert, MSc, Susan J. Bondy, PhD, K. Stephen Brown, PhD, and Steve Manske, PhD

We examined young adult smoking cessation behaviors, coding cessation behavior as no attempt, quit attempt (< 30 days), or abstinence (≥ 30 days) during follow-up from July 2005 through December 2008, observed in 592 young adult smokers from the Ontario Tobacco Survey. One in 4 young adults made an attempt; 14% obtained 30-day abstinence. Cessation resources, prior attempts, and intention predicted quit attempts, whereas high self-efficacy, using resources, having support, and low addiction predicted abstinence, indicating that young adult smokers require effective and appropriate cessation resources. (*Am J Public Health*. 2013;103:449–453. doi:10.2105/AJPH.2012.300878)

Young adults have had the highest smoking prevalence among all age groups.^{1,2} Over the past decade, the prevalence of quit attempts increased among Americans aged 45 to 64 years; however, it remained stable among young adults.³ A recent review concluded that the determinants of young adult cessation are not well understood.⁴ Previous longitudinal studies in this population have long follow-up intervals—3 to 7 years^{5–12}—which means that certain measures (e.g., self-efficacy) may have changed across time and are no longer relevant to predict the later behavior. We examined proximate predictors of young adult smoking cessation behaviors in a prospective study with a 6-month follow-up.

METHODS

We compiled data from 592 young adult smokers (aged 18–29 years) with a 6-month

follow-up from July 2005 through December 2008 from the Ontario Tobacco Survey, a population-representative cohort of smokers in Ontario, Canada.^{13,14} We classified smoking cessation behavior as no quit attempt, attempt to quit (lasting < 30 days), and 30-day abstinence during follow-up. Guided by social cognitive theory,^{15,16} we chose the following covariates: sociodemographic characteristics, smoking addiction,^{17,18} quitting history, intentions, beliefs, and social and environmental factors (Table 1).

Using multivariable logistic regression models with covariates associated with the outcome ($P < .2$), we examined predictors of quit attempts (vs no attempt) and abstinence (vs attempt and no attempt). We conducted analyses using SAS version 9.2,¹⁹ accounting for the complex survey design and weighted to the population.

RESULTS

Sixty percent of young adults made no attempt to quit smoking; 25% made an attempt, and 14% were abstinent for 30 days or longer during follow-up. Education, level of addiction, using resources, having support, prior attempts, quit intention, and perceived addiction were significantly associated with young adult cessation behaviors ($P < .05$; Table 1).

Four factors predicted quit attempts among young adults in the multivariate models: using resources, 2 or more prior quit attempts, quit intention, and knowledge of stop smoking medication benefits (Table 2). Abstinence for 30 days or longer was greater among those who were confident in their ability to quit smoking, had used cessation resources, had support, or had lower levels of addiction (Table 2).

DISCUSSION

We assessed prospective predictors of cessation among young adult smokers. We identified different predictors for quit attempts and abstinence; only the use of cessation resources—known to increase cessation^{20,21}—contributed to both. We combined all forms of cessation resources; however, resources used for making an attempt may differ from those used to maintain abstinence. There is limited evidence of effective interventions for young adult smokers^{22–24}; thus, the resources used for

TABLE 1—Respondent Characteristics by Young Adult Smoking Cessation Behavior at 6-Month Follow-Up: Ontario Tobacco Survey, July 2005–December 2008

Characteristic	No Attempt to Quit Smoking (n = 375), No. ^a (%) ^{b,c} or Mean ±SD (SE Estimate)	Quit Attempt, < 30 Days (n = 149), No. ^a (%) ^{b,c} or Mean ±SD (SE Estimate)	Abstinence, ≥ 30 Days (n = 68), No. ^a (%) ^{b,c} or Mean ±SD (SE Estimate)	p ^d
Continuous variables				
Age (n = 592), y	23.47 ±3.50 (0.25)	23.35 ±3.19 (0.32)	23.14 ±3.39 (0.56)	.564
Heaviness of smoking index (n = 580)	1.76 ±1.59 (0.11)	1.61 ±1.54 (0.16)	0.67 ±1.19 (0.15)	< .001
Categorized variables				
Gender (n = 592)				
Women	187 (61.2)	63 (23.1)	37 (15.6)	.569
Men	188 (60.9)	86 (26.9)	31 (12.1)	
Education (n = 591)				
≤ high school	221 (63.0)	96 (28.0)	30 (9.1)	.045
> high school	153 (58.7)	53 (22.7)	38 (18.6)	
Employment (n = 592)				
Unemployed	94 (61.1)	30 (22.6)	19 (16.3)	.664
Employed	281 (61.0)	119 (26.2)	49 (12.7)	
Marital status (n = 592)				
Single	231 (61.7)	102 (26.2)	40 (12.1)	.509
Married or common law marriage	144 (59.5)	47 (23.7)	28 (16.8)	
Self-efficacy (n = 592)				
Less or uncertain confidence	259 (61.6)	111 (27.5)	40 (10.9)	.137
Very confident	116 (59.9)	38 (21.3)	28 (18.7)	
Perceived health (n = 592)				
Good, fair, or poor	197 (60.1)	84 (27.4)	33 (12.5)	.668
Very good or excellent	178 (62.1)	65 (23.3)	35 (14.7)	
Perceived benefits to quitting (n = 591)				
Benefit a little or not at all	89 (65.5)	20 (20.7)	12 (13.8)	.644
Benefit quite a bit or a lot	285 (59.9)	129 (26.7)	56 (13.5)	
Use of cessation resources or supports ^e (n = 587)				
No	226 (69.5)	64 (21.6)	27 (8.9)	.005
Yes	148 (52.0)	85 (30.2)	37 (17.8)	
Support to quit ^f (n = 592)				
No known support	39 (54.3)	16 (42.3)	5 (3.4)	.006
Yes	336 (61.7)	133 (23.9)	63 (14.4)	
Smoking in the home (n = 592)				
People smoke indoors	148 (67.4)	53 (24.3)	16 (8.2)	.108
No one smokes indoors	227 (58.4)	96 (25.9)	52 (15.7)	
Someone to make quitting difficult (n = 592)				
No	129 (63.0)	31 (19.9)	28 (17.2)	.189
Yes	246 (60.0)	118 (28.3)	40 (11.6)	
Exposure to tobacco industry marketing ^g (n = 591)				
No	343 (60.4)	133 (25.2)	64 (14.4)	.236
Yes	31 (67.1)	16 (27.9)	4 (5.0)	
Exposure to antitobacco mass media campaigns ^g (n = 592)				
No	45 (66.7)	12 (17.1)	5 (16.3)	.506
Yes	330 (60.4)	137 (26.5)	63 (13.2)	

Continued

TABLE 1—Continued

Prior number of quit attempts (n = 592)				
0	88 (75.2)	12 (10.4)	12 (14.4)	.002
1	130 (66.3)	30 (19.8)	22 (14.0)	
≥ 2	157 (51.4)	107 (35.8)	34 (12.8)	
Quit intention (n = 592)				
No	256 (73.1)	53 (17.3)	27 (9.6)	< .001
Yes	119 (45.5)	96 (35.9)	41 (18.6)	
Perceived addiction (n = 590)				
Less addicted	180 (59.3)	66 (21.3)	45 (19.4)	< .001
Very addicted	193 (62.7)	83 (30.8)	23 (6.4)	
Smoking medications make quitting a lot easier ^h (n = 592)				
No	318 (63.1)	113 (23.7)	56 (13.2)	.197
Yes	57 (50.5)	36 (34.4)	12 (15.1)	
Counseling makes quitting a lot easier ^h (n = 592)				
No	323 (61.5)	128 (25.7)	55 (12.8)	.642
Yes	52 (57.9)	21 (24.0)	13 (18.1)	

Note. Respondents were self-report smokers at baseline who smoked in the past 30 days and at least 100 lifetime cigarettes who also reported their age (n = 592). The heaviness of smoking index is an addiction scale that is calculated according to the number of cigarettes smoked per day and time to first cigarette of the day. These questions tend to have more “don’t know” responses, resulting in slightly more missing data for this variable (n = 12).

^aUnweighted sample size.

^bWeighted estimates. Estimates may not sum to 100% because of rounding.

^cMissing data were not used in the calculation of statistical tests or weighted estimates.

^dP values were determined using the χ^2 test for association, which identifies differences across all levels; this test does not identify between which cells the differences are meaningful; all expected cell values were adequate for testing.

^eUse of cessation aids and resources include any use of self-help materials, behavioral therapies, pharmacotherapies, physician advice to quit smoking, and participation in a local quit program measured during 6-month follow-up; we measured all other characteristics at the baseline interview.

^fSupport to quit (yes vs no, “don’t know”) was determined from the question “If you decided to quit smoking, do you have someone you can count on for support?”

^gExposure to tobacco marketing and antitobacco mass media campaigns were self-reported exposure (yes or no) in the past 6 months measured at the baseline interview.

^hPerceived knowledge for the benefits of stop smoking medications and counseling.

smoking cessation deserve further attention in this high-risk population.

Intention to quit smoking has been shown to be predictive of both young adult quit attempts⁷ and smoking cessation.^{7,8,25} Our findings agree with respect to quit attempts but not smoking cessation. Previous studies measured quit intention 5 to 7 years before measuring cessation.^{7,8,25} Behavioral intentions are likely to change more frequently; thus, intention measured more than 5 years before behavior change may not appropriately reflect the observed change. Our findings are congruent with the literature on adult smoking cessation, which shows that intention to quit predicts quit attempts but not cessation.^{26,27}

Corresponding with the literature, high self-efficacy for quitting was a strong predictor of abstinence.⁸ Increased exposure to smokers reduces smoking cessation.^{5–10,25} Although we did not ask about exposure to smokers per se,

the measure of smokers’ support to quit (i.e., social environment) played an important role in young adult cessation.

Smokers with greater addiction were less likely to maintain their abstinence, as in previous studies.^{6,7,28,29} It is evident that addiction plays an important role in young adult smoking cessation, raising the question about gradual reduction in smoking before full abstinence. In a cohort study of Australian young adult women, smokers were found to be more likely to quit if they reduced to nondaily smoking.³⁰ By contrast, a cohort study of adult smokers concluded that those quitting cold turkey were more likely to abstain than were those cutting down to quit.³¹ Demonstrating the impact of smoking reduction on young adult cessation is needed to recommend reduction as an effective cessation strategy for this population.

We used prospective data from a population-based sample of young adult smokers with

shorter follow-up periods; however, future research using similar data should explore the predictors of long-term smoking cessation and relapse in this population. Findings highlight the fundamental importance of resources in smoking cessation among young adults; a wide range of effective and appropriate cessation resources are needed to help these smokers make quit attempts and maintain abstinence. The setting for this study—Ontario, Canada—has extensive tobacco control initiatives but no unified cessation system or widespread specialized services for young adults.²⁴ The generalizability of findings is unknown; thus, comparative data from other jurisdictions on the effectiveness of these resources would be valuable. The high smoking rates among young adults is concerning. Enhancing cessation efforts in this population has the potential to significantly improve the health of the public. ■

TABLE 2—Simultaneously Adjusted Multivariable Logistic Regression Models of Factors Predicting Young Adult Smoking Cessation Behaviors: Ontario Tobacco Survey, July 2005–December 2008

Characteristic	Model 1: Attempt to Quit (< 30 d) vs No Attempt to Quit, OR (95% CI) ^a	Model 2: Abstinence (≥ 30 d) vs Attempt (< 30 d) and No Attempt to Quit, OR (95% CI) ^a
Age, y	0.97 (0.89, 1.06)	0.94 (0.83, 1.07)
Heaviness of smoking index	0.85 (0.68, 1.06)	0.64* (0.46, 0.89)
Gender		
Women (Ref)	1.00	1.00
Men	1.52 (0.81, 2.87)	0.74 (0.36, 1.52)
Education		
≤ high school (Ref)	1.00	1.00
> high school	0.84 (0.42, 1.67)	1.81 (0.73, 4.50)
Self-efficacy		
Less or uncertain confidence (Ref)	1.00	1.00
Very confident	0.53 (0.26, 1.06)	3.27* (1.15, 9.28)
Use of cessation resources or supports ^b		
No (Ref)	1.00	1.00
Yes	1.86* (1.05, 3.31)	3.46* (1.66, 7.19)
Support to quit ^c		
No (Ref)	1.00	1.00
Yes	0.42 (0.16, 1.10)	4.88* (1.29, 18.44)
Smoking in the home		
People smoke indoors (Ref)	1.00	1.00
No one smokes indoors	1.79 (0.97, 3.32)	1.31 (0.52, 3.27)
Someone make quitting more difficult		
No (Ref)	1.00	1.00
Yes	1.14 (0.57, 2.29)	0.72 (0.34, 1.51)
Prior number of quit attempts		
0 (Ref)	1.00	1.00
1	1.46 (0.51, 4.17)	1.34 (0.45, 4.02)
≥ 2	3.50* (1.28, 9.55)	1.58 (0.54, 4.59)
Quit intention		
No (Ref)	1.00	1.00
Yes	3.94* (2.22, 6.99)	1.48 (0.74, 2.98)
Perceived addiction		
Less addicted (Ref)	1.00	1.00
Very addicted	1.20 (0.57, 2.51)	0.58 (0.26, 1.29)
Smoking medications make quitting a lot easier ^d		
No (Ref)	1.00	1.00
Yes	2.30* (1.16, 4.57)	1.54 (0.60, 3.95)

Note. CI = confidence ratio; OR = odds ratio. Data are weighted.

^aVariance inflation factor statistics were all satisfactory in both models.

^bUse of cessation aids and resources include any use of self-help materials, behavioral therapies, pharmacotherapies, physician advice to quit smoking, and participation in a local quit program measured during 6-month follow-up; all other characteristics were measured at the baseline interview.

^cSupport to quit (yes vs no, “don’t know”) was determined from the question “If you decided to quit smoking, do you have someone you can count on for support?”

^dPerceived knowledge for the benefits of stop smoking medications and counseling.

**P* < .05.

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L. M. Diemert conducted all analyses and drafted the article. S. J. Bondy and K. S. Brown assisted with the study and statistical analyses. S. J. Bondy, K. S. Brown, and S. Manske critically reviewed all versions of the article. S. Manske supervised the study.

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Human Participant Protection

The Ontario Tobacco Survey protocols and study instruments received ethical approvals from the University of Toronto and the University of Waterloo.

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