Factors associated with successful vs. unsuccessful smoking cessation: Data from a nationally representative study

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HIGHLIGHTS

- Tobacco exposure and cannabis use were inversely associated with smoking cessation.
- E-cigarette use was associated with unsuccessful smoking cessation.
- Successful smoking cessation was more likely among people with higher education.

ARTICLE INFO

ABSTRACT

Introduction: A substantial proportion of smokers who attempt to stop smoking relapse in the first months. Yet to date, there is limited understanding of the predictors of smoking attempts and their success. We examine the role of tobacco use characteristics, other substance-related factors, as well as socio-demographic characteristics in relation to successful and unsuccessful smoking cessation.

Methods: DePICT (*Description des Perceptions, Images, et Comportements liés au Tabagisme*) is a nationally representative sample of adults aged between 18 and 64 years residing in metropolitan France, who were interviewed by telephone survey ($n = 4342$). Among current or former smokers ($n = 2110$) we distinguished participants characterized by: a) no quit attempt or quit < 6 months; b) unsuccessful smoking cessation (current smokers who previously quit smoking ≥ 6 months); c) successful smoking cessation (≥ 6 months). Factors associated with successful vs. unsuccessful smoking cessation were studied using multivariate multinomial logistic regression analyses.

Results: Successful and unsuccessful smoking cessation share some predicting factors including no cannabis use, older age, and intermediate or high occupational grade. Factors specifically associated with successful smoking cessation included no e-cigarette use, no environmental tobacco exposure, fear of the health consequences of smoking, perceived harmfulness of smoking, and high educational attainment and a good overall health.

Conclusions: Smokers' environmental tobacco exposure, concurrent cannabis use, and the perception of the health consequences of smoking should be taken into account in efforts aiming to promote smoking cessation at the individual as well as collective levels. Our data also suggest that e-cigarette use is associated with unsuccessful rather than successful smoking cessation, which should be verified in additional, longitudinal, studies.

1. Introduction

In any given year, up to one third of regular smokers attempt to quit tobacco (Zhuang, Cummins, Sun, & Zhu, 2016). Among former smokers who are abstinent for 2 weeks, more than half relapse after one year, mainly in the first 6 months (Agboola, Coleman, McNeill, & Leonardi-Bee, 2015).

While motivation is an important predictor of the desire to quit smoking, it does not always translate to volition sufficient to elicit actual behavior change, and its maintenance over time is sometimes difficult (Borland et al., 2010; Schwarzer, 2008).

Smoking cessation could therefore be conceptualized into a two-stage process; first making a quit attempt and then succeeding in maintaining it. A systematic review has previously examined the determinants of attempts to quit smoking and their success (Vangeli, Stapleton, Smit, Borland, & West, 2011), identifying different sets of determinants for each stage (Vangeli et al., 2011). They found that cigarette dependence consistently predicted a successful quit attempt,

while smoking relapse was in part explained by the addictive nature of nicotine, but also by individuals' psychological, health and socio-economic characteristics. However the predictors and different measures of quit attempts studied in the review were highly heterogeneous between the different studies, also many predictors like the use of nicotine replacement products as well as electronic cigarettes were not examined. Electronic cigarette – commercialized since approximately 2010 – is associated with quit attempts but its role with regard to long-term smoking cessation in the community is not yet established (Beard, West, Michie, & Brown, 2016; Brose, Hitchman, Brown, West, & McNeill, 2015).

To help design strategies that will achieve long-term smoking cessation at the individual as well as the collective levels, there is therefore need to improve understanding of determinants of smoking relapse.

In the present study, we examine associations between characteristics of tobacco as well as electronic cigarettes, nicotine substitutes, and other substance use, perceptions of tobacco use, as well as demographic and socio-economic factors in relation to successful vs. unsuccessful smoking cessation.

2. Methods

2.1. DePICT: study design and recruitment

We use data from DePICT (*Description des Perceptions, Images, et Comportements liés au Tabagisme*), a nationally representative telephone survey of adult (18–64 years) residents of Metropolitan France. The primary aim is to evaluate perceptions of tobacco and smokers, as well as patterns of tobacco use. DePICT was approved by the ethical review committee of the French National Institute of Health and Medical Research (INSERM, CEEI-IRB 00003888). Participants were recruited via a computer-assisted telephone interview (CATI) system and interviewed via landline or mobile telephone between August 15 and November 15, 2016.

Telephone lists were randomly generated and cross-checked to remove inexistent or professional numbers. This method has the advantage of including both listed and unlisted phone numbers and therefore provides maximum population representativeness. All phone numbers were dialed up to 30 times in different periods of the day and week. In households reached by landline, one participant was randomly selected by the CATI system (Kish method). Of the eligible adults solicited 62% completed the interview.

2.1.1. Interview

Telephone interviews (average duration: 25 min) were conducted by 30 trained interviewers who administered the questionnaire from a call center equipped with computerized telephone stations. After a brief description of study aims and participants' verbal consent, data were collected on characteristics including: demographics, smoking status, smoking-related behaviors and perceptions.

2.2. Outcome variable and covariates

2.2.1. Smoking cessation and quitting relapse

Current smokers were asked whether they had ever attempted to quit smoking for at least one week, and if yes, the duration of their longest quit attempt. Based on this information, our study outcomes were defined as follows: 1) current smokers who never quit or quit < 6 months; 2) current smokers who previously quit smoking ≥ 6 months; 3) former smokers who quit smoking ≥ 6 months. Six months of abstinence has been proposed, and is commonly used, as a standardized criteria to define smoking cessation. (West, Hajek, Stead, & Stapleton, 2005) Current smokers were asked about the daily number of cigarettes smoked, while former smokers were asked whether they had smoked ' < 10 cigarettes', '10 to 20' or ' > 21 cigarettes' a day when their smoking was at its highest.

2.2.2. Characteristics associated with smoking cessation

We considered characteristics of tobacco and other substance use, including: the number of cigarettes smoked daily (0–9, 10–19, ≥ 20), lifetime electronic cigarette use (yes/no), lifetime use of nicotine replacement products (yes/no), environmental tobacco use (living alone, no, yes, partner, yes, someone else than the partner), alcohol and cannabis use in the preceding month (yes/no). Perceptions of smoking (Peretti-Watel, Legleye, Guignard, & Beck, 2014): fear of the health consequences of smoking (yes/no), the harmfulness of smoking (yes/no), the importance of being a non-smoker (yes/no), friends' opinion regarding smoking (rather positive/rather negative) and knowing someone who quit smoking (yes/no). Sociodemographic characteristics: sex (female/male), age (grouped into categories in order to examine nonlinear relationship with study outcomes: 18–24, 25–34, 35–44, 45–54, 55–64 years), educational attainment (< high school degree, high school degree, university degree), occupational grade (out of the labor market, low occupational grade such as manual worker or clerk, intermediate occupational grade such as technician or administrative assistant, high occupational grade such as engineer or manager); and overall perceived health status (less than good/at least good).

2.3. Statistical analyses

The probability of being solicited through a landline or mobile phone was calculated for each participant by the polling company charged with carrying out the study, taking into account the Kish method (number of eligible individuals/telephone lines in the household/owned by the person). Data were then weighted based on the inverse probability of being solicited. Additionally, weights were used to render participants representative of the French population in terms of sex, age, educational attainment, region of residence and population density, based on data from the French National Institute of Statistics and Economic Studies (INSEE).

Reported sample sizes refer to the actual number of respondents, percentages to weighted data. In the present analysis only regular and former smokers were included ($n = 2110$).

To identify factors that influence smoking cessation and distinguish successful vs. unsuccessful cessation, we selected characteristics that were potentially associated with quit attempts in bivariate analyses and included them in a multinomial logistic regression model. The reference category for the outcome variable was "never quitter" characterizing smokers who never attempted to quit. In additional analyses, the reference category was changed to "unsuccessful smoking attempt".

All analyses were conducted using SAS 9.4.

3. Results

Table 1 shows characteristics of DePICT participants included in our study: 39.7% never attempted to quit smoking or quit < 6 months, 16.7% quit smoking ≥ 6 months and 43.6% achieved long-term smoking cessation. Among smokers (mean age = 38 years (sd = 13), mean number of daily cigarettes = 16 (sd = 13)) who quit for < 6 months, 58% quit smoking for at least 1 week with an average duration of 1.3 months (sd = 1.3) for the longest period of abstinence. Among current smokers (mean age = 44 years sd = (11), mean number of daily cigarettes = 13 (sd = 9)) who previously quit for ≥ 6 months, the average duration of smoking cessation was 27.8 months (sd = 37.0). Among former smokers (mean age = 47 years (sd = 12), the average duration of smoking abstinence was 12 years (149.0 months, sd = 141.0).

Table 2 shows the results of multivariate regression models in which smokers who never attempted to quit smoking served as the reference category. Smoking > 9 cigarettes per day (OR 10–19 cig/day = 0.52, 95% CI, 0.38–0.72; OR ≥ 20 cig/day = 0.35, 95% CI, 0.21–0.57), and no lifetime use of nicotine replacement products (OR = 0.67, 95% CI, 0.48–0.93) were associated with a decreased likelihood of unsuccessful