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ABSTRACT

Introduction. Smoking prevalence rates among young people are high in many countries. Although attempts to quit smoking increasingly occur in young adulthood, many former smokers relapse. We compared individuals who successfully quit smoking from those who relapsed on socio-demographic, psychological and health factors.

Methods. Data come from telephone interviews conducted in 2011 with participants of the TEMPO community-based study (ages 18–37 years, France). To study the likelihood of successful cessation vs. smoking relapse, we restricted the study sample to current or former smokers (n = 600) and conducted multinomial logistic regression analyses.

Results. 43% of participants were current smokers *who never quit for an extended period and*, 33% former smokers and 24% current smokers *who relapsed after extended cessation*. In multivariate analyses female sex, parental status and illegal drug use were associated with both successful and unsuccessful smoking cessation. Factors specifically associated with a low probability of smoking cessation were job strain and symptoms of hyperactivity/inattention, while occupational grade was associated with smoking relapse.

Conclusions. Work and family circumstances, co-occurring substance use and psychological difficulties may influence smoking cessation in young adults. These characteristics should be considered by individual and collective interventions aiming to help young smokers quit successfully.

Introduction

Despite noticeable progress in the fight against tobacco use, smoking remains the leading cause of mortality and morbidity in many countries, particularly in Europe, in South-East Asia and North America (WHO, 2002). France is characterized by high rates of smoking-related mortality in men and in women (Hill, 2012; Jougla et al., 2003) and smoking levels have not decreased in the past 10 years (Guignard et al., 2013). This trend is especially noticeable among 15–30 year olds, 44% of whom are smokers (Guignard et al., 2013).

Despite knowledge about the adverse health effects of tobacco and the will to stop smoking, a great number of smokers have difficulty quitting (Guignard et al., 2013). Factors associated with smoking cessation attempts include high socioeconomic level (Reid et al., 2010), high motivation to quit (Gallus et al., 2013), and low nicotine dependence (Chandola et al., 2004). Psychological problems, which are associated with smoking intensity, may also impede cessation (Cook et al., 2014).

A majority of smokers attempt to quit when they start experiencing the negative health consequences of smoking, that is in their 50s (Gallus et al., 2013). Yet smoking cessation at a younger age can have great health benefits and young people increasingly attempt to quit (Doll et al., 2004; Fidler et al., 2013) making young adulthood a key period to stop smoking. As smokers attempt to quit at least four times, on average, before succeeding (Beck et al., 2007), it is important to identify factors associated with relapse.

To date, most studies have focused on smoking cessation in middle-aged or older individuals (Vangeli et al., 2011; West et al., 2001) and little is known about factors associated with smoking cessation that are specific to young adults. In particular, psychological problems (Kessler et al., 2010) and job instability (Observatoire des

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inégalités, 2014) may play a more important role than in older populations.

In the present study, we study successful smoking cessation and smoking relapse in a community sample of young adults in France.

Methods

Sample characteristics

Data come from the TEMPO (Trajectoires EpidéMiologiques en POpulation) study set up in 2009 to examine associations between life circumstances, substance use, and mental health in young adults. Participants were selected among offspring of GAZEL study participants, an ongoing epidemiological cohort (Goldberg et al., 2007; Redonnet et al., 2012). In 1989, when the GAZEL cohort was set up, all participants were employed by France's national Gas and Electricity Company and aged 35–50 years. In 1991, a sample of children of GAZEL study participants aged 4–16 years was drawn to study children's mental health and access to healthcare. In 2009, we asked all GAZEL participants whose offspring had taken part in the 1991 study to forward an invitation for the TEMPO study as well as a study questionnaire to their offspring (Fombonne and Vermeersch, 1997). In 2011 we extended the TEMPO study to all GAZEL participants' offspring aged 18–37 years (Melchior et al., 2015).

The 2011 sample included 1214 participants of which 526 participated in 2009. 2011 data were collected in a telephone interview conducted by trained interviewers. Factors associated with study participation included characteristics of participants (younger age, female sex, TEMPO participation in 2009) and of their parents (younger age, male sex, regular participation in GAZEL, high occupational grade, stable marriage, no depression). In the 2011 TEMPO study, participants were somewhat more likely to live with a partner, have higher education and work as managers than young adults of the same age in France (Vidalenc and Wolff, 2012). Therefore the TEMPO study sample includes individuals who, on average, have higher educational level and occupational grade, as well as more stable family situation, than young adults in France in general. The present analysis is based on all 2011 TEMPO study participants who reported current or former tobacco smoking (n = 600).

The TEMPO study received approval from France's national committees for data protection (CCTIRS: Comité Consultatif sur le Traitement des Informations pour la Recherche en Santé; CNIL: Commission Nationale Informatique et Liberté). According to prevailing legislation for the ethical conduct of health research in France, TEMPO participants had the possibility to refuse to participate in any of the study assessments conducted.

Measures

Tobacco smoking was ascertained as follows: "Are you: a) a regular smoker [≥1 cigarette/day], b) an occasional smoker [<1 cigarette/day], c) a former smoker, or d) a never-smoker?". All smokers were asked: "Have you ever quit smoking for at least one year?" (no vs. yes).

Based on two questions we defined three groups: persistent smokers (n = 258, 43%), smokers who quit and relapsed (n = 146, 24%), and former smokers who have been abstinent for at least one year (n = 196, 33%). The cut-off of 1 year smoking abstinence corresponds to long-term smoking cessation (Fidler et al., 2013; Kaleta et al., 2012).

Other variables characterizing tobacco use were: age at first cigarette (< vs. ≥13 years), number of daily cigarettes (1–9 cigarettes vs. ≥10 cigarettes). We also accounted for smoking cessation support: 1. consultation with a health professional; 2. use of nicotine replacement products.

Factors potentially associated with tobacco cessation included: 1) sociodemographic factors: sex (female vs. male), age (< vs. ≥ 30

years), education level (≤ vs. >high school degree), household income (≤ vs. > 2000 euros/month), family situation (does not live with a partner vs. lives with a partner) and parental status (pregnancy or child ≤ 1 year of age, child > 1 year of age; vs. no children); 2) work characteristics: occupational grade (no occupation, low [e.g. clerk, manual worker], intermediate [e.g. middle-level manager, technician], vs. high [e.g. manager]) (ILO, 1990), job stability (temporary vs. permanent employment), experience of unemployment in the preceding two years (yes vs. no), job strain (yes vs. no) measured using Karasek's Job Content Questionnaire and defined as high psychological work demands (e.g. high workload, short time delays) and low work control (Karasek et al., 1998) (e.g. lack of flexibility in work organization); 3) health characteristics included chronic health problems (e.g. asthma, diabetes, yes vs. no), self-reported health (poor vs. good), MINI-assessed juvenile antisocial personality (yes vs. no) and depression or anxiety (yes vs. no) (Sheehan et al., 1998), high symptoms of hyperactivity/inattention assessed using the DSM-IV-based ASRS (Kessler et al., 2005) (yes vs. no), and lifetime psychoactive medication use (yes vs. no); 4) problematic use of psychoactive substances other than tobacco: alcohol abuse ascertained using the WHO AUDIT (Gache et al., 2005), illegal drug use defined as cannabis (≥10 times) or ≥1 other illegal drug (e.g. ecstasy, hallucinogens, cocaine) in the preceding 12 months (yes vs. no), and regular (≥1/month) video game use or gambling (yes vs. no); 5) negative life events included childhood harassment or lack of affection (yes vs. no), partner separation (yes vs. no) and physical and/or psychological violence (yes vs. no) in the preceding 12 months (Beck et al., 2010); 6) parental tobacco smoking data (≥1 parent former smoker, ≥1 parent regular smoker, vs. both parents never smokers) came from two sources: TEMPO participants' reports and parents' self-reports in the GAZEL study questionnaire (1991–2011).

Statistical analysis

Our aim was to identify factors associated with successful or unsuccessful smoking cessation, using persistent smokers as the reference group. First, bivariate multinomial regression analyses were conducted; factors associated with either study outcome (p < 0.10) were retained for the multivariate analysis. Multivariate analyses were systematically adjusted for sex and age; other variables were selected using a stepwise descending procedure. Differences between ORs associated with successful and unsuccessful smoking cessation were tested using Generalized Wald tests. In additional analyses, 1) we tested interactions with sex; 2) we studied the role of tobacco consumption level using longitudinal data from 246 smokers who participated in TEMPO both in 2009 and 2011.

All analyses were conducted with SAS version 9.3.

Results

Descriptive findings

Characteristics of study participants are described in Table 1. As shown, persistent smokers, quitters and relapsers differed with regard to family and work characteristics, health status, substance use and negative life events. For 79% of quitters and 64% of relapsers, this was the first attempt at quitting smoking. On average, smokers used 10.2 cigarettes per day.

Bivariate analyses

In bivariate analyses (Table 2), factors positively associated with both quitting and smoking relapse were: female sex, age ≥ 30 years, household income > 2000 euros, no cannabis use, and no video game use or gambling.

Table 1
Characteristics of tobacco smokers in the French TEMPO study (n = 600, 2011).

		Population	Persistent smoking (%)	Quitting (%)	Smoking relapse (%)	Wald F
		n = 600	n = 258	n = 196	n = 146	p value
Sociodemographic characteristics						
Sex:	Male	222	50	27	27	<0.0001
	Female	378	50	73	73	
Age:	<30 years	178	38	21	27	0.0005
	>30 years	422	62	79	73	
Educational level:	≤ high school degree	464	28	17	22	0.026
	> high school degree	136	72	83	78	
Household income:	≤ 2000 euros	147	33	16	21	0.0002
	>2000 euros	453	67	84	79	
Family situation:	Does not live with a partner	331	63	42	58	<0.0001
	Lives with a partner	269	37	58	42	
Parental status:	No children	298	62	38	43	<0.0001
	Child ≤ 1 year	119	14	31	15	
	Child > 1 year	183	24	31	42	
Employment characteristics						
Occupational grade:	High professional	192	28	32	39	0.004
	Intermediate professional	134	23	24	19	
	Low professional	237	38	42	38	
	No occupation	37	11	2	4	
Job stability:	Temporary employment	116	23	14	22	0.03
	Permanent employment	480	77	86	78	
Unemployment in the preceding two years:	Yes	99	18	12	20	0.13
	No	499	82	88	80	
Job strain:	No	446	70	81	73	0.026
	Yes	154	30	19	27	
Health characteristics						
Chronic health problems:	No	466	81	76	75	0.32
	Yes	134	19	24	25	
Self-reported health:	Good	575	95	97	95	0.36
	Poor	25	5	3	5	
Juvenile antisocial personality:	No	480	76	84	83	0.06
	Yes	120	24	16	17	
Major depression or anxiety disorder:	No	431	72	69	74	0.62
	Yes	169	28	31	26	
Symptoms of hyperactivity/inattention:	No	549	90	96	88	0.02
	Yes	51	10	4	12	
Lifetime use of psychoactive medication:	No	367	60	60	64	0.65
	Yes	233	40	40	36	
Drugs use and others practices during the last 12 months						
Alcohol abuse:	No	496	77	90	83	0.002
	Yes	104	23	10	17	
Illegal drug use:	No	494	70	96	86	<0.0001
	Yes	106	30	4	14	
Video game use/gambling:	No	306	45	56	55	0.024
	Yes	294	55	44	45	
Tobacco characteristics						
Age of tobacco initiation:	≤ 13 years	118	19	22	18	0.62
	≥14 years	482	81	78	82	
Support for smoking cessation:	Yes	170	29	27	29	0.36
	No	430	71	73	71	
Parental tobacco smoking:	At least one parent regular smoker	78	15	10	12	0.30
	At least one parent former smoker	342	53	62	58	
	Exclusively never smoking parents	180	32	28	30	
Juvenile antisocial personality:	No	480	76	84	83	0.06
	Yes	120	24	16	17	
Negative life events						
Harassment or lack of affection in childhood:	No	389	60	73	61	0.009
	Yes	211	40	27	39	
Partner separation in the preceding 12 months:	No	541	88	95	87	0.01
	Yes	59	12	5	13	
Violence in the preceding 12 months:	No	381	59	70	62	0.06
	Yes	219	41	30	38	

Recent pregnancy or having a child ≤1 year of age was associated with quitting, while having a child >1 year of age was associated with smoking relapse.

Factors associated only with a decreased likelihood of quitting were: low educational level, living alone, lack of job stability, job strain, alcohol abuse or dependence, symptoms of hyperactivity/inattention, and negative life events in childhood or in adulthood.

Health factors (with the exception of symptoms of hyperactivity/inattention) and characteristics of tobacco use were associated neither with quitting nor with smoking relapse.

Table 2
Factors associated with smoking trajectories (French TEMPO study, n = 600, 2011): bivariate polynomial regression analysis.

	Persistent smoking n = 258	Quitting n = 196	Smoking Relapse n = 146	Generalized Wald test [a]
	OR	OR (CI 95%)	OR (CI 95%)	p value
Sociodemographics characteristics				
Sex (Ref: Male)				
Female	1.00	**2.70 (1.81–1.02)*****	**2.65 (1.71–4.11)*****	0.94
Age (Ref: ≥30 years)				
<30 years	1.00	**0.44 (0.29–0.67)*****	**0.63 (0.40–0.98)***	0.16
Education level (Ref: >high school degree)				
≤High school degree	1.00	**0.53 (0.34–0.85)****	0.74 (0.46–1.19)	0.24
Household income (Ref: >2000 euros)				
≤2000 euros	1.00	**0.40 (0.26–0.64)*****	**0.56 (0.35–0.90)***	0.31
Family situation (Ref: Lives with a partner)				
Does not live with a partner	1.00	**0.43 (0.29–0.63)*****	0.81 (0.54–1.23)	0.004
Parental status (Ref: No children)				
Child ≤ 1 year	1.00	**3.69 (2.25–6.05)*****	1.56 (0.85–2.86)	0.005
Child > 1 year	1.00	2.18 (1.39–3.41)	**2.56 (1.62–4.04)****	0.52
Employment characteristics				
Occupational grade (Ref: High professional)				
Intermediate professional	1.00	0.90 (0.54–1.49)	0.57 (0.32–1.01)	0.14
Low professional	1.00	0.95 (0.61–1.48)	0.72 (0.44–1.15)	0.26
No occupation	1.00	**0.17 (0.06–0.51)****	**0.28 (0.11–0.73)***	0.45
Job stability (Ref: Yes)				
No	1.00	**0.53 (0.32–0.88)***	0.96 (0.59–1.56)	0.041
Unemployment in the preceding two years (Ref: No)				
Yes	1.00	0.64 (0.38–1.10)	1.14 (0.68–1.91)	0.06
Job strain (Ref: No)				
Yes	1.00	**0.55 (0.35–0.86)****	0.89 (0.57–1.39)	0.06
Health characteristics				
Chronic health problems (Ref: No)				
Yes	1.00	1.35 (0.86–2.11)	1.36 (0.83–2.22)	0.32
Self-reported health (Ref: Good)				
Poor	1.00	1.86 (0.65–5.38)	0.84 (0.34–2.11)	0.17
Juvenile antisocial personality (Ref: No)				
Yes	1.00	**0.60 (0.38–0.97)***	0.64 (0.38–1.07)	0.85
Major depressive disorder or anxiety disorder (Ref: No)				
Yes	1.00	1.16 (0.77–1.75)	0.93 (0.59–1.47)	0.35
Symptoms of hyperactivity/inattention (Ref: No)				
Yes	1.00	**0.38 (0.17–0.86)***	1.18 (0.62–2.25)	0.0011
Lifetime psychoactive medication use (Ref: No)				
Yes	1.00	1.03 (0.71–1.51)	0.85 (0.56–1.29)	0.65
Drugs use and others practices during the last 12 months				
Alcohol abuse (Ref: No)				
Yes	1.00	**0.38 (0.22–0.66)*****	0.70 (0.42–1.17)	0.06
Illegal drug use (Ref: No)				
Yes	1.00	**0.09 (0.04–0.19)*****	**0.39 (0.23–0.66)*****	0.0008
Video game use/gambling (Ref: No)				
Yes	1.00	**0.63 (0.43–0.91)***	**0.65 (0.43–0.97)***	0.91
Tobacco characteristics				
Age of tobacco initiation (Ref: ≥ 14 years)				
≤13 years	1.00	1.23 (0.78–1.95)	0.99 (0.59–1.67)	0.44
Parental smoking status (Ref: Exclusively never smoking parents)				
At least one parent former smoker	1.00	1.15 (0.73–1.82)	1.36 (0.89–2.08)	0. 50
At least one parent regular smoker	1.00	0.84 (0.43–1.63)	0.76 (0.40–1.44)	0.80
Support for smoking cessation (Ref: Yes)				
No	1.00	1.09 (0.72–164)	0.96 (0.62–1.51)	0.63
Negative life events				
Harassment or lack of affection in childhood (Ref: No)				
Yes	1.00	**0.55 (0.37–0.83)****	0.98 (0.65–1.48)	0.015
Partner separation in the preceding 12 months (Ref: No)				
Yes	1.00	**0.35 (0.16–0.76)****	1.10 (0.60–2.02)	0.007
Violence in the preceding 12 months (Ref: No)				
Yes	1.00	**0.63 (0.42–0.93)***	0.88 (0.58–1.34)	0.14

[a] Generalized Wald test assesses whether the parameters of "quitting" and "smoking relapse" associated with each covariate differ significantly.
* p < 0.05.
** p < 0.01.
*** p < 0.001.

Multivariate analyses

Multivariate analyses (Table 3) showed that women were more likely than men to quit smoking — successfully or not. Similarly, participants who smoked cannabis or used illegal drugs had a decreased probability of quitting smoking successfully or not.

Compared to participants without children, those who were pregnant or had a child ≤ 1 year of age were more likely to quit smoking (OR = 2.77, 95% CI 1.53–5.02), while having a child > 1 year was associated with smoking relapse (OR = 2.57, 95% CI 1.45–4.55).

Factors specifically associated with a lower probability of successful smoking cessation were job strain (OR = 0.52, 95% IC 0.31–0.85) and high symptoms of hyperactivity/inattention (OR = 0.42, 95% CI 0.17–1.01). Occupational grade was associated with smoking relapse; compared to individuals in high occupational grades, those with intermediate (OR = 0.42, 95% CI 0.23–0.77) or low status (OR = 0.59, 95% CI 0.35–0.99) or with no occupation (OR = 0.31, 95% CI 0.11–0.84) were less likely to relapse smoking.

In additional analyses, being pregnant or having a child ≤1 year was associated with successful cessation only in women (OR = 5.58, 95% CI 2.87–10.85 vs. OR = 0.50, 95% CI 0.20–1.23 in men, p < 0.0001); symptoms of hyperactivity/inattention were more strongly associated with smoking relapse in women (OR = 2.51, 95% CI 1.04–6.02 vs. OR = 0.39, 95% CI 0.11–1.40 in men, p = 0.039), and being single was only associated with smoking relapse in men (OR = 0.40, 95% CI 0.22–0.73 vs. OR = 1.49, 95% CI 0.94–2.36 in women, p = 0.0027). Our results were stable in secondary analyses excluding occasional smokers (n = 94).

Finally, among the 246 participants with complete 2009 and 2011 data, 40% were smoking on both assessments, 33% had quit and 27% had quit and relapsed in-between. Successful smoking cessation was associated with low smoking levels in 2009: compared to occasional smokers, light smokers (1–10 cigarettes/day) [OR = 0.04, 95% CI 0.02–0.10] and heavy smokers (>10 cigarettes/day) [OR = 0.06, 95% CI 0.02–0.16] were less likely to have quit by 2011.

Discussion

Main findings

Our study suggests that smoking cessation patterns in young adults are multifactorial. Women are more likely than men to quit smoking, both successfully and unsuccessfully, in relation to their experience of motherhood: cessation is encouraged during pregnancy but there is a high probability of relapse after the child's birth. Smoking cessation may also be influenced by work-related factors. Finally, individuals who have symptoms of hyperactivity/inattention or use illegal drugs are least likely to quit, successfully or not.

Factors associated with smoking cessation

Characteristics of tobacco use

Contrary to our initial hypotheses, several factors showed no association with smoking cessation: the age of tobacco initiation (Khuder et al., 1999), having a parent who quit smoking (Bricker et al., 2009) and tobacco cessation support (Hartmann-Boyce et al., 2013). Only the level of tobacco use two years prior to the study documented in a sub-sample (Vangeli et al., 2011; Zhou et al., 2009), predicted smoking cessation. Tobacco smoking levels in our study were relatively low (10,2 cigarettes/day), but correspond to nationally-representative estimates in France (Guignard et al., 2013). Evidence showing that light smokers exhale comparable levels of carbon monoxide to heavy smokers (Le Faou and Baha, 2012) points to the need to strengthen prevention efforts in this group, who represents a majority of smokers and has difficulties quitting (Baha and Le Faou, 2010).

Sex and family situation

Contrary to prior research (Scharf and Shiffman, 2004), women in our study were more likely to successfully quit smoking than men. However, women were also more likely to relapse. Women of reproductive age, who composed our study population, are encouraged to quit smoking when planning a pregnancy or when pregnant. Yet in many cases smoking cessation does not last beyond the perinatal period. Importantly, we controlled for single-motherhood (Tong et al., 2009), young age at pregnancy (Tong et al., 2009), and unfavorable socioeconomic circumstances (Kahn et al., 2002) which could contribute to smoking relapse. Women may start smoking again because of fear of weight gain, to manage negative emotions (McKee et al., 2005) or because of the partner's active smoking (Homish and Leonard, 2005). Given a high level of inter-partner correlation in smoking (Clark and Etilé, 2006), supporting young fathers' efforts to quit smoking may be a fruitful way of preventing young women from relapsing.

Use of cannabis and other illegal drugs

As other researchers, we found that young adults who use illegal drugs have low levels of smoking cessation. In France, cannabis is primarily smoked in combination with tobacco which probably sustains nicotine dependence (Ford et al., 2002; Patton et al., 2005). Physicians need to investigate the use of other psychoactive substances in individuals who would like to quit smoking (Agrawal et al., 2012).

Psychological difficulties

One of our hypotheses was that successful smoking cessation is impeded by co-occurring psychological difficulties (Covey et al., 1998). This was not supported by our data as regards depression, anxiety or antisocial personality. However, symptoms of hyperactivity/inattention were negatively associated with quitting. This may reflect high levels of nicotine dependence (Kollins et al., 2005), more severe withdrawal symptoms (McClernon et al., 2011), and the use of tobacco to manage psychological and cognitive difficulties (Gehricke et al., 2007; Potter et al., 2006).

Work characteristics

One factor specifically associated with a decreased probability of quitting smoking in our study was work stress. Two recent literature reviews (Albertsen et al., 2006; Heikkilä et al., 2012) reported a relationship between work stress and the number of cigarettes smoked, yet to our knowledge smoking cessation had not been studied. The use of smoking as a coping mechanism in case of job strain (Ayyagari and Sindelar, 2010) should be confirmed by future research.

Somewhat counterintuitively, we observed a negative association between occupational grade and unsuccessful smoking cessation, whereby managers were most likely to relapse smoking. Yet this group also had the highest likelihood of smoking cessation, even though these attempts were not always successful. As in other countries, socioeconomic inequalities with regard to tobacco use in France have increased in recent years reflecting both higher smoking uptake and lower cessation levels in low socioeconomic groups (Peretti-Watel et al., 2009). The relationship between work-family conflict (Nelson et al., 2012), which may be frequent among young adults, and smoking patterns requires greater research attention.

Limitations and strengths

Our study has limitations: first, the data are cross-sectional and smoking groups were ascertained retrospectively, which could induce bias. Second, we could not study factors such as participants' level of nicotine dependence (Hyland et al., 2006; Zhou et al., 2009), the partner's smoking status (Homish and Leonard, 2005; Okechukwu et al., 2010), and the motivation to quit (Smit et al., 2014). Third, our

Table 3
Factors associated with smoking trajectories: multivariate multinomial regression analysis (French TEMPO study, n = 600, 2011).

	Persistent smoking n = 258	Quitting n = 196	Smoking Relapse n = 146	Generalized Wald test [a]
	OR	OR (CI 95%)	OR (CI 95%)	p value
Sex (Ref: Male)				
Female	1.00	**1.96 (1.26–3.06)**[**]	**2.27 (1.43–3.62)**[***]	0.57
Age (Ref: > 30 years)				
≤30 years	1.00	1.37 (0.81–2.29)	1.05 (0.62–1.78)	0.37
Family situation (Ref: Lives with a partner)				
Does not live with a partner	1.00	0.82 (0.51–1.32)	1.46 (0.88–2.43)	0.03
Parental status (Ref: No children)				
Child ≤ 1 year	1.00	**2.77 (1.53–5.02)**[***]	1.66 (0.84–3.28)	0.13
Child > 1 year	1.00	1.30 (0.74–2.28)	**2.57 (1.45–4.55)**[**]	0.03
Occupational grade (Ref: High professional)				
Intermediate professional	1.00	0.80 (0.45–1.42)	**0.42 (0.23–0.77)**[**]	0.04
Low professional	1.00	1.03 (0.62–1.70)	**0.59 (0.35–0.99)**[*]	0.04
No occupation	1.00	**0.23 (0.07–0.75)**[*]	**0.31 (0.11–084)**[*]	0.67
Job strain (Ref: No)				
Yes	1.00	**0.52 (0.31–0.85)**[**]	0.90 (0.55–1.46)	0.04
Symptoms of hyperactivity/inattention (Ref: No)				
Yes	1.00	0.42 (0.17–1.01)	1.37 (0.68–2.76)	0.01
Illegal drug use (Ref: No)				
Yes	1.00	**0.10 (0.04–0.23)**[***]	**0.43 (0.25–0.77)**[***]	0.002

[*] $p < 0.05$.
[**] $p < 0.01$.
[***] $p < 0.001$.
[a] Generalized Wald test assesses whether the parameters of "quitting" and "smoking relapse" associated with each covariate differ significantly.

study population had more favorable socioeconomic circumstances than the general population of France and the likelihood of smoking cessation may be overestimated.

Our study's strengths are that a) the TEMPO study is composed of young adults, among whom smoking cessation is rarely studied; b) few studies examined the likelihood of sustained smoking cessation; and c) we studied multiple factors potentially associated with smoking cessation.

Study implications

Several factors could be targeted to help smokers successfully quit. First, interventions targeting pregnant women who wish to stop smoking should be extended beyond the pregnancy period, address the partner's cigarette smoking (DiClemente et al., 2000), and take into account factors such as stressful circumstances associated with childcare and work–family conflict (Bottorff et al., 2000). Collective tobacco control policies such as bans on indoor smoking can help decrease tobacco use in pregnancy and thereafter and should be encouraged (Nguyen et al., 2013). Work-based interventions targeting workers who experience job strain should be extended (Okechukwu et al., 2009). Finally, information about the use of cannabis without tobacco should be disseminated to help reduce risks among individuals who do not wish to quit smoking cannabis.

Conclusion

Determinants of smoking cessation in young adulthood show some specificity compared to older populations, who tend to quit smoking due to health problems (Meamar et al., 2013). Professional and family circumstances as well as other substance use appear to play an important role in this group. The introduction of the electronic cigarette in recent years may lead some smokers to gradually decrease their use of tobacco (Etter and Bullen, 2011) and the possibility that this leads towards smoking cessation should be examined. Future studies need to examine long-term smoking patterns considering not only success or failure but also the decrease of tobacco consumption.

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