Prevalence of tobacco smoking in teachers following anti-smoking policies: results from two French surveys (1999 and 2005)

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Background: French public health policies aimed at reducing smoking were reinforced in France between 1999 and 2004 to decrease tobacco consumption. The consequences of these policies are of particular interest to teachers who play a role model for young people. Depression and alcohol problems were particularly studied as they may influence smoking behaviour. Methods: Two large cross-sectional health surveys conducted in 1999 (N = 2931) and 2005 (N = 3702) included teachers, aged 20–59 years. Smoking status, socio-demographic characteristics, history of depressive episode in the previous year and problems with alcohol were collected using self-administered postal questionnaires. Results: From 1999 to 2005, the prevalence of smoking decreased significantly from 25.7 to 18.2% for men (P < 0.001), from 20.0 to 16.5% (P < 0.001) for women; and the proportion of never-smokers increased. In smokers, the number of cigarettes consumed per day decreased significantly. Multivariate analysis revealed a significant decrease of the risk of being a smoker in 2005 compared with 1999 [odds ratio (OR) = 0.68 for men; OR = 0.78 for women]. Risk factors of smoking were: men aged 20–34 years (OR = 1.81), CAGE score ≥ 2, (OR = 1.95 for men, 2.12 for women) history of a major depressive episode in the previous 12 months (OR = 1.46 for men, 1.44 for women). Conclusion: Anti-smoking policies resulted in a decrease of teachers’ tobacco consumption between 1999 and 2005. However, people with more difficulties in quitting smoking, in particular people with depressive episodes or problems with alcohol, might benefit from comprehensive programmes, including training of health professionals.

Keywords: cigarette smoking, tobacco, tobacco policy.

Introduction

Smoking is a major cause of preventable morbidity and premature mortality. In recent years, Governments, mostly in high-income countries, have adopted comprehensive programmes to reduce tobacco use. These programmes generally have consistent goals, including: preventing initiation among youth and young adults; promoting cessation among all smokers; reducing exposure to environmental tobacco smoke.

In 1999 in France, tobacco smoking burden was estimated to 66,000 deaths, ~11% of the global mortality.1 To face this public health issue, the French Minister for Health introduced a strong anti-smoking policy in 1991 including a ban on tobacco advertising and a regulation of smoking in public places. Public health anti-smoking policies were reinforced in 1999 and included a range of assistance measures for smoking cessation: sale of nicotine replacement therapies over-the-counter in pharmacies; training programmes for general practitioners and pharmacists; financial support to implement smoking cessation services.

In addition, France increased the price of manufactured cigarettes by 8% in January 2003, 18% in October 2003 and 9% in January 2004. Between 2000 and 2005 the average price of cigarettes increased by 56%.

In 2004, France was the first European nation to ratify the World Health Organization Framework Convention on Tobacco Control and has implemented a national programme against cancer during 2003–2008, and other measures such as funding for non-Governmental Organizations, strong mass media campaigns, development of cessation services and adoption of more prominent warnings. Finally, the French Government reinforced the smoke-free legislation in 2007.

One of the primary social environments of concern in smoking prevention is the schools, and teachers play an important role model for the young people. The importance of tobacco-free school policies in implementing a non-smoking environment in schools has often been stressed.2–5

The Ministry of Education implemented specific measures to reinforce the 1991 law on tobacco-free public places: internal regulations were adopted to protect children, teenagers, students as well as school and university teachers.6

In 2007, smoking was completely forbidden in schools premises among teachers as well as pupils. As a result, it should attenuate the negative impact of individual teacher’s smoking habits on the prevention messages given in the classroom.

Some studies have demonstrated that the effects of these policies may vary from one individual to another, depending on their age, gender, income and educational level.7 In addition, nicotine dependence can be associated with certain health conditions, particularly mental health problems,8,9 that may hamper tobacco smoking cessation.10 Thus, anti-smoking policies may be less effective in case of depressive disorders or alcohol-use problems.

Previous general population studies have highlighted an association between nicotine dependence and psychiatric disorders,11 but the association between symptoms of alcohol dependence or depression and smoking has not been specifically evaluated of the teaching profession in France.
The objectives of this study were to assess prevalence of smoking in French teachers following the hardening of anti-smoking policies between 1999 and 2005 (proportion of never-smokers; proportion of ex-smokers and daily tobacco consumption for smokers), and to identify socio-demographic variables, alcohol behaviour assessment and depression status associated with smoking.

Methods

Data were obtained from two cross-sectional studies conducted in 1999 and 2005 by the Mutuelle Générale de l’Éducation Nationale (MGEN) in a population of teachers.

The MGEN manages the compulsory and/or complementary social security regime for >3 million French people. MGEN policyholders are mostly teachers from the National Education, and Ministries of Youth, Sport, Research and Culture.

The 1999 MGEN public health survey was a large epidemiological survey on physical and mental health in the MGEN population, with the individual as unit of observation. A self-administered questionnaire was sent by post to home addresses of 10 000 persons aged 20–60 years and randomly selected. After three reminder notices, the overall response rate was of 66.5% (N = 6518 questionnaires). The 2005 MGEN health survey was carried out using the same base population and similar methodology and included 20 099 individuals aged >18 years. Response rate after three reminder notices was 53.0% (N = 10 288). Anonymity was guaranteed to participants and both studies were approved by the French National Confidentially Committee (CNIL).

We included teachers aged 20–59 years, who were actively teaching at the time of the survey and who provided data on age, gender and qualifications, in order to study two comparable groups.

For missing data, an available case analysis was conducted. Non-respondents were compared with respondents. In 2005, respondents were in average older than non-respondents (47.3-years-old for non-respondents vs. 52.7-years-old for respondents, P < 0.001). There were more women (65%) among respondents than among non-respondents (60%), P < 0.001. In 1999, respondents were as well older and more often women than in the MGEN population.

Questionnaires administered in 1999 and 2005 included socio-demographic characteristics: gender, age, marital status, level of qualifications and professional situation. If an individual had several qualifications, the highest qualification was chosen for the analysis.

In the two surveys, smokers were those individuals who stated that they currently smoked tobacco (e.g. cigarettes, pipe, cigs), either regularly or occasionally. Ex-smokers were those who declared that they did not currently smoke but had smoked at some time during their life. Finally, non-smokers were those who stated that they had never smoked.

Daily tobacco consumption for smokers is given in ‘cigarettes’ or an ‘equivalent of cigarettes’ for smokers of pipes, cigars or cigarillos. For the purpose of comparing and combining data on cigarettes, cigars, cigarillos and pipe smoking, we equated one cigarette to 1 g of tobacco, one cigar to 4 g and one cigarillo to 2 g, as done in previous studies.12 We also analysed data obtained from ex-smokers who had quit smoking <5 years ago in order to study eventual changes in behaviour between 1999 and 2005.

Problems with alcohol were investigated using a French–Canadian version of the Cut-down, Annoyed, Guilt, Eye-opener (CAGE) questionnaire13 which is closer to the original version than the DETA and was identical in 1999 and 2005 surveys. The four-item CAGE questionnaire is a brief, effective screening questionnaire for alcohol abuse and dependence.14 This questionnaire is considered as a useful tool for screening alcohol-use disorders and has been assessed and used in epidemiological surveys that attempted to estimate levels of alcohol-related disorders in various populations.15,16

Depression was measured using the self-administered Composite International Diagnostic Interview Short Form (CIDI-SF), which allowed diagnosis of different DSM-IV psychiatric disorders, including major depressive episode (MDE) in the previous year.17,18 The CIDI-SF is a fully structured set of scales developed from the larger CIDI (WHO, 1990). The goal of the CIDI-SF is to provide a quick screen for the most commonly occurring psychiatric disorders assessed in the CIDI (average administration time of 10 minutes). The diagnostic section for MDE has a stem–branch structure using two stem questions ('Have you ever had two weeks or more when nearly every day you felt sad, blue, depressed? Have there ever been two weeks or longer when you lost interest in most things like work or hobbies or things you do usually like to do for fun?'). Endorsement of the stem questions leads to additional questions to assess a clinically significant syndrome.19

The assessment of impairment was the only item to differ between the two studies. In 1999, impairment of MDE was assessed with two closed ended questions ('Have these problems affected you to the point of having stopped your activities or changed your way of life? To the point of stopping you from working or seeing your close relatives?'). In 2005, impairment was assessed using Sheehan Disability scale20 for four areas of daily life activity (daily household tasks, ability to work, relationship with others and social life) graded from 0 to 10. The impairment was considered significant for score ≥4 in one area and severe for score ≥7 in several areas.21

To improve comparability of 1999 and 2005 samples, the results for 2005 were standardized according to age, marital status and level of education by a method of direct standardization considering the 1999 MGEN health study population as the reference population. Because of differences of smoking behaviours between men and women, all results were stratified according to gender. Multivariate analyses were carried out using a logistic model. The level of significance used for the statistical tests was 5%, and 95% confidence intervals (CIs) were reported. All statistical analyses were performed with STATA SE version 8.1.

Results

Our final study sample included 2931 teachers from the 1999 MGEN health survey and 3702 teachers from the 2005 health survey.

Main socio-demographic characteristics for the two populations are reported in table 1. In 1999, mean age was 44.4 and 43.5 years for men and women, respectively. In 2005, mean age was 44.8 years for men and 43.8 years for women. Men to women ratio was 0.76 in 1999 and 0.50 in 2005. There were statistically significant differences between men and women in 1999 and 2005 on age, level of qualifications and marital status.

Results for tobacco smoking status are reported in table 2. From 1999 to 2005, there was a significant decrease in the proportion of smokers.

From 1999 to 2005, the proportion of persons who had never smoked went up from 38.6 to 52.1% in men (P < 0.001), and from 52.6 to 58.2% in women (P < 0.001). In 2005, there were significantly more ex-smokers who had stopped smoking <5 years ago. This decrease of smokers was
associated with a decrease in the daily cigarette consumption. From 1999 to 2005, the proportion of men who smoked ≤10 cigarettes per day increased from 47.7 to 56.7%, while the proportion for a daily consumption of >20 cigarettes decreased from 18.2 to 6.9% (P = 0.007).

Table 3 reports the relationship between smoking status, alcohol abuse and dependence (CAGE score) and the presence of a MDE according to gender. CAGE score was higher in smokers than in non-smokers, irrespective of gender. In 1999, 17.5% smokers had a CAGE score ≥2 compared with 5.1% non-smokers (P < 0.001). Detailed analysis of the results demonstrated that there was an increase in lower scores associated with a decrease in scores ≥2 in men. In women, scores ≥2 were more frequent in 2005 than in 1999 but this increase was not significant at the 5% level.

The frequency of MDE in the previous year remained stable between 1999 and 2005 in both men and women, but there were strong differences according to sex and smoking status. In 2005, 20.3% of woman teachers who smoked fulfilled the diagnostic criteria for a MDE during the previous 12 months compared with 13.4% of non-smokers. This difference was statistically significant in 2005 (P = 0.002), whereas it was not in 1999.

The results of multivariate analysis of factors affecting smoking status in men and women are reported in table 4. The logistic regression model used enabled us to demonstrate a significant decrease in risk for smoking in 2005 compared with 1999, independent of the other variables [odds ratio (OR) = 0.68; 95% CI 0.56–0.83 for men; OR = 0.78; 95% CI 0.66–0.93 for women]. Young men 20–34-years-old had the highest risk for smoking, OR = 1.81, whereas in women it was 35–44-year-olds (OR = 1.63). Living alone and CAGE score ≥2 were independent risk factors of smoking irrespective of gender. The presence of major depressive disorder in the previous 12 months was associated with a higher risk of being a smoker in women (OR = 1.44; 95% CI 1.16–1.79) and in men (OR = 1.46; 95% CI 1.03–2.08).

**Discussion**

This study reports a comparison of 1999 and 2005 MGEN national health surveys on smoking prevalence in teachers. Results highlight a significant reduction of tobacco smoking...
prevalence among individuals aged 20–59 years. There are three main findings from this comparative study: (i) the proportion of never-smokers has increased from 1999 to 2005; (ii) the proportion of ex-smokers has increased from 1999 to 2005; and (iii) for smokers, there has been a decrease of the daily tobacco consumption. The independent risk factors for being a smoker were the following: men aged 20–54 years, women aged 20–44, single, CAGE score ≥2, episode of major depression in the past 12 months. The risk for smoking was less important in 2005 compared with 1999 survey.

In 2005 MGEN national survey, the prevalence of smoking in teachers aged 20–59 years was 18.4%. If we compare our results with data obtained from study regularly conducted in the general population, we can see that, irrespective of age, the prevalence of smokers is less important among teachers (29.9% in the general population). This survey showed that the prevalence of tobacco smoking in French subjects aged 15–75 years was 29.9% in 2005, compared with 33.1% in 2000. Furthermore, results from the only survey conducted in schools’ staff including not only teachers but also administrative personnel and workers between 2002 and 2006 presented the same evolution in the prevalence of tobacco consumption.

This result also agrees with data from the literature which highlight that smoking is less prevalent among middle and upper class. Moreover, in smokers we observed a decrease of daily cigarette consumption, the consequences of this observation in terms of mortality and morbidity are however controversial.

Multivariate analysis has shown that the probability of being a smoker decreased between 1999 and 2005. However, despite this positive trend, certain groups remain more at risk of becoming smokers, including young teachers, single people and people with depressive symptoms, or problems with alcohol. Other authors, who have investigated the social and health determinants of smoking previously, have highlighted groups at particular risk, especially the young and those who live alone.

Between 1999 and 2005, the prevalence of tobacco consumption decreased significantly in the general population. However, the proportions of smokers seem to remain stable since then. Our findings give elements to explain certain limits of general anti-smoking measures. The results seem to indicate that tobacco control policies conducted in France have some limitations, even among a population with a homogeneous level of resources and qualifications. In particular, as teachers belong to the middle or upper class in France, they are less likely to be affected by raise of cigarette tax. On the contrary, smokers with clinical components such as a MDE or problems with alcohol have difficulties to stop smoking. Indeed, we know that alcohol consumption is an important

### Table 3 CAGE score and history of MDE (past 12 months), by gender and smoking status

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
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<tbody>
<tr>
<td></td>
<td>1999 % 95% CI P</td>
<td>2005 % 95% CI P</td>
</tr>
<tr>
<td>CAGE ≥2 (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smokers</td>
<td>11.6 9.9–13.5 0.450</td>
<td>3.7 2.9–4.9 0.421</td>
</tr>
<tr>
<td>Ex-smokers</td>
<td>14.4 11.4–17.9</td>
<td>5.7 3.9–8.3</td>
</tr>
<tr>
<td>Never smokers</td>
<td>5.1 3.5–7.5</td>
<td>1.48 0.9–2.3</td>
</tr>
<tr>
<td>MDE in the previous year (%)</td>
<td>6.9 5.5–8.6 0.697</td>
<td>12.8 11.2–14.5 0.155</td>
</tr>
<tr>
<td>Smokers</td>
<td>9.2 NS 6.4–12.8</td>
<td>14.5 NS 11.1–18.8</td>
</tr>
<tr>
<td>Ex-smokers</td>
<td>5.6 3.8–8.2</td>
<td>12.8 10.0–16.2</td>
</tr>
<tr>
<td>Never smokers</td>
<td>5.6 3.8–8.2</td>
<td>12.1 10.0–14.5</td>
</tr>
</tbody>
</table>

NS = result not significant compared with never smokers (same year)

*Result significant compared with never smokers (same year)

### Table 4 Risk factors for smoking, multivariate analysis

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR 95% CI P value</td>
<td>OR 95% CI P value</td>
</tr>
<tr>
<td>Year of study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2005</td>
<td>0.68 0.56–0.83 &lt;0.001</td>
<td>0.78 0.66–0.93 0.004</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–34</td>
<td>1.81 1.28–2.55 &lt;0.001</td>
<td>1.53 1.12–2.08 0.007</td>
</tr>
<tr>
<td>35–44</td>
<td>1.58 1.13–2.19 0.007</td>
<td>1.63 1.21–2.19 0.001</td>
</tr>
<tr>
<td>45–54</td>
<td>1.43 1.04–1.96 0.026</td>
<td>1.13 0.84–1.53 0.404</td>
</tr>
<tr>
<td>55–59</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
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</tr>
<tr>
<td>Married, marital life</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Single, divorced, widowed</td>
<td>1.50 1.16–1.94 0.002</td>
<td>1.54 1.27–1.86 &lt;0.001</td>
</tr>
<tr>
<td>CAGE score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>1.00 1.00</td>
<td></td>
</tr>
<tr>
<td>≥2</td>
<td>1.95 1.48–2.58 &lt;0.001</td>
<td>2.12 1.50–2.98 &lt;0.001</td>
</tr>
<tr>
<td>MDE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>1.46 1.03–2.08 0.035</td>
<td>1.44 1.16–1.79 &lt;0.001</td>
</tr>
</tbody>
</table>

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factor associated with nicotine dependence in smokers, as well as with greater problems in giving up smoking. In this specific group, the appropriateness of giving up alcohol and tobacco simultaneously has been discussed. In addition, among individuals with a psychiatric comorbidity we found as in the literature a higher proportion of smokers and dependent smokers. Actually, studies have recorded a higher prevalence of depression in daily or dependent smokers than in non-smokers or non-dependent smokers. Despite this medical condition, a population-survey highlighted the fact that the level of long-term abstinence of smokers who are depressed compared with smokers who do not have depressive symptoms does not differ significantly.

Therefore, in order to reach these more dependent populations, it would be interesting to train healthcare professionals located in schools, colleges and universities (1632 medical doctors and 6600 nurses) in smoking cessation methods and not to focus only on smoking bans. These professionals can have a powerful effect in helping to stop the use of tobacco products and can enhance cessation rates >5%, the highest cessation rate obtained by a population of smokers who make a quit attempt on their own.

This study is based on original data from two large postal surveys with good response rates, using reliable and valid tools. However, the following limitations should be borne in mind while interpreting the results of our study. Firstly, the presence of non-responders in 1999 and 2005 surveys may have introduced bias. As questionnaires contained questions on health, we cannot consider that teachers did not respond due to the questions on smoking behaviour. Secondly, due to the specificity of tobacco policy management in each country, it is difficult to have some form of comparison data regarding patterns of change in other countries. However we report some results of French studies in general population during the same period to put teacher’s smoking evolution in the national context. Thirdly, our study population of teachers is not representative of the overall population of France. Teachers have a level of income and qualifications which is above the average in France. As a result, it is believed that the receptivity of this population to health policies is particularly homogenous and limits the presence of confounding factors. Lastly, the comparison of two cross-sectional surveys is not sufficient to infer causality. However, the next MGEN health survey will be a cohort study using the same questionnaire in order to assess longitudinal changes in smoking status more accurately.

Anti-smoking policies introduced in France over the past 15 years seem to have contributed to a reduction of smoking in teachers between 1999 and 2005. The proportion of smokers in this population has decreased and the proportion of individuals who have never smoked has increased. However, these positive results should not mask the fact that certain groups of individuals have difficulties in giving up smoking, in particular people with depressive episodes, or problems with alcohol. Therefore, current policies, which are currently collective, should be reinforced by tailored individual programmes taking into account mental health status.

Key points
- This study revealed a significant decrease in the risk of being a smoker among French teachers in 2005 compared with 1999 (OR = 0.68 for men; OR = 0.78 for women)
- Certain groups have difficulties giving up smoking, in particular people with depressive episodes, or problems with alcohol.
- Current health policies, which are currently collective, should be reinforced by tailored individual programmes taking into account mental health status.

References
28 Hughes JR, Kalman D. Do smokers with alcohol problems have more difficulty quitting? Drug Alcohol Depend 2006;82:91–102.

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