The association between peer, parental influence and tobacco product features and earlier age of onset of regular smoking among adults in 27 European countries

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Background: Factors that influence smoking initiation and age of smoking onset are important considerations in tobacco control. We evaluated European Union (EU)-wide differences in the age of onset of regular smoking, and the potential role of peer, parental and tobacco product design features on the earlier onset of regular smoking among adults <40 years old in 27 EU countries. Methods: We analysed data from 4442 current and former smokers aged 15–39 years, collected for the Eurobarometer 77.1 survey (2012). Respondents reported their age at regular smoking onset and factors that influenced their decision to start smoking, including peer influence, parental influence and features of tobacco products. Multi-variable logistic regression, adjusted for age; geographic region; education; difficulty to pay bills; and gender, was used to assess the role of the various pro-tobacco influences on early onset of regular smoking (i.e. <18 years). Results: Among ever smokers, the mean age of onset of regular smoking was 16.6 years, ranging from 15.8 to 18.8 years in member countries. 68.1% responded that they started smoking regularly when they were <18 years old. Ever smokers who reported they were influenced by peers (OR = 1.70; 95%CI 1.30–2.20) or parents (OR = 1.60; 95%CI 1.21–2.12) were more likely to have started smoking regularly <18 years old. No significant association between design and marketing features of tobacco products and an early initiation of regular smoking was observed (OR = 1.04; 95%CI 0.83–1.31). Conclusions: We identified major differences in smoking initiation patterns among EU countries, which may warrant different approaches in the prevention of tobacco use.

Introduction

Age at regular smoking onset is an important indicator of the overall risk of tobacco use1 as the lifetime duration of tobacco use may reflect a dose–response relationship with the development and onset of certain cancers and several chronic diseases.2 While age of onset of regular smoking is not a direct construct in nicotine dependence scales, such as the Fagerstrom Nicotine Dependence Scale (for adults), or the Hooked On Nicotine Checklist (for adolescents),3 it is nonetheless an important factor in tobacco addiction as the early onset of regular smoking is associated with an elevated risk for later nicotine dependence.4 Indeed a shorter time since the onset of weekly and daily smoking has been associated with a transition to both daily smoking and nicotine dependence, respectively.5

Beyond the individual implications, age at smoking initiation could also reflect numerous health aspects of a population. For example, the average age of smoking initiation along with overall
smoking incidence or prevalence could be a predictor of overall health impact from tobacco-induced diseases, projected economic impact from tobacco-attributable direct medical expenses and lost earnings from loss of productivity, as well as other population-level health indices.\(^5\) In addition, an assessment of age at initiation could have social implications and help to guide public health policy. Specifically, such information could be useful in formulating locally relevant, evidence-based interventions to reduce tobacco initiation. Finally, surveillance of temporal changes in age at smoking initiation may provide important insight into the effectiveness of youth-targeted prevention policies, and help in monitoring of tobacco use—an important element of the World Health Organization MPOWER package.\(^7\)

A comparison between the prevalence of smoking among adolescents and adults in European countries\(^8\) indicates that countries with high smoking prevalence among youth are not necessarily the ones where adult smoking is most prevalent and vice versa. This discrepancy might reflect changes to smoking initiation rates over time, but a comparison with historical data for adolescents\(^9\)–\(^11\) shows that this may only be a part of the explanation, while on the contrary, it can be hypothesized that the patterns of smoking initiation differ between European countries. Such a finding would not be surprising, considering that smoking initiation among adolescents and young adults can be heavily influenced by a number of factors that may differ—or differed in the recent past—between European countries. These factors include family members’ and friends’ smoking behaviour,\(^12\),\(^13\) parental practices,\(^14\),\(^15\) cigarette pack design\(^16\) and price,\(^17\) as well as legislation that bans tobacco sales to minors.\(^18\),\(^19\)

To assess the above, we evaluated European Union (EU) wide differences in the age of onset of regular smoking, and the potential role of peer, parental and tobacco product design features on the earlier onset of regular smoking among younger adults (<40 years old) in 27 EU member countries using data from the 2012 Eurobarometer survey.

**Methods**

**Sampling survey**

We performed a secondary data analysis of the Eurobarometer survey, wave 77.1 (February–March 2012).\(^20\) The survey was conducted in the 27 EU member countries and included respondents aged \(\geq 15\) years. Nationally representative samples were selected through a multi-stage sampling design. A number of primary sampling units (PSU) from all administrative regions in each of the countries were selected with probability proportional to the size of their population during the first stage. In the second stage, a set of addresses was selected randomly in each PSU and additional addresses were systematically selected with the randomly selected addresses as starting points. Finally, one person aged 15 years or older in each household was randomly selected and interviewed. One sampling process was completed for each country, with the exception of the UK, where separate samples for Great Britain and Northern Ireland were selected, and Germany, where separate samples for the Eastern and Western parts were selected. Interviews were conducted in people’s homes and in the language of each country. The total analytical sample comprised 26,751 individuals. As all analyses were performed on de-identified publicly available data, this secondary analysis was deemed as exempt from the Harvard School of Public Health Institutional Review Board (IRB), with IRB protocol number 14-0346.

**Definitions**

Smoking status was assessed with the question ‘Regarding smoking cigarettes, cigars or a pipe, which of the following applies to you?’ Categorical answers included ‘You currently smoke’; ‘You used to smoke but you have stopped’ and ‘You have never smoked’. Participants who responded that they currently smoke and those who used to smoke but had stopped were classified as ever smokers. The age of initiation of regular smoking among current and former smokers was assessed with the question ‘How old were you when you started smoking on a regular basis, i.e. at least once a week?’ and numerical responses were recorded.

EU member countries were grouped into four sub-regions, following the United Nations geoccheme:\(^21\) Southern Europe (Greece, Italy, Malta, Portugal, Slovenia, Spain, Cyprus), Western Europe (France, Belgium, Austria, Germany, The Netherlands, Luxembourg), Northern Europe (Denmark, Ireland, UK, Latvia, Lithuania, Estonia, Finland, Sweden) and Eastern Europe (Slovakia, Czech Republic, Hungary, Poland, Bulgaria, Romania).

Socioeconomic status was assessed with the surrogate question ‘During the last 12 months, would you say you had difficulties to pay your bills at the end of the month . . .?’ Response options included: ‘Most of the time’, ‘From time to time’ or ‘Almost never/never’. Respondents were also classified in three groups, based on how old they were when they stopped full-time education (\(\leq 15\), 16–19 or \(\geq 20\) years old). Data were also collected on respondents’ gender and age (15–24 or 25–39 years old).

**Domains of influence**

Within our analytical approach, three domains of influence among ever smokers were selected based on responses to the question ‘Among the following, what were the most significant elements that made you start smoking?’. Respondents were allowed to select up to three among the following response options: ‘your friends smoked’; ‘your parents smoked’; ‘you liked the packaging of the cigarettes (or other tobacco products)”; ‘you liked the taste or smell of tobacco’; ‘you liked menthol cigarettes’; ‘you liked cigarettes with a specific sweet, fruity or spicy flavour’; and ‘cigarettes were affordable’. Respondents who indicated that they started smoking because their friends smoked were classified as having initiated smoking under the domain of ‘peer influence’ and those who mentioned that they started smoking because their parents smoked were classified as under the domain of ‘parental influence’. All other responses were grouped together as ‘tobacco product features’, as the numbers of respondents who indicated each one as an influence were small.

**Statistical analysis**

The analysis was restricted to ever smokers aged <40 years old, in order to reflect relatively recent social conditions. Ever smokers were classified into two groups, depending on whether they had started smoking regularly before the age of 18 (i.e. \(< 18\) years) or later (i.e. \(\geq 18\) years). Mantel’s test for trend was used to assess trends in identifying a particular domain of influence across the range of age at onset of regular smoking. Multi-variable logistic regression was used to assess the role of various pro-tobacco influences on onset of regular smoking. Predictor variables assessed included age; geographic region; education; difficulty to pay bills; gender; peer pro-tobacco influence; parental pro-tobacco influence; and features of tobacco products. Results are presented as Odds Ratios (OR) with 95% Confidence Interval (95% CI). The complex sampling design was taken into account in all analyses by employing the appropriate country-specific or EU-wide sampling weights, which were included in the dataset. All analyses were performed with Stata 12.0.

**Results**

**Age of onset of regular smoking**

A total of 4442 individuals of the Eurobarometer 77.1 survey were either current \((n = 3145)\) or former smokers \((n = 1297)\) and aged <40
The majority of ever smokers in all 27 EU member countries (80.6%) cited peer smoking as an important factor related to the onset of their regular smoking. Parental smoking (22.8%) and design or marketing features of tobacco products, such as affordable price, taste and packaging (31.7%) were cited by relatively fewer respondents as being important factors in the onset of regular smoking. Peer smoking appeared to be particularly important in smoking initiation among ever smokers who started smoking regularly at a younger age ($P$ for trend <0.001). Parental smoking as a determinant of smoking initiation was more important among respondents who started smoking when they were $\leq$ 15 years old (30.3%), but less so among ever smokers who started using tobacco products regularly when they were $>20$ years (10.3%) ($P$ for trend <0.001). On the contrary, no significant within-group differences were observed for design and marketing features of tobacco products (table 2).

The multivariate logistic regression analysis showed that, after adjusting for gender, geographic region, age, education, difficulty to pay bills and the other variables presented in the table, parental influence was also more likely to have started regular smoking at an earlier age ($<18$ years) (OR = 1.60; 95% CI 1.21–2.12). On the contrary, no significant association between design and marketing features of tobacco products and an early initiation of regular smoking were observed (OR = 1.04; 95% CI 0.83–1.31) (table 3).

Discussion

This secondary analysis of European-wide data demonstrated that having close friends or parents that smoked was significantly associated with an earlier onset of regular smoking (i.e. at an earlier age of $<18$ years) among European smokers. However, peer smoking was the most important factor (in terms of volume of responses)—cited by over 4 of 5 ever smokers as being important to their smoking initiation. This is noteworthy since adolescence represents a critical developmental stage where youths may be more susceptible to pressure from peers to conform to certain social identities or norms. Previous studies have identified that parental styles and parental smoking-specific practices, especially parental smoking, influence adolescents' smoking behaviour. However, the relative importance of peer and parental smoking is not clear in the literature; in some studies their influences are comparable, whereas in others peer smoking behaviours seem to be a more important factor than parental smoking for European adolescents.
Previous research has shown that design and marketing features of tobacco products, such as flavours (e.g. menthol),
packaging characteristics, and price are associated with smoking initiation, especially among adolescents. The current analysis however found no significant effect of such design and marketing elements on the earlier onset of regular smoking. We must however acknowledge that because of the self-reporting of perceived determinants of smoking initiation, it is conceivable that it may be relatively easier for respondents to specifically remember the role of proximal contacts such as parents or peers in their smoking initiation, compared with design or marketing elements.

Peer and parental pro-tobacco influence were reported by a greater proportion of respondents among those who reported regular smoking at an earlier age. Thus, it is possible that design and packaging features of tobacco products play a more significant role in smoking initiation among people >18 years, whereas peer and parental smoking are more important among those who initiate smoking <18 years old. This could also be related to the prohibition of tobacco products sales to minors, as adolescents may have difficulty buying their own cigarettes and start smoking regularly if the ban is enforced. Another implication of this is that the different patterns of smoking initiation between European countries may reflect great variation in the legal age of purchase of tobacco products and enforcement of this legislation in the past 25–30 years, when the study participants started smoking regularly.

These findings have implications for tobacco control policy regarding product regulation and tobacco prevention programs. In countries such as Finland, Malta, UK, The Netherlands, France and Belgium, that were characterized by early age of onset of regular smoking, a greater public health benefit may be realized by investing in tobacco use prevention programmes that denormalize smoking during adolescence. In contrast, in countries such as Romania, Lithuania, Slovakia, Slovenia, Poland, Bulgaria and Greece, where a significant proportion of smokers initiated regular smoking well in their adulthood, product regulation policies such as restrictions in packaging, flavours and prices, may be of greater importance in preventing uptake or maintenance of tobacco use-naturally without omitting the need to prevent adolescent smoking experimentation.

However, tobacco control policies have been shown to be optimal when they are part of a comprehensive tobacco control program. A one size fits all model may not be feasible across all EU member countries, considering certain unique tobacco use cultures (e.g. smokeless tobacco products being predominant in Sweden), as well as major differences in smoking initiation patterns as demonstrated in this study. The World Health Organization MPOWER package provides evidence-based interventions to help reduce and prevent tobacco use. These include increasing the price of tobacco products, implementing smoke-free laws in workplaces and public places, warning about the dangers of tobacco use with anti-tobacco media campaigns, increasing access to help quitting, and enforcing restrictions on tobacco advertising, promotion and sponsorship.

**Strengths and limitations**

The sample of this study was representative of the EU population ≥15 years old and the same sampling design was used in each country, therefore comparisons between countries are valid and results can be generalized to the EU adult population. However, after excluding never smokers and individuals >40 years, country-specific samples were relatively small, leading to wide confidence intervals for country-specific estimates. Similarly, we had to group together a number of tobacco product characteristics, such as price, taste and pack design that would otherwise be interesting to be examined individually. Moreover, all information were self-reported and, as some questions referred to the past, recall bias cannot be ruled out. Finally, ever smokers in the sample might have started smoking within a period of ~25 years, during which major shifts in tobacco control policies and social attitudes towards smoking have been documented. Thus, results might not fully reflect the current situation in some countries.

**Conflicts of interest:**

Israel T. Agaku initiated the reported research while affiliated with the Center for Global Tobacco Control at Harvard University. He is currently affiliated with the Centers for Disease Control and Prevention’s Office on Smoking and Health. The research in this report was completed and submitted outside of the official duties of his current position and does not reflect the official policies or positions of the Centers for Disease Control and Prevention.

**Key points**

- The age distribution of regular smoking onset varied widely within the European Union.
- The relative importance of peer and parental influences, and of tobacco product features differed between ever smokers, depending on the age they started smoking regularly.
- These findings highlight the need for tobacco prevention programmes which take into account the different patterns of smoking initiation within the EU.

**References**

Cultural capital and smoking in young adults: applying new indicators to explore social inequalities in health behaviour

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Background: Associations between social status and health behaviours are well documented, but the mechanisms involved are less understood. Cultural capital theory may contribute to a better understanding by expanding the scope of inequality indicators to include individuals’ knowledge, skills, beliefs and material goods to examine how these indicators impact individuals’ health lifestyles. We explore the structure and applicability of a set of cultural capital indicators in the empirical exploration of smoking behaviour among young male adults. Methods: We analysed data from the Swiss Federal Survey of Adolescents (CH-X) 2010–11 panel of young Swiss males (n = 10,736). A set of nine theoretically relevant variables (including incorporated, institutionalized and objectified cultural capital) were investigated using exploratory factor analysis. Regression models were run to observe the association between factor scores and smoking outcomes. Outcome measures consisted of daily smoking status and the number of cigarettes smoked by daily smokers. Results: Cultural capital indicators aggregated in a three-factor solution representing ‘health values’, ‘education and knowledge’ and ‘family resources’. Each factor score predicted the smoking outcomes. In young males, scoring low on health values, education and knowledge and family resources was associated with a higher risk of being a daily smoker and of smoking more cigarettes daily. Conclusion: Cultural capital measures that include, but go beyond, educational attainment can improve prediction models of smoking in young male adults. New measures of cultural capital may thus contribute to our understanding of the social status-based resources that individuals can use towards health behaviours.

Introduction

Young adults have the highest rates of smoking across all age groups and social inequalities in smoking among them are as conspicuous as in adults. These inequalities include a large range of pathways—through parents, friends and schooling—making young adults vulnerable to smoking uptake, heavy smoking, persistent smoking and lack of success in quitting. One of the obstacles to understanding these inequalities resides in our limited ability to properly assess young adults’ social status with respect to health behaviours. Education is often assumed to be one of the more precise indicators of social status, especially in young adults, But while educational attainment is useful as a parsimonious measure, it fails to encompass the various components acquired through educational experience. In this regard, the concept of cultural capital is being increasingly explored to examine the specific cultural factors that relate to individuals’ social status and health lifestyles. Defined broadly as the knowledge, skills, values and norms accumulated through education and life-long socialization, cultural capital has garnered growing interest with respect to social inequalities in health and has been employed in many empirical studies to explore inequalities in health.

The most established typology of forms of cultural capital describes cultural capital in three states: institutionalized...