European Journal of Public Health, Vol. 15, No. 4, 404–410

doi:10.1093/eurpub/cki040 Advance Access published on 13 July 2005

Influence of social environment in smoking among adolescents in Turkey

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Background: The aim of this study was to examine the social determinants of smoking among adolescents attending school and/or work. **Methods**: A survey was carried out on 6012 adolescents aged between 13 and 17 years in 15 cities, recruited from schools, vocational training centres and work places. A self-completed questionnaire was used for data collection. Single- and multi-level regression analyses were run to estimate models. **Results**: Ever smoking and current smoking rates were 41.1% and 10.5% among girls, and 57.5% and 25.2% among boys. These rates were 47.0% and 13.3% among those who only attended school, 62.2% and 31.7% among those who attended school and worked simultaneously, and 67.5% and 43.0% among those who worked and did not attend school. In multi-level analysis, the major predictors of current smoking were close friends smoking [odds ratio (OR) 3.48; 95% confidence interval (CI) 1.93–6.27], no knowledge of harmful effects of short-term smoking (OR 2.15; 95% CI 1.74–2.67), vulnerability to peer pressure (OR 1.90; 95% CI 1.48–2.46), negative self-perception (OR 1.69; 95% CI 1.31–2.18) and male sex (OR 1.68; 95% CI 1.30–2.16). Mothers higher education was a predictor for girls' smoking, while mother's lower education was a predictor for boys' smoking. At the school level, smoking prevalence was a predictor of current smoking (OR 1.07; 95% CI 1.05–1.08). **Conclusions:** Smoking patterns were similar to Western countries in several aspects, while male prevalence rates were higher and the impact of gender-related predictors was significant. Our findings suggest that youth smoking prevention policies should address personal, familial and educational environmental level requirements, taking into consideration the gender differences in addition to international guidelines.

Keywords: adolescent, epidemiology, smoking, social environment, Turkey, youth

Turkey, with a population of ~70 million is a leading tobacco producer, of over 250 000 million tonnes of tobacco per year,[1–3] and also a leading consumer. Approximately 40% of the adult population currently smokes.[2,4,5] Even though Turkey contributes to the global tobacco epidemic by harvesting and selling its own tobacco, the influence of powerful tobacco multinationals has dramatically impacted the tobacco market in Turkey, with a resultant increase in consumption.[1,2] With the global trend towards market liberalization, Turkey welcomed tobacco multinationals such as Philip Morris and British American Tobacco in the mid-1980s. Their aggressive marketing techniques increased tobacco brand awareness among children,[6] and adolescent smoking rates have significantly increased.[5,7–10] Turkey passed the 'Prevention of the Harms of Tobacco Products Law' in 1996. By banning advertising, sales to minors and smoking in public places, it was seen as an important milestone in tobacco control in Turkey and a critical response to adolescent smoking.

The tobacco epidemic is a global phenomenon, and a number of studies in various countries have concluded that adolescent smoking is influenced by many variables, including socio-demographics, and personal and environmental influencers, which include peer and school environment.[11–15] Most studies on the predictors of smoking have been conducted in Western countries, and therefore evidence from low-income countries is important in order to gain broader perspectives on this issue. Turkey is a country in economic transition and research into youth smoking during this critical time is important. In this context, the aims of this study were to examine the current smoking patterns among adolescents attending school and/or work, and to define the influences of social environment on smoking.

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Methods

We surveyed 6012 adolescents, aged 13–17 years, in 15 cities in Turkey. These cities were Ayvalik (Balikesir), Batman, Eskisehir, Iskenderun, Istanbul, Aksehir (Konya), Karabük, Kirsehir, Malatya, Akhisar (Manisa), Mus, Terme (Samsun), Çorlu, Besikdüzü (Trabzon) and Eregli (Zonguldak).

The sample consisted of three groups of adolescents: (i) those who only attended school (72.8%); (ii) those who attended school and also worked (11.0%); and (iii) those who only worked (16.2%). Students were recruited from public and private schools, and working youth were recruited mostly from vocational training centres (VTCs). VTCs are compulsory technical courses organized by Ministry of National Education to provide 1 day a week courses for working youth who did not attend school. A smaller part of the working youth (16.4%) were recruited from small work places within the organized small industry areas. The group of those who attended school and also worked included both the students from the school sample who identified themselves as working, and workers at the worksites who identified themselves as also students.

Seventy-four schools in 15 cities were identified by field workers non-randomly. In each city, schools were grouped into relatively high, middle and low socio-economic levels by contacts with provincial educational directorates. At least one school from each socio-economic level was selected, concerning the size, type and the location of the school, thus aiming to

cover students with different socio-economic levels, living in different parts of the city and attending different types of schools. All VTCs in the study areas were selected as study units. Official permission letters were obtained from all provincial governors prior to the field study; and 100% of the selected school and VTC directorates collaborated well during the study. In the schools, classrooms were selected randomly, according to grade level. All students in a selected classroom were included in the study.

A self-completed questionnaire was used for data collection. Passive parental consent was obtained with a parent notification form for surveys administered in schools and VTCs. School staff stayed out of classrooms during data collection to increase anonymity. The overall parental and student response rate was 89.8% for adolescents surveyed at schools and 90.3% for adolescents surveyed elsewhere. School level data remained confidential, and province level results have been reported to the educational directorates of provinces.

The survey questions were adapted from the World Health Organization's Global Youth Tobacco Survey[16] (GYTS) and Health Canada's 1994 Youth and Smoking Survey.[17] These questions were adapted to Turkish context, pilot-tested and revised. The questionnaire consisted of 59 multiple choice and easy to answer questions. Only a few respondents whose literacy level was low were assisted by friends or field staff.

Smoking status was the dependent variable. 'Current smokers' were defined as those who smoked at least once in the last 30 days. 'Ever smokers' were those who have experimented with smoking (at least one or two puffs) and included the current and ex-smokers. 'Non-smokers' were those who had never smoked.

Ever and current smoking rates according to age, gender and work status were calculated. Logistic regression analysis was used to estimate models. Risk of current smoking was evaluated with reference to ex- or non-smoking, and risk of ever smoking was evaluated with reference to non-smoking. In the first step, backward conditional regression analysis was run for estimating single-level models using SPSS software. In the second step, those who only worked were excluded from the sample; then, multilevel regression analysis was run by using HLM (Hierarchical Linear and Non-linear Modeling) software in order to evaluate models regarding the school context.[18] Within the multilevel model, student and school levels in the data structure were represented by their own submodels. The grouping variable was the school that the student attends; there were 74 groups. School level variables such as prevalence of smoking and proportion of adolescents who were exposed to cigarette advertisements were obtained by aggregation of student level data to school level information. Other school level information such as size and type of the school was obtained from the school directorates. The Bernoulli model was used for analysis. Final estimation of fixed effects (population average model) was used to estimate the final model. Thus, the influences at the school level were explored by two-level analysis, and the residual effects at the student level were understood. Results of single- and multi-level analysis were presented and compared.

Results

By bivariate analysis, ever and current smoking rates were evaluated according to the gender, age and attendance at school and/or work (tables 1 and 2). The overall rate of ever smoking in the 13–17 year age group was 57.5% for boys and 41.1% for girls, while current smoking rates were 25.2% and 10.5%, respectively (table 1). For a comparison with GYTS results, the overall ever smoking rate in the 13–15 year age group was 49.0%, while the overall current smoking rate in this group was 17.2%.

Table 1 Smoking prevalence by gender and age

Gender	Age (years)	*n*	Prevalence of ever smoking (%)	Prevalence of current smoking (%)
Male	16–17	1016	63.6	33.2
	15	1796	60.7	27.3
	13–14	1078	46.4	14.1
	Total	3890	57.5	25.2
Female	16–17	344	52.6	18.3
	15	949	47.1	13.0
	13–14	829	29.6	4.3
	Total	2122	41.1	10.5
Total		6012	51.7	20.0

Among those who ever smoked, 15.6% of boys and 6.0% of girls started smoking before the age of 10 years, with boys starting at a younger age than girls. Mean age of initiation was 12.39 years [standard deviation (SD) 2.52] for all smokers, while it was 12.20 years (SD 2.59) for boys and 13.17 years (SD 2.03) for girls ($P < 0.001$).

Table 2 indicates that working status has a relationship with smoking. Smoking rates were highest among those who only worked. Those who worked while attending school represented an intermediate level of prevalence, and those who only attended school had the lowest rates. Mean age of initiation was slightly higher among those who only attend school, but the difference was not significant.

Smokers' perceptions of what influenced them the most to try a cigarette was curiosity ('seeing what it was like'); 49% of boys and 67% of girls stated that curiosity was the reason why they first tried a cigarette. The next most frequent responses were encouragement or influence of others (20.5% of boys and 16.7% of girls) and believing smoking impresses others (16.2% of boys and 9.9% of girls).

Single- and multi-level regression analyses indicated that several variables influenced smoking behaviour (tables 3 and 4). Socio-demographic influencers were gender, age, and work or school attendance. Cognitive and behavioural characteristics were self-perception, attitude towards peer pressure, knowledge of harmful effects of smoking, school success, and relations with parents and teachers. Environmental influencers were smoking behaviour of close friends and parents, exposure to cigarette advertisements and smoking prevalence at the school.

Comparing the results of single-level and two-level regression analysis, the odds ratio (OR) for having a close friend smoking was lower in the two-level model than the single-level (tables 3 and 4). To check whether the difference was due to the level factor or the exclusion of out-of-school group in two-level analysis, single level analysis of the dataset that was used for two-level analysis, was performed. This analysis resulted in an increase in the OR for having a close friend smoking, instead of a decrease. Thus, we may attribute the lower OR of having a close friend smoking in two-level analysis to the level factor. In addition to the lower OR of having a close friend smoking in two-level analysis, prevalence of smoking was an independent school level variable that slightly influenced the risk of smoking and the risk of having a close friend smoking (table 3).

We performed single-level regression analysis for some subgroups of our sample to evaluate possible subgroup differences. Mothers' educational level influenced adolescent smoking in two contrasting ways. Boys whose mothers had ≤ 1 or 2–5 years of education were more likely to be current smokers (OR 1.73, 95% CI 1.13–2.67; and OR 1.97, 95% CI

Table 2 Smoking prevalence by school or work attendance and age

School or work attendance	Age (years)	*n*	Prevalence of ever smoking (%)	Prevalence of current smoking (%)
Student only[a]	16–17	855	59.2	22.8
	15	1902	51.1	14.7
	13–14	1582	35.5	6.4
	Total	4339	47.0	13.3
Attending school and working[b]	16–17	234	65.4	40.2
	15	268	63.8	32.5
	13–14	151	54.3	17.2
	Total	653	62.2	31.7
Working/not attending school[c]	16–17	254	65.0	42.9
	15	557	69.7	44.2
	13–14	156	64.1	39.1
	Total	967	67.5	43.0
Total[d]		5959	52.0	20.1

a: students who did not work in any workplace, or worked only for educational purposes.
b: students who worked at a workplace (not for educational purposes).
c: a small proportion of the adolescents who were not working and not attending to school (0.7% of the total sample) were evaluated in this group.
d: data on the working status of 53 school subjects were missing.

1.33–2.93, respectively), compared with those whose mothers had ≥11 years of education. In contrast, girls whose mothers had 6–10 or ≥11 years of education were more likely to be ever smokers (OR 1.68, 95% CI 1.11–2.53; and OR 1.76, 95% CI 1.18–2.63, respectively), compared with those whose mothers had ≤1 year of education.

Educational level of father, socio-economic level of the family and household size were related to adolescent smoking in bivariate comparisons, but not in regression analysis.

Discussion

This study highlights the high level of smoking among adolescents, particularly among boys and those who work, and the significant importance of social environment and the gender differences influencing the adolescents' smoking behaviour.

GYTS was conducted in 12 low and middle income countries among the 13–15 years age group; the median ever smoking rate was 24.2% and the median current smoking rate was 8.7%.[16] Prevalence rates in the same age group of our sample were 49.0% and 17.2%, respectively. These rates are higher than GYTS median rates. The prevalence rates in our sample were similar to US figures on average, but smoking prevalence among boys was much higher than the prevalence among girls in our study.[19,20]

The significant difference between girls' and boys' smoking rates reflects gender differences in Turkish culture. Traditionally, men have had a dominant social role in Turkey. The proportion of working women is very low, particularly in small cities and in the central and eastern parts of Turkey. Men play a dominant role outside the home while women take the lead inside. While these traditional patterns are rapidly changing because of the social development and the socio-economic empowerment of women, the gender roles are still influenced by these traditional perceptions and role divisions.

The education level of mothers influenced adolescents smoking in different ways for boys and girls. Boys whose mothers had very low education were more likely to smoke than other boys, while girls whose mothers had higher level of education were more likely to smoke than other girls. At this point, we may consider the evolution of smoking patterns in communities over time. Long-term analysis of the tobacco epidemic shows that prevalence rates among females are stable or increasing, while they are decreasing among males in most developed countries.[21–23] Today, women in most developed countries with increasing educational level have lower risk of smoking than less educated women. In contrast, the situation in developing or newly developed countries may be the opposite.[24] Turkey is a country in a transition period, and the educational level of the woman may reflect the social developmental level of the family. Thus, mother's low level of education in our study may represent a more traditional family, where smoking may be an accepted social behaviour for men and a symbol of adulthood for the boy. These perceptions bring more risk of smoking for boys, similar to the patterns of the earlier stages of the epidemic. In contrast, an educated mother may reflect a so-called 'modern' family, where smoking may be a symbol of autonomy for the modern girl, and a higher risk of smoking similar to the patterns of the later stages of the global epidemic. Our findings suggest that the relationship between gender and smoking behaviour may change according to the social development not only over time, but also across a country in a given time. Future epidemiological and qualitative research should focus on better understanding of the gender roles because it may have implications for anti-tobacco campaigns in Turkey as well as in other countries in transition.

Working status strongly influenced adolescent smoking. Among working adolescents, ever and current smoking prevalence were quite high. This finding is particularly important because the proportion of working children (age 14 years or under) was reported as 55.9% in Turkey.[25] This high percentage includes temporary work and unpaid family work in rural areas and is much lower in urban areas. Having adult responsibilities may increase the risk of smoking for working adolescents, and having more money and autonomy to spend money may facilitate gaining access to cigarettes. Smoking may be more perceived as an adult social behaviour in these social

Table 3 Predictors of smoking by single-level logistic regression analysis

Characteristics[a]		Estimated OR (95% CI) for ever smoking	Estimated OR (95% CI) for current smoking
Socio-demographic			
Gender	Female	1	1
	Male	1.52 (1.31–1.76)	1.86 (1.49–2.31)
Age (years)	13–14	1	1
	15	1.59 (1.36–1.87)	1.82 (1.41–2.35)
	16–17	1.57 (1.30–1.90)	2.63 (2.01–3.45)
Attendance at school or work	Only school	1	1
	School and work	1.22 (0.97–1.52)	1.96 (1.53–2.51)
	Working/not going to school	1.49 (1.19–1.88)	3.46 (2.72–4.39)
Where he/she lives	Family's home	1	–
	At home with relatives	0.81 (0.47–1.39)	–
	At home with friends/alone	1.27 (0.59–2.71)	–
	Pension/hotel	1.77 (1.23–2.54)	–
Cognitive/behavioural			
Self-perception/wellness	Well	1	1
	Not well	1.59 (1.37–1.85)	1.75 (1.44–2.12)
Attitudes towards peer pressure	Doesn't care about pressure	1	1
	Vulnerable	1.31 (1.14–1.51)	1.86 (1.51–2.29)
Knowledge on harms of short-term smoking	Knows	1	1
	Does not know	1.46 (1.27–1.68)	2.11 (1.76–2.52)
School success	Very good	1	1
	Good	0.94 (0.78–1.12)	0.91 (0.70–1.18)
	Moderate	1.29 (1.05–1.58)	1.66 (1.26–2.18)
	Low	1.26 (0.90–1.76)	2.57 (1.77–3.74)
Extracurricular activity	Yes	–	1
	No	–	1.20 (0.99–1.45)
Problems with communicating with parents	No	1	1
	Yes	1.43 (1.23–1.65)	1.43 (1.18–1.74)
Problems with communicating with teachers	No	1	–
	Yes	1.19 (1.03–1.38)	–
Environmental			
Have any close friends smoking	No	1	1
	At least one	3.05 (2.64–3.53)	4.41 (3.35–5.82)
Smoking persons at home	None	1	1
	One person	1.26 (1.07–1.48)	1.41 (1.10–1.80)
	Two or more	2.02 (1.71–2.39)	2.25 (1.77–2.86)
Ever seen any advertisements?	No	1	1
	Yes	1.19 (1.04–1.37)	1.18 (0.99–1.42)
Own anything with cigarette logo on it	No	–	1
	Yes	–	1.46 (1.13–1.88)
	Not sure	–	1.39 (1.11–1.76)

a: variables were included in the models if $P < 0.10$. Socio-economic status of family, father's education, mother's education and number of persons at home were not found to be significant in these models.

Table 4 Predictors of smoking by two-level regression analysis

Characteristics[a]	Estimated OR (95% CI) for ever smoking	Estimated OR (95% CI) for current smoking
Student level		
Socio-demographic		
Male sex	1.44 (1.23–1.68)	1.68 (1.30–2.16)
Increasing age	1.35 (1.20–1.52)	1.26 (1.07–1.47)
Non-attendance at school/attendance at work		1.47 (1.05–2.05)
Cognitive/behavioural		
Negative self-perception/wellness	1.52 (1.30–1.78)	1.69 (1.31–2.18)
Vulnerability towards peer pressure	1.42 (1.21–1.66)	1.90 (1.48–2.46)
No knowledge on harms of short time smoking	1.42 (1.22–1.67)	2.15 (1.74–2.67)
Low school success	1.09 (0.99–1.21)	1.48 (1.29–1.69)
Problems with communicating with parents	1.43 (1.22–1.67)	1.59 (1.23–2.05)
Problems with communicating with teachers	1.31 (1.12–1.54)	1.35 (1.07–1.71)
Environmental		
Have a close friend smoking[b]	2.38 (1.84–3.07)	3.48 (1.93–6.27)
Smoking persons at home	1.40 (1.27–1.54)	1.43 (1.25–1.65)
Own anything with cigarette logo on it	–	1.15 (1.01–1.32)
School level variables		
Higher prevalence of smoking at school	1.03 (1.02–1.04)	1.07 (1.05–1.08)
Exposure rate to advertisements	1.01 (1.00–1.02)	–

a: variables were included in the models if $P < 0.10$. Socio-economic status of family, father's education, mother's education, number of persons at home, the place where he/she lives and extracurricular activity at student level, and school size and the type of school at the school level, were not found to be significant in these models.
b: higher prevalence of smoking at school was found to be in interaction with having a close friend smoking (estimated OR 1.02; 95% CI 1.01–1.03).

groups. Additionally, exposure to the adult world may increase the risk of smoking. The particular risk that a working adolescent faces emphasizes the need for smoke-free workplaces. This suggests that workplace smoking policies may be important not only for promoting cessation among adults, but also for preventing smoking initiation among working adolescents.

There was a noticeable change in prevalence of smoking between the respondents aged 13–14 years and those aged 15 years. In order to explain this rapid increase, we considered the psycho-social development and environmental change. The group aged 13 years were mostly students in the last grade of primary school. Most of the adolescents aged 14 years and over have become students of high schools and/or started working in workplaces; thus, they were interacting with older peers and adults. Increase in smoking rates coincided with significant psycho-social and environmental change.

We found that the higher risk of smoking among adolescents who have a close friend smoking is not attributable only to a close friend's personal behaviour; but it is also related to higher smoking prevalence at school. The influence of other people who smoke in one's immediate social environment has been well documented in various studies.[26–30] By eliminating the effect of school level influences through multi-level analysis, we demonstrated that the estimated ORs for peer influence are lower than in single-level analysis. Thus, the residual effect of having a close friend smoking is significant, but it is lower than is apparent from single-level analysis.

In order to protect the young individual from the negative influences of friends, it is not always possible to change the social environment. Our findings indicate that better communication with parents and with teachers are important protective factors for adolescents against smoking. The ability of adolescents to refuse peer pressure also has a significant role. Our findings on refusal were simply based on whether or not adolescents declared that they would not care what friends might think if they refused a cigarette. Regression analysis showed that adolescents who declared that they would not care about friends' attitudes were significantly less likely to initiate and continue smoking.

Maintaining a positive and supportive social environment is important for the prevention of adolescent smoking. Better communication within family and school, positive modelling of healthy behaviour, support for better self-perception and wellness, support for developing refusal skills, problem solving and coping with stress will help protect adolescents from smoking as well as from other psycho-social risks. The school success of youths, which was found to be an influencing factor on smoking behaviour, is also affected by the psycho-social environment.

Social environment of adolescents, particularly the school milieu, play an important role in determining smoking behaviour. Attending school has a protective effect. Better communication with teachers and success in school also decrease the risk of smoking. Additionally, the school environment has a contextual effect on smoking, directly and indirectly, by influencing the levels of the effects of other variables. These results indicate that school level policy measures, which are not yet widely applied in Turkey, would likely be effective if applied.

The study has limitations that should be noted. The selection of cities and schools was not random, although the cities were chosen to reflect the geographical distribution of the country, and the schools were chosen from different districts of the cities. The sample included working youth as well as students, but did not include those who did not attend school or work. The sample was also limited to urban youth. Therefore, the gender and age prevalence rates in tables 1 and 2 are suitable for comparisons within the sample, but not representative of the country. A higher percentage of working youth, lower schooling rates particularly for girls and more traditional family characteristics in rural population would influence the results, if rural youth was included in the study. Furthermore, the study was cross-sectional rather than longitudinal, which limits the extent to which conclusions about causality can be drawn.

Studies, mostly in developed countries, have demonstrated the importance of social environment in various aspects, such as the role of peer influence, parental smoking, family relations, school connectedness and school context.[11,14,26–29,31] Analysis of our data confirmed the existence of similar relationships between social environment and youth smoking behaviour in the Turkish context. The similarities indicate that successful youth-oriented anti-tobacco policies used internationally might be successful in Turkey. However, our results indicated that there are gender-related differences; thus, gender-sensitive approaches are needed when carrying international knowledge and experience into the national context. Finally, our results demonstrated that there are multilevel influences on youth smoking behaviour; thus, anti-tobacco interventions should address the problem at all levels: the individual, the family, the school and through legislation policies.

Acknowledgements

This work was a partnership between Marmara University and Physicians for a Smoke-Free Canada and was carried out with the aid of a grant from Research for International Tobacco Control (RITC), an international secretariat housed at the International Development Research Centre, Ottawa, Canada.

Key points

- The study examines the social determinants of smoking among adolescents.
- Influence of peers and parents, school connectedness and working status, exposure to advertisements, and gender were significant in adolescent smoking.
- Mother's higher education was a predictor for girl's smoking while mother's lower education was a predictor for boy's smoking.
- Gender sensitive approaches are needed when carrying international knowledge and experience into the national context.
- Anti-tobacco interventions are needed at all levels – the individual, the family, the school, and policies.

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Received 15 October 2003, accepted 22 July 2004