

Smoking among adolescents: relation to school success, socioeconomic status, nutrition, and self-esteem

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Summary

Objective: Smoking is a worldwide health problem. This study was designed to evaluate the current status and to examine some potential factors affecting smoking among adolescents.

Design: Descriptive, cross-sectional study.

Setting: Community based study.

Subjects: Of all middle and high school students in Edirne, Turkey, 883 (6.83%) were randomly sampled. Mean age of the subjects was 15.0 ± 1.8 years.

Method: A self-applied questionnaire was used to collect demographic data, smoking status, school success, nutritional behaviour and self-esteem. The influence of different factors on smoking was evaluated with a logistic regression model.

Results: There were 89 active smokers (11.1%) with the critical age of 15 years for smoking commitment. 609 students (71.9%) were exposed to environmental tobacco smoke. Nutritional behaviour rich in vegetables (OR = 0.813), high school

success (OR = 0.807), longer time reserved for homework (OR = 0.718) and eating breakfast (OR = 0.353) were significantly associated with a lower smoking rate. Having a mother, who smoked (OR = 2.155), increasing age (OR = 1.704), increasing number of siblings (OR = 1.351) and eating fast food (OR = 1.150) were associated with significantly higher smoking rates.

Conclusion: An educational programme aimed at changing behaviour and attitude to tobacco smoking and including nutritional counselling with high emphasis on the transition age from early to late adolescence may be a successful primary prevention. In addition projects designed to improve school performance may lead to a reduction in smoking rates while providing an investment in the future of the teenagers.

Key words: smoking; adolescents; students; self-esteem; nutrition

Introduction

Tobacco use is a serious problem among adolescents. The relation between lung cancer, chronic obstructive lung disease, coronary artery disease and smoking has been shown in various studies [1-4]. As a result, almost all developed countries have launched vigorous campaigns to diminish smoking rate among adolescents.

On the other hand smoking has been spreading rapidly among young people in developing countries. Concomitant to the psychological changes and risk-taking behaviour that are observed during adolescence, tobacco use rate increases. Statistics from the USA indicate that 20% of adolescents smoke cigarettes [5].

In preparing this report, we were mindful of past findings on associations between tobacco use and different factors, but we tried to add new evi-

dence on this topic. In order to develop effective strategies to fight this harmful addiction, it is essential to know why adolescents commence or carry on smoking. This study was designed to evaluate the smoking behaviour and the related factors among a representative sample of middle and high school students of Edirne, a Turkish city with 115 000 inhabitants.

It is clear that smoking is an intricate health problem with many interlaced factors, giving rise to the hypothesis that there are many social, environmental, behavioural or inborn factors, which affect the smoking status of adolescents. Since these factors could also have inter-item associations, using a logistic regression model could reveal significant factors for smoking. Hence, we decided to conduct a study evaluating factors related

to family, environment, nutrition, school performance and self-esteem on smoking. By determining the factors affecting smoking, it should be possible

to identify high-risk adolescents for future addiction and improve the effectiveness of smoking cessation and prevention programmes.

Materials and methods

Of the 28 middle and high schools in Edirne, with a total population of 12 923 students, 1200 (9.3%) were sampled using a stratified method according to the number of students in each school followed by a simple random sampling based on school registration numbers. 883 students (73.58%) responded to the study. Each student completed a 32-item self-applied questionnaire together with validated instruments for the assessment of self-esteem [6] and socioeconomic level [7] under the supervision of the researchers. The questions aimed to ascertain information on smoking, grades in the last report card, class repetition, study time, nutritional behaviour, parental smoking status, as well as demographic information. All questions were multiple choice-type. Before applying the questionnaire, verbal consent was obtained from each participating student. It was explained to each participant that all of his or her answers would be kept confidential and that he or she could decide whether to answer any question or not. Parental consent had been previously obtained.

Two groups were defined according to age: early adolescents (≤ 15 years) and late adolescents (> 15 years). Smoking was defined as having smoked at least 100 cigarettes and continuing to smoke. We categorised those who smoke occasionally (lifelong cigarette smoking < 100) as "occasional smokers". For statistical analysis, both "active smokers" and "occasional smokers" were grouped into one category "smokers". Quantity of smoking was defined as

the self-reported current average number of cigarettes smoked per day. Duration of smoking was measured by subtracting the age at smoking initiation from the current age. Age-specific smoking onset percentages were calculated by dividing the number of adolescents commencing smoking for each age by the number of participants at and above the specific age group.

Self-esteem was evaluated by the Turkish version [8] of Rosenberg self-esteem questionnaire [6]. Composed of 10 questions, this questionnaire grades individuals into low, medium and high self-esteem levels.

Socioeconomic level was assessed by the Neyzi questionnaire [7]. This tool uses mother's education, father's education, and father's occupation to calculate a socioeconomic index from 1 (good) to 4 (poor).

To determine nutritional behaviour, fast food, vegetable, fruit and meat consumption in weekly number of meals were queried; the eating of breakfast was asked separately.

We built a logistic regression model, which included socioeconomic status, grade status in the last report card, study time per day, age, sex, nutritional behaviour, parental smoking status, number of siblings, living conditions (with family or other), TV watching time, parental status (separated vs non-separated), self-esteem and family type (small vs large number of members). SPSS statistical package programme was used in statistical analysis.

Results

The mean age of the subjects was 15.00 ± 1.80 (min. 11, max. 19). Of the subjects, 480 (54.36%) were early adolescents whereas 403 (45.64%) were late adolescents. The majority of adolescents had small families with medium to low socioeconomic status. Demographic characteristics of the participants are presented in table 1.

Two hundred and forty four adolescents (30.46%) had smoked tobacco. 90 (11.24%) of these were active smokers, 78 (9.74%) occasional smokers, 64 (7.99%) had tried only once and only 12 (1.50%) were ex-smokers. Boys and late adolescents smoked more than girls and early adolescents (table 1). The average smoking rate of the smokers was 5.65 ± 5.89 cigarettes / day (min. 1, max. 20).

Age of smoking onset was 13.02 ± 2.78 years (min. 5, max. 18). These data were recalculated to obtain the age-specific smoking onset percentages. Smoking onset percentages increased gradually and reached a peak at the age of 15 (boys 6.39%; girls 7.76%). Smoking onset started to decrease after age 15 (fig. 1). The mean duration of smoking was 3.07 ± 2.63 years (min. 0, max. 12) for smokers.

Two hundred and seventy two mothers (31.70%) and 555 fathers (64.91%) were smokers.

Daily studying time (h/day \pm SD) for smokers, non-smokers and total sample was 2.53 ± 1.59 , 3.00 ± 1.73 and 2.91 ± 1.71 respectively.

Parental smoking status was evaluated in order to estimate environmental tobacco smoke (ETS). The number of adolescents in whom both parents smoked, only mother smoked, only father smoked and neither of the parents smoked was found to be 210 (24.8%), 60 (7.1%), 339 (40.0%) and 239 (28.2%) respectively. This revealed a total environmental smoking exposure of 71.9%. ETS was found to be 47.2% ($n = 83$) among non-smokers.

One hundred and eighteen of the adolescents (29.5%) who had one or more poor grades in their last report cards were smokers, whereas 282 were non-smokers (70.5%). The same numbers for those who had no poor grades were 49 (12.4%) and 345 (87.6%) respectively.

Seven hundred and twenty nine students (82.56%) watched television. Daily time spent in front of the television (Mean \pm SD for all participants) was 2.50 ± 1.44 hours.

Table 1

Social and demographic characteristics of the adolescents with regard to smoking status.

Characteristics		smoking status			p value
		yes n (%)	no n (%)	total* n (%)	
age	≤15	43 (10.2)	377 (89.8)	420 (100)	<0.001
	>15	125 (33.2)	252 (66.8)	377 (100)	
sex	female	76 (17.4)	361 (82.6)	437 (100)	0.007
	male	92 (25.3)	272 (74.7)	364 (100)	
family type	small (<5 members)	29 (22.7)	99 (77.3)	128 (100)	0.723
	large (>5 members)	136 (21.0)	519 (79.0)	647 (100)	
parent separation	separated	7 (15.2)	39 (84.8)	46 (100)	0.455
	not separated	158 (21.4)	581 (78.6)	739 (100)	
living conditions	with parents	138 (20.0)	553 (80.0)	691 (100)	0.086
	other	27 (27.6)	71 (71.4)	98 (100)	
socioeconomic status	1 (high)	8 (9.9)	73 (90.1)	81 (100)	0.017
	2 (medium)	47 (19.5)	194 (80.5)	241 (100)	
	3 (low)	101 (23.0)	338 (77.0)	439 (100)	
	4 (very low)	10 (33.3)	20 (66.7)	30 (100)	
number of siblings	0 or 1	14 (17.9)	64 (82.1)	78 (100)	0.033
	2	84 (18.5)	371 (81.5)	455 (100)	
	3	68 (26.5)	189 (73.5)	257 (100)	

* Sum of numbers differ owing to the response rates.

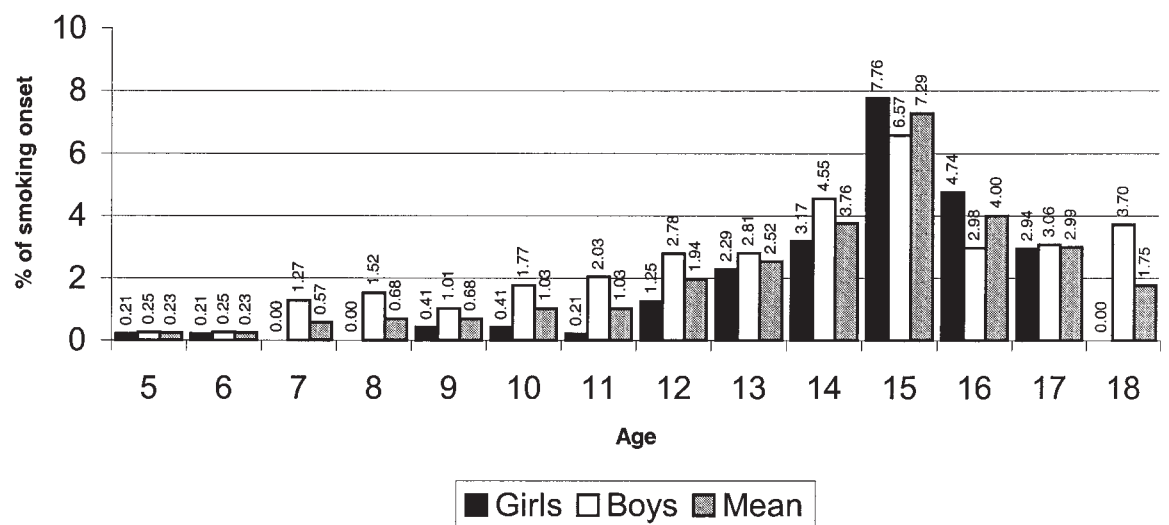
Table 2

Nutritional behaviour of the adolescents with regard to smoking status.

	adolescents smoking status			p value
	smokers	non-smokers	total	
Vegetable consumption (meal/week)	3.56 ± 2.93 (n = 146)	3.95 ± 2.60 (n = 552)	3.87 ± 2.68 (n = 698)	0.118
Fruit consumption (meal/week)	1.85 ± 0.75 (n = 156)	1.83 ± 0.73 (n = 591)	1.84 ± 0.73 (n = 747)	0.742
Meat consumption (meal/week)	2.95 ± 1.74 (n = 148)	3.23 ± 2.10 (n = 554)	3.17 ± 2.03 (n = 702)	0.146
Fast food consumption (meal/week)	3.71 ± 2.89 (n = 123)	3.15 ± 2.69 (n = 462)	3.27 ± 2.74 (n = 585)	0.045
Breakfast	n (%)	n (%)	n (%)	0.015
Yes	107 (18.4)	475 (81.6)	582 (100)	
no	24 (30.8)	54 (69.2)	78 (100)	

Figure 1

Age-specific smoking onset percentages.



Self-esteem scores in the smoking and non-smoking group (mean ± SD) were 1.65 ± 1.18 (n = 166) and 1.66 ± 1.27 (n = 618) respectively.

While fast food consumption was higher among smokers, vegetable, fruit and meat consumption, as well as having breakfast rates were

lower. The nutritional behaviour of the adolescents according to smoking status is shown in table 2.

A logistic model was used to evaluate the relative risk of the following factors: age, sex, socioeconomic status, daily studying time, grade status

Table 3

Factors associated with smoking. Variables included in the model: age, sex, socioeconomic status, daily studying time, grade status in last report card, living with family, nutritional behaviour (consumption of vegetable, fruit, meat and fast food; breakfasting), mother's and father's smoking status, time spent watching television, number of siblings, family type, separation of parents and self esteem. Sex, family type, separation of parents, parental smoking status, having breakfast and living conditions (with family vs other) have been used as categorical variables. Other variables have been entered as continuous variables.

variable	B	p	odd's ratio	95% CI
mother smoking	0.7366	0.0498	2.0889	1.0005 to 4.3613
older age	0.5394	0.0001	1.7150	1.3699 to 2.1471
higher number of siblings	0.3228	0.0391	1.3810	1.0162 to 1.8767
increasing fast food consumption	0.1415	0.0412	1.1520	1.0057 to 1.3195
increasing vegetable consumption	-0.1969	0.0334	0.8213	0.6851 to 0.9846
higher scores in last report card	-0.2145	0.0274	0.8069	0.6669 to 0.9763
more time reserved for homework	-0.3115	0.0071	0.7324	0.5837 to 0.9189
eating breakfast	-1.0666	0.0202	0.3442	0.1399 to 0.8465

in last report card, living with family, nutritional behaviour (consumption of vegetable, fruit, meat, fast food, breakfasting), mother's and father's smoking status, television watching time, number of siblings, family type, separation of parents and self esteem. The power of this model in estimating non-smokers and smokers was calculated as

96.45% and 24.62% respectively. Poor school performance, lower studying time, higher age, lower consumption of vegetables, higher consumption of fast food, irregular breakfasting, smoking of mother and increasing number of siblings were factors associated with smoking (table 3).

Discussion

Factors such as family, culture and socioeconomic status are shown to affect the behaviour of adolescents [9, 10]. The same factors can also be expected to affect smoking in adolescents in developing countries. The determination of the strength and importance of these factors will help in the struggle against smoking. This study describes the current state of smoking among adolescents in a Turkish population and evaluates the contribution of possible factors to smoking.

A wide range of smoking prevalence has been reported in the literature, ranging from 8 to 56% according to different studies [9, 11–13]. This wide range can be attributed to the definition of smoking. Our results are at the high end of the reported data but we should emphasise that in our study only a third of the smokers were active smokers.

Smoking rate is higher in male than female adolescents. This is a common finding in the literature partially attributable to the higher self-esteem of males [14, 15]. Smoking rates are higher in late adolescents. According to our study, increasing age almost doubles the smoking rate. Our results demonstrate a gradual increase in smoking onset with age reaching a peak at 15 years of age and declining thereafter. Hence, special attention should be given to those around 15 years of age. In Turkey, 15 is the age of graduation from middle school to high school. This may be another reason for smoking i.e. in order to prove one's maturity. Lectures and programmes on the harmful effects of smoking will probably be most effective if provided during the 8th or 9th school year before the transition from middle to high school.

ETS is another important issue. CDC has reported the exposure to ETS at home for adolescents and children as 5% in USA [16]. According to the youth tobacco surveillance study, approximately 70% of middle school and 57% of high school students who currently smoke cigarettes live in a home where someone smokes cigarettes [17]. In our study, almost half of the non-smoking adolescents are exposed in some way to tobacco smoke. On the other hand, among the items included in the logistic regression model, maternal smoking was the strongest factor affecting smoking in adolescents, with an odds ratio of 2.1. Although fathers smoke more than mothers, it seems that maternal smoking is more important in determining the behaviour of the adolescent. The very high prevalence of paternal smoking can be assumed to be the reason for this result in the logistic regression analysis. Whatever the current smoking prevalence among adolescents, the high exposure rate to environmental tobacco smoke and the relationship between maternal smoking status and smoking prevalence of adolescents should alert governmental and non-governmental organisations as well as for physicians to the need to take precautions and develop programmes aimed at overcoming smoking addiction.

The affect of socioeconomic status on smoking may change among populations [2, 9, 18]. We found no relationship between socioeconomic status and smoking in this study. This can be interpreted as a reflection of sociocultural differences. Studies specifically designed to further investigate this issue among adolescents are necessary.

Self-esteem is an important factor in the behaviour of adolescents. It is widely accepted that individuals with higher self-esteem have better physical health and are more successful students [19–22]. Although higher smoking rates among individuals with lower self-esteem have been demonstrated in some studies [15, 23–25], there are also studies reporting weak evidence for this finding [14, 26]. According to our study, self-esteem in a logistic regression model was not significantly affecting smoking.

Higher vegetable and fruit consumption and eating regular breakfasts have been shown to be associated with non-smoking, whereas eating fast food, meat and fat consumption have been demonstrated to be higher among smokers [9, 18, 27]. However, in our study, only high vegetable and high fast food consumption was associated with smoking.

Less daily studying time and consequently lower grades in the last report card increased the risk of smoking 1.4 and 1.2 folds respectively. According to Hu and Keeler [28], student's school performance is a key factor in predicting smoking and cessation attempts. Schulenberg et al. found a similar result [29]. Even low grade point averages during elementary school years, before the onset of smoking, were found to be significantly associated with smoking at high school [30]. Developing academic or remedial classes designed to improve students' school performance may lead to a reduction in smoking rates among adolescents while at the same time providing a human capital investment in their future.

Prevention projects with mass media programming have been proven to be of value in the primary prevention of smoking in adolescents [31]. Although we found no significant relationship between television viewing and smoking, television programmes are still an important tool in the struggle against tobacco use because the most common extracurricular activities of adolescents are watching television, reading, listening to music and watching or playing sports [32]. Concomitant with the increasing trend towards computer usage in this era we also suggest using the computer medium for anti-smoking campaigns. Inclusion of anti tobacco information and slogans as video clips into educational and game programmes or incorporation on compact discs and other information

technology products seems a reasonable initial step.

Potential limitations of this study are the reliability of the answers given to the questions, further probable parameters not yet included in the model and being a single centre study as opposed to a multicenter study.

Future studies should use further refined models in order to identify other potential factors involved in the commitment to smoking and control for more confounding factors among adolescents with increased sensitivity and specificity.

Conclusion

The transition from early to late adolescence is critical in the commencement of smoking. Among previously established factors such as age [5], parental smoking [9], school success [30] and lower self-esteem [14], nutritional behaviour factors and number of siblings are found to be important factors in smoking. According to our study, smoking prevalence increases with low vegetable consumption and high fast food consumption as well as with increasing number of siblings. The proposed model has a high sensitivity in predicting non-smokers.

The high prevalence of exposure to and the association of tobacco smoking among adolescents and their environment reveals the need for the development of educational programmes against tobacco use, which take the familial, social and school environments into account. Nutritional education should be included in these programmes. Public health campaigns should take into account the influence of parental behaviour on children's behaviour and the association of limited education with adverse lifestyles. The understanding and support of policy makers should be obtained from the start and special attention should be given to those young people at the transition age from early to late adolescence.

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