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ORIGINAL ARTICLE

Tobacco use among institutionalized adolescents in Turkey: does social environment affect the risk?

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Abstract
Objectives The study aimed to estimate smoking prevalence and associated risk factors among Turkish adolescents residing in orphanages and to investigate whether "institutionalization" (i.e., factors leading to institutionalization and/or those present in the institutional environment) makes adolescents more prone "to try" and/or "continue" smoking.
Methods An institution-based survey was conducted in all orphanages in Turkey and included 6,220 adolescents. Effects of institutionalization on smoking were further evaluated based on comparisons with external data obtained from an earlier survey of non-institutionalized Turkish students.
Results Of the participants: 57% had ever smoked cigarettes; 29.3% were current cigarette smokers; and exposure to secondhand smoke (SHS) was above 80.0%. Compared to non-institutionalized adolescents, institutionalized adolescents seem to be more prone to start and continue smoking; have higher access to tobacco; know less about the health hazards of smoking; and have higher prevalence of addiction, especially among girls.
Conclusions Smoking prevalence among institutionalized adolescents is quite high; they have an environment favoring smoking and the gender gap in smoking rates is closing. An effective tobacco-control program based on evidence, tailored to the specific needs, and combined with a motivating environment is required to decrease tobacco consumption among institutionalized youngsters.

Keywords Tobacco use · Institutionalized adolescents · GYTS

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Introduction

Tobacco use is a contemporary pandemic threatening public health worldwide. Projections based on current smoking rates in the world suggest an increase in associated deaths from five million per year to approximately eight million per year by 2020, whilst, the increase in smoking among young girls compared with adult females, high susceptibility of smoking among never smokers, high levels of exposure to secondhand smoke (SHS), and pro-tobacco indirect advertising might cause even higher mortality in future years, if significant interventions cannot be ensured in time (Warren et al. 2008; WHO Report 2008).

Worldwide, more countries need to develop, implement, and evaluate their tobacco-control programs to address the use of any type of tobacco products, especially among youngsters and girls (WHO Report 2008; Warren et al. 2006; Mortal Wkly Rep 2006; Peto and Lopez 2001). A study based on self-reported cigarette and other tobacco product use by adolescents during 1999–2005 indicated that it is a major public health problem in all six WHO regions and nearly two of every ten students reported

current use of a tobacco product (Warren et al. 2006). Tobacco-related preventive efforts, particularly those at early ages in life, would be of vital impact in preventing exposure to tobacco or (at least) minimizing tobacco-related health hazards.

The Global Youth Tobacco Survey (GYTS), initiated in 1999 by the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC) (2006), and the Canadian Public Health Association, is a school-based survey. It provides a standardized methodology and enables regional, national, and international comparisons. In-depth analysis of regional and national differences in tobacco use would be beneficial to investigate the general features of the epidemiology of smoking and factors affecting its initiation and development of smoking habit (Simsek et al. 2008).

In European region, GYT Surveys have been conducted among students aged 13–15 years old in Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Former Yugoslavian Republic of Macedonia, Montenegro, Republic of Moldova, Romania, Serbia, and Greece. The results indicated that current cigarette smoking rates among students range from 5.6 to 33.1%, with current use of tobacco products other than cigarettes ranging from 3.6 to 10.2% (Stojiljkovic et al. 2008; Kyrlesi et al. 2007).

Prevalence rates of smoking among youngsters are of special importance because Turkey is not only a tobacco producing country but is one of the top ten countries with the highest smoking rates in the World (WHO Report 2008). The GYTS was conducted in Turkey 2003 and indicated that 10.9% (9.8–12.0%) of adolescent students were current cigarette smokers, with significantly higher rates in boys than in girls (Erguder et al. 2006, 2008). Findings point at peer smoking as the strongest risk factor for adolescents' smoking intentions (Turner et al. 2004; Niknami et al. 2008; Paek 2008) and that exposure to smoking parent, teacher, and/or peer; cigarette promotions; and perceived ease of access to cigarettes are significant predictors of being susceptible to smoking and Turkish youths who attribute positive traits to smokers are more prone to start/continue smoking (Ertas 2007).

Institutionalized children live in closed environments, away from their families, many have single or no living parents, have lower socioeconomic status than their non-institutionalized counterparts and spend most of their time with their peers. A recent national cross-sectional study on emotional and behavioral problems in adolescents reared in orphanages found that the prevalence of problem behaviors was about 2-to-5 times more compared to that in the national sample of adolescents and was significantly associated with tobacco and alcohol use (GTSS group 2005; ESTC 2007). Comparison of institutionalized children with non-institutionalized peers in terms of smoking habits and associated risk factors has not been achieved yet.

Investigation of risk factors for smoking in students at orphanages would assist with planning and implementation of effective tobacco-control interventions at these settings to protect this vulnerable group of children from long-term health hazards of smoking. With this aim, in 2005, an institution-based survey was conducted in Turkey.

Methods

The objectives of the 2005 Global Youth Tobacco Survey of children residing in Institutions of the General Directorate of Social Services and Child Protection Agency (SSCPA), Turkey, are to determine the prevalence of smoking among Turkish adolescents residing in orphanages of SSCPA; to examine their knowledge about and exposure to tobacco; and, to investigate presence and effects of potential risk factors for smoking. The study also aimed to portray how "social environment" (institutionalization) and the underlying characteristics affect smoking-related behavior. In order to explore whether institutionalization makes adolescents more prone "to try" and/or "continue" smoking, prevalence of smoking and potential risk factors in institutionalized students were compared and contrasted with rates obtained from an "external control group", namely non-institutionalized Turkish students, attending grades 7th (elementary), 8th (elementary), and 9th (high school) grades in year 2003. Comparative interpretations with this "external control group" aimed to investigate whether "institutionalization" (portraying a special social environment with all its components such as, a closed living environment, separated families/siblings, low socioeconomic status, social and mental problems) could have any undesirable effects on smoking habits among youngsters.

Sample and sampling

The study aimed to reach all institutionalized students recorded in the qualifying forms of the all institutions of the SSCPA, attending 7th (elementary), 8th (elementary) or 9th (high school first year) classes—78.4% was aged 12–17 years in 2005. The institutional response rate was 100% ($n = 69$) and total of 6,220 of the 7,941 students (59% were boys) enrolled in SSCPA Institutions agreed to participate in the study and completed usable questionnaires. The majority of these missing students was those qualified in the institutional records but not actually continuing the school; those temporarily away from the institutions to spend some time with their parents/families; those working part-time outside the institutions and were absent on the

day of the interview; or those on sick leave. The percentage of students who were present in the institution on the day of the interview and did not agree to participate in the study or did not complete the questionnaire was not more than 5% at any institution.

Data collection tool and procedures

The Substance Dependence Section of Mental Health Department of Primary Health Care General Directorate of the Turkish Ministry of Health (MoH) coordinated the survey. Data were collected in institution-settings from March through July 2005, using an anonymous, self-reported, standardized questionnaire of 90 questions that were developed for the WHO-European Region, translated to Turkish, and ensured for its linguistic property. The same questionnaire had been used in 2003 for GYTS-Turkey (Erguder et al. 2006).

Data collection procedure was standardized by a central training of provincial MoH staff selected from outside the institutions study accomplished. Written guidelines to all of them and supervision visits were provided during data collection phase. No local staff of institutions was present in classes during data collection to maximize the validity of the students' responses to the questions.

Ethical issues

Prior to data collection, permission was obtained from the SSCPA, individual institutions and from each student, based on informed consent. All students approached for the study was first informed about the study; participation in the study was voluntary and anonymous. No compensation was offered to the participants but following completion of the survey in each institution, a training conference was provided on health hazards of smoking, healthy life style and ways to quit smoking.

No personal identifiers were requested and data were not shared with anybody other than the core study group; all analyses were completed solely for scientific purposes. Results of the study were shared with the MoH and SSCPA in aggregate tables to guide future training and interventional efforts.

Analysis

Upon completing data collection, all data were scanned and data files were compiled at the Mental Health Department of Primary Health Care Directorate, MoH. Statistical analyses were completed using Epi Info 2002 statistical software package. In order to reduce the potential selection and information biases, by compensating for differing patterns of non-response and to get robust estimates for prevalence rates and standard errors, all statistical analyses were based on weighted analytic techniques. The weights used for estimations included an adjustment factor for a student-level non-response, calculated by relevant class and institution. With the overall response rate of 78.3% and the assumption that non-response is not associated with smoking status and/or related risk factors, the weighted results can be used to make inferences concerning tobacco use risk behaviors of institutionalized children attending 7th, 8th, and 9th grades.

Statistical analyses included frequency and percent distributions and calculation of prevalence rates, with 95% confidence intervals (CI). Statistical differences between group prevalence rates were determined comparing the range of 95% CI for the estimates: the differences were considered as statistically significant if the CIs did not overlap. It is of note for the reader that in the discussion section, comparisons with an external control group (i.e., the GYTS-Turkey 2003 cohort) were conducted by comparing the prevalence rates for institutionalized students from the tables in the results section and giving the corresponding values of the non-institutionalized counterparts in parentheses. The absence of an overlapping in 95% confidence intervals of the two cohorts for a particular point estimate can be used as an indicator of statistical significance at $\alpha = 0.005$. Given that smoking and related risk factors are known to be associated with gender, all analyses were stratified on gender. The absence of an overlapping in 95% confidence intervals for a particular point estimate can be used as an indicator of statistical significance by gender.

Terminology

In the paper, "ever smokers" means those who experienced any tobacco product at least one or two puffs any time in life, whereas, "current smokers" are those who used any form of tobacco (for at least one day) over the 30 days preceding the survey date. All questions and response categories are the same as in all other GYTS studies conducted worldwide (Warren et al. 2008; Erguder et al. 2006) and can be provided from the authors on requested.

Results

Prevalence

Among 6,220 institutionalized adolescents attending school, more than half had reportedly ever smoked cigarettes (58.9% of boys and 49.7 of girls) (Table 1). Almost one-third of "ever smokers" had reportedly initiated smoking before age 10 (25.8% of boys and 26.3% of girls).

Table 1 Frequency and characteristics of smoking experience of institutionalized adolescents by gender, Turkey, 2005

	Ever smoked (even 1 or 2 puffs lifetime)		Current Smoker (those smoked at least 1 day over the past 30 days)[a]				Students who smoked any tobacco product daily over the past 30 days (%)
	Percent	Ever smokers who first smoked <10 years old (%)	Smoked cigarette (%)	Smoked tobacco products other than cigarette (%)	Smoked any form of tobacco (%)	Usually smoke on school premises in school hours (%)	
Boys	58.9 (58.0–59.7)¶	25.8 (24.8–26.8)¶	29.5 (28.7–30.3)¶	14.3 (13.7–14.9)¶	32.2 (31.4–33.0)¶	11.5 (10.4–12.8)	14.8 (14.3–15.4)¶
Girls	49.7 (48.7–50.7)	26.3 (24.9–27.7)	23.7 (22.8–24.6)	7.6 (7.0–8.1) 14.2	24.8 (23.9–25.7)	9.1 (7.7–10.7)	12.9 (12.2–13.7)
Total	56.6 (56.0–57.2)	28.0 (27.2–28.8)	29.3 (28.7–29.9)	(13.8–14.7)	32.2 (31.6–32.7)	11.3 (10.4–12.2)	15.9 (15.4–16.3)

Students may use more than one tobacco product

[a] 95% confidence intervals are given in parentheses

¶ Rates in males and females are statistically significant

More than one-third of the students reported themselves as "current smokers", with higher rates among boys (32.2% versus 24.8% in girls) (Table 1). Of the current tobacco users, the majority was smoking cigarettes. Current cigarette smoking prevalence rates were 29.5 and 23.7% in boys and girls, respectively. Current smoking of any tobacco products other than cigarettes was also common and reported by 14.3% of boys and 7.6% of girls.

Among institutionalized adolescents, 15.9% reported themselves as "current daily" smokers, i.e., they smoked any tobacco product in all 30 days of the past month. As expected, the majority of daily smokers used to smoke cigarettes. Of current smokers, about half was "daily" smokers. Of all institutionalized students, 13.5% reported that they smoked cigarettes in all 30 days of the past month: this rate was significantly higher among boys [(13.3%) (12.8–13.9)] than in girls [11.0% (10.4–11.7)]. It was noteworthy, that 11.3% of all students reported that they usually smoke on school premises (despite banned) during school hours. Among current smokers, "a feel of having a cigarette as the first thing in the morning", used in the study as a surrogate measure for addictive behavior, seemed to be higher among girls (45.8%) than among boys (25.2%) (Table 1).

Of the several factors that might motivate adolescents to try, initiate and/or continue smoking, it is noteworthy that a fair number of adolescents consider smoking as a means of socialization (such as, having more friends, appearing more attractive and/or providing more comfort in involving in social gatherings). Such believes were more common in boys than in girls (Table 2).

Besides high prevalence rates of current smoking, proportion of "never smokers" who were "susceptible" to starting smoking was also quite high. Thirteen percent of never smokers (11.8% of boys and 11.2% of girls) mentioned "a wish" to initiate smoking in the next year (Table 3).

Accessibility

The Law on "Prevention of Hazards of Tobacco Products (Law No: 4207)" introduced to Turkey some prohibitions and associated penalties/fines in 1996 to protect children from tobacco use. Accordingly, children below 18 years old cannot be sold any tobacco product, nor can be hired to work in businesses related to tobacco producing, marketing or sales; and no tobacco products can be sold in any training and educational setting or places for cultural and social services (Law No: 4207). Despite all these bans to minimize accessibility of adolescents to smoking, their accessibility was quite high among institutionalized adolescents: reportedly, 56.5% bought their cigarettes from stores, 80.5% of whom bought cigarettes from a store over

Table 2 Percentages of the reasons that may motivate institutionalized adolescents to experience smoking, Turkey, 2005

	Smoking peers have more friends[a]	Smoking peers are more attractive[a]	Smoking helps feeling more comfortable at social gatherings	
			Never smokers	Current smokers
Boys	30.3 (29.5–31.1)¶	29.7 (28.9–30.6)¶	18.0 (16.9–19.0)¶	24.4 (23.0–25.8)
Girls	23.5 (22.6–24.4)	18.5 (17.7–19.3)	11.6 (10.7–12.6)	26.4 (24.5–28.5)
Total			16.1 (15.4–16.8)	25.7 (24.7–26.8)

Prevalence rates and 95% confidence intervals (in parentheses) are presented

[a] Boys answered this question for smoking boys, whereas, girls answered this question for smoking girls

¶ Rates in males and females are statistically significant

Table 3 Percent distribution of institutionalized adolescents accessibility to tobacco products and potential for initiation or addiction, Turkey, 2005

	Current smokers who buy cigarettes from a store	Current smokers who bought cigarettes in the past 30 days and not refused when approached for buying cigarettes	Current smokers who borrow their own cigarettes from someone else	Current smokers who steal their cigarettes	Current cigarette smokers who feel like having a cigarette/chew first thing in the morning	Never smokers likely to initiate smoking within a year
Boys	64.4. (62.7–66.1)	78.2 (75.9–80.2)	11.0 (9.9–12.2)	0.6 (0.4–0.9)	25.2 (23.4–27.0)¶	11.8 (10.9–12.7)
Girls	58.0 (55.4–60.5)¶	86.7 (83.9–89.1)	12.5 (10.9–14.2)	3.7 (2.8–4.9)	45.8 (43.0–48.6)	11.2 (10.2–12.2)
Total	56.5 (55.2–57.8)	80.5 (78.9–82.1)	11.7 (10.9–12.5)	3.1 (2.7–3.6)	32.8 (31.4–34.3)	13.4 (12.8–14.1)

Prevalences and 95% confidence intervals (in parentheses) are presented in the table

¶ Rates in males and females are statistically significant

the past 30 days with no refuse by the owner of the store because of their age. Such refusal rates were significantly lower among girls (13.3%) compared to boys (21.8%). The proportion of current smokers who borrow (11.7%) and even steal (3.1%) cigarettes from others was of remarkable size (Table 3).

Media and advertising

Importance of oral and written media on students' learning about smoking was investigated asking eight questions on whether they had seen any advertisement for or against smoking. Despite the national regulations against smoking-related advertising in Turkey, more than half of the students reported that they had seen at least one cigarette brand name over the past month, while watching TV. Television was the most commonly reported media where students saw "any" message related to smoking. In decreasing frequency order, billboards and written media were reported as the main sources of information regarding smoking. Although prevalence rates of seeing anti-smoking messages were slightly higher than rates of seeing pro-smoking messages, the pro-smoking messages were frequent. Over the month preceding the survey, the percentage of students seeing anti-smoking messages on billboards was 54.2% versus 40.9% of students who reportedly had seen pro-cigarette ads on billboards. It is noteworthy, that nearly one out of five institutionalized students was offered a free cigarette by a tobacco company representative and a similar proportion of them had an object with a cigarette brand logo on it (Table 4).

The proportion of adolescents who had seen "any" anti-smoking media messages in the month preceding the survey was similar in boys and girls (both being over 98%), whereas, 36.9 and 54.0% of them reportedly had seen pro-cigarette ads on written media and had seen any cigarette brand name when watching TV, respectively (Tables 4, 5).

Cessation

The tobacco survey also aimed to investigate the likelihood of success of cessation activities in this special group of adolescents. Sixty-six percent of current smokers (67.1% of boys and 50.1% of girls) (Table 6) reported a wish to stop smoking. Of the smokers, 78.7 had ever received any help/advice to stop smoking and 74.3% had reportedly tried to stop smoking during the past year. Prevalence rates for attempts to stop smoking and for seeking professional help with ceasing smoking were similar in boys and girls (Table 6).

The survey aimed to investigate whether the students learned about the hazardous effects of smoking in school

Table 4 Percent distribution of environmental factors favoring tobacco smoking among institutionalized adolescents, Turkey, 2005

	Saw a lot of pro-cigarette ads on billboards in the past month	Saw a lot of pro-cigarette ads in newspapers or magazines in the past month	Who saw any cigarette brand names when watching TV	Have been offered "free" cigarettes by a tobacco company representative	Have an object with a cigarette or tobacco logo on it
Boys	41.7 (40.8–42.6)¶	37.5 (36.6–38.4)¶	54.4 (53.4–55.3)¶	22.6 (21.8–23.4)¶	23.9 (23.1–24.7)¶
Girls	37.6 (36.5–38.6)	31.7 (30.7–32.7)	49.1 (48.0–50.2)	10.3 (9.6–11.0)	9.9 (9.2–10.5)
Total	40.9 (40.3–41.6)	36.9 (36.3–37.5)	54.0 (53.3–54.6)	19.3 (18.8–19.8)	19.4 (18.9–19.9)

Prevalences and 95% confidence intervals (in parentheses) are presented in the table

¶ Rates in males and females are statistically significant

Table 5 Percent distribution of environmental factors against tobacco smoking among institutionalized adolescents, Turkey, 2005

	Saw anti-smoking media messages in the past month	Saw a lot of anti-cigarette ads on billboards in the past month	Saw a lot of anti-cigarette ads in newspapers or magazines in the past month	Who saw any anti-smoking media messages on TV
Boys	98.5 (98.3–98.7)	54.4 (53.6–55.3)¶	48.4 (47.6–49.3)	60.9 (59.9–61.8)¶
Girls	98.6 (98.3–98.8)	51.0 (49.9–52.0)	48.0 (46.9–49.0)	55.5 (54.4–56.7)
Total	98.4 (98.3–98.6)	54.2 (53.6–54.9)	48.6 (48.0–49.2)	59.0 (58.3–59.7)

Prevalences and 95% confidence intervals (in parentheses) are presented in the table

¶ Rates in males and females are statistically significant

Table 6 Percent distribution of various measures for readiness to stop smoking among current institutionalized adolescents smokers, Turkey, 2005

	Those of current smokers who want to stop smoking	Current smokers who received any help/advice from "anybody" to cease smoking	Current smokers who tried to stop smoking in the past year
Boys	67.1 (65.2–69.0)	79.6 (78.2–81.0)	77.2 (75.5–78.7)
Girls	50.1 (47.2–53.0)	75.0 (72.8–77.2)	75.4 (72.8–77.8)
Total	59.7 (58.2–61.2)	78.7 (77.6–79.8)	74.3 (72.9–75.5)

Prevalences and 95% confidence intervals (in parentheses) are presented in the table

Table 7 Percent distribution of institutionalized adolescents exposure to anti-smoking messages in school, Turkey, 2005

	Percent taught dangers of smoking/chewing tobacco	Percent discussed reasons why people their age smoke/chew tobacco	Percent taught about the effects of smoking/chewing tobacco
Boys	64.2 (63.3–65.0)	35.6 (34.7–36.4)	53.4 (52.5–54.2)
Girls	64.3 (63.3–65.3)	30.6 (29.6–31.5)	54.5 (53.4–55.5)
Total	61.6 (61.0–62.2)	34.9 (34.3–35.5)	52.3 (51.7–52.9)

Prevalences and 95% confidence intervals (in parentheses) are presented in the table

curricula and if so, what they had learned. Regardless of gender, 61.6% had been taught in class, during the past year, about the dangers of smoking, and 52.3% reported that they had been taught in class about the effects of tobacco use. About 35% of adolescents had discussed in class, during the past year, the reasons why people their age smoke (Table 7).

Exposure to secondhand smoke (SHS)

Prevalence of self-reported exposure to passive smoking in both residential and nonresidential areas was quite common: 81.7% of the students lived in places where others did smoke in their presence and 84.3% were exposed to tobacco smoke in nonresidential areas. One out of five

adolescents reported that almost all of their friends were smoking: these rates were 23.1% in boys and 17.0% in girls, respectively (Table 8).

About 65% of the students considered "exposure to smoke from others is harmful to them". In general, 81.9% of adolescents believed that "smoking should be banned in public places": the proportion of adolescents with such thoughts was statistically significantly higher among "never" smokers (91.4%), compared to "current" smokers (63.8%) (Table 8).

Discussion

Tobacco use is common throughout the world and no single country or population is immune to its health hazards. Thus, tobacco-related research is of interest to many professionals extending from health professionals, public health workers, academicians, to policy makers and economists. Studies on high-risk groups (such as adolescents, institutionalized individuals, imprisons, specific professional groups, etc.) are of particular interest for anti-tobacco interventions, given that: (1) prevalence of smoking is high in these groups and (2) reasons for smoking, status of access/availability, motivating/aggregating factors, thus, related preventive and/or cessation activities could be different in this group than those in "low" risk groups.

Youngsters are a well-known high-risk group for smoking and need priority attention in anti-tobacco activities: young individuals are inclined to act like their role models; are curious to try new "tastes"; are less concerned about long-term health hazards of smoking and deal more with short-term benefits (including "adult-like looks"); are bodily more prone to tobacco-related health hazards on pulmonary and circulatory system compared to adults; and, have a longer life span that will be affected by tobacco products. Moreover, tobacco companies should find a new consumer for each "adult" who quits smoking. Given that youngsters are very "stubborn" to change their behavioral patterns, it is usually easier to avoid initiation of smoking rather than stopping it. Nationwide surveys on use of tobacco and related risk factors have the unique potential to examine prevalence rates and its predictors among youngsters with the ultimate goal of identifying effective interventions for tobacco control in this group.

Investigation of the risk factors for initiation and continuation of smoking among youngsters is very valuable because it may help with planning and implementation of interventions that may "avoid to try", enable "to stay away" and assist with "ceasing" smoking at an age before people get addicted or develop long-lasting complications due to smoking. Despite more attention to research on the

Table 8 Percentages of institutionalized adolescents' experience to passive smoking in non-residential environment and related thoughts, Turkey, 2005

	Exposed to smoke from others at home	Exposed to smoking in public places ("outside home")	Almost all friends are smokers	Smoking should be prohibited in public places	Smoking should be prohibited in public places—never smokers	Smoking should be prohibited in public places—current smokers	Smoke from others is definitely harmful
Boys	79.4 (78.7–80.2)	85.8 (85.2–86.4)	23.1 (22.4–23.9)	82.4 (81.8–83.1)	90.6 (89.8–91.4)	69.8 (68.2–71.3)	61.8 (60.9–62.6)
Girls	84.1 (83.3–84.9)	84.8 (84.1–85.6)	17.0 (16.2–17.8)	83.3 (82.5–84.1)	93.1 (92.3–93.8)	55.5 (53.2–57.8)	75.1 (74.2–76.0)
Total	81.7 (81.2–82.2)	84.3 (83.8–84.7)	21.7 (21.2–22.2)	81.9 (81.4–82.4)	91.4 (90.9–92.0)	63.8 (62.6–65.1)	64.4 (63.8–65.0)

Prevalence rates and 95% confidence intervals (in parentheses) are presented

etiology of smoking, much less is known about factors that predict the initiation of smoking in young ages and/or development of dependence once an adolescent tries smoking. Several factors ranging from intra-personal factors (such as, genetics, demographics, temperament and co-morbidities), to social influences (such as, families and peers), to the more macro (societal/cultural levels of influence, including advertising and tobacco-related policies) could all play a role on this (Erguder et al. 2006).

Institutionalized adolescents might be expected to smoke more than non-institutionalized adolescents due to various factors such as, separation from family members, less parental control, lower socioeconomic status and high peer-effect (due to living in crowded premises with many friends of their own age, most of whom are smoking). Their access to smoking might also be higher than that of their non-institutionalized counterparts. In order to investigate this issue, smoking rates and related factors among institutionalized students (as obtained from this study in 2005) were compared and contrasted to those obtained from the GYTS-Turkey 2003 cohort (Erguder et al. 2006). GYTS-Turkey 2003 cohort was suitable for an external comparison group, given that the age group was similar and both surveys were representative for Turkey. Yet, the 2-year gap between the two studies could have lead to a cohort effect (if any) in smoking-related behaviors. This is an important limitation in study-based inferences on the effects of institutionalization on smoking prevalence. However, it is noteworthy that if such a cohort effect was present this would have led to a bias towards the null in interpreting the potential association between social environment and smoking, given that the continuing anti-smoking campaign in Turkey must have had decreased the rates, if it made any change.

Rates for ever- and current smoking were quite higher among institutionalized adolescents compared to that among their non-institutionalized counterparts [29.3% (95 CI = 27.2–31.4%) for ever smoking and 10.9% (95% CI = 9.8–12.0%) for current smoking, respectively]. Institutionalized adolescents seem to be at higher risk of tobacco-related future health concerns in the sense that the potential for addiction among smokers (i.e., smoking as first thing in the morning) and proportion of never smokers at risk of initiation of smoking in the upcoming year (Table 3) were both significantly higher in this group than in their non-institutionalized counterparts (with rates of 15.9 and 7.7%, respectively). These prevalence rates alone confirmed that institutionalized adolescents should be treated as a "priority" group for smoking-related interventions and should be given special attention in smoking-related prevention activities.

In the study, reporting "a feel like having a cigarette first thing in the morning" was about two times more common among smoking girls than in smoking boys (Table 2). This alarming difference by gender needs to be confirmed in future studies, given that data are based on self-reports and selective recall by gender could not be controlled for in this study.

Proportion of those experiencing smoking before age 10 was lower in institutionalized and non-institutionalized boys [33.1% (95% CI = 30.7–35.5%)]; but higher in institutionalized girls compared to that in their non-institutionalized counterparts [22.3% (95% CI = 18.8–25.8%)]. This suggests that the nation-wide anti-tobacco activities have caused a latency in initiation of smoking, yet, the gap between boys and girls have decreased and institutionalized girls are more likely to start smoking in early ages.

Residential smoking prevalence and/or accessibility to smoking could directly affect both the age for first trial of smoking and the smoking behavior afterwards. Thus, the effects of parental or sibling smoking as role models or on access to smoking could not be reliably examined in the study and would be valuable if investigated in further studies.

When environmental exposure to smoke was investigated, exposure to passive smoking in non-residential premises was quite similar for institutionalized (Table 8) and non-institutionalized adolescents (91.1% of current and 83.8% of never smokers). Passive smoking in residential area was strikingly higher in institutionalized cohort: 64.9% of never smoker students, slightly more prominent in girls [66.9% (95% CI = 65.4–68.5%)] than in boys [60.7% (95% CI = 59.0–62.4%)]. As expected, passive smoking was even higher for current smokers: 76.2% of all current smokers were exposed to smoke at residential setting. Rates were close in girls [73.5% (95% CI = 71.1–75.7%)] and in boys [77.8% (95% CI = 76.2–79.3%)].

The proportion of students who believed that "smoking should be prohibited in public places" was similar in the two cohorts: among never smokers rates were 94 and 91.4% and among current smokers, rates were 64.1 and 63.8% among non-institutionalized (2003) and institutionalized (2005) adolescents, respectively. Similar findings, despite the 2-year lag, could be explained by still high prevalence of smoking in Turkey and that most places where adolescents spend their leisure time are still not smoke free.

As expected, proportion of students who approve prohibition of smoking in public places is less among smokers compared to non-smokers, suggesting that those who wish to smoke in public places ignore others' smoking in such places. On the other hand, it is pleasing to find that about two-thirds of smokers were in favor of a ban for smoking in public places.

It is remarkable that non-institutionalized and institutionalized children who have never tried smoking think differently on hazardous effects of passive smoking: 81.6% of never smokers and 55.3% of current smokers had reported in 2003 GYTS (Peto and Lopez 2001). Yet, in GYTS–SSCPA, these rates were close among never smokers (69.5%: 62.8% of boys and 80.7% of girls) and in current smokers (57.8%: 62.0% of boys and 61.5% of girls). It is likely that the phrase "passive smoking is harmful" might be praised less among current smokers in both groups and even if they believed so, they disagreed with the phrase to rationalize their behavior. On the other hand, significantly low rates for considering passive smoking as harmful among never smokers in the non-institutionalized adolescents group may simply be due to lack of knowledge or their "ignorance" due to high smoking rates in their environment.

When educational interventions against smoking were investigated, prevalence of having a class on effects of tobacco use [41.0% (95% CI = 39.4–42.6%]; dangers of smoking [53.2% (95% CI = 51.5–54.9%)], and "why people their age smoke" [23.5% (95% CI = 22.1–24.9%)] were significantly lower in the GYTS group than in the GYTS–SSCPA group (Table 7). It could be at least partially explained by the fact that teachers in institutions emphasize such issues more, given that institutionalized children are highly prone to develop smoking habits.

It should be noted that there was a 2-year period between the two surveys and a cohort-effect due to differential exposure to anti-smoking messages in media, schools, social events, etc., might also explain the differences in adolescents' exposure to educational/interventional activities. Exposure to anti-smoking messages in media and advertising was also investigated in the GYTS–SSCPA. As expected, percentage of seeing an anti-smoking media message on TV (59.0 vs. 57.8%), on billboards (54.2 vs. 43.0%), and in newspapers or magazines (48.6 vs. 44.1%) were higher in the GYTS–SSCPA group compared to the earlier GYTS in non-institutionalized children, strengthening the proposal of such a cohort-effect.

Proportion of adolescents having an object with a cigarette brand logo and of those offered free cigarettes by a tobacco company representative were significantly higher in the institutionalized cohort compared to their non-institutionalized counterparts. This finding is controversial with an expectation of finding lower prevalence of such promotional activities in a later cohort in a country that actively fight with smoking. This finding, however, might suggest that tobacco companies consider institutionalized adolescents as a high-risk group for smoking and exert more promotional activities in this group. This finding is critical in planning future anti-smoking interventions for institutionalized adolescents.

It is remarkable that almost similar proportion of current smoker institutionalized [59.7% (95% CI = 58.2–61.2%)] and non-institutionalized [62.8% (95% CI = 59.0–66.6%)] adolescents wanted to stop smoking, whereas, proportion of those who attempted quitting smoking in the last year and those getting any professional help with stopping smoking at any time in their lives were significantly lower in the non-institutionalized cohort [63.0% (95% CI = 60.0–66.0%)] than in the institutionalized cohort [71.5% (95% CI = 67.0–75.5%)]. Such a difference in rates in the two cohorts could at least partially be explained by special attendance of health care administrators and professionals to institutionalized adolescents to urge and expedite anti-smoking activities in this group. Such efforts should definitely be motivated and continued.

Quite many adolescents mentioned in the study group that they got help from others in obtaining cigarettes or some even borrowed their cigarettes from older persons. Families, teachers, and health professionals should all take responsibility to be good role models for children and adolescents and to make sure that accessibility of adolescents to tobacco products is restricted.

Many adolescents believe that smoking makes girls/boys "look more attractive" and that "smokers have more friends than non-smokers". Sixteen percent of never smokers and 25.7% of current smokers reported that "smoking cigarettes helps people feel more comfortable at celebrations, parties, and social gatherings". This finding is parallel with results from earlier GYTS studies in neighboring countries (Stojiljkovic et al. 2008; Kyrlesi et al. 2007; Nikolaishvili and Gambkrelidze 2002; GYTS Slovakia Collaborative Group 2003; Juricic 2009; Baska et al. 2006) and Turkey (Erguder et al. 2006): adolescents often concentrate on short-term "benefits" of smoking, neglecting its harmful effects. Smoking is considered by the youth as a social activity; a way of contact with peers; a habit, which facilitates having friends and/or looking attractive; and, smoking is regarded as a potential tool to hide "low" self-confidence in social gatherings. Thus, smoking control programs should consider the psychological and social aspects of smoking and should underscore assertive behavior and alternatives for smoking, providing non-smoking environments for youngsters.

A remarking finding of the study is that no matter and how much institutionalization affects the smoking behavior of adolescents, there is a gender-specific issues to be considered thoroughly in planning interventional programs for this special group of adolescents. Despite the fact that both males and females initiate smoking at similar ages, males seem more likely than females to smoke (ever or current), be attentive to media messages regarding smoking (both pro- and anti-messages) and to have exposure to tobacco promotions (e.g., have an object with a tobacco company

logo on it), and to consider smoking as a way of socializing, "making people attractive" or "helping with having more friends". This might be explained by the fact that the social environment around males could favor smoking behavior more or their accessibility to tobacco products could be higher (either because smoking is socially more acceptable or tobacco companies target them more in their advertising and promotional activities). On the other hand, females are more prone to continue smoking once they start, get addicted more, and risk factors for smoking behavior are more obscure to tailor interventional efforts effectively.

In summary, similar to the GYTS-Turkey 2003 cohort, this study confirms that smoking rates are alarmingly high among adolescents. Despite the cross-sectional nature of this study, use of an external comparison group of Turkish non-institutionalized adolescents attending school, enables to interpret the magnitude of smoking prevalence rates among institutionalized adolescents and assists with generating some hypotheses on why "institutionalized adolescents" are more likely than their non-institutionalized counterparts to initiate and/or continue smoking. Compared to their non-institutionalized counterparts, institutionalized adolescents have higher smoking rates, gender gap is closing; potential for addiction seems to be higher in girls; and, adolescents become more reluctant to passive smoking as the number of smoking peers around them increases. One or more of the components of the "social environment" they live in could be a predictor for this difference and further comparative quantitative and qualitative studies on this difference are clearly warranted.

In the meanwhile, school-based and institution-based preventive interventions against smoking seem to be unique opportunities for effective tobacco-control among adolescents. It is important to train both the instructors and administrative staff of the SSCPA and the students on health hazards of active and second-hand smoking, about potential preventive measures, to offer help to them to stop smoking (if they smoke), to ensure that both indoor and outdoor premises of such places are smoke-free, and to provide adequate sports facilities inside/close to such institutions where students spend their leisure time. It is important that all such facilities have social workers and psychological consultants available to students at need to share their stress factors, frustrations, and problems. Such staff could also take active role in tobacco-control activities.

Efficiency of such efforts would be maximized by providing good role models and a motivating (physical and social) environment enabling not to "try smoking" at first place. In light of the findings from this and other tobacco-related prevalence studies, tobacco-use related legislation in Turkey was revised recently (enacted as of January 3, 2008) and has made all indoor public places and workplaces smoke-free, banning all kind of tobacco-related advertising and promotional activities in the country. Tobacco sales to those less than 18 years are banned as well. These enforcement efforts aim to reduce smoking among youngsters in general.

Finally, it would be valuable to repeat this survey a year after the enactment date of the new 100% smoke free law and to study how effectively these general efforts are reflected on institutionalized students and what other measures should be undertaken to protect this vulnerable group from tobacco-related health hazards.

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