

Age of smoking initiation, tobacco habits and risk perception among primary, middle and high school students in Southern Italy

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Abstract

Aim: The aim of this study was to find out at what age children start smoking, as well as their tobacco habits and risk perceptions according to the different school-age groups.

Methods: A cross-sectional survey was carried out in 2007; it involved around 1700 students of the Catania province, in Southern Italy. The students filled in a structured tobacco questionnaire. They did it anonymously in the classrooms. Main outcome measures were initiation of smoking, smoking habits, number of cigarettes smoked per day and risk perception.

Results: From the first year of the primary school to the last year of the high school the proportion of daily smokers increased from 0.0% to 11.8% for girls and from 0.8% to 12.7% for boys. For both genders the initiation of smoking habits occurred mainly at age 10 to 13. Finally, girls had a better risk perception.

Conclusions: Studying young people's tobacco habits over time gives an understanding of when preventive measures have to be implemented. In order to influence smoking attitudes, these preventive interventions must be put in place before children start experimenting tobacco.

Key words: smoking, initiation, habits, risk perception, young people

Background

Smoking among young people is worrying because of the addictive nature of tobacco and of the health risks associated with its use [1]. To study the extent of cigarette smoking in young people is important because it is known that those who start earlier are more at risk of becoming habitual smokers [2-4] and have less chances to succeed in quitting smoking [5]. There is no doubt that tobacco use prevention brings about health benefits; furthermore, health benefits are also gained from postponing the onset of tobacco use [6]. Previous research has shown that usually there is a time lapse of 2 to 3 years between the stage of experimenting tobacco and the development of a tobacco addiction [7]; however, more recent findings suggest that young people may become addicted to tobacco much quicker [8,9]. Data show that in Southern Italy (including islands) there is the highest percentage of male smokers, the lowest percentage of female smokers and the earliest start (before age 14) in boys. Tobacco habits are still too common, particularly among young people aged 14 to 24 (27.5% boys and 12.5% girls) [10,11]. In the short-term, young smokers are more likely to

develop respiratory illnesses and face co-morbidity issues [5]. In the long term, young people who become habitual smokers and continue smoking in adulthood are more likely to develop cancer and cardiovascular diseases [12]. Regarding adolescents' perceptions towards smoking, Tomar et al examined the perception of harm from smoking in a sample of high school students and found that the perceived risk is strictly related to smoking intensity: 80.3% of non-smokers perceived smoking as a great health hazard, compared to 49.7% of students who smoked about half a pack per day and 36.1% who smoked a pack-a-day [12]. Two of the main challenges in tobacco control are postponing smoking initiation by young people and ensuring they have a real risk perception. Therefore, the aim of this study was to find out at what age children start smoking, as well as their tobacco habits and risk perceptions according to the different school-age groups.

Methods

Setting and study design

Primary, middle and high schools of the Catania province (Southern Italy), that met the criteria of



being mixed schools and of having a minimum of 250 students, were invited to participate. As soon as one school had agreed to participate, invitations to other schools of the same type were stopped. All children from the schools taking part in the survey were recruited, reaching a sample size of 1710 students. This size widely satisfied the conditions of a power of 80% to detect a difference in smoking prevalence of 10% between a standard level of 20% and a Sicilian level of maximum 30%, with a two-tailed significance of 5%, that would imply a sample of 310. There were no excluding criteria. The goals and the potential health benefits of the survey were explained to the children in an attempt to enhance their response rate. The questionnaire was distributed in the classrooms to all children. The same questionnaire had been used on similar target groups and thus validated [13-15]. In particular, to ascertain "ever having tried cigarettes and at what age" students were asked, "Have you ever tried smoking cigarettes and at what age?"; students could respond "yes" (and then would state the age) or "no". All students were also asked "How many cigarettes/day you smoke?". Those who stated they smoked less than or equal 1 cigarette/day (cig/day) were grouped together as "occasional smokers", while those who stated they smoked more than 1 cig/day were considered as "usual smokers".

Risk perception was assessed by asking "How many cigarettes/day are acceptable from a health hazard point of view?". We collected data on the "presence of adult smokers at home and parental smoking" by asking "Can you specify how many and which family components are smoking?". Socio-demographic characteristics were collected as well. A researcher was present at the time of filling in the questionnaire in order to answer any question. For primary school children, the age of the first cigarette was considered equal to the age at the time of the questionnaire compilation given their not well defined time perception.

Statistical Analysis

Subtotals and percentages were given for all questions. Percentages were compared through Chi-square test and Fisher exact test when adequate (expected numbers less than 5); quantitative data were compared using Student t-test. The age of the first trial was compared between genders using the unbalanced ANOVA for two-way design. Then a multivariate logistic analysis was performed having as dependent variable smoking status and as independent

ones those studied in the univariate analysis (age, gender, school level and parents' smoking habits). The results were reported with the odds ratio (OR) and 95% confidence interval (CI). The software SAS (version 9.1, 2003, SAS, Inc, Cary, NC) was used for all analyses. All tests were two-sided. P-values < 0.05 were considered statistically significant.

Ethical considerations

The type of research (survey, through an anonymous questionnaire, on voluntary basis) only needed an informal approval by the ethics committee of our University. Therefore, there is no specific reference number for this study. A meeting was held by the principal of each school with teachers and parents representatives; at the end of the meeting they all agreed to participate in the study. An individual consent by each parent was not needed in our set up for this type of survey.

Results

Sample characteristics

The study included 1710 students, 853 boys (B) (49.9%) and 857 girls (G) (50.1%); among them 261 (B: 48.3%; G: 51.7%) were attending primary school (PS), 432 (B: 47.0%; G: 53.0%) middle school (MS) and 1017 (B: 51.5%; G: 48.5%) high school (HS) in the Catania province. Students' age ranged from 6 to 21 for both boys and girls; the mean age was 13.9 (B: 13.9; G: 13.8). Age characteristics according to school level are reported in Table 1. Chi-square test did not show differences between genders in school distribution ($p=0.25$).

Smoking initiation

Students who declared that they had already tried smoking were 31.5%, (B: 32.4%; G: 30.6). In particular, 6.1% were from PS, with a statistically significant difference between boys and girls (B: 11.1%; G: 1.5%; $p=0.005$); 18.1% were from MS (B: 18.7%; G: 17.5%) and 43.7% from HS (B: 42.7%; G: 44.6%). The age of the first trial was between 1 (for 4 students) and 19 (B: 1-17; G: 1-19), the mean age was 12.8, and that happened earlier to boys than to girls (B: 12.4; G: 13.3; $p<0.0001$). Data according to school level are shown in Table 2. The mean age at the various school levels was not different between genders ($p=0.44$). A further analysis showed that 0.5% of the students experimented smoking in preschool (B: 0.8%; G: 0.2%), 4.3% between 6 to 10 years old (B: 5.5%; G: 3.0%), 18.9% (B: 18.6%; G: 19.0%) between 11 to 14 and 7.8% (B: 7.4%; G: 8.3%)

between 15 to 19. Finally, below the age of 16 (age limit according to the article 730 of penal code that banned selling tobacco products) 28.4% of the students had already tried smoking (B: 29.9%; G: 26.8%) whereas almost all students who smoked (31.2%) had already tried it (B: 32.4%; G: 30.6%) before they were 18.

Smoking habits

In total, 13.7% of the sample recorded to be smokers (B: 14.0%; G: 13.4%). Among them 2.3% were from the youngest (B: 4.8%; G: 0.0%), (PS vs MS: $p < 0.001$), 6.0% from the MS (B: 6.4%; G: 5.7%) (PS vs HS: $p < 0.001$; MS vs HS: $p < 0.001$) and 19.9% from the oldest students (B: 19.1%; G: 20.7%). The mean number of cigarettes smoked per day (cig/day) was 5.0; boys tended to smoke more than girls although the difference was not statistically significant (B: 5.9 cig/day; G: 4.2 cig/day; $p = 0.08$). PS children declared to smoke a mean of 0.34 cig/day (B: 0.34 cig/day; G: 0.0 cig/day), MS children reached 3.6 cig/day (B: 4.2 cig/day; G: 2.9 cig/day) and HS students 5.4

cig/day (B: 6.4 cig/day; G: 4.3 cig/day; $p = 0.05$). Occasional smokers (less than or equal to 1 cig/day) were 5.6% (B: 5.2%; G: 6.0%): 1.9% in PS (B: 4.0%; G: 0.0%), 3.0% in MS (B: 3.0%; G: 3.1%) and 7.6% in HS (B: 6.3%; G: 8.9%). Habitual smokers were 8.1% (B: 8.8%; G: 7.5%): 0.4% in PS (B: 0.8%; G: 0.0%), 3.0% in MS (B: 3.4%; G: 2.6%) and 12.3% in HS (B: 12.7%; G: 11.8%). Table 3 shows cigarettes consumption by occasional and habitual smokers according to gender and school level. Finally, 4.9% of the smokers (B: 5.6%; G: 4.2%) consumed 5.0 or more cig/day. No PS students were in this group, only 0.9% of MS pupils had this habit (B: 1.0%; G: 0.9%) (MS vs HS: $p < 0.001$), while 7.9% were from HS (B: 8.8%; G: 6.9%).

Risk perception

Smoking was considered incompatible with health by 56.7% of the study population (B: 50.8%; G: 62.7%, $p < 0.0001$); in particular, by 66.3% of the PS (B: 66.7%; G: 65.9%), by 50.0% of the MS (B: 43.4%; G: 55.9%) and by 57.1%

Table 1. Study group age characteristics according to school level and gender.

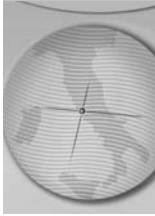
	Boys		Mean age at interview (min-max)	Girls		Mean age at interview (min-max) years	Tot. Pop. %
	No.	%		No.	%		
Primary school	126	14.8	8.5 (6-11)	135	15.8	8.5 (6-12)	15.3
Middle school	203	23.8	11.8 (10-14)	229	26.7	12.0 (10-14)	25.3
High school	524	61.4	16.1 (13-21)	493	57.5	16.1 (13-21)	59.5
Total	853	100	13.9 (6-21)	857	100	13.8 (6-21)	100

Table 2. Age of smoking initiation by school level and gender.

	Boys		Mean age (min-max) years	Girls		Mean age (min-max) years	Tot. Pop.	
	No.	%		No.	%		No.	%
Primary school	14	5.1	10 (10-10)	2	0.76	9.1 (7-12)	16	3.0
Middle school	38	13.8	10.9 (5-13)	40	15.3	10.8 (1-14)	78	14.5
High school	224	81.2	13.7 (3-19)	220	84.0	12.8 (1-17)	444	82.5
Total	276	100	13.9 (6-21)	262	100	13.8 (6-21)	538	100

Table 3. Cigarettes consumption of occasional and habitual smokers by school level and gender.

	Boys		Cig/day	Girls		Cig/day	Tot. Pop.	
	No.	%		No.	%		No.	%
Primary school								
Occasional	5	5.0		0	0.0		5	2.6
Habitual	1		0.34	0		0.0	1	
Middle school								
Occasional	6	10.9		7	11.3		13	11.1
Habitual	7		4.2	6		2.9	13	
High school								
Occasional	33	84.1		44	88.7		77	86.3
Habitual	67		6.4	58		4.3	125	
Total	119	100	5.9	115	100	4.2	234	100



of the HS students (B: 49.8%; G: 64.9%), $p_{\text{school level}}=0.0001$. According to the participants a mean of 1.3 cig/day is acceptable for health, in particular 1.2 cig/day for boys and 1.3 cig/day for girls. Divided by school level, results were very similar (PS: B: 1.7 cig/day; G: 1.5 cig/day; MS: B: 1.1 cig/day; G: 1.0 cig/day; HS: B: 1.2 cig/day; G: 1.4 cig/day). As expected, an acceptable number was higher for smokers (1.8 cig/day) than for non smokers (1.2 cig/day). However, 14.3% of the students (B: 13.7%; G: 15.8%) agreed that an occasional consumption is almost harmless. Higher consumption, from 1 to 5 cig/day is still considered harmless for 36.2% of the participants (B: 30.2%; G: 42.1%; $p<0.001$), and 5.8% do consider harmless 5 or more cig/day (B: 6.8%; G: 4.8%). The latter result by school level shows that 5.8% of PS (B: 5.6%; G: 5.9%), 4.9% of MS (B: 5.4%; G: 4.4%) and 6.2% of HS students (B: 7.6%; G: 4.7%) did not consider smoking a harmful habit.

Families smoking habits

Smoking was a habit in half of the students' families (51.6%) (B: 49.5%; G: 53.8%; $p=0.07$): in 50.6% of PS (B: 55.6%; G: 45.9%), in 55.6% (B: 53.2%; G: 57.6%) of MS and in 50.2% (B: 46.6%; G: 54.2%) of HS students' families. As we can see in Table 4, students who had a family member who smoked were more likely to begin smoking than students who did not have a smoker in the family. Among those who were smoking, 66.7% had at least another smoking family member, while among the non-smoking youths the corresponding figure was 49.3%. The table also shows that association between smoking and having a smoker in the family is only in high

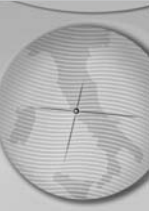
school. In fact, there is no association in primary and middle school. The multivariate analysis on smoking status explained by factors previously seen showed that age and parents' smoking habits (at least one smoker versus no smokers) were highly significant ($OR=1.24$, $95\%CI=1.12-1.38$ and $OR=2.19$, $95\%CI=1.62-2.95$ respectively, both $p<0.0001$) whereas school level ($OR=0.47$, $95\%CI=0.15-1.43$ for level 1 respect to level 3 and $OR=0.61$, $95\%CI=0.61-0.94$ for level 2 respect to level 3), $p_{\text{global}}=0.24$) and gender ($OR_{\text{girls respect to boys}}=0.94$, $95\%CI=0.71-1.26$, $p=0.68$) were not. The result of school level was expected given that it is a grouped variable of variable age.

Discussion

This study documents the early age of smoking initiation among young people residing in the Catania province. We found that boys start earlier than girls. The initiation of smoking habits occurred mainly between 11 and 13 years of age. This early smoking initiation implies that the health impact of smoking will be greater in the young people of today; indeed in the long term young people who become habitual smokers and continue smoking in adulthood, are more likely to develop cancer and cardiovascular diseases [3]. Although it is banned selling tobacco products to children below an age limit, almost a third of the children had already tried tobacco before age 16. This highlights that there are still some possibilities to get tobacco products through cigarette distributors or tobacconists. Early smoking habits differ significantly when our findings are compared with national data. In fact, in our study 11.2% of the boys and 5.7% of the girls smoked (usually or occasionally),

Table 4. Family members' smoking status by gender.

		Boys		Girls		Total	
		Smoker in the family (N)	No smoker in the family (N)	Smoker in the family (N)	No smoker in the family (N)	Smoker in the family (N)	No smoker in the family (N)
Primary school	Smoker	5	1	0	0	5	1
	No smoker	65	55	62	73	127	128
	Chi-square test	0.23		-		0.21	
Middle school	Smoker	8	5	9	4	17	9
	No smoker	100	90	123	93	223	183
	Chi-square test	0.53		0.38		0.30	
High school	Smoker	65	35	69	33	134	68
	No smoker	179	245	198	193	377	438
	Chi-square test	<0.0001		0.002		<0.0001	
Total	Smoker	78	41	78	37	156	78
	No smoker	344	390	383	359	727	749
	Chi-square test	0.0002		0.001		<0.0001	



compared with 6.9% and 3.4%, respectively, in Italy. One of the possible explanations is that the Catania province is also slightly over the national average for smoking habits in the adult population [10], that has an influence on the younger population. That is confirmed by the role of the variable parents' smoking habits in the multivariate analysis, which has been found highly significant. From the first year of the primary school to the last year of the high school the proportion of daily smokers increased from 0.0% to 11.8% for girls and from 0.8% to 12.7% for boys. This phenomenon may also imply that the current interventions to prevent teenagers from starting smoking are not successful enough.

The mean number of smoked cigarettes per day (cig/day) was 5.0; it is encouraging that smoking less than five cigarettes per day concerns 8.8% of our population given that this implies minimal risk for dependence [16]. It has been shown that about half of all youngsters who have tried tobacco have discontinued using it [17]. Indeed, 5.6% of our participants were occasional whereas 8.1% were regular smokers. Moreover, Wellman et al revealed that the magnitude of relapse of sporadic and occasional smokers was very low respect to regular smokers; this indicates that interventions aiming at cessation of smoking need to target occasional and sporadic smokers as well [18]. Our study also adds to the literature new data about tobacco habits and risk perception in this population. To our knowledge, this is the first study that examines both age of smoking initiation and risk perception among school-attending young people in this province. In addition to a qualitative opinion on compatibility of smoking with health we asked an estimation of the number of cigarettes that do not pose health at risk. The perceived risk varied according to both, gender and smoking habit. In particular, girls had a higher risk perception than boys (62.7% versus 50.8%), and smokers had a cut off of harmful consumption lower (1.2 cig/day) than the non-smokers (1.8 cig/day). Furthermore, a trend could be identified between MS and HS, as the latter group had lower cut offs. This result makes think that harmful effects of tobacco are not well perceived yet by younger people and consequently the need of tobacco control measures are more urgent for their age group. Our study, like others, shows that high school students who smoke regularly have in a high percentage another smoker in the family (51.6%) [19,20]. Nevertheless, correlation between being a smoker and having a family member who is also a smoker was evident only in the high

school. As a matter of fact, not only the parents' tobacco habits exert an influence on children's smoking habits, but also various individual and social factors as well as parents' opinions on smoking [21,22]. It could be interesting to collect information on these aspects in a future study.

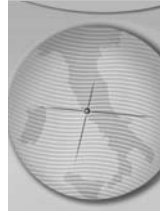
Strengths and limitations of the present study

The strengths of our study lie in the large sample of students and the limited number of non-responders, and also having used different types of questions to investigate topics of interest. Moreover the quantity of data allowed us to compute a multivariate analysis.

A significant methodological problem concerns whether or not the students provided truthful answers on this critical topic, particularly the younger ones. However, earlier studies suggest that the proportion of incorrect reporting is low, especially if the participants are anonymous [23,24]. Because bioassay measures are not sufficiently sensitive to differentiate between non-smokers and intermittent smokers [25], self-report is the current gold standard in research with initial smokers. Moreover, self-reports have repeatedly been found to correlate with biological measures in adolescent daily smokers and thus can be used as an exposition indicator [26,27]. The study was conducted as cross-sectional survey, that naturally implies certain disadvantages. Thus, it might have been better if individual students could have been followed prospectively. However, this would have entailed other problems, such as increased costs, ethical issues, a lower response frequency, and probably a lower degree of veracity in the responses.

Conclusions

The practical value of this study is that it demonstrates when the main increase in tobacco use occurs. Thus, it gives an idea of when to start tobacco-preventive programs geared to adolescents, parents, school staff, primary care personnel, etc. To be effective, the measures should be initiated well before "the stage of becoming a smoker" [28,29], and it is important that the methods are adapted to the youngsters. Gender differences should also be taken into consideration to achieve the desired results. Next studies could also include the influence of parents advices on smoking behavior. The risk of starting to smoke increases if one of the parents smokes, yet the effect of the parents' own behaviour is reduced if they nevertheless express a highly negative attitude to their children's



smoking [30,31]. It is therefore extremely important that parents are involved in tobacco-preventive programs, where their role is greater than they may believe, regardless of whether or not they are smokers. Effective methods for

communicating accurate health risks to young people are needed [13]. Thus, this is yet another important preventive task for the public health practitioner.

References

- 1) Henderson AJ. The effects of tobacco smoke exposure on respiratory health in school-aged children. *Paediatr Respir Rev* 2008; 9(1):21-7; quiz 27-8.
- 2) Jason LA, Berk M, Schnopp-Wyatt, DL, Talbot B. Effects of enforcement of youth access law on smoking prevalence. *Am J Commun Psychol* 1999;27:143-60.
- 3) Action on Smoking and Health (ASH UK). Ash. facts at a glance: Smoking statistics. Available from: http://newash.org.uk/files/documents/ASH_93.pdf. [Accessed on July 2010].
- 4) Järvelaid M. Adolescent tobacco smoking and associated psychosocial risk factors. *Scand J Prim Health Care* 2004;22:50-3.
- 5) BMA Board of Science. Breaking the cycle of children's exposure to tobacco smoke. London, UK: British Medical Association, 2007.
- 6) Taioli E, Wynder EL. Effect of the age at which smoking begins on frequency of smoking in adulthood. *N Engl J Med* 1991;325:968-9.
- 7) CDC. Preventing tobacco use among young people: A report of the Surgeon General. Atlanta, GA: Centers for Disease Control and Prevention, Office of Smoking and Health, 1994.
- 8) Di Franza JR, Savageau JA, Fletcher K, Ockene JK, Rigotti NA, McNeill AD, et al. Measuring the loss of autonomy over nicotine use in adolescents: The DANDY Study. *Arch Pediatr Adolesc Med* 2002;156:397-403.
- 9) Di Franza JR, Savageau JA, Fletcher K, O'Loughlin J, Pbert L, Ockene JK, et al. Symptoms of tobacco dependence after brief intermittent use. *Arch Pediatr Adolesc Med* 2007;161:704-10.
- 10) Ministero del Lavoro, della Salute e delle Politiche Sociali Direzione Generale del Sistema Informativo. Relazione sullo Stato Sanitario del Paese [Report on the health status of the country] 2001-2002.
- 11) Ministero del Lavoro, della Salute e delle Politiche Sociali Direzione Generale del Sistema Informativo Relazione sullo Stato Sanitario del Paese. [Report on the health status of the country 2007-2008]. Available from: <http://www.salute.gov.it/pubblicazioni/ppRisultatiRSPSP.jsp>. [Accessed on July 2010].
- 12) Tomar SL, Hatsukami DK. Perceived risk of harm from cigarettes or smokeless tobacco among U.S. high school seniors. *Nicotine Tob Res* 2007; 9(11):1191-6.
- 13) Modonutti GB. Segnali di fumo tra i giovani (Signs of youth smoking). In: *Prevenzione, giovani e tabacco 01*. Trieste: Edizioni Goliardiche, 2001:33-43.
- 14) Modonutti GB. Modelli di approccio, comportamenti e percezione del rischio espressi dagli studenti delle scuole medie di 1° grado nei confronti del fumo di tabacco. [Approach, behavior and perception of risk expressed by secondary school students on tobacco smoke]. Capitolo 2. In: Mangiaracina G, Ottaviano M. eds. *La Prevenzione del Tabagismo: metodi, progettualità, esperienze*. Lega Italiana per la Lotta Contro i Tumori, 2004:35-52.
- 15) Modonutti GB, Altobello A, Fiore M, Garascia C, Leon L, Lombardo C, Sciacca S, Ferrante M. Uso del fumo di tabacco: approccio e percezione dei rischi ad esso correlati da parte degli studenti catanesi. [Tobacco smoke use: approach and perception of risks associated with it by students of Catania]. *Ig Sanità Pubbl* 2009;65:109-20.
- 16) Von Bothmer M, Mattsson B, Fridlund B. Influences on adolescent smoking behaviour: Siblings smoking and norms in the social environment do matter. *Health Soc Care Community* 2002;10:213-20.
- 17) Johnson LL, O'Malley PM, Bachman JG. Monitoring the Future, national results on adolescent drug use: overview of key findings. Bethesda, Maryland: National Institute on Drug Abuse, 2002 (NIH Publication No 02-5105).
- 18) Wellman RJ, Di Franza JR, Savageau JA, Dussault GF. Short term patterns of early smoking acquisition. *Tobacco control* 2004;13:251-7.
- 19) McNeill AD, Jarvis MJ, Stapelton JA, Russell MA, Eiser JR, Gammage P. Prospective study of factors predicting uptake of smoking in adolescents. *J Epidemiol Community Health* 1989;43:72-8.
- 20) Bricker JB, Leroux BG, Peterson AV, Kealey KA, Sarason IG, Andersen MR, et al. Nine-year prospective relationship between parental smoking cessation and children's daily smoking. *Addict* 2003;98:585-93.
- 21) Jackson C, Dickinson D. Enabling parents who smoke to prevent their children from initiating smoking. *Arch Pediatr Adolesc Med* 2006;160:56-62.
- 22) McGee R, Williams S, Reeder A. Parental tobacco smoking behaviour and their children's smoking and cessation adulthood. *Addict* 2006;101:1193-201.
- 23) Benowitz NL, Henningfield JE. Restablishing a nicotine threshold for addiction. *N England J Med* 1994;331:123-5.
- 24) Stanton WR, McClelland M, Elwood C, Ferry D, Silvia PA. Prevalence, reliability and bias of adolescents' reports of smoking and quitting. *Addict* 1996;91:1705-14.
- 25) Dappen A, Schwartz RH, O'Donnell R. A survey of adolescent smoking patterns. *J Am Board Fam Pract* 1996;9:7-13.
- 26) Williams CL, Eng A, Botvin GJ, et al. Validation of students' self-reported cigarette smoking status with plasma cotinine levels. *Am J Public Health* 1979;69:1272-4.
- 27) Patrick DL, Cheadle A, Thompson DC, et al. The validity of self-reported smoking: a review and meta-analysis. *Am J Public Health* 1994;84:1086-93.
- 28) Leventhal H, Cleary PD. The smoking problem: a review of the research and theory in behavioral risk modification. *Psychol Bull* 1980;88:370-405.
- 29) Roncarolo F, Ramella F, Sacco S, Pretti G, Bonfanti M, Tenconi MT. Mr. Starbene e il Club dei Vincenti: assessing an anti-smoking campaign for school children. *Ital J Public Health* 2008;5:72-9.
- 30) Mayhew KP, Flay BR, Mott JA. Stages in the development of adolescent smoking. *Drug Alcohol Depend* 2000;59:61-81.
- 31) Jackson C, Dickinson D. Enabling parents who smoke to prevent their children from initiating smoking: results from a 3-year intervention evaluation. *Arch Pediatr Adolesc Med* 2006;160:56-62.