

Prevalence of smoking habits, attitudes, knowledge and beliefs among Health Professional School students: a cross-sectional study

Margherita Ferrante^(a), Rosella Saulle^(b), Caterina Ledda^(a), Roberto Pappalardo^(a),
Roberto Fallico^(a), Giuseppe La Torre^{(b)(c)} and Maria Fiore^(a)

^(a) Dipartimento "GF Ingrassia", Igiene e Sanità Pubblica, Università degli Studi, Catania, Italy

^(b) Dipartimento di Sanità Pubblica e Malattie Infettive, Sapienza Università di Roma, Rome, Italy

^(c) Fondazione Eleonora Lorillard Spencer Cenci, Rome, Italy

Abstract

Objectives. To examine smoking prevalence, attitudes, knowledge and behaviours/beliefs among Health Professional School students according to the Global Health Professional Student Survey (GHPSS) approach.

Methods. A cross-sectional study was carried out in Catania University Medical Schools. The GHPSS questionnaires were self-administered. Logistic regression model was performed. The level of significance was $p \leq 0.05$.

Results. 422 students answered to the questionnaire. Prevalence of current smokers was 38.2%. 94.3% of the total sample believe that health professionals should receive specific training to quit smoking, but only 21.3% of the sample received it during the study courses.

Conclusions. Given the high prevalence of smokers among health professionals and their key role both as advisers and behavioral models, our results highlight the importance of focusing attention on smoking cessation training addressed to them.

Key words

- smoking
- tobacco use
- global health profession students survey
- cross-sectional study

INTRODUCTION

Tobacco smoking is a global epidemic. The World Health Organization has estimated that tobacco and its products kill over 3.5 million people worldwide every year and it is extrapolated that by the decade 2020-2030, tobacco will kill 10 million people a year [1]. Specifically, smoking rates remain high in the European Union (EU), especially in Central and Eastern European countries [1], in particular, data from 2012 showed that 24.6% of Italian men and 17.2% of women were daily cigarette users [2].

The adverse effects on general health of tobacco smoking are well documented and on average, cigarette smokers die ten years younger than non-smokers [3, 4]. There is increasing evidence that contact with other smokers, particularly in the family, is a strong determinant of risk of smoking uptake [5, 6]. Tobacco smoke is powerfully addictive, so experimentation and uptake of smoking which, in developed countries typically occurs in late childhood or adolescence, is a highly hazardous behaviour. Moreover the health impact of smoking will be greater in the young people of today related to

the early smoking initiation; 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 [7, 8].

Tobacco smoking can be reduced by clinical interventions that are highly cost-effective, and can be delivered by general physicians with relatively little training [9]. Moreover, the benefits of smoking cessation have been well demonstrated. Smoking cessation reduces health risks and improves quality of life [10, 11]. Therefore, every smoker should be actively encouraged to give up smoking. Due to tobacco's highly addictive properties, cessation attempts need to be supported by health care professionals to achieve long-term abstinence. Health professionals are in an ideal position to advise and educate patients about the dangers of smoking. Moreover, they can play an important role in preventing harmful health effects by promoting smoking cessation both as advisers and behavioral models for the citizens [12-16].

Primary care physicians (PCPs) have been the main focus for smoking cessation efforts, but they are insufficient to help most smokers quit [17-19]. Moreover,

Table 1
Characteristics of the sample

Socio-demographic variables	Frequencies N (%)	No smokers N (% ROW)	Current smokers N (% ROW)	p-value
Age				
< 24	197 (46.7)	112(56.9)	85 (43.1)	0.048*
≥ 25	225 (53.3)	149 (66.2)	76 (33.8)	
Gender				
F	268 (63.5)	179 (66.8)	89 (33.2)	0.006*
M	154 (36.5)	82 (53.2)	72 (46.8)	
Year of attendance				
2°-3°	291 (69)	172(59.1)	119 (40.9)	0.08
4°-6°	131 (31)	89 (67.9)	42 (32.1)	
^^School types				
Strictly Medical Schools	237 (56.2)	167 (70.5)	70 (29.5)	< 0.001*
Health Professional Schools	185 (43.8)	94(50.8)	91 (49.2)	
Total	422 (100)	261 (61.8)	161 (38.2)	

*p < 0.05 (level of significance); ^^School types: Strictly Medical School (Medicine and Dentistry); Health Professional School (Pharmacy, Diagnostic, Physiotherapy, Nursing).

despite the responsibility that physicians have to their smoking patients, research suggests medical students still do not receive adequate training. [20, 21]. If other health professionals besides physicians could be mobilized to address tobacco dependence, this would help identify more smokers and reinforce smoking cessation attempts. There is evidence that smoking cessation interventions are effective when delivered by non-physician health professional groups: nurses [22], dentists [23], dental hygienists [24], and pharmacists [25]; so, it is relevant to have information on their habits and attitudes towards smoking, especially concerning their role to give help to smokers who wish to quit.

The aim of this study was to examine smoking prevalence, attitudes, knowledge and beliefs among multiple types of Health Professional Schools according to the GHPSS (Global Health Profession Students Survey) approach.

MATERIALS AND METHODS

Study design and population

This cross-sectional study was carried out in Catania city in Sicily Region (South of the Nation).

Undergraduates were randomly chosen from the only last year of course from Catania University Medical Schools belonging to the Strictly Medical Schools including Faculty of Medicine (6 year of course) and Faculty of Dentistry (5 year of course) and to the graduate courses of Technical Science for Health Professional School concerning Pharmacy Faculty (5 year of course), Diagnostic Technical Health Professional School (second years of course), Nursing Technical Health Professional Schools (3 year of course) and Physiotherapy Technical Health Professional Schools (3 year of course). Only the last year of course for each Schools was involved and the survey was conducted among students attending the daily lessons. All of them were asked to perform the survey. The study was made possible by President of the University agreement and thanks to academic professors attending the classroom approving the survey performance. The

survey was conducted during the second semester of study, between March and July 2012.

The questionnaires

The tool used in this survey was the Global Health Professions Student Survey (GHPSS) questionnaire, carried out by the Tobacco Free Initiative (TFI), World Health Organisation (WHO) and the Office on Smoking and Health (OSH), Centers for Disease Control and Prevention (CDC), in consultation with a range of countries representing the six WHO regions. GHPSS is an important part of the Global Tobacco Surveillance System (GTSS), started in 1999 (CDC 2010).

After emphasizing the importance of the topic, the questionnaire, it was explained and distributed by the hygiene lecturer during regular class sessions and then the self-administered questionnaires were compiled by Health Professional School students in an anonymous, voluntary manner, in accordance with the protocol developed by WHO Europe and the CDC [26].

The original questionnaire was composed of 42 questions divided into six sections, but in the current study we added one country-specific question on knowledge about the use of antidepressants (such as bupropion or Zyban) and acetylcholine receptor partial agonists (such as Varenicline or Champix) and counselling techniques in tobacco cessation programs.

The original version of the GHPSS questionnaire was translated into Italian by an expertise in translation English-Italian language and modified by adding country-specific questions.

The translated version was tested in a previous time [27].

The final form of the Italian questionnaire was composed of 44 questions, distributed in 6 sections on:

- 1) prevalence of tobacco use (questions 1-9);
- 2) exposure to environmental tobacco smoke (*i.e.* time spent with people who smoke in places other than home) (questions 10-13);
- 3) attitudes (*i.e.* opinions about no-smoking policies and laws, and about the role of healthcare professionals

Table 2
Attitudes and beliefs about tobacco (smokers and non-smokers)

Attitude and beliefs	Frequencies N (%)	Non-smokers N (% column)	Current smokers N (% column)	p-value
Should HPs get specific training on cessation techniques?				
YES	398 (94.3)	252 (96.6)	146 (90.7)	0.01*
NO	24 (5.7)	9 (3.4)	15 (9.3)	
HPs serve as role models for their patients and the public?				
YES	285 (67.5)	180 (69)	105 (65.2)	0.42
NO	137 (32.5)	81 (31)	56 (34.8)	
Should HPs regularly advise smokers to quit?				
YES	405 (96)	254 (99)	151 (93.8)	0.07**
NO	17 (4)	7 (2.7)	10 (6.2)	
Should HPs regularly advise smokers to quit chewing tobacco/smoking cigar or pipe?				
YES	403 (95.5)	253 (96.9)	150 (93.2)	0.07**
NO	19 (4.5)	8 (3.1)	11 (6.8)	
HPs that are smokers give less advice or information about smoking cessation to patients?				
YES	213 (50.5)	145 (55.6)	68 (42.2)	0.008*
NO	209 (49.5)	116 (44.4)	93 (57.8)	
HPs that chewing tobacco/smoking cigar or pipe give less advice or information about smoking cessation to patients?				
YES	203 (48.1)	146 (55.9)	57 (35.4)	< 0.001*
NO	219 (51.9)	115 (44.1)	104 (64.6)	
Patients, if advised by HPs, have more chances to quit smoking?				
YES	348 (82.5)	221 (84.7)	127 (78.9)	0.12**
NO	74 (17.5)	40 (15.3)	34 (21.1)	

HPs: Health professionals; * $p < 0.05$ (level of significance); **Hosmer-Lemeshow procedure (Hosmer and Lemeshow 1989) (only covariates having a p-value < 0.25 at univariate analysis were introduced into the models).

in smoking cessation) (questions 14-24);

4) behavior/cessation (*i.e.* smoking habit, willingness to stop, opinions about healthcare professionals who used to smoke) (questions 25-32);

5) curriculum/training (*i.e.* formal training in smoking cessation techniques on the medical curriculum and knowledge about methods – pharmacological or counseling techniques – for help to quit) (questions 33-41 in the original, previous adding the two new therapies. So the 5 section resulted form 33-41); and

6) demographics (age, gender, course year) (questions 42-44).

Our attention was focused in particular on questions about smoking behavior and intention to quit, attitudes regarding the role of healthcare professionals in smoking cessation, training and knowledge about smoking cessation methods.

Outcome measure

The outcome measure was “being a current smoker” – who smoked cigarettes at least 1 day during the 30 days before the survey (WHO 2010).

Statistical analysis

Data were analysed with the software SPSS 19.0 for Windows.

Descriptive analyses were performed using frequen-

cies, percentages, frequency tables for categorical variables and mean \pm standard deviation (SD), and 95% confidence intervals (95% CI) for quantitative variables.

For the bivariate analysis t-tests and chi-square tests were performed to evaluate differences for quantitative and categorical variables, respectively. A logistic regression model was used to identify possible factors associated with the tobacco smoking status. According to the Hosmer-Lemeshow procedure, only covariates having a p-value < 0.25 at univariate analysis were introduced into the models [28].

Moreover, gender and age, as possible confounders, were included into the regression model. Results are expressed as odds ratio (OR) with 95% CI, and the goodness of fit of the model was assessed by the Hosmer-Lemeshow test. The level of significance was set at $p \leq 0.05$.

RESULTS

Sample characteristics and prevalence of smoking

The questionnaire was administered to 422 students including in all graduate Schools (response rate 100% of the attendance students).

63.5% (n. 268) were females, and 53.3% (n. 225) of the students were over 25 years old.

The prevalence of current smokers was 38.2% (n. 161). Socio-demographic characteristics of the sample are reported in Table 1.

Table 3
Binary logistic regression analysis for the outcome "being a current smokers"

Independent variables	Crude OR (95% CI)	Adjusted OR (95% CI)
Age		
≥ 25 (reference) *	1	1
< 24	1.48 (1.2-2.20)	1.32 (0.86-2.03)
Gender		
Female (reference) *	1	1
Male	1.76 (1.17-2.65)	1.59 (1.04-2.46)^
** Year of attendance		
4°-6° year (reference) *	1	1
2°-3° year	1.46 (0.94-2.26)	0.58 (0.31-1.08)
School types		
Strictly Medical Schools (reference) *	1	1
Health Professional Schools	2.31 (1.54-3.45)	3.25 (1.84-5.72)^
HPs that are smokers give less advice or information about smoking cessation to patients?		
No (reference) *	1	1
Yes	0.58 (0.39-0.87)	1.45 (0.70-2.99)
HPs that chewing tobacco/smoking cigar or pipe give less advice or information about smoking cessation to patients?		
No (reference) *	1	1
Yes	0.43 (0.28-0.64)	0.41 (0.26-0.62)^
Should HPs get specific training on cessation techniques?		
No (reference) *	1	1
Yes	0.34 (0.14-0.81)	0.26 (0.10-0.68)^
Should HPs regularly advise smokers to quit chewing tobacco/smoking cigar or pipe?		
No (reference) *	1	1
Yes	0.43 (0.17-1.09)	0.60 (0.21-1.71)
Patients, if advised by HPs, have more chances to quit smoking?		
No (reference) *	1	1
Yes	0.67 (0.40-1.12)	0.73 (0.42-1.28)

Hosmer and Lemeshow Test: $p = 0.04$; *(Reference); **Hosmer-Lemeshow procedure (Hosmer and Lemeshow 1989) (only covariates having a p -value; < 0.25 at univariate analysis were introduced into the models; ^Statistically significant value.

The highest rate of current smokers resulted in the sample under 24 years old (43.1%) ($p = 0.048$) and among males 46.8% (n. 72) are current smokers vs 33.2% (n. 89) among females sample ($p = 0.006$) (Table 1).

77.5% (n. 327) of the sample have just at one time smoked a cigarette in their life and 29.6% had smoked their first cigarette between 16 and 17 years.

Attitudes, beliefs and knowledge

About attitude, more than half of the students believe that Health Professionals (HPs) are a models for patients: 67.5% answer that health professionals have a role in giving advice or information about smoking cessation and overall of the sample think that HPs regularly should advise smokers to quit (96%) believing that patients, if advised by HPs, have more chances to quit smoking for the 82.5% of the sample (Table 2).

94.3% of the total sample believe that health professionals should receive specific training on technique to quit smoking, but only 21.3% of the sample received specific training on smoking techniques during the study courses.

Binary logistic regression. Possible factors associated with smoking status

Multivariate analysis for the outcome "being a current

smokers" show that students belonging to the Technical Science for Health Professional School (Pharmacy, Diagnostic, Physiotherapy, Nursing) were significantly more likely to be smokers in comparison to students from Medical Schools (Medicine and Dentistry) (OR = 2.31; 95% CI: 1.54-3.45; Adjusted OR = 3.25; 95% CI: 1.84-5.72).

In addition, males have a higher probability to be smokers than females (OR = 1.76; 95% CI: 1.17-2.65; Adjusted OR = 1.59; 95% CI: 1.04-2.46).

Students who believe that health professionals should get specific training on cessation techniques appear to have a lower probability to be a smokers (OR = 0.34; 95% CI: 0.14-0.81; Adjusted OR = 0.26; 95% CI: 0.10-0.68) likewise who believe that health professionals that chewing tobacco/smoking cigar or pipe give less advice or information about smoking cessation to patients (OR = 0.43; 95% CI: 0.28-0.64); Adjusted OR = 0.41; 95% CI: 0.26-0.62).

In the regression model, two variables reversed their Adjusted OR in order to the Crude OR: the "year of attendance" that changed when in the model was introduced the type of School (2°-3° year of attendance: Crude OR = 1.46 (0.94-2.26); Adjusted OR of 0.58 (0.31-1.08), with no statistically significant values and

the "HPs that are smokers give less advice or information about smoking cessation to patients? (Crude OR of 0.58 (0.39-0.87); Adjusted OR of 1.45(0.70-2.99).

Hosmer and Lemeshow goodness of fit Test resulted in a value of $p = 0.04$ (Table 3).

DISCUSSION

The major objectives of this cross-sectional study were to examine the prevalence of smoking habit among the Health Professional School students and their knowledge and beliefs about tobacco cessation training. Our investigation found important results which are worth to discuss.

Although the Health Professional School students is a group of society expected to have quite conscious approach to addictive substance use, our findings confirm a rate of current smoking (38.2%) among them higher than that in the general population [2]. Various cross-sectional investigations have suggested that there is an alarming worldwide trend for smoking rates to increase during students' time at medical schools [29-36]. Our results, in accordance with Grassi, *et al.* [37] highlight that Italian medical students lack knowledge about tobacco dependence, how to treat it, and the critical role of the physician in promoting cessation. Globally the prevalence of smoking is higher among our students than other European studies. These findings suggest that medical schools do not offer adequate training in tobacco dependence and provide a rationale for modifying the core curriculum to include more information on tobacco dependence treatment. Also of note is the fact that, these are future healthcare professionals and one smoking HP for instance would have a profound influence on the smoking habits of his hundreds of patients/clients in the general population, mainly considering that smoking prevalence in the general population of the Sicily region, resulted slightly higher than in the whole of the Nation (31% vs 30% respectively). In the island, males are more smokers than females and the number of cigarettes smoked amount in a mean of 14 in just one day [38].

"Health professional who continues to smoke sends inconsistent message to patients whom he/she counsels, and need to acquire knowledge about smoking-related diseases and specific skills in smoking cessation techniques [39, 40].

Interestingly the current smokers prevalence is higher among the Health Professional School students than the Strictly Medical School students, this means more attention needs to be given to them in prevention and controlling tobacco smoking.

Another finding of this study is that more than half of the medical students think that HP have a role in giving advice or information about smoking cessation, it is important because the future general practitioners who attach little importance to physicians' advice are unlikely to make an effort to provide smoking-prevention counselling once they have become general practitioners themselves [41]. Despite the most of HP believe that health professionals should receive specific training on technique to quit smoking, most of the students had not received such training in a formal way during regular courses.

Finally, our findings related to attitudes and beliefs among smokers and non-smokers confirm that more non-smokers than smokers are active in smoking cessation counseling [42-45]. The strength of our analysis is that this simultaneous survey of multiple health professionals asks specifically about their smoking status, knowledge, attitudes, beliefs and tobacco cessation training, allowing us to examine possible factors associated with smoking status to improve delivery of tobacco dependence treatment among a diverse range of health professionals who encounter smokers on the front lines of clinical care.

Our study is subject to certain methodological limitations. First, the design of our study was cross-sectional and this form of research can only provide a snap-shot of the situation in the sample. Second, smoking status of subjects was assessed only by means of self-report, potentially rendering our results less reliable. Because the survey was anonymous and completely voluntary, one can assume that smoking status was reliably captured.

CONCLUSIONS

Given the high prevalence of smokers among future health professionals and their role both as advisers and behavioral models, our results highlight the importance of focusing attention on smoking cessation training addressed to them. Continuous education is essential in order to hope that cessation rates and interventions will increase and more lives will be saved. No other intervention has such a high health potential benefit.

Conflict of interest statement

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this study.

Received on 22 November 2013.

Accepted on 10 April 2013.

REFERENCES

1. World Health Statistics 2008. Available from: www.who.int/whosis/who/stat/EN_WHS08_Full.pdf.
2. Il fumo in Italia - ISS-DOXA 2012. Available from: www.iss.it/fumo/doxa/cont.php?id=284&lang=1&tipo=18.
3. Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ* 2004;26:1519-33. DOI: 10.1136/bmj.38142.554479.AE
4. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006;3(11):e442. DOI: 10.1371/journal.pmed.0030442
5. Hill KG, Hawkins JD, Catalano RF, *et al.* Family influences on the risk of daily smoking initiation. *J Adolesc Health* 2005;37:202-10. DOI: 10.1016/j.jadohealth.2004.08.014

6. Fiore M, Modonutti GB, Leon L, Costantinides F, Ledda C, Sciacca S, Ferrante M. *Exposure to parental smoking and the risk of smoking uptake in pupils*. Abstracts of the 23rd Annual Conference of the International Society of Environmental Epidemiology (ISEE). Barcelona, Spain: Environ Health Perspect; 2011. <http://dx.doi.org/10.1289/ehp.isee2011>.
7. Modonutti GB, Altobello A, Fiore M, Garascia C, Leon L, Lombardo C, Sciacca S, Ferrante M. Use of tobacco smoke: approach and risk perception by middle-school students in Catania (Italy). *Ig Sanità Pubbl* 2009;65:109-20.
8. Ferrante M, Fiore M, Leon L, Costantinides F, Castaing M, Fallico R, Sciacca S, Modonutti G. Age of smoking initiation, tobacco habits and risk perception among primary, middle and high school students in Southern Italy. *Ital J Public Health* 2010;7(3):142-7.
9. Fiore C, Jaén CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, et al. Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline. Rockville, MD: US Department of Health and Human Services, Public Health Service; 2008.
10. Peto R, Darby S, Deo H, Silcocks P, Whitley E, Doll R. Smoking, smoking cessation, and lung cancer in the UK since 1950: combination of national statistics with two case-control studies. *BMJ* 2000;321:323-9. DOI: 10.1136/bmj.321.7257.323
11. Anthonisen NR, Skeans MA, Wise RA, Manfreda J, Kanner RE, Connett JE. The effects of a smoking cessation intervention on 14.5-year mortality: a randomized clinical trial. *Ann Intern Med* 2005;142:233-9. DOI: 10.7326/0003-4819-142-4-200502150-00005
12. Ficarra MG, Gualano MR, Capizzi S, et al. Tobacco use prevalence, knowledge and attitudes among Italian hospital healthcare professionals. *Eur J Public Health* 2010;21(1):29-34. DOI: 10.1093/eurpub/ckq017
13. Walsh MM, Ellison JA. Treatment of tobacco use and dependence: the role of the dental professional. *J Dent Educ* 2005;69:521-37.
14. Chestnutt IG. What should we do about patients who smoke? *Dent Update* 1999;26:227-31.
15. Ussher M, Chambers M, Adams R, Croghan E, Murray R. Evaluation of a nationally disseminated self-help intervention for smoking cessation "Quit Kit". *Tob Control* 2011;20(5):380-2. DOI: 10.1136/tc.2010.040535
16. Goniewicz ML, Lingas EO, Czogala J, Koszowski B, Zielinska-Danch W, Sobczak A. The role of pharmacists in smoking cessation in Poland. *Eval Health Prof* 2010;33(1):81-95. DOI: 10.1177/0163278709356190
17. Ferketich AK, Khan Y, & Wewers ME. Are physicians asking about tobacco use and assisting with cessation? Results from the 2001-2004 National Ambulatory Medical Care Survey (NAMCS). *Prev Med* 2006;43:472-6. DOI: 10.1016/j.ypmed.2006.07.009
18. Thorndike AN, Regan S, & Rigotti, NA. The treatment of smoking by US physicians during ambulatory visits: 1994-2003. *Am J Public Health* 2007;97:1878-83. DOI: 10.2105/AJPH.2006.092577
19. Thorndike AN, Rigotti NA, Stafford RS, & Singer DE. National patterns in the treatment of smokers by physicians. *JAMA* 1998;279:604-8. DOI: 10.1001/jama.279.8.604
20. Raupach T, Shahab L, Baetzing S, Hoffmann B, Hasenfuss G, West R, Andreas S. Medical students lack basic knowledge about smoking: findings from two European medical schools. *Nicotine Tob Res* 2009;11:92-8. DOI: 10.1093/ntr/ntn007
21. La Torre G, Kirch W, Bes-Rastrollo M, et al. GHPSS Collaborative Group Tobacco use among medical students in Europe: Result of a multicentre study using the Global Health Professions Student Survey. *Public Health* 2012;126:159-64. DOI: 10.1016/j.puhe.2011.10.009
22. Rice VH, & Stead L. Nursing intervention and smoking cessation: Meta-analysis update. *Heart Lung* 2006;35:147-63. DOI: 10.1016/j.hrtlng.2006.01.001
23. Gorin SS, & Heck JE. Meta-analysis of the efficacy of tobacco counseling by health care providers. *Cancer Epidemiol Biomarkers* 2004;13:2012-22.
24. Binnie VI, McHugh S, Jenkins W, Borland W, & Macpherson LM. A randomized controlled trial of a smoking cessation intervention delivered by dental hygienists: A feasibility study. *BMC Oral Health* 2007;7:5. DOI: 10.1186/1472-6831-7-5
25. Sinclair HK, Bond CM, & Stead LF. Community pharmacy personnel interventions for smoking cessation. *Cochrane Database Syst Rev* 2004;(1):CD003698. DOI: 10.1002/14651858.CD003698
26. Warren CW, Jones NR, Chauvin J, Peruga A, GTSS Collaborative Group: Tobacco use and cessation counselling: cross-country. Data from the Global Health Professions Student Survey (GHPSS), 2005-7. *Tob Control* 2008;17(4):238-47. DOI: 10.1136/tc.2007.023895
27. Gualano MR, Bontempi C, Saulle R, Ricciardi W, La Torre G. Validation of the Global Health Professions Students Survey questionnaire in Italy. *Ital J Public Health* 2011;8:392-8.
28. Hosmer DW, Lemeshow S. Applied logistic regression. New York: John Wiley & Sons; 1989.
29. Hamadeh RR. Smoking habits of medical students in Bahrain. *J Smoking Related Dis* 1994;5:189-95.
30. Ramakrishna GS, SankaraSarma P, Thankappan KR. Tobacco use among medical students in Orissa. *Natl Med J India* 2005;18:285-9.
31. Ahmadi J, Khalili H, Jooybar R, Namazi N, Aghaei PM. Cigarette smoking among Iranian medical students, resident physicians and attending physicians. *Eur J Med Res* 2001;6:406-8.
32. Patkar AA, Hill K, Batra V, Vergare MJ, Leone FT. A comparison of smoking habits among medical and nursing students. *Chest* 2003;124:1415-20. DOI: 10.1378/chest.124.4.1415
33. Cauchi D, Mamo J. Smoking health professional student: An attitudinal challenge for health promotion? *Intern J Environ Res Public Health* 2012;9(7):2550-61. DOI: 10.3390/ijerph9072550
34. Pantisidis GM, Papageorgiou DI, Bouros D. Smoking habits, attitudes and training among medical students of the Democritus University of Thrace. *Pneumon* 2012; 25(2):208-18.
35. Warren CW, Sinha DN, Lee J, Lea V, Jones NR. Tobacco use, exposure to secondhand smoke, and cessation counseling among medical students: Cross-country data from the Global Health Professions Student Survey (GHPSS), 2005-2008. *BMC Public Health* 2011;11:72. DOI: 10.1186/1471-2458-11-72
36. Kusma B, Quarcoo D, Vitzthum K, Welte T, MacHe S, Meyer-Falcke A, Groneberg DA, Raupach T. Berlin's medical students' smoking habits, knowledge about smoking and attitudes toward smoking cessation counseling. *J Occup Med Toxicol* 2010;(16)5:9. DOI: 10.1186/1745-6673-5-9
37. Grassi MC, Chiamulera C, Baraldo M, Culasso F, Ferketich AK, Raupach T, Patrono C, Nencini P. Cigarette smoking knowledge and perceptions among students in four Italian medical schools. *Nicotine and Tobacco Research* 2012;14(9):1065-72. DOI: 10.1093/ntr/ntn330
38. Regione Siciliana, Assessorato Della Salute. *Preven-*

- tion *Regional Plan 2010-2012*. Available from: http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaStrutturaRegionale/PIR_AssessoratoSalute/PIR_AreeTematiche/PIR_Pianodiprevenzione/Piano%20Regionale%20Prevenzione%202010-12.pdf. (last access on 20/03/2013).
39. Chatkin J, Chatkin G. Learning about smoking during medical school: are we still missing opportunities? *Int J Tuberc Lung Dis* 2009;13:429-37.
 40. GTSS Collaborative Group. Tobacco use and cessation counselling: Global Health Professionals Survey Pilot Study, 10 countries, 2005. *Tob Control* 2006;15(Suppl. 2):iii31-4. DOI: 10.1136/tc.2006.015701
 41. Fiore MC, Jaen CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, et al. *Treating tobacco use and dependence: 2008 update-Clinical practice guideline*. Rockville, MD US: Department of Health and Human Services, Public Health Service; 2008.
 42. Vogt F, Hall S, Marteau TM. General practitioners' beliefs about effectiveness and intentions to prescribe smoking cessation medications: qualitative and quantitative studies. *BMC Public Health* 2006;6:277. DOI: 10.1186/1471-2458-6-277
 43. Gunes G, Karaoglu L, Genc MF, Pehlivan E, Egri M. University hospital physicians' attitudes and practices for smoking cessation counseling in Malatya, Turkey. *Patient Educ Couns* 2005;56:147-53. DOI: 10.1016/j.pec.2004.02.002
 44. Kawakami M, Nakamura S, Fumimoto H, Takizawa J, Baba M. Relation between smoking status of physicians and their enthusiasm to offer smoking cessation advice. *Intern Med* 1997;36:162-5. DOI: 10.2169/internalmedicine.36.162
 45. Lewis CE, Clancy C, Leake B, Schwartz JS. The counseling practices of internists. *Ann Intern Med* 1991;114:54-8. DOI 10.7326/0003-4819-114-1-54