

# SMOKING DETERMINANTS BY GENDER: A PILOT STUDY IN SCHOOLS OF THE VISEU DISTRICT

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## Abstract

### Introduction

According to the data of the Health Behaviour in School – Aged Children: 11 – 15 years old (HBSC), of 1997/ 98 and 2002, the smoking epidemic is growing in Portugal, particularly among the female adolescents. It seems to indicate that the preventive actions in our country are not working out, which can be an outcome of not considering important issues like gender differences. Much has been researched on the determinants of smoking but the existed data has not been conclusive or specific of Portugal.

An Investigation Project is ongoing, aiming to deepen the knowledge of the adolescents' determinants of smoking by gender and to develop more effective preventive actions. Preliminary results of the Project are here presented.

### Objectives

The main objectives are to determine the individual, micro-social and environmental variables related to smoking by gender.

### Methodology

A quantitative study, of the transversal descriptive type, was carried out on a sample of schools of the 3<sup>th</sup> grade and secondary level of Viseu District. An anonymous self-filling questionnaire, purposed-built, was fulfilled in the classroom from 9<sup>th</sup> to 12<sup>th</sup> years. Odds-Ratio test was used to measure the risk factor.

### Results

470 students from 9<sup>th</sup> to 12<sup>th</sup> grades fulfilled the questionnaire. They were aged between 13 and 20 years old. 8.1% of the girls and 16.1% of the boys are regular or occasional smokers. Smoking, in girls and boys, seems to be related to these factors, among others: inability to refuse a cigarette offer, drunkenness, smoking among best friends (boys and girls), cigarette offers by best friend(s) and availability of money. Gender differences were found in some smoking

determinants. Body dissatisfaction appears as a factor related to smoking only in girls.

### **Conclusion**

There are differences in the variables related to the risk of smoking in girls and boys. It is then a crucial issue to continue the investigation about gender differences so that prevention actions based on them can be developed.

**Keywords:** smoking; determinants of smoking; gender differences; tobacco.

# DETERMINANTES DO CONSUMO DE TABACO EM FUNÇÃO DO SEXO: UM ESTUDO PILOTO REALIZADO EM ESCOLAS DO DISTRITO DE VISEU

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## Resumo

### Introdução

Segundo os dados do Health Behaviour in School - Aged Children: 11 - 15 anos (HBSC), de 1997 / 98 e 2002, a epidemia tabágica está em crescimento em Portugal, particularmente nas adolescentes. Este pode ser um indício de que as acções preventivas, no nosso país, não estão a ter os resultados esperados, o que pode estar relacionado com o facto de não terem em conta, entre outros factores, as diferenças de sexo. Apesar de existirem muitos estudos acerca dos determinantes do consumo de tabaco em adolescentes, os dados existentes, em relação às diferenças de sexos, não são conclusivos nem específicos do nosso país. Um Projecto de investigação está a decorrer em Portugal, com o objectivo de aprofundar o conhecimento dos determinantes do consumo de tabaco nos adolescentes, por sexo, e desenvolver acções preventivas mais eficazes. Os dados preliminares do estudo são aqui apresentados.

### Objectivos

Os principais objectivos deste estudo são: determinar os factores individuais, micro-sociais e ambientais relacionados com o consumo de tabaco em adolescentes.

### Metodologia

Trata-se de um estudo quantitativo, do tipo transversal descritivo, realizado numa amostra de escolas do 3.º Ciclo e Ensino Secundário do distrito de Viseu. Foi utilizado um questionário anónimo de auto-relato, construído para o efeito e aplicado em contexto de sala de aula. Para medir o grau de risco, foi utilizado o teste do Odds-Ratio.

### Resultados

Responderam ao questionário 470 alunos do 9.º ao 12.º anos, com idades compreendidas entre os 13 e os 20 anos. 8.1% das raparigas e 16.1% dos rapazes da amostra são consumidores regulares ou ocasionais de tabaco.

O consumo de tabaco, por rapazes e raparigas, parece estar associado, entre outras variáveis, a: incapacidade de recusa de oferta de cigarros, consumo excessivo de álcool, consumo de tabaco pelos melhores amigos (rapazes e raparigas), ofertas de

cigarros pelos melhores amigos e disponibilidade de dinheiro. Foram encontradas diferenças, entre sexos, relativamente a alguns determinantes do consumo de tabaco. A insatisfação com o corpo é uma variável que surge relacionada com o consumo de tabaco apenas nas raparigas.

### **Conclusão**

Há diferenças nos factores determinantes do consumo de tabaco, em relação ao sexo. É, assim, fundamental continuar a investigação acerca destas diferenças, para que as acções preventivas possam incluir estes dados, tornando-se mais efectivas.

**Palavras – chave:** tabagismo; determinantes do consumo; diferenças de sexo; tabaco.

### **Introduction**

Smoking keeps on being the main isolated cause of premature death in the western world (World Health Organization [WHO], 2008).

According to the data of the Health Behaviour in School – Aged Children: 11 – 15 years old (HBSC), of 1997/ 98 (Currie, Hurrelmann, Settertobulte, Smith, & Todd, 2000) and 2002 (Currie *et al.*, 2004), the smoking epidemic in Portugal is growing, particularly among the female adolescents. In four years, the prevalence of 15-year old adolescent boys, daily smokers, raised from 13% to 13.1%. In the same time period, the prevalence of girls, daily smokers, registered an alarming increase from 10 to 19.5%. These tendencies being maintained, the pre-birth and post-birth problems related to smoking will aggravate in a near future. It seems to prove that the preventive actions in our country are not working out, either because they are not being applied or because they are not considering the differences of gender. For that reason it is necessary to get to know better the motives that lead adolescents to smoke.

Much has been researched on the determinants of smoking but a smaller attention has been paid to gender differences. Data from the European project Gender differences in Smoking in young people, in which 13 countries have participated, have not been conclusive (Hublet, Lambert, Verduyck, Maes, & Broucke, 2002). Also in the Paris Conference About Smoking and Woman, which took place in 1999, some explanations were presented to the increase in the epidemic in women, but little has been put forward about the reasons for the increase in the young women who had schooling.

To have smoking prevention done based on the scientific evidence, several researches have been done to get to know the aetiology. The majority of smokers start smoking in

adolescence, before the 18 years old (Precioso, 2004; Puerta & Checa, 2007). In Portugal, according to an investigation of Precioso (2004), with 388 students of the University of Minho, 49% of them started smoking between 15-18 and the initiation age was earlier to boys than girls (32% of the boys started smoking in the Basic Education, where only 1.7% of the girls did it, which is seen in many other studies (Currie *et al.*, 2008; Matos *et al.*, 2006; Nebot, Tomás, Ariza, Valmayor, & Mudde, 2002). School is the place of initiation of the smoking behaviour for the majority of the students.

According to the four stages of development of the “smoker career” - preparation; initiation/ experimentation; habituation and maintenance/ dependency -, there are different factors influencing each of them (DeVries, 1989; Nutbeam, Mendoza, & Newman, 1988; Precioso, 1999).

The “Preparation” stage goes from birth to the beginning of adolescence. It is characterized by the fact that the child has not yet smoked but starts to raise expectations and form attitudes that may lead him/ her to experiment the first cigarette (Initiation). To the formation of a positive attitude towards smoking it is particularly strong the parents’ smoking, the opinion of parents and social communication, especially television (Becoña & Vázquez, 1996; DeVries, 1989; Nutbeam, *et al.*, 1988).

The “Initiation and Experimentation” stage consists in the first cigarette try and it is associated with the process of secondary socialization that happens particularly at school, with the closest friends, and also through the “media”. To the experimentation of the cigarette the following influences are particularly strong: the natural curiosity of all children of this age; the exercise of smoking by intimate friends; the exercise of smoking by parents; the “media”, especially television and magazines; the easiness in getting cigarettes; the desire of social acceptance; curiosity concerning adults’ habits (Becoña & Vázquez, 1996; USDHHS, 1994, 2001).

The “Habituation” stage generally occurs during adolescence and it is characterized by the fact that the adolescent starts smoking with some regularity (at least one cigarette a week). The main psychosocial risk factors associated with this kind of use are: having smoker friends, being involved in social situations in which friends support smoking, having low self-efficiency and refusal ability, having cigarettes available, having the perception that smoking is useful for the person, having little restrictions to smoking at school and in the community.

The acquisition of the habit is related to the reinforcement of physical, social and psychological positive experiences related to smoking. Particularly influent in this stage are the beliefs about the effects of smoking (for instance: “it calms down”, “it gives confidence”, “it controls the weight”); the acceptance or underestimation of the risks for the health; the friends’ attitude concerning smoking (including the one of the brothers/sisters) and habits. Those whose parents, siblings, friends or others of their social environment smoke have a higher probability of remaining smokers (Ariza & Nebot, 2002; Piperakis, *et al.*, 2008; Puerta & Checa, 2007; USDHHS, 2001; Vitória, Silva, & DeVries, 2007; WHO, 2001). The ability to refuse cigarette offers and the image of himself/ herself are some of the psychological factors with impact at this and following stages. Also, the non smokers reveal more positive emotions (Hoving, Reubsæet, & DeVries, 2007). The accessibility and the price of the cigarettes are environmental factors which have a great influence in smoking (USDHHS, 2001).

In the stage of Maintenance/ Dependency the individual continues to smoke due to the physical dependency on nicotine and the social and psychological dependency (Becoña & Vázquez, 1996; Precioso, 1999; USDHHS, 1994).

The way followed by a smoker may not be linear. From the knowledge of the determinants of smoking several preventive strategies have been drawn to apply on each stage of the smoker career, namely: school-based curricula; school environmental changes; parental involvement; promotional bans; price increases (Becoña & Vázquez, 1996; Flay, 1998; Nutbeam, *et al.*, 1988; Perry & Forster, 2002; USDHHS, 1994).

In this context, determinants of smoking among adolescents deserve a profound study. In Portugal, data have not been conclusive and few studies have been carried out so far regarding gender differences.

Due to this set of reasons, an Investigation Project is ongoing, aiming to deepen the knowledge on the smoking determinants by gender, heightening the chances of developing more effective preventive actions.

### **Objectives**

This study presents preliminary results of the Project, with the data from schools of the Viseu District. The main objective is to determine the individual, micro-social and environmental factors related to occasional and regular smoking in adolescents by gender.

## Methodology

### Sample

The sample consists of 470 students from four schools of the 3<sup>th</sup> Cycle and Secondary Level of the Viseu District, in the school year 2008/09. The students who fulfilled the questionnaire were those whose parents gave permission to participate in the study. Regarding sociodemographic characterization of the sample (Table 1), 262 participants are girls (55.9%) and 207 are boys (44.1%). Girls have a mean age of 16.12 years and boys of 16.02. Regarding parents' education level, the medians reveal that girls have mothers and fathers mainly with the 7<sup>th</sup>, 8<sup>th</sup> or 9<sup>th</sup> years, while boys have mothers and fathers mainly with a higher education level (10<sup>th</sup>, 11<sup>th</sup> or 12<sup>th</sup> years). Regarding residence, both girls (45.8%) and boys (38.5%) live mainly in the village.

**Table 1. Sociodemographic data of the sample**

**N= 469**

	<b>GIRLS</b> n = 262 (55.9%)		<b>BOYS</b> n = 207 (44.1%)	
	<b>Mean (DS)</b>	<b>Min.-Max.</b>	<b>Mean (DS)</b>	<b>Min.-Max.</b>
<b>Age</b>	16.12 (1.39)	13-20	16.02 (1.37)	13-20
<b>Mothers' education</b>	<b>Median</b> 4 (7 <sup>th</sup> , 8 <sup>th</sup> or 9 <sup>th</sup> year)		<b>Median</b> 5 (10 <sup>th</sup> , 11 <sup>th</sup> or 12 <sup>th</sup> year)	
<b>Fathers' education</b>	4 (7 <sup>th</sup> , 8 <sup>th</sup> or 9 <sup>th</sup> year)		5 (10 <sup>th</sup> , 11 <sup>th</sup> or 12 <sup>th</sup> year)	
<b>Residence</b>	<b>Frequencies</b>		<b>Frequencies</b>	
	<b>f</b>	<b>%</b>	<b>f</b>	<b>%</b>
- Village	120	45.8	79	38.5
- Town	71	27.1	54	26.3
- City	71	(27.1)	72	35.1

### Materials

An anonymous self-filling questionnaire, purposed-built for the Project, was applied.

Once the construct assessed is multidimensional – determinants of smoking -, this is a questionnaire where most variables are measured by one item. It has 53 items and a scale, with 24 items. In addition to the original items, using some drawn from previously validated questionnaires was suitable to this instrument: the “Questionnaire

for the assessment of smoking behaviour” (Precioso, 2001) and the “Research Protocol for the 1997-98 study”, from the Health Behavior in School-Aged Children (2008). The questionnaire was validated by experts.

Dimensions evaluated with this questionnaire are: sociodemographic data; smoking habits; cigarette experimentation; individual, environmental, micro and macrosocial determinants of smoking. Regarding the individual determinants of smoking, in this study were analyzed the perception of smoking in the micro-social environment, the subjective norm, assertiveness, opinion about tobacco price, school failures, feelings about school, physical exercise, body satisfaction, alcohol consumption, drunkenness, emotional feelings and ability to make new friends. At the micro-social level, were chosen the perception of smoking by parents and friends, second-hand smoke exposure, cigarette offers, transmission of knowledge about the disadvantages of smoking and the perception of interest shown by parents about their school performance. At the environmental level, the availability of money was analyzed.

The questionnaire was approved by the Direcção Geral de Inovação e Desenvolvimento Curricular (DGIDC).

### *Procedure*

A quantitative study was carried out, of the transversal descriptive type. After having validated the sample collection plan of the Project, for the whole country, schools from the Viseu District were assigned by convenience. Previously, authorization from the Direction of the Schools has been collected. Two classes from each year (from 9<sup>th</sup> to 12<sup>th</sup>) were randomly assigned to participate in the study. After getting the parents authorization, children fulfilled the questionnaire in a classroom, with the presence of a teacher. Teachers were responsible to gather and deliver the questionnaires, which were then collected by an investigator.

In order to determine prevalences, frequency distributions were used. To get to know the factors related to smoking in the sample Odds Ratio test (OR) was used, with category variables being dichotomized. The Odds Ratio test is a way of comparing whether the probability of a certain event is the same for two groups. In this study, these groups were formed based on the variable “smoking habits”. It was measured through the question “Do you currently smoke?”. Answers were dichotomized in two categories, creating the two groups of analysis: “smokers”, which included regular and occasional



smokers, and “non smokers”, including those who are not smokers, although they may have experienced a cigarette.

The analyzed variables of the determinants of smoking were those that in a preliminary analysis seemed to have a greater impact on smoking.  $\chi^2$  was used to evaluate the significance of the OR results, although these data are not presented. According to these significances, variables were then grouped in three categories: related factors – those clearly related to smoking (where the  $\chi^2$  test revealed an association between variables or the OR result was consistent); undetermined (those whose result could be compromised by the small number of subjects in each category) and non-related factors (those clearly not related to smoking). Data were statistically analyzed through the Statistical Package for Social Sciences *Statistics* (version 17.0 for Windows).

## Results

*These results represent an exploratory study, and so data should be understood with high precaution. We are aware that these data can be strongly affected by the reduced size of the sample. More consistent data will be obtained in the end of the project, being this only a small part of it.*

Regarding smoking habits, there is a prevalence of 11.6% (54) smokers (daily and occasional) in the total sample. Analyzing by sex, 8.1% (21) of the girls and 16.1% (33) of the boys are smokers (Table 2).

**Table 2. Smoking habits**

N= 463

		Smoking habits			
		Smokers		Non smokers	
	n	f	%	f	%
GIRLS	258	21	8.1	237	91.9
BOYS	205	33	16.1	172	83.9

Regarding cigarette experimentation (table 3), there is a higher percentage of boys than girls who have experienced (56.3% vs 42.5%). Boys also experience to smoke at an earlier age (12.79 years vs 13.54). Both point out the curiosity as the first motive for trying a cigarette (83.6% of the girls and 76.1% of the boys) and both got the first one mainly given by a friend.

**Table 3. Cigarette experimentation**

	GIRLS		BOYS	
<b>Experimentation</b>	<b>f</b>	<b>%</b>	<b>f</b>	<b>%</b>
Yes	111	42.5	116	56.3
No	150	57.5	90	43.7
<b>Experimentation Age</b>	<b>Mean (Standard-Deviation)</b>		<b>Mean (Standard-Deviation)</b>	
Years	13.54 (2.22)		12.79 (2.88)	
<b>Motive</b>	<b>f</b>	<b>%</b>	<b>f</b>	<b>%</b>
Curiosity (“wanted to know how it was to smoke”)	92	83.6	89	76.1
Others	18	16.4	28	23.9
<b>Way of getting the first cigarette</b>	<b>f</b>	<b>%</b>	<b>f</b>	<b>%</b>
Given by a friend	80	72.1	91	77.8
Bought	9	8.1	4	3.4
Others	22	19.8	22	18.8

*Individual determinants of smoking*

Table 4 presents the risk values associated with each individual determinant of smoking, by gender. In table 5 we can see the significance of that risk values, regarding their relation with smoking.

Common factors related to smoking are: to be unable to refuse a cigarette offer (Girls - OR=3.20; Boys – OR= 4.73) and to have been drunk at least one time (Girls - OR=6.36; Boys= 3.00). Body dissatisfaction appears as a factor related to smoking, only in girls (OR=3.23).

Undetermined individual factors to smoking, in both sexes, are: to believe that father and mother would like them to smoke (subjective norm); to have little assertiveness (“to do things that others convince them to do”); to feel confident never or rarely; to have school failures (at least one year failed); not liking the school and to have experienced alcohol. The lack of physical exercise is an undetermined factor to smoking in girls. In boys, to think that their siblings want them to smoke is an undetermined factor, along with “feeling sad sometimes or always”, body dissatisfaction and difficulty in making new friends.

To consider tobacco cheap, very cheap or affordable and to have the perception that more than half of classmates smoke (overestimation) are non-related factors to smoking in girls and boys. Specifically in girls, factors that are not related to smoking are: to believe that siblings would like them to smoke (subjective norm); to feel sad (sometimes or always) and to have some difficulties in making new friends. The lack of physical exercise is a non-related factor to smoking in boys.

Table 4. Odds–Ratio Test results for the individual determinants of smoking, by gender

		Smoker	vs	Non Smoker
		GIRLS		BOYS
<b>Individual determinants</b>				
<b>Opinion about tobacco price</b>				
	Expensive or very expensive	1.00		1.00
	Very cheap, cheap or affordable	0.32 (0.12-0.89)		0.57 (0.25 – 1.27)
<b>Perception of smoking among classmates and adolescents of their age</b>				
Colegas de turma	Less than half	1.00		1.00
	More than half	0.37 (0.11-1.31)		0.42 (0.19 – 0.92)
<b>Subjective norm (“They would like me to smoke”)</b>				
Father	No	1.00		1.00
	Yes	9.52 (0.87 – 10.05)		1.01 (1.00 – 1.02)
Mother	No	1.00		1.00
	Yes	9.52 (0.87 – 10.05)		1.02 (1.00 – 1.02)
Siblings	No	1.00		1.00
	Yes	0.94 (0.84 – 1.06)		1.01 (1.00 -1.03)
<b>Ability to refuse a cigarette offer</b>				
	Refuse	1.00		1.00
	Accept	3.20 (1.20 – 8.54)		4.73 (1.89 – 11.82)
<b>Assertiveness (“They convince me to do things that later I regret”)</b>				
	Never or rarely	1.00		1.00
	Sometimes, often or always	1.11 (0.39 – 3.18)		2.12 (0.88 – 5.04)
<b>School failures</b>				
	No	1.00		1.00
	Yes	0.42 (0.06 – 3.30)		2.20 (1.04 – 4.68)
<b>Feelings about school</b>				
	Like or really like	1.00		1.00
	Not really like or dislike	1.96 (0.38 – 10.05)		1.44 (0.43 – 4.84)
<b>Physical exercise</b>				
	Never or once or twice a month	1.00		1.00
	1/ 2 times a week or every day	2.26 (0.86 – 5.92)		0.77 (0.21 – 2.74)
<b>Body satisfaction</b>				
	Yes	1.00		1.00
	No	3.23 (1.21 – 8.61)		0.67 (0.26 – 1.74)
<b>Have you ever drunk an alcoholic drink?</b>				
	No	1.00		1.00
	Yes	1.17 (1.11 – 1.24)		1.93 (0.43 – 8.69)
<b>Drunkenness</b>				
	Never	1.00		1.00
	Yes, at least one time	6.36 (2.49 – 16.25)		3.00 (1.38 – 6.53)

<b>Emotional state</b>			
d) <sup>1</sup>	Sometimes or always	1.00	1.00
	Never or rarely	1.47 (0.60 – 3.60)	1.20 (0.54 – 2.65)
e) <sup>2</sup>	Never or rarely	1.00	1.00
	Sometimes or always	0.79 (0.31 – 1.97)	0.78 (0.36 – 1.67)
<b>Ability to make new friends</b>			
	Easy or very easy	1.00	1.00
	Difficult or very difficult	0.76 (0.31 – 1.86)	1.06 (0.50 – 2.25)

Table 5. Risk significance for each individual determinant of smoking, by gender

				Smoker	vs	Non Smoker					
				GIRLS			BOYS				
<b>Individual determinants</b>											
<b>Opinion tobacco price</b> – Cheap, very cheap or affordable				NR			NR				
<b>Perception</b> that more than half of classmates smoke				NR			NR				
<b>Subjective norm (“They would like me to smoke”)</b>											
Father				U			U				
Mother				U			U				
Siblings				NR			U				
<b>No ability to refuse a cigarette offer</b>				R			R				
<b>Assertiveness (“They convince me to do things that later I regret”)</b>											
Sometimes, often or always				U			U				
<b>School failures</b>				U			U				
<b>Feelings about school</b> - Not really like or dislike				U			U				
<b>Physical exercise</b> - Never or once or twice a month				U			NR				
<b>Body dissatisfaction</b>				R			U				
<b>Alcohol experimentation</b>				U			U				
<b>Drunkenness</b> - at least one time				R			R				
<b>Emotional state</b>											
d) <sup>3</sup>	Never or rarely			U			U				
e) <sup>4</sup>	Sometimes or always			NR			U				
<b>Difficulty to make new friends</b>				NR			U				

R - Related factor; U – Undetermined; NS - Non-related factor

### *Micro-social and environmental determinants of smoking*

As can be seen in tables 6 and 7, regarding micro-social determinants of smoking, there are common factors related to smoking: to have more than three friends – girls – who smoke (Girls – OR= 8.12; Boys - OR= 3.55); to have more than three friends – boys – who smoke (Girls – 4.27; Boys - OR= 3.90); to receive cigarette offers from best friends (Girls - OR= 7.71; Boys - OR=7.35) and to have not been spoken about the disadvantages of smoking by a teacher (Girls - OR= 7.54; Boys - OR= 2.62).

<sup>1</sup> Frequency with which he/she feels confident

<sup>2</sup> Frequency with which he/she feels sad

<sup>3</sup> Frequency with which he/she feels confident

<sup>4</sup> Frequency with which he/she feels sad

Also availability of extra money by month, the analyzed environmental factor, is a related factor to smoking both in girls (OR= 3.34) and boys (OR= 1.53).

Related factors to smoking only in girls are: to have a smoking mother (OR= 5.4) and siblings (OR= 3.17); to be exposed to second-hand smoke exposure by mother (OR= 6.44); to receive cigarette offers by “other people” (OR= 3.4) and to have not been spoken about the disadvantages of smoking by best friend(s) (OR= 1.42).

In both sexes, there are micro-social factors to smoking which relation to smoking is undetermined: the second-hand smoke exposure by siblings; to receive cigarette offers by father, mother and friends and to have not been spoken about the disadvantages of smoking by the father or mother. Other undetermined factors appear in boys: to have a smoking father and siblings; to be exposed to second-hand smoke by mother and to have not been spoken about the disadvantages by their best friend(s) and siblings.

The non-related factor to smoking, in both sexes, is to be exposed to second-hand smoke by father. In girls, specific factors non-related to smoking are: to have a smoking father and to have not been spoken about the disadvantages of smoking by siblings. Non-related factors to smoking only in boys are: to have a smoking mother; to receive cigarette offers by “other people” and to percept parents to show a lack of interest about their school performance (“parent’s help in everything that is related to school” and “encouragement to do good homework”).

Table 6. Odds–Ratio Test results for the micro-social and environmental determinants of smoking, by gender

		Smoker	/	Non Smoker
		GIRLS		BOYS
<b>Micro-social determinants</b>				
<b>Smoking in the social environment (parents, siblings)</b>				
		<b>ODD Ratio (CI)</b>		<b>ODD Ratio (CI)</b>
Father	Doesn't smoke	1.00		1.00
	Smokes	0.99 (0.35-2.83)		1.21 (0.50 – 2.95)
Mother	Doesn't smoke	1.00		1.00
	Smokes	5.4 (1.84 – 15.81)		0.86 (0.23 – 3.06)
Siblings	Doesn't smoke	1.00		1.00
	Smokes	3.17 (1.15 – 8.70)		2.40 (0.83 – 6.91)

<b>Second-hand smoke exposure</b>			
Father	No	1.00	1.00
	Yes	0.79 (0.18 – 3.60)	0.94 (0.26 – 3.43)
Mother	No	1.00	1.00
	Yes	6.44 (1.76-23.58)	1.42 (0.28 – 7.16)
Siblings	No	1.00	1.00
	Yes	2.16 (0.24 – 19.47)	1.02 (1.00 – 1.05)
<b>Smoking among best friends (boys and girls)</b>			
Friends (boys)	Less than three	1.00	1.00
	More than three	4.27 (1.60-11.40)	3.90 (1.78 – 8.54)
Friends (girls)	Less than three	1.00	1.00
	More than three	8.12 (3.09-21.34)	3.55 (1.47 – 8.57)
<b>Cigarette offers</b>			
Father	No	1.00	1.00
	Yes	1.44 (0.16 – 13.02)	1.05 (1.01 – 1.09)
Mother	No	1.00	1.00
	Yes	1.84 (0.20 – 17.36)	1.02 (1.00 – 1.05)
Best Friends	No	1.00	1.00
	Yes	7.71 (2.74 – 21.64)	7.35 (2.57 – 21.00)
Friends	No	1.00	1.00
	Yes	1.15 (1.08 – 1.22)	2.94 (0.37 – 23.67)
Other people	No	1.00	1.00
	Yes	3.4 (0.90 – 12.88)	0.96 (0.35 – 2.64)
<b>To have been spoken about the disadvantages and harm of smoking by one of the following:</b>			
Father	Yes	1.00	1.00
	No	1.68 (0.64 – 4.43)	2.18 (0.87 – 5.46)
Mother	Yes	1.00	1.00
	No	1.78 (0.61 – 5.16)	0.93 (0.30 – 2.91)
Siblings	Yes	1.00	1.00
	No	0.69 (0.27 – 1.73)	0.82 (0.37 – 1.83)
Best friend(s)	Yes	1.00	1.00
	No	1.42 (0.57 – 3.59)	0.60 (0.27 – 1.32)
Teacher(s)	Yes	1.00	1.00
	No	7.54 (2.85 – 19.95)	2.62 (1.13 – 6.11)
<b>Perception of the interest shown by parents about school performance</b>			
a) <sup>5</sup>	Often or always	1.00	1.00
	Never, rarely or sometimes	2.03 (0.23 – 17.71)	2.69 (0.47 – 15.35)
b) <sup>6</sup>	Often or always	1.00	1.00
	Never, rarely or sometimes	3.42 (0.88 – 13.39)	2.03 (0.78 – 5.26)
<b>Environmental determinants</b>			
<b>Availability of money</b>			
	Less than 10€	1.00	1.00
	More than 10€	3.34 (1.32 – 8.43)	1.53 (0.70 – 3.35)

<sup>5</sup> Parents' help in everything that is related to school

<sup>6</sup> Encouragement of parents to do good homework

Table 7. Risk significance for each micro-social and environmental determinant of smoking, by gender

		Risk significance	
		GIRLS	BOYS
<b>Micro-social determinants</b>			
<b>Smoking in the social environment (parents, siblings)</b>			
Father		NR	U
Mother		R	NR
Siblings		R	U
<b>Second-hand smoke exposure</b>			
By father		NR	NR
By mother		R	U
By siblings		U	U
<b>Smoking among best friends (boys and girls)</b>			
More than three friends smoking (boys)		R	R
More than three friends smoking (girls)		R	R
<b>Cigarette offers</b>			
Father		U	U
Mother		U	U
Best Friends		R	R
Friends		U	U
Other people		R	NR
<b>To have been spoken about the disadvantages and harm of smoking by one of the following:</b>			
Father		U	U
Mother		U	U
Siblings		NR	U
Best friend(s)		R	U
Teacher(s)		R	R
<b>Perception of the interest shown by parents about school performance</b>			
a) <sup>7</sup>	Never, rarely or sometimes	U	NR
b) <sup>8</sup>	Never, rarely or sometimes	U	NR
<b>Environmental determinants</b>			
<b>Availability of money - More than 10€extra/month</b>		R	R

R – Related factor; U – Undetermined relation; NS - Non-related factor

## Discussion and conclusion

This study intended to identify individual, micro-social and environmental determinants of occasional and regular smoking by gender. Gender differences were found regarding some smoking determinants.

Prevalence of smoking in this sample is about double in boys than girls. This data didn't match that of the HBSC (2004), where there were more smoking girls than boys smoking, which can be due to the fact that this is a small sample, that doesn't reflect the

<sup>7</sup> Parents' help in everything that is related to school

<sup>8</sup> Encouragement of parents to do good homework

national results and also the fact of belonging to a within city of the country, which is referred to in other investigation data.

Boys have their first smoking experience earlier than girls, which is in accordance with other studies (Matos *et al.*, 2006; Precioso, 2004). Both girls and boys experiment their first cigarette by curiosity, which reinforces the importance of individual factors, as refereed in other studies (Becoña, 2004) and environmental factors (accessibility to the substance).

There is an association between smoking, in both girls and boys, and some factors: the lack of ability to refuse a cigarette offer; to have been drunk at least one time; to have more than three friends smoking (being them girls or boys); to receive cigarette offers by best friends; to have not been spoken about the disadvantages of smoking by a teacher and to have availability of money.

Starting by the individual factors, girls and boys who have a lack of assertiveness, as the inability to refuse a cigarette offer, have a higher risk to be smokers than those that are able to refuse this kind of pressure. This highlights the importance of incrementing the assertiveness ability, in order to promote more resistance to peer pressure to consumption. Also the association between alcohol (to have been drunk at least one time) and smoking is seen in this study, in both sexes, which seems to reinforce that the risk behaviors are associated many times: smokers are involved in most risk health behaviors, like alcohol consumption (Scal, Ireland, & Borowsky, 2003), and this is also a related factor to the beginning and maintenance of smoking behavior (Ariza & Nebot, 2002; Hoving, Reubsaet, & deVries, 2007).

Differences have been found in individual determinants, by gender. Body dissatisfaction represents an elevated risk only for girls, which is, according to Ariza and Nebot (2002), related to a higher need of using tobacco as a tool to deal with distress, anxiety and other negative feelings. Also many girls believe smoking controls weight (USDHHS, 2001), which is not found in boys who smoke. Having this into account, it is extremely important that preventive programs include this variable, emphasizing the short-term negative consequences of smoking to appearance and health.

Regarding micro-social determinants, it should be emphasized the association, to both sexes, between smoking behavior and having more than three friends smoking (being them boys or girls) as well as having received cigarette offers from friends. This is



clearly in accordance with other studies (Puerta & Checa, 2007; USDHHS, 2001), reinforcing that the most direct influence in adolescents is the smoking of their best friends.

Also the lack of transmission of knowledge about the disadvantages of smoking by a teacher is a related factor to smoking in girls and boys, which supports the importance of the involvement of school to mitigate the negative impact of the friends' group beliefs, as this is a moderator factor between the models received (others smoking) and the behaviors.

Cigarette offers are more associated with smoking in the feminine gender, but both are influenced by cigarette offers by best friends, showing the higher impact of the proximal variables, as the easy availability to the substance, reinforced then by the peer pressure to the consumption.

Regarding smoking in the social environment, it is interesting to notice that girls who have a smoking mother and siblings, and also those that are exposed to second-hand smoke by mothers, have a greater risk to be or to become smokers, which is not seen in boys. Tobacco consumption by father has an undefined relation to their sons', as mother smoking has a defined relation to their daughter smoking. At the same time, smoking by mothers is not related to boys' smoking neither fathers' smoking to girls' smoking. This leaves opened the possibility of a greater impact of smoking by mothers in girls and smoking by fathers in boys. These results call attention for a great impact to girls of mother behavior, as mentioned in other studies (Puerta & Checa, 2007). Also the impact of social modeling, in general, is higher in girls (Hublet, *et al.*, 2002).

Regarding environmental factors, the availability of money should have some parental control and appeals to environmental interventions, as it is a smoking related factor for both sexes.

There are many individual and micro-social factors whose relation to smoking is undetermined, to both sexes, in this study, like the subjective norm, as the belief that "mother and father would like me to smoke", school failures, feelings about school, feelings of confidence/lack of self-esteem, to have not been spoken about the disadvantages of smoking by parents, which are probably, in some direction, related to smoking, but need to be analyzed with further data.

These results should be seen in the context of this study's limitations. This is an exploratory study, and so data should be understood with high precaution. These data revealed many undetermined factors and didn't allow making more analyses with all the interesting variables regarding gender, due to the reduced sample size. As mentioned before, we are aware that these data can be strongly affected by this limitation. The project foresees the collecting of a national sample, with about 8000 participants, which will allow gathering more feasible data. Prosecution of the investigation is needed in order to have more accurate results and clarify the variables related to smoking in adolescents, and especially by gender.

However, this study highlighted the importance of including gender specific measures while constructing preventive intervention programmes directed to adolescents. There is a fundamental role played by some individual, micro-social and environmental factors in smoking behavior. In this study, both girls and boys appeared to have more clearly related factors to smoking from the micro-social level. Micro-social factors are related to aspects of the social environment of the individual, as family, peer group and their influences operating as proximal determinants of behaviour.

It is a crucial issue to continue the investigation about gender differences so that prevention actions based on such differences can be developed.

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