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Program for the Prevention of Smoking in Secondary School Students

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ABSTRACT

Background and Objective. School smoking prevention programs have never yielded the expected results. The aim of this study was to analyze the efficacy of an intensive smoking prevention program created by the educational community in which it was to be applied.
Population and Method. A 3-year smoking prevention program was carried out among the students of Fuentesaúco Secondary School in Zamora, Spain. The Babilafuente Secondary School in Salamanca, Spain was the control group. The program included both prevention and treatment activities. The former were carried out in the school, in out-of-school situations, and in the community. The questionnaire of the European Smoking Prevention Framework Approach was used.
Results. A total of 417 students aged 12 to 17 years participated in the study. Of these, 54.4% belonged to the intervention group and 45.6% to the control group. Smokers represented 36.7% of the population. After the intervention smokers represented 40.1% of the Fuentesaúco students compared with 46.1% of the Babilafuente students, though the difference was not statistically significant. With respect to the cognitive determinants of smoking behavior, after the intervention significant differences in favor of the intervention group were only observed in the subjects' perception of the behavior of their siblings, peers, and teachers.
Conclusions. The use of smoking prevention programs in schools should be reconsidered, and their evaluation should be based on educational rather than clinical criteria. Proposed changes in the program include decreasing its intensity, starting with students of an earlier age and seeking greater involvement of parents.

Programa de prevención del tabaquismo en alumnos de enseñanza secundaria

Palabras clave:
Prevención de tabaquismo
Programas escolares
Consumo de tabaco
Adolescentes
Centros escolares

RESUMEN

Introducción y objetivo. Los programas de prevención de tabaquismo en la escuela no han ofrecido nunca los resultados que era previsible esperar. El objetivo del presente trabajo es analizar la eficacia de un programa intensivo de prevención del tabaquismo elaborado por la propia comunidad educativa en la que se va a desarrollar.
Población y método. Se ha realizado un programa de intervención de tabaquismo, de 3 años de duración, dirigido a los alumnos de enseñanza secundaria del instituto de Fuentesaúco (Zamora). El instituto de Babilafuente (Salamanca) ha sido el grupo control. El programa constaba de actividades de prevención y actividades de tratamiento. Las primeras se desarrollaron en el ámbito tanto escolar como extraescolar y en la comunidad. Se utilizó el cuestionario del proyecto ESFA.

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Resultados. Participaron 417 alumnos de 12-17 años, de los que el 54,4% pertenecía al grupo de intervención y el 45,6% al grupo control. Fumaba el 36,7% de los alumnos. Después de la intervención fumaba el 40,1% de los alumnos de Fuentesaúco frente al 46,1% de Babilafuente, diferencia no significativa. Con respecto a los determinantes cognitivos de la conducta fumadora, después de la intervención únicamente se observaron diferencias significativas a favor del grupo de intervención en la conducta percibida de hermanos, iguales y profesores.

Conclusiones. Es preciso replantearse la realización de programas de prevención de tabaquismo en la escuela y su evaluación con criterios clínicos, que deben sustituirse por criterios pedagógicos. Se plantea corregir el programa disminuyendo su intensidad, comenzar a edades más tempranas e implicar más a los padres de los alumnos.

Introduction

Though smoking has decreased in developed countries in the last decade, the rates among young people are still high, and those in Spain are among the highest in the European Union.[1] According to the Spanish National Health Survey of 2003, the general prevalence in the population over the age of 16 years was 31.2%, whereas in the population aged 16 to 24 years it was 35.8%.[2] The National Health Survey of 2006 showed figures for the 2 groups of 29.9% and 33.26%, respectively.[3]

In the Survey on Drugs in the School Population (EDPE) for 2000, the mean age at which students smoked for the first time was 13.1 years, the mean age at which they started to smoke every day was 14.4 years, and the prevalence of smoking was 32.1%. In the EDPE for 2004, the figures were 13.2 years, 14.5 years and 37.4%, respectively.[4]

According to the latest figures published by the Spanish Ministry of Health and Consumer Affairs and taken from the National Survey on the Use of Drugs in Secondary School Students for the academic year 2006-2007, 14.8% of students aged 14 to 18 years smoked every day,[5] compared with 21.5% in 2004 and 23.0% in 2000, suggesting that there is room for optimism.

Smoking initiation takes place at school age.[6] Smoking prevention has been included in the cross-curricular content of the school curriculum, which is material of a diverse nature that cannot be distinguished as belonging to any specific subject but that must be integrated into all of them. A cross-curricular approach is considered the ideal in many areas of education, but it is far from being achieved in practice.[7,8]

There is a consensus on the need to prevent harmful behaviors such as smoking in schools,[9,10] but school prevention programs have never yielded the expected results. Though protocols for excellence have been developed for these programs in the last 20 years,[11] their results have not improved. Therefore, their efficacy and the appropriateness of continuing them have been questioned. The latest Cochrane review[12] on this question points out that only half of the highest quality studies reported fewer smokers in the intervention group than in the control group. The Hutchinson Smoking Prevention Project,[13] the largest and most rigorous study included in the review, observed no long-term effect after an intensive program of 65 sessions over 8 years.

One of the shortcomings of most programs carried out in Spain is that they are introduced in schools rather than being created by them, so the teachers often see them as an imposition by the local authorities. This may well have a bearing on the results. However, the development of these programs must continue because they are our main educational tool for reducing smoking among children and adolescents.

The purpose of this study was to analyze the efficacy of a smoking prevention program aimed at reducing smoking among students and improving their attitudes to smoking. The program followed all best-practice guidelines,[11] and was created and developed in the school where it was implemented with the active involvement of all members of the community.

Population and Method

A prospective, nonrandomized, controlled longitudinal community study was carried out in 3 school years (2001-2004) on the student population of 2 Spanish secondary schools (IES), IES Fuentesaúco in Zamora and IES Babilafuente in Salamanca. The intervention was carried out at IES Fuentesaúco and IES Babilafuente provided the control group. Though for ethical reasons the program was aimed at all the students of IES Fuentesaúco, the evaluation was carried out exclusively on the students who were the object of the intervention for 3 years.

For the data collection, we used the questionnaire of the European Smoking Prevention Framework Approach (ESFA)[14] based on the Attitudes–Social Influences–Self-Efficacy (ASE) model and previously validated in a population of Spanish schoolchildren of similar characteristics to the 2 groups chosen for this study.

The study was designed to evaluate the effectiveness of a program aimed at the educational community of a basic health zone and created by the professionals who were going to carry it out. The intervention group therefore had to be defined beforehand, so it was necessary to find a control group that was as similar as possible in terms of the social and academic environment, student population, and teaching staff. Though it was not possible to randomize the participants, the groups did not show significant differences in smoking behavior. There were slight differences in the cognitive determinants of that behavior (which had to be taken into account in the evaluation of the results), but IES Babilafuente was an ideal school to provide the control group.

Before the start of activities, the program was approved by the teaching staff of both schools. The school councils were informed and asked to give their consent. A personal letter was sent to the students' parents to inform them that the program would be carried out and to request their voluntary participation. They were told that the questionnaires were anonymous, and that student answers would therefore be completely confidential and unknown to teachers and researchers. No refusals were received from the parents.

The questionnaires were self-administered during school hours after students had been told that their responses would be completely confidential. At the start of the 2001-2002 school year the questionnaire was answered by a total of 464 students at the 2 schools. At the end of the 2003-2004 school year the same questionnaire was given to the students who had participated 3 years earlier; a total of 417 responses were obtained. The numbers differed because some students of the initial groups were no longer attending the schools.

Questionnaire

The questionnaire is based on the ASE model, which integrates several theories and explains smoking behavior according to the subjects' intention to smoke in the future and in relation to attitudes and beliefs that are favorable to smoking or tolerant of its disadvantages, social influences (perceived social norms, the perceived behavior of others and pressure to smoke) and self-efficacy (the ability to refrain from smoking in situations that are conducive to it).[15]

According to the definitions of the ESFA project, the students were considered to be smokers if they were regular smokers (smoking daily or at least once a week), experimenters (smoking less than once a week, but at least once a month), and triers (smoking once in a while, but not monthly). They were considered to be nonsmokers if they were ex-smokers (no longer smoking after having smoked at least once a week), current nonsmokers (having smoked less than once a week or occasionally, but no longer doing so), and never-smokers (never having smoked a cigarette).

The cognitive variables analyzed were attitudes and beliefs, social influences, self-efficacy and intention to smoke in the future. The attitudes and beliefs were measured through 12 questions with 5 or 7 options on a Likert-type scale. The social influences were evaluated through the analysis of the social norms; the perceived behavior of parents, siblings, peers and teachers; and the pressure to smoke from peers and from advertising. Self-efficacy was assessed through 12 items with 7 possible responses reflecting the ability to refrain from smoking when individuals are with friends who smoke or offer cigarettes, are faced with emotions, or are in certain situations. The intention to smoke in the future was evaluated on a scale of 7 points, from –3 ("I will definitely smoke") to +3 ("I will definitely not smoke").

Intervention

A multidisciplinary team composed of teachers of the school and staff of the health center was formed to set up the program. The team and the program were presented to the staff meeting, the school council, the parents' association, the staff of the health center, the health council and the town council.

The initial preparation included organizing a smoking library and hanging no-smoking signs and smoking prevention posters in the corridors and classrooms of the school. The program included both prevention and treatment activities. The former were carried out in the school, in out-of-school situations, and in the community. Cross-curricular content on smoking created by the teachers of the school was included in all the areas and specific subjects of the school program. Broader, specific topics dealing with smoking were developed for use in the guidance and counseling that were undertaken in all classes and courses. During the 3-year period, common activities were also organized by the multidisciplinary team on special occasions such as World No Tobacco Day, the Day of the Spanish Constitution and the school's culture week (when photography and poster competitions are held, games are played, and there are workshops for the plastic arts and for creating comics in French and English). Several talks and debates on smoking prevention in the family environment were aimed at the students' parents, and during the holidays letters were sent regularly to the parents to try to sustain the activity of the program in the students' homes.

During the 3 years of the intervention, following best-practice guidelines,[11] the program was widely reported in the local press, on radio and on television.

The local health centers referred parents wishing to quit smoking to the smoking treatment clinic at the health center. The teachers and students wishing to quit smoking were offered the treatment in the school itself.

The teaching staff, school council and parents' association were informed of the progress of the program annually.

Statistical Analysis

For the statistical analysis a Microsoft Excel 2000 spreadsheet was converted to an SPSS database (version 11.0 for Windows, SPSS Inc, Chicago, Illinois, USA), which was used to carry out the descriptive statistical study.

The following statistical tests were used: for the comparison of proportions, Pearson's χ^2 test; for the comparison of 2 independent means, the Student-Fisher *t* test; and to determine the relationship between 2 quantitative variables, the Pearson correlation coefficient and the Spearman rank correlation coefficient.

Results

A total of 417 students participated in the study for 3 consecutive years. Of these, 54.4% belonged to the intervention group and 45.6% to the control group. In the population, aged between 12 and 17 years (mean, 14.24 years), 45.8% were boys and 54.2% girls.

A comparison of the demographic characteristics of the intervention and control groups (Table 1) showed significant differences in sex distribution, because there was a lower percentage of male students at IES Babilafuente than at IES Fuentesaúco, and in age, because students in the intervention group were younger (with more aged 12-13 years) than those in the control group. These aspects were taken into account when the intervention was evaluated.

Results Before the Intervention

Of the total population, 36.7% were smokers (38.6% of girls and 34.4% of boys). This result agrees with the figures of the EDPE of 2004.[4] Smokers were older than nonsmokers (mean [SD] age, 14.80 [1.33] years and 13.88 [1.37] years, respectively; *P*<.001). Students smoking daily or weekly represented 19.1% of the students aged 12 to 13 years, 40% of the students aged 14 to 15 years, and 58% of the students aged 16 to 17 years (Table 2).

Table 1
Demographic Characteristics of the Study Population[a]

	Intervention Group	Control Group	Total	*P*[b]
Total population	227 (54.4%)	190 (45.6%)	417	
Sex				
Boys	116 (51.1%)	75 (39.5%)	191	
Girls	111 (48.9%)	115 (60.5%)	226	.018
Age, y				
Mean (SD)	14.08 (1.48)	14.42 (1.33)		.017
12-13	85 (37.4%)	48 (25.3%)	133	
14-15	101 (44.5%)	101 (53.2%)	202	
16-17	41 (18.1%)	41 (21.6%)	82	.028
School performance				
High academic level	63 (27.8%)	61 (32.1%)	124	
Average academic level	113 (49.8%)	94 (49.5%)	207	
Low academic level	51 (22.5%)	35 (18.4%)	86	.392

[a] Data are expressed as number (%) unless otherwise stated.
[b] Statistical significance was set at *P*<.05.

Table 2
Analysis of the Smoking Behavior of the Students, by Sex and Age

	Smokers			Nonsmokers			Total	*P*[a]
	No.	%	95% CI	No.	%	95% CI		
Total	149	36.7	32.0-41.4	257	63.3	58.6-68.0	406	
Sex								
Boys	64	34.4	27.6-41.2	122	65.6	58.8-72.4	186	
Girls	85	38.6	32.2-45.1	135	61.4	54.9-67.8	220	.409
Age, y								
Mean (SD)	14.80 (1.33)			13.88 (1.37)				.001
12-13	25	19.1	12.4-25.8	106	80.9	74.2-87.6	131	
14-15	79	39.9	33.1-46.7	119	60.1	53.3-66.9	198	
16-17	45	58.4	46.6-69.6	32	41.6	30.4-53.4	77	.001

Abbreviation: CI, confidence interval.
[a] Statistical significance was set at *P*<.05.

Table 3

	School						*P*[a]
	Intervention Group			Control Group			
	No.	%	95% CI	No.	%	95% CI	
Smokers	80	36.4	30.0-42.7	69	37.1	30.2-44.0	.918
Sex							
Boys	37	32.7	24.1-41.4	27	37.0	26.0-49.1	.636
Girls	43	40.2	30.9-49.5	42	37.2	28.3-46.1	.679
Age, y							
	N	Mean	95% CI	N	Mean	95% CI	
All ages	80	14.91	14.61-15.22	69	14.67	14.36-14.97	.123
12-13	12	14.5	7.70-23.9	13	27.1	15.3-41.8	.106
14-15	42	42.4	32.6-52.8	37	37.4	27.9-47.7	.562
16-17	26	68.4	51.3-82.5	19	48.7	32.4-65.2	.106

Abbreviation: CI, confidence interval.
[a] Statistical significance was set at *P*<.05.

The mean age at which the students started smoking was 12 years (range, 11.83-12.15 years); this was the age at which the largest percentage of students started to smoke (20%), followed by the age of 13 years (18.1%).

Before the intervention, no significant differences were found in the smoking behavior between the 2 school populations overall or by sex or age (Table 3). No significant differences were found in the cognitive determinants of smoking behavior between the 2 schools, except in the perception of social norms and social pressure to smoke. These cognitive determinants were significantly stronger in the students of the control group (Table 4).

Results After the Intervention

After the 3-year intervention at IES Fuentesaúco, the students at both schools were asked to complete the same questionnaire they had answered before the intervention. The proportion of smokers in the intervention group was 40.1%, compared with 46.1% in the control group; ie, in the intervention group 6% fewer subjects smoked, showing no significant difference (Table 5).

No significant difference was observed in the percentage of smokers among the boys between the 2 groups (41.8% in the intervention group and 40.4% in the control group). In girls the intergroup difference was greater (38.8% in the intervention group and 49.5% in the control group) but did not reach statistical significance. This trend was important because before the intervention the proportion of girl smokers in the intervention group was higher than that in the control group.

In the cognitive determinants of smoking behavior after the intervention, significant differences in favor of the intervention group were only observed in perception of siblings, peers and teachers. In the intervention group, perceptions came closer to the real situation, whereas in the control group students had the distorted perception that over 50% of their peers and almost 50% of the teachers were smokers (Table 6).

Discussion

The increase in smoking among children and adolescents leaves many questions unanswered. Poor results of school programs worldwide justify further research aimed at determining the factors that predict smoking and at improving the methodological efficacy of the programs.

The Cochrane review on school-based programmes for preventing smoking stated that controlled intervention studies must be randomized for inclusion.[12] In practice, randomization of the intervention and control groups is very difficult, as is shown by the fact that only 3 of the 6 countries participating in the ESFA study were able to manage it.[16] Furthermore, other studies that were randomized ultimately found they had intervention and control groups with substantial differences.[17,18]

In the population we studied, 36.7% of the students were smokers, which is a higher prevalence than the 23.1% reported by Clemente Jiménez et al[19] in 2647 schoolchildren aged 10 to 17 years. However, it is similar to that observed in the late 1990s by Barrueco et al,[20,21] Romero Palacios et al[22] and Díez et al[23] in studies carried out in

Table 4
Comparative Analysis, by Schools, of the Cognitive Determinants of Smoking Behavior Before the Intervention

	School				P^a
	Intervention Group		Control Group		
	Mean	(SD)	Mean	(SD)	
Attitudes and beliefs (–6, has advantages and is not harmful; +6, has disadvantages and is harmful)	0.76	(1.22)	1.24	(1.23)	.052
Social norms (–3, definitely should smoke; +3, definitely should not smoke)					
Parents	1.94	(1.13)	2.25	(0.85)	.002
Adults	1.73	(1.04)	2.03	(0.79)	.001
Siblings	1.30	(1.28)	1.73	(1.14)	.009
Peers	0.61	(1.25)	0.89	(1.08)	.017
Perceived behavior (0, nobody smokes; 4, almost everyone smokes)					
Parents	1.68	(1.54)	1.58	(1.48)	.505
Siblings	0.84	(1.46)	0.90	(1.42)	.754
Peers	1.98	(1.27)	1.80	(1.04)	.217
Teachers	2.46	(1.58)	2.32	(1.21)	.587
Social pressure to smoke (0, never; 4, very often)					
Advertising	0.36	(0.90)	0.43	(0.90)	.435
Parents	0.08	(0.49)	0.01	(0.11)	.036
Siblings	0.20	(0.83)	0.08	(0.33)	.172
Peers	0.41	(0.78)	0.36	(0.58)	.501
Teachers	0.11	(0.57)	0.01	(0.21)	.022
Self-efficacy (–3, would definitely smoke; +3, would definitely not smoke)					
With friends	1.58	(1.57)	1.56	(1.60)	.900
When confronted with emotional situations	1.59	(1.74)	1.50	(1.73)	.624
When given the chance	1.84	(1.44)	1.99	(1.13)	.240
Global	1.67	(1.50)	1.69	(1.36)	.888
Intention to smoke (–3, will definitely smoke; +3, will definitely not smoke)					
In the future	0.85	(1.81)	0.78	(1.75)	.689
Next year	1.22	(1.80)	1.28	(2.00)	.748
Of your best friend	0.12	(1.55)	0.08	(1.70)	.812

[a] Statistical significance was set at $P<.05$.

Table 5
Comparative Analysis, by Schools, of the Smoking Behavior of the Students After the Intervention

	School				P^a
	Intervention Group		Control Group		
	%	95% CI	%	95% CI	
Smokers	40.1	32.2-48.1	46.1	38.2-54.0	.352
Sex					
Boys	41.8	32.5-49.8	40.4	27.6-54.2	.509
Girls	38.8	28.1-50.3	49.5	39.2-59.8	.101

Abbreviation: CI, confidence interval.
[a] Statistical significance was set at $P<.05$.

students of a similar age, and coincides with the figures of the EDPE for 2004.[4] This very high percentage of smokers justifies the interventions that are being carried out, even if there is no ideal program.

The EDPE shows prevalences of 32.9% in boys and 41.9% in girls.[4] The figures for boys and girls observed in the present study of 34.4% and 38.6%, respectively, corroborate the results of the EDPE and other studies carried out in Spain that show that smoking among girls has increased to the extent that more girls than boys now smoke.[20-24]

The mean age of smoking initiation was 12 years, 14 months earlier than reported in the EDPE[4] and in other studies.[20-23] This finding confirms the trend towards increasingly early smoking initiation and suggests that interventions aimed at preventing or delaying smoking initiation should be applied earlier, in the final stage of primary education.

The smoking prevention program was designed and managed by the school itself following best-practice guidelines,[11] as described above. After it had been implemented during 3 academic years in the intervention group and no specific measures had been taken in this period in the control group (except administration of pre- and post-intervention questionnaires), no significant differences were found for the main variables.

Smoking behavior was also similar in the 2 schools at the end of the program, as shown by no observation of significant differences (Figure). Other studies have reported similar results, which have led to questioning of the efficacy of these programs.[25] In the results of the ESFA project published by de Vries et al,[26] whose method of analysis we followed, 1 year after the intervention no significant differences were observed between the intervention and control groups; in Finland and Spain the program showed positive influences; in Denmark the intervention was even counter-productive; and in the remaining countries no significant improvements in smoking prevalence were observed. After 30 months, significant differences were only found in Portugal, with fewer new weekly smokers, and in the Netherlands, where differential effects were found for adolescents with a Dutch and non-Dutch origin. Borderline effects were found in Finland and Spain.[27]

Other authors have also pointed out this lack of efficacy in the short term. Soria-Esojo et al[28] found no differences in the prevalence among schoolchildren aged 13 to 18 years (27% before the program, 27.8% after the program), after applying a low- to medium-intensity program for 6 months. In a year-long intervention, García et al[17] observed no significant differences between the intervention and control groups.

Table 6
Comparative Analysis, by Schools, of the Cognitive Determinants of Smoking Behavior After the Intervention

	School				P^a
	Intervention Group		Control Group		
	Mean	(SD)	Mean	(SD)	
Attitudes and beliefs (–6: has advantages and is not harmful; +6: has disadvantages and is harmful)	1.05	(1.47)	1.26	(1.13)	.369
Social norms (–3: definitely should smoke; +3: definitely should not smoke)					
Parents	2.26	(1.10)	2.44	(0.62)	.089
Adults	2.10	(1.07)	2.20	(0.65)	.379
Siblings	1.73	(1.46)	2.00	(1.00)	.238
Peers	1.04	(1.25)	1.13	(1.14)	.487
Perceived behavior (0: nobody smokes; 4: almost everyone smokes)					
Parents	1.34	(1.46)	1.30	(1.46)	.814
Siblings	0.50	(1.12)	1.18	(1.62)	.017
Peers	1.68	(1.22)	2.04	(1.08)	.010
Teachers	1.21	(1.30)	1.97	(1.21)	.001
Social pressure to smoke (0: never; 4: very often)					
Advertising	0.65	(1.15)	0.73	(1.22)	.540
Parents	0.05	(0.30)	0.02	(0.28)	.397
Siblings	0.04	(0.33)	0.05	(0.22)	.808
Peers	0.33	(0.52)	0.44	(0.65)	.093
Teachers	0.10	(0.60)	0.00	(0.07)	.045
Self-efficacy (–3 would definitely smoke; +3: would definitely not smoke)					
With friends	1.40	(1.77)	1.22	(1.87)	.396
When confronted with emotional situations	1.40	(1.88)	1.10	(2.00)	.177
When given the chance	1.84	(1.38)	1.88	(1.32)	.801
Global	1.55	(1.59)	1.40	(1.64)	.427
Intention to smoke (–3 will definitely smoke; +3: will definitely not smoke)					
In the future	1.41	(1.59)	1.07	(1.72)	.075
Next year	1.44	(1.72)	1.34	(1.82)	.208
Of your best friend	0.49	(1.67)	0.24	(1.71)	.616

[a]Statistical significance was set at $P<.05$.

The hypothesis of the present work was that a program developed following best-practice guidelines and managed by the school itself could offer better results than programs imposed by the authorities. However, in view of the results obtained, the hypothesis has not been confirmed.

On comparing the cognitive determinants of smoking behavior before and after application of the program, significant differences were observed in the perception of the intervention group, whose estimate of the number of siblings, peers, and teachers who smoked was lower than the control group's estimate. Though their perception was still far from accurate, it showed improvement, thus correcting an erroneous perception—still held by the control group—that smoking was normal. This is relevant because the social perception of smoking, especially among peers, is of great importance in smoking initiation and is even considered to be a variable with predictive value.[29]

The overall results of the ESFA project, obtained from the sum of the intervention in 6 countries after 12 months, showed no differences between the control and intervention groups in the cognitive variables.[26] Only the students of the intervention group in Barcelona were significantly less convinced of the advantages of smoking than the control group and showed significantly more self-efficacy and a significantly lower intention to smoke in the future than the latter. This result was comparable to that observed in the present study, in which the students of the intervention group tended to a lower intention to smoke in the future, though in our case the difference was not significant.

Unlike the present study, the 24-month evaluation of the ESFA project[27] did show overall significant differences in the students' beliefs about smoking: the students of the intervention group were less convinced of the advantages of smoking than those of the control group (with significant differences in Finland, Portugal, and Spain). In the 30-month evaluation overall differences also appeared in self-efficacy: the students of the intervention group were more confident about refusing a cigarette offered by their friends than the control group students (with significant differences in Denmark, Portugal, the United Kingdom, and Spain).[27]

After evaluating the smoking prevention program in the intervention group, we observed that the working hypothesis had not been confirmed. Other authors have reported similar results persisting over long time periods,[30,31] even after the programs had been modified to increase their efficacy. Therefore, smoking prevention programs in schools must be reconsidered and changes must be made to achieve better results.

One of our objectives was to evaluate the application of an intensive program. In view of the results, we now think that such a program may lead to saturation of both students and teachers. We therefore propose a less intensive program that will allow teachers to acquire the necessary skills and knowledge and apply them more easily in their daily work in the long term without needing help from outside the school.

As happens in other studies,[32] during the program we observed that when students are already smokers the intervention achieves very limited results. This is the case even when the quality criteria for this type of intervention (offering treatment for smoking addiction in the form of health advice and a brief intervention) are fulfilled.[33] We therefore think that the intervention must start before the age of 12 years, when children have not yet started to smoke. Work should

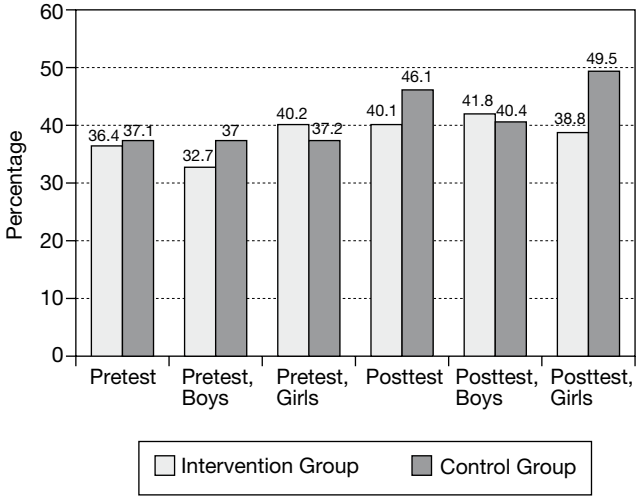

Figure. Pretest-posttest comparison of smoking prevalence, by sex and type of intervention.

be done with students in the last 2 years of primary education, so that they reach the age of 12 with sufficient knowledge and skills to defend themselves from group pressure and direct and indirect advertising.

Furthermore, activities must be intensified in out-of-school situations of the educational community. Several studies[34,35] indicate the need for community action in this direction. After our intervention, we consider that parents should be involved more actively. Firstly, they should be made to see the importance of their role as models. If they are smokers, they should be encouraged to quit smoking in order to show their children that smoking is not normal. Secondly, they should be encouraged to educate their children in smoking prevention within the family environment, speak to them, guide them in carrying out healthy activities that prevent smoking, and teach them to resist peer pressure.

In conclusion, as there is no model for such programs that guarantees success, we should perhaps—without abandoning the search for excellence that characterizes any scientific activity—replace the current clinical approach of seeking short- and medium-term efficacy and efficiency with an educational approach in which smoking prevention programs are seen as a long-term investment that is difficult to evaluate with the usual clinical criteria. Indeed, investment in smoking prevention in education need not be less profitable than investment in other aspects of the education of children and adolescents.

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