

Smoking intervention programme for male secondary-school students in south-western Saudi Arabia

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برنامج محاربة التدخين بين طلاب مدرسة ثانوية للبنين في جنوب غرب المملكة العربية السعودية
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خلاصة : تم تنفيذ برنامج لمحاربة التدخين استغرق يوماً واحداً بين 289 طالباً في مدرسة ثانوية للبنين في أبها بالمملكة العربية السعودية . ولقد أعد محتوى البرنامج على أساس التوصيات المنشورة في المطبوعات الطبية . واستخدم نص عربي لاسميان معياري أعدته منظمة الصحة العالمية خصيصاً لصغار السن ، كأساس لتقييم اختبار قبلي واختبار بعدي على مجموعة واحدة من الطلاب لتصميم البرنامج . وتبين من النتائج أن معدل انتشار التدخين المنتظم بين الطلاب كان 14.5% . وأبدى الطلاب تبايناً كبيراً في الإجابات الصحيحة عن أسئلة حول الحقائق المختلفة . وثبت أن للبرنامج تأثيراً يعد به على غير المدخنين ($P < 0.01$) وعلى طلاب مرحلة ما قبل التخصص ($P < 0.01$) . وكانت مواقف الطلاب إيجابية إجمالاً تجاه التدابير العامة ، باستثناء المدخنين منهم . ولكن كان تأثير برنامج اليوم الواحد أقل من المستوى المقبول .

ABSTRACT A one-day antismoking programme was conducted for 289 students in a male secondary school in Abha, Saudi Arabia. The one-group pretest/post-test design to evaluate the programme was based on an Arabic version of the WHO standard questionnaire for young people. The results showed that the prevalence rate of regular smoking was 14.5%. The students showed marked variability in correct responses to various factual items. The programme had a significant impact on nonsmokers ($P < 0.01$) and prespecialty students ($P < 0.01$). With the exception of smokers, the students showed an overall positive attitude towards public action, but the impact of the one-day programme was less than satisfactory.

Programme d'intervention contre le tabagisme destinés aux élèves d'un lycée de garçons dans le Sud-Ouest de l'Arabie saoudite

RESUME Une journée d'information dans le cadre de la lutte antitabac a été organisée à l'intention des 289 élèves d'un lycée de garçons à Abha. Pour l'évaluation de ce programme, un test a été effectué sur un groupe avant et après son application au moyen du questionnaire standard de l'OMS pour les jeunes (version arabe). Les résultats ont montré que le taux de prévalence était de 14,5% pour le tabagisme régulier. On a observé une variabilité marquée chez les élèves dans l'exactitude des réponses aux divers éléments factuels. Ce programme a eu un impact considérable sur les non-fumeurs ($P < 0,01$) et sur les élèves de l'enseignement général avant orientation ($P < 0,01$). A l'exception des fumeurs, les élèves ont affiché une attitude généralement positive envers une action publique contre le tabagisme mais l'impact de cette journée n'était pas très satisfaisant.

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Introduction

Smoking is now by far the largest preventable cause of death in the industrialized world [1]. In several countries, recent large-scale efforts at health promotion have contributed to a substantial decline in smoking among adolescents [2,3]. However, partly because of aggressive marketing by tobacco companies, smoking is increasing rapidly in developing countries, particularly among the young [4].

Reducing adolescent smoking rates is essential. Smoking often begins in adolescence; 90% of adult smokers start smoking before the age of 20 [5]. Although the health risks associated with long-term cigarette use in adults are well documented [6], more recent research has demonstrated adverse changes in pulmonary function and lipid proteins even among adolescent smokers [7]. Evidence suggests that school health programmes can prevent tobacco use among youth [8].

In Saudi Arabia, smoking is rigorously prohibited in schools as well as within the Ministry of Health and its hospitals [9]. Members of the Gulf Cooperation Council have introduced legislation to limit the amount of tar and nicotine in cigarette to 12 mg and 0.8 mg respectively, and have curbed cigarette advertising [10]. A health warning on every packet of cigarettes states that "smoking is a major cause of lung cancer, lung diseases and cardiovascular diseases". Moreover, there are 12 smoking-cessation clinics throughout Saudi Arabia, one of which is located in Abha, the capital of Asir province.

The aims of this study were: a) to assess the pattern of smoking behaviour, levels of knowledge about the health effects of smoking, and attitudes towards public action against smoking among secondary-school adolescents in Asir province of

south-western Saudi Arabia; and b) to assess the impact of a short-term antismoking education programme implemented in a selected school.

Subjects and methods

Participants in the educational programme for prevention and cessation of smoking included all students of the largest male secondary school of five such schools previously surveyed for smoking behaviour in Abha, during the 1994–1995 academic year. The students' ages ranged from 14 years to 19 years with a mean of 16.7 ± 1.46 years.

The programme was conducted during one whole school day. The educational content (Table 1) was based on the recommendations in the medical literature [11,12]. Teaching methods included a lecture, group discussion, poetry, role-play, a practical demonstration of how to adapt to an acupuncture session for stopping smoking and an exhibition, in addition to the use of ex-smokers as models.

To evaluate the education programme, a one-group pretest/post-test design was applied using a pretest before the programme and a post-test three months after the programme. How participants acted before training was compared with how they acted after training to detect any improvement [13].

A modified Arabic version of the World Health Organization (WHO) standard questionnaire for young people was applied [14]. The estimated reliability coefficient of the modified questionnaire was greater than 0.90. It consisted of three main areas.

Smoking behaviour. Smokers were classified into daily, weekly and experimental smokers as recommended by WHO [14].

Table 1 Teaching methods and contents of the implemented antismoking programme

Teaching method	Content
Lectures	Harmful effects of smoking Effect of smoking on pulmonary functions Religious opinions on cigarette smoking
Group discussion*	Smoking as social behaviour Alternative methods for cessation
Role-play*	Effect of peer pressure on and sources of initiation of smoking
Demonstration*	Management by acupuncture in the smoking cessation clinic
Poetry*	Hazards of cigarette smoking
Exhibition*	Posters, pamphlets, booklets and video tapes about cigarette smoking
Model of ex-smoker	Self-management skills to help stop smoking

*The students were allowed to actively participate

Daily smokers were those who, at the time of the survey, smoked cigarettes every day. Weekly smokers were those who smoked less than once a day but at least once a week, while experimental smokers were those who smoked less than once a week. To estimate the prevalence rate of smoking, we took into account daily and weekly smokers, who together constitute the regular smokers.

Knowledge about the harmful effects of smoking. This area comprised 11 factual questions about the negative effects of

smoking on the health of smokers and the health of others. Students were requested to give "true", "false" or "don't know" responses to all questions. The level of knowledge was assessed based on the correct responses to all questions.

Attitudes towards public action against smoking. This area comprised nine attitudinal questions to evaluate the students' attitudes towards and beliefs about public measures against smoking. Students were requested to give "strongly agree", "agree", "disagree" or "strongly disagree" responses to all questions. To assess the attitude of students, a scoring system was applied. Negative attitude statements were scored from 0 given to those who strongly agreed, up to 3 given to those who strongly disagreed. The reverse of this scoring system was used for positive attitude statements. Accordingly, the maximum total score for attitude questions was 27 ($9 \times 3 = 27$) and the minimum was 0. For every student, the percentage of attitude was calculated as follows: percentage of attitude = (sum of the score of attitude / maximum total score) $\times 100$. Thus, from 0 to < 30% was considered strongly negative, 30% to < 60% was considered negative, 60% to < 85% was considered positive and $\geq 85\%$ was considered strongly positive.

All questions were completed anonymously. The questionnaire was administered during the school day and was completed by the students in 20–30 minutes. Students were supervised by the authors while the classroom teacher was outside the classroom to ensure that students completed the questionnaires unaided and to ensure confidentiality.

A total of 289 questionnaires were distributed before the programme. All the students completed the questionnaire, from which the prevalence of smoking was esti-

mated. However, there were a number of missing responses for some factual and attitudinal items. Only questionnaires with two or fewer missing responses were considered satisfactory and represented the sample upon which all analyses for knowledge and attitude were based. A total of 277 questionnaires (95.8% of the total) were used. At the time of the post-test, 240 (86.6%) of the students were available. The data of the pretest and post-test were treated statistically as unpaired (independent) groups, because the questionnaire was anonymous in both tests to ensure confidentiality. Thus, it was difficult to match each student before and after the programme. Data were analysed by computing percentages and differences were tested statistically by applying the Pearson χ^2 -test for comparison between categorical data and the Student *t*-test for comparison between quantitative data.

Results

Prevalence of cigarette smoking among adolescents

Out of 289 school adolescents, 50 reported that they had ever smoked. Regular smokers (daily and weekly) constituted 84% of all smokers (giving 14.5% prevalence); three were experimental smokers. Arts students showed the highest prevalence (19.3%), followed by prespecialty students (16.6%); science students showed the lowest prevalence of regular smoking (3.3%) ($P < 0.01$). Daily smokers (12.1% prevalence) showed the same trend (Table 2).

Knowledge about the harmful effects of smoking

The findings of the study suggest that students possess some knowledge, though uneven, of the harmful effects of smoking. Table 3 shows the percentage of students before and after the programme who responded true, false or don't know for each

Table 2 Type and prevalence of smoking behaviour among male adolescents in south-western Saudi Arabia

Smoking frequency	Academic speciality ^a						Total	
	Prespecialty (n = 145)		Arts (n = 83)		Science (n = 61)		No.	%
	No.	%	No.	%	No.	%		
Daily	18	62.1	16	94.1	1	25.0	35	70.0
Weekly	6	20.7	—	0	1	25.0	7	14.0
Experimental	2	6.9	—	0	1	25.0	3	6.0
Unknown	3	10.3	1	5.9	1	25.0	5	10.0
Total number of smokers	29	100.0	17	100.0	4	100.0	50	100.0
Prevalence (%) ^b	16.6		19.3		3.3		14.5	

^a Regarding smoking behaviour, the difference between science and art students is significant ($\chi^2 = 8.23$, $P = 0.004$), and between science and prespecialty ($\chi^2 = 6.86$, $P = 0.009$), but not significant between art and prespecialty students ($\chi^2 = 0.27$, $P = 0.600$)

^b Prevalence was calculated based upon the regular smokers (daily and weekly smokers)

of the 11 factual statements. Generally, more than 50% responded correctly to the different statements, except for the statements "smoking is only bad for you if you smoke a lot every day" (21.4% before and 30.0% after the programme) and "smoking is bad for you only if you smoke for many

years" (35.2% before and 47.4% after the programme). The significant effect of the programme, as indicated by the differences between the responses before and after, was detected in the two above-noted statements. Also, after the programme, significantly more students were aware that smokers die before nonsmokers (46.3% be-

Table 3 Knowledge about smoking among male adolescents in south-western Saudi Arabia before (n = 277) and after (n = 240) the programme

Statement	Group	Response (%)			Statistical difference	
		True	False	Don't know	χ^2	P ^b
Smoking is bad for you only if you smoke a lot every day	B	36.4	21.4*	42.2	5.15	0.02
	A	42.9	30.0*	27.1		
Smokers usually die younger than nonsmokers	B	46.3*	13.9	39.8	5.19	0.02
	A	56.4*	14.4	29.2		
Breathing smoky air harms babies and young children	B	87.0*	1.8	11.2	0.06	NS
	A	86.4*	4.2	9.4		
Almost everyone who gets lung cancer has been a regular smoker	B	55.6*	10.8	33.6	0.05	NS
	A	54.4*	12.7	32.9		
A woman who is going to have a baby could harm the baby if she smokes	B	93.5*	1.4	5.1	1.68	NS
	A	90.4*	4.6	5.0		
Smoking decreases heart rate	B	78.8*	3.9	17.3	1.18	NS
	A	82.5*	3.8	13.7		
Smoking can annoy others who not smoke	B	86.4*	6.6	7.0	1.12	NSdo
	A	83.0*	8.9	8.1		
There are some cigarettes which are not dangerous	B	14.2	54.2*	31.6	2.35	NS
	A	10.6	60.9*	28.5		
Smoking is bad for you only if you smoke for many years	B	20.4	35.2*	44.4	7.01	0.005
	A	21.5	47.4*	31.1		
If you smoke you are more likely to cough	B	61.9*	7.0	31.	3.50	NS
	A	69.5*	7.7	22.8		
Smoking can lead to addiction	B	60.3*	12.3	27.4	0.0	NS
	A	60.5*	14.7	24.8		

^a χ^2 value was calculated by comparing the percentages of correct responses before and after the programme

^b Statistical significance at 5% level of significance

B = before the programme; A = after the programme; NS = not significant

* denotes correct response

fore and 56.4% after the programme), with $P < 0.05$.

With respect to the harmful effect of breathing smoky air due to cigarettes on babies and young children, 87.0% and 86.4% responded correctly before and after the programme. More than 90% affirmed that smoking by a pregnant woman harms the baby. Also, 86.4% of the students before and 83.0% after the programme knew that smoking can annoy others.

The overall levels of correct knowledge among the students before and after the programme were 61.9% and 65.6% respectively, with a significant increase in correct knowledge level after the programme ($P < 0.01$) (Table 4). Nonsmokers showed a significantly higher level of knowledge than smokers before and after the programme. With regard to academic specialty, science students showed significantly the highest level of knowledge before and after the programme (72.6%).

The effect of the programme on levels of knowledge was significant only among the nonsmokers who recorded 63.1% before and 70.0% after the programme ($P < 0.01$). With regard to academic specialty, a significant difference between the levels of knowledge before and after the programme was detected only among the prespecialty group of students.

Attitudes towards public action against smoking

Table 5 shows the percentage of students before and after the programme who responded to nine statements describing various public actions by a four point scale ranging from "strongly agree" to "strongly disagree". Generally, students had an overall positive attitude towards public action. About 75% of the students agreed that parents and teachers should not allow smoking, that tobacco advertising should not be permitted and that cigarettes should be

Table 4 Percentage of correct knowledge about smoking among male adolescents according to their smoking behaviour and academic specialty before and after the programme

Variable	Before		After		Statistical difference	
	%	(N) ^a	%	(N) ^a	χ^2	P
<i>Smoking behaviour</i>						
Smoker	57.1	(50)	54.6	(76)	0.87	NS
Nonsmoker	63.1	(227)	70.0	(164)	22.19	< 0.01
χ^2 [P value]	6.95 [P < 0.01]		60.15 [P < 0.01]			
<i>Academic specialty</i>						
Prespecialty	58.7	(117)	65.6	(85)	13.86	< 0.01
Art	60.9	(105)	59.1	(109)	0.50	NS
Science	70.9	(55)	72.6	(46)	0.44	NS
χ^2 [P value]	27.33 [P < 0.01]		29.29 [P < 0.01]			
Total knowledge	61.9	(277)	65.6	(240)	8.41	< 0.01

^a Number in round brackets denotes the total number of students in each category

^b χ^2 values were calculated based on the cumulative frequency of responses and not on the actual number of students

NS = Not significant

more expensive. A small percentage of students (20%–25%) believed that smoking is not as harmful as is claimed or were in favour of smoking if they are with friends who smoke. An attitude which was very encouraging was that smoking is associated with bad breath. However, for all nine statements, the differences between responses before and after the programme were all statistically not significant ($P > 0.05$).

Table 6 shows the negative attitude of smokers towards public action and the positive attitude of nonsmokers. This difference between smokers and nonsmokers was consistent before and after the programme ($P < 0.01$). With regard to academic specialty, students of all specialties showed positive attitudes before and after the programme. However, the difference in the attitudes between the three groups of students was significant only before the programme ($P < 0.05$), with the highest

Table 5 Attitudes and beliefs about smoking among male adolescents in south-western Saudi Arabia before ($n = 277$) and after ($n = 240$) the programme

Statement	Group	Response (%)				Statistical difference	
		Strongly agree	Agree	Disagree	Strongly disagree	χ^2	P^b
You have to smoke if you are with friends who smoke	B	10.6	9.9	19.7	59.8	0.26	NS
	A	10.4	11.2	19.5	58.9		
Smoking makes your breath smell	B	45.2	37.4	8.1	9.3	2.97	NS
	A	52.4	32.9	5.8	8.9		
If you smoke, you worry about being told off about it	B	27.7	34.9	19.7	17.6	1.21	NS
	A	25.6	35.2	23.6	15.6		
Smoking is not as harmful as is claimed	B	12.1	13.2	18.3	56.4	1.79	NS
	A	10.2	10.6	21.7	57.5		
My parents should not allow me to smoke	B	70.5	11.1	6.9	11.5	1.95	NS
	A	65.2	14.1	8.8	11.9		
Teachers should not allow smoking at school	B	72.4	12.6	5.0	10.0	5.29	NS
	A	62.8	17.3	7.5	12.4		
Tobacco advertising should not be permitted	B	63.3	12.0	8.6	16.1	1.63	NS
	A	61.1	13.5	11.4	14.0		
Cigarettes should be more expensive to stop young people smoking	B	67.2	11.6	8.6	12.7	3.48	NS
	A	59.7	15.9	8.8	15.6		
Smoking should not be permitted in public places	B	65.4	16.9	7.9	9.8	2.00	NS
	A	67.2	13.3	7.1	12.4		

^a Degrees of freedom = 3

^b Statistical significance at 5% level of significance

B = before the programme; A = after the programme; NS = not significant

Table 6 Percentage of attitude score towards smoking among male adolescents according to their smoking behaviour and academic speciality before and after the programme

Variable	Before		After		Statistical difference	
	Mean	± s	Mean	± s	t ^a	P
<i>Smoking behaviour</i>						
Smoker	59.2	± 12.1	58.3	± 14.2	0.39	NS
Nonsmoker	78.8	± 17.2	79.9	± 15.3	-0.68	NS
t* [P value]	-9.62 [P< 0.01]		-10.87 [P< 0.01]			
<i>Academic speciality</i>						
Prespecialty	72.2	± 16.3	72.9	± 16.2	-0.31	NS
Art	76.4	± 17.2	72.3	± 16.9	1.67	NS
Science	79.3	± 17.8	78.6	± 16.9	0.20	NS
F ^b [P value]	3.77 [P< 0.05]				2.21	NS
Total attitude	75.05	± 16.9	74.06	± 14.1	0.73	NS

^a t = Student t-test (two-tailed)

^b F = one-way analysis of variance (ANOVA)

NS = not significant

positive attitude among science students. The programme did not succeed in changing such attitudes ($P > 0.05$).

Discussion

Among the general population, smoking rates have steadily decreased over the past few decades in many countries [6], but it continues to be a significant problem among adolescents [5]. In the present study, the prevalence rate of regular smoking among male secondary-school students was 14.5%. This rate is twice that reported (7.8%) by the only available Saudi Arabian study [10] among male adolescents in Riyadh, the national capital. However, the two studies are not comparable because: 1) the adolescents in the Riyadh study were of a somewhat lower age range (12–18 years) and thus showed a higher proportion of experimental smokers (31%) as compared to only 1% in our study; 2) over 95% of the sample of the Riyadh study were children

of officers in the Saudi Armed Forces, so it was limited to one section of Saudi society; and 3) the Riyadh study was conducted about eight years prior to the present study. On the other hand, the prevalence rate in the present study is comparable to rates among Egyptian adolescents [15,16] and even higher than most of the rates from surveys in industrialized countries [17–19]. It has been said that “no disincentive [to smoking] is as powerful as cost” [20], but in Saudi Arabia, with a high per capita income and the cheapest cigarettes in the world, cost is unlikely to be a deterrent to smoking [10].

Most children in Europe and north America are now aware of the harmful effects of smoking on health [21]. The data of the present study reveal that most school adolescents are reasonably knowledgeable of the harmful effects of smoking and have favourable attitudes towards public measures against cigarette smoking. However, perceptions and beliefs concerning the health effects of smoking differ greatly

among adolescents. Such differences have implications for successful cessation programmes targeted at adolescents [5].

Adolescent smoking prevention strategies originally focused on the dangers of smoking and on increasing knowledge of its long-term negative health effects [22]. These knowledge-based educational programmes have not achieved the hoped-for reduction in the rates of adolescent tobacco use [23]. The programme applied in the present study aimed at changing behaviour, in addition to changing knowledge and attitude by emphasizing role-playing, as recommended by some health educators in the field of smoking prevention [24]. However, the post-test took place three months after the programme, a period that is too short to allow for behaviour change. Thus, the study depended upon the change in knowledge and attitude (the prerequisites for changing behaviour) as the predictors of the success of the programme. The programme resulted in an overall significant increase in the level of knowledge of adolescents, with some significant differences within and between groups of adolescents. Such differences may be partly due to differences in perceptions and beliefs among adolescents concerning the health effects of smoking prior to the programme.

Negative health beliefs about smoking by adolescents are considered a major predictor of smoking cessation [25]. In the present study, it was observed that adolescent smokers had less knowledge and a poorer attitude than nonsmokers. Adolescent smokers more often have friends and family members who smoke and they engage in risk-taking activities more often than nonsmokers [5]. This may explain the significant impact of the programme on the knowledge of nonsmokers only.

With respect to academic speciality, the present study showed that science students

were significantly the most knowledgeable, had the highest positive attitude score and the lowest prevalence of smoking. The reverse was shown among prespecialty students, with the least level of knowledge and the poorest attitude and a significantly higher prevalence of smoking than that of science students. For science students, the school curriculum might have been a good source of knowledge about smoking since the contents include aspects about the physiology and pathophysiology of the human body. Such knowledge perhaps affects the attitude and behaviour of students towards smoking and may have led to the failure of the programme to show an impact upon such students, while the prespecialty students were more receptive to the programme, being less knowledgeable and younger than the other groups of students. On the other hand, arts students, being the group with the highest prevalence of smoking and the highest proportion of daily smokers, might be resistant to the programme. This may be because adolescents do not perceive their smoking similarly [5].

Conclusion

Saudi adolescents have a higher rate of cigarette smoking than those in industrialized countries. They also have uneven knowledge about its negative effects, but show positive attitudes towards public action against smoking.

The one-day school educational programme for prevention and cessation of smoking was less than satisfactory, even though it yielded a significant increase in the level of knowledge. However, the test design of the present study may give an unreliable evaluation of the programme. The pretest in the one-group pretest/post-test design used to evaluate the programme

may "sensitize" students to topics and questions they might not ordinarily perceive, and consequently measures by the post-test may result not only from the educational programme but also from the pre-test.

Adolescents may respond to the programme differently. Student smoking behaviour and academic speciality could account for such differences. Thus, any antismoking programme for adolescents needs to be tailored to the individual adolescent.

Finally, since the impact of the programme was evident among the first-year

prespecialty students, it would be better to initiate such programmes at an early age before secondary-school education. Such programmes should continue at intervals through a comprehensive school health programme.

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