

ORIGINAL ARTICLE

ASSESSMENT OF BELIEFS ABOUT CIGARETTE SMOKING IN MIDDLE SCHOOL STUDENTS IN TEHRAN: IMPLICATIONS FOR INTERVENTION

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Background and Objective – To assess knowledge, attitudes and behavior of middle school students (aged between 12 and 14 years) about the consequences of cigarette smoking (including social, psychological and health-related issues), the present cross-sectional study was conducted based on the concepts of the “social inoculation theory”. This theory enabled the listing of appropriate and true beliefs and attitudes of students in regard to cigarette smoking. Furthermore, it identified differences between beliefs and attitudes of smokers and nonsmokers of both sexes in different age groups. This could be a strong tool to develop a health education curriculum for schools to prevent risk-taking behaviors, such as cigarette smoking, among school-aged children.

Methods – A total of 5,934 boys and girls attending grades 6 to 8 were selected at random from 40 middle schools in the city of Tehran, using multistage cluster random sampling.

Results – About 30.5% of male and 11.7% of female students had smoked at least one cigarette in their life. In general, 2.4% of students reported smoking daily (≥ 1 cigarette/day). The beliefs and attitudes of smokers towards negative consequences attributed to cigarette smoking were significantly different from those of non-smokers in the two sex groups. Both smokers and non-smokers were quite knowledgeable about the health and other consequences of cigarette smoking. However, in most cases, there was some uncertainty among students about the social, cultural, psychological and environmental factors influencing young people to start smoking. Furthermore, a sense of invulnerability to the health-related problems attributed to cigarette smoking was identified among smokers of both sexes.

Conclusion – Male and female students who smoke cigarettes have quite different beliefs and attitudes toward cigarette smoking than those who do not smoke. Therefore, it is necessary to develop educational curricula for schools (based on the sex of students) to teach students about the negative (immediate and long-term) health and other consequences of smoking cigarettes. One of the main elements of such curricula should emphasize the ways to empower young students with the life skills necessary to overcome peer pressure that may encourage them to smoke cigarettes.

Keywords • behavior • health education • smoking • social inoculation • Tehran

Introduction

Tobacco, the foremost public health enemy, is the single most preventable cause of morbidity and mortality around the world.¹⁻³ This highly available and legal drug

is responsible for nearly 50,000 deaths in Iran annually^{4, 5} and 4 million deaths around the world, mostly in developing countries.⁶⁻¹⁰ It is estimated that by 2,030, tobacco will kill more than 10 million people each year, of which 70% will be in developing countries.^{6,8} Today, of 1.2 billion smokers around the world, most (800 million) live in developing countries,^{6,7} where cigarette smoking

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is spreading rapidly among adolescents, especially among young females.^{3, 7, 11 - 13}

Cigarette consumption has been increasing in most Middle-East countries during the past 20 years. However, the rates of increase vary considerably. The most recent study conducted by the World Health Organization (WHO) shows that in Iran, cigarette consumption in 1999 was almost the same as that in 1990 (1% increase), while the consumption in Libya and Syria increased by nearly 60% during that period.¹⁴ In 1999, the average monthly cigarette consumption per adult smoker was highest in Lebanon (243), and the lowest in Yemen (58). This number was 189 for Iran, which was the third lowest among the nine studied countries in the Middle-East.¹⁴ Smoking prevalence among young people in 1999 differed greatly among Middle-East countries; from 7% in Oman, through 14% in Iran, 18% in Kuwait, 23% in Iraq, 25% in Saudi Arabia and Jordan, 31% in Syria and 43% in Yemen, to 53% in Lebanon. For all Middle-East countries, mortality from smoking-related diseases is much higher among men than women, reflecting a higher historical smoking rate among men. In spite of the fact that the average cigarette consumption per smoking adult in Iran has not been as high as in most other studied countries in this region, Iran had the highest mortality rate from both upper (lip, oral cavity and pharynx) and lower (trachea, lung and bronchus) respiratory tract cancers in 1999 among studied countries covered by the WHO Regional Office for the Eastern Mediterranean (EMRO).¹⁴

A survey in 1998, using cluster random sampling of 1/1,000 of the Iranian population, showed that 14.6% of adults (15 - 69 years) were smokers.⁵ Based on the results of another study conducted during 1997 and 1998 in Isfahan, a major province of Iran, the smoking rate among adults (19 years and older) was 24.8% in males and 4.7% in females.¹⁵ Another study in Iran showed that 14.8% of male youths (14 - 18 years) and 10.2% of female youths could be considered smokers.¹⁶ Many international studies have shown that about 85 to 90% of heavy smokers start smoking before the age of 20,^{3, 6} and most of this group first experienced smoking around the age of 11 to 14 years.³ The results of recent studies in Iran indicate that the smoking pattern in this country is almost the same as that in other countries, with a smoking peak (the age of starting to smoke) between the ages of 15 and 24 years.^{5, 15, 16} Almost 71% of Iranian male smokers reported that their

first smoking experience was between the ages of 13 and 24 years, while for more half Iranian female smokers (56%), this was after the age of 18 years.⁵

Because of the many problems associated with cigarette smoking, considerable efforts have been made in health education to both prevent non-smokers from starting to smoke and encourage smokers to quit smoking.¹⁷ These educational efforts have not been overwhelmingly successful. It is generally agreed that the most effective way to solve the problem is to influence children not to start smoking. Many risky behaviors (including cigarette smoking) begin during adolescence,^{4, 18} so school-age children are the most appropriate group for any intervention program aiming to prevent risky behaviors and promote a healthy lifestyle.¹⁹

A lack of health education has not been singled out as the primary culprit for the rise in adolescent smoking.^{3, 4, 6, 8, 20} There are a number of weaknesses in present-day programs which, if attended to, could increase the effectiveness of educators' efforts. These problems include an emphasis on the acquisition of pharmacological or physiological information without consideration of psychological and social aspects, insufficient consideration of adolescents involvement, and a lack of adequate procedures to measure the effectiveness of education programs.^{1, 7, 9, 10}

This study was designed to assess the knowledge, attitudes and behavior of middle school students (the first three years of high school, 12 to 14 years old) with respect to the consequences of cigarette smoking (including social, psychological and health-related issues). It used the concepts of the "social inoculation theory"²⁰ to present a method which, if used by health educators, would help them circumvent the aforementioned weaknesses in three ways: by identifying the most relevant and specific "salient beliefs" that both smokers and nonsmokers have about cigarette smoking; by identifying the relative strength of these beliefs held by students, and those in which smokers and nonsmokers of both sexes are most different; and by identifying the most important factors (including social, cultural, psychological, etc) affecting young students' cigarette smoking behavior. The ultimate goal of this study was to use these findings, based on the perceptions of participating students, to develop a relevant curriculum to supplement traditional curricula to empower young students with the life skills that would minimize the likelihood of their

involvement in unhealthy behaviors (like cigarette smoking), and to teach them how to overcome the pressure of others (including peers) who might encourage them to start smoking.

Patients and Methods

Sample and sampling method

A cross-sectional study was conducted in two school years, 1999 – 2000 and 2000 – 2001, in the city of Tehran. A multistage cluster random sampling procedure yielded a representative sample of sixth- to eighth-grade students, stratified by grade, sex and school district in the metropolitan area of Tehran. All schools were first clustered in five different areas: South, North, East, West, and Central divisions of Tehran. Next, all middle schools in each area were identified and divided based on the gender of the students. Last, by applying a simple random sampling method, 40 schools (8 schools in each area, 4 boys' and 4 girls' schools) were selected. In each school, one class of each grade was selected randomly and all students in the selected classes were enrolled in the study.

Instrumentation

This survey used a questionnaire developed by the author. To assess the students' perceptions of cigarette smoking, an initial open-ended elicitation questionnaire²¹ was given to a sub-sample (different from the final sample) of 40 girls and boys of middle-school age. The most commonly obtained responses were used to develop the main close-ended questionnaire, based on the procedures suggested by Fishbein and Ajzen,^{21, 22} to determine the strengths of smokers' and nonsmokers' beliefs. Items in the main questionnaire were arranged in subscales to measure the prevalence of cigarette smoking among students, and also to evaluate the students' knowledge, attitudes and beliefs with respect to cigarette smoking and its negative consequences, as well as to identify the encouraging and preventive factors regarding cigarette smoking. The measures used in the final questionnaire had been developed and refined by previous research.^{19, 23, 24}

Once the final questionnaire had been developed, it was given to a panel of six experts to review the face and content validity. To pretest the questionnaire and check its construct validity,²⁵ it was given to 50 students (25 boys and 25 girls) with the same characteristics as the main subjects,

and it was also reviewed by focus groups of school-age children. It was then tested for reliability using the test-retest method, which revealed a correlation coefficient of 0.82. The *t*-test for parametric data and Chi-square test for nonparametric data were used in the final analysis of variants. The students participated voluntarily in this study and completed the questionnaire in private and anonymously to protect confidentiality. More than 84% of eligible students completed and returned usable questionnaires. For analysis purposes, the following values were assigned to the answers regarding knowledge and attitudes: completely agree = 4; agree = 3; neither/don't know = 0; disagree = 2; completely disagree = 1.

Results

In total, 5,934 completely answered, legible questionnaires were used in the final analyses, of which 2,903 (48.9%) were completed by male and 3,028 (51.1%) by female students. Of the male students, 878 (30.2%) reported that they had experienced cigarette smoking and 111 (3.8%) smoked daily. Among female students, 354 (11.7%) had experienced cigarette smoking, of whom 32 (1.06%) smoked daily. These results implied that, on average, 2.4% of male and female middle school students were smokers (smoked ≥ 1 cigarette/day). The first experience of cigarette smoking was between the ages of 13 and 15 years (average, 13.3 for males and 15 for females).

In both sexes, the belief and attitude vectors of smokers were significantly different from those of nonsmokers. Both male and female smokers believed only slightly that smoking is harmful to health and would reduce life years and cause bad breath (Tables 1 and 2). Nonsmokers believed these consequences were much more likely (Table 1). The smokers also felt that smoking made them feel good, feel cool, feel like adults (grown up and more mature), would relieve tension and cause relaxation, and helped them cope with stress. Nonsmokers did not believe that these particular consequences would be the outcome of smoking cigarettes, although the level of statistical significance differed by sex (Table 2). In smokers and nonsmokers of both genders, feeling lonely at school, being an unsuccessful student, fear of being ignored by smoker peers and availability of cigarettes were encouraging factors to begin smoking, while prohibition of selling cigarettes to minors and smoking in public places, as well as

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Table 1. Preventive factors for cigarette smoking reported by students.

| Gender | Male | | | | | Female | | | | |
|---|--------|------|-----------|------|----------|--------|------|-----------|------|----------|
| | Smoker | | Nonsmoker | | <i>p</i> | Smoker | | Nonsmoker | | <i>p</i> |
| | Mean | SD | Mean | SD | | Mean | SD | Mean | SD | |
| Reduces life years | 3.17 | 0.40 | 3.31 | 0.38 | < 0.05 | 3.13 | 0.43 | 3.57 | 0.36 | < 0.01 |
| Harmful to health | 3.23 | 0.36 | 3.49 | 0.31 | < 0.05 | 3.11 | 0.31 | 3.64 | 0.40 | < 0.05 |
| Causes cancer | 3.23 | 0.39 | 3.52 | 0.28 | N/S | 3.42 | 0.30 | 3.64 | 0.20 | < 0.05 |
| Causes cough | 3.10 | 0.31 | 3.48 | 0.27 | < 0.01 | 3.46 | 0.17 | 3.56 | 0.40 | N/S |
| Causes bad breath | 2.89 | 1.72 | 3.49 | 0.27 | < 0.01 | 3.01 | 0.35 | 3.69 | 0.29 | < 0.001 |
| Causes short breath | 2.91 | 0.35 | 3.75 | 0.29 | < 0.001 | 3.43 | 0.32 | 3.56 | 0.20 | N/S |
| Causes CVD | 3.39 | 0.34 | 3.44 | 0.52 | N/S | 3.12 | 0.29 | 3.58 | 0.21 | < 0.05 |
| Reduces appetite | 2.98 | 0.44 | 3.08 | 0.37 | N/S | 3.29 | 0.45 | 2.79 | 0.29 | < 0.01 |
| Cost of smoking | 2.72 | 0.49 | 2.78 | 0.48 | N/S | 3.38 | 0.50 | 3.62 | 0.49 | < 0.05 |
| Prohibition of selling cigarettes to minors | 2.49 | 0.48 | 2.94 | 0.46 | < 0.01 | 2.82 | 0.48 | 3.24 | 0.44 | < 0.01 |
| Prohibition of smoking in public places | 2.91 | 0.47 | 3.14 | 0.44 | < 0.05 | 2.47 | 0.50 | 2.99 | 0.98 | < 0.001 |
| Fear of parents | 2.61 | 0.50 | 2.64 | 0.50 | N/S | 2.49 | 0.50 | 2.50 | 0.50 | N/S |
| Being ignored by non-smoking peers | 2.82 | 0.47 | 2.74 | 0.49 | N/S | 2.65 | 0.50 | 2.69 | 0.50 | N/S |
| Knowing health-related problems of smoking | 2.96 | 0.43 | 2.97 | 0.45 | N/S | 2.40 | 0.50 | 2.89 | 0.46 | < 0.05 |

SD = standard deviation; N/S = not statistically significant.

smelling bad and having short breath could be preventive factors.

However, there was a notable difference between genders regarding the role of being knowledgeable about the negative consequences of smoking on preventing cigarette smoking. While both smoker and nonsmoker males slightly agreed that this factor could act as a preventive factor, there was a significant difference between smoker and nonsmoker females in this regard. Non-smoker females were more likely to agree with this influence than smoker females (Table 1). The largest difference between the genders occurred with their beliefs regarding the immediate consequences of smoking (i.e. coughing and short breath). Both smoker and nonsmoker females believed that smoking causes coughing and short breath. However, there was a significant difference between smoker and nonsmoker males. Non-smoker males believed strongly that smoking would cause short breath and coughing, while smoker males, not surprisingly, did not believe so (Table 1). Another significant difference between the genders was the influence of others who smoke on a person's cigarette smoking behavior. Females, both smokers and nonsmokers, disagreed that smoker parents, friends, teachers and movie stars would affect students' smoking behaviors. Among

male students, smokers completely agreed that smoker parents, friends, teachers and movie stars could be role models for students, while non-smoker males agreed only slightly or had no definite idea about it ($p < 0.05$). Responses to the two questions referring to "fear of being ignored by nonsmoking friends" and "fear of punishment by parents" were not significantly different in smokers and nonsmokers in the gender groups, both of whom agreed only slightly with these statements (Table 1). These might therefore be preventive factors for cigarette smoking.

Discussion

Based on the results of this investigation, it is obvious that those who smoke cigarettes have quite different beliefs and attitudes about smoking than those who do not smoke. In spite of the fact that students were knowledgeable about the harmful effects of cigarette smoking, a considerable percentage of them either smoked daily or smoked occasionally. This indicates that being knowledgeable about the health-related negative consequences of cigarette smoking is not enough to encourage behavior changes. These findings confirm the results of other studies.^{26 - 29} The results of this study also indicate that belief and

Table 2. Encouraging factors for cigarette smoking reported by students.

| Gender | Male | | | | | Female | | | | |
|---------------------------------------|--------|------|-----------|------|----------|--------|------|-----------|------|----------|
| | Smoker | | Nonsmoker | | <i>p</i> | Smoker | | Nonsmoker | | <i>p</i> |
| | Mean | SD | Mean | SD | | Mean | SD | Mean | SD | |
| Feeling good | 2.69 | 0.34 | 1.25 | 0.11 | < 0.001 | 2.09 | 0.35 | 1.18 | 0.13 | < 0.01 |
| Feeling cool | 2.94 | 0.43 | 1.31 | 0.14 | < 0.001 | 2.22 | 0.47 | 1.25 | 0.18 | < 0.001 |
| Feeling relaxed | 2.26 | 0.48 | 1.43 | 0.19 | < 0.001 | 2.26 | 0.46 | 1.41 | 0.22 | < 0.001 |
| Feeling grown up | 2.27 | 0.50 | 1.69 | 0.44 | < 0.001 | 2.41 | 0.50 | 1.60 | 0.43 | < 0.001 |
| Helping to cope with stress | 2.04 | 0.45 | 1.51 | 0.25 | < 0.001 | 2.23 | 0.48 | 1.53 | 0.90 | < 0.001 |
| Smoking friends | 2.99 | 0.47 | 2.43 | 0.50 | < 0.01 | 2.98 | 0.49 | 2.88 | 0.92 | N/S |
| Smoking parents | 2.74 | 0.50 | 2.37 | 0.50 | < 0.05 | 2.36 | 0.50 | 2.30 | 0.48 | N/S |
| Smoking sisters or brothers | 2.49 | 0.50 | 2.41 | 0.49 | N/S | 2.46 | 0.50 | 2.27 | 0.48 | < 0.05 |
| Smoking teachers | 2.33 | 0.49 | 3.06 | 0.44 | < 0.01 | 1.67 | 5.87 | 1.48 | 2.60 | N/S |
| Smoking movie stars | 2.35 | 0.49 | 3.24 | 0.45 | < 0.001 | 1.27 | 0.49 | 1.16 | 0.45 | N/S |
| Fear of being ignored by smoker peers | 2.65 | 0.49 | 2.14 | 0.45 | < 0.01 | 2.33 | 0.46 | 2.01 | 1.63 | < 0.001 |
| Being unsuccessful at school | 2.01 | 0.46 | 1.68 | 0.28 | < 0.01 | 1.94 | 0.42 | 1.64 | 0.28 | < 0.01 |
| Feeling lonely at school | 2.27 | 0.49 | 1.98 | 2.63 | < 0.05 | 2.36 | 0.50 | 1.90 | 0.39 | < 0.001 |
| Availability of cigarettes | 2.81 | 0.48 | 2.37 | 0.49 | < 0.001 | 2.51 | 0.50 | 2.25 | 0.47 | < 0.01 |

SD = standard deviation; N/S = not statistically significant.

attitudinal changes are necessary to optimize behavior and to promote a healthy lifestyle.^{30, 31} To develop educational curricula for youths, health education professionals should define the ways in which beliefs and attitudinal changes cause behavior modification. In addition, they also need to consider social, psychological, environmental and cultural factors affecting adolescents' cigarette smoking behavior, as indicated by other studies.^{32 - 34} By assessing these factors, health educators would be able to develop appropriate methods and strategies to empower young people with the necessary life skills to prevent them from smoking cigarettes and finally form the adolescents' healthy lifestyle.

In spite of the efforts invested in health education up to now, smokers of both genders believed that cigarette smoking is an enjoyable behavior that helps them to cope with their daily problems, relieves their tensions and relaxes them. This indicates that when these students think about smoking, these particular beliefs are considered most. The feelings of "growing up" and "looking more mature" are among the messages that young students receive most from their smoker peers.^{24, 26, 27, 31, 33} Adolescents usually believe that smoking is a forbidden behavior for them, while for adults

there is no restriction.¹⁸ This feeling, together with the messages they receive from their peers, could promote the belief among young students that smoking cigarettes make a person "look like an adult" and that smoking is "a logical decision" they make to relieve their tensions and help them to relax.^{20, 27} Hence, they show willingness toward cigarette smoking. In this study, as in many other studies,^{1, 25, 29, 32} the sense of "growing up" was considered by smokers of both sexes as one of the most important factors encouraging them to smoke cigarettes. This indicates that the students' attitudes towards smoking are mostly based on this particular belief. Therefore, according to the findings of this study, an educational curriculum should be designed to emphasize the health hazards of smoking (heart attack, cancer, etc). This same curriculum would also need to stress that smoking cigarettes is expensive, is offensive to others, causes bad breath, coughing and short breath, and does not make them look like adults. Rather than simply attempting to convince smokers that smoking does not relieve tension or relax them, it would be more appropriate to suggest and teach other methods of tension relief and relaxation, such as physical or sport activities.

Regarding the external validity of the present

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study, it should be noted that due to the application of multistage cluster random sampling, it seems that the students in this survey could be considered as a good representative sample of male and female students in grades 6 – 8 in the metropolitan area of Tehran. Therefore, the results of this study could be generalized to male and female students who attended middle schools in Tehran.

Conclusion

The findings of this study revealed interesting information for health professionals in general and public health educators specifically. Male and female students who smoke cigarettes have quite different beliefs and attitudes toward cigarette smoking than those who do not smoke.

The results of this study indicate a need to develop an educational curriculum in schools to teach young students about the negative immediate and long-term consequences of smoking cigarettes and other risk-taking behaviors. In developing such a curriculum, the concepts of “social inoculation theory” should be applied to empower young students with the necessary life skills to overcome the pressure of peers and friends who may encourage them to smoke cigarettes.

Recommendations

Based on the results of this study, the following suggestions are made for educational and policy considerations:

1. Previous research, as well as this study, has reported increased rates of cigarette smoking among young students, and inferred that this could lead them to other unhealthy behaviors, such as illicit use of drugs.^{17, 30, 32, 34} Furthermore, because a great majority of adult smokers start smoking cigarettes before the age of 20,^{1, 3} school health education curricula seem to be essential. Therefore, it is critical that implementation of a comprehensive school health education program with a major component about smoking should be mandated at the school level. Consequently, children and adolescents will be properly educated about health and well-being and equipped with proper social skills so that they can adopt a healthier lifestyle and avoid high-risk behaviors, such as smoking cigarettes.
2. Health education programs regarding

cigarette smoking should be considered as the first step but, as shown by this and other studies,^{6, 26, 27} being knowledgeable about cigarette smoking and the factors that promote or prohibit smoking, did not prevent them from smoking. So, it seems that fundamental changes should be made to the content of education programs. For instance, students should be educated that cigarette smoking cannot make them look good and grown up and feel relaxed, and also it cannot help them to cope with stress or solve their problems. They should learn that these are false feelings and have no scientific basis. It would be more appropriate to focus on modifying students' attitudes toward smoking instead of using only traditional educational curricula. These efforts could be achieved by social and psychological support of students to overcome their problems in school, teaching them different relaxation methods and techniques, empowering them with social life skills (including communication skills) and improving their self-esteem and their ability “to say no” to smokers who put pressure on them to smoke cigarettes. Importantly, education curricula of male and female students should be different, according to the differences in their beliefs and attitudes toward smoking.

3. More strict tobacco control measures by government seem to be necessary in these categories:
 - a. A total ban on cigarette advertisement on TV, radio, newspapers, and magazines, either directly or indirectly (i.e., encouraged by TV/radio shows or actors, attractive pictures in magazines or newspapers, etc.) should be the policy of choice at local and national levels. This recommendation is consistent with the latest meeting of the Iranian National Committee of Tobacco Control (February 2001).⁴
 - b. Raising taxes on tobacco products: researchers have studied the effect of increasing sales tax on cigarettes in many different countries. Generally, higher tax rates are associated with greater declines in consumption of cigarettes.^{6, 9, 23} It seems beneficial to

raise taxes on tobacco products for two reasons. First, to discourage cigarette smoking, especially among young people. Second, to generate revenue to support public and school health education programs and research regarding smoking-related diseases and health problems (social, physical and mental).

- c. A total ban or restriction on smoking in public places: it seems that the general public has recognized, to a great extent, the harmful health consequences of passive smoke.^{2, 33, 34} Thus, a great majority of people agree that public places such as movie theaters, restaurants, public transportation and government buildings, as well as educational facilities such as schools and universities, should be required either to prohibit cigarette smoking or have non-smoking areas. As a result, it seems prudent that legislative bodies at all levels should develop sound policy regarding the banning of smoking in all public places.

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