An evaluation of knowledge, attitude and behavior regarding smoking and smokeless tobacco (Maras powder) use among high school children

Lise öğrencilerinin sigara ve dumansız tütün (Maraş otu) konusunda bilgi, tutum ve davranışlarının değerlendirilmesi

Mustafa Haki Sucaklı[1], Hasan Kahraman[2], Mustafa Çelik[1], Hamit Sırrı Keten[3]

[1] Department of Family Medicine, Faculty of Medicine, Kahramanmaras Sutcuimam University, Kahramanmaras, Turkey
[2] Department of Chest Diseases, Faculty of Medicine, Kahramanmaras Sutcuiman University, Kahramanmaras, Turkey
[3] Kurtul Family Health Center, Kahramanmaras, Turkey

Abstract

The aim of this study was to reveal knowledge, attitude, and behavior regarding smoking and using Maras powder, a kind of smokeless tobacco, among high school children and to provide guidance for preventive medicine professionals. The study was conducted on 2200 high school students (the response rate was 88%) in a state high school with 2500 students in Kahramanmaraş, a city located in the east part of Mediterranean Region in Turkey, in June 2012. Data were collected with a questionnaire consisting of questions about knowledge, attitude, and behavior related to smoking and Maras powder use, and volunteer students participated in the study and informed consent was obtained from all participants. Three hundred and twenty-one students (14.6%) were smoking. There was a significant relation between smoking and having a smoking family member, having a high income and having family members with a higher level of education. In addition, having a good relationship with parents was found to decrease smoking and Maras powder use significantly ($p< 0.001$). Out of the 210 students who answered the question whether they tried giving up smoking, 91 of them (43.3%) revealed that they tried to stop. Of the 215 students responding to the question whether they wanted to quit smoking, 100 (46.5%) noted that they would like to give up the habit. It is of great importance to increase public awareness of health risks of smoking and using Maras powder through the media, courses and conferences.
Keywords: Smoking, smokeless tobacco, high school

Öz

Bu çalışmada; lise öğrencilerinin sigara ve dumansız tütün (maraş otu) konusunda bilgi, tutum ve davranış özelliklerinin ortaya konulması; böylece koruyucu halk sağlığı uygulamalarına kaynak sağlanması amaçlanmıştır. Çalışma Türkiye'nin Akdeniz Bölgesi'nin doğusunda yer alan Kahramanmaraş ilindeki 2500 öğrencisi olan bir genel lisede Haziran 2012 tarihinde gerçekleştirildi ve öğrencilerin 2200'üne ulaşıldı (%88). Sigara ve maraş otu konusunda bilgi, tutum ve davranış özelliklerini tespit için hazırlanan standart anket bilgilenmiş onamla gönüllülük esasına dayanarak uygulandı. Katılımcıların 321'i (%14.6) sigara kullandıklarını ifade etmişlerdir. Ailede sigara içen kişi ya da kişilerin bulunması, yüksek gelir seviyesi ve yüksek eğitim düzeyi ile sigara kullanımı arasında anlamlı ilişki saptandı. Ayrıca anne ve baba ile iletişimin iyi olduğu olgularda sigara ve maraş otu kullanma oranının azaldığı görüldü ($p< 0.001$). "Sigarayı bırakmayı denediniz mi?" sorusuna cevap veren 210 kişinin 91'inin (%43.3) daha önce sigara bırakmayı denedikleri saptanmıştır. "Sigarayı bırakmak istiyor musunuz?" sorusuna cevap veren 215 öğrencinin 100'ü (%46.5) gelecekte sigarayı bırakmak istediğini ifade etmiştir. Sigara ve maraş otunun sağlık açısından taşıdığı risklerin basın yayın yoluyla, kurs ve konferanslarla duyurulması önem taşımaktadır. Milli eğitim ve sağlık bakanlıkları olmak üzere tüm politika oluşturucuların özellikle lise çağındaki öğrencilerin tütün ürünlerini kullanmaya başlamamaları ve kullanıcıların bırakmalarının sağlanmasına yönelik önlemleri ivedilikle almaları gerekmektedir.
Anahtar kelimeler: Sigara, dumansız tütün, lise

Introduction

Smoking and using other tobacco products are important health problems in Turkey as in the rest of the world (1). At the present time, more than 80% of smokers start smoking under the age of 18 (2). In fact, 29.5% of the smokers in Turkey have been found to start smoking under the age of 10 (3). Smoking in childhood has been reported to increase its harmful effects on health (4).

Maras powder (NicotianaRustica Linn) is a kind of tobacco produced in Kahramanmaraş and commonly used in Kahramanmaraş and neighboring cities (5). Nicotine concentrations are higher in Maras powder than those in cigarettes (6). It is crushed, and the obtained powder is put in a piece of paper used in cigarette production by their users or put inside the lower lips (5).

Correspondence: Hamit Sırrı Keten, Kurtul Family Health Center, Kahramanmaras, Turkey
Tel: +90 0553 5385501 *hsketen@hotmail.com*

Received: 24.04.2015 **Accepted:** 18.05.2015
www.gaziantepmedicaljournal.com
DOI: 10.5578/GMJ.10816

In the present study, we attempted to reveal knowledge, attitude and behavior concerning smoking and using Maras powder in high school students, and thus, to shed light on preventive medicine attempts related to this issue.

Materials and Methods

Study Design and Selection of Participants

Kahramanmaraş, where this study was conducted, is a city with a population of about 428.000 located in the north-east part of Mediterranean region in Turkey. The study was approved by Kahramanmaraş Directorate of National Education and carried out on 2200 of 2500 high school students at a state high school between 1 May 2012 and 30 May 2012. The response rate was 88%. All participants gave informed consent.

Data Collection

Data were collected with a questionnaire composed of open-ended questions and developed by the researchers. The questionnaire had four sections. The first section of the questionnaire included questions about socio-demographic features. The second section of the questionnaire included questions about the features of Maras powder use and smoking behavior of the participants and their family members. The third section of the questionnaire consisted of questions about knowledge regarding the harmful effects of smoking and experiences with quitting smoking. The last section was composed of 15 items concerning general health effects, immediate physiological effects, disease-specific consequences and addiction to smoking like "Smoking cigarettes is harmful to your health." The participants had to mark "True," "False" or "Do not know." A correct response was scored 1, while an incorrect one or "Do not know" was scored 0. Scores could range from 0 (none correct) to 15 (all correct). We modified the classification of adolescent smokers made by the World Health Organization to be able to use in this study as in the following: "current smoker" was defined as a person smoking regularly (daily or non-daily) at the time of the interview, "former smoker" as a person not smoking at the time of the interview but answering "Yes" to the question, "Have you ever smoked cigarettes at all?", and "never smoker" as a person not smoking at the time of the interview and answering "No" to the question above (7).

Statistical Analyses

Data were analyzed with SPSS 15.0 and frequencies, percentages, mean and standard deviation. ANOVA and Chi-square test were used to determine whether smokers and Maras powder users differed in attitudes and behavior from non-smokers and non-users of Maras powder. $p< 0.05$ was considered as significant.

Results

The participants were between the ages of 13 and 20 years with a mean age of 16.59 ± 1.24 years. Out of the 2200 participants included in the study, 1025 (46.6%) were males and 1175 (53.4%) were females. Three hundred and twenty-one participants (14.6%) were smokers. Table 1 shows features of smoking behavior. Of the 321 smokers, 204 (63.5%) were males and 119 (37.1%) were females. The distribution of smoking students based on age is shown in Table 2. The gender male was considered a significant risk factor for smoking ($p< 0.0001$). Of all the participants, 1063 (48.3%) had at least one family member (parents, siblings) who was smoking and 806 (36.6%) had at least one family member who was using Maras powder. The participants with a family member smoking or using Maras powder were significantly more likely to smoke ($p< 0.0001$). There was also a significant relation between smoking and family income ($p= 0.019$). In fact, as income increased so did the rate of smoking. In addition, education levels of parents were significantly related to children's smoking behavior ($p< 0.0001$). Indeed, the participants who had parents with high school education or a higher level of education were significantly more likely to smoke ($p< 0.0001$). However, having a good relationship with parents significantly decreased smoking and use of Maras powder ($p< 0.0001$). Effects of socio-demographic features on smoking are shown in Table 3.

Of the 230 participants responding to Fagerström nicotine addiction test, 30 (13.0%) had severe

Table 1. Distribution of smoking frequencies by genders

	Regular smoker	Occasional smoker	Experimental smoker	Ex-smoker	Never-smoker	Total
Gender	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Female	41 (3.5)	78 (6.6)	324 (27.6)	16 (1.4)	716 (61.0)	1175 (100)
Male	99 (9.7)	104 (10.1)	283 (27.6)	40 (3.9)	499 (48.7)	1025 (100)
Total	140 (6.4)	180 (8.2)	604 (27.6)	55 (2.6)	1210 (55.3)	2200 (100)

Table 2. The distribution of smoking participants and ratio of smoking to total participants according to age

Age	Smoking participants (n)	Smoking distribution (%)	Total participants (n)	Smoking / Total participants (%)
13	1	0.3	4	25.0
14	2	0.6	33	6.1
15	63	19.6	450	14.4
16	79	24.6	615	12.9
17	70	21.8	485	14.4
18	82	25.5	496	16.5
19	23	7.2	107	21.5
20	1	0.3	10	10.0
Total	321	100	2200	

Table 3. Effects of socio-demographic features on smoking

	Total	Smoker	Nonsmoker	
Socio-demographics	**n (%)***	**n (%)****	**n (%)****	***p*-value**
Gender				
Female	1175 (53.4)	119 (10.1)	1056 (89.9)	0.0001
Male	1025 (46.6)	204 (19.9)	821 (80.1)	
Education				
9th grade	699 (31.8)	103 (14.7)	596 (85.3)	
10th grade	548 (25.0)	71 (13.0)	477 (87.0)	0.560
11th grade	442 (20.2)	71 (16.1)	371 (83.9)	
12th grade	511 (23.4)	77 (15.1)	434 (84.9)	
Financial status				
Low	690 (31.4)	86 (12.5)	604 (87.5)	
Moderate 1300	1308 (59.4)	194 (14.8)	1114 (85.2)	0.019
High 202	202 (9.2)	41 (20.4)	160 (79.6)	
Mothers' education level				
Primary or secondary school	1802 (81.9)	238 (13.3)	1555 (86.7)	0.0001
High school or higher education	398 (18.1)	82 (20.7)	314 (79.3)	
Fathers' education level				
Primary or secondary school	1515 (68.9)	180 (11.9)	1335 (88.1)	0.0001
High school or higher education	685 (31.1)	142 (20.8)	543 (79.2)	
Members' smoking status				
Yes	1063 (48.3)	192 (18.1)	871 (81.9)	0.0001
No	1137 (51.7)	130 (11.4)	1007 (88.6)	
Total	2200 (100.0)	321 (14.6)	1879 (85.4)	

** Percentages were based on columns, ** Percentages were based on rows.*

addiction, 26 (11.3%) had moderate addiction and 174 (75.7%) had mild addiction.

Ninety-one (43.3%) out of the 210 participants answering to the question whether they tried giving up smoking gave a positive answer. Of the 200 participants who answered the question about their experience with stopping smoking, 10 (2%) received medical help to quit the habit. Out of the 215 students answering the question whether they would like to stop smoking, 100 (46.5%) expressed their willingness to stop this habit in the future.

Eighty-eight participants (4%) were using Maras powder. Of the 88 Maras powder users, 67 (6.5%) were males and 21 (1.8%) were females. There was a significant relation between Maras powder use and gender ($p< 0.0001$). In fact, a significantly higher rate

Table 4. Effects of socio-demographic features on Maras powder use

	Total	Maras powder users	Non-users of Maras powder	
Socio-demographics	**n (%)***	**n (%)****	**n (%)****	***p*-value**
Gender				
Female	1175 (53.4)	21 (1.8)	1154 (98.2)	0.0001
Male	1025 (46.6)	67 (6.5)	958 (93.5)	
Education				
9th grade	699 (31.8)	24 (3.4)	675 (96.6)	
10th grade	548 (24.9)	21 (3.8)	527 (96.2)	0.080
11th grade	442 (20.1)	27 (6.1)	415 (93.7)	
12th grade	511 (23.2)	16 (3.1)	495 (96.9)	
Financial status				
Low	690 (31.4)	29 (4.2)	661 (95.8)	
Moderate	1308 (59.4)	52 (4.0)	1256 (96.0)	0.893
High	202 (9.2)	7 (3.5)	195 (96.5)	
Mothers' education level				
Primary of secondary school	1802 (81.9)	72 (4.0)	1730 (96.0)	0.982
High school of higher education	398 (18.1)	16 (4.0)	382 (96.0)	
Fathers' education level				
Primary of secondary school	1515 (68.9)	47 (3.1)	1468 (96.9)	0.001
High school of higher education	685 (31.1)	41 (6.0)	644 (94.0)	
Family Members' Maras powder use				
Yes	806 (36.6)	46 (5.7)	760 (94.3)	0.002
No	1394 (63.4)	42 (3.0)	1352 (97.0)	
Total	2200 (100.0)	88 (4.0)	2112 (96)	

** Percentages were based on columns, ** Percentages were based on rows.*

of the male participants was using Maras powder. Of the 18 participants answering the question about the causes of using Maras powder, 9 (50%) noted that they were using Maras powder to stop smoking and 6 (33.3%) reported that they were using the powder due to their familial problems. A significantly higher rate of the participants whose family members were using Maras powder were also using the powder (p= 0.002). Sixty-eight users of Maras powder (77.2%) noted that they had tried quitting this powder before (Table 4).

Seventy-five participants (3.4%) were both smoking and using Maras powder. There was a significant relation between smoking and Maras powder use (p< 0.0001). As for the causes of starting smoking, of the 670 participants, 425 (63.4%) started smoking due to their curiosity about it and 174 (26.0%) started smoking when they were offered cigarettes.

The participants learned about the harmful effects of smoking mostly on TV (62%) and at school (58.2%) (Table 5).

Table 5. Sources of information about harmful effects of smoking

Sources of information	**n**	**%**
Television	1363	62.0
School	1290	58.6
Newspaper	796	36.2
Conference	762	34.6
Books	538	24.5
Friends	445	20.2

Smokers and Maras powder users had significantly less knowledge about harmful effects of tobacco products than non-smokers and non-users of Maras powder (p< 0.0001). Participants' responses to the questions about knowledge of harmful effects of smoking and scores for their answers are presented in Tables (Tables 6-8).

Discussion

We found that the male gender, high socio-economic status, family members who smoke or use Maras powder and high education levels of family members were risk factors for smoking.

Table 6. Distribution of rates of correct responses to questions about knowledge of smoking by smokers and non-smokers

	Correct Response Rate			
	Overall	Smokers	Non-smokers	
Items	**n (%)**	**n (%)**	**n (%)**	***p*****
Smoking cigarette is harmful to your health (T)*	2102(95.5)	265(82.8)	1837(97.9)	0.0001
Smoking increases the risk of developing lung cancer (T)	2087(94.9)	272(85.0)	1815(96.7)	0.0001
Smoking causes irritation of the lungs, thus leads to cough with mucus (T)	2023(92.0)	265(82.8)	1758(93.6)	0.0001
Smoking increases the risk of developing heart disease (T)	2004(91.1)	257(80.3)	1747(93.0)	0.0001
If a pregnant woman smokes cigarettes, the fetus will be affected (T)	2095(95.2)	281(87.8)	1814(96.6)	0.0001
Smoking increases the risk of developing larynx cancer (T)	1981(90.0)	268(83.8)	1713(91.3)	0.0001
Smoking can result in a shortened life span (T)	1960(89.1)	248(77.5)	1712(91.2)	0.0001
Smoking increases the risk of developing oral cancer (T)	1812(82.4)	235(73.4)	1577(84.1)	0.0001
Smoking is as addictive as using heroin (T)	1858(84.5)	236(73.8)	1622(86.4)	0.0001
Smoking leads to an increase in facial wrinkles (T)	1618(73.5)	207(64.7)	1411(75.2)	0.0001
Cigarettes with filters are safer (F)	391(17.8)	49(15.3)	342(18.2)	0.213
Cigarette smoking is safe if you do not inhale deeply (F)	1283(58.3)	119(37.2)	1164(62.1)	0.0001
Smoking fewer than 5 cigarettes a day is not harmful to your health (F)	1585(72.0)	154(48.1)	1431(76.2)	0.0001
Smoking low-tar and low-nicotine cigarettes is significantly less harmful to your health (F)	1135(51.6)	112(35.0)	1023(54.5)	0.0001
Quitting smoking is not difficult (F)	1030(46.8)	184(57.5)	846(45.1)	0.0001

** Correct answer for each item: T= True; F= False. ** p< 0.05 is significant.*

Table 7. Distribution of rates of correct responses to question about knowledge of smoking by Maras powder users and non-users of Maras powder

	Correct Response Rate			
	Overall	Maras powder users	Non-users of Maras powder	
Items	**n (%)**	**n (%)**	**n (%)**	***p*****
Smoking cigarette is harmful to your health (T)*	2102(95.5)	63(71.6)	2039(96.5)	0.0001
Smoking increases the risk of developing lung cancer (T)	2087(94.9)	72(81.8)	2015(95.4)	0.0001
Smoking causes irritation of the lungs, thus leads to cough with mucus (T)	2023(92.0)	73(83.0)	1950(92.3)	0.002
Smoking increases the risk of developing heart disease (T)	2004(91.1)	59(67.0)	1945(92.1)	0.0001
If a pregnant woman smokes cigarettes, the fetus will be affected (T)	2095(95.2)	73(83.0)	2022(95.7)	0.0001
Smoking increases the risk of developing larynx cancer (T)	1981(90.0)	67(76.1)	1914(90.6)	0.0001
Smoking can result in a shortened life span (T)	1960(89.1)	64(72.7)	1896(89.8)	0.0001
Smoking increases the risk of developing oral cancer (T)	1812(82.4)	59(67.0)	1753(83.0)	0.0001
Smoking is as addictive as using heroin (T)	1858(84.5)	59(67.0)	1799(85.2)	0.0001
Smoking leads to an increase in facial wrinkles (T)	1618(73.5)	53(60.2)	1565(74.1)	0.004
Cigarettes with filters are safer (F)	391(17.8)	14(15.9)	377(17.9)	0.641
Cigarette smoking is safe if you do not inhale deeply (F)	1283(58.3)	38(43.2)	1245(58.9)	0.003
Smoking fewer than 5 cigarettes a day is not harmful to your health (F)	1585(72.0)	43(48.9)	1542(73.0)	0.0001
Smoking low-tar and low-nicotine cigarettes is significantly less harmful to your health (F)	1135(51.6)	31(35.2)	1104(52.3)	0.002
Quitting smoking is not difficult (F)	1030(46.8)	50(56.8)	980(46.4)	0.055

** Correct answer for each item: T= True; F= False. ** p< 0.05 is significant.*

Table 8. Distribution of scores for knowledge by smoking status and Maras Powder use status: ANOVA and post hoc results

Factors	Scores Knowledge (Mean ± SD)	*p**
Smokers	9.8 ± 3.4	0.0001
Non smokers	11.6 ± 2.3	
Maras powder users	9.2 ± 3.6	0.0001
Non-users of Maras powder	11.4 ± 2.5	
Total	11.3 ± 2.6 (Min.0-Max. 15)	

** p< 0.05 is significant.*

In this study, 14.6% of all the participants were smoking. Other studies on similar age groups from Turkey revealed that the rate of smoking varied from 13.3% to 38%(8-10). The rate of smoking is 9% in females and 31% in males in Russia, 27% in females and 23% in males in Finland, 10.1% in Taiwan, 17.4% in Japan, 27% in females and 13.3% in males in a study performed on 6000 high school students in Sri Lanka and 31.2%-38.2% among high school children in the USA (11-15). We found that 19.9% of the male participants and 10.1% of the female participants were smoking, which suggested that the male gender was a risk factor for smoking. Consistent with this finding, it has been reported in the literature that smoking is more common among males (10,16). The rate of smoking was lower in this study than that mentioned in the literature, which can be attributed to the use of Maras powder in addition to smoking and attempts to help people to stop smoking.

At least one family member (parents, siblings) was smoking and using Maras powder in 48.3% and 36.6% of the participants, respectively. The relation between smoking and having a smoker family member was significant, which is consistent with the literature (17-19). In addition, there was a significant relation between using Maras powder and having a family member using Maras powder. Moreover, the rate of smoking was higher in the participants whose parents had high school education or higher education levels and the rate of using Maras powder was higher in those whose fathers had high school education or higher levels of education. In the literature, although one study has reported no relation between smoking and parents' education (20), Azevedo et al. have reported that as parents' education levels increase so does the rate of smoking among children (19). Saatçi et al. have noted that as mothers' education levels increase so does the rate of smoking among children and Erbaydar et al. have reported that mothers with high school education or higher levels of education increase the risk of smoking among their daughters (21,22). The relation between smoking and parents' education can be explained by the fact that children have a higher tendency to accept parents with higher education levels as their role models since these parents are much more involved in social life and work life. Family members' behavior plays an important role in children's smoking and using Maras powder. In fact, there was also a significant relation between family members" Maras powder use and participants' Maras powder use. Therefore, it is required that parents should exert care with their habits so as to avoid being a poor role model.

In the present study, as parents' income increased so did the rate of smoking among their children. In the study by Saatçi et al., high socio-economic status has been shown to increase smoking (21). Nevertheless, having a good communication with parents was found to decrease smoking in this study. Therefore, it can be recommended that parents should establish good communication with their children.

In the current study, the mean age when the participants started smoking was 14.02 ± 2.63 years, which is compatible with the results of studies from other cities of Turkey (10,20). Similarly, a study from the USA has revealed that the mean age of starting smoking is 12.3 years(23). In other studies on high school children the average age of starting smoking has been found to be 14.2-15 years (14,24,25). These lower ages of starting smoking suggest that there must be more vigorous attempts to struggle against the habit of smoking.

In this study, 13%, 11.3% and 75.7% of the participants responding to Fagerström nicotine addiction test had severe, moderate and mild addiction, respectively. Jimenes et al, in their study on children aged 10-17 years have found that 3.3%, 10.1% and 86.6% of the participants have severe, moderate and mild nicotine addiction, respectively (26). Higher rates of addiction in the present study can be ascribed with higher age of the participants. Socio-cultural features might have played a role as well.

Forty-six point five percent of the smokers noted that they wanted to quit this habit in the future. Studies on similar age groups have revealed that 67%-77.7% of the smokers would like to give up smoking (16,27). These higher rates of willingness to stop smoking suggest that social and medical support mechanisms are needed to help those people.

Four percent of the participants were found to use Maras powder in this study. The rate of Maras powder use was 6.5% and 1.8% among the male and female

students, respectively. The higher rate of the male Maras powder users can be attributed to the fact that Maras powder use is considered as a male behavior in Kahramanmaraş.

Of all the participants answering the questions about the reasons for using Maras powder, 50% reported to use the powder to stop smoking. Overall, it turned out that 3.4% of all the participants were both smokers and Maras powder users. The relation between smoking and Maras powder use was significant. There have been few studies on addictiveness and harmful effects of Maras powder. Therefore, it is required that researchers should focus on the issue, especially on the substances likely to be found in Maras powder and harmful effects of the powder.

Seventy-seven point two percent of Maras powder users admitted that they failed to stop their habit. The percentage of Maras powder users experiencing failure to give up smoking was higher than the percentage of smokers failing to stop their habit. Several studies have revealed that NicotianaRustica L. from which Maras powder is made contains 5-8 times as high nicotine concentrations as Nicotianatobacum, from which cigarettes are made (28,29) . This finding suggests that Maras powder can be more addictive than smoking cigarettes and that Maras powder use as a method to stop smoking is totally useless.

As for the causes of starting smoking, 63.4% of the participants reported that they started smoking since they were curious about it, which is compatible with the results of other studies (17,20). This can be attributed to the fact that smoking is presented in the media in such ways that it attracts the attention of children. All attempts to underline the attractiveness of smoking both in the media and social life should be prevented.

Another finding of this study was that smokers and Maras powder users had less information about tobacco and its harmful effects, which is consistent with the literature, which emphasizes the need to offer education programs to compensate deficiencies in their knowledge (16). In addition, both the smokers and non-smokers thought that filter-tipped cigarettes are less harmful than non-filter-tipped ones, which can be due to the commercials and advertisements falsely showing that filter-tipped cigarettes lessen harmful effects of smoking. Moreover, a higher rate of the smokers correctly answered the question whether it is easy to quit smoking, which can be explained by their experiences of failure to stop the habit.

Conclusion

Using tobacco products is still a serious public health problem. Their use in childhood is especially of great importance in terms of their cumulative effects when their use during lifetime is considered. This study sheds light on the spread of using Maras powder, which has high nicotine concentrations, apart from the frequency of smoking. Awareness in risks of smoking and Maras powder use should be increased by broadcasting TV and radio programs, offering courses and organizing conferences. All policy makers, mainly the Ministry of Education and the Ministry of Health, should also take immediate measures to prevent children from starting to smoke and using Maras powder.

Acknowledgements

This manuscript was presented as a poster at the 12th National Congress of Turkish Family Medicine, Kusadası, Turkey, on 15-19 May 2013.

References

1. Can G, Topbas M, Oztuna F, Ozgun S, Can E, Yavuz Yilmaz A. Factors contributing to regular smoking in adolescents in Turkey. J Sch Health 2009;79(3):93-7.
2. Centers for Disease Control and Prevention. Preventing tobacco use among young people: a report of the Surgeon General (Executive Summary). MMWR 1994;43(No. RR-4):6.
3. Ergüder T, Soydal T, Ugurlu M, Cakir B, Warren CW. Tobacco use among youth and related characteristics, Turkey. Soz Praventiv Med 2006;51(2):91-8.
4. World Health Organization. WHO Report On The Global Tobacco Epidemic, Brazil 2008;1-330. Available from: http://www.who.int/tobacco/mpower/mpower_report_full_2008.pdf.
5. Ozkul Y, Donmez H, Erenmemisoglu A, Demirtas H, Imamoglu N. Induction of micronuclei by smokeless tobacco on buccal mucosa cells of habitual users. Mutagenesis 1997;12(4):285-7.
6. Saıtoh F, Noma M, Kawashıma N. The alkaloid contents of sixty nicotianaspecies. Phytochemistry 1985;24(3):477-80.
7. World Health Organization. Guidelines for the conduct of tobacco-smoking surveys among health professionals. Geneva: WHO; 1984;1-19. Available from: http://apps.who.int/iris/bitstream/10665/66865/1/WHO_SMO_84.1.pdf
8. Arbak P, Erdem F, Karacan Ö, Özdemir Ö. Düzce lisesi öğrencilerinde sigara alışkanlığı. Solunum Dergisi 2000;2:17-21.
9. Karlıkaya C. Edirne'de lise öğrencilerinde sigara içme prevelansı. Toraks Dergisi 2000;3(1):6-12.
10. Golbasi Z, Kaya D, Cetindag A, Capik E, Aydogan S. Smoking prevalence and associated attitudes among high school students in Turkey. Asian Pacific J Cancer Prev 2011;12(5):1313-6.
11. KemppainenU, Tossavainen K, Vartiainen E, Pantelejev V, Puska P. Smoking patterns among ninth-grade adolescents in the pitkaèranta district (Russia) and in eastern Finland. PublicHealth Nursing 2002;19(1):30-9.
12. Chen PL, Huang W, Chuang Y, Warren CW, Jones NR, Asma S. Prevalence of tobacco use among junior high and senior high school students in Taiwan. J Sch Health 2008;78(12):649-54.
13. Takakura M, Wake N. Association of age at onset of cigarette and alcohol use with subsequent smoking and drinking patterns among Japanese high school students. JSch Health 2003;73(6):226-31.

14. Katulanda P, Liyanage IK, Wickramasinghe K, Piyadigama I, Karunathilake IM, Palmer PH, et al. Tobacco smoking among school children in Colombo District, Sri Lanka. Asia Pac J Public Health 2015;27(2):NP278-87.
15. Everett SA, Husten CG, Warren CW, Crossett L, Sharp D. Trends in tobacco use among high school students in the United States, 1991-1995. J Sch Health 1998;68(4):137-40.
16. Çelik P, Esen A, Yorgancıoğlu A, Şen FS, Topçu F. Manisa ilinde lise öğrencilerinin sigaraya karşı tutumları. Toraks Dergisi 2000;1:61-6.
17. Spyratos DG, Pelagidou DT, Chloros D, Haidich AB, Karetsi E, Koubaniou C, et al. Smoking among adolescents in Northern Greece: a large cross-sectional study about risk and preventive factors. Subst Abuse Treat Prev Policy 2012;10(7):38.
18. Uncu Y, Irgil E, Karadag M. Smoking patterns among primary school students in Turkey. Scientific World Journal 2006;6:1667-73.
19. Azevedo A, Machado AP, Barros H. Tobacco smoking among Portuguese high-school students. Bull World Health Organ 1999;77(6):509-14.
20. Göksel T, Cirit M, Bayındır Ü. İzmir ili lise öğrencilerinin sigara alışkanlığını etkileyen faktörler. Toraks Dergisi 2001;2(3):49-53.
21. Saatci E, Inan S, Bozdemir N, Akpinar E, Ergun G. Predictors of smoking behavior of first year university students: questionnaire survey. Croat Med J 2004;45(1):76-9.
22. Erbaydar T, Lawrence S, Dagli E, Hayran O, Collishaw NE. Influence of social environment in smoking among adolescents in Turkey. Eur J Public Health 2005;15(4):404-10.
23. Harrel JS, Bangdiwala SI, Deng S, Webb JP, Bradley C. Smoking initiation in youth: the roles of gender, race, socioeconomics and developmental status. J Adolesc Health 1998;23(5):271-9.
24. Damas C, Saleiro S, Marinho A, Fernandes G, Gomes I. Smoking habits in secondary school students. Rev Port Pneumol 2009;15(1):43-53.
25. Heras P, Kritikos K, Hatzopoulos A, Kritikos N, Mitsibounas D. Smoking among high school students. Am J Drug Alcohol Abuse 2008;34(2):219-24.
26. Jiménez C, Aranda R, Trullén P, Tundidor M, Labarga H, Fernández-Espinar F. Determination of nicotine dependence in school-aged smokers through a modified Fagerstrom Test. Published in An Pediatr (Barc) 2003;58(6):538-44.
27. Burt RD, Peterson AV. Smoking cessation among high school seniors. Prev Med 1998;27(3):319-27.
28. Erenmemişoğlu A. Re: Turkish smokeless tobacco "Maras Powder". Prev Med 1999;28(6):616-7.
29. Kilinc M, Okur E, Kurutas EB, Guler FI, Yildirim I. The effects of Maras powder (smokeless tobacco) on oxidative stress in users. Cell Biochem Funct 2004;22(4):233-6.

How to cite:

Suçaklı MH, Kahraman H, Çelik M, Keten HS. An evaluation of knowledge, attitude and behavior regarding smoking and smokeless tobacco (Maras powder) use among high school children. Gaziantep Med J 2015;21(4):225-232.