

# Better view on attitudes and perceived parental reactions behind waterpipe smoking among Iranian students

Hamidreza Roohafza, Zahra Kasaei<sup>1</sup>, Kamal Heidari<sup>2</sup>, Razieh Omid<sup>2</sup>, Tahereh Alinia<sup>3</sup>, Mojtaba Naji<sup>4</sup>, Morid Jaberifar<sup>2</sup>, Masoumeh Sadeghi<sup>1</sup>

Tobacco Control Unit, Isfahan Cardiovascular Research Center, <sup>1</sup>Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, <sup>2</sup>Isfahan Province Health Center, Isfahan University of Medical Sciences, Isfahan, <sup>3</sup>Department of Epidemiology, Shahid Beheshti University of Medical Sciences, Tehran, <sup>4</sup>Expert Prevention of Isfahan Welfare Organization, Isfahan, Iran

**Background:** Because of the increasing usage of waterpipe globally, we need to know more about the different factors related to waterpipe and cigarette smoking. Therefore, the present study aims at gaining more insight on waterpipe and cigarette smoking based on perceived parental reaction and appeal and repellent of smoking among adolescents. **Materials and Methods:** A cross-sectional survey entitled "Isfahan Tobacco Use Prevention Program" (ITUPP) was conducted among 5,500 adolescents in Isfahan Province, Iran in 2010 using a self-administered anonymous questionnaire. Demographic factors, cigarette and waterpipe smoking status, appeal and repellent of smoking, perceived parental reactions, and the main reasons behind the increase in waterpipe smoking were measured. Chi-square, univariate logistic regression, and multiple logistic regression were used. For all analyses, we defined statistical significance *a priori* with a two-tailed alpha of 0.05. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 15. **Results:** 50% of the sample was female and 89% lived in urban areas. The average age of the respondents was  $14.37 \pm 1.70$  years. While a majority of cigarette smokers (70.9%) were waterpipe smokers, only 35.7% of waterpipe smokers smoked cigarettes. The incidence of smoking was high in those who expected less extensive parental reaction with odds ratio (OR) = 1.89 [95% confidence interval (CI): 1.35-2.63] ( $P < 0.001$ ) among cigarette smokers and OR = 2.75 (95% CI: 2.16-3.50) ( $P < 0.001$ ) among waterpipe smokers. "Taste" was rated the most attractive feature by waterpipe and cigarette smokers 2.83-fold (95% CI: 2.06, 3.90) ( $P < 0.001$ ). Most waterpipe smokers compared to nonsmokers believed that the main reason behind waterpipe popularity was habit. **Conclusion:** The factors related to waterpipe smoking were different from those in cigarette smoking; so we need to implement different interventions to overcome the surging usage of tobacco use.

**Key words:** Adolescents, attitude, Eastern Mediterranean Region (EMR), hookah, parent reaction, parents, perception, smoking, students, waterpipe

**How to cite this article:** Roohafza H, Kasaei Z, Heidari K, Omid R, Alinia T, Naji M, Jaberifar M, Sadeghi M. Better view on attitudes and perceived parental reactions behind waterpipe smoking among Iranian students. *J Res Med Sci* 2015;20:1032-8.

## INTRODUCTION

At present, while the trend of cigarette smoking is either stable or decreasing, the trend of other forms of tobacco use, most notably the waterpipe is increasing.<sup>[1]</sup> Waterpipe has a history of as long as four centuries and originates from India and ancient Persia.<sup>[2]</sup>

During the past decade, waterpipe smoking (also known as hookah, goza, shisha, narghile, ghelyan, and hubble-

bubble) has been witnessing a surge in popularity not only in the Eastern Mediterranean Region (EMR) countries but also in Western countries. Prevalence studies indicate that the prevalence of current waterpipe smoking is 5-17% among American adolescents and 6-34% among EMR adolescents.<sup>[3,4]</sup> Although these differences are because of many reasons including sociocultural differences, smoking norms, and societal or legal situations, the consumption has increased in EMR and Western countries.<sup>[5]</sup> Some waterpipe and cigarette smokers may like some specific features of

Access this article online	
Quick Response Code:	Website: <a href="http://www.jmsjournal.net">www.jmsjournal.net</a>
	DOI: ****

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** [reprints@medknow.com](mailto:reprints@medknow.com)

**Address for correspondence:** Dr. Hamidreza Roohafza, Tobacco Control Unit, Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran. E-mail: [roohafza@crc.mui.ac.ir](mailto:roohafza@crc.mui.ac.ir)

**Received:** 16-03-2015; **Revised:** 22-07-2015; **Accepted:** 09-11-2015

this form of tobacco use such as its smell or taste and stress relief. Maassel, a form of waterpipe tobacco with a variety of flavors (fruit, coffee, etc.), was introduced in the 1990s and tends to be more attractive to youths than the unflavored traditional tobacco used in the waterpipe.<sup>[6]</sup>

Waterpipe smoking often occurs during social activities among friends and family members in and out of home.<sup>[7]</sup> While a large body of studies has examined the role of parent and sibling smoking or the lack of parent-adolescent closeness on smoking,<sup>[8,9]</sup> a few studies have investigated parent reactions toward smoking in relation to adolescents' smoking. These studies indicate that when parents set rules not to smoke, discuss about smoke-related topics, and punish their children when they smoke, adolescents' smoking decreases even when the parents are smokers.<sup>[10,11]</sup> Moreover, waterpipe smoking is perceived by parents as an acceptable social activity in some cultures such as the Arab American community.<sup>[12]</sup>

Smoking every tobacco product has adverse health effects and the severity of those effects vary substantially among products.<sup>[13]</sup> However, people believe that the waterpipe is a safe alternative to cigarette smoking<sup>[14]</sup> as it causes its smoke to pass through water as a filter.<sup>[15]</sup> This misconception may be one of the possible reasons for the waterpipe's popularity.<sup>[16]</sup>

Therefore, the present study aims at gaining more insight on waterpipe and cigarette smoking based on sociodemographic factors, perceived parental reaction, and the appeal and repelling factor of smoking among adolescents. The result can improve the understanding of the role of these factors on waterpipe smoking and may also help to take action to prevent this health hazard.

## MATERIALS AND METHODS

### Study design and participants

An ongoing cross-sectional survey entitled "Isfahan Tobacco Use Prevention Program" (ITUPP) was accomplished collaboratively by the Isfahan Health Centre and cardiovascular research center in Iran in 2010.<sup>[17]</sup>

Five thousand five hundred students in middle and high schools (grades 6-12) were asked to fulfill a self-administered questionnaire in the classroom. Multistage stratified cluster random sampling procedure was used to select students. Clusters included educational districts. Schools were then selected randomly from among each cluster, and finally, students were taken from among the selected schools using a random numbers table. Within each cluster, stratified sampling was performed based on the school level (high/middle school), gender, and area

of residence (rural or urban area). All participants were required to sign a consent form after receiving knowledge on the study goal and design. The students answered the questionnaires in a 30-min period during class time. Trained staff members collected the data and provided help to the students in completing the questionnaires. Five thousand four hundred and eight questionnaires were completed and returned, corresponding to a 98.3% response rate.

A workshop was held to train school staff. Trained staff had the responsibility of explaining the study objectives and helping the students in case they needed more explanation. Participation was voluntary and filling the questionnaire indicated the student's consent to take part in the research. The study was approved by the Ethics Committee of Isfahan University of Medical Science (87139).

### Measurements

The student's age, gender (boy/girl), residential area (urban/rural), parental smoking (yes/no), and sibling smoking (yes/no) were collected using a self-administered questionnaire. Age was represented as a continuous variable.

### Smoking status

Students were asked about their smoking status via a five-item question. The strata consisted of

1. Those who had never been users and never tried, not even one puff,
2. Those who tried at least one puff or more,
3. Those who tried at least once a month but less than once a week,
4. Those who tried at least once a week but less than once a day, and
5. Those who tried at least once a day.

The first strata was considered as those who had never smoked, strata 2 and 3 were considered as triers, and 4 and 5 were considered as smokers.

### Viewpoint on waterpipe harmful effect and its appeal and repellent

Students' perceptions of the harmful effects of waterpipe were gauged by question – "How do you judge the waterpipe in comparison to the cigarette?" The answer options were:

1. Less harmful,
2. The waterpipe is as harmful as cigarette, and
3. More harmful.

Students were asked what they liked most about the waterpipe and cigarette, separately. Common answers were taste, smell, stress relief, and the social environment. There were two other answer options for the waterpipe including its preparation and sound.

They also were asked what they dislike most about waterpipe and cigarette smoking. The answers were malodor, yellowish teeth, and its adverse health effect. Students were allowed to choose more than one option.

### Perceived parenting reactions

Participants were asked to indicate how their parents would react if they

- a. Would smoke cigarettes or
- b. Would smoke the waterpipe.

The answers were:

1. They punish me,
2. They get angry,
3. They discuss with me, and
4. They have no reaction.

### Perceived factors of current increase in prevalence of waterpipe smoking

Students were asked about the main reasons that were responsible for the waterpipe’s increased popularity among students by using nine items, namely, stressful life and need for relaxation, trend and habit, increased availability, media, peer imitation, freedom, ignorance, belief that it was less harmful than the cigarette, self-expression, and appearance. Each student was able to choose more than one option.

### Statistical analysis

We computed absolute and relative frequencies for categorical variables and mean and standard deviation for continuous one. We used chi-square statistics to determine the relation between waterpipe and cigarette smoking status and the main reasons for the recent increase in waterpipe smoking. We used univariate logistic regression to determine the association between perceived factors related to waterpipe and cigarette smoking separately (the triers’ data omitted in this part of the analysis). In multiple logistic regression, we controlled age, gender, residency, and parent and sibling smoking. Odds ratio (OR) with 95% confidence interval (CI) was reported. Chi-square test compared waterpipe smokers and never-smokers with regard to the most important reasons of increase in waterpipe smoking. For all analyses, we defined statistical significance *a priori* with a two-tailed alpha of 0.05. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 15 (SPSS Inc., Chicago, Illinois, USA).

## RESULT

Of the 5,500 students selected for participation, we received completed questionnaires from 5,408 (98.32%) individuals, all of whom were included in the final sample of the study. Fifty percent were females and 89% lived in urban areas. The average respondent age was 14.37 ± 1.70 years.

There was a significant relation between cigarette and waterpipe smoking status ( $\chi^2$  (df = 4) = 172.88,  $P < .001$ ). The prevalence of waterpipe smoking was higher than cigarette smoking (11.5% versus 5.8%). Most of the nonwaterpipe smokers (96.4%) were also noncigarette smokers; however, 79.1% of noncigarette smokers were nonwaterpipe smokers. Cigarette smokers were more common (70.9%) waterpipe smokers, and only 35.7% of waterpipe smokers puffed the cigarette as well [Table 1].

The boys had almost six times more probability of smoking either the waterpipe (OR = 6.06; 95% CI: 4.87-7.46) or the cigarette (OR = 6.32; 95% CI: 4.65-8.54) than girls. Students in urban areas had also a higher chance of smoking (2.15-fold for cigarette smoking (95% CI 1.31-3.37) and 1.87 folds for waterpipe smoking (95% CI 1.35-2.58)). Students whom owning smoker sibling more probably smoked cigarettes (OR: 3.53, 95% CI 2.68-4.64) or waterpipe (OR: 5.06, 95% CI 4.07-6.29). Although with lower OR than sibling smoking, the adolescent was impressionable to parental smoking too. Parental smoking increases the odds of cigarette smoking by 1.59-fold (95% CI: 1.26-2.01) and the odds of waterpipe smoking by 2.41-fold (95% CI: 2.02-2.87).

Table 2 exhibits univariate analysis of influential perceptual factors on cigarette and waterpipe smoking. Nonsmokers were considered as the reference category. The student perception that parents do react to their child’s smoking behavior was a protective factor for cigarette and waterpipe smoking. The belief that the parents would punish, get angry, or discuss against smoking decreased student cigarette smoking probability by 33% (OR = 0.63; 95% CI: 0.50-0.79), 56% (OR = 0.44; 95% CI: 0.35-0.56), and 55% (OR = 0.45; 95% CI: 0.35-0.58), respectively, when compared to those without these belief. The equivalent decrease for waterpipe smoking was 66% (OR = 0.34; 95% CI: 0.28-0.41), 71% (OR = 0.29; 95% CI: 0.24-0.34), and 60% (OR = 0.40; 95% CI: 0.33-0.48). However,

**Table 1: Cross-tabulations of cigarette smoking and waterpipe smoking**

Cigarette smoking status	Waterpipe smoking status			Total
	No smoker	Trier	Smoker	
Nonsmoker	3,486 <sup>a</sup>	704	215	4,405
	79.1(%) <sup>b</sup>	16.0(%)	4.9(%)	100.0(%)
	96.4(%) <sup>c</sup>	63.7(%)	35.1(%)	82.6(%)
Trier	97	346	179	622
	15.6(%)	55.6(%)	28.8(%)	100.0(%)
	2.7(%)	31.3(%)	29.2(%)	11.7(%)
Smoker	34	56	219	309
	11.0(%)	18.1(%)	70.9(%)	100.0(%)
	.9(%)	5.1(%)	35.7(%)	5.8(%)
Total	3,617	1,106	613	5,336
	67.8(%)	20.7(%)	11.5(%)	100.0(%)
	100.0(%)	100.0(%)	100.0(%)	100.0(%)

$\chi^2$  (df = 4) = 2172.88;  $P < .001$ ; <sup>a</sup>Frequency <sup>b</sup>Row percentage; <sup>c</sup>Column percentage

**Table 2: Univariate analysis of influential perceptual factors on cigarette smoking and waterpipe smoking**

Variables	Cigarettes			Waterpipe		
	Nonsmoker	Smoker	OR (95% CI)	Nonsmoker	Smoker	OR (95% CI)
Harm perception						
Cigarette > waterpipe	1,552 (35.1)	116 (37.7)	1.11 (0.88-1.41)	1,239 (34.2)	269 (43.7)	1.41 (1.25-1.78)
Cigarette < waterpipe	1,383 (31.3)	110 (35.7)	1.20 (0.95-1.55)	1,101 (30.4)	207 (33.7)	1.16 (0.96-1.39)
Cigarette = waterpipe	1481 (33.5)	82 (26.6)	0.72 (0.55-0.93)	1,281 (35.4)	139 (22.6)	0.53 (0.43-0.65)
Perception on parent reaction						
Will punish me	2642 (62.3)	157 (50.8)	0.63 (0.50-0.79)	1,904 (55.3)	181 (29.5)	0.34 (0.28-0.41)
Will be very angry	3173 (74.9)	176 (57.0)	0.44 (0.35-0.56)	2,316 (67.2)	227 (36.9)	0.29 (0.24-0.34)
Will discuss it with me	3419 (80.8)	202 (65.4)	0.45 (0.35-0.58)	2,777 (80.6)	361 (62.3)	0.40 (0.33-0.48)
Will do nothing at all	486 (11.5)	75 (24.4)	2.48 (1.88-3.27)	482 (14.1)	237 (38.9)	3.89 (3.22-4.71)
Smoking is appealing because of						
Preparation	NA	NA	NA	403 (11.2)	370 (60.2)	11.99 (9.90-14.52)
Sound	NA	NA	NA	825 (22.9)	429 (69.6)	7.73 (6.40-9.33)
Taste	248 (5.7)	142 (46.3)	14.37 (11.10-18.60)	375 (10.4)	416 (67.8)	18.07 (14.80-22.07)
Smell	272 (6.2)	106 (34.5)	7.96 (6.13-10.42)	535 (14.9)	428 (70.0)	13.40 (11.00-16.69)
Stress relief	272 (6.2)	129 (42.2)	11.03 (8.52-14.27)	254 (7.1)	283 (45.9)	11.19 (9.12-13.71)
Social environment	205 (4.7)	90 (29.9)	8.66 (6.52-11.50)	191 (5.3)	164 (26.8)	6.50 (5.16-8.19)
Smoking is repellent because of						
Malodor	3,986 (90.8)	193 (62.9)	0.17 (0.13-0.22)	2,997 (83.4)	210 (35.1)	0.11 (0.09-0.13)
Yellowish teeth	4,018 (91.5)	199 (64.8)	0.17 (0.13-0.23)	3,056 (85.2)	269 (44.9)	0.14 (0.12-0.17)
Adverse health effect	4,106 (93.4)	205 (66.8)	0.14 (0.11-0.18)	3,209 (89.4)	358 (59.6)	0.17 (0.14-0.21)

Numbers are absolute frequency with percent in parenthesis; SD = Standard deviation; OR (95% CI) = Odds ratio (95% confidence interval); NA = Not applicable

students who thought that their parents showed no reaction had higher odds of 2.48 (95% CI: 1.88-3.27) for cigarette smoking and 3.89 (95% CI: 3.22-4.71) for waterpipe smoking. Among appealing characteristics of smoking, the taste (OR = 14.37; 95% CI: 11.10-18.60) and stress relief (OR = 11.03; 95% CI: 8.52-14.27) were more dominant among cigarette smokers, and taste (OR = 18.07; 95% CI: 14.80-22.07) and smell (OR = 13.40; 95% CI: 11.00-16.69) more influential for waterpipe smokers. The repellent characteristics of smoking were perceived strongly by nonsmokers than smokers [Table 2].

In Table 3, after adjustment, the odds of smoking for students who believed in the equal harm of both the products was 1.33 (95% CI: 1.01, 1.77) for cigarette and 1.84 (95% CI: 1.4-2.31) for waterpipe smoker. But those who did not smoke the cigarette and waterpipe thought the cigarette to be more dangerous than the waterpipe. Even after adjustment, the approach of the parent's reaction responses being "punish me," "get angry," and "discuss with me" were higher in nonsmokers. Smoking in those who expected less extensive parent reactions (parents who do nothing at all) increase among cigarette smokers with OR = 1.89 (95% CI: 1.35-2.63) and waterpipe smokers with OR = 2.75 (95% CI: 2.16-3.50). "Taste" was rated the most attractive feature by waterpipe and cigarette smokers with OR = 2.83 (95% CI: 2.06-3.90) and OR = 4.14 (95% CI: 2.79-6.12), respectively. On the other hand, the social environment had no significant association with waterpipe and cigarette smoking. Yellowish Teeth with odds of 0.67 and adverse health effect with odds of 0.79 were the most repellent factors of smoking.

Table 4 summarized the main reasons for the current increase in waterpipe smoking among students. 62.7 percent of nonsmokers and 58.4% of smokers expressed stressful life as a reason for the current increase of waterpipe smoking. Compared with no waterpipe smokers, higher proportions of waterpipe smokers expressed the trend and habit as the most common reason of increased use of smoking (73.8% of the smokers vs 64.6% of nonsmokers,  $P < 0.001$ ). Higher percentage of nonsmokers expressed media (62%), freedom (70.8%), ignorance (61.6%), wrong belief about the absence of harmful effect of the waterpipe (63.3%), and self-expression (66.9%) as the reasons for increasing the consumption of smoking. There was no difference between the two groups with regard to increased availability and peer imitation.

## DISCUSSION

In this study, approximately 35% of waterpipe smokers were cigarette smokers and 70% of cigarette smokers were waterpipe smokers. The present study revealed that parental reaction to adolescent smoking is a protector of smoking. In addition, waterpipe smokers considered taste and smell as the favorable factors of smoking and malodor and yellowish teeth as the unfavorable ones. On the other hand, cigarette smokers considered taste, stress relief, and the social environment as favorable factors and adverse health effect as an unfavorable one.

At present, the prevalence of waterpipe smoking has been witnessing a surge among youth in the world, especially



**Table 3: Adjusted multiple logistic regression of influential perceptual factors on cigarette and waterpipe smoking**

Variables	Cigarettes	Waterpipe
	OR (95% CI)	OR (95% CI)
Harm perception		
Cigarettes>waterpipe	0.69 (0.57, 0.84)	0.78 (0.67,0.92)
Cigarettes<waterpipe	0.99 (0.82,1.20)	1.10 (0.89,1.36)
Cigarettes=waterpipe	1.33 (1.01,1.77)	1.84 (1.47,2.31)
Perception on parent reaction		
Will punish me	0.76 (0.57,1.02)	0.55 (0.42,0.71)
Will be very angry	0.53 (0.39,0.71)	0.41 (0.32,0.52)
Will discuss it with me	0.62 (0.46,0.83)	0.65 (0.51,0.83)
Will do nothing at all	1.89 (1.35,2.63)	2.75 (2.16,3.50)
Smoking is appealing because of		
Preparation	NA	1.79 (1.32,2.42)
Sound	NA	1.87 (1.38,2.54)
Taste	4.14 (2.79,6.12)	2.83 (2.06,3.90)
Smell	1.52 (1.01,2.29)	2.22 (1.62,3.04)
Stress relief	2.66 (1.81,3.89)	1.69 (1.23,2.33)
Social environment	1.15 (0.74,1.78)	0.81 (0.56,1.17)
Smoking is repellent because of		
Malodor	0.62 (0.39,0.99)	0.44 (0.32,0.62)
Yellowish Teeth	0.67 (0.41,1.10)	0.67 (0.48,0.93)
Adverse health effect	0.50 (0.32,0.79)	0.79 (0.57,1.11)

Nonsmokers were reference category. Smokers compared to nonsmokers; OR (95% CI) = Odds ratio (95% confidence interval); Analysis was adjusted for age, gender, residency, parent and sibling smoking

**Table 4: Main reason for the current increase in waterpipe smoking**

Variables	Nonsmoker N (%)	Smoker N (%)	P value
Main reason			
Stressful life and need for relaxation	2,210 (62.7)	355 (58.4)	0.011
Trend and habit	2,284 (64.6)	449 (73.8)	<0.001
Increased availability (restaurants/cafes)	2,140 (60.7)	364 (60.1)	0.96
Media	2,185 (62.0)	297 (48.9)	<0.001
Peer imitation	2,525 (72.0)	430 (71.1)	0.72
Freedom	2,496 (70.8)	398 (65.7)	0.038
Ignorance	2,163 (61.6)	320 (52.7)	<0.001
Belief it is less harmful than cigarettes	2,219 (63.3)	341 (56.0)	0.001
Self-expression and appearance	2,350 (66.9)	317 (52.1)	<0.001

Numbers are absolute frequency with percent in parenthesis; Chi-square test was conducted to compare waterpipe nonsmokers and smokers; P value <0.05 was considered statistically significant

Eastern countries.<sup>[4]</sup> In our sample, the prevalence of waterpipe smoking was 11.5% among middle and high school students. The result is consistent with the Global Youth Tobacco Survey (GYTS)<sup>[11]</sup> and New Jersey (NJ) Youth Tobacco Survey.<sup>[18]</sup> According to GYTS and NJ Youth Tobacco Survey, current waterpipe smoking had a range of 6-34% among 13-15-year-olds and 9.7% among high school students. Additionally, in the study conducted in London,

England,<sup>[19]</sup> the prevalence of waterpipe smoking was more than double of cigarette smoking, which was similar to our findings.

The present findings reveal that although there was a predominance of cigarette smokers who smoked the waterpipe too, only a small number of waterpipe smokers smoked cigarette. These data are consistent with previous studies, which found a strong association between these forms of tobacco use.<sup>[20-22]</sup> For example, a study among college students in the United States found that cigarette smokers were twice as likely as nonsmokers to report lifetime waterpipe smoking.<sup>[20]</sup> Additionally, the large proportion of both waterpipe and cigarette smokers perceived the waterpipe to be as harmful as or less harmful than regular cigarettes. This might have been because they considered the waterpipe to be a safer substitution than the cigarette or this might point to the belief that waterpipe is more socially acceptable than cigarette smoking, especially in eastern countries such as Iran.<sup>[23]</sup> For example, some families let their children smoke at home and therefore, are the initiators and supporters of waterpipe smoking among youth, especially in females.<sup>[24]</sup> Also, waterpipe cafes are considered as the most prevalent social places for waterpipe smoking.<sup>[25]</sup>

We also examined the role of familial factors on adolescent smoking by perceived parental reaction toward smoking and the influence of parents and sibling smoking. Parent reaction is thought to be the primary source of social influence on smoking and other unhealthy behaviors among adolescents. In our sample, adolescents who perceived that their parents would punish them or discuss with them if they smoked were less likely to be smokers. The finding is in keeping with the finding of the research in 2010, which reported that the adolescent's perception of parental punishment was related to reduction in adolescent smoking.<sup>[26]</sup> The present study also shows that parent and sibling smoking have both been linked to increase adolescent smoking in accordance with a finding reported by several studies. The explanations for this might be that smoking parents are involved in antismoking socialization practices less frequently and less constructively than nonsmoking parents<sup>[27]</sup> and also some smoking parents believe that smoking in the presence of their children is inevitable.<sup>[28]</sup>

Furthermore, we assessed the attitude toward smoking in waterpipe smokers opposed to cigarette smokers. While taste and stress relief are considered as the main positive attributes in the large prevalence of cigarette smokers, most waterpipe smokers like this type of smoking because of its smell and preparation and the minority of waterpipe smokers mention stress relief as a favorable factor. This result is consistent with the outcome of the research by

Maziak *et al.*<sup>[29]</sup> except the stress relief, which is considered as the second reason in both types of smoking in the study. According to several studies conducted in Iran, it seems that most Iranian people perceived the cigarette as a stress relief and the waterpipe as a hobby.<sup>[30,31]</sup> In addition, the majority of cigarette smokers dislike their cigarette due to its health hazard, which is not an important factor in waterpipe smokers. According to the study conducted by Aljarah *et al.*,<sup>[32]</sup> higher percentages of waterpipe smoking were associated with the belief that it was less harmful than the cigarette and this belief can play a role in increasing the percentage of regular waterpipe smokers. This study and other studies conducted in the same field reflect that increasing waterpipe smoking, which might have been due to the belief of its less harmfulness. In addition, most studies considered hobby as the main motive behind the increase in waterpipe popularity.<sup>[16]</sup> For example, in a study conducted in Iran among youth aged 12-20 years, most respondents considered the waterpipe as a means of entertainment, hospitality, and as a symbol of fashion.<sup>[33]</sup> But we found that a large proportion of waterpipe smokers believed that habit and dependency were the main factors behind the maintenance of waterpipe smoking.

### Limitations

These findings had some limitations. The study's main limitation was the cross-sectional design of the present study, which only measured the association than causation. Second, the data was self-reported and might be subject to social desirability and underreporting. Third, we selected a sample as representative of Iranian students; however, sampling from only one province might affect the generalizability of the study. Despite these limitations, the strengths of the current study include a large sample with a high response rate (98.3%) and pioneer information about the attitudes and beliefs and the role of parent reaction among Iranian adolescents, which is a clue for policymaker in planning the first step of prevention strategies.

### CONCLUSION

In summary, our study shows that the perception of no reaction from the parents and lack of students' knowledge about waterpipes' health hazards and addictive features of the waterpipe might be associated with an increase in waterpipe smoking among students. Additionally, we found that the attitudes toward smoking were different among waterpipe smokers in contrast to the cigarette smokers.

### Acknowledgements

The study was funded by Isfahan University of Medical Sciences (Number 87139). We would like to especially thank the staff of the

Cardiovascular Research Institute and Isfahan Provincial Health Center for their enthusiasm and commitment to conduct the study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### AUTHOR'S CONTRIBUTION

HR contributed in the conception and design of the work, drafting and revising the draft, analyzing and interpreting of data, approval of the final version of the manuscript, and agreed to all aspects of the work. ZK contributed in the conception of the work, drafting and revising the draft, approval of the final version of the manuscript, and agreed to all aspects of the work. KH contributed in the conception and design of the work, conducting the study, revising the draft, approval of the final version of the manuscript, and agreed to all aspects of the work. RO contributed in the conception and design of the work, conducting the study, revising the draft, approval of the final version of the manuscript, and agreed to all aspects of the work. TA contributed in the conception of the work, drafting and revising the draft, approval of the final version of the manuscript, and agreed to all aspects of the work. MN contributed in the conception of the work, data acquisition, approval of the final version of the manuscript, and agreed to all aspects of the work. MJ contributed in the conception of the work, data acquisition, approval of the final version of the manuscript, and agreed to all aspects of the work. MS contributed in the conception of the work, analyzing and interpreting of data, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work.

### REFERENCES

1. Warren CW, Lea V, Lee J, Jones NR, Asma S, McKenna M. Change in tobacco use among 13-15 year olds between 1999 and 2008: Findings from the Global Youth Tobacco Survey. *Glob Health Promot* 2009;16(Suppl):38-80.
2. World Health Organization Regional Office for the Eastern Mediterranean: A Strategy for Health Promotion in the Eastern Mediterranean Region 2006-2013. 2008. Available from: <http://www.emro.who.int/dsaf/dsa794.pdf>. [Last accessed on 2014 Sep 22].
3. Akl EA, Gunukula SK, Aleem S, Obeid R, Jaoude PA, Honeine R, *et al.* The prevalence of waterpipe tobacco smoking among the general and specific populations: A systematic review. *BMC Public Health* 2011;11:244.
4. Maziak W. The global epidemic of waterpipe smoking. *Addict Behav* 2011;36:1-5.
5. Maziak W, Taleb ZB, Bahelah R, Islam F, Jaber R, Auf R, *et al.* The global epidemiology of waterpipe smoking. *Tob Control* 2015;24(Suppl 1):i3-12.
6. Rastam S, Ward KD, Eissenberg T, Maziak W. Estimating the beginning of the waterpipe epidemic in Syria. *BMC Public Health* 2004;4:32.

7. Roohafza H, Sadeghi M, Shahnam M, Shokouh P, Teimori S, Amirpour A, *et al.* Social norms of cigarette and hookah smokers in Iranian universities. *ARYA Atheroscler* 2013;9:45-50.
8. Chassin L, Presson CC, Todd M, Rose JS, Sherman SJ. Maternal socialization of adolescent smoking: The intergenerational transmission of parenting and smoking. *Dev Psychol* 1998;34:1189-201.
9. Foshee V, Bauman KE. Parental and peer characteristics as modifiers of the bond-behavior relationship: An elaboration of control theory. *J Health Soc Behav* 1992;33:66-76.
10. Dornelas E, Patten C, Fischer E, Decker P, Offord K, Barbagallo J, *et al.* Ethnic variation in socioenvironmental factors that influence adolescent smoking. *J Adolesc Health* 2005;36:170-7.
11. Harakeh Z, Scholte RH, Vermulst AA, de Vries H, Engels RC. Parental factors and adolescents' smoking behavior: An extension of the theory of planned behavior. *Prev Med* 2004;39:951-61.
12. Kulwicki A, Hill Rice V. Arab-American adolescent perceptions and experiences with smoking. *Pub Health Nurs* 2003;20:177-83.
13. Tobacco Free Initiative. Tobacco: Deadly in Any Form or Disguise. Geneva: World Health Organization; 2006. Available from: [http://www.who.int/tobacco/communications/events/wntd/2006/Tfi\\_Rapport.pdf](http://www.who.int/tobacco/communications/events/wntd/2006/Tfi_Rapport.pdf). [Last accessed on 2014 Sep 10].
14. Primack BA, Sidani J, Agarwal AA, Shadel WG, Donny EC, Eissenberg TE. Prevalence of and associations with waterpipe tobacco smoking among U.S. university students. *Ann Behav Med* 2008;36:81-6.
15. Kandela P. Narghile smoking keeps Arabs in wonderland. *Lancet* 2000;356:1175.
16. Akl EA, Jawad M, Lam WY, Co CN, Obeid R, Irani J. Motives, beliefs and attitudes towards waterpipe tobacco smoking: A systematic review. *Harm Reduct J* 2013;10:12.
17. Roohafza H, Heidari K, Omidi R, Alinia T, Rajabi F, Bagheri S, *et al.* Methodology of Isfahan Tobacco Use Prevention Program: First phase. *Adv Prev Med* 2013;2013:182170.
18. Jordan HM, Delnevo CD. Emerging tobacco products: Hookah use among New Jersey youth. *Prev Med* 2010;51:394-6.
19. Jawad M, Wilson A, Lee JT, Jawad S, Hamilton FL, Millett C. Prevalence and predictors of water pipe and cigarette smoking among secondary school students in London. *Nicotine Tob Res* 2013;15:2069-75.
20. Grekin ER, Ayna D. Argileh use among college students in the United States: An emerging trend. *J Stud Alcohol Drugs* 2008;69:472-5.
21. Maziak W, Hammal F, Rastam S, Asfar T, Eissenberg T, Bachir ME, *et al.* Characteristics of cigarette smoking and quitting among university students in Syria. *Prev Med* 2004;39:330-6.
22. Jackson D, Aveyard P. Waterpipe smoking in students: Prevalence, risk factors, symptoms of addiction, and smoke intake. Evidence from one British University. *BMC Public Health* 2008;8:174.
23. Momtazi S, Nuhraresh M, Tareman F. A study of Substance Abuse and Some Related Risk Factors in Iranian High School Students. NIDA International Forum; 2009. Abstract Book p. 61. Available from: <http://www.drugabuse.gov/international/abstracts/study-substance-abuse-some-risk-factors-in-iranian-high-school-students>. [Last accessed on 2014 Aug 12].
24. Ghafouri N, Hirsch JD, Heydari G, Morello CM, Kuo GM, Singh RF. Waterpipe smoking among health science university students in Iran: Perceptions, practices and patterns of use. *BMC Res Notes* 2011;4:496.
25. Cobb C, Ward KD, Maziak W, Shihadeh AL, Eissenberg T. Waterpipe tobacco smoking: An emerging health crisis in the United States. *Am J Health Behav* 2010;34:275-85.
26. Kristjansson AL, Sigfusdottir ID, James JE, Allegrante JP, Helgason AR. Perceived parental reactions and peer respect as predictors of adolescent cigarette smoking and alcohol use. *Addict Behav* 2010;35:256-9.
27. Harakeh Z, Scholte RH, de Vries H, Engels RC. Parental rules and communication: Their association with adolescent smoking. *Addiction* 2005;100:862-70.
28. Clark PI, Scarisbrick-Hauser A, Gautam SP, Wirk SJ. Anti-tobacco socialization in homes of African-American and white parents, and smoking and nonsmoking parents. *J Adolesc Health* 1999;24:329-39.
29. Maziak W, Eissenberg T, Rastam S, Hammal F, Asfar T, Bachir ME, *et al.* Beliefs and attitudes related to narghile (waterpipe) smoking among university students in Syria. *Ann Epidemiol* 2004;14: 646-54.
30. Roohafza H, Shahnam M, Zolfaghari B, Tavassoli A, Sadeghi M, Toloee H, *et al.* Stress level and smoking status in central Iran: Isfahan Healthy Heart Program. *ARYA Atheroscler* 2011;6: 144-8.
31. Roohafza H, Sadeghi M, Shahnam M, Bahonar A, Sarafzadegan N. Perceived factors related to cigarette and waterpipe (ghelyan) initiation and maintenance in university students of Iran. *Int J Public Health* 2011;56:175-80.
32. Aljarrah K, Ababneh ZQ, Al-Delaimy WK. Perceptions of hookah smoking harmfulness: Predictors and characteristics among current hookah users. *Tob Induc Dis* 2009;5:16.
33. Kelishadi R, Mokhtari MR, Tavassoli AA, Khosravi A, Ahangar-Nazari I, Sabet B, *et al.* Determinants of tobacco use among youths in Isfahan, Iran. *Int J Public Health* 2007;52:173-9.