



Research Article

Water pipe smoking among female in Iran : A survey Pattern of use, risk perception and environmental factors

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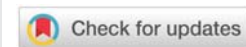
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Abstract

Background: Considering the prevalence of water pipe smoking among female adolescents and the need to identify the components and dimensions of such behaviors, this study was conducted to investigate determinants of water pipe smoking, use pattern, risk perception and environmental factors among female in Iran.

Methods: This cross-sectional study was conducted on 1302 adolescent females in Kermanshah city, western Iran, in 2019. The method was multi-stage sampling with a systematic random approach. Data were collected using a questionnaire and analyzed using SPSS 22 software. Statistical tests included descriptive statistics and linear and logistic regression analyses.

Results: 32.4% of the participants reported ever water pipe smoking and 20.4% mentioned they used WP at the present time. 60 % of water pipe smoking believed that water pipe smoking is less harmful than cigarettes. 78 % participants believed water pipe smoking 1 h a day was not dangerous and environmental factors affect the tendency to water pipe smoking.

Conclusions: water pipe smoking by adolescents is a multi-factor and multi-level phenomenon, and the major factors for their determining existat multiple levels of individual, interpersonal and environmental factor, which should be considered for intervention, prevention, an control of water pipe smoking.

Background

WPS¹ has become one of the most common methods of smoking [1]. WP was first introduced in Iran and WP is used in its present form under the influence of major changes. WPS reached Egypt and the Mediterranean region in the middle of the 16th century and in the 19th century, WPS has widespread among female in the Middle East [2]. in recent, WPS in Europe and the United States has been increasing [3]. WP is known all over the world with different names including: Hubble bubble, Shisha,

¹Water pipe smoking

Gylan, Goza [4]. WP among adolescents has been increasing in recent years [5]. According to a 2012 national survey on student smoking, 32% of male and 30% of female ever used WP [6]. In Iran, ever WPS in adolescents were estimated to be 59.16% [7]. In addition, the results of the latest survey on risk factors of Non-Communicable Disease [SuRFNCD 2007] in Iran showed that more than half of female smoke WP [8]. one reason for the increasing tendency of WPS in adolescents is misunderstanding about WPS and they think WP is less harmful than other tobacco products [9]. This is more sensitive in the Arab countries and Iran, because WPS in female is not considered harmful and it is much more acceptable in the community than other types

of tobacco products [10]. there are several factors affecting the tendency to WP, including: individual factors [attitude], family factors [peer influence], environmental factors [easy access], political, etc [11]. studies show that the smell and flavours of WP has increased adolescents' tendency to WP compared to other tobacco products [12,13]. new types tobacco products including WP have gained popularity because of attractive advertising and financial sponsors [14]. more access to more modern types of tobacco products and marketing strategies by tobacco manufacturers has caused tobacco control laws less effective[15]. the purpose study of investigate determinants of waterpipe smoking, use pattern, risk perception and environmental factors among female in Iran and using Sociocological [SEM] model to clearer perception determinants of use.

SEM

Using the SEM is a useful method for examining health-related behaviors, however, this model has not been used about WPS in women. This model examines the interpersonal and environmental relationships and indicates that although individual factors play an important role in health-related behaviors, but examining other factors and levels gives the researcher a clearer understanding about doing or not doing a behavior, especially in high-risk behaviors such as smoking [16,17]. [form1].

Materials and methods

Study design and setting

This cross-sectional study was carried out on 1302 middle and high school females aged 12–18 years in Kermanshah, one of the largest cities with the highest prevalence of tobacco use in Iran, between January and August 2019. The method applied was multistage sampling with a systematic random approach. Initially, a list of schools in the three districts of Kermanshah was prepared. In total, 12 schools were then selected by systematic random sampling (two middle schools and two high schools). At the school level, systematic random sampling was also selected based on the number of students and the proportion of the total sample size. Written informed consent was obtained from students aged ≥ 16 years, and from parents of students aged < 16 years. The names of the participants in the questionnaire were not recorded and other information was kept confidential and used only for this study.

Instrument

The formal and content validity of the questionnaire was assessed using the opinion of 15 health education and promotion specialists. The Content Validity Ratio (CVR) and Content Validity Index (CVI) for each question was extracted. Also, for the reliability of the questionnaire, in a preliminary study, the questionnaire was given to 30 students who had characteristics similar to the main study samples. Cronbach's alpha coefficient was then calculated.

The questionnaire consisted of two parts: demographic and water pipe-related behaviors. The questionnaire was completed on a self-report basis and took approximately 20 minutes to complete.

Demographic factors: Included age, grade, father's and mother's job, father's and mother's education, living conditions.

WPS -related determinant: Including never having been a ever WPS, having friends who smoke WP [Yes/No] and having friends who offer WPS [Yes/No], perceptions of cigarette smoking associated with WP, perceptions of harm associated with WP, environmental factors associated with WP, reasons of WP use, prototype images about WPS.

Statistical analysis

The data were entered into IBM SPSS 22 software after collection. Logistic regression was used to investigate and predict factors affecting WP. Chi-square and logistic regression were performed to identify statistical differences and analyze factors associated with WP.

Ethical consideration

This research received ethics approval from the Ethics Committee of Hamadan University of Medical Sciences. [IR.UMSHA.REC.1397.696]. All participants were given an informed consent form to participate in the study.

Results

Individual determinants of use

The results were obtained after completion of 1302. A total of 883 (67.8%) participants reported that they had never smoked WP, 419 (32.3%) had a single experience of WP during their lifetime, and 265 (20.4%) were current consumers of WP. Also, the likelihood of an increase in WPS in students whose fathers were self-employed and un-employed was 3.85 and 3.23 times more likely than those whose fathers were employees Table 1.

Socialecological factor

Table 2 shows perception of the comparison between WP and cigarette smoking, those who ever WPS compared to those never WPS, believe that WP access is 1,08 times easier than cigarette.

Most participants believed that the smell of WP is more pleasant than cigarette. The odds of ever use WP were 2.2 times higher for those who had much better smell to WP than cigarettes. Nearly 60% of them believe that WP is less harmful than cigarettes. 73% female adolescent believed cost WP less expensive than cigarettes.

The students that their friends WPS, they were more likely to smoke WP and those that their friends had suggested WP smoking, were 7 times more likely than others to smoke (Table 3).

78% female students believed WPS 1h daily was not dangerous and ever users WP had 5.07 times a higher odd of believing that WPS makes users cool and fit. ever WPS had 4.4 time a higher odd of believing that WP smoking makes users teeth damaged (Table 4).

Table 5 shows WPS in relation to environmental factors.



Table 1: Characteristics of the students based on waterpipe ever use and non-use.

Characteristics	Never water pipe smoking [n=883][%]	ever water pipe smoking [n=419][%]	AOR [95% CI]	P-value	Past-month water pipe smoking [n=265][%]	AOR [95% CI]	P-value
Age a[yr]							
13-Dec	200 [15.3]	86 [6.6]	0.94[0.69 to 1.028]	0.7	53 [20]	1.05[0.73 to 1.5]	0.7
14-15	273[20.9]	147[11.2]	1.18[0.91 to 1.5]	0.2	106[40.]	1.5[1.15 to 2.1]	0.04**
16-17-18b	410[31.5]	186[14.3]	1	-	106[40]	1	--
High school grade^a							
Seventh	137[10.6]	54[4.1]	0.69[0.46 to 1.04]	0.08	31[11.7]	0.74[0.45 to 1.2]	0.24
Eighth	168[12.1]	66[5.1]	0.88[0.69 to 1.28]	0.5	48[18.1]	0.98[0.62 to 1.5]	0.95
Ninth	126[9.7]	97[7.45]	0.75[0.51 to 1.1]	0.1	68[25.6]	1.68[1.09 to 2.5]	0.01*
Tenth	164 [12.6]	45 [3.4]	0.56[0.31 to 0.84]	0.006***	33[12.4]	0.71[0.43 to 1.17]	0.945
Eleventh	154 [12.4]	64 [5]	0.55[0.35 to 0.87]	0.004***	38 [14.3]	0.82[0.5 to 1.31]	0.673
Twelfth ^b	134[10.5]	93[7.1]	1	---	47[17.8]	1	---
Father's Education^a							
Illiteracy	39 [2.1]	26 [2.00]	1.95[1/1 to 3/4]	0.01*	16 [6.4]	1.37[0.73 to 2.50]	0.3
Under the diploma	176 [13.6]	109 [8.5]	1.81 [1.27 to 2.50]	0.001***	72 [27.1]	1.40 [0.96 to 2.1]	0.07
Diploma	442 [34.0]	207 [15.9]	1.37 [1.01 to 1.84]	0.04*	119 [45]	0.71 [0.66 to 1.33]	0.73
College ^b	226 [17.4]	77 [6.0]	1	-	58 [21.9]	1	-
Mother's Education^a							
Illiteracy	55 [4.2]	20 [1.5]	0.78[0.4to 1.4]	0.4	12 [4.5]	0.60[0.29 to 1.26]	0.1
Under the diploma	326 [25]	159 [12.2]	1.03 [0.68 to 1.55]	0.83	97 [12.7]	0.79 [0.51 to 1.25]	0.32
Diploma	411 [31.5]	197 [15.2]	1.01 [0.68 to 1.54]	0.94	124 [46.8]	0.81 [0.52 to 1.27]	0.37
College ^b	91 [7.0]	43 [3.3]	1	-	32 [12.1]	1	-
Father's job^a							
Unemployed	489 [37.5]	288 [22.12]	3.23[2.3 to 4/3]	0.001***	184 [69.5]	2.62[1.7 to 3.6]	0.00***
Self-employed	114 [8.8]	80 [6.3]	3.85 [2.52 to 5.81]	0.000***	46 [17.4]	1.48 [1.63 to 4.21]	0.00***
Employee ^b	280 [21.5]	51 [4.00]	1	-	35 [13.1]	1	-
Mother's job^a							
Housewife ^b	819 [33.8]	382 [33.7]	1	-	234 [24.4]	1	-
Employed	64 [3. 4]	37 [2.7]	1.23[0.81 to 1.81]	0.31	31 [1.9]	1.83 [1.17 to 2.86]	0.008**

CI: Confidence Interval, AOR: Adjusted Odds Ratio. a: Categorical variables, b: Reference group, *p<0.05, **p < 0.01, ***p < 0.001

Table 2: Logistic regression examining perceptions of cigarette smoking associated with waterpipe ever use.

In comparison to cigarette ever use	Study participants 1302	Waterpipe ever use		AOR [95% CI]
		Yes 419	No 883	
Harm perception waterpipe vs. cigarette*				
Less harmful	655[51]	253[60]	494[56]	2.29[1.73 to 2.80]
More harmful [reference]	647[49]	166[39]	389[44]	
Accessibility cigarette vs. waterpipe? *				
Easier access	902[69.2]	295[70.4]	607[68.7]	1.08[0.84 to 1.39]
Difficult to access [reference]	400[30.7]	124[29.5]	276[31.3]	
Cost cigarette vs. waterpipe? *				
Less expensive	962[73]	264[63]	564[64]	1.5[1.3 to 1.63]
More expensive [reference]	340[27]	155[37]	319[36]	
Smell waterpipe vs. cigarette? *				
Much better	832[64]	317[75]	515[59]	2.2[1.7 to 2.8]
About the same [reference]	470[36]	102[26]	368[41]	

CI: Confidence Interval, AOR: Adjusted Odds Ratio. *p<0.05

Table 3: Logistic regression examining peer pressure factors associated with Waterpipe ever use.

Peer pressure	Study participants 1302	Waterpipe ever use		AOR [95% CI]
		Yes 419	No 883	
Have friends who smoke waterpipe regularly*				
Yes	445[74]	247[58]	198[23]	4.9[3.87 to 6.31]
No[reference]	857[26]	172[42]	685[77]	
If your friends invite will you smoke* waterpipe?				
Yes	319[25]	227[55]	92[11]	7.27[5.4 to 9.7]
No[reference]	983[75]	192[45]	791[89]	
If your friends insist will you smoke* waterpipe?				
Yes	158[12]	108[26]	50[6]	5.07[4.3 to 8.2]
No[reference]	1144[88]	311[74]	833[94]	

CI: Confidence Interval, AOR: Adjusted Odds Ratio. *p<0.05

tendency to smoke WP, including easy access to WP, the existence of different WP tobacco flavours, and the acceptance of WP in the community which increases odd of smoking 1.6, 2.8,



and 1.46, respectively. But there is no significant relationship between the lack of facilities for healthy recreational activities and WPS.

The 5 most frequently recorded reasons of WPS from students' viewpoints are shown in Table 6. take pleasure and sense relax and increase focus were common reasons of WPS from students viewpoints OR estimates of becoming an ever WPS was 2.6, 2.1 and 2.2 for students who mentioned sense of relax, take pleasure and increase focus as the main reason of WP use compared to those who did not mention it, respectively. As well as, the likelihood of WPS was higher among those who mentioned these reasons as the main reasons of WPS compared to those who did not mention to such reasons.

Table 7 presents the important positive and negative images of typical WPS in the students. It was hypothesized that students prototypes of daily smoking peers would differ among WP users and non-users. In this regard, comparison to non-users,WPS evaluated a typical WP user as more clever,Less immature, more popular, more attractive, more self-confident,more independent and less selfish [P<0.001].

Table 4: Logistic regression examining perceptions of harm associated with Waterpipe ever use.

Harm perception	Study participants 1302	Waterpipe ever use		AOR [95% CI]
		YES 419	NO 833	
Waterpipe smoking makes theeth damaged*				
Yes	940[72]	214[51]	726[82]	4.4[3.87 to 6.31]
No[reference]	362[28]	205[49]	157[18]	
Smoking waterpipe for an hour daily is harmful*				
Yes	284[21]	192[46]	92[11]	7.27[5.4 to 9.7]
No[reference]	1018[78]	227[54]	791[89]	
Waterpipe smoking makes users fit*				
Yes	158[12]	240[57]	703[80]	5.07[4.3 to 8.2]
No[reference]	1144[88]	204[43]	180[20]	

CI: Confidence Interval, AOR: Adjusted Odds Ratio. *p<0.05

Table 5: Logistic regression environmental factors associated with Waterpipe ever use.

Enviromntl factors	Study participants 1302	Waterpipe ever use		AOR [95% CI]
		Yes 419	No 883	
Acceptance of WP smoking in the community*				
Yes	1013[78]	344[82]	669[75]	1.46[1.09 to 1.96]
No[reference]	289[22]	75[28]	214[25]	
Easy access to hookah*				
Yes	1094[84]	370[88]	724[82]	1.6 [1.7 to 2.3]
No[reference]	208[16]	49[12]	159[18]	
Various flavors*				
Yes	1091[84]	385[92]	706[80]	2.8[1.9 to 4.2]
No[reference]	211[16]	34[8]	177[20]	
No other facilities				
Yes	990[76]	323[77]	667[76]	1.09[0.81 to 1.4]
No[reference]	312[24]	96[23]	216[24]	

CI: Confidence Interval, AOR: Adjusted Odds Ratio. *p<0.05

Table 6: Reasons of water pipe use in the female students.

Cause of smoking	Never WP smoking [n=883][%]		Former WP smoking [n=419][%]		AOR [95% CI]	P-value
	Frequency	percent[%]	Frequency	percent[%]		
sence relax						
NO	671	[76]	113	[27]	2,6[1.8 to 3.6]	0.001
YES	212	[24]	306	[73]		
Take pleasure						
NO	634	[72]	115	[28]	2,1 [1.5 to 2.4]	0.001
YES	249	[28]	304	[72]		
Increase focus						
NO	752	[85]	165	[40]	2,2[1.3 to 2.9]	0.001
YES	131	[15]	254	[60]		
Forggtive problem						
NO	745	[84]	171	[41]	1.7 [1.1 to 2.4]	0.001
YES	138	[16]	248	[59]		
control violence						
NO	670	[76]	275	[66]	1.7[1.2 to 2.4]	0.001
YES	213	[28]	144	[34]		

CI: Confidence Interval, AOR: Adjusted Odds Ratio. *p<0.01

Table 7: Prototype images about waterpipe users among female students.

Images of WP users	Never WP smoking [n=813][%]		Former WP smoking [n=409][%]		AOR [95% CI]	P-value
	Frequency	percent [%]	Frequency[%]	percent [%]		
Immature						
NO	595	[68]	170	[41]	2,1[2.3 to 3.2]	0.001
YES	288	[28]	249	[59]		
popular						
NO	624	[70]	129	[30]	5.1 [4.2 to 6.9]	0.001
YES	259	[30]	290	[70]		
Attractive						
NO	639	[72]	140	[34]	3.1[3.6 to 5.5]	0.001
YES	244	[28]	279	[66]		
clever						
NO	673	[76]	151	[36]	5.1[4.4 to 7.3]	0.001
YES	210	[24]	268	[64]		
Self-confident						
NO	528	[60]	137	[33]	1.6[1.2 to 2.1]	0.001
YES	355	[40]	282	[67]		
Independent						
NO	458	[52]	146	[35]	1.9[1.5 to 2.5]	0.001
YES	455	[48]	273	[65]		
Selfish						
NO	428	[49]	139	[33]	1.89[1.4 to 2.3]	0.001
YES	453	[51]	280	[67]		

CI: Confidence Interval, AOR: Adjusted Odds Ratio. *p<0.01



Discussion

32.2 % of the female adolescent had ever WPS and 20.4 % were current WPS, Our findings were similar to those of other studies in other countries [1,18]. for example, in a study in Turkey, the prevalence of WPS was 32.7%. [19]. in this study showed that the job and education the play a significant role in the increase of WPS, in such a way that , the probability of WPS in students whose fathers are unemployed and self_employed is 3 times more than students whose fathers are employee which is similar to the results of study [19-22], ever WPS believed that WPS makes them cool and fit compared to cigarettes which is similar to the results of study [16].

Female reported WPS to be less harmful than cigarettes,in line with finding from other studies [2,4,23-25]. WP, like cigarettes, has many disadvantages and especially in female it causes oral diseases, infectious diseases, menstrual disorders and infertility [26-28] .female adolescents believed cost WP less expensive than ciggaret. We worry that students believe that WP is cheaper than cigarettes, and this is one of the most effective reasons about the tendency to smoke WP [29].

The results showed that the smell of WP is one of the incentives for students to smoke WP and this is consistent with the results of study [30]. findings showed that the influence and offer friend to smoke WP increased the probability of WPS 7 times more among students, which is similar to the results of study [31-33]. It seems that lack of sufficient people skills, such as the ability to say 'no' to the suggestion of friends, is one of the main reasons for the tendency to smoke WP. the result demonstrated that sense of relax , take pleasure and increasing focuse, are the most important reasons on starting tobacco smoking as reasons for WPS was higher than those who did not mention to such reasons. which are consistent with results of similar studie [34,35].the findings indicate that positive and negative images of typical WP lead to WP use, in line with other study [36-38]. our study showed that female students believed that WP was more acceptable and less harmful than cigarette[39, 40]. flavored tobacco smell, environment friendly, easy access to WP some of it is attributable to the significant expansion, which is similar to The results of study [15,41]. Also, Iranian females often face many restrictions with regard to cigarette smoking, but family members approve of WPS as traditional entertainment with no trouble, and females are allowed to use them inside and outside the home. WPS is a major threat for female adolescent. WP is a multi-factor and multi-level phenomenon, and the major factors for their determining existat multiple levels of individual, interpersonal and environmental factor, which should be considered for intervention, prevention, an control of WP.

Consent to publish

The manuscript has been read and approved by all authors.

Availability of data and materials

Data used in this study is analyzed and the data is available any time you had request.

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Ethical consideration

Written informed consent was obtained from students aged 16 years and over and parents of students under 16 years of age. The names of the participants in the questionnaire were not recorded and other information was kept confidential and used only for this study. The Ethics Committee of Hamadan University of Medical Sciences approved this study (reference number: (IR.UMSHA.REC.1397.696).

Authors' contributions

SB, MB, MK, participated in the study designing. EE participated in data collection. SB, MB,MK and EE participated in the data analysis and SB and EE and BH wrote the manuscript. The manuscript has been read and approved by all the authors.

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