

Original Article

Water Pipe Smoking and Health-Related Quality of Life: A Population-Based Study

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Background: Water pipe smoking is increasing in Eastern Mediterranean Region. The objective of this study was to investigate any relationship between water pipe smoking and health-related quality of life in the general population of Bandar Abbas, Iran.

Methods: Using a multistage sampling method, a random sample of 1675 individuals aged 15 years and over was studied from June through July 2007. All eligible participants were interviewed using the Short Form Health Survey (SF-36) questionnaire and a short questionnaire containing items regarding socio-demographic characteristics and water pipe smoking status. To compare SF-36 scores between water pipe smokers and nonsmokers, *t*-test was performed. In addition, multiple logistic regression analysis was used to determine the influence of water pipe smoking on SF-36 scores after adjusting for other independent variables.

Results: In all, 1675 individuals were studied. The mean age of the respondents was 42.1 (SD=16.5) years. One hundred and seventy-two participants (10.4%) were water pipe smokers. There were statistically significant differences between water pipe smokers and nonsmokers on all scales except for role emotional ($P<0.001$). Logistic regression analysis showed that using water pipe was a risk factor for decreasing Physical Component Summary and Mental Component Summary scores [OR (95% CI): 2.15 (1.56 – 2.96), $P<0.01$; and OR (95% CI): 1.88 (1.36 – 2.60), $P<0.01$, respectively].

Conclusion: The study findings indicated that people who smoked water pipe carried a higher risk for poorer health-related quality of life.

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Keywords: Health-related quality of life • Iran • population-based study • water pipe smoking

Introduction

Smoking is well-established as a recognized reason for cancer, lung diseases, coronary heart disease, and stroke. It is argued that the majority of morbidities and mortalities are attributed to smoking worldwide.¹ There is much evidence that cigarette smoking could decrease self-reported physical (SF-36 Physical Component Summary [PCS] score

and mental health (SF-36 Mental Component Summary [MCS] score) of smokers.²

Water pipe smoking is common especially in the countries in Eastern Mediterranean Region (EMR),^{3,4} as it is believed that 20% of adult people living in these countries smoke water pipe.⁴ Although little data is available regarding the prevalence of water pipe smoking in EMR, existing data is worrying.⁵ A national survey conducted in Kuwait indicates that more than 50% of adult population have smoked water pipe at least once throughout their lives.⁶ Water pipe smoking is also common in Egypt,³ Syria,⁷ and Lebanon.⁸ A previous study conducted in Israel reported that about 22% of children between 12 and 18 years of age smoked water pipe at least once every weekend.⁸

Despite the evidence regarding the effects of water pipe smoking on health¹⁰⁻¹⁵ and the fact that

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a high prevalence of water pipe smoking is seen in developing countries, especially in countries located in EMR, most research efforts have addressed developed countries. Moreover, research tends to focus on cigarette smoking rather than water pipe smoking.³

Hormozgan, the southernmost province of Iran, is near Arab countries such as Kuwait, United Arab Emirates, and Kingdom of Saudi Arabia where water pipe smoking is prevalent among their general population.⁶ According to the Iranian National Health Survey conducted in 2000,¹⁶ Hormozgan Province was ranked second in terms of water pipe smoking. It has been said that the proximity of this province to Arab countries and positive attitudes and beliefs towards water pipe smoking in the general public living in this area has made water pipe smoking a prevalent high-risk behavior among people especially women and illiterate individuals. Despite these features and studies regarding the pattern of water pipe smoking among the Iranian population,¹⁷ there has been no survey to investigate the relationship between water pipe smoking and health-related quality of life (HRQOL) in people who live in this area. Although it is assumed that water pipe smoking could be related to decreased quality of life, there is no evidence in Iran to indicate this relationship. This study was aimed to examine any relationship between water pipe smoking and HRQOL in the general population of Bandar Abbas, Iran. Since different factors may influence HRQOL, in this study, we tried to assess the predicted effects of socio-demographic factors as well as cigarette smoking on HRQOL.

Materials and Methods

A cross-sectional population-based study was conducted to investigate the relationships between water pipe smoking and HRQOL in the general population of Bandar Abbas, Iran, from June first through July first, 2007. Using a multistage sampling method, a random sample of 1675 individuals aged 15 years and over who resided in Bandar Abbas was selected. If someone refused to take part in the research or was unable to answer the questions because of a language barrier, he/she was excluded from the study. Face to face interviews were done to collect data.

In this study, highly-trained interviewers were asked to interview eligible individuals. First of all, they communicated with the interviewees most

effectively and intimately and described the objectives and procedures of the study to them; if they were willing to participate in the study, they signed a consent form.

Two questionnaires were used to collect data. The first one included questions regarding basic demographic data such as age, gender, years of education, marital status, occupational status, cigarette smoking status, and water pipe smoking status. A water pipe smoker in this study was defined as a person who answered "yes" to the following question: "Are you currently a water pipe smoker?" The term of water pipe—in this study—was used to refer to a method of tobacco smoking in which smoke passes through water. Besides terminology, there are also regional variations in the shape, size, and appearance of the water pipe and type of smoked tobacco. Generally in Iran, a water pipe consists of sections such as a head, a body, a water bowl, and a hose and the most common type of tobacco is Tumbak. A cigarette smoker was defined as someone who answered "yes" to the question "Are you currently a cigarette smoker?"

The second questionnaire was the Short Form Health Survey (SF-36). This tool is a well-known general questionnaire that measures HRQOL in eight subscales: Physical Functioning (PF), Role Limitations due to Physical Problems (RP), Bodily Pain (BP), Vitality (VT), General Health (GH), Social Functioning (SF), Role Limitations due to Emotional Problems (RE), and Mental Health (MH). Three subscales (PF, RP, and BP) correlate most highly with the physical aspect of HRQOL, and associated with subscale of GH, contribute most to the scoring of PCS measure. The mental aspect of HRQOL correlates most highly with the subscales, including MH, RE, and SF, and associated with VT, contributes most to the scoring of MCS measure. This study also focused on analyzing and reporting two summary scores, including PCS and MCS. The SF-36 reports the subjects' perceived HRQOL by scores ranging from zero to 100, where 100 is the best and zero is the worst score.¹⁸ We used the Iranian version of the SF-36 questionnaire. The validity and reliability of the Iranian version of SF-36 is well-documented.¹⁹ Data were analyzed in a descriptive-analytic fashion using SPSS software. To compare the mean score of each subscale between smokers and nonsmokers, *t*-test was used. Logistic regression analysis was performed to calculate crude and adjusted odds ratios and to examine the

relationship between studied independent variables and HRQOL in both dimensions of PCS and MCS. Studied independent variables included age, gender, education years, occupational status, marital status, cigarette smoking status, and water pipe smoking status. As Tables 3 and 4 show, all these variables were entered into the model as categorical data and the category with the assumed lowest risk for quality of life was considered as reference category. PCS and MCS were considered as dependent variables and were categorized into two groups: the group equal or less than mean score and the group with PCS/MCS scores of more than mean score. A two-tailed *P* value of less than 0.05 was considered statistically significant.

This study was approved by the Medical Ethics Committee of Hormozgan University of Medical Sciences (HUMS). The procedures of the study were explained to all subjects, and all participants were provided with informed consent forms for signing.

Results

In all, 1675 individuals were studied. The mean (SD) age of the subjects was 42.1 (16.5) (range: 15 – 100 years). Eight hundred and thirty (49.6%) participants were men with a mean (SD) age of 42.2 (16.5). Table 1 shows the characteristics of the study sample. In this study, all potential interviewees were willing to take part in the study, and additionally, all the questionnaires were filled completely by the interviewers.

The mean scores of eight subscales of SF-36 questionnaire are shown in Table 2. As this table indicates, there were statistically significant differences between water pipe smokers and non-smokers on all scales except for RE scale ($P < 0.001$). Table 3 presents the predictive effects of gender, age, education, occupation, and water pipe smoking on PCS and MCS. As this table

Table 1. The characteristics of the study sample ($n=1675$).

Characteristics	No.	%
Gender		
Male	830	49.6
Female	845	50.4
Age		
15–24	318	19
25–44	583	34.8
45–64	643	38.4
>64	131	7.8
Education years		
0–5	583	34.8
6–12	950	56.7
>12	142	8.5
Employment status		
Employed	617	36.8
Housewife	590	35.2
Student	135	8.1
Unemployed	85	5.1
Retired	248	14.8
Marital status		
Single	328	19.6
Married	1183	70.6
Widow/Divorced	164	9.8
Water pipe smoking		
Yes	172	10.4
No	1486	89.6
Cigarette smoking		
Yes	192	11.5
No	1483	88.5

shows, water pipe smoking was a risk factor for both PCS and MCS [OR (95% CI): 2.15(1.56 – 2.96), $P < 0.01$; 1.88(1.36 – 2.60) $P < 0.01$, respectively]. In addition, as this table shows, female gender, older ages, and low level of education were significant risk factors for lower scores of both MCS and PCS (all P values < 0.01). According to this table, housewives were at higher risk for worse PCS [OR (95% CI): 1.68 (1.06 – 2.64), $P = 0.03$], and students were at higher risk for worse MCS [OR (95% CI): 1.84 (1.11 – 3.10), $P = 0.02$]. To omit the predictive effect of age—because of its highest odds ratio—and to show the

Table 2. Comparison of SF-36 scores of the participants in terms of water pipe smoking.

	Smokers ($n=172$)	Nonsmokers ($n=1486$)	<i>P</i> value*
	M(SD)	M(SD)	
Physical function	71.1(26.7)	81.4(25.1)	<0.001
Role physical	80.6(33.3)	88.2(27.9)	<0.001
Bodily pain	74.5(28.5)	82.3(25.8)	<0.001
General health	61.8(21.1)	68.1(19.8)	<0.001
Mental health	74.7 (17.1)	81.4(16.6)	<0.001
Role emotional	91.8 (21.7)	92.8 (22.1)	0.54
Vitality	75.9 (21.7)	84.1(20.1)	< 0.001
Social function	83.2 (20.4)	88.2 (18.4)	< 0.001

* *t*-test; M=mean

Table 3. Relationship between gender, age, education, occupation, and water pipe smoking on PCS and MCS.

	* PCS		**MCS	
	OR (95% CI)***	P value	OR (95% CI)	P value
Gender				
Male	Ref (1)		Ref (1)	
Female	1.85(1.25–2.74)	0.002	2.26(1.55–3.30)	0.001
Age				
15–24	Ref (1)		Ref (1)	
25–44	1.22(0.68–2.11)	0.38	1.18(0.74–1.62)	0.35
45–64	1.86(1.31–2.78)	0.001	1.78(1.12–2.43)	0.001
>64	13.4(6.23–21.24)	0.001	4.56(2.23–6.85)	0.001
Years of education				
>12	Ref (1)		Ref (1)	
6–12	2.90 (1.69–4.98)	0.001	2.23 (1.32–3.76)	0.002
0–5	2.23 (1.67–2.97)	0.001	1.85 (1.38–2.49)	0.001
Employment status				
Employed	Ref (1)		Ref (1)	
Housewife	1.68(1.06–2.64)	0.03	1.21(0.75–1.93)	0.42
Student	1.67(1.00–2.78)	0.05	1.84(1.11–3.10)	0.02
Unemployment	1.98(0.95–4.11)	0.07	1.35(0.67–2.73)	0.39
Retired	1.28(0.63–2.58)	0.48	0.77(0.39–1.55)	0.47
Marital status				
Single	Ref (1)		Ref (1)	
Married	1.21 (0.79–1.83)	0.37	1.13 (0.74–1.72)	0.55
Widow/Divorced	0.85 (0.46–1.57)	0.60	0.95 (0.51–1.74)	0.87
Water pipe smoking				
No	Ref (1)		Ref (1)	
Yes	2.15(1.56–2.96)	0.001	1.88(1.36–2.60)	0.001

*Physical Component Summary; **Mental Component Summary; ***Odds ratio.

predictive effect of cigarette smoking on PCS and MCS, we omitted the variable of age from the model and entered the variable of cigarette smoking status, instead.

The findings of this model of regression analysis are shown in Table 4. According to this table, significant risk factors for lower scores of PCS were as follows: female gender, low education (less than 12 years), occupational status such as being unemployed, being a student and housewife, cigarette smoking status, and water pipe smoking status. Furthermore, significant risk factors for lower scores of MCS were as follows: low education (less than 12 years), occupational status, being a student, cigarette smoking status, and water pipe smoking status.

Discussion

In this article, we sought to quantify the association between water pipe smoking and HRQOL. This population-based study showed that the mean scores of the Short Form Health Survey for water pipe smokers were lower than those of nonsmokers for seven out of eight dimensions indicating that water pipe smokers had a substantially worse health condition than non-

smokers in all scales except for RE scale. Therefore, it could be argued that water pipe smoking is significantly associated with poorer health perception. In addition, the scores of each reduced scale of smokers compared to non-smokers decreased for more than five points, which is clinically important. Moreover, the findings of this study showed that water pipe smoking could decrease all scales related to the physical aspect of HRQOL that include physical function, role physical, bodily pain, and general health indicating that the participants who smoked water pipe were in worse position in terms of physical health and had more limitations to do their daily activities; also, they suffered from more severe pain, and finally, they reported poorer general health. This finding is consistent with reports of a study in which researchers noticed that smokers reported a significantly poorer quality of life and greater disability than nonsmokers.¹ Furthermore, the findings of this study revealed that the mean scores of three scales related to MCS, namely vitality, social function, and mental health, were significantly lower among water pipe smokers than nonsmokers indicating that smokers compared to nonsmokers reported poorer health in the mental aspects of HRQOL. This finding is

Table 4. Relationship between gender, education, occupation, water pipe, and cigarette smoking on PCS and MCS.

	* PCS		**MCS	
	OR (95%CI)***	P value	OR (95%CI)	P value
Gender				
Male	Ref (1)		Ref (1)	
Female	1.85(1.26–2.71)	0.002	2.18(1.52–3.15)	0.001
Years of education				
>12	Ref (1)		Ref (1)	
6–12	4.88 (2.84–8.37)	0.001	3.65 (2.18 –6.12)	0.001
0–5	3.40 (2.62–4.41)	0.001	2.73 (2.10–3.56)	0.001
Employment status				
Employed	Ref (1)		Ref (1)	
Housewife	1.96(1.25–2.83)	0.01	1.64(0.78–2.21)	0.38
Student	1.84(1.23–2.88)	0.03	2.13(1.16–3.24)	0.01
Unemployed	2.17(1.14–4.12)	0.05	1.68(0.54–2.94)	0.32
Retired	2.23(0.94–2.94)	0.32	0.95(0.44–1.72)	0.42
Marital status				
Single	Ref (1)		Ref (1)	
Married	1.21(0.71–2.10)	0.47	0.97 (0.56–1.67)	0.93
Widow/Divorced	1.42(0.95–2.13)	0.08	1.24 (0.83–1.85)	0.28
Cigarette smoking				
No	Ref(1)		Ref(1)	
Yes	2.12(1.34–2.96)	0.001	1.82(1.45–2.89)	0.001
Water pipe smoking				
No	Ref (1)		Ref (1)	
Yes	2.27(1.56–3.11)	0.001	1.65(1.24–2.71)	0.001

*Physical Component Summary; **Mental Component Summary; ***Odds ratio.

similar to those reported by other studies in which the investigators found that smokers were more likely to report symptoms of depression or anxiety than nonsmokers.^{1,20,21} When comparing water pipe smokers and nonsmokers and reviewing the differences between them, one should keep in mind that smokers might show a higher prevalence of chronic diseases in comparison to nonsmokers that results in poorer quality of life. However, other researchers have reported the impact of chronic diseases on HRQOL in their studies,²² but the present study has not obtained any data regarding chronic diseases in studied participants.

Since previous studies have demonstrated that socio-demographic characteristics could impact HRQOL,^{23–25} it is argued that observed differences between water pipe smokers and nonsmokers might be due to existing differences in their socio-demographic characteristics. To answer this question, multivariate logistic regression analysis was conducted through which the interactions between water pipe smoking and other independent variables, including age, gender, education level, occupational status, marital status, and cigarette smoking status were assessed and findings showed that water pipe smoking could increase the risk of both physical and mental impairment independent of other socio-demographic characteristics.

Importantly, adjusted odds ratio for cigarette smoking showed that water pipe smoking could worsen physical and mental health of smokers when the effect of cigarette smoking was adjusted. Therefore, given the harmful effects of water pipe smoking on HRQOL, more research in different target populations and with larger samples are needed to confirm these results.

This study concluded that smoking water pipe posed a higher risk for poorer HRQOL and should therefore be of high priority for health planners.

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