



## The Association between Waterpipe Use and Resilience in University Students: A Study at Kerman University of Medical Sciences, Iran

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### Abstract

**Background:** It has been well documented that resilience is a protective factor against the abuse of a variety of drugs. To date, this factor has not been examined regarding waterpipe smoking. This study aims to investigate the predictive role of resilience in tobacco use among students of the University of Medical Sciences.

**Materials and Methods:** A cross-sectional study was conducted among a consecutive sample of college students ( $n = 820$ ) at Kerman University of Medical Sciences, Iran, 2019. To this end, the 14-item Resilience Scale (RS-14) was used. The students entered the study using convenience sampling. Self-administered questionnaires were completed anonymously and confidentially in the classroom. Besides, multivariable logistic regression was used to examine the association between waterpipe smoking and resilience. SPSS version 24 was used for statistical analysis.

**Results:** The mean (SD) age of the participants was 22.2 (3.0) years. A total of 776 subjects were enrolled into the study, with 47.3% of whom having been female. Most of the students were single (84.4%). The prevalence of waterpipe use in the past 30 days was 33.4%. The initiation age of waterpipe smoking in 75.1% of the students was  $\leq 18$ . Low resilience was (OR=7.10, CI: 4.75-10.62,  $p < 0.001$ ) the strongest predictor of waterpipe smoking among students.

**Conclusion:** Given the importance of resilience in the field of tobacco use, this study suggests that resilience-building programs be included in university curricula especially at the time of university enrollment.

**Keywords:** Resilience, Tobacco Use, Students, Adolescents.

### Introduction

Nowadays, waterpipe smoking is considered an emerging health problem among civilized humans. According to the World Health Organization (WHO), waterpipe smoking will kill over 10 million people a year by 2030, with most of which to be occurred in developing countries [1]. Waterpipe smoking (WPS) has been one of the traditional smoking methods in recent decades, especially among young people, and is a factor leading to diseases and mortality [2]. In different regions and cultures of the world, waterpipe smoking has

different names (Hookah, Arghile, Shisha, Narghile Argeela, Goza, and Waterpipe), with all of which having in common the passage of smoke through water before being inhaled by the user [3]. Waterpipe has become popular among young people due to its social acceptance, innovative design, availability, pleasant and varied aromas, as well as low costs [4]. According to a systematic study, the majority of waterpipe users in the world are school and university students [2]. The onset of waterpipe smoking (WPS) is mainly during adolescence, but it peaks in younger adults [5]. Waterpipe smoking produces more carbon

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monoxide and smoke than cigarette smoking [6]. Besides, one hour of waterpipe smoking equals 2 to 10 cigarettes of carcinogenic substances [7]. Therefore, side effects of waterpipe smoking are dangerous to those around the smoker. Recent evidence suggests that waterpipe smoking has a significant relationship with cardiovascular diseases, esophageal, bladder, and lung cancers, as well as adverse pregnancy outcomes, such as low birth weight, mental disorders, and periodontal disease in waterpipe users [8]. Waterpipe smoking is a causative factor in using other drugs and a predictor of using other tobacco products [9]. The prevalence of waterpipe smoking has increased dramatically in the world. For example, US national data showed that its prevalence among 10th grade students increased from 17% in 2010 to 19.8% in 2015 [10]. The waterpipe smoking rate has been reported among students from three countries in the EMRO region of Egypt (60.7%), Jordan (67.7%), and Palestine (63.1%) for the last 30 days [11]. In a study of 13- to 15-year-old Lebanese boys, the waterpipe smoking prevalence was reported to be 38% in the last 30 days [12].

In general, the prevalence of WPS in the Eastern Mediterranean region is higher than that in other parts of the world; however, its prevalence in some European countries has been close to that in the Middle East [13]. In a survey, the highest prevalence of waterpipe smokers so far was observed among Lebanese college students (%65.3), and the prevalence of regular waterpipe smokers among Iranian university students was reported to be %16.2 [5]. In a study, the prevalence of continuous WPS among Kerman University students was 47.9% (the setting of this study) [14], which was reported to be 43.8 and 27% among male and female high school students of the Kerman province, respectively [15]. When students were asked about the reasons for starting WPS, they cited reasons, such as getting entertained, being curious, exerting peer influence, allaying anxiety and stress, as well as coping with depression and anger [16-18]. In general, it is well established that WPS is associated with mental health problems, such as anxiety, depression, and high stress among students [19]. Recognizing factors leading to the onset and persistence of WPS is effective in designing policies and interventions to reduce its prevalence. It seems that any factors with a potential protective role against mental illnesses could reduce the tendency to smoke or perhaps start WPS [20]. Resilience is one of the effective factors with a well-established relationship with mental health [21]. According to the American Psychological Association, resilience refers to the process of being able to adapt well to

significant sources of stress or trauma [22]. Accordingly, Johnson defines resilience as an individual's ability to adapt to stressful situations. In addition, resilience is related to social components of health and is simply defined as successful compatibility despite challenges and threats. In fact, it is the process of positive adaptation to and compatibility with unpleasant experiences in life [23]. Goldstein et al [24] in a study showed that people with high levels of resilience are less likely to start smoking and less likely to smoke in the past month to become more addicted to nicotine. In addition, resilience is strongly associated with a reduced risk of alcoholism [25, 26]. Research shows that people with low levels of resilience are more likely to demonstrate inefficient coping skills, such as substance or alcohol abuse, to manage stressors [26]. Although all evidence suggests that resilience is a protective factor against adolescent smoking and use of illicit drugs, such a factor has not been studied in WPS. The present study answers the question of 'Is the psychological factor of resilience related to waterpipe smoking in students who are young, dynamic, and lively in the society?' The answer to this question will help improve the current state of the society, take steps in promoting the level of health, and prevent development of this health problem by identifying factors involved in waterpipe smoking, from a psychological point of view. As far as the authors of this paper know, this is the first study to have explained this relationship.

## Materials and Methods

This cross-sectional study was conducted in 2019 in Kerman city, and the sampling framework consisted of students at Kerman University of Medical Sciences. This university includes faculties of health sciences, such as medicine, nursing, dentistry, etc. Students entered this study using the quota sampling method, after taking the school size into account. The year of university admission and the field of study were not considered in the sampling scheme. Questionnaires were completed anonymously in the classroom. The researcher distributed the questionnaires upon arrival of students to the classroom. In addition, a sealed ballot box was placed in the classroom so that the students could put their completed questionnaires inside it before leaving the classroom. The questionnaires were anonymous, and the participants were assured that the questionnaires were untraceable. They were asked about their willingness to participate in the research, and those reluctant to cooperate were excluded. Using the formula of the 'number of events per variable

(EVP)', it was decided that at least 700 students were necessary for performing the logistic regression analysis [27]. The Ethics Committee (EC) of Kerman University of Medical Sciences approved the general protocol of this study (IR.KMU.REC.1398.440). In addition, the aim of the study was explained to the students, anonymity of the answers was ensured, and verbal consent was obtained from the participants.

In this study, the measurement tool consisted of three parts as follows:

- 1- Demographic questionnaire: This questionnaire included the demographic items of age, sex, marital status, level of education, place of residence, and study year.
- 2- Waterpipe use questionnaire: In this study, a valid short questionnaire with three questions on a yes/no scale was used to measure the current use status of waterpipe smoking in the past 30 days. People with a yes answer were considered waterpipe users and received code 1. The first two questions were related to waterpipe use in the past 30 days and in the life time. The third question was related to the frequency of waterpipe smoking. Each question was analyzed separately. Besides, validity and reliability of this questionnaire has been confirmed in Iran [18]. The questionnaire was selected and utilized owing to its short format and feasibility of administration.
- 3- Fourteen-item Resilience Scale (RS-14): This is a seven-point Likert scale consisting of 14 items used to assess the resilience level from a

minimum of 14 to a maximum of 98 [28]. The item scores ranged from 1 (strongly disagree) to 7 (strongly agree). Some examples included 'I am friends with myself' and 'I am interested in some things'. In the end, after summarizing the obtained scores, one group of low resilience (scores 14 to 48) and another group of medium to high resilience (scores 49 to 98) were classified. In this study, to better understand the analysis, the individuals were divided into the two groups of low as well as medium to high resilience. Psychometric properties of the Persian version of the questionnaire were confirmed [29]. Besides, the Cronbach's alpha coefficient was 0.81.

The mean ( $\pm$ SD) and percentage were used to describe the quantitative and qualitative data. Besides, multivariable logistic regression was used to examine the relationship between resilience, in the presence of contextual variables, and likelihood of waterpipe smoking in the past 30 days. The fitness of the model was assessed by the Hosmer-Lemshow test. The significance level was set at 5%. Besides, SPSS version 24 was used for statistical analysis.

### Results

Out of 820 delivered questionnaires, 776 were completed with a response rate of 94.6%. The mean (SD) age of the males and females were 25.3 (1.6) and 23.7 (2.3), respectively. Table 1 shows other characteristics of the students.

**Table 1.** Descriptive indicators and current prevalence of waterpipe use in students (N = 776)

Variable	Number of people (percentage)	Current prevalence of use in each category	P-value
Gender	Male	367(47.3)	<0.001
	Female	409(52.7)	
	Total	776(100)	
Marital status	Single	655(84.4)	<0.004
	Other	121(15.6)	
Study year	1 <sup>st</sup> year	315(40.6)	<0.001
	2 <sup>nd</sup> year	169(21.8)	
	3 <sup>rd</sup> year	126(16.2)	
	4 <sup>th</sup> year or higher	166(21.4)	
Place of residence	Dormitory	556(71.6)	<0.321
	Family	189(24.4)	
	Friends	31(4.0)	
Education level	Undergraduate	433(55.8)	<0.001
	Graduate	343(44.2)	
Resilience	Low	443(57.1)	<0.001
	Moderate to high	333(42.9)	

The current prevalence of waterpipe use (last 30 days) among students was 33.4% (n = 259), and 11% (n=28) of the users stated that they used

waterpipe on a daily basis. Besides, 75.1% (n=194) of the current users stated that they started using waterpipe at age 18 or earlier.

The mean ( $\pm$ SD) of resilience was 65.34 ( $\pm$ 19.7) for the subjects (N = 776), and 57.1% (n=443) of the subjects had low resilience. Based on the results of the multivariable logistics test, the chance of current waterpipe use in people with low resilience was significantly higher than that in those with moderate to high resilience (OR = 7.10, CI: 4.75-10.62;  $p < 0.001$ ) (Table 2). In addition,

the males were 5 times more likely to smoke waterpipe than the females. Besides, the first-year students were by 64% less likely to use waterpipe than the fourth year ones (OR = 0.36, CI: 0.20-0.63;  $p < 0.001$ ). Other baseline variables showed no significant association with waterpipe smoking (Table 2).

**Table 2.** Variables related to current waterpipe use in students using the logistic regression model (N = 776)

Variable		Odds ratio (CI 95%)	P-value
Gender	Male	4.84 (3.31-7.06)	<0.001
	Female	1	
Marital status	Single	1.82 (1.10-3.03)	0.21
	Other	1	
Study year	1 <sup>st</sup> year	0.36 (0.20-0.63)	<0.001
	2 <sup>nd</sup> year	0.84 (0.48-1.46)	0.544
	3 <sup>rd</sup> year	0.78 (0.44-1.34)	0.402
	4 <sup>th</sup> year or higher	1	
Place of residence	Dormitory	1.20 (0.50-2.88)	0.688
	Family	0.85 (0.34-2.88)	0.734
	Friends	1	
Education level	Undergraduate	0.81 (0.53-1.21)	0.306
	Graduate	1	
Resilience	Low	7.10 (4.75-10.62)	<0.001
	Moderate to high	1	

## Discussion

Waterpipe smoking is a growing threat to public health around the world. Different stressors among adolescents, such as the fear of unemployment, worrying about the future, and various stressors in the university environment could make students smoke [30]. The current prevalence of waterpipe use in the present study could be compared with similar studies conducted among university students [5]. For example, the statistics related to the United States showed the prevalence of waterpipe use was from 1.9 to 21.8 and 11.6% in the United Kingdom [5]. According to a systematic review, in Europe about a third of students are currently engaged in waterpipe smoking, while the estimates of waterpipe use among young Europeans over the past 30 days was 10.6% [5]. Nearly 60% of current waterpipe users started waterpipe use before entering the university. This finding implies that the best opportunity for taking preventive measures is at early ages, with schools playing a key role in this regard [28]. The role of resilience as a causative factor in preventing smoking and alcoholism has been established in recent studies [31, 32], yet there is no such evidence for waterpipe use. Resilience gives adolescents the ability to adapt to difficult situations, thereby enabling them to avoid unhealthy coping mechanisms, such as smoking [32]. The results of the present study indicated the

presence of a significant negative relationship between resilience and waterpipe use so that upon a decrease in resilience, the risk of waterpipe smoking increased. This finding is consistent with the results of Khodaverdi [33], Ahmadi [30], Goldstein et al [24], Long et al [25], and Veselka et al [26]. By way of explanation, resilience is a dynamic process that includes positive adaptation during difficulties. In other words, resilience indicates a state of efficiency and flexibility in dealing with life problems. This ability is closely related to self-control and indicates flexibility at a level of self-control in dealing with various situations. Accordingly, it is considered a coping strategy for dealing with stressful events and challenges [34]. People with high levels of resilience accept facts and believe that human life has a deep meaning that makes people resist problems and refrain from giving up. People with low resilience, as against resilient people, consider life challenges as negative and uncontrollable [35]. High levels of resilience help a person use positive emotions and feelings to get rid of unpleasant experiences and return to the desired state. In fact, resilience improves self-esteem and leads to coping with negative experiences successfully. In addition, it makes a person be less likely to use drugs and tobacco when facing problems and negative emotions through increasing the level of positive emotions. Therefore, psychological

vulnerability, depression, anxiety, and attitudes towards substance use are consequences of poor resilience [35].

Students are recommended to be more aware of the concept of resilience and its determinants. People with high resilience are hopeful when confronted with threatening situations and adopt effective coping measures. Resilience, being a kind of protection against stressors, makes a person adapt to these situations effectively [35]. In addition, resilient people possess problem-solving skills, a sense of competence, intimate relationships, and secure attachment. These people use such skills and abilities in dealing with hardships in life and use constructive relationships with others; thus, this factor reduces depression, anxiety, and mental stress, thereby improving mental health. On the other hand, it causes people to be less inclined to use drugs and tobacco in coping with life troubles and apply effective ways of alleviating their problems [35]. This study stressed the importance of building resilience to refrain from waterpipe smoking. To strengthen resilience in students, authorities should boost capacities of individuals, communities, and universities concomitantly. Families and parents have a greater role in helping their children build resilience. Thus, the resilience-building practice should start from childhood and continue till adulthood. Resilience-building programs should be included in university curricula, especially at the time of university enrolment. The main limitation of this study was its lack of generalizability. Since the sampling method was not probabilistic and included only one university, the results should be generalized to the whole country cautiously.

### **Conclusion**

In general, the results of the present study showed that resilience plays a significant role in protecting students against waterpipe smoking. Due to the importance of this variable in controlling waterpipe use, the results of the present study could be considered as a framework for further studies. In addition, it could be used in designing preventive and therapeutic interventions for people involved in waterpipe use and offering innovative methods to prevent and reduce waterpipe smoking among students.

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