Original article

**Frequency of waterpipe smoking and its effective factors among students of state universities in Kerman, Iran**

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**Abstract:** Background — Nowadays, using tobacco such as waterpipe is considered a worldwide health problem. In recent years, the consumption of waterpipe, has been increased in different countries, especially among young people. This study was conducted to determine the frequency of waterpipe consumption and factors affecting it among Kerman students.

Methods — This cross-sectional study was conducted among Kerman students. The students were selected using convenience sampling, and each of them completed the waterpipe consumption questionnaire. Data analysis was performed using chi-square test and logistic regression, as well as SPSS 17 software.

Results — In this study, 675 students were investigated. The mean (±standard deviation) age of the subjects was 21.1 (±2.6) years and 39% of them were male, and 30% of students had the experience of waterpipe consumption. The most important reason for waterpipe was entertainment, followed by curiosity. The waterpipe consumption was correlated with male gender, lower education level, living in a single house, and its consumption by friends or family members.

Conclusion — The results indicated that approximately one third of students experienced waterpipe smoking and some groups of them were susceptible to waterpipe smoking. Therefore, planning and intervention for the students are needed.

**Keywords:** tobacco, waterpipe smoking, student.

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**Introduction**

Nowadays, tobacco consumption is considered a worldwide health problem. Based on the World Health Organization (WHO) report released in 2005, more than 5 million deaths occurred due to complications arising from tobacco consumption around the world. By estimation, the death rate will increase to 8 million per year by 2030, and approximately 80 percent of these deaths will occur in countries with moderate and low economic income [1].

Waterpipe is an old method for tobacco consumption whose history dates back to the 15th century in India. It was later spread to other countries, including Iran, Egypt and the Eastern Mediterranean. After a short period of reduction in waterpipe consumption, its consumption increased since the early 1990s [2], particularly in recent years and among young people in different countries, even in Western countries such as England, France, Russia, Australia, Canada and the United States, not only in Asian and African countries [3, 4]. Reasons for increased consumption of waterpipe include lack of knowledge about its complications, acceptance of waterpipe consumption as a social behavior, expansion of waterpipe supply centers and stores supplying its related products in society, and supply of new and flavored tobaccos at low cost [5-7]. However, the results of recent studies suggest the presence of carcinogens compounds, high concentrations of carbon monoxide, nicotine, tar and heavy metals in smoke produced from waterpipe [3, 7]. Pathogenicity of all of them has been proven, and the available evidence suggests a relationship between waterpipe consumption and lung cancer, pulmonary disease, weight loss in birth delivery, as well as periodontal diseases [8]. In addition, given the common use of waterpipe by several people at the same time, there is potential for transmission and the development of certain infectious diseases, and the likelihood of transmission of infectious agents has been indicated in this regard [9]. Studies conducted in Iran suggest the increase of waterpipe consumption among young people, including students [10, 11]. To design preventive interventions, it is necessary to examine the underlying reasons providing the conditions for its consumption among young people and develop plans to reduce their consumption.

The current study was conducted to evaluate the frequency of waterpipe consumption and factors affecting it among Kerman city students.

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The students were educated in the medical sciences universities and willing participants; with the exclusion of unwilling participants and incomplete questionnaires. In this study, convenient non-probabilistic sampling was used to select students to participate in this research. Data were collected from students attending classes from two universities, accordingly after coordinating with the teachers and attending a classroom and after explaining the research process and its objectives for the students at the end of the class and obtaining their consent to participate in the research, the questionnaires were distributed among the students. Then, the way of completing the questionnaire was explained for them. Moreover, at time of completion of the questionnaire, the researcher attended beside the students to answer the probabilistic questions.

To observe ethical principles, the students were informed that their participation in this research was voluntary, the questionnaires were remained anonymous, and the students were ensured that their responses were recorded and analyzed by observing the confidentiality principles.

After collecting the questionnaires, the recorded data were entered into the computer and finally analyzed by SPSS 17 software. The quantitative data are presented as mean with standard deviation – M±SD; the qualitative data are presented as number and percents – n (%). Chi-square test for univariable analysis and logistic regression for multivariable analysis were also used to analyze the data. The significance level was considered to be less than 0.05.

Results

In this study, 675 students were investigated of which 303 (45%) and 372 (55%) were students in non-medical and medical science, respectively. The mean (±SD) age of the students was 21.1 (±2.6) years and 268 (39%) of the students were male. The highest number of the students studied at the doctoral level (60%), and 174 people (26%) lived in a single house. Table 1 presents the research subjects' demographic characteristics.

In total, 203 students (30.2%) had an experience of waterpipe consumption, and the mean (±SD) age at the first time of waterpipe consumption was reported 17.04 (±3.9) years, and 16 students (8%) consumed it before the age of ten and half of them experienced its consumption before the age of 18 years.

Furthermore, 99 (48.8%) of the students with a history of waterpipe consumption experienced it for the first time with their friends, and entertainment and pleasure (46.3%), followed by curiosity (36%) were the main reasons for the first use of waterpipe. Moreover, 29 (17.5%) of the students having a history of its consumption were also cigarette smokers. Regarding the question "Do you want to quit it or not?", 129 people (63.5%) believed that they were not addicted to waterpipe to quit its consumption (Table 2).

In this study, 58 students (8.6%) stated that their last consumption of waterpipe was a month before the study, of which 4 consumed it daily and 7 consumed it 1 to 4 times per week. The most common place for waterpipe consumption was coffee table/coffee house (23.2%) and friends’ home (21.4%), and most of these students (82.5%) consumed waterpipe more along with their friends. The duration of its consumption in most of the cases was reported more than half an hour (73.7%). The univariable analysis results suggest that male students consumed significantly more than female students (P<0.001), while no difference was observed between married and single students in this regard. Bachelor students consumed waterpipe highly (P<0.05), while no difference was observed among the students in its consumption regarding the educational field of study. In students living in single

### Table 1. Characteristics of the students (n=675)

| Characteristic                  | n (%)     |
|--------------------------------|-----------|
| Gender:                        |           |
| - Male                         | 268 (39)  |
| - Female                       | 407 (61)  |
| Marital status:                |           |
| - Single                       | 580 (86)  |
| - Married                      | 95 (14)   |
| Educational level:             |           |
| - Doctor                       | 404 (60)  |
| - Master                       | 8 (1)     |
| - Bachelor                     | 263 (39)  |
| Educational field:             |           |
| - Health sciences              | 372 (55)  |
| - Non-health sciences          | 303 (45)  |
| Housing status:                |           |
| - Dormitory                    | 246 (36.4)|
| - Single house                 | 174 (25.8)|
| - With family                  | 246 (36.4)|
| - Unknown                      | 9 (1.4)   |
| Age in the first consumption, year: |         |
| ≤10                            | 16 (7.9)  |
| 11-15                          | 42 (20.7) |
| 16-20                          | 113 (55.7)|
| 21+                           | 25 (12.3) |
| Person in first consumption:   |           |
| - Parents                      | 15 (7.4)  |
| - Sibling                      | 12 (5.9)  |
| - Others in family             | 77 (37.9) |
| - Friends                      | 99 (48.8) |
| The main motives for waterpipe smoking: |       |
| - Entertainment and pleasure   | 94 (46.3) |
| - Peer pressure                | 5 (2.5)   |
| - The curiosity                | 73 (36.1) |
| - Reducing fatigue             | 3 (1.4)   |
| - Attract people's attention   | 3 (1.4)   |
| - Others                       | 25 (12.3) |
| Concurrent use of cigarette:   |           |
| - Yes                          | 29 (14.3) |
| - No                           | 137 (67.5)|
| - Unknown                      | 37 (18.2) |
| Tendency to quit waterpipe smoking: |       |
| - I don't intend to quit        | 12 (5.9)  |
| - I am thinking of quitting    | 5 (2.5)   |
| - I am ready to quit           | 14 (6.9)  |
| - I have not thought about quitting | 15 (7.4) |
| - I am not addicted to quitting| 129 (63.5)|
| - Unknown                      | 28 (13.8) |

### Table 2. Characteristics of the waterpipe smoking of students (n=203)

| Characteristic                                        | n (%)     |
|-------------------------------------------------------|-----------|
| Age in the first consumption, year:                   |           |
| ≤10                                                   | 16 (7.9)  |
| 11-15                                                 | 42 (20.7) |
| 16-20                                                 | 113 (55.7)|
| 21+                                                   | 25 (12.3) |
| Person in first consumption:                          |           |
| - Parents                                             | 15 (7.4)  |
| - Sibling                                             | 12 (5.9)  |
| - Others in family                                    | 77 (37.9) |
| - Friends                                             | 99 (48.8) |
| The main motives for waterpipe smoking:               |           |
| - Entertainment and pleasure                          | 94 (46.3) |
| - Peer pressure                                       | 5 (2.5)   |
| - The curiosity                                       | 73 (36.1) |
| - Reducing fatigue                                    | 3 (1.4)   |
| - Attract people's attention                           | 3 (1.4)   |
| - Others                                              | 25 (12.3) |
| Concurrent use of cigarette:                          |           |
| - Yes                                                 | 29 (14.3) |
| - No                                                  | 137 (67.5)|
| - Unknown                                             | 37 (18.2) |
| Tendency to quit waterpipe:                           |           |
| - I don't intend to quit                               | 12 (5.9)  |
| - I am thinking of quitting                            | 5 (2.5)   |
| - I am ready to quit                                   | 14 (6.9)  |
| - I have not thought about quitting                    | 15 (7.4)  |
| - I am not addicted to quitting                        | 129 (63.5)|
| - Unknown                                             | 28 (13.8) |

**Material and Methods**

This cross-sectional and analytical study was conducted among students of two major and public universities of Kerman, center of the largest province in southeastern Iran, including medical science and non-medical science universities.

The participants in this research were students educated in medicine, dentistry, social science, economics, basic science schools. The study inclusion criteria were students of two universities and willing participants; with the exclusion of unwilling participants and incomplete questionnaires. In this study.
houses, waterpipe consumption was significantly higher (P<0.001), and waterpipe consumption was significantly high in students whose families had a history of waterpipe consumption (P<0.001), as well as students whose friends had a history of its consumption (P<0.001) (Table 3). Based on the multivariate analysis performed using logistic regression and given the significant items in Table 3, all the variables remained in the model (Table 4).

Discussion

In the current study, 30.2% of the students had a history of waterpipe consumption, and 28.6% of them consumed waterpipe in the last month. Investigations revealed that the frequency of waterpipe consumption among Iranian students was reported differently. Frequency of waterpipe consumption in our study is significantly lower than the results of the research conducted on the students of state universities in Tehran (40.3%) [12] and Karaj (51.2%) [13], but similar to the consumption frequency (29%) reported in the research conducted by Dehdari et al. [7]. The frequency of waterpipe consumption in two studies conducted by Rezakhani Moghadam [14] (23.3%) and Taremian [15] (25.7%) on students of medical universities of Tehran and the study conducted by Rahimzadeh [11] on physical education students of Kurdistan University (24.7%) has been reported less than that of the current research. In other countries, the frequency of waterpipe consumption has been reported differently. In the United States, Leavens et al. [16], Heinz et al. [17] and Noonan [18] reported the history of waterpipe consumption as 35.3%, 48% and 61%, respectively. It has been also reported 66% in England [19], 32.2% in South Africa [20], 37% in Saudi Arabia [21], 41.9% in Lebanon [22], and 56% in Jordan [23] students. In general, waterpipe consumption has increased in different communities and in different cultures, and it is mostly seen among adolescents and young people, thus high frequency of waterpipe consumption among students in different countries is predictable.

The age of the first consumption of waterpipe in the current research was 17.9 (±3.9) years, the age of starting to consume waterpipe was 18(±3.4) years in Tehran [14], 18(±2.5) years in Saudi Arabia [21], and 16(±2.81) years in South Africa [20], 19(±5.84) years in the United States [16], indicating lack of a significant difference between the domestic and foreign studies. Comparing the frequency of waterpipe consumption among males and females demonstrates higher consumption of it among males, and this result is seen in many domestic and foreign studies [11, 12, etc.].

The first reason for waterpipe consumption in this research was reported to be entertainment and pleasure (46.3%), followed by curiosity (36.1%). In the research conducted be Rezakhani Moghadam, the main reason for using waterpipe was also reported to be fun (34.8%) [14]. The main reason for consumption of waterpipe for the first time was reported to be curiosity (74.8%) in Saudi Arabia [21]. In South Africa, 57% of students consumed it for socialization and 33.3% for relaxation [20]. As the conditions of consuming the waterpipe are in a way that several people can converse for a long time while waterpipe, it is considered recreation and entertainment and even a tool for resting and relaxation. In this study, 48.8 percent of the students experienced waterpipe consumption for the first time with their friends, being similar to the results of the research conducted by Rezakhani Moghadam [14] and Dehdari [7]. In the research conducted by Javad in England, 73.7 percent of the students consumed waterpipe for the first time with their friends [19].
doctor students. It seems that bachelor students have more free time to spend for on recreation and various experiences; therefore, waterpipe consumption is more common in these students. As doctor students mainly study in medical and dentistry fields of studies, they have less free time and they can have knowledge about its harmful effects, they show a lower tendency to its consumption. One of the factors affecting the consumption of waterpipe by students is living in single houses. Ansari et al. in their research conducted in Zahedan revealed that waterpipe consumption was higher among students living in single houses [26]. Rezakhani Moghaddam et al. reported that waterpipe consumption in non-native students was higher than that in native students; while there is no information if they live in a dormitory or single house [14]. In Saudi Arabia [21] and the United States [25], waterpipe consumption was reported more in students living in single houses. It is clear that living at a personal house provides a special condition for students to experience various issues, including tobacco consumption in the absence of supervision of parents and adults.

One of the most influential factors encouraging students to consume waterpipe was friends who had a history of waterpipe consumption. This result was also reported in the research conducted by TaraghiJah et al. [12] in students of public universities and Kabir et al. [13] among the students of Karaj University. In general, having friends with a history of waterpipe consumption is a risk factor for waterpipe consumption, and it is effective in encouraging students to consume it [26].

In addition, the consumption of waterpipe in students with a history of waterpipe consumption in the family was higher, being in line with that of the research conducted by Kabir et al. in Karaj [13]. Based on studies conducted in Lebanon [27] and Saudi Arabia [28], the consumption of waterpipe by parents predicted its consumption in children. The results of the study in Syria also suggest that tobacco consumption in the form of waterpipe by Syrian students is accepted by families [29]. In many Iranian cities, waterpipe consumption by children in the presence of parents and other members of the family is accepted and not criticized, while families usually do not accept cigarette smoking by their children, and this is rooted in cultural beliefs and customs of different regions of Iran. Additionally, the waterpipe consumption by family members causes it to be considered a gradually accepted action for smaller members of the family. In other words, parents and adults are a model for smaller members of the family. Moreover, owing to the availability of waterpipe in the family environment, it leads to a higher tendency of smaller members of the family to its consumption [30].

Conclusion
Approximately one third of the students experienced waterpipe smoking. In addition, male gender, lower education level, living in a single house, and its consumption by friends or family members were the main factors associated with waterpipe consumption. Accordingly, the planning and intervention for students are needed.

Limitations
The limitation of the present study was that sampling was limited to students of two major universities in Kerman and using the convenient sampling method. It is clear that in generalizing the results, we should treat with caution, given the limitations of this type of sampling.

Ethical approval
This study was approved by the Ethical committee of the Kerman University of Medical Sciences, Iran (Ethical code:IR.KMU.REC.1394.263).

Conflict of interest: none declared.

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