

ORIGINAL ARTICLE

Pattern of Water-pipe Smoking among the University Students: Gender Differences

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ABSTRACT

Water-pipe tobacco smoking is a way of tobacco consumption which smokes flavored or non-flavored tobacco using a single or multi-stemmed device to pass the smoke through water or other fluid (WHO, 2015). Water-pipe smoking is currently considered as a global phenomenon among the adult population in addition to many health problems such as obesity (Alghawrien et al., 2020; Maziak et al., 2015).

A systematic review (2018) aimed to review the medical literature on water pipe smoking and trends. Around 129 studies with 355 estimates in 68 countries were included. The results showed that the prevalence of water pipe smoking among adults was highest in the Eastern Mediterranean. Lebanese had the highest prevalence of water pipe past 30-day use (37.2%), and Lebanese university students had the highest prevalence of ever use water pipe smoking (65.3%). Iranian university had the highest prevalence of regular or occasional use of water pipe smoking students (16.3%), and Egyptian youth had the highest prevalence of daily use (10.4%). The most studies showed ranging from 0.3–1.0% increase in the past 30-day use of water pipe smoking over time in the US to 2.9% per year among youth in Jordan. Likewise, ever use trends showed that Turkey had a significant decrease in use from 2.3% in 2008 to 0.8% in 2010 and Iraq 6.3% in 2008 to 4.8% in 2012 (Jawad et al., 2018).

Introduction

Waterpipe tobacco smoking is induced by several drivers including the emerging of flavored tobacco (Maassel); the developing of café culture; and the absence of regulatory/policy related to prevention of water-pipe (Maziak et al., 2015).

Many studies and reports reported many serious health effects of water-pipe tobacco smoking (Al-Sheyab et al., 2014; Alomari et al., 2014; Bandiera et al., 2016; Fwares et al., 2021; El-Zaatari et al., 2015; Fong et al., 2018; Waziry et al., 2017; Alghawrien et al., 2020). For these reasons, the pattern of water-pipe tobacco smoking is considered a key for authorities and health managers to develop proper prevention policies, programs, and strategies to compact this type of smoking which subsequently leads to improve national economic and social status and decline the burden on health systems. Knowing the gender differences, may help to ensure effectiveness of these interventions (Maziak et al., 2015). The pattern of use is described how something happens or does in the repeated or regular way (Online-Oxford-

English-Dictionary, 2016). Accordingly, the patterns of water-pipe tobacco smoking among university students in this study described how it happens including the monthly expense, current situation, the rate of smoking, the period of the smoking session, starting age, place the first use, availability of water-pipe at home, preferred flavor, and quit attempts (Faloye et al., 2018).

However, little studies discussed the water-pipe tobacco smoking in term of use patterns and its difference according to genders especially among university students who are considered an important age group due to its role in their future and development of their countries (Maziak et al., 2015). There are no recent studies measured the patterns of use of water-pipe tobacco smoking and its difference according to genders, especially among university students in Jordan. The purpose of this research was to identify the patterns of use of water-pipe tobacco smoking and its differences according to gender among the University students.

Method

Design:

The study used cross sectional design to examine the patterns of water-pipe tobacco smoking among the University of Jordan students. This design was utilized to present the general overview of the specific phenomenon and the examiner differences between the groups (Sekaran & Bougie, 2016).

Setting

This study was conducted in University of Jordan (UJ) in Amman, Jordan. University students form the biggest proportion of Jordanian adult population. For this reason, their health has a significant impact on national social and economic outcomes (HHC, 2016).

Population and Sample

The population in this study was all undergraduate students who used water pipe smoking at the Jordanian universities while the targeted population was all undergraduate students who used water pipe smoking and enrolled in the University of Jordan (UJ).

The adequate sample size for this study should be 381 based on a 5% margin of error and a 95% confidence interval (Sekaran & Bougie, 2016). However, around 460 students were recruited to decrease the risk of withdrawal from study and possible refusal. It was calculated by adding around 20% of minimal sample to the calculated sample.

There were many inclusion criteria considered in the selection of sample including the students should have Jordanian nationality to ensure adequate generalization of results to all study population, a study in UJ, use or previously use water-pipe for smoking, accept the participation in the study and sign the consent forms before data collection. Based on that, the students who had non-Jordanian nationality, a study in other universities, did not use or previously use a water-pipe, and refused to participate and signed the consents were not recruited in the study. Accordingly, 435 students were included in the study.

Convenience sampling technique was used to select the participants from different schools This technique was used due to its time-effectiveness and ability to collect from and access to a high number of participants (Sekaran & Bougie, 2016). The researcher distributed the questionnaires at three places where the different types of schools are located, tried to include the participants from different schools: social schools, science schools, and medical schools.

Data Collection

A self-administered questionnaire was used to collect the data. The questionnaire began with the cover letter had a study title, goals, statement of asking to participate, participant signature place to get the students' acceptance to participate, and the contact information of researchers.

The questionnaire had two sections. The first section was the demographic data section (8 items) aimed to collect general demographic information about students such as age, marital status, family income, school, academic year, Cumulative grade point average (CGPA), and place of residence during the studying.

The second section was the patterns of water-pipe use section (18 items) aimed to describe the use of water-pipe smoking. It identifies the expense of use per month, water-pipe smoking status, prevalence rate, length of use at this rate, age of starting water-pipe smoking, with whom and where the using water pipe is taken place in general and first time, and availability of water-pipe at home. These items were retrieved from many studies in the literature (Dar-Odeh et al., 2013; Smith-Simone et al., 2008).

The Arabic version questionnaire was used. However, the pilot study was done on 15 students in UJ in order to ensure that the questionnaire was understandable and easy to fill. However, no feedback was received, and the duration for filling the questionnaire was 10 minutes.

The reliability and validity of the questionnaire were measured by researcher. Face validity was measured by five experts to identify if the statement measured what should be measured. The reliability was tested using Cronbach's alpha. The results of the test showed that the overall Cronbach's alpha coefficient was 0.72 and more than 0.60 for each section. Accordingly, it can be described as reliable (Sekaran & Bougie, 2016).

Procedure

In order to collect the data from students, the researcher approached the students individually at three places where the different schools (social schools, science schools, and medical schools) were located. The researcher firstly checked the student eligibility by asking if they are water-pipe smokers or previous smokers, have Jordanian nationality, and study in UJ. Then the researcher provides a brief introduction about the study purposes, significance methods, and significance. After that, the students were asked if they were interested in participating.

Accordingly, the interested students signed the consent and given the questionnaire to fill. The students were asked to fill the questionnaire in private class and take their time to answer. The filled questionnaires were put in enveloped folder. The folder was open by the researcher only before starting the data analysis to check the completeness and missing information. Then the data was uploaded to data for analysis.

Data Analysis

The Statistical Package for Social Sciences (SPSS) was deployed for the data analysis. The descriptive statistics were aimed to explore the demographic data of students and identify their perception toward study variables, including frequency, percentage, and mean. Chi-square test and T-test was used to measure the difference between variables results of data according to gender, where the t-test was used for continues data while Chi-square test was used for categorical data.

Ethical Consideration

In order to protect the rights of the participants, the consent form was taken from students after explaining the purposes and significance of the study and before starting the collection of data; data confidentiality was ensured by not sharing data with; the right to full disclosure or withdraw and self-determination of students were taken into consideration, and the ethical permission was taken from UJ before conducting the study.

Results

Sample Characteristics

The response rate was 94.5%. Of 435 students, 301 (69%) students were male. The mean of students' age was 20.01. All participated students were single. Most of the students, 46.2%, had less 500 JD of family income. 45.9% of students from medical schools. 120 (27.5%) studied in the second academic year. 390 (89.6%) live at family house during the studying. The mean GPA was 3.11.

Of 301 male students, 151 (50.1%) had family income ranged between 500-1000. 140 (46.5%) of students studied in medical school while the same rate and number in social school. 120 (27.5%) studied at the fourth academic year — 259 (86.0%) lives at the family house. The mean GPA was 3.10. Of 134 female students, 68 (50.7%) %, had less 500 JD of family income. 390 (89.6%) lives at family house during the studying. 50 (37.3%) of

students studied in social school. 49 (36.2%) studied at the fourth academic year — 131 (97.7%) left at the family house. The mean GPA was 3.14.

Moreover, the results showed no significant difference between male and female studies in all studied variables except academic year and place of residence (alpha less than 0.05). See table 1.

Table 1: Characteristics of Respondents

	Total N=435	Male N=301,69%	Female N=134,31%	P *
Age Per Years (Mean, SD)	20.1 (2.11)	21 (3.21)	18.9 (1.01)	0.08
Marital Status (N, %)				
• Single	435 (100%)	301 (100%)	134(100%)	
• Married	0 (0%)	0 (0%)	0 (0%)	
Family Income Per JD (N, %)				
• Less than 500 JD	201 (46.2%)	133 (44.1%)	68 (50.7%)	0.07
• 500-1000 JD	182 (41.8%)	151 (50.1%)	31 (23.1%)	
• More than 1000 JD	52 (12.0%)	17 (5.6%)	35 (26.2%)	
School				
• Social	190 (43.6%)	140 (46.5%)	50 (37.3%)	0.16
• Medical	200 (45.9%)	140 (46.1%)	49 (36.5%)	
• Science	45 (10.5%)	21 (6.9%)	24 (17.9%)	
Academic Years				
• 1 st year	90 (20.7%)	70 (23.2%)	20 (14.9%)	0.04**
• 2 nd year	120 (27.5%)	70 (23.2%)	50 (37.0%)	
• 3 rd year	105 (24.1%)	70 (23.2%)	15 (11.1%)	
• 4 th year	120 (28.6%)	81 (30.2%)	49 (36.2%)	
GPA (Mean, SD)	3.11 (1.01)	3.10 (.99)	3.14 (1.05)	0.19
Place of Residence				
• Family house	390 (89.6%)	259 (86.0%)	131 (97.7%)	0.09
• Students house (Alone)	10 (2.2%)	10 (3.3%)	0 (0%)	
• Students house (With other)	35 (8.0%)	31 (10.3%)	3 (2.3%)	

* X2 for categorical data and t test for continues data.

** Significant at alpha less than 0.05

Pattern of Water pipe Use

The results showed the average cost of water pipe use per month among students was 45 JD. 191 (43.9%) smoked a cigarette while 200 (46.2%) are currently using water pipe. The average age of starting the use of the water pipe was at 15 years old. 122 (28.0%) used a water pipe every week. 210 (48.3%) used it at this rate since 1 -3 years. 186 (42.7 %) used a water pipe with their friends for the first time while 285 (65.5 %) used it currently with their friends. 216 (49.6 %) used it at café for the first time, and 245 (56.3 %) used it in café most of the time. 430 (98.8 %) had a water pipe at home. After using the water pipe smoking, 20 (4.5%) felt nausea and vomiting. 429 (98.7 %) preferred a water pipe with flavor. 135 (31.0%) intent to stop water pipe use. However, 200 (45.9%) tried to stop it more than one time. The average time since the last serious attempt to stop water pipe smoking per month was 16.

Of 301 male students, the average cost of water pipe use per month among students was 47 JD. 160 (53.1%) smoked a cigarette while 153 (50.1%) smoked water pipe a few times but did not participate in full smoking sessions. The average age of starting the use of the water pipe was at 14 years old. 80 (26.6%) used a water pipe every month. 161 (53.5%) used it at this rate since 1-3 years. 130 (43.2%) used a water pipe with their friends for the first time while 167 (55.4%) used it with their friends currently. 146 (48.5%) used it at their home for the first

time, and 138 (45.8%) used it in café in most of the time. 301 (100%) had a water pipe at home. After using the water pipe smoking, 297 (98.8%) did not feel any things. 295 (98.1%) preferred a water pipe with flavor. 135 (31.0%) 25 (8.3%) intent to stop water pipe use. However, 140 (46.5%) tried to stop it more than one time. The average time since the last serious attempt to stop water pipe smoking per month was 18.

Of 134 female students, the average cost of water pipe use per month among students was 39 JD. 31 (23.1%) smoked a cigarette while 68 (50.7%) currently smoked water pipe. The average age of starting the use of the water pipe was at 18 years old. 52 (38.8%) used a water pipe every week. 50 (37.3%) used it at this rate since 1 year. 64 (47.7%) used a water pipe alone for the first time while 118 (87.4%) used it with their friends currently. 78 (57.7%) used it at their home for the first time, and 80 (59.2%) used it in café in most of the time. 129 (95.5%) had a water pipe at home. After using the water pipe smoking, 105 (78.4%) did not feel any things. 134 (100%) preferred a water pipe with flavor. 135 (31.0%) 110 (81.5%) intent to stop water pipe use. However, 49 (36.5%) tried to stop it more than one time. The average time since the last serious attempt to stop water pipe smoking per month was 15.

Moreover, the results showed no significant difference between male and female students in all studied variables except cigarette smoking status, water pipe smoking status, long of use water pipe at same rate, with whom used water pipe, and intention to quit (alpha less than 0.05). See table 2.

Table 2: Pattern of Water pipe Use

Pattern	Total N=435	Male N=301,69%	Female N=134,31%	P *
Cost of Water pipe use per month (Mean, SD)	45 (7.21)	47 (9.11)	39 (6.81)	0.07
Cigarette Smoking Status (N, %)				
• Current Smokers	191 (43.9%)	160 (53.1%)	31 (23.1%)	0.01**
• Previous Smokers	152 (34.9%)	146 (48.5%)	6 (4.5%)	
• Non Smokers	102 (23.4%)	5 (1.6%)	97 (72.3%)	
Water pipe Smoking Status (N, %)				
• Current Smokers	200 (46.2%)	132 (44.1%)	68 (50.7%)	0.04**
• Smoked a few times but did not participate in full smoking sessions	184 (41.8%)	153 (50.1%)	31 (23.1%)	
• Previous Smokers	52 (12.0%)	17 (5.6%)	35 (26.2%)	
Rate of Water pipe Smoking (N, %)				
• Daily	92 (21.1%)	75 (24.9%)	17 (12.9%)	0.17
• Weekly	122 (28.0%)	70 (23.2%)	52 (38.8%)	
• 2-3 per week	102 (23.4%)	70 (23.2%)	32 (23.8%)	
• Monthly	113 (25.9%)	80 (26.6%)	32 (23.8%)	
How long have you smoked water pipe at this rate? (N, %)				
• Less than 1 year	185 (42.5%)	135 (44.8%)	50 (37.3%)	0.04**
• 1-3 years	210 (48.3%)	161 (53.5%)	49 (36.5%)	
• More than 3 years	40 (9.2%)	21 (6.9%)	19 (17.9%)	
At what age did you start water pipesmoking?(Mean, SD)	15 (1.75)	14 (1.9)	18 (1.0)	0.07
The first use of the water pipe was accompanied by: (N, %)				
• Alone	180 (41.4%)	116 (38.5%)	64 (47.7%)	0.09
• with a friend or more	186 (42.7 %)	130 (43.2%)	56 (41.5%)	
• with family	50 (11.5%)	45 (14.9%)	5 (3.7%)	
• with group of family and friends	19 (4.3%)	10 (3.3%)	9 (6.6%)	
Generally, I smoked the water pipe (N, %)				
• Alone	130 (29.8%)	113 (37.5%)	17 (12.6%)	0.01**
• with a friend or more	285 (65.5 %)	167 (55.4%)	118 (87.4%)	
• with family	31 (7.1%)	31 (10.3%)	0 (0%)	

<ul style="list-style-type: none"> with group of family and friends 	9 (2.0%)	9 (2.9%)	0 (0%)	
The place of the first use of the water pipe (N, %) <ul style="list-style-type: none"> Home Café Friend house 	200 (57.9%) 216 (49.6%) 19 (4.3%)	146 (48.5%) 138 (45.8%) 17 (5.6%)	54 (40.0%) 78 (57.7%) 2 (1.4%)	0.08
In most cases, where do you smoke water pipe?(N, %) <ul style="list-style-type: none"> Home Café Friend house 	180 (41.3%) 245 (56.3%) 10 (2.2%)	126 (41.8%) 156 (51.8%) 19 (6.3%)	54 (40.0%) 80 (59.2%) 0 (0%)	0.14
Do you have a water pipe at home?(N, %) <ul style="list-style-type: none"> Yes No 	430 (98.8%) 5 (1.2%)	301 (100%) 0 (0%)	129 (95.5%) 5 (4.5%)	0.74
Average duration of water pipe smoking session(N, %) <ul style="list-style-type: none"> Less than 30 min 30-60 min 60-120 min More than 120 min 	19 (4.3%) 180 (41.4%) 186 (42.7%) 50 (11.5%)	10 (3.3%) 116 (38.5%) 130 (43.2%) 45 (14.9%)	9 (6.6%) 64 (47.7%) 56 (41.5%) 5 (3.7%)	0.09
After using the water pipe smoking, I feel <ul style="list-style-type: none"> Nausea and Vomiting Difficulty breathing Chest pain the next day All the above Nothing 	20 (4.5%) 14 (3.2%) 0 (0%) 0 (0%) 401 (92.2%)	2 (0.6%) 2 (0.6%) 0 (0%) 0 (0%) 297 (98.8%)	30 (21.3%) 0 (0%) 0 (0%) 0 (0%) 105 (78.4%)	0.05
Preferred Flavor (N, %) <ul style="list-style-type: none"> With flavor Without flavor 	429 (98.7%) 6 (1.3%)	295 (98.1%) 6 (1.9%)	134 (100%) 0 (0%)	0.69
Do you intend to quit water pipe smoking? <ul style="list-style-type: none"> Yes No 	135 (31.0%) 300 (68.9%)	25 (8.3%) 276 (91.7%)	110 (81.5%) 24 (18%)	0.001**
Have you ever tried to quit water pipe smoking?(N, %) <ul style="list-style-type: none"> No One time More than one time 	190 (43.6%) 45 (10.5%) 200 (45.9%)	140 (46.5%) 21 (6.9%) 140 (46.5%)	50 (37.3%) 24 (17.9%) 49 (36.5%)	0.10
How long has it been since the last serious attempt to stop water pipe smoking per month? (Mean, SD)	16 (3)	18 (1)	15 (4)	0.09

* X2 for categorical data and t test for continues data.

** Significant at alpha less than 0.05

Discussion

The purpose of this research was to examine knowledge, attitudes, and beliefs toward water-pipe tobacco smoking and patterns of water pipe tobacco smoking use among the university students. This is first comprehensive study was conducted in Jordan among university students. In Jordan, around 8.6% of smokers used water-pipe tobacco smoking while around 93.0% used cigarettes tobacco smoking. However, water-pipe smoking increased by 85% (136% for female and 72% for male) (McKelvey et al., 2014; Mckelvey et al., 2013).

Regarding the patterns of water-pipe use among university students, the results showed the average cost of water-pipe use per month among students was 45 JD (47 JD among male and 30 JD among female). The cost is considered very high when knowing that the poverty line was 336 per capita per year (Dawas, 2018). This indicated that the smoking is considered a serious economic and health problem knowing that around 43.9% (53.1% of males and 23.1% of females) of university students are currently smoking a cigarette, and the average age of starting the use of the water-pipe was at 15 years old.

The results indicated the role of growing the café culture in starting water-pipe use as showed in many studies that considered the rising café culture as main driver to start the water-pipe smoking and play important role to start water-pipe use among adolescents as explained by many students (Borgan et al., 2013; Maziak et al., 2015). This may also argue the policy maker to develop and strength the policies regarding prevention of providing water-pipe to adolescents in cafes for both genders. However, the results also argue the health managers to initiate a comprehensive program to combat the water-pipe use covered different setting in order to prevent the water pipe use in home where about 98.8 % of students had a water-pipe at home which showed the extent of this problem.

The results indicated the role of development of flavor that have a different tastes which also considered a main driver to start water-pipe use in many studies where about more than 98% of both gender in our sample preferred water-pipe with flavor (Borgan et al., 2013; Maziak et al., 2015; Feirman et al., 2016). This is mainly seen among females that may be resulted from the females' concerns regarding their odors than males to keep their self-images and hygiene.

The results explained the community acceptance of females' water-pipe use than cigarette smoking, trying to decrease the bad odors that resulted from cigarette use where the results showed no significant difference between male and female studies in most studied variables (alpha less than 0.05) (Smith-Simone et al., 2008; Dar-Odeh et al., 2010). Moreover, the females' ability to smoke for long duration is limited due to the limitation in exposure to smoke. This may be resulted by the restrains in their feely movements, especially in Middle East countries (Dar-Odeh et al., 2010; Alzyoudet al., 2013). Based on our study results, many recommendations could be raised to enhance the health of university students in Jordan and decreasing the use of water-pipe smoking among university students.

It was recommended to develop the structured awareness programs regarding the risk water-pipe use, stress management techniques for university students. Moreover, it was recommended to develop a national or university level database regarding water-pipe use to monitor of water-pipe use and related drivers among university students.

Proper collaboration between ministry of health, universities, ministry of higher education, and all stakeholders and increasing the university and ministry of higher education's funding was recommended to ensure developing of proper and comprehensive strategies to combat water-pipe use among university students.

Finally, more studies at national level discussing the water-pipe, its impacts on academic achievements, students' psychological and physical health, differential factors are recommended to increase the understanding of water-pipe use and its relationships.

There are many limitations that challenged researcher while conducting this research to attain the study goals. The limited time for data collection, the difficulty to take acceptance of student's restricted the data collection from more university. For this reason, the generalization of data to all Jordanian universities is restricted. Furthermore, many female students felt shame when filling the questionnaire which increases the number of are not interested students to participate in the research. Finally, limited comprehensive studies and lack of national data bases regarding water-pipe among university students limited the understanding of study results.

Conclusion

The studies provide an information regarding the water-pipe use among the university of Jordan students which could be used as baseline information for more specific studies. The results showed the high cost of water-pipe use per month among students. The students used a water-pipe with their friends for the first time especially the males and at café for the first time. Most of students had a water-pipe at home and preferred a water-pipe with flavor. Moreover, the results showed no significant difference between male and female students in all studied variables except cigarette smoking status, water pipe smoking status, long of use water pipe at same rate, with whom used water pipe, and intention to quit.

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