

RESEARCH ARTICLE

# Prevalence of Cigarette and “Waterpipe” Smoking among “Duhok Universities” Students

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## ABSTRACT

Tobacco use is considered one of the largest public health threats facing the world. Waterpipe smoking (WPS) is a customary and cultural method of tobacco consumption in many parts of the world. This study aimed to find the prevalence of smoking among Duhok city University students in Iraq and to assess students' knowledge regarding smoking. A cross-sectional, self-completed questionnaire-based study was conducted at four Universities in Duhok city. According to the study's objectives, scientific and literature colleges from each university are selected. The selection of the number of enrolled colleges and departments is proportionate with total university students' number. The colleges and departments are selected by a simple random sampling method. Descriptive and analytic statistical tools (SPSS-23) were used to assess significant associations. Chi-square test association is used to compare between proportions. The prevalence of cigarette smoking was 23.5% among studied students (41.9% among males and 6.8% among females), and the prevalence of WPS was 33.2% (56.7% among males and 11.8% among females). There is a significant correlation between cigarette smoking and WPS. Most of the students in this study were not well aware of the most harmful effects of smoking. There was a highly statistically significant association between cigarette and WPS. Smoking in males is more prevalent than females. Inclusion of a detailed and separate course in the university curriculum regarding tobacco control and the effects of smoking on health should be made compulsory. This course must be started from the 1<sup>st</sup> year of academic courses till the time of graduation or conducting health education and extensive counseling on the harmful effect of smoking for all university students.

**Keywords:** Cigarette; Duhok students cigarette smoking; Water; Waterpipe smoking

## INTRODUCTION

Tobacco consumption, of all types, is a preventable cause of morbidity and mortality worldwide. Countries having low- and middle-income are the most severely affected. Tobacco consumption attributable deaths are expected to decline by 9% between 2002 and 2030 in high-income countries, but it increased twice times in developing countries from 3.4 million to 6.8 million (Mathers and Loncar, 2006). Annually 5 million deaths are attributed to tobacco consumption all over the world and about 50% of smokers will die prematurely (Neergaard et al., 2007).

Consumption of tobacco by the human population is the second main well-known cause of death; it is responsible for the deaths of one in ten adults across the world (Al-Numair et al., 2007). Currently, the use of waterpipe smoking (WPS) of tobacco is contributing to a large scale in its increased use, a practice dating back at least 400 years (Neergaard et al., 2007). This observation also brings to light the need to study the trends and patterns of tobacco usage in its different forms. The WPS is also known as

Narghile, Shisha, in different societies and countries. It is a type of smoking tobacco in which the steam passes to cross the water before inhalation (Sameerur et al., 2012).

WPS is a form of tobacco consumption, takes its roots from Eastern Mediterranean Region, and currently gaining popularity in western countries, including Australia, the United Kingdom, Canada, and the United States of America (Brockman et al., 2012). Nowadays, the WPS masses include the youth mainly university and college students and also high school children (Neergaard et al., 2007). Currently, waterpipe has been considered a global threat and given the status of an epidemic by public health officials.

Tobacco consumption in the Kurdistan region of Iraq is between the top five causes of morbidity and mortality. The Kurdish Association for Fighting Smoking reports that 54% of the Kurdish population smoking cigarette and waterpipe. Although cigarette smoking is not new in Kurdistan, WPS has occurred as a new mode among the young age group (Jaff and Kumar, 2016). Another Study has been done in Zakho

city among 500 students in four secondary male schools, the study showed that the prevalence of students who ever tried smoking was 76%; about 65% of them started at age 12 years or less. Although the majority of participants (95%) knew that smoking is harmful and had negative impact on human health, 18% of them thought that they will never quit smoking (Kachel et al., 2018). One thousand nine hundred eighty-nine adolescents participated in the Kurdistan-Iraq Global Youth Tobacco Survey. Of these, 58.1% and 41.9% were boys and girls, respectively, and the overall prevalence of cigarette smoking was 15.3%; 25.1% and 2.7% for boys and girls, respectively. The factors associated with adolescent smoking were: Parents' smoking, smoking in closest friends, male gender, having pocket money, and perceptions that boys or girls who smoked were attractive.

Studies on tobacco consumption have disclosed the influence of primary prevention. Therefore, the results of such studies can be used to formulate preventive measures for smoking among medical students. Till now as we knew, there is no accurate prevalence of numbers of smokers in Duhok city. The objectives of this study are to find the prevalence of cigarette and WPS among students of Duhok Universities (DU) in Duhok city, and to study sociodemographic characteristics of smokers, and to study students' Knowledge regarding cigarette and waterpipe use.

## SUBJECTS AND METHODS

For this research, a descriptive cross-sectional study design was selected to conduct at four Universities in Duhok city, Kurdistan Region, Iraq from February 2018 to May 2018. There were five universities at Duhok city, including two governmental (public) Duhok Polytechnic University (DPU) and DU, three private universities including Nawroz University (NU), Cihan University (CU), and the American University of Kurdistan Duhok. Both governmental universities and two private universities (NU and CU) were selected to conduct this study.

### Sampling Procedure

According to the study's objectives, the scientific and literature colleges from each enrolled university were

selected. The selection of the number of enrolled colleges and departments was proportionate with total university students' number [Table 1]. The colleges and departments were selected by simple random sampling method. The selected colleges were from DU Pharmacy, Sciences, Basic Educations, and Law and Politic Sciences, from the DPU Technical Engineering and Technical Administration from NU, Engineering and Translation, from JU, Sciences and Administration. If the college consisted of many departments, one to two of them were selected by simple random sampling method. All students for all stages in the selected departments were included in this study.

### Response Rate

About 2600 questionnaire forms were distributed, but 2225 forms refilled completely. The response rate was 85.57%. The acceptable response rate for survey studies is 80–85% (Saldivar, 2012). The total respondent students represent 10% of all four universities.

### Method of Data Collection

Before visiting the selected university, the investigator provided the concerned (dean assistant, head of department, or department's coordination) with a facilitation letter. The students had been met at the teaching halls. In the beginning, the investigator had introduced himself and gave a brief discussion about the study including the main aim and objectives of the study.

After that, the investigator explained each paragraph (questions) in Kurdish and Arabic languages (as the questionnaire was written in English), the students filled the questionnaire forms accordingly. The investigator clarified all the vague or misunderstanding paragraphs — descriptive data analyses conducted using the Statistical Package for the Social Sciences (SPSS version 23). Frequencies, percentages, means, figures, and tables were used for categorical variables. Chi-square test of association used to compare between proportions.

### Administrative and Ethical Considerations

Before conducting the study, official approval was taken from the ethical committee at Duhok General Directorate

**Table 1: Distribution of study sample according to universities and types of colleges**

| University | Number and type of selected colleges |            | Enrolled students |            |          |      |
|------------|--------------------------------------|------------|-------------------|------------|----------|------|
|            |                                      |            | Type of colleges  |            | Total    |      |
|            | Scientific                           | Literature | Scientific        | Literature | <i>n</i> | %    |
| DU         | 2                                    | 2          | 461               | 425        | 886      | 39.8 |
| DPU        | 1                                    | 1          | 350               | 368        | 718      | 32.3 |
| NU         | 1                                    | 1          | 133               | 294        | 427      | 19.2 |
| JU         | 1                                    | 1          | 39                | 155        | 194      | 8.7  |
| Total      | 5                                    | 5          | 983               | 1242       | 2225     | 100  |

of Health. For ensuring more collaboration and assistance from selected universities, official letters was taken from the presidency of DPU and was issued to the other three universities (DU, NU, and JU). Furthermore, verbal consent was also taken from each student before the distribution of the questionnaire to them.

## RESULTS

About 23.5% (522) of the total studied students were cigarette smokers (CSs). Students of JU had a higher percentage (27.3), followed by DU (23.5%), NU (23%), and DPU (22.7%). Up to 33% (738) of students had a history of SWP. Students of CU and NU showed a higher percentage (35.2), followed by DPU (33.7%) and DU (31.4%). There was no any significant statistical association between the universities and history of ever cigarette smoking nor WPS [Table 2].

The most prevalent age for both CS and WPS was 24 years old which represents 30.1% and 46.3% among smokers consecutively, while the least prevalent age was 19 years old which represents 18.1% and 26.4% among smokers consecutively [Table 3].

Up to 443 (41.9%) of male students were CSs and 600 (56.7%) of them were WPSs. Moreover, 79 (6.8%) of female students were CSs and 138 (11.8%) of them are (WPSs). There was a high significant statistical association between gender and cigarette smoking and WPS [Table 4].

About 23.3% of single students were CSs and 33.7% of them were WPSs. Contrarily, 25.1% of married were CSs and 26.9% of them were WPSs. There was no statistically significant association between marital status and cigarette smoking or WPS [Table 5]. There was a highly statistically significant association between cigarette smoking and WPS. The 400 (76.6%) of CSs were WPSs [Table 6].

Most of the students in this study were not well aware of the most harmful effects of smoking and there is a statistically significant association between students' knowledge and their college types in certain information such as smoking causing cancers, bronchitis, and stained teeth [Table 7].

Figure 1 categorizes the students as a smoker and non-smoker according to the presence of smoker or non-smoker members within the family. There was a significant association between the smoking status of students with the presence of smokers inside their families.

The majority of students believe that the WPS has harmful effects, and there was no statistically significant association

**Table 2: Prevalence of CS and WPS among studied students according to their universities**

| University | CS         |             | WPS        |             |
|------------|------------|-------------|------------|-------------|
|            | Yes n (%)  | No n (%)    | Yes n (%)  | No n (%)    |
| DPU        | 163 (22.7) | 555 (77.3)  | 242 (33.7) | 476 (66.3)  |
| DU         | 208 (23.5) | 678 (76.5)  | 278 (31.4) | 608 (68.6)  |
| CU         | 53 (27.3)  | 141 (72.7)  | 68 (35.1)  | 126 (64.9)  |
| NU         | 98 (23.0)  | 329 (77.0)  | 150 (35.1) | 277 (64.9)  |
| Total      | 522 (23.5) | 1703 (76.5) | 738 (33.2) | 1487 (66.8) |
| P value    | 0.605      |             | 0.605      |             |

**Table 3: Prevalence of SC and WPS among studied students according to their age**

| Age in years | CS         |             | WPS        |             |
|--------------|------------|-------------|------------|-------------|
|              | Yes n (%)  | No n (%)    | Yes n (%)  | No n (%)    |
| 19           | 83 (18.1)  | 375 (81.9)  | 121 (26.4) | 337 (73.6)  |
| 20           | 87 (21.8)  | 313 (78.3)  | 125 (31.3) | 275 (68.8)  |
| 21           | 95 (22.2)  | 332 (77.8)  | 144 (33.7) | 283 (66.3)  |
| 22           | 87 (26.2)  | 245 (73.8)  | 127 (38.3) | 205 (61.7)  |
| 23           | 64 (26.3)  | 179 (73.7)  | 84 (34.6)  | 159 (65.4)  |
| 24           | 37 (30.1)  | 86 (69.9)   | 57 (46.3)  | 66 (53.7)   |
| 25 and above | 69 (28.6)  | 172 (71.4)  | 80 (33.2)  | 161 (66.8)  |
| Total        | 522 (23.5) | 1703 (76.5) | 738 (33.2) | 1487 (66.8) |
| P value      | <0.008     |             | <0.001     |             |

**Table 4: Prevalence of CS and WPS among studied students according to their gender**

| Gender  | CS         |             | WPS        |             | Total No. |
|---------|------------|-------------|------------|-------------|-----------|
|         | Yes n (%)  | No n (%)    | Yes n (%)  | No n (%)    |           |
| Male    | 443 (41.9) | 615 (58.1)  | 600 (56.7) | 458 (43.3)  | 1058      |
| Female  | 79 (6.8)   | 1088 (93.2) | 138 (11.8) | 1029 (88.2) | 1167      |
| Total   | 522 (23.5) | 1703 (76.5) | 738 (33.2) | 1487 (66.8) | 2225      |
| P value | <0.000     |             | <0.000     |             |           |

**Table 5: Prevalence of CS and WPS among studied students according to their marital status**

| Marital status | Smoking cigarette |             | Smoking waterpipe |             | Total No. |
|----------------|-------------------|-------------|-------------------|-------------|-----------|
|                | Yes n (%)         | No n (%)    | Yes n (%)         | No n (%)    |           |
| Single         | 479 (23.3)        | 1575 (76.7) | 692 (33.7)        | 1362 (66.3) | 2054      |
| Married        | 43 (25.1)         | 128 (74.9)  | 46 (26.9)         | 125 (73.1)  | 171       |
| Total          | 522 (23.5)        | 1703 (76.5) | 738 (33.2)        | 1487 (66.8) | 2225      |
| P value        | 0.574             |             | 0.362             |             |           |

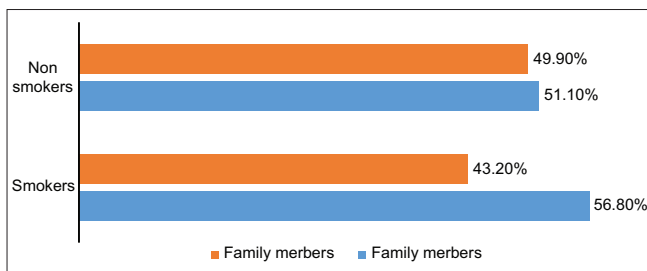
**Table 6: Relation between CS and WPS**

| #                 | Smoking waterpipe |            |             |           |
|-------------------|-------------------|------------|-------------|-----------|
|                   |                   | Yes        | No          | Total No. |
| Smoking cigarette | Yes <i>n</i> (%)  | 400 (76.6) | 122 (23.4)  | 522       |
|                   | No <i>n</i> (%)   | 338 (19.8) | 1365 (80.2) | 1703      |
|                   | Total             | 738 (33.2) | 1487 (66.8) | 2225      |

P<0.000

**Table 7: Awareness of studied students according to the harmful effects of smoking**

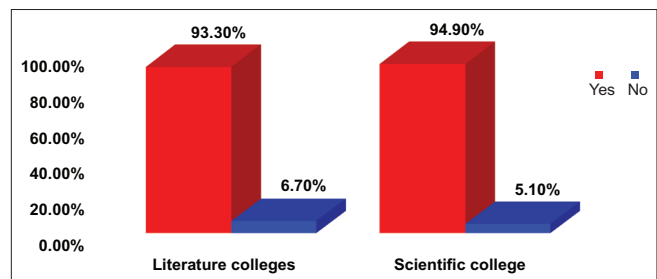
| Items                                   | Literature n=1236 |             | Scientific n=989 |            | P value |
|---|-------------------|-------------|------------------|------------|---------|
|   | Yes n (%)         | No n (%)    | Yes n (%)        | No n (%)   |         |
| Smoking cause lung cancer               | 884 (71.6)        | 350 (28.4)  | 825 (83.4)       | 164 (16.6) | 0.000   |
| Smoking cause other kind of cancer      | 457 (37.0)        | 779 (63.0)  | 414 (41.9)       | 575 (58.1) | 0.021   |
| Smoking cause bronchitis                | 541 (43.8)        | 695 (56.2)  | 592 (59.9)       | 397 (40.1) | 0.000   |
| Smoking cause infection                 | 585 (47.3)        | 651 (52.7)  | 432 (43.7)       | 557 (56.3) | 0.087   |
| Smoking cause premature aging           | 527 (42.6)        | 709 (57.4)  | 391 (39.5)       | 598 (60.5) | 0.141   |
| Smoking cause stained teeth             | 866 (70.1)        | 369 (29.9)  | 767 (77.6)       | 222 (22.4) | 0.000   |
| Smoking cause impotence among males     | 327 (26.5)        | 908 (73.4)  | 236 (23.9)       | 753 (76.1) | 0.158   |
| Smoking cause infertility among females | 330 (26.7)        | 906 (73.3)  | 235 (23.8)       | 754 (76.2) | 0.113   |
| Smoking cause stroke                    | 499 (40.4)        | 737 (49.6)  | 439 (44.4)       | 550 (55.6) | 0.057   |
| I do not know                           | 58 (4.7)          | 1178 (95.3) | 34 (3.4)         | 955 (96.6) | 0.137   |

**Figure 1: Impact of smoking and non-smoking family member on students ( $P = 0.003$ )**

between college types and students' knowledge about the harmful effects of smoking [Figure 2].

## DISCUSSION

The study revealed that about 23.5% of the total studied students are CSs, on the other hand, higher percentages are gathered from three studies done among university students in Iraq, two studies in Sulaymaniyah city and one in Karbala city, showed that the percentages of CS ranged from 10% to 11.1% (Almousawi, 2014; Ramzi, 2014; Othman et al., 2017). Conversely, the STEPS survey of non-communicable disease risk factors conducted in Iraq in 2015 found that up to 20.7% of Iraqi adults above 18 years old are CSs (MOH, 2015). Similarly, in other survey to estimate the prevalence of tobacco, alcohol, and drug use in Iraq, 22% (20.18–23.92) of the adults are CSs (Al-Hemriy et al., 2017). In other countries, the prevalence of current WPS among university students was high in the Arabic Gulf region (6%), the United Kingdom (8%), Syria (15%), Lebanon (28%), and Pakistan (33%) (Akl, 2011). It appears that this variation may be due to different socio-cultural factors. In the United States of America, CS prevalence had been decreased from 20.9% (45.1 million smokers) in 2005 to 15.5% (37.8 million smokers) in 2016 because of increasing health education and awareness about harmful effects of CS, in addition to the implementation of control measures (Jamal et al., 2018). This, however, should be cautiously interpreted as these studies were computed

**Figure 2: Knowledge of students about the harmful effects of smoking**

at different times in an area where smoking rates may be rapidly changing.

The number of WPSs was more than those who smoke cigarettes. Our study revealed that 33.2% of studied students were WPSs, while the percentage of WPS was less among Sulaymaniyah students (28%) and much less among students in Karbala University (4.4%) (Almousawi, 2005; Othman et al., 2017).

This study shows a higher prevalence of WPS than the other studies which had been performed in England among university students, and the USA indicating that the rate of steady (WPSs) was 2.8%, 19% alternatively (Jackson and Aeyard, 2008, Smith-Simone et al., 2008).

In the present study, the prevalence of WPS was higher than most of the previous studies. Lack of knowledge about the health adverse effects of WP, and having positive pattern toward the WPS compared to CS, also social acceptance of WPS rather than CS and the traditional role of WP in Duhok society as an instrument for recreation in family, friendly gathering, and inappropriate implantation of laws limiting WP use in restaurants, tea shops and public places in recent years are the main reasons for this badly health practice.

In our study regarding to sex distribution, the prevalence was much higher among males (41.9%) compared to



females (6.8%) in CS among males (56.7%) compared to female students (11.8%) in WPS. Hence, CS was more than 6 times as common among male students compared to female students – a pattern compatible with the unfavorable perception of female smoking in Syrian and Arab societies, the sex ratio for waterpipe use was a little more than four. This shows that a more tolerant attitude toward female WPS can be one of the factors fueling the spread of this tobacco use method among women in Duhok and traditional societies (Maziak et al., 2005). Interestingly compared to other study smoking rate was significantly lower than males. This argument is supported by statistics from Lebanon and other Arab countries presenting gradually less sex-based gradient in WPS use compared to CS (Warren et al., 2006). It is likely that since waterpipe has a long-standing association with the Orient and the Middle East, it is perceived by the local populations as more conforming to the local traditions, and thus more acceptable to be used by women than the “Western” cigarettes (Maziak et al., 2005).

A recent literature review of smoking in Saudi Arabia (Bassiony, 2009) confirms that smoking was reported to be much higher among Saudi males compared to females. Yet we think that the much lower female smoking prevalence may be attributed to “social stigma” of smoking that females may be more conservative and more health-aware about the drawbacks and consequences of smoking. Across all age groups is the highest prevalence among the age of 24 years: 30.1% CS, 46.3% WS.

Across all age groups, the highest prevalence of both CS and WPS was found at the age of 24 years and the lowest rate was at age of 19 years. The high percentage of early starting is may be associated with low-priced, lack of taxes, absence of prevention of all tobacco types’ sales for youth, and uncontrolled marketing. At age of 19-year-old young’s still living with their parents and do not have responsibility, so some of them start smoking at that age and then when they were older they become more mature about life responsibilities, they will face many social and studying pressure that make them smoking more at age of 24 years to relieve frustration, anxiety, and anger.

Furthermore, the probability of smoking increased with older age. Similar outcomes were informed by studies conducted in Iran, Nepal, and Ethiopia (Farshi et al., 2007; Rudatsikira et al., 2007 and Sreeramareddy et al., 2008). Thus, if tobacco regulation and educational programs start early, they can decrease the popularity of tobacco use later in life.

In the present study, the intention to quit smoking in the study sample was significantly higher with increasing

age, in which the participants started smoking at age of  $\geq 18$  years old more likely intend to quitting compared to individuals started smoking at age  $< 18$  years old. The result of our study is consistent with the result of the survey was conducted among Arab Americans in Houston, Texas, USA (Athamneh et al., 2015).

Marriage often comes with responsibilities and married participants are more likely to be restricted in their ability to purchase tobacco (Kim, 2012; Schane et al., 2012). Unmarried students were more likely to become CSs than married students; they live with their friends and spend money as they want (Jamshed et al., 2017). Doski and Ahmed (2016) also found in a study done in Erbil that singles smoke more than married persons. A survey conducted in South Korea from 2008 to 2010, showed that the association between smoking behavior and marital status was different according to the gender and a high smoking prevalence widowed or divorced women, was of concern. Among men smokers, the prevalence of 21.8% was among unmarried, 4.4% among widowed, and 8.1% among divorced men. In women smokers, 23.1% were married, 10.7% were widowed, and 19.8% were divorced (Kim, 2012). In Nigeria, the marital status had no correlation with past and present smokers (Owonaro and Eniojukan, 2015). In our study, although up to 92% of students were singles there was no statistically significant association between the marital status and cigarette smoking or WPS which may be due to an equal chance for access to smoking for single and married students.

This study showed that a high statistically significant association between CS and WPS. This finding was in harmony with that of Maziak’s study conducted on university students in Syria (Maziak et al., 2004). The previous study showed the prevalence of intermittent use patterns of WP compared to the more regular use pattern of cigarettes. This is maybe due to the social nature of WP use and the affordability, time and setting differences between the two types of tobacco use procedures (Mazaik et al., 2005). Research shows that regular WPS increases the risk of becoming CS (Daniels, 2012).

Most of the students in this study are not well aware of the most harmful effects of smoking; however, there is statistically significant association between students’ knowledge in certain information such as smoking in general causing cancers, bronchitis, and stained teeth. Jaff and Kumar (2016) stated that many people, especially the youth, are not aware of the harmful health effects of tobacco smoking specially WP and they think that it is less harmful than CS. Other studies stated that it is harmless to smoke WP than cigarettes due to the misconception of respondents that they think the smoke could be harmless

or free of toxic agents when it passes through the water (Amin et al., 2012). Furthermore, the majority of the participants of Al-Naggar and Saghir (2011) study in Malaysia indicated that the water in WP filters several of the toxic materials and, there is practically no tar in WP tobacco smoke. The majority of the respondents in our study were aware of the harmful effects of smoking. This is consistent to China study on Medical Teachers, also with Jordan students (Sharif et al., 2013), also in Sulaymania health-care professionals (Abdulateef et al., 2016), and Pakistan medical students (Latif et al., 2017), while the opposite in South and in East USA; where the students are misinformed about the bad health consequence of WPS (Holtzman et al., 2013).

There was a significant association between smoking habits of students with the presence of smokers inside their families being more prone to smoking who live with a smoker family member. Korn and Magnezi (2008) did a study among Arab high school students in Israel and found that if one of the parents is a smoker, this will give high chance for their scion to become smoker. Same conclusions found by Thabit et al., 2015; Jaff and Kumar, 2016.

## CONCLUSION AND RECOMMENDATIONS

There were highly significant correlations between cigarette and WPS. Smoking in males is more prevalent than females. Inclusion of a detailed and separate course in the university curriculum regarding tobacco control and the effects of smoking on health should be made compulsory. This course must be started from the 1<sup>st</sup> year of academic courses till the time of graduation or conducting health education and extensive counseling on the harmful effect of smoking for all university students.

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