



Research Article:

Awareness, Knowledge and Attitude of Waterpipe Smoking Among University Students in Syria: A Cross Sectional Study

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Abstract

Background: Waterpipe smoking, also known as hookah or shisha smoking, has gained popularity in recent years, particularly among young adults and adolescents. **Methods:** A cross-sectional survey was conducted at four universities in Syria, using an interviewer-administered questionnaire aimed to determine the prevalence of waterpipe smoking among university students in Syria, explore their attitudes and awareness of the health risks, and assess their intentions to quit smoking. 321 students participated in the study with a gender ratio of 44.2% male and 55.8% female. **Results:** The most common positive perceptions of Waterpipe were related to entertainment (20.6%) and stress reduction (9.3%). The negative perceptions of the waterpipe according to the students, as 29.3% stated that everything in the waterpipe is harmful. Almost every student has stated in a way or another the dangerous and negative effects of smoking waterpipe (99%). A significant percentage of students believe that the most common reasons for using a waterpipe are self-expression, boredom, and the availability of time. The majority of waterpipe smoking students, 83 expressed no plan of giving up smoking (52.8%). Approximately half of the students abstain from smoking waterpipe entirely, attributed to their heightened awareness and understanding of the health hazards associated with smoking, both for themselves and those around them. Only 6.9% of students have named tuberculosis a disease that can be transferred by waterpipe and 36.4% have named influenza virus as waterpipe transferable. Furthermore, 28.7% of participants asserted that the coronavirus is transmitted through waterpipe. **Conclusion:** Waterpipe smoking poses a significant health challenge in Syria, therefore, this study contributes with data that support eradication of this health issue.

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1. Introduction

Waterpipe smoking, also known as hookah or shisha smoking, has gained popularity in recent years, particularly among young adults and adolescents. Despite the growing trend of waterpipe smoking, there is a lack of awareness and understanding of its negative health effects (1). Waterpipe smokers use a special apparatus that has a head, a metal

body, a water bowl, and a flexible hose with a mouthpiece. Since the smoke passes through water before being inhaled, many users hold the incorrect perception that smoking through a water pipe is less harmful compared to cigarette smoking (2). In fact, waterpipe smoke contains more toxins and harmful chemicals than cigarette smoke, including tar, carbon monoxide, heavy metals, and carcinogens such as polycyclic aromatic hydrocarbons (PAHs) and benzene (1). Recent clinical and experimental studies suggest that waterpipe use is as harmful as, or even more harmful than, cigarettes. Despite differences in consumption methods, waterpipe tobacco contains similar harmful constituents found in cigarettes, but these are produced in greater amounts (3). Furthermore, the smoke produced during waterpipe smoking is often shared among a group of people, increasing the risk of exposure to infectious diseases such as tuberculosis, hepatitis, and herpes (4). The prevalence of

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waterpipe tobacco smoking is a global public health concern (5). A thorough systematic review identified 206 chemical compounds in waterpipe smoke (5). The use of waterpipe has been linked to systemic conditions typically associated with smoking (5). Reviews and studies consistently demonstrate a positive association between waterpipe smoking and health conditions such as obstructive lung disease, lung cancer, malignancies of the head and neck, and cardiovascular disease, among others (5). A solitary waterpipe smoking session typically endures for about 45 minutes and has the potential to generate a smoke volume equivalent to 100 or more cigarettes (6). Furthermore, the deep inhalation of waterpipe smoke may result in irritation and inflammation of the airways, leading to wheezing, coughing or shortness of breath (7). Waterpipe smoking has also been linked to infectious diseases, particularly in developing countries where waterpipes are often shared among multiple users (4). The water in the pipe acts as a reservoir for microorganisms, making it a potential source of infectious diseases (8). A study (9) conducted found that the prevalence of tuberculosis was significantly higher among waterpipe smokers than non-smokers, indicating a potential link between waterpipe smoking and the spread of tuberculosis (9). The increasing trend of waterpipe smoking can be attributed to several factors, including many individuals perceive waterpipes as a means to quit smoking cigarettes, as a form of entertainment, and as a way to foster social connections and acceptance. Additionally, they view waterpipes as conducive to friendly gatherings, cultivating close friendships, and promoting relaxation, while also being perceived as less harmful and more cost-effective than cigarettes (10). Additionally, the sweet flavors of waterpipe tobacco make it appealing to young people, leading to a higher risk of initiation and continued use (11). The idea that waterpipe smoking is less harmful than cigarettes has also contributed to its growing popularity (1). However, as was previously said, using a waterpipe is linked to several harmful health impacts. Therefore, it's critical to educate people about the risks involved in this practice and to study their attitude and awareness especially among younger generations like university's students.

2. Methods

2.1. Study design, participants, and data collections

A cross-sectional survey was conducted from September 24 to December 14, 2023, at four Universities in Syria, using an interviewer-administered questionnaire. The questionnaire was distributed through university portals and Facebook to students after obtaining their consent. Data was collected and recorded from 231 students, with 121 students from Al-Sham Private University, 80 students from Damascus University, 63 students from Kalamoon Private University and 57 students from Syrian Private University, encompassing various specializations.

2.2. Questionnaire development

A questionnaire titled "Awareness, knowledge and attitude of waterpipe smoking among university students in Syria" was created in Arabic and utilized to gather data. The questionnaire comprised five sections with a total of 18 questions, each serving a specific purpose. Some questions were specifically directed towards waterpipe smokers.

The first section collected demographic information such as age, gender, and university name. The second part included questions assessing the popularity of waterpipe among university students through three questions. The third segment aimed to understand student's attitudes and perspectives through three questions as well. The fourth section aimed to evaluate student's awareness and knowledge of the health risks associated with waterpipes and compare them to cigarettes by answering four questions. The fifth part included a question exploring parent's attitudes toward waterpipe use. Finally, we asked a question about attempting to quit smoking to understand the future tendencies of waterpipe smokers. Subsequently, we analyzed and interpreted the results.

2.3. Ethical consideration and consents

All procedures conducted in this study were in compliance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its subsequent amendment or equivalent ethical standards. An ethical approval was also obtained prior to this study from Faculty of Pharmacy, Al-Sham Private University with registration No. June/2023/PhEC#08.

3. Results

The initial participant count was 341 students. However, 20 responses from students at other universities were excluded to ensure a more representative sample. This exclusion aimed to maintain the study's focus on the selected universities. As a result, the analysis is based on 321 responses, with 179 females (55.8%) and 142 males (44.2%), most of whom were between 20 and 22 years old. The percentage of students who smoke was (49.2%), with (19.27%) being females and (28.36%) being males. **Table 1** illustrates the basic characteristics of the study sample regarding waterpipe smoking.

Table 2, captures attitudes and opinions about waterpipe among university students in Syria, incorporating responses to questions asked to participants about what they dislike about waterpipe and about the motivations behind waterpipe use. The main motivation for using waterpipe revolves around entertainment and reducing stress. In addition to their opinion on the main reason for the increased popularity of waterpipe, it was found that several

factors contributed to this, including self-expression, boredom, availability of time, and the belief that it is less harmful than cigarettes. While, in **Table 3**, students conveyed varying beliefs about waterpipe smoking. They indicated that it poses health risks, with (43.9%) highlighting its harmful effects on the cardiovascular system, and (31.5%) pointing to respiratory effects. Additionally, students mentioned that sharing waterpipe can transmit various diseases among individuals, including the influenza virus and coronavirus. A significant majority of

students, (57.9%) feel that waterpipe poses greater health risks than cigarettes, while only (17.1%) believe the opposite. **Figure 1** shows the prevalence rate of waterpipe smoking among the universities surveyed. The prevalence of smoking stands at 48.76% in Al-Sham Private University, 42.5% in Damascus University, 52.38% in Kalamoon Private University, and 54.39% in Syrian Private University. Finally, **Figure 2** outlines the parent's viewpoint on their children smoking, while the efforts made to quit smoking are documented in **Table 4**.

Table 1. Basic characteristic of the study sample in relation to current waterpipe smoking

	N= 321	%
Waterpipe smoking		
Yes	158	49.2%
No	163	50.8%
Pattern of waterpipe smoking		
Daily	42	13.1%
Once a week	42	13.1%
Occasional	85	26.5%
Never	152	47.4%
Age of participants	Mean \pm SD 22.1 \pm 2.0	
First time using waterpipe*		
Since a year ago	24	15.2%
Since two years ago	21	13.3%
Since three years ago	34	21.5%
Less than a year	14	8.7%
More than that	65	41.1%

*Asked only to those saying they smoke waterpipe

4. Discussion

Waterpipe smoking represents a significant public health problem, and recently there has been an unprecedented increase in waterpipe smoking around the world (12). The Syrian society is predominantly composed of the youth, and this stage serves as a crucial starting point since smoking habits typically begin around this age. Therefore, it is essential to take into consideration the beliefs and opinions of this segment when designing strategies to combat tobacco (13). It is estimated that water pipe smoking among university students is around 49.2%. As depicted in Figure 1, there was no significant difference in smoking rates among the four mentioned universities, whether governmental or private. This is attributed to the relatively acceptable cost of tobacco and its widespread availability in commercial stores, making it easily accessible. It is noteworthy that the prevalence of tobacco use in the Middle East has surged, notably following the introduction of fruit flavored (Ma'assel) in the early 1990s (14). The growing social acceptance has

contributed to the increasing popularity of waterpipe smoking, particularly among younger generations (14). Waterpipes are easily found in many cases, restaurants, and hotels, often at reduced prices. Some establishments even offer them for free with the purchase of a drink or a meal (14). The percentage of females engaging in our study was higher than that of males. The data indicates that the prevalence of waterpipe smoking is still greater among males than females. These findings align with numerous studies (15-19) in Mediterranean and Arab countries, revealing a substantial rise in smoking prevalence among males compared to females. This trend is linked to the perception of smoking as a masculine behavior that diminishes the qualities of women, making it shameful and socially rejected in our community (3, 6). It has been observed that the smoking rate gradually increases during the age range from 17 years to 25 years. This result could be attributed to student's curiosity in exploring the waterpipe. The reason behind this could be an attempt to imitate parents or friends, with some students turning to waterpipe smoking due to anxiety arising from various familial or personal

issues. Consequently, this behavior evolves into a fundamental habit in their lives. The utilization pattern of water pipes is an additional crucial factor to take into account (20) Where it was found that the majority of students (39.6%) smoke waterpipe intermittently compared

to others (13.1%) who smoke daily. Despite the lower percentage, both intermittent and daily use of waterpipe pose health risks that need to be communicated to smokers (21).

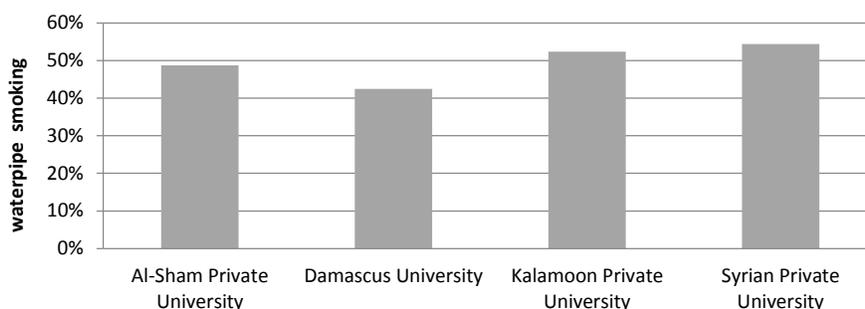


Figure 1. The prevalence of waterpipe smoking among the universities surveyed, expressed as a percentage

Table 2. Attitudes and perspectives on waterpipe among university students in Syria

	N= 321	%
Like most about waterpipe		
Taste and smell	27	8.4%
Entertainment	66	20.6%
Sound	1	0.3%
Smoke	10	3.1%
Reduce stress	30	9.3%
Everything	48	15%
Nothing	139	43.3%
Dislike most about waterpipe		
Smoke and pollution	19	5.9%
Cough or burning sensation	43	13.4%
Health effects	91	28.3%
Sharing	33	10.3%
Smell	6	1.9%
Everything	94	29.3%
Nothing	31	9.7%
Other	4	1.2%
Main reason for the current increase in waterpipe		
Boredom and availability of free time	92	28.7%
Increased availability (restaurants-cafes)	37	11.5%
Self-expression and manifestation	94	29.3%
Belief it is less harmful than cigarettes	25	7.8%
Stressful life	48	15%
Other	25	7.8%

The student's opinions varied, with 43.3% of participants indicating that they dislike everything about waterpipe, compared to 15% who enjoy everything. Additionally, the majority of participants mentioned that they smoke waterpipe for entertainment, as well as for the smell and taste. It's not surprising that some undesirable negative perceptions of waterpipe were mentioned, such as the smoke and pollution it causes, the sensation of coughing and irritation, sharing, and its harmful health effects. In addition, smoking waterpipe causes addiction associated with the substantial presence of nicotine, the addictive

substance found in tobacco. Studies have provided confirmation that nicotine levels in the bloodstream rise after partaking in waterpipe sessions (22). Roughly half of smokers (41.8%) reported experiencing dizziness as the primary symptom following waterpipe use, in addition to headaches, increased heart rate, and difficulty breathing. Although the evidence linking diseases to waterpipe use may not be as robust as that for cigarette smoking, an increasing body of research suggests that waterpipe smoking represents a risk factor for lung and cardiovascular diseases (23).

(57.92%) believe that waterpipe are more dangerous than cigarettes, indicating a clear perception of the health risks of waterpipe compared to cigarettes. However, the controversial aspect arises as (43%) of those who consider waterpipe more hazardous are currently smoking it. This could be explained by many students using waterpipe as a coping mechanism for the psychological stress resulting from financial and social pressure. The economic hardship resulting from this war acts as an ideal catalyst for depression, a factor that can trigger and intensify a dependence on smoking (20).

(44.5%) of the participants indicated that the danger of waterpipes is attributed to the increased inhalation of smoke compared to cigarettes, aiming to overcome water resistance. Additionally, (24.9%) stated that it is equal to cigarettes, as they cause similar health effects. A minority of

students answered that cigarettes are more dangerous than waterpipes, pointing to higher addiction potential and greater availability. Even though waterpipe smoking entails ten times the nicotine content of cigarettes and is equivalent to smoking 50- 100 cigarettes in a single session, it still shares many of the same toxic substances, including nicotine and carbon monoxide, with cigarette smoking (14).

In comparison to cigarette smoking, waterpipe smokers tend to inhale larger volumes of tobacco smoke due to prolonged smoking sessions and the use of charcoal, thereby elevating levels of carbon monoxide and carcinogens in waterpipe smoke. Additionally, secondhand waterpipe smoke contains substantial amounts of aldehydes, polycyclic aromatic hydrocarbons (PAHs), and ultrafine particles respirable (12, 22).

Table 3. Health beliefs about waterpipe and cigarettes among university students, Syria

	N= 321	%
What are the symptoms that appear after using a waterpipe*		
Headache	48	17.1%
Dizziness	117	41.8%
Increased heart rate	44	15.7%
Difficulty breathing	39	13.9%
Other than that	32	11.4%
Main health hazard of waterpipe		
Cardiovascular effects	141	43.9%
Respiratory effects	101	31.5%
Cancer	53	16.5%
Other bodily effects	15	4.7%
Other	11	3.4%
What are the infectious diseases that are transmitted by waterpipe		
Influenza	117	36.4%
Herpes	14	4.4%
Tuberculosis	22	6.9%
Liver Inflammation	44	13.7%
Corona	92	28.7%
other than that	32	10%
Belief about harmful effect of waterpipe and cigarette		
Cigarettes are more harmful	55	17.1%
Waterpipe is more harmful	186	57.9%
Equally harmful	80	24.9%
Why waterpipe is more harmful **		
tobacco used in waterpipe is more harmful	37	17.7%
more smoke inhaled	93	44.5%
Smoke not filtered	18	8.6%
More addictive	42	20.1%
Other than that	19	9.1%
Why cigarettes are more harmful***		
Accessibility	28	24.8%
More nicotine	14	12.4%
Tobacco used in cigarettes are more harmful	10	8.8%
More addictive	39	34.5%
Other than that	22	19.5%
Why they are equally harmful****		
Contain the same ingredients	24	18.3%
Same effect on health	75	57.3%
Other than	32	24.4%

* Asked only to those saying they smoke waterpipe

** Asked only to those saying waterpipe is more harmful

*** Asked only to those saying cigarettes are more harmful

**** Asked only to those saying that waterpipe and cigarettes are equally harmful

It is extremely important to know the attitudes and opinions of families regarding waterpipe smoking to understand the potential impact on the new generation. As observed in Figure 2, there is rejection by families, particularly towards females using waterpipe. This is influenced by the nature of Arab society, cultural norms, traditions, and customs.

Comparatively, parents showed greater tolerance towards smoking waterpipe for males than females. The parent's perception of smoking initially was negative, as they approached the matter from a social perspective without paying attention to its health risks, both for males and females.

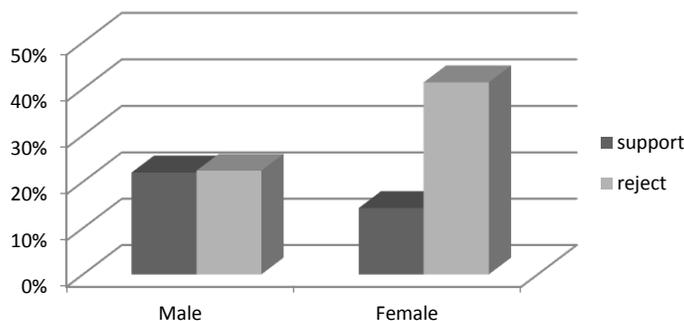


Figure 2. Percentage-wise responses from students regarding their family's stance on their smoking, categorized by gender.

Table 4. student's responses of regarding their attempts to quit smoking.

	Male n=94		Female n=64	
	n	%	n	%
Yes	44	46.8%	31	48.43%
No	50	53.19%	33	51.56%

*Asked only to those saying they smoke waterpipe

Approximately half of the participants (both males and females) indicated attempting to quit smoking, while the other half believes that quitting smoking would be more challenging.

We observed from the results that (41.1%) of students started smoking three years ago, and this is a cause for concern and apprehension, as recent studies indicate that individuals who start smoking during their teenage years and persist for an additional 10 to 15 years could face the possibility of dying twenty years earlier than anticipated (24). This is attributed to the lack of awareness programs regulating smoking.

5. Conclusion

The high prevalence of waterpipe smoking among young individuals in syria persists despite awareness of the health hazards linked to this practice. Therefore, it is imperative to implement strict tax measures on tobacco products and enforce bans. Moreover, conducting extensive education programs and seminars, particularly among young people, to raise awareness about the adverse health impacts of waterpipe smoking is crucial. Furthermore, efforts should be

made to explore solutions for addiction and guide individuals toward quitting smoking.

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الوعي والمعرفة والاتجاهات تجاه تدخين النرجيلة بين طلاب الجامعات في سوريا: دراسة مقطعية

الخلاصة

الخلفية: اكتسب تدخين النرجيلة، المعروف أيضاً باسم تدخين الشيشة أو الشيشة، شعبية كبيرة في السنوات الأخيرة، خاصة بين الشباب والمراهقين. **الطرق:** تم إجراء مسح مقطعي في أربع جامعات في سوريا، باستخدام استبيان يديره القائمون على المقابلات يهدف إلى تحديد مدى انتشار تدخين النرجيلة بين طلاب الجامعات في سوريا، واستكشاف مواقفهم ووعيهم بالمخاطر الصحية، وتقييم نواياهم بشأن ذلك. الإقلاع عن التدخين. شارك في الدراسة 321 طالبًا، بنسبة جنس بلغت 44.2% ذكور و55.8% إناث. **النتائج:** كانت التصورات الإيجابية الأكثر شيوعاً عن النرجيلة تتعلق بالترفيه (20.6%) والحد من التوتر (9.3%). التصورات السلبية عن النرجيلة لدى الطلبة، حيث أفاد 29.3% أن كل ما في النرجيلة ضار. لقد ذكر جميع الطلاب تقريباً بطريقة أو بأخرى الآثار الخطيرة والسلبية لتدخين النرجيلة (99%). تعتقد نسبة كبيرة من الطلاب أن الأسباب الأكثر شيوعاً لاستخدام الشيشة هي التعبير عن الذات، والملل، وتوفير الوقت. أعرب غالبية الطلاب الذين يدخنون النرجيلة، 83، عن عدم وجود خطة للإقلاع عن التدخين (52.8%). يتمتع ما يقرب من نصف الطلاب عن تدخين النرجيلة تماماً، ويعزى ذلك إلى زيادة وعيهم وفهمهم للمخاطر الصحية المرتبطة بالتدخين، سواء بالنسبة لهم أو لمن حولهم. وقد وصف 6.9% فقط من الطلاب مرض السل بأنه مرض يمكن أن ينتقل عن طريق النرجيلة، و36.4% وصفوا فيروس الأنفلونزا بأنه مرض قابل للانتقال عن طريق النرجيلة. كما أكد 28.7% من المشاركين أن فيروس كورونا ينتقل عن طريق النرجيلة. **الاستنتاج:** يشكل تدخين النرجيلة تحدياً صحياً كبيراً في سوريا، لذلك تساهم هذه الدراسة ببيانات تدعم القضاء على هذه المشكلة الصحية.