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## The Use of Unconventional Substances and Tools in Narghile Smoking; a Pilot Study in Jordan

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### Authors' contributions

This work was carried out in collaboration between all authors. Authors NSD, MMB, and OAA designed the study and the questionnaire, and wrote the first draft of the manuscript. Authors MAA and MHS performed the statistical analysis. Author WSA explained the study to participants, and collected data. Authors SJ and MAI managed the literature searches. All authors read and approved the final manuscript.

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### ABSTRACT

**Aims:** Narghile smoking may be associated with a number of unconventional practices that need to be thoroughly investigated for their potential health problems. We investigated the prevalence and pattern of unconventional practices related to narghile smoking including the use of medications, fruits, and alcohol, among a sample of café patrons.

**Place and Duration of Study:** A few cafés at Amman, Jordan during July 2011.

**Methodology:** This was a cross-sectional survey whereby a pre-prepared questionnaire was distributed to a sample of café patrons. Questionnaire included demographic information, history of tobacco use, pattern of narghile smoking including unconventional practices and lastly health awareness and attitudes towards cessation.

**Results:** Out of 96 café patrons, 61 (63.5%) agreed to participate with 42 males and 19

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females. Age range was 16-64 years (mean=27.5±9.2). About 47.5% used fruits as the narghile head and 16.4% used fruits as water tank. Equal proportions (9.5%) of the sample added either milk/soft drinks to tank or added drugs to tobacco mix or the liquid contents of the tank.

**Conclusion:** Narghile smoking may be associated with unconventional practices like the use of psychoactive drugs and alcohol. Further research is needed to explore the reasons behind this trend, and the associated potential health hazards.

**Keywords:** *Narghile; alcohol; psychoactive; fruits.*

## 1. INTRODUCTION

Narghile is a smoking instrument in which special tobacco mixes are placed to burn in the "head" of the narghile. Smoke is then shifted to pass within a liquid placed in the "tank" of the narghile before it is finally inhaled by the smoker. Narghile smoking is now considered an epidemic that is affecting many Asian and African countries. It has also spread within North American and several European countries especially among the young communities of university students [1,2]. A recent study confirmed that more than 25% of US college students smoke narghile [3]. Jordan like many Arabic countries [4-6] is affected by this epidemic and it was shown that narghile smoking has become extremely popular among both genders of all age groups [4-6].

The conventional tobacco mix of narghile is based on tobacco which may also incorporate other materials in order to enhance the smoking experience. Incorporating medications or herbs in tobacco mixes of narghile are known to narghile smokers, however its prevalence and pattern have not been investigated sufficiently if at all. The most frequently used medications are paracetamol and codeine- containing tablets which are ground before being added to the mix. Likewise, herbs or spices like nutmeg in the powder form may be added to obtain basically the same effect of analgesia or sedation. Within the same context, other materials may be used instead of tobacco like cannabis [7], and other psychoactive drugs [8]. Sporadic reports have emerged to draw attention to the trend of mixing tobacco with marijuana or hashish among young narghile smokers [3,9]. Furthermore, some reports found an association between narghile smoking and an increased risk of being involved in road accidents [10,11], and they attributed that to the use of cannabis [10].

Other aspects of narghile smoking that have received little or no attention are the unconventional use of fruits to replace certain components of the narghile instrument itself like the head or water tank (Fig. 1).



**Fig. 1. Two conventional narghiles are shown on the left-hand side. An apple can replace the head of the narghile while a melon or a watermelon can replace the tank (right side)** A courtesy of Mr Ahmad Jaber, a dental student at the University of Jordan

Fruit-flavored tobacco mixtures, which list "Muassel" as an ingredient, burn with a strong aroma of caramelizing sugar [12]. It is considered one of the factors that make narghile smoking an attractive and trendy habit [13]. On the other hand, fruits that can be used to replace the head of the narghile include apples that are hollowed in the centre and a hole is made at the bottom half to transfer smoke down to the tank.

Another conventional part of the narghile instrument is the tank, and is usually made of glass and filled with water that needs to be replaced frequently. Usually cold water and sometimes ice are added to the water tank to cool the inhaled smoke and reduce irritation to the lungs. A few studies emerged to report on the mixing of tank water with alcoholic beverages [9], however, the addition of other substances like soft drinks, rosewater or milk has not yet been reported. The effect of these materials is unclear, but they possibly provide a cooler smoke; enhance capacity to remove toxic materials and perhaps produce some sedative effect.

Another unconventional trend that is found mainly in cafés is the replacement of the water tank with a watermelon, a pumpkin or other fruits after removing the pulp [4].

Whilst a limited number of studies have reported on the effects of tobacco mixes that contain certain fruits [14], the use of fruits as a main part of the narghile (head or tank) has scarcely been investigated if at all.

Since the beginning of revolutions in some Arab countries (December 2010), or the so called "Arab Spring", Amman, the capital city of Jordan has become the destination for many Arabs and tourists of other nationalities, for its relative stability. Since then, number of cafés in Jordan has exponentially increased, and so have their cosmopolitan patrons who wish to practice unconventional narghile smoking and the associated exotic experience.

We investigated the patterns of unconventional practices related to narghile smoking including the use of analgesic and psychoactive drugs, fruits, and alcohol, among a sample of patrons of cafés in Amman, Jordan. We also investigated their health awareness and their willingness to quit narghile smoking. This study also comes as an effort to estimate the prevalence of these practices which in turn will provide the basis for any future research that targets health hazards that may accompany unconventional smoking practices particularly when these practices are overlooked or encouraged by the society.

## **2. SUBJECTS AND METHODS**

### **2.1 Questionnaire Design and Validation**

The questionnaire was written in Arabic and was structured into 1) demographic data of age, gender, marital status, number of children, occupation and nationality, 2) history of tobacco use in general and narghile smoking specifically, 3) attitude towards smoking cessation, 4) unconventional narghile smoking practices including the use of fruits or addition of certain substances to the tank or the tobacco mix in the head of the narghile. The questionnaire was initially designed by researchers MB, OA and ND based on a previously used questionnaire [5]. Validation of the questionnaire was done by distributing it to 10 persons and after one week, the process repeated. The completed questionnaires were compared to ensure that the answers were similar, thereby confirming, albeit in part, the clarity of the questions; vague questions were modified accordingly.

### **2.2 Study Sample**

This study was a cross-sectional survey, and the study sample was conveniently recruited from patrons of two cafés in west Amman, Jordan during July 2011. After consenting to participate, each participant was given the questionnaire to complete and was instructed to ask researcher (WA) about any vague questions. Participants were allowed to complete questionnaires in private and they were also informed that the questionnaires are anonymous to encourage them to answer all questions. Questionnaires were eventually collected in cafés once the participants completed them.

### **2.3 Statistical Analysis**

The statistical analysis program SPSS (Statistical Package for Social Sciences) version 17.0 (SPSS, 2008) was used to undertake all the statistical analyses. For the categorical data, descriptive statistics were used to calculate frequencies for each category. For the numerical data descriptive statistics were used to point out the maximum and minimum values and to calculate the mean and the standard deviation. Cross tabulation and Chi-square test were

used to test for significant difference between categorical data at  $P$  value  $< .05$  at the 95% confidence interval.

### **3. RESULTS**

#### **3.1 Sample Description and Patterns of Tobacco Use**

Two out of five cafés have agreed to the distribution of the questionnaires to their patrons. Number of subjects invited for participation was 96. A total of 61 subjects have agreed to participate resulting in a response rate of 63.5%. Age was stated by 55 people and the age range was (16-64) years with a mean of (27.5±9.2) years. For married people the number of children ranged from 0-5 children with a median of 4. Other demographic characteristics of gender, marital status, occupation, and nationality are shown in Table 1.

**Table 1. Number and percentage of participants according to gender, marital status, occupation and nationality**

<b>Gender (responders=61)</b>	<b>No (%)</b>
Male	42(68.9)
Female	19(31.1)
<b>Marital status (responders=60)</b>	
Single	48(80)
Married	9(15)
Divorced	2(5)
<b>Occupation (responders=54)</b>	
Student	22(40.7)
Professional	25(46.3)
unemployed	7(13)
<b>Nationality (responders=53)</b>	
Jordanian	31(58.5)
Other Arabs	22(41.5)

Most of the sample were males (68.9%) and single (80%), while students and professionals were almost equally represented (40.7% and 46.3% respectively) with a smaller percentage of unemployed (13%). Participants were mainly Jordanians (58.5%), and Arabs of other nationalities (41.5%) including Iraq, Palestine and Egypt; two participants had an American and a Canadian nationality but they were of Arabic origin. None of these demographic characteristics was significantly associated with narghile smoking ( $P>.05$ ). On the other hand, cigarette smoking was highly significantly associated with narghile smoking at a  $P$  value of (.004) indicating that narghile smokers are likely to be cigarette smokers as well. Type and patterns of tobacco use including age of initiation of tobacco use, quantity of smoked cigarettes and frequency of narghile smoking are shown in Table 2.

**Table 2. Pattern of tobacco use, n= number of smokers. Admitters are the participants who answered by "yes" to the question "Do you smoke tobacco?"**

<b>Smoking habit</b>		
	<b>Cigarette smoking</b>	<b>Narghile smoking</b>
Admitters	N=33	N=51
Age of initiation (years) (Mean± SD)	10-30 (19.29±3.56)	14-26 (19.83±2.67)
Frequency (n)	5-20 cigarettes/day (n=16) 1 cigarette/week (n=4)	1-7 sessions /week (n=30) 1-2 sessions / month (n=10)

**3.2 Pattern of Narghile Smoking and Associated Unconventional Practices**

Pattern and attitudes towards narghile smoking including the introducer to the habit, companions in the narghile smoking session, the favorite place of narghile smoking, and associated unconventional practices are shown in Table 3.

**Table 3. Pattern and attitudes towards narghile smoking including unconventional practices among narghile smokers. Soft drinks include lemon and milk. Drugs include antihistamines, paracetamol, and cannabis. N=number of responders**

<b>Practice/ attitude</b>	<b>N (%)</b>
<b>Introducer [n (%)= 55 (90.2%)]</b>	
Alone	3 (5.5)
Friends	43 (78.1)
Colleagues	3(5.5)
Relatives	6 (10.9)
<b>Companions [n (%)=49 (80.3)]</b>	
Friends	49 (100)
<b>Favourite place [n (%)=52 (85.2)]</b>	
Café	47 (90.4%)
Home	4(7.6%)
Farm	1(2%)
<b>Unconventional practices [n (%)=48 (78.7)]</b>	
Uses apple head	29 (47.5)
Uses melon or watermelon tank	10 (16.4)
Adds ice to tank	32 (52.5)
Adds milk or other soft drinks to tank	6 (9.5)
Adds alcohol to tank	4 (6.5)
Adds drugs to tobacco or tank water	6 (9.5)

The most popular unconventional practice was the use of apple head (47.5%), a watermelon tank (16.4%), addition of milk and soft drinks to tank (9.5%), addition of medications to tank water or tobacco mix (9.5%), and addition of alcohol to tank (6.5%).

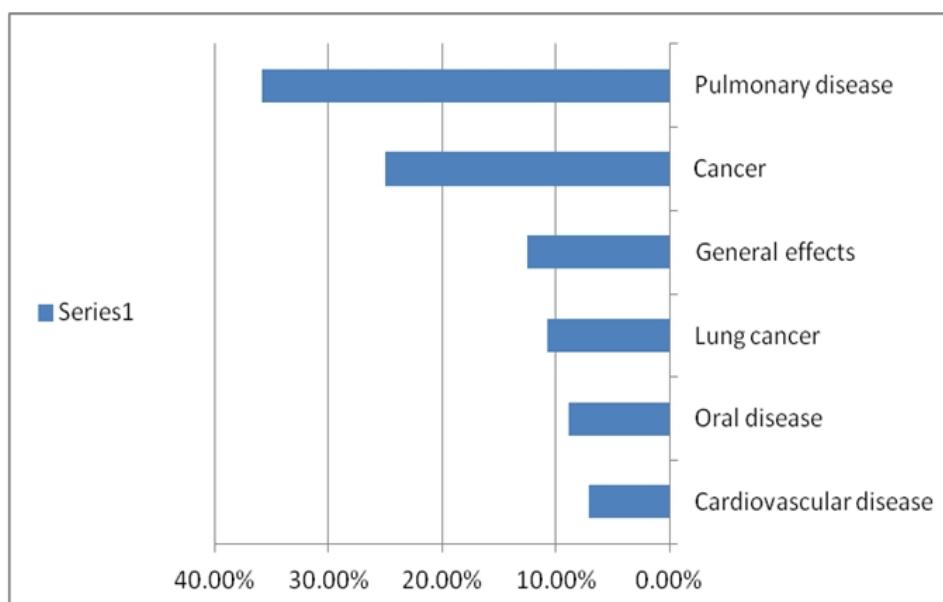
The use of apples to replace the narghile head was significantly associated with gender ( $P=.031$ ), where males showed a higher attitude to use apples to replace narghile head. Furthermore, the use of drugs or substances in narghile was significantly associated with

age ( $P=.008$ ) with the majority of subjects using substances were between 20 and 29 years of age.

A substantial proportion of the sample (52.5%) used ice to cool the tank water. This practice was significantly associated with subjects that believe that narghile is more harmful than cigarettes ( $P=.025$ ).

### **3.3 Health Awareness and Attitudes towards Quitting**

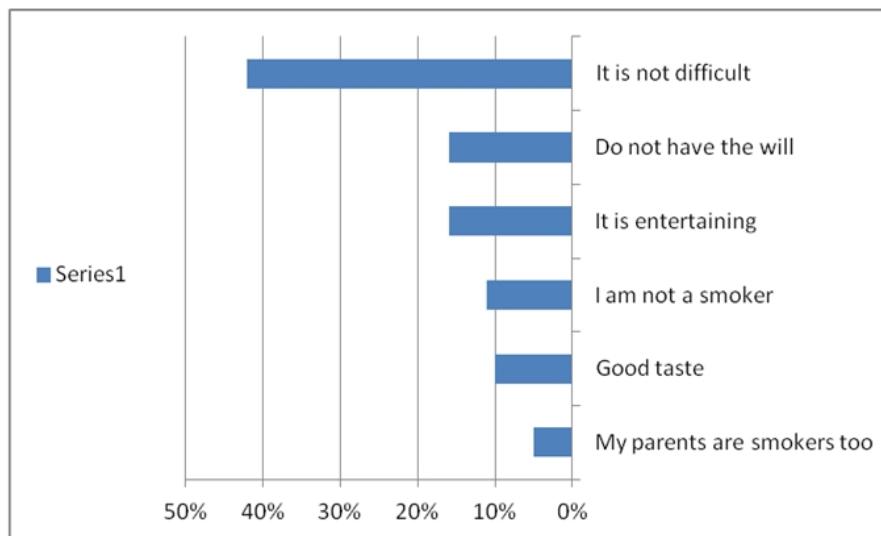
Although 54 participants (88.5%) stated that narghile is harmful to health, only 21(34.4%) explained the health hazards of narghile. The most frequently reported health hazard was pulmonary diseases followed by cancer. All reported health hazards are shown in Fig. 2.



**Fig. 2. Health hazards of narghile as stated by 21 participants.**

Fifty four (88.5%) participants responded to the question: which is more harmful to health narghile or cigarettes; most of them ( $n=30$ , 55.6%) stated that it is narghile. Also subjects believing narghile use is more harmful were more likely to use apple as head replacement.

Regarding the question pertaining to quitting narghile smoking, while 21 participants (34.4%) expressed their wish to quit smoking, only 16 (26.2%) have tried to quit. And lastly, only 19 (31.1%) participants responded to the question: "what are the reasons behind the difficulty to quit narghile smoking"; the most frequently reported statement was that quitting is not difficult (42%). All reasons behind the difficulty in quitting, as stated by participants, are shown in Fig. 3.



**Fig. 3. Reasons for difficulty in quitting narghile smoking**

#### **4. DISCUSSION**

We believe that by exploring the patterns of unconventional practices associated with narghile, can appropriate policies be designed and adopted for anti-smoking directives. The study sample were given the privacy in completing the questionnaires, however, this may have resulted in incomplete responses to some questions, or inaccuracies in answering them. Therefore, while only 60% admitted to being smokers, more than 90% of the sample stated who their introducers to narghile smoking were. And since these cafés are meant for narghile smoking, it may not be erroneous to say that all participants were actually narghile smokers. This discrepancy may reflect a denial behavior that is often associated with NS; a practice that may be considered a social hang-out habit [15] rather than a risky health behavior. Most of the cafés that were approached for participation have declined, probably because of the sensitivity of the issue of drug use within the narghile setting. Within the same context, a substantial number of patrons ( $n=35$ , 36.5%) have declined to participate in contrast to 61(63.5%) people who actually participated. As a consequence, the sample size is small and it cannot be considered representative of all narghile smokers. Another limitation was that the study included only participants of high socioeconomic background; participants were recruited from elite cafés in the relatively expensive area of west Amman. Exploring the trends of lower socioeconomic backgrounds may reveal other important findings. Still, this study confirmed the existence of unconventional practices including the more serious substance abuse within the relatively conservative community in Jordan.

None of the demographic characteristics of age, gender, occupation and nationality was significantly associated with narghile smoking. This result confirmed the popularity of narghile smoking among different ages and genders. It has also proved to be a trans-cultural habit which attracts people of different nationalities. On the other hand, cigarette smoking was highly significantly associated with narghile smoking at a  $P$  value of (.004). This association between cigarette and narghile smoking was anticipated and was in accordance with other studies [16,17]. Cigarette smoking came second in popularity to narghile smoking. There was no difference in the mean age of initiation for both cigarette and narghile

smoking, however, it was noticed that the earliest age of onset was 10 and 14 years for cigarettes and narghile respectively. Narghile smoking has become increasingly popular in the last two decades and it is estimated that the surge in popularity commenced mostly in the nineties of last century [18]. This may explain the relative difference in initiation age for both narghile and cigarettes.

It is also noticeable that introducers to narghile smoking are mainly friends; the role of colleagues and relatives seems to be negligible, showing here an influence of peers on narghile smoking outside the authority of the family and emphasizing the observations of other studies [19]. This comes in contrast with earlier findings that confirmed the role of family in the introduction of the habit to female members [6]. The striking social aspect of narghile smoking is further emphasized by practicing the habit with friends as the favorable companions and also by choosing cafés as their favorable place for practicing the habit. Home comes in the second place while the farm is chosen by only one participant as the favorable place.

A number of unconventional practices were observed among this sample of narghile smokers. Nearly half of the sample (47.5%) used apples to replace the head of the narghile. On the other hand, use of watermelons or melons to replace the water tank was less popular (16.4%). It is also observed that a number of substances were used instead of water to produce the desired cooling effect. These substances included alcohol (6.5%), milk, lemon juice, and soft drinks (9.5%). A number of substances were also used by a small percentage of this sample by mixing them with tobacco prior to placement in the head of the narghile. These included cannabis, lemon, antihistamine drugs and paracetamol all in equal proportions (1.6%). What characterize narghile as compared to cigarettes are the flexibility of its parts and the open choice of materials and tools that can be used to enhance the smoking experience. Young generations who like to explore new ideas may enjoy the highly versatile methods associated with narghile smoking. Fruits added to flavored tobacco make narghile smoking a healthy choice for the narghile smokers [20], and so does the replacement of narghile head with a fruit. The fashionable and trendy look of narghile [21] may be fostered by the addition of fruits to the setting of narghile. Up to our best knowledge, health hazards associated with use of fruits in narghile, if any, have not yet been investigated. However, the chic look of colorful fruits when added to narghile, does certainly add to the appeal of narghile particularly among females perhaps through giving the instrument more of a natural look. Banning the use of flavored tobacco of narghile has been suggested as a method to limit its sales [13]. Banning the use of fruits that are used to replace narghile parts may be beneficial in reducing narghile popularity at least among café patrons. Clearly, the efficacy of these suggestions will need to be investigated.

Only 19 participants explained reasons behind difficulty in quitting narghile smoking; a substantial proportion of responders interestingly believe that quitting is not difficult and this was their answer. It is mostly noted that in general, narghile smokers think that quitting narghile smoking is not challenging probably due to the fact that the intermittent use of narghile may create a false perception of easiness of quitting [22]. This added to the fact that most of the sample did not respond to the question "what are the health hazards of narghile smoking?" indicates that there is a lack of knowledge of the health hazards of narghile smoking and that they did not know that it is dangerous [15].

Unfortunately, in Jordan, like many developing countries, self-medication is a common practice although medicines are classified as prescription-only-medicine and over-the-counter medicines [23].

Participants who added medications to their tobacco mix possibly maintain that smoking medications is as safe as swallowing them. Other participants who add milk, soft drinks or more seriously alcohol to tank water may also assume that this may add to the safety of narghile smoking since the main aim of using liquids in the water tank is to increase the filtering capacity of narghile and cool down the smoke to reduce its irritation to lungs. Subjects, who were inclined to using apple heads, also believed that narghile is more harmful than cigarettes. This association may reflect the belief of those smokers that using fruits may add to the safety of narghile.

It seems that the use of narghile is shifting from a conventional method of tobacco use to an unconventional method of substance abuse. Risks of this behavior are much higher than those risks associated with cigarette smoking, since within the Arab communities narghile smoking is endorsed by family and narghile is a welcomed guest in many Arabic homes and Jordanian society is no exception [24]. It is also socially alright for women and children to share in the narghile smoking session as smokers [6].

The findings of this study show a potential for narghile smoking to be used as a gateway to substance abuse [25]. The increasing popularity of this method of tobacco use may be associated in the future with a higher rate of substance abuse. Furthermore the addictive potential for the habit may be further fostered by the highly addictive substances added to either tobacco mix or tank water.

Health care workers and ministries of health can play an important role in disseminating awareness regarding potential health hazards of using other substances in narghile smoking. Other governmental institutions like antinarcotics departments should also be involved.

It is recommended to investigate reasons behind the different unconventional practices associated with narghile smoking and their potential health hazards including drug addiction.

## **5. CONCLUSION**

Narghile smoking may be associated with a number of unconventional practices that prove to be a risky health behavior like the use of psychoactive drugs and alcohol. Although other unconventional practices like the use of fruits to replace main parts of the narghile may seem a safe practice to narghile smokers, their health effects have to be investigated. Further research is needed to explore the reasons behind this trend, and the associated potential health hazards.

## **CONSENT**

This section is not applicable in this paper.

## **ETHICAL APPROVAL**

Ethical approval was obtained from the scientific research committee of the Faculty of Dentistry, University of Jordan.

## COMPETING INTERESTS

The authors declare that they have no competing interests

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