Hookah smoking among a sample of Iraqi male high school students: Awareness and understanding

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DOI: 10.21203/rs.2.17315/v1

SUBJECT AREAS  Epidemiology

KEYWORDS  High school, students, Hookah use, smoking, understanding
Abstract

Background: The use of hookah smoking device is increasing at large scale distributing from Eastern Mediterranean region reaching Western countries. Hookah smoke users exposed to a lot of chemical compounds and to several chronic diseases. The purpose of this study is to confirm the prevalence of hookah use among a sample of male high school students in Iraq, and to provide a better understanding of cessation-related behaviors and cognitions of hookah only users.

Methods: A descriptive cross-sectional study was conducted among students in three high schools (for males only) at Karkh District, Baghdad. The study period was from Oct. 2017 till Jan. 2019 including a total of 847 male students. A structured KAP questionnaire was used to identify their knowledge and use of hookah smoking. Analysis of data was carried out using the available statistical package of SPSS-25.

Results: the overall prevalence of hookah smoking among high school male students was high (46%). More than two-thirds (70.6%) of them think that water pipe smoking is acceptable socially more than cigarette smoking. More than half of participants (55%) first heard about hookah smoking from friends and close to two-thirds (65.2%) who smoke hookah from those surround students were also friends. Almost half of respondents think hookah smoking is not encouraged in the faith of Islam (47.3%) and less than quarter (20.9%) think it’s completely forbidden in Islam.

Conclusions: Hookah smoking is increasing among high school students and becoming a socially acceptable behavior that needs more public and adolescent education about its harmful effect.

Background
Globally, tobacco use is considered the second leading cause of death, and it is responsible for the deaths of 1 in 10 adults [1]. Many carcinogenic compounds are found in the smoke from tobacco which is the leading cause of different types of cancer in the body specially; lung cancer [2] is considered the leading cause of cancer mortality in the world [3]. In addition to cancer, it can cause several respiratory infections where nicotine contained in cigarette smoke decreases the immune response defending body from malignant growth [4]. Hookah "Shisha, Hubble-Bubble, Nargileh & Water-Pipe (WP)" smoking is another form of tobacco use. Although hookah smoking practice dating back at least 400 years, nowadays the use of this device to smoke is increasing at large scale from the Eastern Mediterranean region reaching to Western countries [5,6]. Hookah design features a water bowel size, hose and mouthpiece. Several studies have been shown that hookah contains harmful chemicals [7–10], and a single 45-minute hookah session can expose the smoker to 48.6 times the amount of smoke as to smoking a cigarette [11]. In the US and from 2011 to 2016, current use of hookahs increased among middle and high school students, and in the year 2016 2% of middle school students reported that they had used hookah in the past 30 days “an increase from 1.0% in 2011” [12,13].

In Iraq, few research studies related to hookah smoking among high school students were done and mostly among college students [14]. The purpose of this study was to confirm the prevalence of hookah use among a sample of young adults, also to provide a better understanding of cessation-related behaviors, intentions, and cognitions of hookah only users, and to determine appropriate future public health strategies of hookah cessation interventions.
Methods

A cross-sectional survey of adolescent students in high school was done. The sample was a convenient sample (non-probability sampling) and a random selection of three governmental high schools in Baghdad City was carried out in order to determine the prevalence of hookah smoking among those students.

Ethical approval was granted by the ethical committee at Anbar University and Baghdad Education Directorate. Informed consent was obtained from school staff and students. Study period was from Oct. 2017 till Jan. 2019.

Sample size calculation is based on the equation: \( n = Z^2 \frac{1-a}{p} \frac{p}{(1-p)/d^2} \) where \( n \) is the required sample size[15] and sample size of 847 students aged 15 to 18 years old were included in the study, with level of significance at 5%, and a random selection of high schools was made to include all eligible students. A structured KAP questionnaire form was prepared to students which include questions to identify their knowledge and use of hookah smoking, their sources to obtain tobacco hookah smoking, the effect of cultural and social relations in starting hookah smoking, and their ability to quit hookah smoking.

Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). Analysis of data was carried out using the available statistical package of SPSS–25 (Statistical Packages for Social Sciences- version 25).

Results

Table 1 show that students first heard and knew about hookah from friends (55%), brothers/sisters (16.9%), café (14.2%), media and newspaper (8.6%),
internet (4.7%), and from father/mother (4.3%). Most of high school students (86.1%) know that there is café shop for hookah smoking near their residence. It was found that the friends who smoke hookah are the highest group among the people who surround the hookah user (65.2%) followed by close relatives (31.6%), brothers/sisters (31.6%) and father/mother (4.5%).

Table 1: First heard about hookah, Café near residence, smoke hookah from surrounding.

| From where the student first heard/know about Hookah? |          |
|------------------------------------------------------|----------|
| Father and/or Mother                                  | 143      |
| Brothers/ Sister and/or Cousin                        | 466      |
| Friends                                              |          |
| Media and Newspaper                                   | 120      |
| Saw a Hookah Café shop                                |          |
| Others (internet)                                     |          |
| There is a Cafe for hookah smoking around students’ residence | 729 |

| Who smoke hookah from those surround the student      |          |
|------------------------------------------------------|----------|
| Father and/or Mother                                  | 268      |
| Brothers and/or Sisters                               | 552      |
| Other close relatives                                 |          |
| Friends                                              |          |
| None                                                  |          |

Table 2 shows that the participant’s opinion about different types of smoking and its effect on health from the worst to the better rate order was hookah (35.7%), cigarette (34.6%), e-cigarette (23.8%) and tobacco gum (5.9%).

Prevalence of student’s opinion about Islam’s opinion regarding shisha smoking as being discouraged (47.3%), forbidden (20.9%), allowed (9.3%) or don’t know (22.4%).

More than two-thirds (70.6%) of the students think that water pipe smoking is more acceptable socially than cigarette smoking and 62.9% of them did
not think that water pipe smoking is less harmful and less addictive than cigarette smoking.

There was agreement for the need for regulations to prevent or forbid hookah café places (81.5%).

Table 2: Opinion of participants regarding harmfulness of tobacco products, Islam's opinion, social acceptance, hookah harmfulness and addictiveness, and regulations against hookah cafe.

| In student opinion: Which is of the following types of smoking are more harmful on health? | No |
|---|---|
| Tobacco gum | 50 |
| Cigarette | 293 |
| e-cigarette | 202 |
| Hookah | 302 |

| In student opinion: hookah smoking in Islam. | No |
|---|---|
| Forbidden | 177 |
| Discouraged | 401 |
| Allowed | 79 |
| Don't know | 190 |

| Think that hookah smoking is acceptable socially more than Cigarette smoking? | No |
|---|---|
| Yes | 598 |
| No | 249 |

| Think that hookah smoking is less harmful and less addictive than Cigarette smoking? | No |
|---|---|
| Yes | 314 |
| No | 533 |

| Do agree on regulations to forbid café places | No |
|---|---|
| Yes | 690 |
| No | 157 |

Figure 1 shows that the prevalence rate of Hookah smoking among high school students was (46%).

Regarding average number of hookah smoked in the last 30 days, table 3 shows that a high prevalence rate was once (28.1%), twice (16.6%), three times (11.3%). Among hookah smokers (85.5%) smokes in the last six months. Age at first hookah was smoked; the highest rate was at the age of 16 and 15 (27.4 % and 26.3 % respectively) followed by the age of 14 (15.1%). Average number of hookah smoking sessions per day among hookah smokers were one (13.3%), two (34.3%),
three (31%), four (20.7%), ≥5 times (0.8%). The prevalence of sharing the mouthpiece with others during hookah smoking was never (30.7%), sometimes (34.6%), most of times (15.1%), and always (19.7%). Prevalence rate among smokers who were completely confident that they can quit hookah smoking was (61.2%), while those who are not completely confident (21.3%), somehow confident (7.7%), not that confident (5.6%), and not confident at all (4.3%). The duration of hookah smoking at each session in minutes was >15 (15%), 15-29 (5.1%), 30-44 (24.3%), 45-59 (6.2%), 60-119 (35.6%), and ≥120 minutes (14.2%).

Table 3: Number of hookah smoked (last month), hookah smoking in the last 6 months, age first smoked hookah, hookah sessions per day, duration of sessions, mouthpiece sharing, confident to quit hookah smoking.
| **Average number of hookah smoked in the past 30 days (even one puff)** | **No** |
|---|---|
| 1 | 110 |
| 2 | 65 |
| 3 | 44 |
| 4 | 16 |
| 5 | 23 |
| 6 | 6 |
| 7--- | 48 |
| 14--- | 32 |
| 21--- | 3 |
| 28--- | 32 |
| ≥50 | 12 |

| **Smoking hookah in the last 6 months** | **Yes** | **No** |
|---|---|---|
| Yes | 335 | 56 |

| **Age you first smoked hookah** | **<10 years** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **≥17 years** |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 14 | 7 | 19 | 30 | 59 | 103 | 107 | 46 |

| **Average number of hookah smoking sessions/day** | **One** | **Two** | **Three** | **Four** | **Five & more** |
|---|---|---|---|---|---|
| 52 | 134 | 121 | 81 | 3 |

| **Sharing the mouth-piece with others during hookah smoking** | **Never** | **Sometimes** | **Most of the times** | **Always** |
|---|---|---|---|---|
| 120 | 135 | 59 | 77 |

| **How confident that you can quit hookah smoking** | **Completely confident** | **Confident** | **Some Confident** | **Not that Confident** | **Not Confident at all** |
|---|---|---|---|---|---|
| 239 | 83 | 30 | 22 | 17 |

| **Duration of hookah smoking at each session (minutes)** | **<15 minutes** | **15---** | **30---** | **45---** | **60---** | **≥120 minutes** |
|---|---|---|---|---|---|---|
| 58 | 20 | 95 | 24 | 139 | 55 |
Regarding the place of hookah smoking, table 4 shows that a high rate of
students smoke at Café shop (61.1%) and more than three-quarters of participants
in this study get their hookah tobacco from hookah shop (78%), while only less rate
from friends and family member (11% and 6.4% respectively).

Low prevalence rate (only 12.9%) think that Electronic cigarette (e-
cigarette) can be a substitute to hookah smoking. High prevalence rate among
students was found in this study (61.3%) don’t know if e-cigarette is less harmful
and less addictive than hookah smoking, the rest of smokers (13.5%) think e-
cigarette is less harmful and less addictive than hookah and a quarter of them
(25.3%) don’t think e-cigarette is less harmful and addictive than hookah.

Table 4: Place of smoking, tobacco gain, substitute, harm and addictive.

| Where student usually smoke the hookah | No   |
|---------------------------------------|------|
| Home                                  | 92   |
| Friend’s home                         | 38   |
| Café                                  | 239  |
| Others;                               | 22   |
| Relative’s home                       | 18   |
| Mall                                  | 1    |
| School                                | 1    |
| Street                                | 1    |
| Public garden                         | 1    |

| From where student get their tobacco for hookah? | No |
|--------------------------------------------------|----|
| Myself from hookah shop                         | 305|
| From family members                             | 25 |
| From friends                                     | 43 |
| Others                                           | 18 |

| Student smoke e-cigarette as substitute for hookah? | No |
|-------------------------------------------------------|----|
| Yes                                                   | 109|
| No                                                    | 738|

| Think that e-cigarette is less harmful and less addictive than hookah? | No |
|-----------------------------------------------------------------------|----|
| Yes                                                                   | 114|
| No                                                                    | 214|
| Don’t know                                                            | 519|

Discussion

Although a lot of high school male students who smokes hookah have some
appropriate opinion about the harm of hookah smoking and their agreement on regulations against café shops, still the overall prevalence of hookah smoking among students in this study was high (46%). This prevalence is an agreement with a study in Saudi Arabia (secondary school adolescence male, aged > 18 years) where the overall prevalence of hookah smoking was 44% [16]. This high rate in our study is not seen in other studies in the region, where Abbas et al. and Alzyoud et al. studies done in Iranian and Jordanian high school male students were the prevalence percentage were 6% and 24% respectively [17,18].

More than half of participants first heard about hookah smoking from friends and more than two third have friends who smoke hookah. Azodi et al. in their study highlighted the role of friends in hookah smoking and emphasized that being among friend who smoked hookah was the most important factor of their tendency towards using it [19]. Also Bejjani et al. found in his study that almost half of his students in their study had all their friends smoking hookah [20].

Among different types of tobacco smoking, hookah smoking was the highest among students who believe it causes more harm on human being health. Also the results showed high prevalence among students who believe hookah is more harmful than cigarette, but are more socially accepted. Aslam et al. in his review explained the significant association between hookah smoking and increased risk of heart disease, cancer and hypercholesterolemia. [21]. Although adolescence in this study believe that hookah has worse health effects on them than other types of smoking but perhaps the effect of odor, flavor and taste of hookah overcome their choice of smoking. In addition hookah device can bring new and more group of friends smoking together in restricted or specific places minimizing the impact of their smoking on public. These opinions could explain the reason beyond students think
hookah smoking is more acceptable socially than cigarette smoking. Fitzpatrick et al. in his findings showed that attempts of hookah smoking among young adults users is associated with their conviction that it is socially acceptable [22]. A study in Beirut, Lebanon demonstrates that hookah smoking is more culturally accepted in society than cigarette smoking [23]. Momenabadi et al. in his article mentioned that in Iran the presence of hookah in traditional society is considered one of traditional custom icon and fashion character [24]. All this led to an increase in the prevalence of this behavior. Therefore, it is a challenge that norm of acceptance should be changed in the society and hookah users should be looked at similar to cigarette smokers.

This study showed almost half of respondents think hookah smoking is discouraged in Islam (47.3%) and less than quarter (20.9%) think it’s forbidden reflecting that religion could play an important role in preventing smoking in addition to a lot of risk behaviors such as drug abuse, gambling, alcohol drinking. A study was done in Jordan where they studied smoking habits among university students in different faculties and academic level, it showed that those in religion faculty were less likely to smoke compared to those in other faculties [25].

Our study showed more than one third of participants (33.1%) first tried hookah at the age between 10-14 years, and that the highest rate was among the age of 15 and 16 year (26.3% and 27.4% respectively). Teenage follow their parents and peers in a lot of high-risk behaviors and attitudes. Studies showed that increased prevalence of hookah smoking was associated with number of friends or family members who smoke [24,26]. In our study it was found that more than one-third (34.8%) of hookah smokers share the same mouth piece of hookah device in most of time and always. Sharing same mouth piece with different group of people and
friends has the opportunity to have different types of infection from mouth, sputum and lung. Munckhof et al. concluded in his study that transmission of tuberculosis was found in people sharing a marijuana hookah with a case of pulmonary TB [26]. Sajid et al. reported that carboxyhaemoglobin concentration in cigarette smokers is lower (6.1 ppm) as compared to shisha smokers (8.8 ppm) [27]. In this study more than three-quarters of adolescence smoke hookah for equal or more than 30 minutes at each session. Duration of hookah smoking sessions, depth of inhalation, and frequency of puffing all participate in the level of exposure to nicotine and other carcinogenic chemical materials present in charcoal and tobacco in shisha smoke. In this report more than three-quarters were completely confident and confident that they can quit from hookah smoking. It’s doubtful they could quit hookah smoking. As mentioned above hookah has more concentration of carboxyl group, nicotine and other chemical materials than cigarette smoking that has addictive pattern once the body is saturated with its difficult to withdraw or quit from smoking.

Limitations and strength of study

The study was self-funded and a convenient sample of hookah smoking students from three high schools, Karkh District. Also the questions were of short duration in time and number so the possibility of missing other items related to smoking is present. The reason for that we couldn’t take more time of students inside their class. However, the study provided rich data and precise answers, students had filled the questionnaire in front of their teachers, and therefore there was no drop rate from students or missing forms in this study.

Conclusions
Hookah tobacco smoking rates is increasing among high school students and becoming an acceptable socio-cultural phenomena in Iraq as it is worldwide urging the need of different effective preventive measures to be started to overcome the burden of hookah smoking on children and youth adults’ health through public and adolescence educational sessions and lectures explaining its harmful effect and changing its social acceptance behavior aiming to build a negative attitude towards using hookah device.

Declaration

Ethics approval and consent to participate
The Research Ethics Committee at College of Medicine, University of Anbar approved the study. All students were informed of the study purpose and the voluntary and anonymous nature of participation, before providing written informed consent.

Consent for publication
’Not Applicable’

Availability of data and material
The datasets generated and/or analyzed during the current study are not publicly available.

Competing interests
The authors declare that they have neither competing interests nor financial disclosure.

Funding
This study was self-funded.

Authors’ contributions
Both authors read and approved the final manuscript.

Acknowledgements

The authors thank the study participants for their contribution to the research, as well as school staff.

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Abbreviations

KAP: Knowledge, Attitude, Practice

WP: Water Pipe

e-cigeratte: electronic cigarettes

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Figures
Figure 1

The prevalence of Hookah smoking among high school students.