*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 7 Ver. 11 (July. 2018), PP 60-66*
*www.iosrjournals.org*

# Knowledge and Attitude on Effects of Hookah Smoking in a Kenyan population

Dar Arisa[1], Butt Fawzia[2], Mutave Regina[3]
[1]*Final year student, University of Nairobi- School of Dental Sciences, Nairobi, Kenya*
[2]*Department of Oral and Maxillofacial Surgery; Department of Anatomy, University of Nairobi- School of Dental Sciences and School of Medicine, Nairobi, Kenya*
[3]*Department of Periodontology/ Community and Preventive Dentistry, University of Nairobi- School of Dental Sciences, Nairobi, Kenya*
*Corresponding Author: Dar Arisa*

***Abstract***
***INTRODUCTION:****Hookah smoking is an olden yet more recently made popular way of tobacco consumption carrying the same effects as cigarette smoking, well-known cause of cancer.*
***OBJECTIVES****: Knowledge on the effects of hookah smoking is important to help reduce its practice, thus preventing diseases.*
***METHODS:****This was a descriptive cross-sectional study carried out in randomly selected hookah bars. One hundred and eighty individuals who smoke hookah were interviewed on their knowledge, attitude and perception on the effects of Hookah using a questionnaire, and results were analyzed.*
***RESULTS:*** *The study found that majority of the participants (70.5%) ranged between 19-26 years of age with a mean age of 24 years; 57% were male. Most participants smoked for 1-2 days (24.4%) or 21+ days (21.7%); and 32.8% smoked at least once each week but not daily. Average age of first trying shisha was 16 years, and the mean time spent smoking shisha is 96 minutes. Most common reason for smoking shisha was to pass time (67.8%). 24% of the shisha smokers also smoke cigarettes out of which 66% started smoking cigarettes after smoking shisha. 85% of the participants believe there is tobacco in shisha and 58.3% believe this tobacco is filtered by the water in the shisha pot. 60% stated that smoking shisha is harmful to the consumers and 50.6% stated it is not harmful to others around the consumer. 72.2% believe that smoking shisha is safer than smoking cigarettes.*
***CONCLUSION****: This study revealed the alarming situation that although the level of knowledge on the effects of smoking shisha was high, there is still a persistence to continue smoking it; and that shisha smoking is practiced mostly by the youth who consume it predominantly for social reasons.*
***Keywords:*** *Tobacco, Nicotine, Systemic health/disease, stress, risk factor(s), oral systemic disease(s)*

---

Date of Submission: 10-07-2018 Date of acceptance: 27-07-2018

---

## I. Introduction

Waterpipes have been used to smoke tobacco and other substances by the indigenous peoples of Africa and Asia for at least four centuries (Chattopadyay 2000).According to one historical account the water pipe was invented in India by a physician during the reign of the Emperor Akbar (who ruled from 1556 to 1605) as a purportedly less harmful method of tobacco use with the explanation that asthe smoke passed through water it would be rendered harmless (Chattopadyay 2000). Therefore, a widespread but, unsubstantiated belief held by many waterpipe users today is as old as the waterpipe itself (Maziak et al. 2005).Others report hookah originating from the Eastern Mediterranean Region during the 15th century. Names for the waterpipe also differ and include "narghile" in East Mediterranean countries including Turkey and Syria, "shisha" and "goza" in Egypt and some North African countries, and "hookah" in India (Maziak et al. 2005).

Water pipe tobacco smoking delivers the addictive drug nicotine, and is the case with other tobacco products, more frequent use is associated with the smokers being more likely to report that they are addicted (Maziak et al. 2004).Tobacco smoke contains over 4800 chemicals out of which 69 are carcinogens and several others are tumour promoters or co-carcinogens. Charcoal is used to heat the mixture(Maasel)which releases the tobacco and flavours from it. The temperature used is about 480°Celcius, producing high levels of carbon monoxide, metals, cancer-causing substances and tar. Studies have shown that even after filtering through the water, the smoke still contains high levels of these toxic agents (Maziak et al. 2004; Sajid et al. 2008; Cobb et al. 2010).These toxic agents are known to cause many to different types of cancers mainly lung, oral and bladder

cancer.There is a significant association between Hookah smoking and Squamous cell carcinoma of the lip(El-Hakim et al. 1999).

Globally the highest rates of smoking occur in the North African, the Eastern Mediterranean and South East Asia regions(Shihadeh et al. 2004). Recently, hookah smoking has been contemplated as a worldwide threat, and has been given the status of a global epidemic by health officials. Its consumption has been drastically increased where almost 1 billion males and 250 million females smoke hookah, with majority of its consumption is by the youth especially among college and university students (Aljarrah et al. 2009; Sajid et al 2008; WHO 2005; Marshall et al. 2006; Ward et al. 2006). Due to an existing knowledge gap, the purpose of this study was to find out the knowledge and attitudes of consumers of Hookahamong a population in Nairobi, Kenya.

## II. Material and Methods

The study design was cross-sectional study carried out among the water pipe smokers, at randomly selected10 Hookah barsin Nairobi. Permission to carry out the research was granted by the Kenyatta National Hospital and University of Nairobi Ethics and Standards committee and from the management of the venues. Data was collected over a five weeks beginning in February to March 2017. Participants were assured of their confidentiality, once theyverbally approved and signed the consent. They were then asked to fill aquestionnaire. In order to calculate the sample size the percentage of individuals with knowledge on the effects of Hookah smoking was estimated at 50%, a 95% confidence interval was used with a corresponding Z value of 1.96 and it came to 168. A total of 200 people who smoked Hookah were sensitized of this exercise and 180 agreed to participate; the rest declined. The data was analyzed using Ms-Excel, SPSS data collection software (22.0) and subjected to statistical analysis (Chi square tests) to test for levels significance before presentation the form of tables and graphs.

## III. Results

Out of the 180 participants interviewed, 57% were male (M:F≃1:1) with an age range of 17 to 43 years ( $\bar{x}$= 24;SD=4.47yrs) and a median of 23 years. The majority (70.5%) were between the 19 and 26 years of age and 13.8% were above the age of 28 years. There was a decline in the number 21(12%) of the people who engaged in Hookah smoking after the age of ⩾ 30 years (Figure 1A).Fifty eight percent (58%) of the users first smoked Hookah before the age of 18 years and 11.7% were < 14 years of age (Figure 1B). The ethnic distribution of the study population consisted of Caucasians (44.4%), Blacks (38.3%) and Whites (17.3%). While, some (24.4%) smoked Hookah for 1-2 days, others (21.7%) smoked it for more than 21 days. Most (87%) of the smokers visited a Hookah bar, the rest (13 %), smoked at their residence (Table 1). The reasons for smoking were to pass time (67.8%), relaxation (56.1%), euphoria (32.8%), to unwind after a long day(19.4%) and for the flavored taste(36.7%).One shisha pot mixture lasts for 60 to 90 minutes before it needed replacement, 87% of the users replaced it to increase the effects and time of the tobacco being smoked . Each session of smoking for 56.7% of the population lasted for >2hours ( $\bar{x}$= 96minutes), only 8.9% smoked for < 30 minutes (Figure 1C).

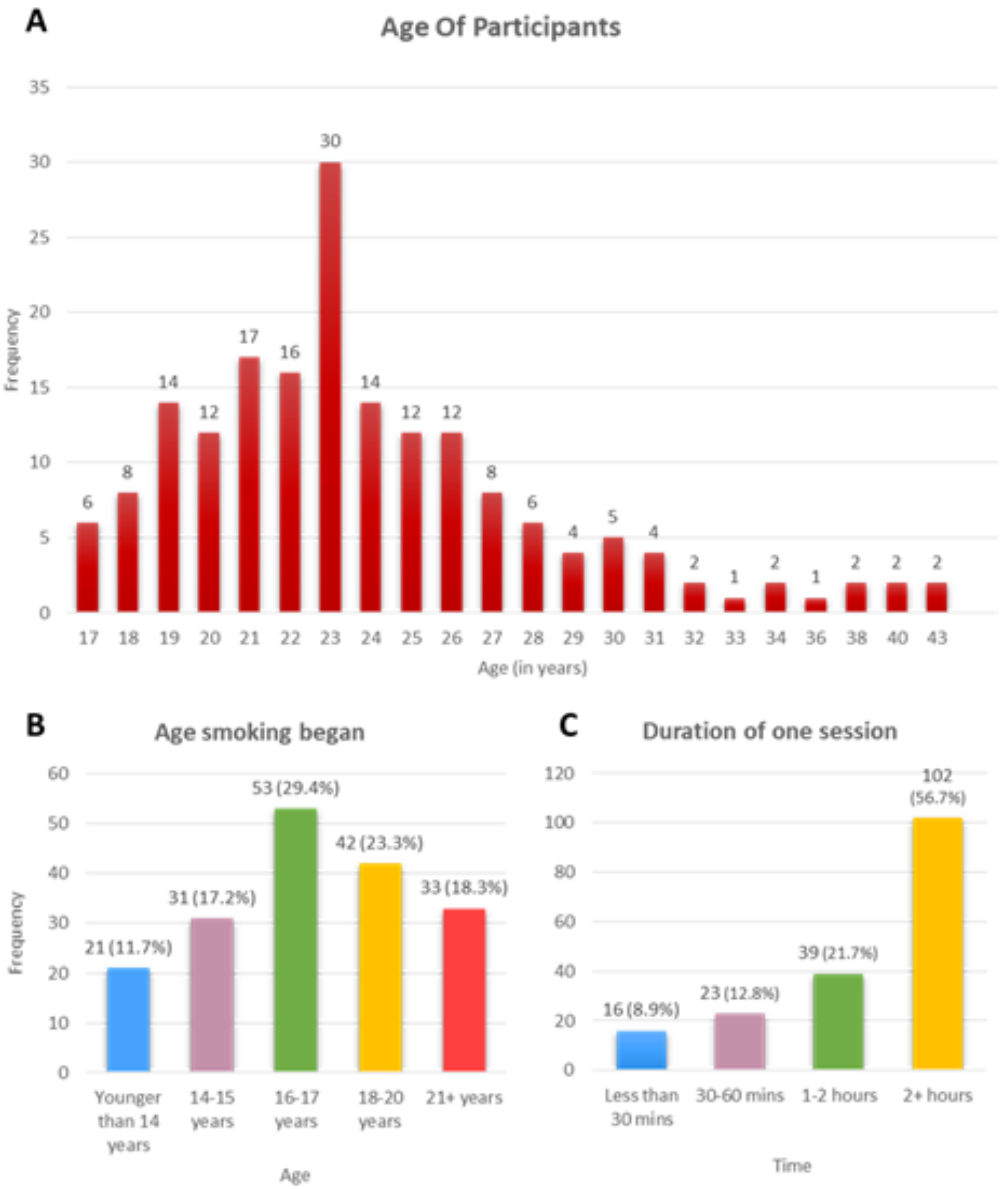


**Figure 1.** Time Characteristics. (A) Age of participants during time of interview. (B) Age of participant when they first smoked shisha. (C) Average time spent smoking shisha in one session

Fifteen percent of the smokers believed it was a harmless habit and the majority (85%) were aware of the presence of tobacco in the smoke. More than half (58.3%) believed that this tobacco was being filtered as it bubbled through the water and 15% were unaware of its presence in the Hookah smoke (Figure 2A). Sixty percent (60%) knew it was a harmful habit and 49.4% were aware of itsnegative effects as secondary smoke (Figure 2B).

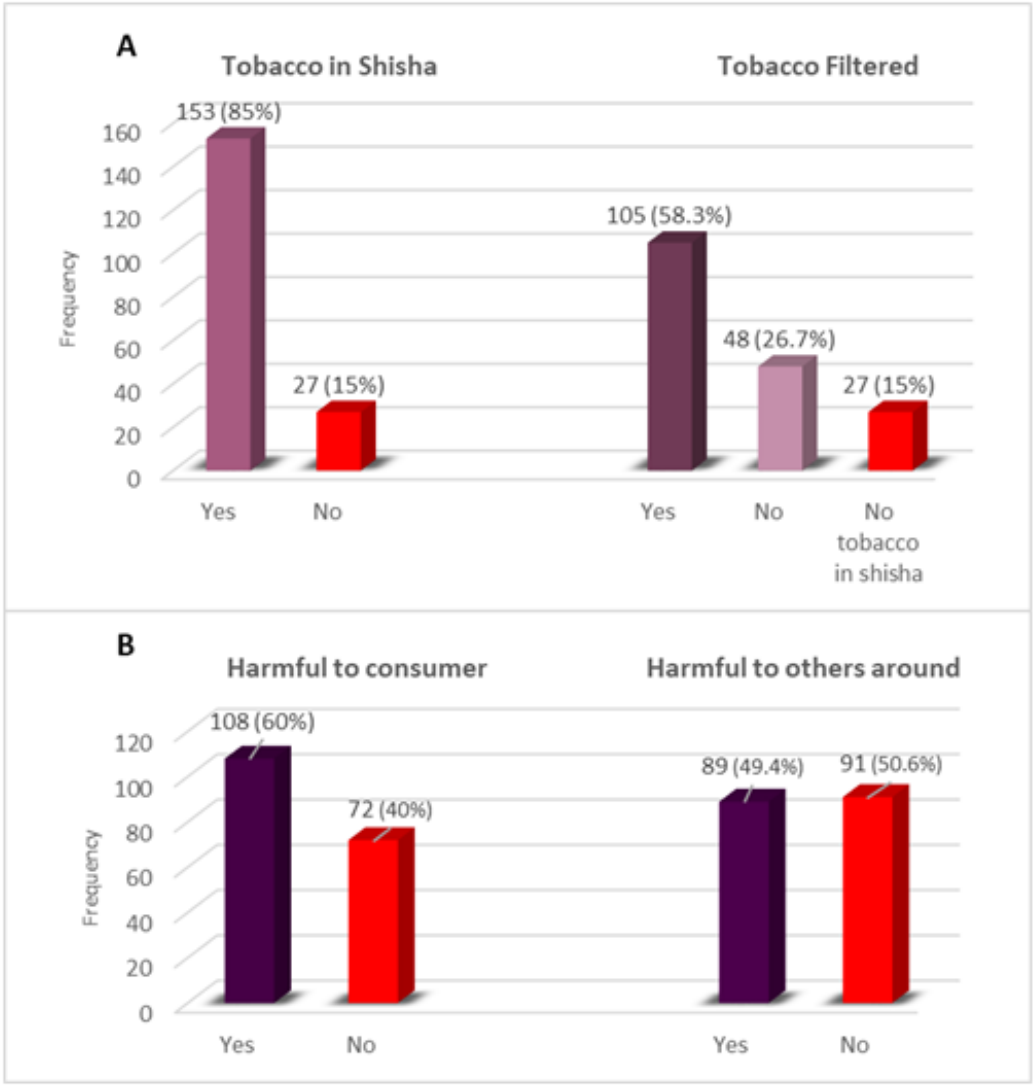


**Figure 2.** Main reasons participants smoke hookah

With regards to its carcinogenic effects 82.4% acknowledged that hookah smoking caused either mouth, esophageal or lung cancer. When compared to cigarette smoking, 72.2% believed hookahwas safer option. There were 44.4% who were aware of it harmful effects but,continued for purposes of socializing and to pass time and 23.1% claimed addiction. The majority 70%(126) of the participants did not intent to quit this habit and the remaining 30%, were planning to give up within a year due to the carcinogenic effects.

| CHARACTERISTICS | N | % |
|---|---|---|
| Gender | | |
| Male | 102 | 57.0 |
| Female | 78 | 43.0 |
| Ethnicity | | |
| Black | 69 | 38.3 |
| Caucasian | 80 | 44.4 |
| White | 31 | 18.2 |
| Days smoked in past one month | | |
| 1-2 days | 44 | 24.4 |
| 3-5 days | 33 | 18.3 |
| 6-10 days | 32 | 17.8 |
| 11-15 days | 23 | 12.8 |
| 16-20 days | 8 | 5.0 |
| 21+ days | 38 | 21.7 |
| Location smoked | | |
| Shisha Venue | 157 | 87.0 |
| Home | 23 | 13.0 |
| Replace shisha pot? | | |

| | | |
|---|---|---|
| Yes | 157 | 87.0 |
| No | 23 | 13.0 |

**Table 1.** Descriptive characteristics of the sample

| CHARACTERISTICS | N | % |
|---|---|---|
| Perceived effects from smoking hookah | | |
| Cancer | 89 | 82.4 |
| Respiratory and/or Cardiac effects | 54 | 50.0 |
| Headaches/Migraines | 28 | 25.9 |
| Others* | 46 | 42.6 |
| Reason for still smoking | | |
| Pass time/ Social reasons | 48 | 44.4 |
| For Fun | 36 | 33.3 |
| Addicted | 25 | 23.1 |
| Stress relief | 24 | 22.2 |
| Comparison to Cigarette | | |
| Safer than cigarettes | 130 | 72.2 |
| More dangerous than cigarettes | 3 | 1.7 |
| No difference | 47 | 26.1 |
| Smoke cigarettes as well? | | |
| Yes | 44 | 24.0 |
| No | 136 | 76.0 |
| Started cigarette smoking when? | | |
| Before hookah | 15 | 34.0 |
| After hookah | 29 | 66.0 |

**Table 2.** Characteristics based on belief of harmfulness of hookah smoking

## IV. Discussion

Although most studies on Hookah smoking have been done among students either in High school or Universities with a few from Hookah bars,there still appears to be a pattern among the users with regard to age, gender and perception of its effect towards health. The majority (70.5%) of Hookah smokers were between 19 - 26 years($\bar{x}$ = 24) in this population which is similar to data from the USA, Malaysia, Syria, Pakistan (Brockman et al. 2012; Al-Naggar et al. 2012; Rehman et al. 2012). More worrying has been the growing trend of users among school-aged children. Some 21.6% of children from Iran, 12.5% of children from Canada, 59.8% of children from Lebanon, and 20% of children from Malaysia, all aged between 13 and 17 years, have reported ever smoking a waterpipe(Aslam et al. 2014). In Saudi Arabia and Egypt the age at which Hookah smoking was started was almost a decade younger (Taha et al. 2010; Gadalla et al. 2003). In this study, the average age of first trying shisha smoking was 16 years (with 11.7% first trying it before they turned 14 years) similar to a survey in the United States with many confessing that they had tried it before the age of 10 years (Rice et al. 2003). A much higher Middle Eastern ethnic group and less white predominance was reported both in United States and UK, similarly our population had more Caucasians and blacks and the whites were a minority (Aljarrah et al. 2009; Jackson et al. 2008).There was gender equality among our population similar to a studies in United States(Aljarrah et al. 2009;,Brockman et al. 2012; Sutfin et al. 2011).It was more common in males as documented in India,Pakistan, Egypt, Saudi Arabia and Syria with only one study from Jordan reportingtwice as many females among university students(Bali et al. 2015; Jawaid et al. 2008; Jaffri et al. 2012; Gadalla et al. 2003; Amin et al. 2010; Maziak et al. 2004; Dar-Odeh et al. 2010).

A typical single session of hookah smoking has been reported to last for 20 to 80 minutes, during which the smoker takes 50 – 200 puffs which range from about 0.15 to 1 lite so much more smoke is inhaled during one session as a cigarette smoker would inhale an equivalent of consuming 100 or more cigarettes (WHO 2005). The smoking per session was longer (96minutes) amongst our participants than the reported standard time hence, increasing the risks associated with tobacco exposure (WHO 2005; Shihadeh et al. 2004).Most participants ≃50% smoked for between 15 and >21days while, 33% smoked for < 5days, this is less than that reported in a study done in California, United States where 70.8% of the population reported smoking every week and 25.3% daily which probably depends on the consumers addiction to tobacco or social habits.The most common location (87%) for smoking shisha was a Hookah bar probably due to ease of access of the dispensing device, availability of various flavors and for socializing. This is probable due to the anti-cigarette smoking campaigns, which has led to the exponential growth of Hookah bars worldwide (Salvi 2016).

The main reason(67.8%) for smoking shisha was to pass time similar to many studies done in the USA, UK, Saudi Arabia, Syria and India(Who 2005; Cobb et al. 2010; Jackson and Aveyard 2008; Taha et al. 2010; Maziak et al. 2008; Rami et al. 2015).There were some who did for relaxation after a tiring day or for its taste and some for euphoria as already reported (Chaouachi 2009; Aslam et al. 2014; Maziak et al. 2008).Eight five (85%) were aware of the presence of tobacco in shisha and yet continued the habit.The fallacy that Hookah smoking is a less hazard than cigarettes has furthered propelled its use (Aslam et al. 214; Salvi 2016). So it was

not surprising that 58 % believed in the misconception that tobaccosmoke was safe as it was filtered out by the water as reported by manystudies done in USA, UK, Saudi Arabia, Pakistan and India (Cobb et al. 2010; Jackson and Aveyard 2008; Taha et al 2010; Maziak et al. 2004; Jawaid et al. 2008; Rami et al 2015).Unfortunately, most consumers do not know that the carcinogens present in the smoke are polyaromatic hydrocarbons which are water insoluble and cannot be removed even if passed through it (Rubin 2001). Inspite of being aware of theknown associated risks of Hookah smoking like cancer, respiratory and migraine headaches the tendency to continue was probably due to addiction or ignorance.In general our population was more educated with regards to risk of Hookah usein contrast to those who believed it was safe (Aljarrah et al. 2009; Cobb et al. 2010; Ward et al. 2006; Jackson and Aveyard 2008).As compared to cigarette smoking, the belief that hookah was less harmful was quite common(72%) as widely reported (American Lung association;Maziak et al,). In addition to higher nicotine, carbonmonoxide levels, Shisha smoke has higher levels of heavy metals, four to five membered ring polyaromatic hydrocarbons, benz(o)pyrenewhich are a health hazard (Primack et al. 2016;Shihadeh and Saleh 2005; Monzer et al. 2008; Sutfin et al. 2011).

## V. Conclusion

Although there has been a ban on Hookah smoking since 2017 in Kenya, this study was done to compare and contrast the attitudes with other populations globally. At the time this study was done it was alarming to see Hookah smoking was a popular practice among young adults. In addition it was surprising that although,there was awarenessof its health risk, there was still a persistence to continue smoking. It is important to note many countries (Tanzania, Rwanda, Pakistan, Thailand, India (Punjab State) and Ghana)have dedicated themselves to dealing with this new Tobacco epidemic, by placing a complete ban on the consumption of shisha and sale of its products.

## Acknowledgements

This study used data collected from various locations around the city; the authors would like to acknowledge each of these anonymous locations. The authors received no financial support and declare no potential conflicts of interest with respect to the authorship and/or publication of this article.

## References

[1]. Aljarrah, K, Ababneh ZQ, Al-Delaimy WK. 2009. Perceptions of hookah smoking harmfulness: Predictors and characteristics among current hookah users. Tobacco Induced Diseases. 5(1):16.
[2]. Al-Naggar RA, Bobryshev YV. 2012. Shisha smoking and associated factors among medical students in Malaysia. Asian Pacific Journal of Cancer Prevention. 13(11):5627–5632.
[3]. Amin TT, Amr MAM, Zaza BO, Suleman W. 2010. Harm perception, attitudes and predictors of waterpipe (shisha) smoking among secondary school adolescents in Al-Hassa, Saudi Arabia. Asian Pacific Journal of Cancer Prevention. 11(2):293–301.
[4]. Aslam H, Saleem S, German S, Qureshi W. Harmful effects of shisha. 2014. Literature review. International Archives of Medicine. 7(1):16.
[5]. Bali E, Chinmaya BR, Chand S, Tandon S, Prasad S, Sahu D, Handa S. 2015. An emerging trend: Hookah smoking among youth smokers in Gurgaon, Haryana. Journal of Indian Association of Public Health Dentistry. 13:244-249
[6]. Brockman LN, Pumper MA, Christakis DA, Moreno MA. 2012. Hookah's new popularity among US college students: a pilot study of the characteristics of hookah smokers and their Facebook displays. BMJ Open, 2(6).
[7]. Chaouachi K. 2009. Hookah epidemic. British Dental Journal. 207 (5)
[8]. Chattopadhyay A. 2000. Emperor Akbar as a healer and his eminent physicians. Bull Indian Inst Hist Med Hyderabad. 30:151–157 [PubMed: 12577995].
[9]. Cobb C, Ward KD, Maziak W, Shihadeh AL, Eissenberg T. 2010. Waterpipe tobacco smoking: An emerging health crisis in the United States. American Journal of Health Behavior. 34(3):275-285.
[10]. Dar-Odeh NS, Bakri FG, Al-Omiri MK, Al-Mashni HM, Eimar HA, Khraisat AS, Abu-Hammad SM, DudeenA, Nur Abdallah M, Alkilani SMZ. 2010. Research narghile (water pipe) smoking among university students in Jordan:prevalence, pattern and beliefs. Harm Reduction Journal. 7(10).
[11]. El-Hakim IE, Uthman MAE. 1999. Squamous cell carcinoma and keratoacanthoma of the lower lip associated with "Goza" and "Shisha" smoking. International Journal of Dermatology. 38(2):108–110.
[12]. Gadalla S, Aboul-Fotouh A, El-Setouhy M, Mikhail N, Abdel-Aziz F, Mohamed MK, Kamal AA, Israel E. 2003. Prevalence of smoking among rural secondary school students in Qualyobia governorate. Journal of the Egyptian Society of Parasitology. 33(3 Supplement):1031–1050.
[13]. Jackson D, Aveyard P. 2008. Waterpipe smoking in students: Prevalence, risk factors, symptoms of addiction, and smoke intake. Evidence from one British university. BMC Public Health. 8(1).
[14]. Jaffri SB, Yousuf A, Qidwai W. 2012. Water pipe smoking amongst the University and College Students of Karachi, Pakistan. Pakistan Journal of Chest Medicine. 18(2):13–19.
[15]. Jawaid A, Zafar A, Rehman T, Nazir M, Ghafoor Z, Afzal O, Khan J. 2008. Knowledge, attitudes and practice of university students regarding waterpipe smoking in Pakistan. International Journal of Tuberculosis and Lung Disease. 12(9):1077–1084
[16]. Marshall L, Schooley M, Ryan H, Cox P, Easton A, Healton C, Jackson K, Davis KC, Homsi G; Centers for disease control and prevention. 2006 Youth tobacco surveillance – United States 2001-2002. (3);1- 56.
[17]. Maziak W, Eissenberg T, Ward KD. 2005. Patterns of waterpipe use and dependence: implications forintervention development. Pharmacology Biochemistry and Behavior. 80:173–179. PubMed: 15652393].
[18]. Maziak W, Rastam S, Ibrahim I, Ward K, Eissenberg T. 2010. Waterpipe-associated particulate matter emissions. Nicotine & Tobacco Research. 10(3):519–523.

[19]. Maziak W, Ward KD, Soweid RA, Eissenberg T. 2004. Tobacco smoking using a waterpipe: a reemergingstrain in a global epidemic. Tobacco Control.13:327–333. [PubMed: 15564614]
[20]. Monzer B, Sepetdjian E, Saliba N, Shihadeh A. 2008. Charcoal emissions as a source of CO and carcinogenic PAH in mainstream narghile waterpipe smoke. Food and Chemical Toxicology. 46:2991–2995.
[21]. Primack BA, Carroll MV, Weiss PM, Shihadeh AL, Shensa A, Farley ST, Fine MJ, Eissenberg T, NayakS. 2016. Systematic review and meta-analysis of inhaled toxicants from waterpipe and cigarette smoking. Public Health Reports .131:76–85.
[22]. Rami K, Bhikhu J. Makvana, Thakor NC. 2015. Knowledge, attitude and practices of hookah smoking among medical students in Gujarat, India: a cross sectional study. International Journal of Advanced Medicine. 2(4):397-400.
[23]. Rehman S, Sadiq MA, Parekh MA, Zubairi AB, Frossard PM, Khan JA. 2012. Cross-sectional study identifying forms of tobacco used by Shisha smokers in Pakistan. Journal of the Pakistan Medical Association. 62(2):192-195.
[24]. Rice VH, Templin T, Kulwicki A. 2003. Arab-American adolescent tobacco use: four pilot studies. Preventive Medicine. 37:492–498. [PubMed: 14572433]
[25]. Rubin H. 2001. Synergistic mechanisms in carcinogenesis by polycyclic aromatic hydrocarbons and by tobacco smoke: a bio-historical perspective with updates. 22:1903–1930.
[26]. Sajid K, Chaouachi K, Mahmood R. 2008. Hookah smoking and cancer: Carcinoembryonic antigen (CEA) levels in exclusive/ever hookah smokers. Harm Reduction Journal. 5(1):19.
[27]. Salvi S. 2016. The perils of waterpipe or hookah smoking: Time for action. American Journal of Respiratory and Critical Care Medicine. 194 (5):532-534.
[28]. Shihadeh A, Azar S, Antonios C, Haddad A. 2004. Towards a topographical model of narghile waterpipecafe smoking: a pilot study in a high socioeconomic status neighborhood of Beirut, Lebanon. Pharmacology Biochemistry Behavior. 79(1):75–82. [PubMed: 15388286]
[29]. Shihadeh A, Saleh R. 2005. Polycyclic aromatic hydrocarbons, carbonmonoxide, "tar", and nicotine in the mainstream smoke aerosol of the narghile water pipe. Food and Chemical Toxicology. 43:655–661.
[30]. Shihadeh A. 2003. Investigation of mainstream smoke aerosol of the arghile water pipe. Food and Chemical Toxicology. 41(1):143–152.
[31]. Sutfin EL, McCoy TP, Reboussin BA, Wagoner KG, Spangler J, Wolfson M. 2011. Prevalence and correlates of waterpipe tobacco smoking by college students in North Carolina. Drug and Alcohol Dependence. 115(1–2):131–136.
[32]. Taha AZ, Sabra AA, Al-Mustafa ZZ, Al-Awami HR, Al-Khalaf MA, Al-Momen MM. 2010.Water pipe (shisha) smoking among male students of medical colleges in the eastern region of Saudi Arabia. Annals of Saudi Medicine. 30(3):222–226.
[33]. Ward KD, Vander WMW, Relyea G, DeBon M, Klesges RC. 2006. Waterpipe smoking among American military recruits. Preventive Medicine. 43(2):92–97.
[34]. World Health Organisation. 2005. Advisory note. Waterpipe tobacco smoking: health effects, research needs and recommended actions by regulators. WHO TobReg and Tobacco Free Initiative. Prepared by Thomas Eissenberg, Alan Shihadeh, and WasimMaziak. Geneva: WHO; 2005. Available from: http:// www.who.int/tobacco/global_interaction/tobreg/en/ [cited 18 December 2010]