



ORIGINAL ARTICLE

Effect of Hubble-Bubble Smoking on Oral Health

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ABSTRACT

This particular study was done to assess the effects of hubble-bubble smoking on the oral health. In this comparative analytical study, 87 dental patients were selected and were divided into 3 groups of smokers. Bleeding on brushing, halitosis, gingivitis, pockets and gingival recession were determined for each participant. Also the oral hygiene aids that were used by the smokers were recorded. Generated data was processed for statistical analysis. The overall oral findings indicated that gingivitis, bleeding on probing and halitosis was not as prevalent as compared to gingival recession and pockets. The results of this study also indicated that more women were found to be smoking hookah as compared to men. The result of this study identifies a negative impact of smoking hookah on the periodontal health and provides further evidence that this is an avoidable risk for periodontal disease.

Keywords: Hookah, Cigarette, Smoking, Periodontitis, Tobacco, Gingival Recession, Pockets, Bleeding, Halitosis

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INTRODUCTION

One of the significant risk factors in the development of periodontal disease and its progression is known to be tobacco smoking. However it's also one of the factors that can be easily prevented. Tobacco smoking not only includes cigarette smoking but smokeless tobacco, cigar and pipe (hookah) smoking which are known to carry the same risks as smoking cigarettes. Smoking can have many different health effects including, vascular abnormalities such as stenosis, lung cancer, heart attacks, strokes, impotence, and low birth weight of infants.

In addition it can also have oral health effects, such as persistent bad breath, discolored teeth (sticky tar deposits that leave black staining on the teeth), an increase in calculus build-up, periodontal disease, oral cancers, sinusitis, black hairy tongue, smoker's lip, altered sense of taste and smell, smoker's palate—red inflammation on the roof of the mouth.

Bone loss and recession has been sometimes seen to occur in smokers even in the absence of periodontal disease. Other contributing factors such as increase in the amount of calculus and periodontal pocket formation increase the risk for periodontal disease. The duration of smoking, the number of cigarettes smoked per day, the age, the gender and any associated systemic disease (controversial) are other significant determinants considered to contribute to the progression of periodontal disease in individuals.

The purpose of this study is to find the overall oral health effects of hookah smoking, with chiefly concentrating on the periodontal effects.



Figure 1. A 3-hose hookah

INTRODUCTION TO HUBBLE-BUBBLE

A hookah is also known as a water pipe, shisha, nargile, argile or goza. "Hubble-bubble" or "hubbly-bubbly" is the more informal term used by some. The term "shisha" is used for water pipes chiefly in Egypt and the Persian Gulf countries such as Bahrain, UAE, and Saudi Arabia. It is referred to as Argile in Arab Mediterranean countries. The practice of adding strong flavors (e.g., apple, mint, cherry, chocolate, coconut, licorice, cappuccino, and watermelon) is a relatively recent one but has grown in popularity in the past 20 years [19]. A hookah is usually described as a single or multi-stemmed (often glass-based) instrument used for smoking, and the smoke is known to be cooled and filtered by passing through water [13]. Waterpipes had originally been created especially to smoke tobacco by the native people of Africa and Asia [4]. It has gained enormous popularity, especially in the Middle East and is currently gaining popularity in the USA, UK, and elsewhere [13]. In a note published by the WHO group in 2007, the unsupported belief that hookah is

relatively safer than cigarette smoking, has been widely advertised by the media. For example, one label of a popular waterpipe tobacco brand being sold in South-West Asia and North America claimed that hookah consisted of only "0.5% nicotine and 0% tar" [4]. It is largely overlooked by mass media as a folkloric and inert object. However it is unquestionable that this tool is being used daily for hours on end, by over hundred million men and

women in the world at local coffee shops and also at homes [13]. Hookah smoking has now become a global tobacco epidemic as seen by many public health officials [17].

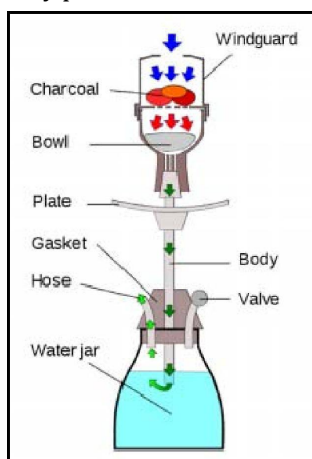


Figure 4. Parts of Hookah (based on this PNG by smackware, SVG version by user: Surachit, 2007)[13]

STRUCTURE OF A HUBBLE-BUBBLE

COMPONENTS INCLUDE

Simarpreet V Sandhu (2010) suggested that a hookah consisted of many parts including a bowl, hose, body, valve, water jar, etc.

The **bowl** also known as the head of the hookah is known to hold the tobacco and charcoal. The tobacco is covered by an aluminum foil over which the lit charcoal is placed.

The smoke is drawn through a tube which is known as a **hose**, the end of which is fitted with a mouthpiece.

The **body** of the hookah is a hollow tube with a gasket at the bottom which seals the connection of the body of the hookah with the water jar.

A **valve** is connected to the airspace in the water jar to wash out any stale smoke.

A **water jar** below the body of the hookah over which the smoke passes before it reaches the hose. Other forms of liquid such as alcohol, spirit and/or fruit juice can be used.

A **plate** (or an ash tray) which contains "dead" coals from previous smoking sessions.

Different types of tobacco forms are used in hookahs; e.g. Maasel- which consists of tobacco and honey, Tumbak/Ajami- pure tobacco paste or Jurak- consisting of fruits and oils [13].

DESCRIPTION OF HUBBLE-BUBBLE SMOKING [OPERATION]

According to the WHO [4] in the bottom of the head of the hookah there are small holes through which smoke passes into the body's central gasket. The smoke that is puffed by the smoker is passed down from the tube and then through a jar of water before it is inhaled by the smoker. The tobacco placed into the head is very moist (and often sweetened and flavored) and charcoal is placed on top of the tobacco-filled

head (often separated by perforated aluminum foil) to light the tobacco. As the smoke is inhaled by the smoker through the hose a vacuum is created above the water and air is drawn through the body and over the tobacco and charcoal. The heated air that passes over the charcoal is also known to contain combustion products. As a result, mainstream aerosol is produced after the air passes over the tobacco.

This smoke is known to pass through the body after bubbling through the water in the bowl and is carried through the hose to the smoker. The decreased irritation and temperature of the hookah smoke caused by the presence of water moisture as compared to cigarette or cigar smoke has led to a false sense of security that it may be safer. It has also decreased health concerns of many people who think that less irritation means less harm.

Portable waterpipes along with accessories such as carrying cases with shoulder straps are extensively marketed around the world. Some accessories also claim to reduce the health effects of smoke, such as mouthpieces containing activated charcoal or cotton, chemical additives for the water bowl, and plastic mesh fittings to create smaller bubbles. However, none of these accessories have been proven to reduce smoker's exposure to toxins or the risk of tobacco-caused disease and death [4, 13].

CONSTITUENTS OF TOBACCO SMOKE

Dr. R. Hashim *et al* [1] suggested that around 4800 different chemical constituents are known to be identified in tobacco smoke. 69 of which are carcinogens (chemicals known to cause cancer), and several others are tumor promoters or co-carcinogens. These can be broadly divided into two main constituent groups, namely gaseous and particulate material. A typical cigarette "puff" contains 50mg of material, of which 18mg is solid particulate matter. The remainder consists of the gases. Combustion chemistries that are involved in the production of mainstream cigarette and hookah smoke differ due to widely different combustion temperatures and the dry or humid characteristics of tobacco. In both these cases, the plant-derived organic matter undergoes pyrolysis or volatilization, as well as distillation, as emphasized by Baker *et al*. [22] producing addictive nicotine as well as a number of the same toxicants from combustion. These include carbon monoxide (CO), tar, and innumerable carcinogenic polycyclic aromatic hydrocarbons (PAH). Also, hookah smoke contains significantly higher quantities of toxic heavy metals like arsenic, nickel, cobalt, chromium, lead and cadmium, as compared with cigarette smoke. These facts about hookah smoke are a "screaming warning" that hookah smoking is harmful.

The particulate phase of the cigarette smoke contains the most amounts of mutagenic and carcinogenic agents of tobacco. Tar is not a separate agent but a complex mixture of hundreds (or thousands) of compounds. It is defined as "that portion of cigarette smoke retained on a special filter, minus the water and nicotine [1, 19].

Some carcinogens identified in tobacco smoke:

- 1) Polynuclear aromatic hydrocarbons,
- 2) N-heterocyclic hydrocarbons
- 3) N-nitrosamines
- 4) Aromatic amines
- 5) Aldehydes
- 6) Organic and inorganic compounds (including arsenic, benzene, cadmium, chromium and vinyl chloride) and the radioactive element polonium.

MATERIALS AND METHODS

In this comparative analytical study, a total sample of 87 smokers, 68 males and 19 females with a mean age of 27 years were questioned and their oral health examined. The study group consisted of men and women who had a minimum 1-year long recent history of smoking cigarettes or hookah or both. The other conditions included were that they had no medical problems and were taking no medications that could have an effect on the oral findings.

The sample was divided into 3 groups to be compared. The first group consisted of cigarettes smokers only. The second group consisted of hookah smokers and the third group consisted of both cigarette and hookah smokers. The patients were examined by means of a clinical assessment and a chart was filled accordingly.

The oral findings that were investigated were bleeding on brushing, halitosis, gingivitis, pockets and recession. Also the oral hygiene aids that were used by smokers were recorded.

Data were fed into a computer for analysis by SPSS statistical package.

RESULTS

The statistical analysis showed that 28 of the participants smoked only cigarettes with a mean of 17

cigarettes per day for 10 years, 35% of the participants were male and 21% were female from group I (Table 1 and 3).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	68	78.2	78.2	78.2
	Female	19	21.8	21.8	100.0
	Total	87	100.0	100.0	

Table 1. Genders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cigarettes	28	32.2	32.2	32.2
	Shisha	27	31.0	31.0	63.2
	Both	32	36.8	36.8	100.0
	Total	87	100.0	100.0	

Table 3. Cigarettes

27 of the participants smoked shisha with a mean of 2 sessions per week for 4 years. 19 % were male and 73% were female from group II (Table 4), while the other 32 participants smoked both cigarettes and shisha. 45% were male and only 5% were female from group III (Table 5). Only 3 participants were found chewing tobacco.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	60	69.0	69.0	69.0
	Yes	27	31.0	31.0	100
	Total	87	100.0	100.0	

Table 4. Shisha

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	55	63.2	63.2	63.2
	Yes	32	36.8	36.8	100.0
	Total	87	100.0	100.0	

Table 5. Both cigarettes and shisha

Out of the participants with systemic conditions only 3 participants were found to be diabetic, 1 was hypertensive and 4 were asthmatic (Table 2).

	Disease	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No disease	75	86.2	86.2	86.2
	Diabetes	3	3.4	3.4	89.7
	Diabetes and hypertension	1	1.1	1.1	90.8
	Hypertension	4	4.6	4.6	95.4
	Asthma	4	4.6	4.6	100.0
	Total	87	100.0	100.0	

Table 2. Diseases

The completed questionnaire showed that 10 of the participants were not using any oral hygiene aid, 3 were males who belonged to the first group, 2 were males belonging to the second group and the other 5 male participants were from group III (Table 6). Among the participants using oral hygienic aid only 9 of the participants were using dental floss, 3 of them were female from group I, 1 female and 2 males from group II and 1 female from group III used dental floss (Table 7).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	10	11.5	11.5	11.5
	Yes	77	88.5	88.5	100.0
	Total	87	100.0	100.0	

Table 6. Brushing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	78	89.7	89.7	89.7
	Yes	9	10.3	10.3	100.0
	Total	87	100.0	100.0	

Table 7. Flossing

The other oral hygienic aid recorded was mouth wash which was used by 2 male participants who smoked both shisha and cigarette (Table 8). Oral findings showed 9 participants to have halitosis, 2 females from group I, 1 male and 2 female participants from group II and 3 males and 1 female participant from group III (Table 9).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	85	97.7	97.7	97.7
	Yes	2	2.3	2.3	100.0
	Total	87	100.0	100.0	

Table 8. Oral Hygiene Aids

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	10.3	10.3	10.3
	Yes	78	89.7	89.7	100.0
	Total	87	100.0	100.0	

Table 9. Halitosis

For the bleeding gum and the signs of gingivitis assessment, 15 participants showed healthy gums, 2 females and 2 males from the first group, 1 male and 1 female from second group and 7 male and 1 female from the third group(Table 10,11).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	17.2	17.2	17.2
	Yes	72	82.8	82.8	100.0
	Total	87	100.0	100.0	

Table 10. Bleeding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	17.2	17.2	17.2
	Yes	72	82.8	82.8	100.0
	Total	87	100.0	100.0	

Table 11. Gingivitis

11 of the participant showed only pockets 4 males from group I, 1 female and 1 male from group II and 5 males from group III (Table 12).

		Frequency	Percent	Valid Percent	Cumulative Percent
valid	No	76	87.4	87.4	87.4
	Yes	11	12.6	12.6	100.0
	Total	87	100.0	100.0	

Table 12. Pockets

3 participants showed only recession, 2 males from group I and 1 female from group II (Table 13), while 19 participants showed recession and pockets, 13 males from group I, 2 females and 2 males from group II and 2 males from group III (Table 14).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	84	96.6	96.6	96.6
	Yes	3	3.4	3.4	100.0
	Total	87	100.0	100.0	

Table 13. Recession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	68	78.2	78.2	78.2
	Yes	19	21.8	21.8	
	Total	87	100.0	100.0	100.0

Table 14. Pockets and Recession

DISCUSSION AND CONCLUSION

As the result of the collected sample showed a big difference between number of female and male participants included in the study, it's not possible to compare the results considering the gender criteria but it was remarkable to find more women smoking hookah than men. The reason for this could possibly be due to the extensive social acceptance of hookah and its idea of being relatively safer than cigarette smoking. [13,2]

While comparing the use of more than one oral hygiene aid, the result demonstrated that participants smoking both hookah and cigarettes were mostly not concerned about having a good oral hygiene and showed signs of periodontal disease when compared to other groups. The reason behind this is however unclear. This could possibly just be personal preference or lack of oral hygiene education.

Halitosis was found to be more prominent in participants who smoked only cigarettes. Even though some studies have shown that hookah (pipe) and cigar smokers have more evident halitosis than cigarette smokers because of the increased amounts of sulfur in it.

When comparing the 3 groups of participants not much significant difference was observed concerning the relation between their smoking behavior and their oral health. This was due to the fact that most of the participants belonged to a young age group and the duration of smoking was kept to a minimum of 1 year, which could be a reason for the absence of advanced periodontal disease.

It has been established that nicotine covers the very first signs of gingival inflammation, which is bleeding gingival. Hence, it was understandable that the participants of the 3 groups showed no significant difference in the gingival health when maintaining good oral hygiene.

This can prevent such effects of smoking and therefore also prove that nicotine acts as a vasoconstrictor, which tends to cover the signs of inflammation. These effects are usually limited even with an increased dose or duration of smoking. The vasoconstrictive effect of nicotine results in reduced blood flow to the skin, tissue ischemia, and hypoxia thus resulting in less distinct signs and symptoms of periodontal disease. This therefore, may lead to a misconception of a healthy oral status [1, 6, 26].

LIMITATIONS

Some of the limitations of this study include:

- 1) A small sample of participants.
- 2) An uneven number of male and female participants, which prevented us from studying and differentiating the effects of hookah smoking at a gender perspective.
- 3) The duration of smoking. A minimum duration of 1 year of smoking was considered which can influence the outcome of the oral findings as compared to a duration of 5 years or more.
- 4) An equal number of participants in each group i.e. those smoking only hookah, only cigarette and those smoking both.

FUTURE RESEARCH

For future research, it would be recommended to address these limitations. For example, by getting a larger sample of participants, by keeping the criteria for duration of smoking to be at least more than 1 year in order to get a definite result and by studying an even amount of males and females smoking hookah. In addition, other oral findings can be studied, for instance any associated oral lesions specific in smokers.

CONCLUSION

On the basis of these observations it can be concluded that, hookah smoking is not any less unsafe on the overall oral health when compared to cigarette smoking. Hookah smoking carries significant oral health risks especially on the periodontium. However, more awareness should be spread among populations especially among the youth to lower or prevent such risks in the future. Also, there is a need for more oral health care education in the society for prevention and better health measures.

This area would however need further investigation and study to compare the severity of the gingival and periodontal disease in the participants who smoke only hookah, only cigarettes or a combination of both.

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