Early Respiratory Symptoms of Water-Pipe (Shisha) Smoking in Medical Students of Karachi

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Abstract

Objective: The aim of this study was to assess the frequency of early respiratory symptoms in relation to the severity and duration of water-pipe smoking in the medical students of Karachi.

Methods: This cross-sectional study was conducted in medical colleges of Karachi. A self-administered questionnaire collected information about smoking habits and respiratory symptoms from students. A sample size of 296 was calculated. Purposive judgmental sampling technique was used to collect the data. Those who smoked shisha, either once or in continuum were included in the study, irrespective of the gender. All non-medical and diagnosed-asthmatic students were excluded from the study. The questionnaire was designed to be precise inclusive of close ended questions. Participants were asked to fill the questionnaire.

Results: Out of 250 participants, 68.8 % (n=172) were short term smokers. 31.6% (n=79) reported to have smoked shisha monthly. The main reason of smoking shisha for 26% (n=65) was just to fill in the free time with friends. 39.4% (n=88) intend to quit shisha smoking in future. 32.4% (n=81) of the students experienced shortness of breath, 30.4% (n=76) Dry cough, 30.4% (n=76) Scratchy sensation in the throat, 23.6% (n=59) rapid breathing, 20% (n=50) chest tightness and 13.6% (n=34) hoarse voice after shisha consumption. The association of these symptoms with duration and severity of shisha exposure remained insignificant.

Conclusion: The results of this study show that smoking shisha can bring about the early respiratory symptoms. Education is important in creating awareness about water-pipe smoking hazards.

Keywords: Water-pipe; Shisha; Smoking; Medical students; Respiratory symptoms

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Introduction

Tobacco inhalation is a known health hazard. It is involved in systemic diseases and predisposes organs to develop cancer[1]. It is estimated that death rate due to smoking will reach 8.3 million per year by the year 2030, where 70% of these deaths will occur in developing countries[2].

Cigarette smoking is the usual form of tobacco inhalation. The risks posed by other tobacco containing products have not received much attention. One such form which has gain popularity is the water pipe or shisha. The suggested origins of Water pipe smoking (also known as Hookah) date back as far as 1500 A.C. E., when Dr Hakim Abul Fath, during the reign of Emperor Akbar, invented the apparatus in the attempt to create a harmless smoking alternative[3]. The ancient belief of tobacco smoke rendered harmless when passed through the heated water of the apparatus has stood through the times and stemmed the common belief amongst water pipe smokers that it does not affect health[4]. This habit, which was traditionally confined to older men in the Indian sub-continent and Arab countries, is

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now spreading around the globe, due to rapid opening of shisha bars commonly around residential, commercial and educational communities. Studies had reported that the shisha smoker's prevalence reached up to 27% in school students and 54% in university students of Pakistan[5,6].

Research in the resent past have documented credible evidence that WPS is detrimental to health, with associations to Chronic Obstructive Pulmonary disease, heart disease, hypertension, abortions in women and cancers including lung, esophageal, gastric & bladder[7,4]. Other studies have also connected WPS to otitis media[8], gum disease[9], cancers of the lip and buccal mucosa[10]. Transmission of infections is also seen with the use of shisha include Tuberculosis & Hepatitis C[4]. A strong association was seen in a study, of WPS with Respiratory Symptoms (wheezing, chest tightness, cough) and deranged Pulmonary Function Tests values, which were similar to the effects of deep inspiration cigarette smoking[11].

The World Health Organization has released information documenting WPS as a harmful form of smoking and has even proclaimed it to generate more smoke and carbon monoxide than cigarettes[7]. The nicotine contents of shisha tobacco are 2-4% and carbon monoxide concentrations 0.34 -1.40%[12]. Shisha smokers are exposed to extra smoke over a longer time period, as a shisha smoking session lasts for 25-80 minutes, and shisha smoker takes 45-200 puffs and inhales 0.15-1 liter of smoke in one session of shisha. This is equivalent to smoking about hundred cigarettes[4,13]. This exposure can lead to the development of impaired lung function, increased lung inflammation, syncope, acute CO poisoning as well as COPD in the long run[14].

Although many studies have been conducted before, none has addressed the association of acute respiratory symptoms after shisha smoking sessions. According to Hydari et al. worldwide more than 100 million people are shisha smokers[15] thus this study was planned to observe the early respiratory symptoms caused by WPS and to assess if there was a relation between WPS duration and severity to the early respiratory symptoms. Such research would be of great use to policy makers as a tool for educating the adolescents.

Subjects and Methods

This research was a cross-sectional study and was conducted in the city of Karachi. Out of total 9 private sector colleges in Karachi, 4 were conveniently chosen for the study. The permission from these medical/dental colleges was requested through proper channel. Total number of medical and dental students in above colleges were approximately 2800.

The Ethical Review Board of the Jinnah medical and dental college had given the permission to conduct this study. It was approved by the Community Health Sciences Department of Jinnah Medical & Dental College, Karachi.

A sample size of 296 was calculated for this multi-centric study during March and April 2019, using the following formula:

$$n = \frac{z^2 p(1-p)}{d2}$$

where,

n = sample size

z = statistic for a level of confidence

(z = 1.96 for 95% confidence level)

P = expected prevalance or proportion

(p=0.26, since the expected prevalance was taken as 26% as deduced by pilot study;[16])

d=precision

(d=0.05, sice the precision was taken as 5%)

Purposive judgmental sampling technique was used to collect the data[17]. The investigators approached groups of students at college campuses and inquired if they were willing to participate in the study. Those who smoked shisha, either once or in continuum were included in the study, irrespective

Table 1. Frequency and percentages of different variables

Variable	Frequency	Percentage (n=250)	(%)
Gender	Male	142	56.8
	Female	108	43.2
Stream of education	MBBS	195	78
	BDS	55	22
Socioeconomic status	High	129	51.6
	Middle	121	48.4
Intending to quit shisha smoking	Yes	88	35.2
	No	99	39.6
	Maybe	63	25.2
Reasons for initiating shisha smoking	Free time	65	26
	Cool and trendy	25	10
	Social media popularity	23	9.2
	Family members also smoke	13	5.2
	Aid to quit cigarettes	18	7.2
	Peer pressure	46	18.4
	Stress	32	12.8
	Feeling low	28	11.2

Table 2. Association of Duration of Shisha smoking with the symptoms.

Symptoms	Duration of shisha exposure		Total n = 250 n (%)	P- Value
	Short term (n=172) (68.8%)	Long term (n=78) (31.2%)		
Shortness of breath				
Yes	59	22	81 (32.4)	0.340
No	113	56	169 (67.6)	
Dry Cough				
Yes	58	18	76 (30.4)	0.090
No	114	60	174 (69.6)	
Scratchy sensation in the throat.				
Yes	52	24	76 (30.4)	0.793
No	119	53	173 (69.2)	
Hoarse Voice				
Yes	22	12	34 (13.6)	0.579
No	150	66	216 (86.4)	
Rapid breathing				
Yes	39	20	59 (23.6)	0.609
No	133	58	191 (76.4)	
Chest tightness				
Yes	31	19	50 (20)	0.246
No	141	59	200 (80)	

Table 3: Association of frequency of shisha exposure with the symptoms

Symptoms	Frequency of shisha exposure					P- Value
	Daily (n=13) (5.2%)	Weekly (n=37) (14.8%)	Monthly (n=79) (31.6%)	Yearly (n=70) (28%)	Occasion (n=51) (20.4%)	
Shortness of breath						
Yes (n=81)	5	15	26	20	15	0.731
No (n=169)	8	22	53	50	36	
Dry Cough						
Yes (n=76)	4	13	28	14	17	0.274
No (n=174)	9	24	51	56	34	
Scratchy sensation in the throat						
Yes (n=76)	2	14	26	18	16	0.327
No (n=173)	11	22	53	51	35	
Hoarse Voice						
Yes (n=34)	1	6	14	9	4	0.523
No (n=216)	12	31	65	61	47	
Rapidbreathing						
Yes (n=59)	1	12	21	17	8	0.231
No (n=191)	12	25	58	53	43	
Chest tightness						
Yes (n=50)	2	10	18	11	9	0.613
No (n=200)	11	27	61	59	42	

Table 4. Association of water pipe smoking duration with demographics

Demographic variables		Duration of shisha exposure			P- Value
		Short term (n=172)	Long term (n=78)	Total n=250%	
Gender	Male	85 (59.9%)	57 (40.1%)	142 (56.8)	< 0.001
	Female	87 (80.6%)	21 (19.4%)	108 (43.2)	
Stream of education	MBBS	127 (65.1%)	68 (34.9%)	195 (78)	0.018
	BDS	45 (81.8%)	10 (18.2%)	55 (22)	

of the gender. They were asked to fill the questionnaire. All non-medical and diagnosed-asthmatic students were excluded from the study.

The questionnaire was designed to be precise inclusive of close ended questions. Variables of this study included age, gender, socioeconomic status which was categorized as high, middle and lower depending upon respondents own assessment; duration of smoking shisha categorized as those people who have been smoking for less than a year; those who have been smoking for 1-5 years and lastly those who have been smoking for 5-10 years. Frequency of smoking shisha was assessed by options such as daily, weekly, monthly, yearly and occasionally. Main reason of initiation of shisha, and whether they intend to quit shisha in the future were also included. Respiratory symptoms included shortness of breath, dry cough and scratchy sensation in the throat, hoarse voice, rapid breathing and chest tightness.

A pilot study was done on 25 medical students earlier to check the validity and to confirm the understanding of the questionnaire. Data collectors approached the participants and explained the objectives to them. Verbal consent was taken from the students after which an anonymous written consent form was given to the participants, and their signature was taken. A structured self-administered questionnaire designed in English was distributed to only those students who agreed to participate. The questionnaires were recollected after 15-20 minutes.

The collected questionnaires were manually checked for accuracy and completeness. The forms which were more than 50% unanswered were declared invalid and were not included in analysis. After this validation of data, it was entered using SPSS version 25. The frequencies for each variable were calculated, and associations were determined by chi-square test. The test was considered statistical significance with $p<0.05$ at 95% confidence interval.

Results

After data validation, a total of 250 participants were selected for data analysis. The sample population comprised 56.8% males and 43.2% females. (Table 1 & 4)

The mean age of the study participants was 21.7 years with standard deviation of 1.5 years.

78% (n=195) of participants were medical students while 22% (n=55) were Dental. (Table 1)

51.6% (n=129) of the respondents marked themselves in the category of High socioeconomic whereas 48.4% (n=121) in middle socioeconomic category. (Table 1)

68.8%(n=172) were found to be smoking shisha for a short term while 31.2% (n=78) for long term. (Table 2)

Of all these respondents 31.6% (n=79) reported to have smoked shisha monthly, 28% (n=70) yearly and 20.4% (n=51) occasionally. Respondents of smoking shisha weekly and daily were as low as 14.8% (n=37) and 5.2 (n= 13) respectively. [Table 3]

Overall, 26% (n=65) believe that their main reason of smoking shisha was just to fill in the free time hanging around with friends. Peer Pressure was cited as the second main reason with a total of 18.4% (n=46) respondents. 12.8% (n=32) used to smoke shisha when in stress while 11.2% (n=28) smoked when feeling low or sad. 10% (n=25) thought it was cool and trendy; and 9.2% (n=23) consumed because of its social media popularity. 7.2% (n=18) were smoking to help them in quitting cigarette smoking. (Table 1)

39.4% of the respondents were intended to quit shisha smoking in future. (Table 1)

When asked about the symptoms; 32.4% (n=81) experienced shortness of breath; 30.4% (n=76) Dry cough; 30.4% (n=76) Scratchy sensation in the throat; 23.6% (n=59) rapid breathing; 20% (n=50) chest tightness while only 13.6%

(n=34) experienced hoarse voice, after shisha consumption. (Table 2)

The association of gender with the duration of shisha smoking was significant (p<0.001) saying that significant number of males were long term smokers. (Table 4)

The association of stream of education with the duration shows that MBBS students significantly (p<0.018) tend to be long term smokers. (p<0.001)

Association between duration of shisha smoking with symptoms; shortness of breath (p=0.340), dry cough (p=0.090), scratchy sensation (p=0.793), hoarse voice (p=0.579), rapid breathing (p=0.609) and chest tightness (p=0.246) was not significant. (Table 2)

Association between frequency of shisha smoking and symptoms such as shortness of breath (p=0.731), dry cough (p=0.274), scratchy sensation (p=0.327), hoarse voice (p=0.523), rapid breathing (p=0.321) and chest tightness (p=0.613) was also not significant. (Table 3)

Discussion

This study was conducted on medical students of Karachi as, its emergence among the urban youth has caused a recent interest for research in young individuals; as seen by Primack et al. in high school students of Arizona, USA states;[18] and by Varsano et.al in children in Israel[19]. Though work on WPS has previously been done in Karachi which showed 21.5% prevalence but it did not aim at finding an association between early respiratory symptoms and WPS[20].

The results from the present study indicated that shisha smoking ratio of male and females is almost equal making them equally vulnerable to the threats that shisha smoking carries, however this result contradict with Zavery et al. who found higher percentage of male shisha smokers in universities of Karachi[20].

A higher proportion of shisha smokers belonged to a higher socioeconomic background in our study, as said by respondents, suggestive of easy access and affordability to shisha for this class. These results were corresponding to the observations made by Sugathan et.al, where (68.8%) belonged to high income group[21]. Moreover, the study was conducted in private medical colleges, where the students come with higher socioeconomic backgrounds.

The frequency of WPS exposure among our study population was monthly, matching with monthly population of Primack et al.; but Varsano et al. population had 22% weekly exposure[18,19]. Whereas Asfar et al. found daily and regular exposure to WPS but intermittent smoking exposure remained predominant for their study population as well[22].

The main reason for shisha smoking appeared to be filling up the free time hanging around with friends. Peer Pressure was cited as the second main reason. Previous work from Rawalpindi by Haroon et al. states that Shisha smokers were likely to smoke for the first time with friends[23]. Akers et al. have stated that "the single most direct influence on smoking among young people is how many of their 5 best friends smoke"[24]. This signifies the influence of peer pressure on shisha smoking; and yet attraction of this group activity increases with the choice of flavors. Overall, 39.4 % intend to quit shisha smoking, which indicates that a decent proportion do show concern for their health. However, few were not sure of their decision of quitting shisha while the rest totally turned down the idea of quitting. Asfar et.al, also found that established water pipe smokers seem more hooked on the habit and are less willing to quit[22].

The symptoms related to respiratory system showed that majority experienced shortness of breath, Dry cough and scratchy sensation in the throat. Though their association with the duration and severity of smoking shisha remained insignificant in this study; nonetheless, Shaikh et al. had highlighted that after a Shisha smoking session of approximately 45 minutes, all cardiovascular (Heart rate and Blood Pressure) and respiratory system

(respiratory rate) indices showed a significant increase[25]. Literature also ponders on worsening of pulmonary parameters that is decrease in Forced Expiratory Flow 2.75% and an increase in the resting respiratory rate as acute effects of WPS exposure[26]. The general thinking of various urban areas of Pakistan is that water pipe is less harmful than cigarettes smoking (69%);[26] even worse, many users did not consider it a form of tobacco smoking at all.

The potential limitations of this study are; purposeful sampling; the data collection from shisha smokers only, whether the students were using any other form of addiction which could become confounding factors for the development of respiratory symptoms was not asked; for example conventional cigarettes, E-cigarettes, vaporizers, etc. Moreover, the respiratory symptoms could also be influenced by the environment which was out of the investigator's control.

Water pipe smoking is a growing concern among our youth specially university students. Strong positive social image of shisha is providing a route for more frequent habits and prevalence of respiratory symptoms in students irrespective of the gender. Our study has demonstrated that there is a link to shisha smoking to the respiratory symptoms which is not dependent on the frequency of exposure and duration; making it more susceptible with single exposure. Though expanded observation and extra research are needed to establish stronger associations; even though this study adds to the proof that water pipe tobacco smoking is destructive and supports interventions to control the worldwide spread of Water pipe tobacco Smoking, particularly among youth in Pakistan.

Conclusion

The results of this study show that smoking shisha can bring about the early respiratory symptoms. Education is important in creating awareness about water-pipe smoking hazards.

Conflict of Interest

Authors have no conflict of interest and no grant/funding from any organization.

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Answer of Picture Quiz

Follicular Amelobalstoma