

RESEARCH ARTICLE

Shisha Smoking and Associated Factors among Medical Students in Malaysia

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Abstract

Background: The aim of the study was to determine the prevalence of shisha smoking and associated factors among medical students in Malaysia. **Materials and Methods:** A cross-sectional study was conducted at the Management and Science University from December 2011 until March 2012. The questionnaire consisted of five sections including socio-demographic, social environment, knowledge about shisha, psychosocial factors, and personal shisha smoking behavior. Obtained data were analyzed using Statistical Package for the Social Sciences (SPSS 13). T-test was used to determine the relationships between shisha smoking and socio-demographic characteristic. **Results:** A total number of 300 medical students participated in this study. Mean age was 22.5 ± 2.5 years. The majority were female, Malay, single, from urban areas (67%, 54%, 97%, 73%; respectively). The prevalence of shisha smoking among medical students was found to be 20%. The study revealed that many students believed that shisha does not contain nicotine, carbon monoxide, does not lead to lung cancer, dental problems and does not lead to cardiovascular diseases (25%, 20.7%, 22.3%, 29%, 26.7%; respectively). Age and sex were found to be significantly associated with smoking shisha status among medical students ($p=0.029$, $p<0.001$; respectively). Furthermore, having parents, siblings and friends smokers of shisha were found to be significantly associated with shisha smoking status ($p<0.001$, $p<0.001$, $p<0.001$; respectively). Furthermore, family problems, problems with friends, financial problems and university life were found to be significantly associated with shisha smoking status among medical students ($p<0.001$, $p=0.002$, $p<0.001$, $p=0.002$; respectively). **Conclusions:** There is a high prevalence of shisha smoking and a poor knowledge about its impact on health among medical students. More attention is needed to focus on medical education in this regard. The policies that are currently employed in order to reduce the cigarettes smoking should be applied to shisha smoking and shisha products.

Keywords: Shisha smoking - medical students - Malaysia

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Introduction

The tobacco epidemic receives a striking attention around the world. It is estimated that up to 10 million people will die annually by the year 2030 due to tobacco-related causes (WHO, 1999). While most of research has focused on cigarettes, the increasing popularity of shisha has received much less attention. Shisha smoking has become to be fashionable and is widely used in Arabic worlds (Radwan et al., 2003; Maziak et al., 2004; Afifi Soweid, 2005) and even in Europe and the United States (Kandela, 2000; Maziak et al., 2004). There are also reports that are indicative of that shisha smoking has already become a culture among urban teenagers in Malaysia (Mohd, 2006; Al-Naggar and Saghir, 2011).

The use of shisha is a 400-year-old method of smoking in which tobacco is passed through a water pipe before being inhaled (Knishkowsky and Amitai, 2005; Maziak et al., 2005). Shisha is typically smoked in social settings such as cafes and restaurants where water pipes are passed

from person to person. Typical smoking sessions last between 45 and 50 minutes but may continue for several hours (Knishkowsky and Amitai, 2005; Maziak et al., 2005). The shisha "equipment" usually consists of a head, body, water bowl, and a hose, attached to each other. Tobacco is placed on the head and covered with a thin perforated aluminum plate. Lit charcoal is placed on the plate to burn the tobacco. The bowl is half filled with water and tobacco smoke is immersed into the water through a tube. Inhalation of the air from the mouth tube draws from the air-filled space in the water bowl so that smoke passes from the head to the body through the water to the mouth (Maziak et al., 2004).

Shisha smoke contains carbon monoxide, nicotine, tar and heavy metals in equal amounts to cigarettes and thus, shisha smoking increases the risk of bronchogenic carcinoma as well as oral and bladder cancers (Shihadeh, 2003). A meta-analysis study also revealed that shisha tobacco smoking is significantly associated with lung cancer, respiratory illness, low birth-weight and

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periodontal disease (Akl et al., 2010). In addition, shisha smoke increases heart rate, decreases pulmonary function and it is associated with markers of atherosclerosis as well as increases the risk of coronary heart disease (Jabbou et al., 2003). Other investigators noted impairment of pulmonary function on spirometry (Kiter et al., 2000) and increased pulmonary epithelial permeability (Aydin et al., 2004). Taken together, these reports suggest that shisha smoking has deleterious effects on health and also induces the dependence on nicotine similar to that found in cigarette use (Akl et al., 2010).

However, in the general population there exists a common belief is that shisha smoking is less harmful than cigarette smoking, in particular because the water “filters” the smoke (Chaouachi, 1999). There is a lack of researches about shisha smoking and associated factors among medical students in Malaysia. Therefore, the objective of this study was to determine the prevalence and associated factors of shisha smoking among medical students in Malaysia.

Materials and Methods

A cross-sectional study was conducted among medical students from International Medical School, Management and Science University, Malaysia, during December 2011 - March 2012. A simple random sampling technique was used. Inclusion criteria included all the students from MBBS program. Students from year one until year five was selected to participate in this study. Students were briefed about the topic of the study before the distribution of questionnaires. The confidentiality of the study participants was ensured and informed consent was obtained. The study was approved by the ethics committee of the Management and Science University.

The questionnaire consisted of five sections: socio-demographic, social environment, knowledge and awareness about shisha, psychosocial factors, and personal smoking behavior. The Socio-demographic section of the questionnaire contained basic demographic questions such as race, marital status, age and family income. The Social environment section related to the information about the social environment, especially about students' parents, siblings and friends shisha smoking. In the Knowledge about shisha section of the questionnaire the participants were asked questions about their knowledge and awareness on shisha smoking. In the Psychosocial factors section of the questionnaire, questions were about psychosocial factors such as stress and family problems that may lead a person to be involved in shisha smoking. The Personal smoking behavior section of the questionnaire was designed in such a way that only the participants who smoke shisha were needed to answer this section because the questions were about their own personal smoking behavior. The participants were given approximately 15 minutes to answer all the questions of the questionnaire and then, the completed questionnaires were collected. The obtained data was analyzed using the Statistical Package for the Social Sciences (SPSS) Program. T-test was used to determine the relationships between shisha smoking and socio-demographic characteristic.

Results

A total number of 300 medical students participated in this study. Mean age was 22.5 ± 2.5 years old, with maximum age of 32 years old and minimum age of 18 years old. The majority of the study participants were female, Malay, single, from year one and from urban areas (67%, 54%, 97%, 43.7%, 73%; respectively). The prevalence of shisha smoking among medical students was found to be 20%. Age and gender were found to be significantly associated with shisha smoking status ($p=0.029$, $p<0.001$; respectively). Furthermore, having parents, siblings and friends who were smokers of shisha was significantly associated with shisha smoking status among the surveyed medical students ($p<0.001$, $p<0.001$, $p<0.001$; respectively) (Table 1). The obtained data on knowledge about effects of shisha smoking are given in Table 2. Some study participants were found to believe that shisha does not contains nicotine, does not contain carbon monoxide, does not lead to lung cancer, does not lead to dental problems, does not lead to cardiovascular diseases (25%, 20.7%, 22.3%, 29%, 26.7%; respectively). The study revealed that 19% of the study participants did not believe that shisha is harmful to health and that 97% of the study participants believed that water in shisha “filters” toxins. The study also revealed that family problems, problems with friends, financial problems were significantly associated with shisha smoking status

Table 1. Socio-demographic Factors Associated with Smoking Shisha among Medical Students (n=300)

Variable	N (%)	Mean \pm SD	p-value	
Age	<22	115 (38.3)	0.73 \pm 0.44	0.029
	\geq 22	185 (61.7)	0.58 \pm 0.49	
Gender	Male	99 (33)	1.38 \pm 0.49	<0.001
	Female	201 (67)	1.74 \pm 0.43	
Part-time job	Yes	50 (16.7)	1.75 \pm 0.43	0.091
	No	250 (83.3)	1.85 \pm 0.35	
Live with the family	Yes	116 (38.7)	1.58 \pm 0.49	0.595
	No	184 (61.3)	1.62 \pm 0.48	
Divorced parents	Yes	17 (5.7)	1.93 \pm 0.25	0.7
	No	283 (94.3)	1.94 \pm 0.22	
Passed away parents	Yes	20 (6.7)	1.96 \pm 0.18	0.147
	No	280 (93.3)	1.92 \pm 0.26	
Father smokes shisha	Yes	8 (2.7)	1.93 \pm 0.25	0.14
	No	292 (97.3)	1.98 \pm 0.12	
Mother smokes shisha	Yes	4 (1.3)	2.23 \pm 2.7	0.32
	No	295 (98.3)	1.98 \pm 0.11	
Shisha smoker parents influenced decision of children to start shisha smoking	Yes	127 (42.3)	1.80 \pm 0.40	<0.001
	No	173 (57.7)	1.52 \pm 0.50	
Siblings smoke Shisha	Yes	59 (19.7)	1.43 \pm 0.49	<0.001
	No	241 (80.3)	1.89 \pm 0.30	
Parents influenced decision of children to start shisha smoking	Yes	139 (46.3)	1.46 \pm 0.50	0.23
	No	161 (53.6)	1.55 \pm 0.49	
Friends smoke shisha	Yes	227 (75.7)	1.01 \pm 0.12	<0.001
	No	73 (24.3)	1.30 \pm 0.45	
Friends can influence smoking	Yes	253 (84.3)	1.10 \pm 0.30	0.145
	No	47 (15.6)	1.16 \pm 0.37	

Table 2. Knowledge and Prevalence of Shisha Smoking among Medical Students (n=300)

Issue	Answer (Yes/No)	N (%)	Mean ±SD	p-value
Shisha contains nicotine	Yes	225 (75.0)	1.22±0.42	0.915
	No	75 (25.0)	1.23±0.42	
Shisha contains carbon monoxide	Yes	238 (79.3)	1.21±0.41	0.453
	No	62 (20.7)	1.16±0.37	
Shisha is more addictive than cigarettes	Yes	89 (29.7)	1.87±0.33	0.003
	No	211 (70.3)	1.65±0.86	
Shisha smoking leads to lung cancer	Yes	233 (77.7)	1.62±0.48	<0.001
	No	67 (22.3)	1.11±0.31	
Shisha smoking leads to dental problem	Yes	213 (71.0)	1.76±0.42	<0.001
	No	87 (29.0)	1.16±0.37	
Shisha smoking leads to cardiovascular diseases	Yes	220 (73.3)	1.67±0.47	<0.001
	No	80 (26.7)	1.15±0.36	
Shisha smoking reduces weight	Yes	147 (49.0)	1.89±0.30	<0.001
	No	153 (51.0)	1.40±0.49	
Stress influences one to start shisha smoking	Yes	230 (76.7)	1.33±0.47	0.65
	No	70 (23.3)	1.20±0.40	
Family problems lead to shisha smoking	Yes	100 (33.3)	1.88±0.32	<0.001
	No	200 (66.7)	1.61±0.48	
Problems with friends lead to shisha smoking	Yes	124 (41.3)	1.75±0.43	0.002
	No	176 (58.7)	1.54±0.49	
Husband-wife or boyfriend-girlfriend problems lead to shisha smoking	Yes	154 (51.3)	1.60±0.49	0.5
	No	146 (48.7)	1.45±0.49	
Financial problems lead to shisha smoking	Yes	94 (31.3)	1.88±0.32	<0.001
	No	206 (68.7)	1.63±0.48	
University life burdening leads to shisha smoking	Yes	130 (43.3)	1.73±0.44	0.002
	No	170 (56.7)	1.52±0.50	
Advertisement about shisha can influence smoking	Yes	157 (52.3)	1.65±0.48	0.002
	No	143 (47.7)	1.42±0.49	
Shisha is harmful to health	Yes	243 (81.0)	1.55±0.50	<0.001
	No	57 (19.0)	1.09±0.29	
Water in shisha filters toxins	Yes	97 (32.3)	1.40±0.49	<0.001
	No	203 (67.7)	1.74±0.43	
Shisha contains tar	Yes	206 (68.7)	1.19±0.39	0.057
	No	94 (31.3)	1.31±0.46	

($p < 0.001$, $p = 0.002$, $p < 0.001$, $p = 0.002$; respectively) (Table 2).

Discussion

This study revealed that 20% of the medical students surveyed were shisha smokers. Analysis of available information indicates that there are marked differences between countries in the incidence of shisha smoking.

Taha et al. (2010) reported that the prevalence of shisha smoking among male medical students in Saudi Arabia was 8.6%. A quite similar finding has been reported by Almutairi (2004) who found that among university students in Riyadh 7.3% of the study participants were shisha smokers. However, in an Jordanian study conducted by Dar-Odeh et al. (2010) it has been found that as many as 44.1% of medical students smoked shisha and that 25% of them used shisha smoking on a daily or weekly basis. Likewise, in a study conducted in central Saudi Arabia it has been revealed that among medical students 44.1% of the students smoked shisha and that 23.7% smoked both cigarettes and shisha (Al-Turki, 2006).

In regards of gender, our present study found that gender was significantly associated with shisha smoking. This is in agreement with an earlier study of Poyrazoglu et al. (2010) who reported that gender has significant effects on the prevalence of shisha smoking. Male gender was associated with shisha smoking in a number studies (Eissenberg et al., 2008; Smith-Simone et al., 2008; Primack et al., 2008; 2010). Maziak et al. (2004) reported that the shisha smoking was more common among older and male students. In a study performed in Ukraine it has been found that men of low income category were more likely to initiate tobacco smoking earlier (Andreeva et al., 2007). According to Poyrazoglu et al. (2010), residence, economic status of the family, and with whom students live have no significant effect on the prevalence rate. In contrast, Tamim et al. (2003) and Anjum et al. (2008) reported that the highest percentage of shisha smoking occurred among college students in a higher socioeconomic group.

In our present study, majority of the participants (81%) indicated that they believe that shisha harmful for health. Opposite findings reported by Maziak et al. (2004) who reported that 89% of the participants thought that shisha is less harmful than cigarettes. A study from Egypt revealed that 74% of female students believed that shisha smoking is less harmful than cigarette smoking (Labib et al., 2007). There is a false perception that shisha smoking is safer than cigarette smoking, perhaps because the invention of shisha smoking involves the passage of smoke through water that is presumed to filter the smoke and remove toxic agents (Kandela, 2000; WHO 2005; Dawn 2006). However, in a study of Ash (2007) it has been found that the water pipes have three additional deadly risks over cigarette smoking and it has been shown; to worsen the situation, new toxins are added to the dangerous smoke when smoking flavoured tobacco over coals (Ash, 2007). There is a false belief that the tobacco contains "healthy" fruits and thus smoking is beneficial for health (Varsano et al., 2003). However, according to Ash (2007), the amount of shisha smoke inhaled exceeds that of one cigarette smoke by 200 times. In terms of the perceived health risk, 19% of the respondents in the present study indicated that they believe that shisha is harmless. This finding is in line with a number of previous studies (Shafagoj et al., 2002; Marziak et al., 2004; Ward et al., 2006). In reality, shisha smoke is just as dangerous as cigarette smoke (Knishkowsky and Amitai, 2005). As compared to a single cigarette, shisha smoke contains even higher level of metals such as arsenic,

lead, and nickel, 36 times more tar, 15 times more carbon monoxide and nicotine (Knishkowsky and Amitai, 2005). It has been documented that shisha smoking exposes a smoker to a variety of diseases, such as lung, bladder, and oral cancers (Kentucky Tobacco Prevention and Cessation Program 2006; American Lung Association, 2007) and that shisha smoking increases the risk of transmitting tuberculosis, viruses such as herpes or hepatitis, and other illnesses (Knishkowsky and Amitai, 2005, City of Ottawa 2010, Nakkash and Khalil, 2010). Some studies claim a session of shisha smoking produces the same levels of cotinine, a nicotine metabolite, as smoking two cigarettes daily (Neergard et al., 2007). Another study has analyzed carbon monoxide levels (CO) in shisha smoke and found that a single session of shisha smoking emits 30 times as much CO as a single cigarette (Daher et al., 2010). According to a number reports one session of shisha is equivalent to smoking several cigarettes (Dotinga, 2008; Spangler 2008; Hendrick 2010).

In the present study, a total of 70.3% of the participants reported that shisha is less addictive than cigarettes. According to reports of Ward et al. (2007) and Smith-Smione et al. (2008), many shisha smokers do not see themselves as addicts and there is a common perception among shisha users that they can quit whenever they want. Likewise, Primack et al. (2008) reported that 52% of college students believed shisha are less addictive than cigarettes. However, the perception that shisha smoking is not as addictive as smoking cigarette is proven to be wrong. This is evidenced by the studies which revealed that approximately half of the respondents still returned to shisha smoking after trying to quit it (Marziak et al., 2004; Jackson and Aveyard, 2008, Mohammed et al., 2010). Many shisha smokers believe that because shisha tobacco smoke is filtered by the water in the base of the smoking apparatus, many of the harmful substances are removed making shisha smoking to be less detrimental to health than cigarette smoking (Shihadeh, 2003; Asfar et al., 2005; American Lung Association, 2007, Ward et al. 2007). The World Health Organization committee on Tobacco Product Regulation has refuted these claims stating that the amount of smoke inhaled in a single shisha session often surpasses that from a single cigarette and that shisha smoking contains the same harmful substances as cigarette smoking (WHO, 2005).

In the present study, 32.3% of the study participants indicated that they believe that water in shisha "filters" many of the toxins; 31.3% of the study participants indicated that they believe that there is no tar in shisha smoking. Twenty five percent of the study participants indicated that they believe that there is no nicotine in shisha smoking. However, it is established that shisha smoke contains the same toxicants as cigarette smoke (Shihadeh, 2003; Shihadeh and Saleh, 2005). Not surprisingly, carbon monoxide is found in shisha users' breath (Shafagoj and Mohammed, 2002; Ward et al., 2006; Chaouachi, 2007) and nicotine is found in shisha users' blood (Shafagoj et al., 2002); blood nicotine of a daily shisha user is of the similar level to that of an individual who smokes cigarettes every day (Maziak et al., 2004; Neergaard et al., 2007). Shisha smoking leads to

substantial health harm including cancer, cardiovascular disease, decreased pulmonary function and nicotine dependence (Jabbour et al., 2003; Maziak et al., 2004; Knishkowsky et al., 2005; Ward et al., 2006).

The findings of our study are in agreement with previous reports (Jackson and Aveyard, 2008; Roskin and Aveyard, 2009; Mohammed et al., 2010) which found that university students viewed shisha smoking with friends as an affordable and relaxing novelty. This is because teenagers, and university students in particular, are the dominant user groups for one of the popular networking, namely Facebook in Malaysia (Lim, 2010), and the teenagers tend to share their shisha consumption experiences and practices through this social networking. Nevertheless, after the first trial of shisha, sweetened flavor became the main attraction for them to continue smoking. Various fruit flavors seem to mask the toxic substances in the tobacco and this makes it less irritating, thus motivating them further to smoke (Marziak et al., 2004; Knishkowsky and Amitai, 2005; Smith-Simone et al., 2008). Given that previous studies show most of the shisha users started with friends in café restaurants (Ward et al., 2007; Smith-Simone et al., 2008) and since this has mostly become a group socializing activity, we believe that those who are nonsmokers would eventually try shisha smoking and become users along with their friends. Several studies have shown that shisha smokers were significantly more likely to have shisha smokers as friends (Maziak et al., 2004, Mohammed et al., 2006).

A perception that shisha smoke is filtered in the water and thus shisha smoking becomes less harmful than cigarette smoking influences the use of shisha (Kandela, 2000; Kiter et al., 2000). However, it is well known that passing air bubbles through water does not change their contents, and since the volatile carcinogens for tobacco smoke and other particles will stay within the air bubble during its passage through the water, the water will not filter the smoke in the bubbles. Some shisha users report shisha smoke being less irritating than cigarette smoking, noting it has a 'smooth texture' that allows them to smoke it for hours (Roskin and Aveyard, 2009). More importantly, the negative social norm against cigarette smoking is not applied to shisha because of its more recent trend and use.

Compared to cigarettes, there is a lack of knowledge about the harmfulness of shisha smoking among users regardless of their demographic background. Education about the harmfulness of shisha smoking and policies to limit its use is not implemented to prevent the spread of this form of tobacco use. A report from Canada states that the misconceptions about the health risk of shisha are strengthened by the lack of information provided by Government such as lack of warning label for shisha tobacco pack and accessories (City of Ottawa, 2010). There are no advertisements from mass media as well as no age restriction laws against buying or smoking shisha in restaurants (Griffiths et al., 2011). The same policies that reduced the cigarettes smoking should be applied on shisha and shisha products (Griffiths et al., 2011).

In conclusion, there is a high prevalence of shisha smoking, poor knowledge and misconception about its impact on health among medical students. More attention

is needed to focus on medical education in this regards. The policies that are currently employed in order to reduce the cigarettes smoking should be applied on shisha smoking and shisha products such as label shisha tobacco as a cause of cancer and print the pictures of cancer patients on the pack and accessories and form a laws against buying smoking shisha in restaurants. Education about the harmfulness of shisha smoking and policies to limit its use is not implemented to prevent the spread of this form of tobacco use is urgently needed. The government should play a main role through the media and Facebook to provide information about the danger of shisha smoking.

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