

## RESEARCH ARTICLE

# Pattern of Shisha and Cigarette Smoking in the General Population in Malaysia

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### Abstract

**Background:** Smoking is a primary risk factor for cancer development. While most research has focused on smoking cigarettes, the increasing popularity of shisha or water pipe smoking has received less attention. This study measured the prevalence and risk factors for shisha and cigarette smoking and related knowledge. **Materials and Methods:** This cross-sectional analytical study was conducted in Shah Alam, Malaysia. Participants aged  $\geq 18$  years were selected from restaurants. Data regarding demographic variables, smoking patterns, and knowledge about shisha smoking were collected in local languages. Logistic regression was performed to assess risk factors. **Results:** Of 239 participants, 61.9 % were male and 99.2% revealed their smoking status. Some 57.4% were smokers: 50.7% only cigarettes, 5.9% only shisha and 42% both. Mean age of starting cigarette smoking was  $17.5 \pm 2.4$  years and for shisha smoking  $18.7 \pm 2.0$  years. In a univariate model, male gender, age 33-52 years and monthly income > MYR 4,000 increased the risk and unemployment and being a student decreased the risk. In a multivariate model, male gender increased the risk of smoking, while being a student decreased the risk, adjusting for age and income. The perception of shisha being less harmful than cigarettes was present in 14.6% and 7.5% had the opinion that shisha is not harmful at all, while 21.7% said that it is less addictive than cigarettes, 39.7% said that shisha did not contain tar and nicotine, 34.3% said that it did not contain carbon monoxide and 24.3% thought that shisha did not cause health problems. **Conclusions:** Prevalence of shisha and cigarette smoking is high in the general population in Malaysia and knowledge about shisha smoking is relatively low. The findings of our study might have implications for understanding similarities and differences in incidence of shisha and cigarette smoking in other cultural/geographic regions.

**Keywords:** Shisha - cigarette - risk factors - general population - Malaysia

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### Introduction

Smoking is a primary risk factor for cancer development (National Cancer Institute 2014). Tobacco, a preventable cause of morbidity and mortality, kills 6 million people annually (World Health Organization, WHO report on the global tobacco epidemic, 2011). If this trend continues, it will cause more than 8 million deaths each year by 2030, 80% of which will be premature deaths in low and middle income countries (World Health Organization, WHO report on the global tobacco epidemic, 2011). It is estimated one-half of the long-term smokers, especially those who have started smoking in adolescent, will die due to their use of tobacco (Centers for Disease Control and Prevention, 2010). Moreover, half of these deaths will occur in the people aged 35 to 69 years, shortening 20-25 years of their life expectancy (Centers for Disease Control and Prevention, 2010). In Malaysia, prevalence of tobacco smoking is about 60% since 1980s and morbidity due to it is on the rise (Habil, 2000). This high level can be

attributed to the fact that Malaysia is a tobacco-producing country, much of the taxation revenue being generated from tobacco (Morrow and Barraclough, 2003). Malaysia has an official agency which regulates and promotes the tobacco industry (Morrow and Barraclough, 2003).

While most of research has focused on smoking cigarettes, the increasing popularity of shisha has received much less attention. Shisha smoking is considered a global public health threat (Chaouachi, 2006), and more than 100 million people worldwide smoke shisha daily (Knishkowy and Amitai, 2005). Prevalence of shisha smoking among university student in Malaysia has been reported to be 30% (Al-Naggar and Saghir, 2011), and among medical students 20% (Al-Naggar and Bobryshev, 2012).

Shisha is also known as Narghile, Hookah, Hubble bubble and water pipe in different cultures and countries. 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 (Maziak

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et al., 2004; Knishkowy and Amitai, 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. Lighted 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 also revealed that shisha tobacco smoking is significantly associated with lung cancer, respiratory illness, low birth-weight and 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 (Jabbour 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) Additional dangers which are associated with shisha but not with cigarette smoking include infectious diseases which could result from pipe sharing and the frequent addition of alcohol or psychoactive drugs (Varsano et al., 2003), or “Spice,” a common brand name for K2 or synthetic marijuana (Hu et al., 2011). This refers to a series of products that are advertised and sold legally as herbal blend incense. However, they are smoked by people to gain effects similar to marijuana, hashish, and other forms of cannabis.

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). The perception that hookah smoke is filtered in the water may lead to the belief that it is less harmful than cigarette smoking (Aljarrah et al., 2009). This belief is independent of gender, ethnicity, or age (Jamil et al., 2011; Smith et al., 2011). However, the belief that water filters out smoke particles is scientifically inaccurate, since the volatile carcinogens in tobacco smoke and other particles will stay within the air bubbles during their passage through the water (Aljarrah et al., 2009). Shisha users also report that shisha smoke is less irritating than cigarette smoke, as it has a ‘smooth texture’ that allows them to smoke it for hours (Chaouachi, 2006; Aljarrah et al., 2009; Jacot and Cornuz, 2009; 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 (Smith-Simone et al., 2008).

There is a lack of research about shisha smoking, current estimates of cigarette smoking and its associated factors among general population in Malaysia. Therefore, the objective of this study was to determine the prevalence and associated factors of shisha and cigarette smoking among general population in Malaysia.

## Materials and Methods

### *Study design, place and duration of study*

This cross sectional study analytical was conducted from June to September 2012 in Shah Alam, Malaysia.

### *Sampling procedures and eligibility criteria*

Participants were selected from restaurants by multi-stage random sampling technique. There are 43 sections (clusters) located in North, South and Central of Shah Alam. Five sections that are located in central were picked randomly; Section 7, Section 8, Section 13, Section U2 and Section U8. There are about 30-50 restaurants in each sections, 10 were picked randomly from each section and 05 participants were selected from each restaurant randomly. A total of 250 participants'  $\geq 18$  years of age, able to give consent were selected. Of them, 239 responded (response rate 95.6%).

### *Data collection tool*

Data was collected on a questionnaire translated in the local language Malay, by trained data collectors after taking informed consent from the participants. The questionnaire consisted of three parts. Part A inquired about demographic variables, part B contained questions about smoking status and trends and part C was related to knowledge about shisha smoking.

### *Data analysis*

Data were analyzed in SPSS version 17. Proportions were calculated for categorical variables. Univariable and multivariable logistic regression models were run and Odds Ratio (OR) and its 95% confidence interval (CI) were calculated to measure the risk factors for tobacco smoking. OR of '1' meant no association with smoking, OR  $> 1$  meant that the factor is associated with higher odds of smoking and OR  $< 1$  meant that the factor is associated with lower odds of smoking.

### *Ethical considerations*

The study was ethically approved by the ethics committee of the Faculty of Health and Life Sciences, Management and Science University (MSU), Shah Alam, Malaysia.

## Results

### *Baseline characteristics*

Of 239 participants included in the study, 61.9 % (n=148) were male. Highest numbers, 31.4% (n=75) of participants were 18 to 22 years of age, 82.8% (n=198) were Malay, 84.9% (n=203) were Muslims, 64.0% (n=153) were single, and 77.7% (n=186) were urban. Baseline characteristics of the study participants are shown in Table 1.

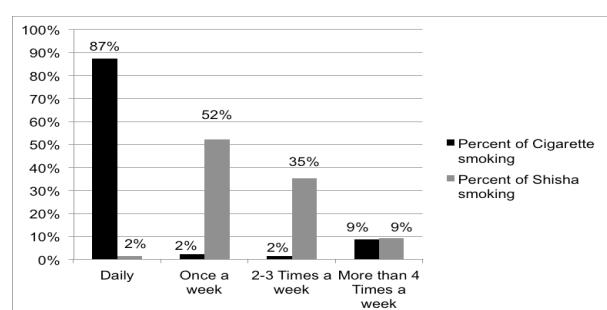
### *Smoking trends*

Smoking status was revealed by 237 (99.2%) participants. Of them, 57.4% (n=136) were smokers. Among them, 50.7% (n=69) were cigarette smokers,

5.9% (n=8) smoked only shisha and 42% (n=57) smoked both, while 1.4% (n=2) did not reveal type of smoking. Mean age of starting cigarette smoking was reported to be  $17.5 \pm 2.4$  years and mean age of starting shisha smoking was  $18.7 \pm 2.0$  years. Highest numbers of cigarette smokers, 87.3% (n=110), smoked cigarettes daily. Of 64 shisha smokers who revealed their frequency of shisha smoking, 52.3% (n=34) smoked shisha once a week

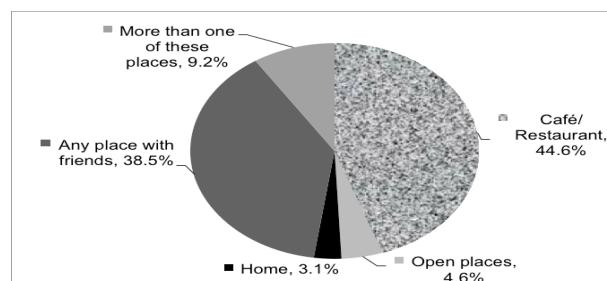
**Table 1. Baseline Characteristics of the Study Participants**

Characteristics	Response
Age (years)	18-22 31.4% (n=75)
	23-27 26.4% (n=63)
	28-32 24.7% (n=59)
	33-37 10.5% (n=25)
	38-42 3.8% (n=9)
	43-47 2.9% (n=7)
	48-52 0.4% (n=1)
Gender	Male 61.9% (n=148)
	Female 38.1% (n=91)
Marital status	Single 64.0% (n=153)
	Married 34.4% (n=82)
	Divorced 1.3% (n=3)
Ethnicity	Separated 0.4% (n=1)
	Malay 82.8% (n=198)
	Chinese 6.3% (n=15)
	Indian 7.9% (n=19)
Religion	Others 2.9% (n=7)
	Muslim 84.9% (n=203)
	Buddhist 4.2% (n=10)
	Hindu 8.4% (n=20)
Education	Christian 2.5% (n=6)
	Primary school 1.7% (n=4)
	High school 15.1% (n=36)
	Diploma 37.2% (n=89)
	Bachelors 34.3% (n=82)
	Masters 8.4% (n=20)
	Doctorate (PhD) 2.9% (n=7)
Employment status	Missing 0.4% (n=1)
	Employed 62.3% (n=149)
	Unemployed 12.6% (n=30)
	Retired 1.3% (n=3)
	Student 23.4% (n=56)
Monthly Income	Missing 0.4% (n=1)
	RM 0-2,000 50.2% (n=120)
	RM 2,000-4,000 23.4% (n=56)
	RM 4,000-6,000 18.0% (n=43)
	RM 6,000-8,000 5.4% (n=13)
Urban rural dwelling	RM 8,000 & above 2.9% (n=7)
	Urban 77.8% (n=186)
Rural	22.2% (n=53)

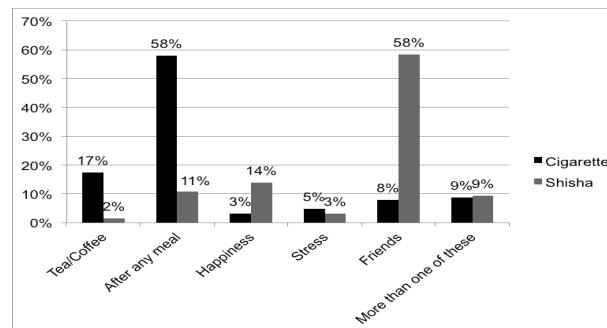


**Figure 1. Frequency of Smoking**

(Figure 1). Time spent per day in cigarette smoking was reported to be < 1 hour in 34.9% (n=44), 1-3 hours and > 3 hours in 32.7% (n=41) for both. Time spent per day in



**Figure 2. Places of Shisha Smoking**



**Figure 3. Conditions Associated with Smoking**

**Table 2. Univariable Regression**

Risk Factors	Crude Odds Ratio (95% CI)
Gender	
Female (reference)	-
Male	38.5 (17.8-83.4)
Age	
18-32 years (reference)	-
33-52 years	2.8 (1.3-6)
Marital status	
Single	0.37 (0.038-3.69)
Married	0.61 (0.061-6.12)
Divorced or Separated (reference)	-
Ethnicity	
Malay	0.24 (0.03-2.04)
Chinese	0.11 (0.01-1.17)
Indian	0.12 (0.01-1.21)
Others (reference)	-
Religion	
Muslim	1.48 (0.29-7.52)
Buddhist	1.0 (0.13-7.57)
Hindu	0.67 (0.11-4.17)
Christian (reference)	-
Education	
Less than bachelors (reference)	-
Bachelor level or more	0.74 (0.44-1.24)
Employment status	
Employed (reference)	-
Unemployed	0.43 (0.19-0.96)
Retired	1.0 (0.08-11.3)
Student	0.32 (0.17-0.61)
Monthly Income	
RM ≤ 4,000 (reference)	-
RM > 4,000	2.28 (1.22-4.24)
Urban Rural dwelling	
Urban (reference)	-
Rural	1.01 (0.54-1.89)

shisha smoking was 1-3 hours in 55.4% (n=36), < 1 hour in 23.1% (n=15) and >3 hours in 21.5% (n=14). Places of shisha smoking are shown in Figure 2. Conditions associated with cigarette and shisha smoking is reflected in Figure 3. Reasons of smoking were: 39.7% (n=54) said that after first try, it became a habit, 28.7% (n=39) smoked to mingle up with friends, 14.0% (n=19) smoked due to social and latest trend, 7.3% (n=10) smoked to be like their father or mother, 2.9% (n=4) smoked due to financial or psychological problem, 2.9% (n=4) had other reasons and 4.4% (n=6) had more than one of these reasons.

#### *Risk factors for smoking*

In Univariable regression, male gender, age 33-52 years and monthly income more than MYR 4,000 increased the risk of smoking, while being a student and unemployment decreased the risk (Table 2). In multivariable regression model, male gender increased the risk and being a student decreased the risk of smoking adjusting for age and monthly income (Table 3).

**Table 4. Knowledge about Shisha Smoking**

Perception	Response
Harmful effect of shisha	
Less harmful than cigarettes	14.6% (35)
More harmful than cigarettes	10.8% (26)
Both are equally harmful	54.8% (131)
Not harmful at all	7.5% (18)
I don't know	10.1% (29)
Addictive effect of shisha	
More addictive than cigarettes	9.6% (23)
Less addictive than cigarettes	21.7% (52)
Both are equally addictive	58.2% (139)
Not addictive at all	10.0% (24)
Does shisha has flavor?	
Yes	92.1% (220)
No	7.5% (18)
Does water in shisha filters toxin?	
Yes	49.4% (118)
No	49.4% (118)
Does shisha contain tar?	
Yes	59.4% (142)
No	39.7% (95)
Does shisha contain nicotine?	
Yes	58.6% (140)
No	39.7% (95)
Does shisha has smell?	
Yes	82.8% (198)
No	16.7% (40)
Does shisha contain Carbon monoxide?	
Yes	64.0% (152)
No	34.3% (82)
Does shisha lead to health problems?	
Yes	75.3% (180)
No	24.3% (58)
What are the immediate effects of shisha smoking?	
Headache	21.3% (51)
Stomachache	2.5% (06)
Vomiting	1.3% (03)
Sleepiness	2.1% (05)
Shortness of breath	20.5% (49)
Chest pain	28.9% (69)
More than one of the above	23.0% (55)

**Table 3. Multivariable Regression Model**

Risk Factors	Adjusted Odds Ratio (95% CI)
Gender	
Female (reference)	-
Male	41.8 (18.2-95.8)
Age	
18-32 years (reference)	-
33-52 years	1.6 (0.49-5.2)
Employment status	
Employed (reference)	-
Unemployed	0.99 (0.29-3.4)
Retired	0.20 (0.01-2.5)
Student	0.31 (0.12-0.83)
Monthly Income	
RM≤4,000 (reference)	-
RM>4,000	1.07 (0.37-3.09)

#### *Knowledge about shisha smoking*

When inquired about harmful effects of shisha as compared to cigarettes, 54.8% (n=131) said that it is as harmful as cigarettes and 10.8% (n=26) had the perception that shisha is less harmful. Addiction of shisha as compared to cigarettes was perceived to be equally addictive in 58.2% (n=139), less addictive in 21.7% (n=52) and not addictive at all in 10.0% (n=24). Perception about shisha containing flavor, tar, nicotine, smell, carbon monoxide, its water filtering toxin and health effects caused by it are shown in Table 4.

## Discussion

Cigarette and shisha smoking is quite high in the general population of Malaysia. Tobacco smoking, shisha and cigarettes, starts at an early age. Being a male increases the risk of smoking, while being a student decreases the risk. Though more than half of the participants were aware about the harmful and addictive effects of shisha, almost one fourth reported that shisha did not have any health effects. Almost 40% perceived shisha as not containing tar and nicotine.

In this study, prevalence of tobacco smoking in general population in Malaysia is found to be double (57%) than that reported by World Health Organization in 2011 (23%) (World Health Organization, Noncommunicable diseases country profiles 2014: Malaysia, 2014). Tobacco smoking was high in both genders; it was found that 12% females smoked tobacco, in contrast to 1%, and 84% males were smokers in comparison to 43% in 2011 (World Health Organization , 2014). Male gender is the strongest predictor of tobacco smoking, a finding similar to that reported by Morrow et al. (2003). Prevalence of shisha smoking is high in general population as compared to the university students and the medical students (Al-Naggar and Saghir, 2011; Al-Naggar and Bobryshev, 2012).

It was found that participants of this study started shisha and cigarette smoking at the mean age of 18.7 years and 17.5 years respectively. This age of initiation of tobacco smoking in both forms is less than that found in the National Health and Morbidity Survey of 1996/ 1997 in Malaysia (Morrow, 2003). This indicates that efforts have to be made from a young age to prevent tobacco

smoking in Malaysia.

Students were less likely to be smokers than those employed. The odds of smoking in employed people was found to be 1.82 times than those unemployed in the third National Health and Morbidity Survey in Malaysia. This can be due the finding by Do et al, that youth employment increases the probability of smoking initiation (Do and Finkelstein, 2012). Among male students, 60% were smokers. This finding is more than that found in male students in a study on University students in Malaysia in 2009 (41%) (Al-Naggar et al., 2011). Among female students, 15.4% were smokers; shisha smokers more than cigarette smokers. This proportion is less than that reported by Manaf et al. (2008) in their study on female students in Kuala Lumpur, Selangor and Malaysia.

Shisha smoking session was between 1 to 3 hours in more than half of the shisha smokers. This implies that shisha smokers inhales more tobacco than cigarette smokers in one session due to the large volume of smoke they inhale reflecting that shisha smoking is more harmful than cigarette smoking. This perception was present only in one tenth of the general population, less than that reported by the university students in Malaysia (Al-Naggar and Saghir, 2011). Almost one fifth of the study participants reported shisha smoking to be less addictive than cigarette. The content of nicotine present in the shisha, makes it as addictive as, or even more addictive than cigarette, as a water pipe smoker inhales equivalent of 100 cigarettes in a single session of smoking (Public health officials warn about the unrecognized health hazards of smoking from a hookah, Harvard Mental Health Letter, 2014). Two fifth of the participants perceived that shisha did not contain tar and nicotine, when in fact it contains a large amount of tar and nicotine (Shihadeh and Saleh, 2005). Almost one third said that shisha is devoid of carbon monoxide. Carboxyhemoglobin rises three times after a single session of water pipe smoking as compared to cigarette smoking (Eissenberg and Shihadeh, 2009). One fourth of the study participants said that shisha smoking does not cause any health problems. This lack of knowledge about health problems in general population is quite high as compared to the University students in Malaysia (Al-Naggar and Saghir, 2011).

Strengths of this study are that, and random sampling technique increases the internal validity of the study. In addition to this, the study being conducted on adults in general population in Malaysia, increases the external validity or generalizability of the results.

The results of this study suggest that health policy and health education have to be promoted in general population about health hazards caused by shisha smoking. Further research needs to be done for effective interventions to prevent and control tobacco smoking in the general population of this region. The findings of our study might have implications for understanding similarities and differences in incidence of shisha and cigarette smoking in other cultural/geographic regions.

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