

Disparity and compatibility, familiarity and perception among waterpipe tobacco smokers (Shisha) in Malaysia: A comparative study

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Abstract

Background: In Malaysia, although the number of Shisha smokers has not exceeded the regular cigarette users, waterpipe smoking (Shisha) has been appeared as a new form of tobacco use, especially among the new generation. This study aims to describe the comparative characteristics, familiarities, and motives for Shisha use in some states of Malaysia. **Methods:** A cross-sectional survey using a new validated self-administered, bilingual questionnaire was conducted among Shisha smokers in Pulau Penang and Kuantan Malaysian cities. Five hundred questionnaires were distributed evenly and randomly in Shisha lounges around the mentioned two cities. **Results:** A total of 297 people (55.8%) agreed to participate in the study. The majority of the study participants were male (82.1%), Malay (82.8%), and currently studying or graduated from university or college (67.5%). Almost half (49.3%) of the study participants were Shisha users. The majority (80.3%) of respondents had smoked Shisha at least once in the last six months. More than half of the respondents (58%) were influenced by comrades in the first trial of Shisha smoking. The catchy smell, the flavor, and taste of Shisha, and curiosity were the main attractive factors for smoking Shisha among study participants (30%, 29%, & 12%, respectively). However, the major contributory factors to continue smoking Shisha were pleasure and happiness, relief from tension, stress, and boredom, and passing of time (61.3%, 56.6%, & 47.4%, respectively). Study results showed that respondents' residency was a differential significant factor in attitudes, perceptions, and motivation toward experimentation and continuation of Shisha smoking. The vast majority of Penangites perceived that Shisha was purified from harmful substances, Shisha smoking did not irritate the bronchi, and there was no association between Shisha smoking and lung cancer (82.5%, 64.6%, & 62.1%, respectively). About half of the respondents believed that Shisha was less harmful, less addictive, and contained less nicotine than a cigarette (44.1%, 68.9%, & 67.5%, respectively). There is a strong belief among the study population (67.5%) that the popularity of Shisha will increase over the next half-decade. **Conclusion:** High prevalence of Shisha smoking associated with the considerable poor level of knowledge about Shisha use has been noticed among the study population. The results indicated the role played by peers in instigating the testing or using shisha. Study findings affirm the necessity for further research into contributory factors influencing Shisha use.

Keywords: Shisha Smoking, Familiarity, Perception, Prevalence, Malaysia

INTRODUCTION

Waterpipe tobacco smoking (WTS) (Shisha, Hookah & Narghileh) is a centuries-old form of tobacco smoking intuitive to the Middle East and South Asia countries [1]. It is becoming a serious public health problem globally, especially among youth, many of whom believe that WTS is safer than cigarette smoking [2-4]. Health is a significant factor in human beings' life [5]. Waterpipe tobacco smoking (WTS) is associated with several harmful health indicators and outcomes like lung cancer [6-10]. Studies have shown that the use of WTS among adolescents and young adults has increased and was not prioritized as a curtail use. [11-14].

Not much is known about the harbingers of smoking Shisha in the Malaysian community. As for the recent decades of the twentieth century, it has become noticeable within the

Malaysian society with the beginning of the millennium facilitated by the influx of Middle Eastern people into Malaysia [15]. Previous studies indicated that smoking Shisha has become a culture in urban communities, especially among

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adolescents^[16, 17]. However, most of the early information about the Shisha smoking phenomenon in the country is anecdotal. There is a high prevalence of Shisha smoking among Malaysian university students^[18]. Research is needed since the prevalence of WTS has become a common practice adopted by the Malaysian youth and younger population. Hence, this study was designed and carried out to estimate the prevalence of Shisha smoking in Malaysia and to evaluate the familiarity and perception of Shisha smokers towards Shisha smoking. The study also aimed at identifying the socio-demographic characteristics associated with Shisha smoking in Malaysia.

METHODS

Study Design

A cross-sectional survey was carried out using a validated self-administered, bilingual (English & Bahasa Malaysia) questionnaire for approximately one year, until the end of 2016, among Shisha smokers in the two cities of Pulau Penang (Penang Island) and Kuantan, Malaysia, throughout Shisha cafes around both cities. A random sample of 500 participants has been targeted conveniently, divided equally between the two cities. Inclusion criteria included: participants above 18 years old either speak/understand English or Malay language. Those who did not meet any of those criteria were excluded from the study. Participants were briefed about the topic of the survey before the distribution of questionnaires. The confidentiality of the study participants was guaranteed, and informed consent was obtained.

Development of the Questionnaire

A 43-item questionnaire was used for data collection and was piloted with 30 general public for testing its validity and reliability. Experts at Discipline of Social and Administrative School of Pharmaceutical Sciences, Universiti Sains Malaysia, Department of Pharmacy Practice, The Kulliyah of Pharmacy, and International Islamic University Malaysia assessed the validity (face & content) of the questionnaire. Furthermore, the internal consistency was assessed using Cronbach's alpha. With the recommendation of minor changes, reliability testing was conducted for the attitudes and perception responses from the pilot testing. The results showed that the internal consistency of the items tested with Cronbach's α value of 0.76.

The results of the pilot study were not included in the final analysis. The questionnaire was adopted from previous studies and modified to suit the local population^[18-20]. The questionnaire was designed in two language versions: English and Malay (the national language of Malaysia). The English version of the survey was developed initially and was translated into the Malay language. Face and content validation of the questionnaire was done by three senior faculty members (two with expertise in survey & pharmacy practice research and one with clinical expertise & teaching

experience in smoking cessation) and two registered pharmacists (both are clinical pharmacists with expertise in public health). Modifications were made based on the feedback provided, and the consensus was reached following a meeting with all experts who were involved in revising the subjects randomly selected from the study site. From the pilot study, participants were found to be able to understand and answer the questionnaire provided.

Consequently, no further modification of the questionnaire was done before the actual survey. The final draft of the questionnaire contained three parts. **Part 1** obtained the demographic characteristics of the respondents. **Part 2** was designed to assess the knowledge of the participants about Shisha smoking. Participants were requested to choose between two options provided: "true" or "false."

Additionally, three statements were addressing the health effect, addictive effects, and nicotine contents in the water pipe (Shisha) comparing to the regular cigarettes. **Part 3** of the questionnaire consisted of 14 statements to evaluate the perception of the general public of Shisha smokers. A three-point semantic differential scale ranging from "Yes", "No," or "Not decided" was used to assess the responses of the participants.

Ethical Approval

The Institutional Review Board of Management Services Division (MSD), IIUM approved the study. The confidentiality of the study participants was ensured, and informed consent was obtained. However, the subjects that completed and returned the questionnaire were considered as providing consent to participate.

Statistical Analysis

The data were computed and analyzed using Statistical Package for Social Sciences (SPSS version 19.0, SPSS Inc., Chicago, IL, USA). The results of each item on the questionnaire were reported, the mean (\pm SD) was calculated for continuous variables, and frequencies were measured for categorical variables. The Kolmogorov-Smirnov test was used for normality assessment, and non-parametric tests were used accordingly. Any association between groups was examined by the X^2 or Fisher exact tests as appropriate for categorical variables. Data, which emerged from domains using a Likert scale as a measurement, was analyzed statistically as non-parametric data^[21]. A p-value of <0.05 was considered to be of statistical significance.

RESULTS

A total of 500 questionnaires were distributed to the general public at the Shisha cafes in both cities (Pulau Penang & Kuantan), from which 297 (55.8%) agreed to participate in the study. However, 23 of the questionnaires were found incomplete and therefore were excluded from the analysis to avoid fallacious results. The overall usable responses were

(59.4%, N=274). Respondents were from Pulau Penang and Kuantan (n=103, 37.6%, n= 171, 62.4%, respectively).

Socio-demographic Characteristics of the Study Respondents

The majority of the study participants were male (n=225, 82.1%), Malay (n=227, 82.8%) with university or college qualification (n=185, 67.5%), and with an average age of 22.55 years (SD = 4.48). The demographic information of the participants is presented in Table (1).

Familiarity about Shisha

The prevalence of Shisha smoking among study participants was found to be about half (n=135, 49.3%). The vast majority of respondents (n=200, 73%) were under 20 years old when they first smoked tobacco from a Shisha. Most of the respondents (n=215, 78.5%) had smoked Shisha at least once in their lives at Shisha café.

More than half of respondents (n= 159, 58%) had tried Shisha for the first time with more than one friend. The vast majority of Shisha users (n=145, 52.9%) had smoked Shisha almost always in a café or restaurant, while more than one-third of them (n= 104, 38%) smoked Shisha sometimes in café or restaurants and sometimes at home. The vast majority of respondents (n=238, 86.9%) usually shared Shisha with others and had smoked Shisha in the last six months (n=220, 80.3%). About half (n=117, 42.7%) of respondents revealed that they smoked Shisha for more than 60 minutes per session.

Although, about 60% (n=163) of respondents were not curious about tobacco used in Shisha, a large proportion of respondents had started smoking Shisha because they liked the smell and taste of tobacco (n= 172, 62.8% & n=174, 63.5%, respectively). However, about half (n=141, 52.2%) of the respondents had started smoking Shisha because they liked the crafting way of the water pipe as shown in **Figure 1**.

Primary Motivations towards Shisha Smoking

Study results showed that the most common primary motivators for Shisha smoking were pleasure and happiness, relief from tension, stress, and boredom, or the passing of time (n=168, 61.3%; n=155, 56.6% and n= 130, 47.4%, respectively). There was a statistically significant difference between Kuantanians (respondents from Kuantan) and Penangites in view that relief from tension and stress was the most common motivator towards Shisha smoking (p <0.001). However, the majority (67.7%) of Kuantanians believed that relief from stress and tension was the most common reason behind Shisha smoking. The rest of the results have been shown in **Table 2**.

Safety and Health Aspects of Shisha Smoking

The vast majority of study respondents (n=226, 82.5%) thought that Shisha was purified of harmful substances as passing through the water filter. Regarding the question of whether smoking Shisha irritates the airways or not as it contains natural products, a more substantial proportion of study respondents (n=177, 64.6%) answered negatively to this statement. Furthermore, nearly half (n=136, 49.6%) of respondents believed that Shisha smoking might not cause lung cancer. A great statistically significant difference between the two cities' residents' perceptions about the relationship of Shisha smoking to lung cancer was noticed (p<0.001). About half (n=99, 57.9%) of Kuantanians believed that Shisha smoking causes cancer. On the contrary, almost two-thirds (n=64, 62.1%) of Penangites believed that there is no association between Shisha smoking and lung cancer.

Nearly half of the surveyed respondents (n= 124, 45.3%) believed that Shisha smoking caused damage to the respiratory system and transmitted hepatitis infection (n=116, 42.3%). It is worth noting that more than half (n=90, 52.6%) of Penangites believed that Shisha smoking might not transmit hepatitis infection (p=0.030). However, a large proportion of respondents did not believe that Shisha smoking could transmit infection, which caused gastric ulcer or coronary heart diseases (60.6%, 63.5%, respectively). There was moderate evidence of a statistically significant relationship between current education level and the fact that Shisha smoking caused damage to the respiratory system (p=0.028). Slightly more than half of the respondents who had non-formal education (n=13, 52%) agreed that Shisha smoking caused damage to the respiratory system. There was a statistically significant relationship between the current education level and the fact that Shisha smoking might transmit hepatitis infection (p=0.021). Slightly less than half of the respondents who had non-formal education (n=12, 48%) agreed that Shisha smoking might transmit hepatitis infection followed by the university or college-educated respondents (n=85, 45.9%). The complete information about the beliefs towards the health risks of Shisha among study participants is mentioned in **Table 3**.

Perceptions of Shisha Smoking

The study revealed that nearly half (n=121, 44.2%) of respondents believed that cigarettes were more harmful than water-pipe. Analogously, the same percentage of respondents believed that they had the same harmful effects. A statistically significant difference between the two cities' residents concerning the harmful effect of water pipe comparing to compostable cigarettes has been noticed (p<0.001), where only a few (n=3, 2.9%) of Penangites believe that water pipe is more addictive than cigarettes compared to Kuantanians. The vast majority of respondents considered that cigarettes had more addictive effects and more nicotine content than water-pipe. At the same time, about one-quarter of them believed that they were the same regarding addictive effects and nicotine content (69%, 67.5%, 27%, & 27.7%, respectively). There was moderate evidence

of a statistically significant relationship between the current education level and comparing the nicotine content of Shisha and combustible cigarettes ($p=0.018$). The vast majority of respondents with secondary school education ($n=50$, 80.6%) agreed that cigarette smoke had more nicotine than Shisha smoke. However, more than one-third of non-formal educated respondents ($n=9$, 36%) considered that nicotine content was the same, while less than one-fifth of them ($n=4$, 16%) considered that Shisha smoke had more nicotine than cigarette smoke (See **Table 4**).

About two-thirds of respondents agreed that Shisha smoking was socially acceptable in Malaysia compared to cigarettes and offered a good opportunity to meet friends and families (66.1% & 58.4% respectively). There was a statistically significant difference between both cities' residents where more Kuantanians perceived that Shisha smoking was an opportunity to meet family and friends ($p<0.001$). About half of the respondents ($n=139$, 50.7%) agreed that their parents did not object to their smoking of Shisha compared to cigarettes. Kuantan respondents agreed that there was no objection from their parents of Shisha smoking ($p=0.025$). About one-third of respondents ($n=86$, 31.4%) disagreed that their parents allowed them to smoke Shisha at home but not cigarettes. Half of the respondents disagreed that smoking Shisha is considered a sign of maturity ($n=137$, 50%).

The vast majority of respondents ($n=80$, 77.7%) agreed that smoking of Shisha relieved stress and tension, while a low percentage of them ($n=12$, 11.7%) disagreed. There was a statistically significant difference between the two cities' residents, where more Kuantanians thought that Shisha smoking could relieve stress and tension ($p=0.002$). About one-third of respondents ($n=34$, 33%) agreed that Shisha smokers had more friends than non-smokers, while slightly more than one third ($n=38$, 36.9%) disagreed. More than half of respondents ($n=151$, 55.1%) agreed that women smoking Shisha were not as odd as those smoking cigarettes. However, Study findings showed that only the minority of Penang island was not decided ($p<0.001$). There was solid evidence of a statistically significant relationship between gender, and a statement that women smoking Shisha was not odd as those smoking cigarettes ($p<0.001$). The vast majority of female respondents ($n=41$, 83.7%) agreed that women smoking Shisha were not as odd as those smoking cigarettes compared to ($n=110$, 48.9%) males. About less than half of respondents agreed that movie stars smoking Shisha were less offensive than those smoking cigarettes, and respondents preferred smoking Shisha over normal cigarettes because it was easy to get (46.4% & 44.9%, respectively).

There are wide variations of whether the ease of access is the reason for the preference of smoking Shisha over cigarettes among the two cities' populations. A large number of Kuantanians disagreed with the statement ($p=0.005$). There was strong evidence of a statistically significant relationship between gender and preferring Shisha smoking over

cigarettes because it was easy to get ($p=0.006$). About two-thirds of female respondents ($n=32$, 65.3%) agreed that they preferred Shisha smoking over cigarettes because it was easy to get compared to ($n=91$, 40.4%) males. However, less than half of male respondents ($n=93$, 41.3%) disagreed that they preferred Shisha smoking over cigarettes because it was easy to get compared to ($n=13$, 26.5%) females.

Study results showed that there was robust evidence of a statistically significant relationship between gender and a statement that movie stars smoking Shisha were less offensive than those smoking cigarettes ($p<0.001$). More than two-thirds of female respondents ($n=34$, 69.4%) agreed that movie stars smoking Shisha were less offensive than those smoking cigarettes compared to ($n=93$, 41.3%) males.

About two-thirds of respondents ($n=185$, 67.5%) agreed that the use of Shisha to smoke tobacco would be more popular in Malaysia in the next five years, while a low percentage of them ($n=33$, 12%) disagreed. Almost all of the Penangites agreed with the statement compared to about half of Kuantanians ($p<0.001$). There was a statistically significant relationship between the current education level and the statement that in the next five years the use of Shisha smoking to smoke tobacco in Malaysia would be more popular ($p=0.006$). The vast majority of respondents with secondary school education ($n=47$, 75.8%) agreed that in the next five years, the use of Shisha smoking to smoke tobacco in Malaysia would be more popular, followed by the university or college-educated respondents ($n=124$, 67%) (**Table 5**).

There was moderate evidence of a statistically significant relationship between gender and type of smoking ($p=0.015$). Slightly more than two-thirds of females ($n=33$, 67.3%) preferred Shisha only compared to ($n=102$, 45.3%) males.

DISCUSSION

The Limitations of the previous studies were their focus on some of the society components such as university students, school pupils, etc. Thus, it failed to draw a comprehensive picture of the phenomenon. Hence, the need to look for studies conducted at the national level includes different categories of society to help the decision-makers and planners of social policies in the development of effective measures to curb this phenomenon and limit its escalation. This study aimed to identify the determinants of water-pipe smokers in both Penang Island in West Malaysia and the Kuantan city on the east coast of Malaysia. Little is known about the early history of Shisha smoking in Malaysia; it is thought that the phenomenon seemed noticeable in Malaysian society with the beginning of the millennium facilitated by the influx of Middle Eastern people into this country [22, 23]. It is noticeable that smoking Shisha has become a culture in urban communities, especially adolescents [24]. However, most of the early information about Shisha smoking phenomena in the country is anecdotal. In 2011, the Malaysian tobacco adult

survey showed that about one-quarter (n= 4.75 million, 23.1%) of the Malaysian adults aged 15 years and older were current smokers. Furthermore, 40% of them were men. The same survey showed that there was an upward trend in Shisha smoking among Malaysian adults over four years, with a prevalence rate of 5.6% [23, 25]. The previous study reported that there was a high prevalence of Shisha smoking among Malaysian university students. Al-Naggar *et al.*, reported that in Malaysia, the prevalence of Shisha smoking was 30% among university students [18]. A recent study reported that the prevalence of current Shisha smokers was 3.5%, while the prevalence of ever Shisha smokers was 10.6%. Furthermore, the prevalence of current Shisha smokers among adolescents aged 13-15 years old was 4.6%. The same survey showed that the number of smokers among Malaysian adolescents has increased to 15.2 percent from 11.2 percent in 2012. [26].

Despite the similarity in the design of the methods of previous studies and the current study, there were, however, apparent discrepancies in the reported figures, which might be attributed to the characteristics of studies' populations and settings. For instance, this study has been carried out in the Shisha smoking cafes through both cities, and the study population was those who go to the Shisha cafes regularly, which necessarily comprises different age groups. While in the other studies, school children and university students were the main basis for the study population. It seems that Shisha smoking is becoming very common among the study population, where about 41.6% (mean 1.9 ± 0.76 weakly) of them used to smoke Shisha on a weekly base which similar to previously reported data from Saudi Arabia (41.0%) regardless of Saudi peoples having their Shisha set at home [27]. This wide consuming of Shisha could be attributed to the affordability and accessibility to Shisha around both cities of study. Furthermore, the previous study attributed this notable upsurge in Shisha smoking to the fact that Shisha smoking is considered a trend in the Malaysian community, particularly among youth. However, a higher prevalence was reported in a recent Malaysian study, which reported that 68% of university students used Shisha smoking every week [28].

In this study, numerous socio-demographic characteristics (*residency, age, gender, and level of education*) were found to be significantly associated with smoking Shisha habits among study participants. Study findings showed that residency significantly influenced the practice of Shisha smoking among Shisha users. Regarding residency, the previous study from Pakistan showed that that the highest percentage of Shisha smoking was observed among college students with higher socioeconomic status [29], which inconsistent with the study results, more Penangites were Shisha users. Furthermore, Wong *et al.* indicated that Shisha smoking has already become a culture among urban teenagers and gained popularity nationwide [25]. Previous studies had reported similar findings were younger, male, high socioeconomic, and urban groups were associated with Shisha smoking. This study showed that the majority of

participants were accustomed to using Shisha in Shisha cafes, which were common in urban areas, suggesting that Shisha smoking is an urban phenomenon [1].

Study Limitations

The fundamental limitations of this study include a nonrandomized design and a relatively small sample size. Given the small sample size, participants in this study may not be representative of the Malaysian adult population in general. This study is descriptive, and several limitations may affect the ability to generalize the findings. This study relied on self-reporting of the respondents' experience toward Shisha smoking. There could be a potential response bias by the study respondents, i.e. the respondents could have provided a socially desirable response. Furthermore, self-reporting might not necessarily reflect the real practice of the respondents. The Other limitation besides the small sample size is gender and race disproportionate among study respondents. Precautions in interpreting the results of this study are highly advised because the respondents may have exposed to tobacco control awareness campaigns that have not been explored in the present study. Despite these limitations, this study provides preliminary data to help decision-makers in the development of smoking cessation programs in the country.

CONCLUSION

The study findings reveal the attitudes and behavioral variation among Shisha smokers in two different cities in Malaysia. The rate of Shisha smoking among study respondents is comparably high. Poor knowledge and misconception about Shisha smoking impact on general health have been observed. Education about the harmfulness of Shisha smoking and strengthening the implementation of the policies to limit its use are urgently needed. Comrades and cafés around the two cities play a central role in the practice of Shisha smoking. The information generated from this study is valuable for developing smoking prevention and cessation efforts for Shisha smokers; additional educational interventional measures are needed. Longitudinal studies to further clarify the relationship between certain characteristics among Shisha smokers in Malaysia is encouraged. Future researches on the national level to examine Shisha smokers' determinants are necessary to help curb the phenomena.

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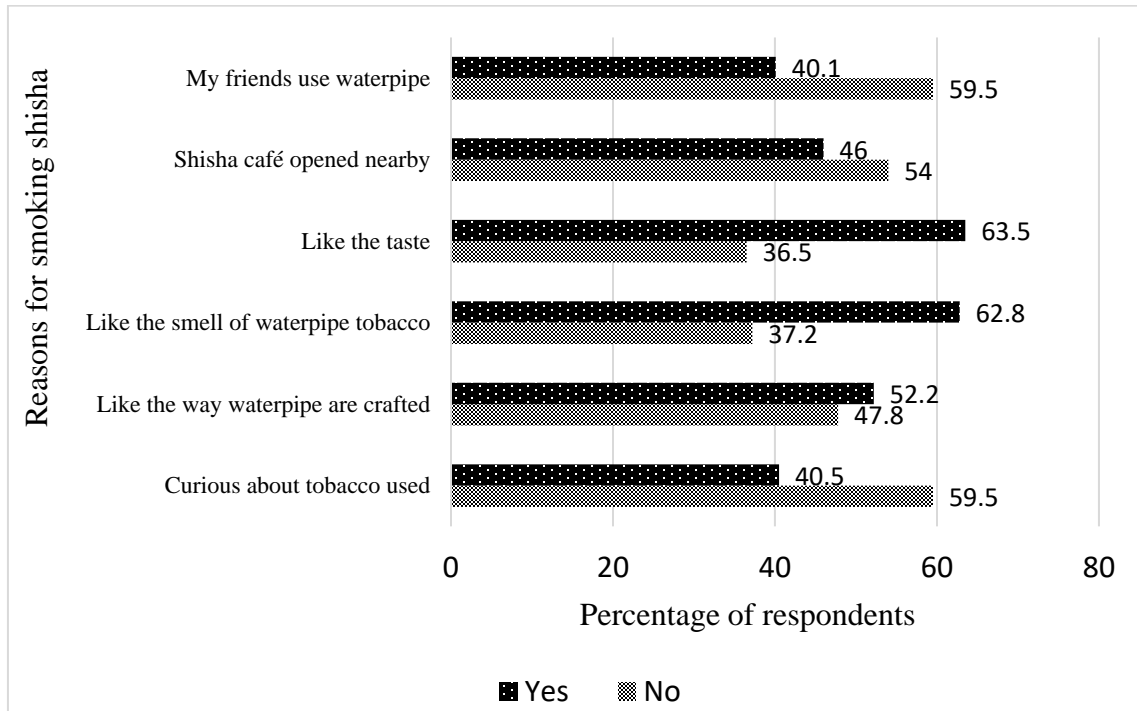


Figure 1: Reported Reasons for Shisha Smoking (%). (Why did you start waterpipe smoking ?)

Table 1: Socio-demographic Characteristics of the Study Participants (N=274)

Variables	Frequency (n)	Percentage (%)
Gender		
Male	225	82.1
Female	49	17.9
Residency		
Pulau Pinang	103	37.6
Kuantan	171	62.4
Age When Started to Smoke Shisha for the First Time		
<20	200	73.0
21- <30	71	25.9
>31	3	1.1
Race/Ethnicity		
Malay	227	82.8
Chinese	19	6.9
Indian	15	5.5
Others	13	4.7
Frequency of Shisha Use		
Monthly	15	14.6
Weekly	51	49.5
Daily	37	35.9
Education Level		
Primary Schooling	2	0.7
Secondary Schooling	62	22.6

	University or College Educated	185	67.5
	Non-formal Education	25	9.1
Shisha Smoking Session Time	< 30 minutes	43	15.7
	31-60 minutes	114	41.6
	> 60 minutes	117	42.7
Have you smoked Shisha at Shisha cafe?	Yes	215	78.5
	No	59	21.5
Smoking Type	Cigarette only	7	2.6
	Shisha only	135	49.3
	Cigarette and Shisha	132	48.2

Table 2: Primary Motivation for Shisha Smoking according to Study Participants Residency (N=274)

Statement	Residency			p- value*				
		Penang f (%)	Kuantan f (%)	Total f (%)	R**	A**	G**	LE**
Meeting Friends and Family	Yes	29 (28.2)	81(47.7)	110(40.1)	0.002	0.277	0.873	0.068
	No	74(71.8)	90(52.6)	164(59.9)				
Outing with Friends and Company	Yes	45(43.7)	64(37.4)	109(39.8)	0.305	0.905	0.036	0.200
	No	58(56.3)	107(62.6)	165(60.2)				
Boredom / Passing of Time	Yes	54(52.4)	76(44.4)	130(47.4)	0.214	0.263	0.385	0.421
	No	49(47.6)	95(55.6)	144(52.6)				
Negligence by the Family	Yes	2(1.9)	100(58.5)	102(37.2)	<0.001	0.002	0.087	0.174
	No	101(98.1)	71(41.5)	172(62.8)				
Imitations of Father and Brothers	Yes	0(0)	59(34.5)	59(21.5)	<0.001	0.194	0.639	0.938
	No	103(100)	112(65.5)	215(78.5)				
Relieve of Tension and Stresses	Yes	40(38.8)	115(67.3)	155(56.6)	<0.001	0.257	0.037	0.217
	No	63(61.2)	56(32.7)	119(43.4)				
Emotional and Family Problems	Yes	9(8.7)	116(67.8)	125(45.6)	<0.001	0.043	0.907	0.674
	No	94(91.3)	55(32.2)	149(54.4)				
Pleasure and Happiness	Yes	56(54.4)	112(65.5)	168(61.3)	0.067	0.633	0.053	0.380
	No	47(45.6)	59(34.5)	106(38.7)				

*Chi square test; **R= residency, A= age, G= gender and LE=Level of education

Table 3: Beliefs towards the Health risks of Shisha among Study Participants (n=247)

Statement	P. Penang (n=103) Kuantan (n=171)				P- value*			
	Agree	Disagree	Agree	Disagree	R**	A**	G**	LE**
	f (%)	f (%)	f (%)	f (%)				
Shisha is purified of harmful substances as passing through water filter.	84(81.6)	19(18.4)	142(83.0)	29(17.0)	0.754	0.510	0.557	0.462
Shisha smoking does not irritate the bronchi as it contains natural flavors and less nicotine and tar.	79(76.7)	24(23.3)	98(57.3)	73(42.7)	0.001	0.165	0.152	0.314
Shisha smoking does not cause lung cancer.	64(62.1)	39(37.9)	72(42.1)	99(57.9)	0.001	1.000	0.464	0.141

Shisha smoking causes damage to the respiratory system.	40(38.8)	63(61.2)	84(49.1)	87(50.9)	0.097	0.272	0.371	0.028
Shisha smoking may transmit hepatitis infection.	35(34.0)	68(66.0)	81(47.1)	90(52.6)	0.030	0.336	0.812	0.021
Shisha smoking is a leading cause of pharyngeal (Mouth Cavity) cancer.	32(31.1)	71(68.8)	64(37.4)	107(62.6)	0.285	0.688	0.956	0.088
Infection that causes gastric ulcer can be transmitted through Shisha smoking.	32(31.1)	71(68.9)	76(44.4)	95(55.6)	0.028	0.655	0.586	0.020
Shisha smoking does not cause coronary heart diseases as cigarettes.	74(71.8)	29(28.2)	100(58.5)	71(41.5)	0.026	0.723	0.772	0.002

*Chi square test; **R= residency, A= age, G= gender and LE=Level of education

Table 4: Perception towards the Health Risks of Waterpipe Smoking among Waterpipe Smokers with regard to their Residency (n=274)

Statement	Penang (n=103)	Kuantan (n=171)	Total n(%)	*P-value			
	f(%)	f(%)		**R	**A	**G	**LE
How do you compare the HEALTH EFFECTS of smoking tobacco using a waterpipe with the HEALTH EFFECTS of cigarette smoking?							
Cigarettes are more harmful than Waterpipe.	62(60.2)	59(34.5)	121(44.2)				
They are pretty much the same.	32(31.1)	89(52.0)	121(44.2)	<0.001	0.611	0.247	0.340
Waterpipe is more harmful than cigarette.	9(8.7)	23(13.5)	32(11.7)				
How do you compare the ADDICTIVE EFFECTS of smoking tobacco using a waterpipe with the ADDICTIVE EFFECTS of cigarette smoking?							
Cigarettes are more addictive than Waterpipe.	74(71.8)	115(67.3)	189(69.0)				
They are pretty much the same.	26(25.2)	48(28.1)	74(20.0)	0.642	0.957	0.051	0.082
Waterpipe is more addictive than smoking cigarettes.	3(2.9)	8(4.7)	11(4.0)				
How do you compare the NICOTINE in the smoke from a waterpipe with the NICOTINE in the smoke from a cigarette?							
Cigarette smoke has more nicotine than waterpipe smoke.	69(67.0)	116(67.8)	185(67.5)				
They are pretty much the same.	31(30.1)	45(26.3)	76(27.7)	0.471	0.856	0.574	0.018
Waterpipe smoke has more nicotine than cigarette smoke.	3(2.9)	10(5.8)	13(4.7)				

*Chi square test; **R= residency, A= age, G= gender and LE=Level of education

Table 5: Perception towards Shisha among Study Participants (N=247)

Statement	Penang (n=103)			Kuantan (n=171)			P* Value			
	Agree	Disagree	Not Decide	Agree	Disagree	Not Decide	R**	A**	G**	LE**
	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)				
Shisha smoking is acceptable by the society compared to cigarettes.	69(67.0)	10(9.7)	24(23.3)	112(65.5)	20(11.7)	39(22.8)	0.878	0.290	0.052	0.482
Shisha smoking represents a good opportunity to meet friends and family.	74(71.8)	11(10.7)	18(17.5)	86(50.3)	53(31.0)	32(18.7)	0.001	0.381	0.332	0.253
My parents would not object my smoking of Shisha compared to cigarettes.	62(60.2)	25(24.3)	16(15.5)	77(45.0)	46(26.9)	48(28.1)	0.025	0.332	0.438	0.246
My parents would allow me to smoke Shisha at home but not cigarettes.	33(32.0)	44(42.7)	26(25.2)	53(31.0)	68(39.8)	50(29.2)	0.767	0.673	0.951	0.296
Shisha smoking is a sign of maturity.	31(30.1)	47(45.6)	25(24.3)	34(19.9)	90(52.6)	47(27.5)	0.156	0.435	0.626	0.548

Smoking of Shisha relieves stress and tension.	80(77.7)	12(11.7)	11(10.7)	96(56.1)	39(22.8)	36(21.1)	0.002	0.917	0.705	0.349
Shisha smokers have more friends than non-smokers.	34(33.0)	38(36.9)	31(30.1)	50(29.2)	72(42.1)	49(28.7)	0.677	0.164	0.164	0.292
Women smoking Shisha are not odds as those smoking cigarettes.	72(69.9)	23(22.3)	8(7.8)	79(46.2)	54(31.6)	38(22.2)	<0.001	0.729	0.001	0.144
Movie stars smoking Shisha are less offensive than those smoking cigarettes.	47(45.6)	24(23.3)	32(31.1)	80(46.8)	49(28.7)	42(24.6)	0.424	0.684	0.001	0.328
I prefer Shisha smoking over cigarettes because it is easy to get!	59(57.3)	29(28.2)	15(14.6)	64(37.4)	77(45.0)	30(17.5)	0.005	0.113	0.006	0.655
In the next five years, I think the use of Shisha to smoke tobacco in the Malaysia will be More popular.	86(83.5)	4(3.9)	13(12.6)	99(57.9)	29(17.0)	43(25.1)	0.001	0.823	0.502	0.006

*Chi square test; **R= residency, A= age, G= gender and LE=Level of education