

# Individual and Social Determinants of Water-Pipe Smoking among Medical Student at King Saud University

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**Abstract:** Several factors may contribute to the rising of water-pipe smoking. **Objectives:** Several factors may contribute to the rising of water pipe smoking. The objectives of our study were to determine the prevalence, individual and social factors of water pipe smoking among undergraduate medical students of King Saud University in Riyadh, Saudi Arabia. **Methods:** A cross-sectional descriptive/analytical study was done among a representative sample of 408 male and female undergraduate medical students. A simple random sampling method was used to select the participants. A self-administered questionnaire was constructed based on the National Youth Tobacco Survey in the United States. Multiple logistic regression analysis was performed to analyze the data. **Results:** The prevalence of water-pipe smoking among medical students was 11.8% for males and 2% for females. Factors associated with water pipe smoking were water pipe smoking among siblings (OR=6.6; 95% CI = 2.3 – 18.2), parents (OR=4.6; 95% CI = 1.7 – 12.0), and close friend (OR=65.7; 95% CI = 8.8 – 490.0). The odds of water pipe smoking among the 5<sup>th</sup> year students were five times higher (OR = 5.5; 95% CI = 1.4 – 24.6) compared to other years. Students whose parents were widowed had 4.2-fold (95% CI = 1.2- 13.7) odds of water pipe smoking compared to students with full families. **Conclusion:** Social determinants, such as water pipe smoking among siblings, parents and close friends, as well as individual factors such as years of a study and parental marital status were associated with water pipe smoking among undergraduate medical students. Our finding can potentially improve tobacco control programs in Saudi Arabia and decrease the prevalence of water pipe smoking among students.

**Keywords:** Water pipe, Smoking

## 1. Introduction

Water-pipe (which is called hookah and shisha as well) smoking started in the North Western provinces of India. In addition, Smoking the hookah has spread outside of its native region, in India, Iran, Pakistan and the Middle East, and is gaining popularity in North America, South America, Europe, Australia and South Africa.

Tobacco smoking (including all forms such as: water pipe smoking and cigarette) is one of the major causes of death worldwide (2). In addition, many chronic diseases can be caused by tobacco smoking especially water pipe smoking such as: Pulmonary, cardiac diseases, several types of cancer and non-neoplastic pathologies(3, 4). Also, 4.9 million deaths a year due to tobacco use was reported by world health organization (WHO) in 2001, there are many researches show that the prevalence of water pipe smoking is increasing in the last few years and it is expected to rise up to 10 million by 2030(5).

In 2010, a study shows the prevalence of water pipe smoking was 37.5% among non-medical students(6) However, it was mentioned that this percentage is influenced by multifactor such as: gender, presence of cigarette and water pipe smoking among family and friends (5, 4). It was discovered that the cigarette smokers are less than water pipe smokers among medical students(7). Some school students believe that the water pipe smoking is less harmful than the cigarette in addition to the social acceptance for the water pipe smoking in comparison to cigarette smoking (4).

Furthermore, a study shows that cigarette and water pipe smoking prevalence rate of 61.9% for males and 10.7% for females(8). Another study shows that 414 university students were reported as water pipe smokers(9). It was also mentioned that 20.7% of water pipe smokers smoked on daily basis and 23.8%

Weekly (6). However, the prevalence of smoking among health professionals, including medical students, is higher than the general population (2).

A study showed that the prevalence of water pipe was 28.6% among medical students; it was influenced by the presence of water pipe smoking among family and friends (5). Another study showed that the overall prevalence of tobacco use among medical students were 10.9% for cigarette and 23.5% for water pipe and 7.3% for both (1). In 2010, it was reported that 17.6% of medical students were water pipe smokers (6). Furthermore, it was mentioned that smoking tobacco was in older age medical students than younger age year students (1, 4).

In 2011, a study was done among male medical students which showed a result of 12.6% was reported as Shisha smokers and 4% were smoking both shisha and cigarette. In addition, it was mentioned that the percentage of smokers who started smoking at age 16 – 18 years old was 63.8% and the percentage of daily smokers was 15%(10).

There are many factors that lead the student to smoke using water-pipe. In 2010 study shows that outings with friends, company, boredom and wasting time considers as a Primary motives of shisha smoking. It is also found that knowledge

about health hazards of water-pipe smoking was low, regardless of smoking status. Also (37.8%) believe that it relieves stress and tensions.

## 2. Rationale

Smoking is getting spread over time among the developing countries. A high prevalence of water pipe smoking is shown in these countries, especially among students of middle-aged adults. A study was conducted in KSU has conclude that the prevalence of tobacco smoking among students is 14.5% (11). Furthermore, tobacco (in both forms of cigarette and water pipe smoking) has a very significant effect on the health. It considered as one of the most factors that cause cancers and other serious chronic diseases. We have determined the prevalence of smoking water pipe among medical students at KSU. In addition to the individual and social factors that lead them to smoke.

## 3. Methodology

### Study Design

We have used a cross-sectional study design (quantitative [observational]), in order to assess the prevalence and to identify the social and individual factors associated with water pipe smoking among the medical students of the KSU.

### Study Setting

We reached our study population in the lecture halls, after the lectures, and conduct the interview in the nearby available study rooms in the College of Medicine building - KSU in Riyadh, Saudi Arabia. We collected the data on Saturday 2<sup>nd</sup> of February with an estimated duration of 15 days.

### Target Population

We have targeted medical students at KSU including male and female students from all medical years (from 1<sup>st</sup> until 5<sup>th</sup>).

The medical students who we chose in our pilot study were excluded from the study.

### Sampling Design

We conducted a stratified proportionate random sampling of the study elements from list of students obtained from the Medical Education Department, using a random number generator of MS Excel program (2010)

### Sample Size:

We have conducted the study among 380 medical students. We used the formula for a single proportion to calculate our sample size. The single proportional formula is:

$$n = \frac{z_a^2 p(1-p)}{d^2}$$

Where, d= (precision) = 5%,  $Z_a=1.96$  because we used a 95% confidence interval, p= (proportion) = 54%, that we got from our literature search (5).

### Final Sample Size

We increased the sample size by 26% which will result in final sample size of 500 to overcome low response rate (2)

### Data Collection Methods

We constructed our questionnaire based on different valid and reliable questionnaires regarding tobacco use including from the National Health and Nutrition Examination Survey, World Health Organization Global Youth Tobacco Survey, and Oxford Happiness Questionnaire.

Our questionnaire was divided into three main sections which are personal data, smoking history and possible social and individual factors, in personal data section we will ask about the main data e.g. age, gender, residency and socioeconomic status of the subjects and their families. While in smoking history section we will try to figure out if they have ever tried water-pipe smoking or other type of smoking and the age of starting, frequency and the amount of smoking. Social and individual factors section we will explore the social and individual factors by asking about the cause, the purpose and if there are any triggers to smoke. Also we want to know if there is any relation between living alone far from the family and smoking. To determine social factors, we will ask our subjects if their family members or close friends are smokers and the effect of advertising in the internet, news paper and television of being a smoker. At the end we will ask smoker subjects if they intend to quit smoking or not.

### Pilot Study

We distributed a pilot study on 20 medical students to test the questionnaire and logistics of data collection, suitability / clarity of data collection tools, estimation of timing for data collection and then they were excluded from the study.

### Study Variables

The outcome of the study is to measure water-pipe smoking status among medical students at KSU. Also we studied the effect of social and individual factors on medical students at KSU who smoke water pipe such as ; gender, family residency, family exposure, close friend exposure, socioeconomic state, advertising in the ( internet, news paper and television), etc.

### Data Analysis

Data were coded and analyzed by using SPSS version 21 to do some descriptive statistic, cross tables and weighting the variables. Also, the Odds ratios were obtained by using Epi Info software version 3.5.4.

### Ethical Considerations

- 1) Participants anonymity was assured by using code numbers rather than names for analysis only.
- 2) Written consent was obtained from the respondents, and they were informed them that they can refuse to participate or answer on any question at any point.
- 3) No incentives or rewards were given to participant.
- 4) This study was approved by the Institutional Review Board of the King Saud University.

## 4. Results

### Background Data

Out of 500 medical students approached, both males and females, 408 students completed the questionnaire, with a

response rate of about 81.5%. There were 209 male and 198 female participants from the first to the fifth year in approximately equal percentages of the medical school with mean age of 21.6 (SD 1.45) for male and 21.83 (SD 1.53) for female. Most of the students' families (89.7%) were living in Riyadh and the majority of them around (97%) were single and with little percent of married student the female (4.4%) was much more than male (0.8%). In addition, most of the students (90.7%) were living with their families and approximately half of them had an household income of more than SAR 25,000. As seen in Table1, 71.6% of students were physically inactive or had some light physical activity, with males generally more physically active than females and the BMI level tend to be more in males than females (26.5 vs. 22.5).

### Prevalence of Smoking

The overall number of regular water-pipe smokers was 25 (11.8%) of male and 4 (2%) of female medical students (Table 2). However, there was small percentage of cigarette smoking among male students only (6.8%). Moreover, most of the male students who were currently smoke water-pipe they started to smoke before college (52.4%) unlike all of the females that tend to start smoking after joining the college.(Table XXX). However, 56 (26.9%) of male and 21 (10.6%) of female responded that they did try water-pipe in the past, but only small percentage of them continuo to smoke. On the other hand, there were a good percentage of the overall family members who smoke in general (43.6%) of male family member and (52%) of female family member. Also, water-pipe smoking among students' fathers was (4.9%) in male and (6.6%) in females and the mothers and brother also had some percentages of water-pipe smoking.

### Prevalence of Happiness

In Table (3), the study show in different type of happiness level among the medical student including male and female. Most of male (71.7%) and female (66.1%) disagreed on feeling of unpleased. Also, (76.5%) male and (83.3%) female agreed upon felt that life is rewarding and (76.6%) male and (81.8%) female agreed on their satisfaction about everything. Moreover, (66%) male and (81.2%) female disagreed on didn't think that they look attractive and also (78.1%) male and (87.5%) female disagreed on didn't have happy memory in the past. Furthermore, most of the male and female student agreed in finding beauty in life, can fit in everything that they want and feeling of fully mental alter.

### Individual Factors

Table 4 shows the effects of the individual factors (Medical year, marital status, current living, total income and parent current marital status) on water-pipe smoking among

medical students. Medical year show a fluctuation trend that start from 1st year by (3.4%) and increased in second year to (5.1%) and decreased in 3rd and 4<sup>th</sup> to (4.2%) year and finally a big increased in 5th year (16.9%) with significant OR (Odds Ratio) = (5.46) and 95%CI (Confidence Interval) = (1.42–24.57), so the risk to smoke water-pipe is five time higher when being in 5th year than the others. Almost every current water-pipe smoker was single in compare to married smoker. The study shows those water-pipe smokers who living in dormitory (8.7%) have more risk to smoke water-pipe than whom living with their families (6.2%) with (OR = 1.44; 95%CI = 0.15-6.5). The total income of the household seems to have no risk in being water-pipe smoker as the study shows almost equal income to all current smokers. However, our study shows that if the parent status were widow (22.7%) the risk of being water-pipe smoker is four time more than if the parent were married with ( OR = 4.22; 95%CI = 1.23-13.68). Furthermore, the majority of current water-pipe smokers have started smoking before joining the college (52.4%) and the rest was started through the studying years.

### Social factors

There are so many social factors that can be associated with water-pipe smoking among medical students such as (family member smoking including the parents and sibling, number of close friends who are smoker, physical activity in leisure time and the mood of the person and how happy he/she is). In Table 5, it shows that the number of water-pipe smoker who had a family member smoker (9.3%) was more than in case of no family member smoke (4.8%) with (OR = 2.01; 95%CI = 0.85-4.83). In addition, specifically there was about four times risk increase of water-pipe smoking if the parents were water-pipe smoker (22.6%) in compare to the parents who were non smoker (6%) with (OR = 4.56; 95%CI = 1.68-11.96)). Surprisingly, our study shows that the effect of sibling (brother and sister) is very high by which if the sibling were water-pipe smoker the risk were about six times to be a water-pipe smoker (29.17%) in compare to who smoke with non smoker siblings (brother and sister) (5.85%) with ( OR = 6.63; 95%CI = 2.34-18.25). However, the effect of close friends is also considered to be high as the number of water-pipe smoker with smoker friend (20.3%) is much more than with non smoker friend (0.4%) with ( OR = 65.72; 95%CI = 9.37-1316.56). Moreover, physical activity during leisure time were found to effect the water-pipe smoker in which number of smokers in hard physically active students (16%) were higher than number of smokers whom physically inactive (4.2%) with ( OR =4.34; 95%CI = 0.89-20.88) In regarding the happiness status of the student, there were no much significantly difference between water-pipe smoker and non smoker.

**Table 1:** Socio-Demographic Characteristics for Water-pipe smoking among KSU medical student, 2013

Variables	Male (209)	Female(198)
Age (Mean±SD)	21.6±1.45	21.83±1.53
BMI (Mean±SD)	26.54±5.87	22.45±4.40
Family living, N (%)		
Riyadh	180 (88.3%)	186 (94%)
Other	24 (11.7%)	6 (3%)
Medical year, N (%)		
1 <sup>st</sup>	43 (20.8%)	44 (22.3%)
2 <sup>nd</sup>	36 (17.3%)	42 (21.1%)
3 <sup>rd</sup>	39 (18.5%)	32 (16.3%)
4 <sup>th</sup>	36 (17.3%)	35 (17.5%)
5 <sup>th</sup>	54 (26.1%)	45 (22.9%)
Marital Status, N (%)		
Single	207 (99.2%)	187 (94.6%)
Married	2 (0.8%)	9 (4.4%)
Engaged	0	2 (1%)
Income of entire household (SAR), N (%)		
5,000 or less	14 (6.9%)	6 (3%)
5,001-15,000	37 (17.8%)	28 (14.1%)
15,001-25,000	47 (22.7%)	31 (15.7%)
25,001-35,000	26 (12.5%)	29 (14.6%)
35,001-45,000	30 (14.2%)	35 (17.7%)
45,001 or more	47 (22.8%)	59 (29.8%)
Current living, N (%)		
Dormitory	21 (10%)	3 (1.5%)
With family	179 (85.7%)	191 (96.5%)
Other	7 (3.5%)	4 (2%)
Parent's current marital status, N (%)		
Married	184 (88.4%)	171 (86.4%)
Divorced	6 (2.7%)	11 (5.6%)
Separated	1 (0.4%)	5 (2.5%)
Widowed	16 (7.7%)	6 (3%)

**Table 2:** Smoking profile for Water-pipe smoking among KSU medical student, 2013

Variables	Male	Female
Start water-pipe smoking, N (%)		
Before college	11 (52.4%)	0
1 <sup>st</sup> year	3 (14.3%)	1 (25%)
2 <sup>nd</sup> year	2 (9.5%)	1 (25%)
3 <sup>rd</sup> year	1 (4.8%)	0
4 <sup>th</sup> year	2 (9.5%)	2 (50%)
5 <sup>th</sup> year	2 (9.5%)	0
Ever smoke water-pipe, N (%)		
Yes	56 (26.9%)	21 (10.6%)
No	152 (73.1%)	177 (89.4%)
Current smoke water-pipe, N (%)		
Yes	25 (12%)	4 (2%)
No	181 (88%)	194 (98%)
Current smoke cigarette, N (%)		
Yes	14 (6.8%)	0
No	192 (93.2%)	198 (100%)
Current smoke cigar, N (%)		
Yes	0	0
No	207 (100%)	198 (100%)
Family members smoke, N (%)		
Yes	91 (43.6%)	103 (52.6%)
No	118(56.4%)	93 (47.4%)
Father smoke, N (%)		
Cigarette	27 (13.2%)	38 (19.2%)
Water-pipe	10 (4.9%)	13 (6.6%)
Non smoker	167 (81.8%)	145 (73.2%)
Mother smoke, N (%)		
Cigarette	2 (1%)	2 (1%)
Water-pipe	2 (1%)	5 (2.5%)
Non smoker	205 (98%)	190 (96.5%)
Brother smoke, N (%)		

Cigarette	42 (20.1%)	38 (19.2%)
Water-pipe	10 (4.7%)	6 (3%)
Non smoker	147 (70.4%)	146 (73.7%)
Sister smoke, N (%)		
Cigarette	2 (0.8%)	1 (0.5%)
Water-pipe	2 (1.1%)	5 (2.5%)
Non smoker	205 (98.1%)	192 (97%)
Other smoke, N (%)		
Cigarette	5 (2.4%)	8 (4%)
Water-pipe	0	5 (2.5%)
Non smoker	203 (97.1%)	180 (90.9%)

**Table 3:** Individual Factors for Water-pipe smoking among KSU medical student, 2013

Variables	Male	Female
I don't feel particularly pleased...., N (%)		
Disagree	142 (71.7%)	127 (66.1%)
Agree	56 (28.3%)	65 (33.9%)
I feel that life is very rewarding, N (%)		
Disagree	46 (23.5%)	32 (16.7%)
Agree	150 (76.5%)	160 (83.3%)
I am well satisfied about everything, N (%)		
Disagree	46 (23.4%)	35 (18.2%)
Agree	151 (76.6%)	157 (81.8%)
I don't think I look attractive, N (%)		
Disagree	128 (66%)	156 (81.2%)
Agree	66 (34%)	36 (18.8%)
I find beauty in some things, N (%)		
Disagree	19 (9.7%)	16 (8.4%)
Agree	177 (90.3%)	175 (91.6%)
I can fit in everything I want to, N (%)		
Disagree	47 (24%)	52 (26.9%)
Agree	149 (76%)	141 (73.1%)
I feel fully mentally alert, N (%)		
Disagree	40 (20.4%)	33 (17.4%)
Agree	156 (79.6%)	157 (82.6%)
I do not have particularly happy...., N (%)		
Disagree	153 (78.1%)	168 (87.5%)
(Agree)	43 (21.9%)	24 (12.5%)
Physical activity during leisure time, N (%)		
Physically inactive	46 (22.2%)	75 (37.9%)
Some light physical activity	91 (43.6%)	80 (40.4%)
Regular physical activity and training	41 (19.7%)	24 (12.1%)
Regular hard physical training for competition sports	18 (8.7%)	7 (3.5%)

**Table 4:** Individual factors for Water-pipe smoking among KSU medical student, 2013

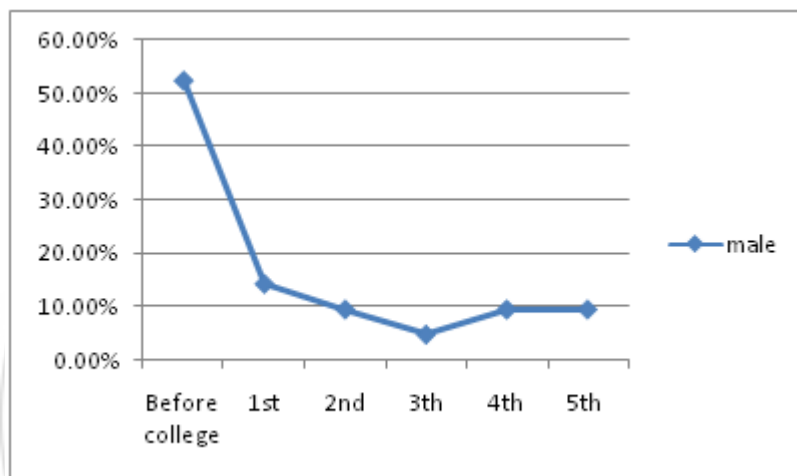
Variables	Water pipe smoker		
	Yes	No	OR (95%CI)
Medical year			
First	3 (3.4%)	84 (96.6%)	Reference
Second	4(5.1%)	74 (94.9%)	2.38(0.43-14.13)
Third	3(4.2%)	68 (95.8%)	1.24(0.19-7.97)
Fourth	3(4.2%)	68 (95.8%)	1.24(0.19-7.97)
Fifth	16(16.3%)	82 (83.7%)	5.46(1.42-24.57)
Marital status			
Single	27 (6.9%)	365 (93.1%)	Reference
Married	1(10%)	9 (90%)	1.50(0.03-11.55)*
Engaged	1(50%)	1 (50%)	13.52(0.17-1063.81)*
Current living			
With family	23(6.2%)	347(93.8%)	Reference
Dormitory	2(8.7%)	21(91.3%)	1.44(0.15-6.5)*
Other	3 (33.3%)	6 (66.7%)	7.54(1.39-37.25)
Income of household (SAR)			
5,000 or less	2(10%)	18 (90%)	Reference
5,001-15,000	4(6.2%)	61(93.8%)	0.59(0.08-5.10)
15,001-25,000	2(2.6%)	76(97.4%)	0.24(0.02-2.57)
25,001-35,000	1(1.8%)	55(98.2%)	0.16(0.01-2.52)
35,001-45,000	5(7.7%)	60 (92.3%)	0.75(0.11-6.15)
More than 45,000	13(12.3%)	93(87.7%)	1.26(0.24-8.84)
Parent current marital status			
Married	23(6.5%)	330(93.5%)	Reference
Divorced	0	17(100%)	-----
Separated	0	6(100%)	-----
Widowed	5(22.7%)	17(77.3%)	4.22(1.23-13.68)
Start smoking			
Before college	10(24.4%)	31(75.6%)	Reference
First	4(33.3%)	8(66.7%)	1.55(0.31-7.57)
Second	4(50%)	4(50%)	3.10(0.52-19.04)
Third	1(25%)	3(75%)	1.03(0.02-14.64)*
Fourth	5(100%)	0	-----
Fifth	3(30%)	7(70%)	1.33(0.22-7.49)

\*Fisher Exact

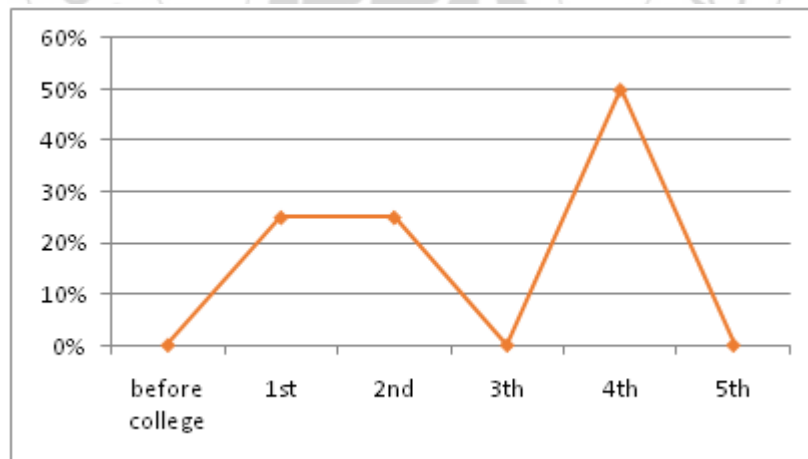
**Table 5:** Social factors for Water-pipe smoking among KSU medical student, 2013

Variables	Water pipe smoker		
	Yes, N (%)	No, N (%)	OR (95%CI)
Family members smoke			
Yes	18 (9.3%)	176 (90.7%)	2.01(0.85-4.83)
No	10 (4.8%)	197 (95.2%)	Reference
Parents smoke			
Water-pipe	7 (22.6%)	24 (77.4%)	4.56(1.68-11.96)
Non smoker	42 (6%)	657 (94%)	Reference
Sibling smoke			
Water-pipe	7 (29.17%)	17 (70.83%)	6.63(2.34-18.25)
Non smoker	40 (5.85%)	644 (94.15%)	Reference
I don't feel particularly pleased with the way I am			
Disagree	17 (6.3%)	252 (93.7%)	Reference
Agree	8 (6.6%)	113 (93.4%)	1.04(0.44-2.50)
I feel that life is very rewarding			
Disagree	7 (9.1%)	70 (90.9%)	Reference
Agree	18 (5.8%)	292 (94.2%)	0.61(0.24-1.53)
I am well satisfied about everything in my life			
Disagree	8 (10%)	72 (90%)	Reference
Agree	17 (5.5%)	292 (94.5%)	0.52(0.21-1.26)
I don't think I look attractive			
Disagree	17 (6%)	267 (94%)	Reference
Agree	7 (6.9%)	95 (93.1%)	1.15(0.46-2.87)
I find beauty in some things			
Disagree	2 (5.9%)	32 (94.1%)	Reference
Agree	22 (6.2%)	331 (93.8%)	1.06(0.23-6.86)
I can fit in everything I want to			

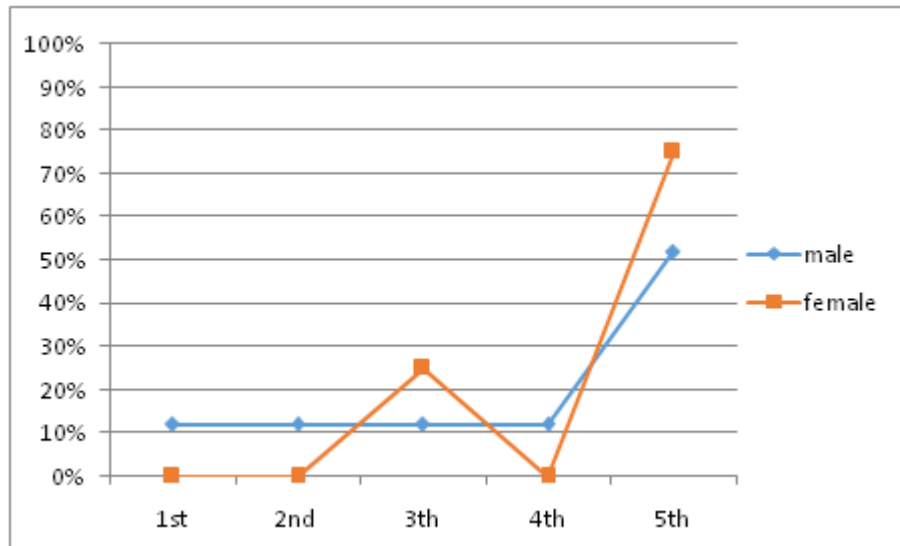
Disagree Agree	5 (5.1%) 19 (6.5%)	93 (94.9%) 272 (93.5%)	Reference 1.3(0.44-4.1)
I feel fully mentally alert			
Disagree Agree	7 (9.7%) 17 (5.4%)	65 (90.3%) 297 (94.6%)	Reference 0.53(0.21-1.48)
I do not have particularly happy memories of the past			
Disagree Agree	22 (6.9%) 2 (3%)	299 (93.1%) 65 (97%)	Reference 0.42(0.07-1.9)
Physical activity during leisure time			
Physically inactive	5 (4.2%)	114 (95.8%)	Reference
Some light physical activity	12 (7%)	159 (93%)	1.72(0.54-5.78)
Regular physical activity and training	5 (7.7%)	60 (92.3%)	1.90(0.45-7.95)
Regular hard physical training for competition sports	4 (16%)	21 (84%)	4.34(0.89-20.88)
Close friends smoker			
Yes	27 (20.3%)	106 (79.7%)	65.72(9.37-1316.56)
No	1 (0.4%)	258 (99.6%)	Reference



Male trend of starting water-pipe smoking



Female trend of starting water-pipe smoking



Trend shows the prevalence of smoking throughout all medical year among students

## 5. Discussion

Several factors may contribute to the rising of water-pipe use in the popularity. Water-pipe is cheap and widely available, facilitating its use among youth and individuals. In 2010, a study shows the prevalence of water pipe smoking was 37.5% among non-medical students(6) and a study shows that cigarette and water pipe smoking prevalence rate of 61.9% for males and 10.7% for females(8). Another study shows that 414 university students were reported as water pipe smokers (9) the study showed among Medical students it was reported that the prevalence of water pipe was 28.6%(5) which shows that is our estimate indicate the prevalence of smoking water pipe less in KSU medical students 12.1% . In 2011, a study was done among male medical students which showed results of 12.6% were reported as Shisha smokers and 4% were smoking both shisha and cigarette. This seems to agree with our estimate of 12% male students are water pipe smoker.

Therewith, such estimates are still high among young educated adults who should be role models for their community, fighting tobacco use rather than using it.

In bivariate analysis showed that the parents' marital statuses significantly influenced the practice of smoking water pipe among medical students in our study. Further analysis showed marital status did not significantly influence the practice of water pipe smoking among Malaysian University Students (8). In addition, we noticed some statistically significant raising trend of water-pipe Smoking a risk of 1<sup>st</sup> year students to 5<sup>th</sup> year students which the prevalence in 1<sup>st</sup> year is 3.4% and it became 16% in 5<sup>th</sup> year. It similar with finding was reported in Smoking among Saudi university students study (7). Furthermore, we observed is the living status is a significant and our study showed increasing of water pipe smoking in whom living in dormitory (8.7%) or alone without family(33.3%) more than those living with their family(6.2%) . There is a study showed that the living status did not significant in smoking among university students (8). As well, in our study we noticed also the Income of household is not a significant in water pipe smoking. Nevertheless, in another study finding that the

students with high family income had a higher practice of water pipe smoking compared to those with lower monthly family income(8).

There is a significant association between having a family member smoker and becoming a water-pipe smoker. We found in our study that the effect of the parents who smoke water-pipe on being a water-pipe smoker is high(22.6%) with OR (4.56), also the effect of the sibling who smoke water-pipe is high(29.17%) with more significant OR (6.63). In addition, a similar finding was reported from Saudi study of smoking tobacco among Saudi university students<sup>(11)</sup> in which the effect of the parents who smoke water-pipe on being a water-pipe smoker was almost similar(26.22%) and the effect of the sibling who smoke water-pipe(24.7%) is slightly lower significant in compare to our study. Also in our study, the effect of close friends who smoke water-pipe on being a water-pipe smoker is significant (20.3%) but not as significant as what was reported from Saudi study of smoking tobacco among Saudi university students<sup>(11)</sup> which shows the effect of peer pressure (having a smoking friend) on being a smoker is (32%). Furthermore, there is an interesting finding in our study which is 81.8% of water-pipe smokers are physically active ranging from some light physical activity to Regular hard physical training for competition sports which is not explained by other studies.

## 6. Conclusion and Recommendations

The initiation of water-pipe smoking among KSU medical students while studying in the university is 63%. According to our study we found out those most relevant risk factors is the effect of family members (parents, sibling) and close friends among medical student. Also many studies shows that tobacco smoking including water-pipe started increasing among medical students who supposed to be more educated about the tobacco toxicity and the outcome diseases. Finally, the communities should work hardly to know the real predisposing factors for tobacco smoking including water-pipe and why it is increasing among educated people (medical students) and starting the prevention programs to reduce the incidence and the prevalence of tobacco use



including water-pipe smoking and to educate and advise the people to quit smoking because they don't only harm themselves, they actually harm everybody around them from sons, daughters, brothers, sisters and friends.

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