***Prevalence and factors associated with Shisha* (Waterpipe) smoking among students in tertiary institutions: a cross-sectional study in Buea, Cameroon.**

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**ABSTRACT**

**Background:** Globally, tobacco smoking is a major cause of disease worldwide. S*hisha* (waterpipe) smoking has been reported to expose its users to excess levels of tobacco, and despite its increased use in young adults few studies have reported prevalence and factors associated with *shisha* smoking in a low income setting.

**Objectives:** This study aimed at determining the prevalence, knowledge and factors associated with *shisha* use among students of four tertiary institutions in Buea.

**Methods:** A cross-sectional study, using multistage sampling to select students from four tertiary institutions in Buea, over a 3-month period, including participants who consented to take part in the study. Assessment of knowledge was done using a knowledge summary score adapted from a previous study. Logistic regression was used to identify factors associated with shisha smoking. The level of significance was set at p <0.05.

**Results:** A total of 1008 students were recruited, and 509(50.9%) were females. The mean age was 22.9 ± 3.1 years. The prevalence of *shisha* smoking was 26% (95%CI: 23.3-28.8). Most of the respondents had good knowledge about *Shisha* (59.2%). Poor knowledge about *Shisha* (AOR:2.6195%CI.74-3.93, p<0.001), living in a hostel (AOR: 2.00,95%CI: 1.29-3.11, p=0.002, and alcohol consumption (AOR: 1.91,95%CI: 1.24-2.94, p=0.003) were independently associated with *shisha* smoking.

**Conclusion:** The prevalence of *shisha* smoking among students of tertiary institutions in Buea is high; about one quarter of the students have a poor knowledge about its harmful health effects. There is an increase need for surveillance and response from policy providers on *shisha* smoking interventions.

**Keywords:** Knowledge, Prevalence, *Shisha* smoking, University students.

**INTRODUCTION**

Tobacco smoking is a major cause of disease and death worldwide [1].According to the World Health Organization (WHO), there are approximately 1.1 billion smokers worldwide, with 80% living in low and middle-income countries. About 8 million global mortalities are attributed to tobacco smoking, and it is projected to increase by 2030 [2,3]. Tobacco is used in various forms, including cigarettes, cigars, electronic cigarettes, water pipes (*Shisha*) and chewable tobacco [4]. One form of tobacco, waterpipe, *Shisha*, hookah, or narghileh, has recently increased popularity in many developed and developing countries [5]*.* It is emerging as a public health burden among youths [6]. In the Middle East, *Shisha* has replaced cigarettes as the most popular form of tobacco use among youths [5]. *Shisha* was supposedly invented in India as a safer method of tobacco use [7]. It is a form of smoking tobacco whereby charcoal placed on an aluminium foil paper is used to heat a fruit-flavoured tobacco mix, which is connected by a tube that draws the smoke to a bowl of water for moisturization of the smoke before inhalation into the lungs through the mouthpiece [5].

Several studies have reported increased use of Shisha in young adults and have been likened to the increased use of the internet and social media alongside a lack of policies to regulate its use [11]. *Shisha* contains similar toxins as cigarette smoke [12]. *shisha* smoke contains 6.5 times more carbon monoxide, 1.7 times more nicotine, 46 times more tar and dangerous heavy metals [13]. Tobacco chemicals expose *shisha* smokers to diseases like cancers, respiratory diseases, nicotine dependence and herpes due sharing of the mouth piece. [14–16]. Despite the harmful effects of *Shisha*, it has experienced increasing use due to acceptance, appeal, social relevance as a symbol of fashion, and the perception of it being less addictive [17], and less hazardous to health because of addition of fruit flavors [18]. Individual factors influencing its intake include age, sex, education, attitude and peer pressure [19].

The increased use of *Shisha* has been demonstrated in several studies [8][9][10]. However, to our knowledge, little has been done in Cameroon regarding the use of shisha smoking in young adults. This study sorts to provide data on the prevalence and factors associated with shisha smoking amongst university students in the south west region of Cameroon.

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**MATERIALS AND METHODS**

**Study design and setting**

This was an institution based cross-sectional analytical study carried out in Buea from February 2020 to April 2020 Buea is the capital of the South West region of Cameroon, with approximately 200,000 inhabitants, most of which are students from different parts of the country, since it is an academic site made up of several different universities. We recruited participants from four randomly selected institutions. University of Buea, Catholic University Institute of Buea, Biaka University Institute of Buea, Higher Institute of Management Studies (UB,CUIB,BUIB,HIMS).These four institutions have a total of 15504 students and 850 teaching staff.

Several shops, bars, restaurants and different leisure points are located around each of these institutions. Apart from the University of Buea which has a few on-campus hostels, the students in the other two institutions (CUIB and HIMS) and most of the UB students live in private hostels off-campus.

**Participants and Sampling**

We included all students enrolled in 4 purposively selected tertiary institutions in Buea. Students who returned incomplete questionnaires( <50% filled questionnaires) were excluded.

A multistage sampling technique was used to obtain the data. In the first stage, 4 tertiary institutions were purposively selected from the 25 approved tertiary institutions in Buea. In the second stage, clusters were mapped, where faculties of each of the selected 4 tertiary institutions represented various clusters. 3 clusters were randomly selected from each of the 4 tertiary institutions, and students were consecutively selected from each of the chosen clusters to participate in the study.

A minimum sample size of 255 participants was calculated using the Lorentz formula based on the findings of Omotehinwa et al in Kigali city, Rwanda in 2018. [21].

**Study procedure and data collection**

A self-administered questionnaire adapted from a previous study done in Kigali, Rwanda was used for data collection[21]. The students were approached individually and invited to participate in the study. The potential participants were informed about the aim and objectives of the study, and participated in the study voluntarily. The study objectives were explained which involved voluntary participation in the study, anonymity of the participants, confidentiality of the data and their right to withdraw from the study at any point in time without negative consequences. After consent was obtained, the students were given approximately 10 to 15minutes to fill the questionnaires and submit then immediately.

## Definitions

Current User: Participants having smoked *Shisha*, at any point in time prior to the study in the last month.

Ever user: Participants who have tried or experimented with *shisha* smoking even one or two puffs.

Knowledge was scored on 9. A score of 1 was given for every correct knowledge question, and 0 for every wrong answer to a knowledge question. Score of 0-3, 4-5 and 6 or more were considered poor, moderate and good knowledge respectively.

Incomplete questionnaires **:** Questionnaires that were <50% filled.

Cigarette smoker: Anyone who answered ‘yes’ to do you smoke cigarette?

## Statistical analysis

Data was analyzed using Statistical Package for Social sciences (SPSS) version 25.0. Categorical values were presented as frequencies and percentages. Continuous variables were presented as means (and standard deviation). Chi squared test was used to compare categorical variables whereas independent student T test was used to compare means. Logistic Regression was used to identify factors associated with *shisha* smoking. Significance level was set at p< 0.05.

## Ethical considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the Faculty of Health Sciences, University of Buea (2020/1082-01 /UB/SG/IRB/FHS). Also, administrative authorization was obtained each selected institution. This study was conducted in accordance to the declerations of Helsinki

**RESULTS**

**General characteristics**

**Attitudes and practice**

**Knowledge**

**Prevalence and associated factors**

Overall 1220 students 2were approached; the response rate was 83.6% (1020) and 1008 (82.7%) students were included in the analysis. Figure 1 summarizes the flow of participant’s recruitment.

Figure 1: Flow chart of participant enrollment

## SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

The age of the participants ranged from 18-32 years with a mean age of 22.9 ±3.1years More than half of the participants were females (50.7%), and from the University of Buea (53. 4%). Figure 2 summarizes the distribution of students by institution. Most of the study participants were Christians (96.9%), likewise most of the students lived in hostels (76.1%). The median monthly allowance was 30000FCFA (IQR: 20000-50000FCFA). Details of participant’s socio-demographics is presented in table II.

Figure 2: Distribution of participants from various tertiary institutions.

## SOCIAL ENVIRONMENT CHARACTERISTICS OF PARTICIPANTS

Most of the respondents drank alcohol, 63.8% (n=641) and most had friends who smoke *Shisha*, 69.7% (n= 701). A considerable 482 (47.9%) students had friends who smoke cigarette and 325 (32.4%) had siblings who smoke *Shisha* as shown on table II below.

## PREVALENCE OF *SHISHA* SMOKING

Overall, 449 students (44.5%) reported to have ever smoked *Shisha* before, even one or two puffs, meanwhile 26% (95%CI: 23.3-28.8), said they had smoked *Shisha* in the last 30days (current *shisha* smokers). Prevalence of current *shisha* smokers per tertiary institutions were as follows: UB, 177(32.9%); CUIB ,34(26.8%); HIMS ,26(19.4%); BIAKA, 25(12%).

Figure 3: Prevalence of *shisha* smoking (current *shisha* smoking).

## MOTIVATION FOR SMOKING *SHISHA*

The main reasons given for the initiation of *shisha* smoking included: curiosity, 59.9% (n=269), trend and class, 35% (n=157), peer influence, 31.1% (n=139), and stress/anxiety, 23.9% (n=107). This is summarized in Figure 4 below.

Figure 4: Motivation for initiation of *shisha* smoking.

## PRACTICES OF *SHISHA* SMOKING AMONG PARTICIPANTS

The mean age of initiation of *shisha* smoking was 20 ±2.4 years. A third of the population reported smoking *shisha* every month, with up to 293 (65.8%) sharing a mouth piece during the sessions and 189 (43.2%) smoking for less than 30mins. Majority (70.6%) of respondents who smoked *Shisha* did so in bars, however 18.9% (n=84) of *shisha* smokers owned *shisha* smoking machines. A total of 153 (36.1%) *shisha* smokers were not willing to quit smoking.

## KNOWLEDGE OF *SHISHA* AMONG PARTICIPANTS

With respect to overall knowledge of students about *Shisha* 597 respondents (59.2%) had a good knowledge, 177 (17.6%) had moderate knowledge and 234 (23.2%) had poor knowledge.

Figure5: Knowledge of *shisha* smoking among participants.

## FACTORS ASSOCIATED WITH *SHISHA* SMOKING

On bivariate analysis, male gender, being single, living in a hostels and having a monthly allowance of ≥30,000FCFA were associated with *shisha* smoking. Older students had a higher chance of smoking *shisha* but this was however not significant (OR: 1.08, p=0.596). This is represented on Table V below.

Alcohol consumption (OR=4.39, 95%CI: 3.03-6.35, p<0.001), cigarette smoking (OR=7.27, 95%CI: 4.02-13.12, p<0.001) and having friends who smoke *Shisha* (OR=11.38, 95%CI: 3.03-6.35, p<0.001) were statistically significant to *shisha* smoking as represented on table VI below.

We also noted that having a poor and moderate knowledge was statistically significant with *shisha* smoking as seen on table VII below.

Following multivariate analysis, the factors presented in Table VIII were independently associated with increased risk of *shisha* smoking, and having peers smoking *Shisha* presented the greatest risk to smoke *Shisha* ( AOR:5.50 95%CI:3-10.1)0.

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## DISCUSSION

This study aimed at assessing the prevalence, knowledge and factors associated with *shisha* smoking among students of tertiary institutions in Buea. In this study the prevalence of *shisha* smoking was high and the about one quarter of the students had a poor knowledge about its harmful health effects thereby exposing its users to many health hazards. The main reasons for initiation of *shisha* smoking was curiosity, social trend and peer influence. Male gender, having poor knowledge about *Shisha*, having friends or siblings that smoke *shisha* were identified to be factors associated with *shisha* smoking. The findings in this study will help -public health experts and policy makers to develop strategies to limit the use of *Shisha* among University students in Cameroon.

In this study, we had a prevalence of 26.0%. This prevalence is similar to that reported in a study carried out among university students in Kigali Rwanda, by Omotehinwa, with a prevalence of 20.8%[21] This is also congruent with the findings of Zavery *et al.*21.5%) and Al Naggar *et al.*(20%) who studied a population of medical students in Pakistan and Malaysia respectively.[23,24].

Our study had a higher prevalence than the 7.1% reported by Lasebikan *et al* after assessing *shisha* smoking among selected nightclubs in Nigeria [25]. This could be explained by the smaller sample size used in their study. On the other hand, our prevalence was lower than the 36.4% reported by Aanyu *et al* among youth in Kampala city [26]. This could be explained by their choice of sampling area. The two areas included in the study were the areas with the highest number of bars, and participants were recruited at a specific time mostly in the late evening during drinking hours. The mean age of initiation of *shisha* smoking was 20 years, similar to findings of Maziak et al, who reported of mean age of 19 years [8]. This coincides with the age where most youths go to university and live alone in their hostels, having less parental control, and more peer influence.

The main reasons given for the initiation of *shisha* smoking in our study population included: curiosity (59.9%), trend and class (35%), peer influence (31.1%) and stress/anxiety (23.9%).This agrees with findings reported by Haroon et al and Omotehinwa et al [21,27]. Smoking in bars (70.6%) and at home (23.7%) were the most common locations for smoking *shisha*, congruent with findings reported by Rami et al [64]. Most students smoked *Shisha* because it was trendy and classy, therefore implying it is gaining popularity. Peer influence is a potent factor influencing smoking behavior, therefore understanding the dynamics of friendship patterns should be an important consideration.

Our findings reveal that 59.2% of respondents had good knowledge on *Shisha* and its harmful health effects and 40.8% of participants had moderate and poor knowledge on *Shisha*. This is supported by a study in Rwanda by Omotehinwa *et al* where 60% of the students had a good knowledge on *Shisha* and 40% had satisfactory and poor knowledge [21]. We also found out that 53.1% of the respondents believed that *Shisha* is less harmful than cigarette, consistent with the reports of Maziak *et al* [18]. Up to 38.7% of student did not know that *Shisha* contains nicotine and can cause addiction, 28.8% did not know it can cause cancer and 60.5% believed that water in the *shisha* apparatus filters toxic and carcinogenic substances from the smoke in line with the findings of the study carried out by Al-Naggar *et al* [24]. However, it is 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 [28]. In reality *shisha* smoke is just as dangerous as cigarette smoke. *Shisha* smoke contains higher levels of metals such as asernic, lead, nickel, 36 times more tar, 15times more carbon monoxide and nicotine [29].

Consistent with a study carried out among university students in Syria by Maziak *et al* and in Malysia by Al-Naggar , male gender was found to be independently associated with *shisha* smoking, thereby implying that men tend to smoke *Shisha* more than female [8,30]. Other factors independently associated with *shisha* smoking included alcohol consumption, having friends or siblings who consume *Shisha*. This highlights the effect of peer influence of the practice of *shisha* smoking. This is congruent with a study reported by Omotehinwa *et al* and Al-Naggar *et al*[21,30]. Poor knowledge about *Shisha* and its health hazards was associated a higher likelihood to smoke *Shisha* similar to a study done by Al-Lawati *et al* [19]. However age was found not to be significantly associated with *shisha* smoking in this study contrary to what was reported by Omotehinwa *et al* and Aanyu *et al* [21,26] respectively.

To the best of our knowledge it is the first study to be carried out on *shisha* smoking in our setting. Yet, a number of limitations have to considered while interpreting these findings, including the fact that ,our study may also have been subjected to reporting and recall bias.

## CONCLUSION

Waterpipe smoking (*Shisha*) is relatively prevalent among students of tertiary institutions in Buea, Cameroon. About one quarter of the students had a poor knowledge about *Shisha*, with more than half of the respondents actually believing it is less harmful than cigarette and that water in the apparatus filters toxic substances from the smoke. Male gender, living in a hostel, smoking cigarette, having friends or siblings that smoke *shisha* and poor knowledge about *Shisha* were independently associated with *shisha* use.

The early age of initiation of *shisha* smoking among these participants is particularly worrisome, given the harmful health effects of *shisha* smoking. There is an increase need for surveillance and response from policy providers on *shisha* smoking interventions.

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**Table 1: General characteristics of study participants**

|  | Smoked shisha in the past 30 days | | Total | p |
| --- | --- | --- | --- | --- |
| No | Yes |
| Age years ( Mean (SD) | 22.9 (3.2) | 22.7 (2.8) | 22.9 (3.1) | 0.435 |
| Age category |  |  |  |  |
| <= 23 years | 455 (64.4) | 160 (62.5) | 615 (63.9) | 0.650 |
| >23 years | 252 (35.6) | 96 (37.5) | 348 (36.1) |  |
| Gender |  |  |  |  |
| Female | 414 (55.8) | 95 (36.4) | 509 (50.7) | <0.001 |
| Male | 328 (44.2) | 166 (63.6) | 494 (49.3) |  |
| Marital status |  |  |  |  |
| married | 54 (7.3) | 8 (3.1) | 62 (6.2) | 0.022 |
| single | 683 (92.7) | 252 (96.9) | 935 (93.8) |  |
| Religion |  |  |  |  |
| muslim | 28 (3.8) | 3 (1.1) | 31 (3.1) | 0.054 |
| christian | 706 (96.2) | 259 (98.9) | 965 (96.9) |  |
| Current level of studies |  |  |  |  |
| first year | 200 (27.4) | 79 (30.4) | 279 (28.2) | 0.730 |
| second year | 175 (24.0) | 63 (24.2) | 238 (24.1) |  |
| third year | 232 (31.8) | 81 (31.2) | 313 (31.6) |  |
| fourth year | 87 (11.9) | 29 (11.2) | 116 (11.7) |  |
| post graduate | 35 (4.8) | 8 (3.1) | 43 (4.3) |  |
| Monthly allowance |  |  |  |  |
| <30000 fcfa | 208 (50.4) | 57 (28.6) | 265 (43.3) | <0.001 |
| =30000 fcfa | 205 (49.6) | 142 (71.4) | 347 (56.7) |  |
| Adress |  |  |  |  |
| living in a hostel | 505 (72.8) | 218 (85.2) | 723 (76.1) | <0.001 |
| living with family | 189 (27.2) | 38 (14.8) | 227 (23.9) |  |
| Smokes cigarette |  |  |  |  |
| No | 729 (97.7) | 224 (85.5) | 953 (94.5) | <0.001 |
| Yes | 17 (2.3) | 38 (14.5) | 55 (5.5) |  |
| Use of other tobaco products |  |  |  |  |
| No | 730 (97.9) | 225 (85.9) | 955 (94.7) | <0.001 |
| Yes | 16 (2.1) | 37 (14.1) | 53 (5.3) |  |
| Do you drink alcohol |  |  |  |  |
| No | 326 (43.7) | 41 (15.6) | 367 (36.4) | <0.001 |
| Yes | 420 (56.3) | 221 (84.4) | 641 (63.6) |  |
| Do any of your friend smoke shisha |  |  |  |  |
| No | 291 (39.1) | 14 (5.3) | 305 (30.3) | <0.001 |
| Yes | 453 (60.9) | 248 (94.7) | 701 (69.7) |  |
| Does any of your parent smoke shisha |  |  |  |  |
| No | 713 (96.0) | 240 (91.6) | 953 (94.8) | 0.010 |
| Yes | 30 (4.0) | 22 (8.4) | 52 (5.2) |  |
| Does any of your sibling smoke shisha |  |  |  |  |
| No | 566 (76.2) | 113 (43.3) | 679 (67.6) | <0.001 |
| Yes | 177 (23.8) | 148 (56.7) | 325 (32.4) |  |

**Table 2: Factors associated with shisha smoking**

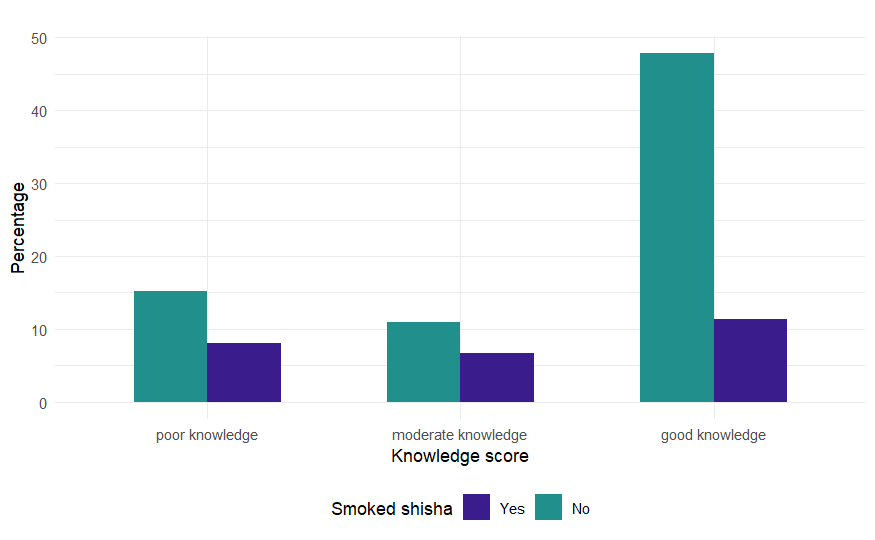
| Characteristic | Crude OR | Adjusted OR |
| --- | --- | --- |
| **Age category** |  |  |
| >23 years | 1.08 (0.80-1.45, p=0.596) | - |
| **Gender** |  |  |
| Male | 2.21 (1.65-2.96, p<0.001) | 1.55 (1.09-2.20, p=0.014) |
| **Marital status** |  |  |
| single | 2.49 (1.24-5.73, p=0.018) | 1.08 (0.46-2.76, p=0.867) |
| **Religion** |  |  |
| Christian | 3.42 (1.20-14.40, p=0.044) | 1.36 (0.40-6.30, p=0.656) |
| **Current level of studies** |  |  |
| second year | 0.91 (0.62-1.34, p=0.640) | - |
| third year | 0.88 (0.61-1.27, p=0.505) | - |
| fourth year | 0.84 (0.51-1.37, p=0.501) | - |
| post graduate | 0.58 (0.24-1.24, p=0.186) | - |
| **Adress** |  |  |
| living in a hostel | 2.15 (1.48-3.19, p<0.001) | 2.01 (1.31-3.15, p=0.002) |
| **Smokes cigarette** |  |  |
| Yes | 7.27 (4.09-13.45, p<0.001) | 3.26 (1.55-7.03, p=0.002) |
| **Use of other tobacco products** |  |  |
| Yes | 7.50 (4.17-14.10, p<0.001) | 2.27 (1.08-4.92, p=0.033) |
| **Do you drink alcohol** |  |  |
| Yes | 4.18 (2.94-6.09, p<0.001) | 1.86 (1.22-2.87, p=0.004) |
| **Does any of your friend smoke shisha** |  |  |
| Yes | 11.38 (6.75-20.79, p<0.001) | 5.59 (3.14-10.67, p<0.001) |
| **Does any of your parent smoke shisha** |  |  |
| Yes | 2.18 (1.22-3.83, p=0.007) | 1.63 (0.75-3.51, p=0.207) |
| **Does any of your sibling smoke shisha** |  |  |
| Yes | 4.19 (3.12-5.65, p<0.001) | 2.52 (1.79-3.55, p<0.001) |
| **Knowledge score categories** |  |  |
| moderate knowledge | 2.58 (1.78-3.71, p<0.001) | 1.99 (1.28-3.06, p=0.002) |
| poor knowledge | 2.24 (1.59-3.14, p<0.001) | 2.60 (1.73-3.92, p<0.001) |

***Table IV: Incorrect responses to knowledge questions***

|  |  |  |
| --- | --- | --- |
| **Knowledge Question** | **Incorrect response**  **,n (%)** | |
| Water in *shisha* apparatus filters toxic substances from smoke | | 610 (60.5%) |
| *Shisha* smoking is less harmful than cigarette smoking | | 535 (53.1%) |
| *Shisha* contains nicotine and is addictive | | 390 (38.7%) |
| *Shisha* may contain additional substances like marijuana | | 388 (38.5%) |
| *Shisha* contains significant amount of tobacco | | 352 (34.9%) |
| Habitual *shisha* smoking can cause cardiovascular impairments | | 318 (31.5%) |
| Health hazards are associated with habitual *shisha* mouth piece sharing (oral herpes) | | 293 (29.1%) |
| Habitual *shisha* smoking can cause cancer | | 290 (28.8%) |
| Habitual *shisha* smoking can cause respiratory disease | | 243 (24.1%) |

**Table III: Practices of *Shisha* Smoking**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Category | Frequency | Percentages |
|  |  |  |  |
| Duration of *shisha* smoking | Less than 30mins  30 to 60mins  1 to 2 hours  More than 2hours | 189  132  67  50 | 43.2  30.1  15.3  11.4 |
| Number of Puffs inhaled during a *shisha* smoking session | At most 5  At most 10  More than 10 | 239  100  94 | 55.2  23.1  21.7 |
| Frequency of *shisha* smoking | Daily  Weekly  Monthly  Every couple of months  About once a year | 21  65  142  50  152 | 4.9  15.1  33.0  11.6  35.3 |
| Venue of *shisha* smoking | At home  At a bar  At a restaurant | 106  317  75 | 23.7  70.6  16.7 |
| Sharing of mouth piece  N=445 | NO  YES | 152  293 | 34.2  65.8 |
| Ownership of a *shisha* machine  N=445 | NO  YES | 361  84 | 81.1  18.9 |
| Willingness to quit *shisha* smoking  N=424 | NO  YES | 153  271 | 36.1  63.9 |



**STUDY QUESTIONNAIRE**

Date of interview: \_\_\_\_\_\_\_\_\_\_\_\_

Participant ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**A. Sociodemographic information**

1. How old are you? \_\_\_\_\_

2. Sex: *(0) Male*

*(1) Female*

3. University/Institution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Faculty/Department: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Current level of study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Marital Status *(0) Not married (Single, divorced, widowed)*

*(1) Married*

7. Religion (0) Christian (1) Muslim (2) Others \_\_\_\_\_\_

8. Address (0) family house (1) Hostel

9. Estimated monthly allowance\_\_\_\_\_\_\_\_\_\_\_\_

**B. Prevalence/Practices of *shisha* smoking**

10. Have you ever smoked *shisha* in your lifetime, at least one or two puffs?

*(0) No (1) Yes*

11. If yes to (10), how old were you the first time you smoked *shisha*? \_\_\_\_\_\_\_

12. Averagely how much do u spend on *shisha* per month? \_\_\_\_\_\_\_\_\_

13. What is/was your motivation to smoke *shisha*? (You choose more than one answer)

a. Curiosity (*0) No (1) Yes*

b. Peer Influence (*0) No (1) Yes*

c. Stress/Anxiety (*0) No (1) Yes*

d. To feel strong/bold (*0) No (1) Yes*

e. It is trendy/classy *0) No (1) Yes*

f. Others

14. Have you smoked *shisha* in the last 30days?

*(0) No (1) Yes*

15. Which of the following choices best describes your *shisha* smoking habit?

*(0) ‘daily’ (1) ‘weekly’ (2) ‘monthly’*

*(3) ‘Every couple of months’ (4) ‘about once a year’*

16. On average, how long is one *shisha* session for you (and the people you share it with)?

*(0) ‘Less than 30 minutes’ (1) ’30 to 60 minutes’*

*(2) ‘1 to 2 hours’ (2) ‘more than 2 hours’*

17. During a session of *shisha* smoking, have you ever shared the mouthpiece?

*(0) No (1) Yes*

18. During a session of *shisha* smoking, how many puffs can you inhale?

(0) At most 5 (1) At most 10 (3) more than 10

19. Do you have a *shisha* apparatus or machine?

(0) No (1) Yes

20. Where do you smoke *shisha*?

(0) At home (1) at a restaurant (2) at a bar / club

21. Do you wish to quit smoking *shisha*?

(0) No (1) Yes

**Associated Social and Environmental factors**

22. Do you smoke cigarette?

*(0) No (1) Yes*

23. Do you smoke any other tobacco product apart from *Shisha* and cigarette (marijuana, cocaine)?

*(0) No (1) Yes*

24. Do you drink alcohol?

*(0) No (1) Yes*

25. How often do you drink alcohol?

*(0) daily (2) weekly (3) monthly*

*(4) Every couple of months (5) about once a year*

26. Does any of your friends smoke *Shisha*?

*(0) No (1) Yes*

27. Does any of your friends smoke cigarette?

*(0) No (1) Yes*

28. Does any of your parents smoke *Shisha*?

*(0) No (1) Yes*

29. Does any of your siblings smoke *Shisha*?

*(0) No (1) Yes*

**C. Knowledge about *shisha* tobacco use and its health effects**

30. *Shisha* contains significant amounts of tobacco.

*(0) No (1) Yes*

31. *Shisha* may contain additional substances like marijuana

*(0) No (1) Yes*

32. *Shisha* contains nicotine and is addictive

*(0) No (1) Yes*

33. Water in *shisha* apparatus filters toxic substances from the smoke

*(0) No (1) Yes*

34. Habitual *Shisha* smoking can cause cancer

*(0) No (1) Yes*

35. Habitual *shisha* smoking can cause respiratory problems (cough, chronic bronchitis)

*(0) No (1) Yes*

36. Habitual *shisha* smoking can cause cardiovascular impairments. (Heart Disease)

*(0) No (1) Yes*

37. Health hazards are associated with habitual *shisha* mouthpiece sharing (oral herpes infection)

*(1) No (1) Yes*

38. *Shisha* smoking is less harmful to health than cigarette smoking.

*(0) No (1) Yes*