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Research Article

Prevalence of Hookah Smoking and its Associated Factors among Undergraduate Engineering Students of Khwopa College of Engineering, Nepal

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Abstract

Background: Hookah smoking, also known as water pipe smoking, is an emerging trend that is gaining popularity globally, especially among youth and college students. It has been referred to as a global tobacco epidemic by public health officials and identified as an emerging threat to public health.

Methodology: A descriptive cross-sectional study with systematic sampling was conducted. A self-administered questionnaire was used to collect the data. Collected data were entered, and analysis was done using SPSS IBM version 26.

Results: The overall prevalence of hookah smoking was found to be 38.7%, with a mean age of 17.92 years. The analysis indicated that sex and faculty of respondents were significantly associated with hookah smoking. In this study, male participants were 2.44 times more likely to be involved in hookah smoking compared to female participants (OR=2.449, 95% CI=1.026–0.848). Participants in the electrical engineering faculty were 4.84 times more likely to smoke hookah than participants in the computer engineering faculty (OR=4.844, 95% CI), and participants in the civil engineering faculty were 2.58 times more likely to smoke hookah than participants in the computer engineering (OR=2.583, 95% CI).

Conclusion: The cross-sectional study with systematic sampling conducted among undergraduate engineering students at Khowpa College of Engineering revealed that hookah smoking was more prevalent among male participants than female participants. Hence, an awareness program is needed to be planned and implemented among engineering students, with a special focus on male students.

Keywords: Hookah smoking; Prevalence; Associated factors; Undergraduate engineering students

Introduction

Smoking refers to the action of inhaling and exhaling fumes from burning tobacco in cigars, cigarettes, and hookahs. According to the Center for Disease Control and Prevention (CDC), hookahs are water pipe apparatuses that are used to smoke specially made tobacco that comes in different flavors such as apple, mint, cheery, chocolate, watermelon, strawberry, etc. and are typically practiced in groups with the same mouthpiece passed from person to person. Hookah is also called narghile, waterpipe, and shisha. Hookahs vary in shape and size. A hookah has a head, a body, a water bowl, and a flexible hose with a mouthpiece. Hookah smoking is also known as water pipe smoking and is gaining popularity globally, especially among young people and college students [1]. Hookah smoking is the second-most prevalent form of alternative tobacco product. The rapid increase in hookah smoking is due to the misconception that hookah smoking is less harmful and less addictive than cigarette smoking [2]. Hookah users perceived hookah as less harmful, less addictive, and socially and parentally acceptable [3]. Hookah smoking is generally done in groups, with the same mouthpiece being passed from person to person, which can increase the risk of the transfer of infectious oral diseases. The expansion of cafés and hookah bars has rapidly increased hoo-

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kah smoking [4]. The physical appearance of a hookah and the taste of flavored tobacco have rapidly attracted new hookah users. Hookah smoking has been promoted by factors such as the misperception of less harm, socially and parentally acceptable and curiosity, higher socioeconomic status, curiosity, and being easily available and accessible. Globally, about 1 billion people are familiar with hookah, and more than 100 million people use hookah on a daily basis. The sweet taste of flavored tobacco contributes to attracting hookah users, who are generally young adults and beginner hookah smokers [5].

Hookahs generate smoke that is similar to cigarette smoke, which contains nicotine, tar, carbon monoxide, heavy metals, and other toxicants and also poses a risk for the same diseases caused by cigarette smoking [3]. The volume of smoke from hookahs is ten times higher than cigarette smoke. The burning temperature of tobacco in a hookah is about 900 degrees Celsius, which could produce different types of harmful chemicals and toxicants [6]. Non-cigarette smokers viewed hookah as an alternative way of smoking flavored tobacco and misperceived it as less harmful, less addictive, socially acceptable, and a way to socialize with friends. Generally, in a 1-hour hookah smoking session, a hookah smoker inhales 90,000mL of smoke [4]. Hookah smoking is rapidly increasing and has become an emerging threat to public health. Adolescents who smoke either hookah or cigarettes are associated with health problems and may increase the risk of health problems during adulthood. In order to reduce the health threat caused by tobacco, the World Health Organization (WHO) has set a target of a 30% decrease in the prevalence of tobacco usage among people older than 15 years until 2025 [7].

Curiosity and susceptibility were the major reasons for experimenting with hookah smoking. Curiosity refers to an interest in tobacco products, and susceptibility is the development of beliefs about future tobacco use behaviors. The diversification of the tobacco product has contributed to changes in patterns of use of tobacco products. Since 2011, use of novel tobacco products such as hookah and electronic cigarettes has increased, while conventional tobacco products such as cigarettes are declining [8].

Methods

A descriptive cross-sectional study was conducted among undergraduate engineering students of Khwopa College of engineering. It was calculated using the formula:

$$n = \frac{Z^2 pq}{d^2 + \frac{Z^2 pq}{N}}$$

where the prevalence of 13%, 95% confidence interval, and 5% margin of error were taken. Semi-structured, self-administered questionnaires were used to assess the prevalence and associated factors of hookah smoking. Systematic sampling was used as the sampling technique for the collection of data. Ethical approval was received from IRC, and approval for data collection was received from the respective municipality. The data were entered and analyzed using IBM SPSS Statistics version 25.0. Based on the distribution and variance, appropriate statistical tests were used for analysis. Descriptive analysis was used to describe background characteristics. A chi-square test was used to test the difference between the categorical variables, and $p < 0.05$ was considered statistically significant.

Result

The mean age of the respondents was 20.83, with minimum and maximum ages of 18 and 24 years, respectively. The majority of students were from the Hindu religion (96.1%), followed by Buddhism (1.9%) and Christianity (1.9%). More than two-thirds of participants were male (78.1%), while few of the respondents were female (21.9%). The majority of the respondents were from Janajati (45.2%), followed by Brahmin (30.3%), and Chhetri (20.6%). More than two-thirds of students (81.9%) were from nuclear families; while very few (18.1%) were from joint families. More than half of the sample students were from the civil engineering faculty (51.6%), followed by the computer faculty (25.2%), and the electrical faculty (23.2%). More than two-thirds of respondents (77.4%) were from urban areas, while only 22.6% of respondents lived in rural areas (Table 1).

The prevalence of hookah smoking was found to be 38.7%. Among the smokers, the majority of the respondents (18.7%) were found to smoke hookah monthly, followed by those who tried it only once or twice (17.4%) (Table 2).

Majority of the respondents smoked hookah with friends (34.8%), few of the respondents smoked hookah with family (2.6%), and very few of the respondents smoked hookah alone (1.3%). Majority of the respondents reported using apple-flavored (64.4%) and mint-flavored tobacco in hookahs for hookah smoking. Few of the participants' families (18.7%) have been involved in hookah smoking, while the majority of the participant's families (81.3%) have not been involved in hookah smoking (Table 3).

Table 1: Socio-demographic characteristics of respondents.

Characteristics	Category	Frequency n=155	Percentage (%)
	≤20	64	41.3
Age	>20	91	58.7
Religion	Hindu	149	96.1
	Buddhist	3	1.9
	Christian	3	1.9
	Male	121	78.1
Sex	Female	34	21.9
Ethnicity	Brahmin	47	30.3
	Chhetri	32	20.6
	Janajati	70	45.2
	Dalit	4	2.6
	Muslim	2	1.3
Family type	Nuclear	127	81.9
	Joint	28	18.1
Faculty	Civil	80	51.6
	Computer	39	25.2
	Electrical	36	23.2
Place of residence	Urban	120	77.4
	Rural	35	22.6

Table 2: Prevalence and pattern of Hookah Smoking.

Factors	Frequency	Percentage (%)
Hookah Smoking (n=155)		
Yes	60	38.7
No	95	61.3
Frequency of Hookah Smoking (n=60)		
Tried only once or twice	27	17.4
Once in 2-4 days	1	0.6
Weekly once	3	1.9
Monthly	29	18.7

Table 3: Hookah Smoking Behavior of Respondents.

Factor	Frequency	Percentage (%)
Hookah Smoking With (n=60)		
Friends	54	34.8
Family	4	2.6
Alone	2	1.3
Flavor used (n=96)		
Apple	38	64.4
Mint	32	54.2
Cherry	6	10.2
Strawberry	5	8.5
Vanilla	5	8.5
Chocolate	8	13.6
Other flavor	2	3.4
Hookah Smoking Status in Family (n=155)		
Yes	29	18.7
No	126	81.3
Contributing Factors for Hookah Smoking (n=95)		
Peer pressure	13	21.7
Fashion	10	16.7
Socialization with friends	17	28.3
Curiosity	43	71.7
Time availability	8	13.3

The majority of the respondents (92.3%) were aware of hookah smoking, whereas a few of the respondents (7.7%) were not. The majority of respondents (72%), headache (60.8%), and dizziness (58%) were aware of the harmful effects of post Hookah smoking (Table 4).

Table 4: Aware on Hookah Smoking.

Factor	Frequency	Percentage(%)
Aware on Hookah Smoking (n=155)		
Yes	143	92.3
No	12	7.7
Aware on harmful effects of Hookah Smoking(n=402)		
Dizziness	83	58
Headache	87	60.8
Oral cancer	34	23.8
Lung cancer	103	72
Stomach cancer	23	16.1
Cardiovascular diseases	35	24.5
Esophageal cancer	15	10.5
Infectious oral diseases	20	14
Others	2	1.4

Table 5: Association of socio-demographic variables with Hookah Smoking.

	Hookah Smoking (n=155)		
Factors	**Yes**	**No**	**p-value**
Sex			
Male	52(43%)	69(67%)	0.04*
Female	8(23.5%)	26(76.5%)	
Religion			
Hindu	59(39.6%)	90(60.4%)	0.371
Buddhist	1(33.3%)	2(66.7%)	
Christian	0	3(100%)	
Family Size			
Nuclear	53(41.7%)	74(58.3%)	0.134
Joint	7(25%)	21(75%)	
Faculty			
Civil	32(40%)	48(60%)	0.007*
Electrical	20(55.6%)	16(44.4%)	
Computer	8(20.5%)	31(79.5%)	
Age interval			
≤20	21(32.8%)	43(67.2%)	0.206
>21	39(42.9%)	52(57.1%)	
Ethnicity			
Brahmin	19(40.4%)	28(59.6%)	0.973
Chhetri	12(37.5%)	20(62.5%)	
Janajati	27(38.6%)	43(61.4%)	
Dalit	1(25%)	3(75%)	
Muslim	1(50%)	1(50%)	
Residence			
Urban	46(38.3%)	74(61.7%)	0.859
Rural	14(40%)	21(60%)	

Table 6: Association of associated factors with Hookah Smoking by using binary logistic.

Factors	Hookah Smoking		P-value	Odds Ratio (OR)	95% CI (Lower-Upper limit)
	Yes (%)	No (%)			
Sex					
Male	52(43%)	69(57%)	0.044	2.449	1.026-5.848
Female	8(23.5%)	26(76.5%)		Ref	
Faculty					
Civil	32(40%)	48(60%)	0.038	2.583	1.054-6.333
Electrical	20(55.6%)	16(44.4%)	0.002	4.844	1.750-13.405
Computer	8(20.5%)	31(79.5%)		Ref	

The sex of respondents and faculty were significantly associated with the prevalence of hookah smoking, while other socio-demographic factors were not statistically significant (Table 5). Those variables associated with the prevalence of hookah smoking were further analyzed, and an odds ratio was calculated. Male participants were 2.44 times more likely to be involved in hookah smoking as compared to female participants (OR=2.449, 95% CI=1.026–4.848). Similarly, participants who belong to the Electrical Engineering faculty were 4.84 times more likely to be involved in hookah smoking compared to computer engineering faculty (OR=4.844, 95% CI). And participants who belong to civil engineering were 2.58 times more likely to be involved in hookah smoking compared to computer engineers (OR=2.583, 95% CI) (Table 6).

Discussion

The result of this study showed that the overall prevalence of hookah smoking among undergraduate engineering students at Khwopa College of Engineering was 38.7%. Hookah smoking was prevalent among participants over the age of 21. A third round STEPS survey conducted by the Nepal Health Research Council (NHRC) with the support of the Government of Nepal and the World Health Organization (WHO) in February to May 2019 showed that the prevalence of hookah smoking in the 15–24 age groups was 13% [9]. A high prevalence of hookah smoking was found as compared to the STEPS survey conducted by the NHRC. It may be due to the fact that hookah smoking has become more fashionable with time. Most of the late adolescents and young college students have been involved in this study, and the STEPS survey conducted by the NHRC has been two years old.

The findings of this study were quite similar to a cross-sectional study conducted among youth in Makindye Division of Kampala City during April through June 2014. The prevalence of hookah smoking was found to be 36.4%. This might be due to the fact that undergraduate engineering students have quite similar demographics to youth. The analysis of this study showed that gender and marital status were associated with hookah smoking [10]. However, the findings of this study were relatively lower than the study conducted among secondary school students in a disadvantaged community in Johannesburg, South Africa, which showed the prevalence of hookah smoking at 60% [11].

A demographic and health survey conducted on smoking and smokeless tobacco in nine South and Southeast Asian countries showed quite a lower prevalence of hookah smoking at 33.6% (9). The high prevalence in this study may be because the participants were undergraduate university students. The findings of this study showed that the mean age of initiation of hookah smoking was 17.92 1.565, which was similar to a study conducted among 280 youth in Pune, India [12]. This might

be because of the similar population. This study shows that males were more involved in hookah smoking (43%) as compared to females (23.5%), which was quite similar to the study conducted among US adults, which shows males were more involved in hookah smoking (18.8%) as compared to females (13%). This might be because men were more exposed to the outside and had less guidance from family members. This study showed that males were 2.44 times more likely to experience hookah smoking than females, which was similar to the study conducted among US adults, which showed males were 1.55 times more likely to experience hookah smoking than females [1]. This study shows that engineering students from nuclear families were more involved in hookah smoking (41.7%) as compared to students from joint families (25.2%), which was similar to the study conducted among 280 youth hookah smokers in Pune, India, which shows that youth smokers from nuclear families were more involved in hookah smoking (58.2%) as compared to youth smokers from extended families [12]. This might be due to a communication gap between parents and children and a lack of guidance from different family members, which may lead to hookah smoking. This study shows that the prevalence of hookah smoking increases with an increase in economic status. As the engineering students who were above the poverty line were more involved in hookah smoking (39.5%) as compared to students who were below the poverty line (20%), which was similar to the study conducted among university students of US adults, which shows that students with high economic status were found to be more involved in hookah smoking as compared to students with low economic status [1]. This might be because hookah users perceive hookah as a matter of pride and fashion.

Although there was no significant association between age and hookah smoking, the prevalence of hookah smoking increased with the increase in age of participants who belonged to age group older than 21. This was similar to the cross-sectional study conducted among university students in Hong Kong, which shows that the age group older than 21 was more involved in hookah smoking (23.2%) as compared to other age groups [13]. This could be because as they get older, they are more exposed to the outside world and face more risks from hookah smoking. This study shows that the major contributing factors for hookah smoking were curiosity (71.7%) and socialization with friends (28.1%), which was quite similar to the study conducted among youth smokers in Pune, India [12]. This could be because the physical appearance and taste of flavored tobacco piqued the interest of the young population. In this study, among 155 respondents, 60 participants were found to be involved in hookah smoking. The prevalence of hookah smoking was found to be highest in respondents who belong to urban areas as compared to respondents from rural areas, which was similar to the study conducted among youth in Kampala, Uganda, which shows that the prevalence of hookah smoking was high among the participants who belong to urban areas as compared to participants from rural areas [10]. This might be because in urban areas, hookah is available and accessible. This study shows that the age of the respondent had no significant association with hookah smoking, but also that hookah smoking was more prevalent among those older than 21 (42.9%). However, a study conducted among university students and US adults shows that age had a significant association with hookah smoking. The age group of 18–24 respondents was 5.93 times more likely to be involved in hookah smoking as compared to the age group of 65+ respondents [1].

This study shows that the sex of respondents was significantly associated with hookah smoking. The prevalence of hookah smoking was higher in men (43%) as compared to women. The further analysis shows that the male participants were 2.44 times more likely to engage in hookah smoking as compared to the female participants. [OR=2.449, 95% CI=1.026–5.848] which was similar to a longitudinal study conducted in high school students in Iran and shows that male participants were 2.29 times more likely to be involved in hookah smoking as compared to female participants. [OR=2.29, 95% CI=1.83-2.86] [14].

In this study, socio-demographic factors of students such as age, ethnicity, religion, type of family, and place of residence had no significant association with hookah smoking. Similar to this result, the study conducted among youth in Kampala, Uganda, showed there was no significant association between demographic factors such as age, family type, and place of residence with hookah smoking [10].

Conclusion

The findings of this study provided information on the high prevalence of hookah smoking. Hookah smoking was found to be more prevalent in men than in women. A comprehensive awareness program regarding the harmful effects of hookah smoking needs to be planned and implemented, with special focus on adolescent males and their associated factors, with the combined effort of the government, college teachers, and as well as parents.

Author Statements

Conflicts of Interest

Authors have declared that no competing interests exist.

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