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Waterpipe Smoking among Herat University Students: Prevalence, Attitudes, and Associated Factors

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Original Article

Abstract

Background: Waterpipe tobacco smoking (WTS) is an ancient type of smoking that has become a global phenomenon. This study aimed to identify the prevalence of waterpipe smoking and its relation to socio-demographic characteristics in Herat University students in western Afghanistan.

Methods: In this cross-sectional study, a structured self-administered questionnaire containing 53 items in 3 subscales was distributed between July and December 2018, to examine the use of waterpipe among Herat University students. Data were evaluated in SPSS. Chi-square test was used to observe differences between categorical variables. All important variables were separately evaluated for men and women in logistic regression models. A P-value less than 0.05 was considered statistically significant.

Findings: The prevalence of ever waterpipe use in male and female students was 54.1% and 81.8%, respectively. Parents' higher education and family economic status were associated with higher rates of ever waterpipe use in both sexes. On the other hand, marital status and parents' employment were not associated with waterpipe use. Ever waterpipe use was associated with having smoking friends or family members in both sexes. Male and female waterpipe users believed that cigarette smoke had more nicotine than waterpipe. While more male waterpipe users believed that cigarette was more addictive than waterpipe, more female users believed otherwise.

Conclusion: The prevalence of ever waterpipe use is higher in male students at Herat University. Having a smoking friend and family member positively influences waterpipe use among both sexes. Most users believed that waterpipe smoking was less hazardous than cigarette smoking.

Keyword: Waterpipe smoking; Students; Afghanistan

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Introduction

Smoking is a major public health threat directly killing more than seven million people around the world annually.[1] Smoking is the leading cause of preventable deaths, illnesses, and impoverishment around the globe.[2,3] It is estimated that over eight million people will die from diseases related to tobacco use, each year, by 2030.[3]

Waterpipe tobacco smoking (WTS) is an ancient type of smoking that has become a global phenomenon. In WTS, a multi-stemmed instrument that contains water in its base is used. The smoke of tobacco passes through water prior to inhalation.[4] The tobacco used in waterpipe smoking is mainly of three types: 'Muessel' containing 30% tobacco and 70% honey, 'Agami' a pure dark unflavored paste of Persian tobacco, and 'Jurak' commonly used in India.[5] Different fragrant materials are used to improve tobacco taste in waterpipe.[6]

The prevalence of waterpipe use varies greatly between different regions; it is 4.4% among Karbala University students in Iraq,[7] 8.9% in Iran,[8] 12.6% in Jordan,[9] 18.0% in the United States (US),[10] 24.2% in Saudi Arabia,[11] 24.4% in Palestine,[12] and 28.0% in Kurdistan Region of Iraq.[13]

The main determinants for waterpipe use have been identified as its affordability, availability, and media influence.[14] Users believe that waterpipe is good for cessation of cigarette smoking,[15] entertainment, building and supporting a social network,[16,17] and social acceptance.[16] Moreover, they believe that waterpipe is good for friendly gathering, having close friends,[17,18] and relaxation,[15] and it is less hazardous and cheaper than cigarette.[15]

Many people believe that waterpipe smoking has less hazard compared to cigarette smoking due to the fact that the smoke of waterpipe passes through water and its harmful particles are filtered before inhalation.[19] However, despite this popular belief, compared to cigarette smokers, waterpipe users inhale higher levels of heavy metals such as chromium, arsenic, lead, and tar; chemicals that are risk factors for cancer and ischemic heart disease (IHD).[20-23]

To date, no data about the prevalence of waterpipe use are available in Afghanistan, but the popularity and social acceptability of this harmful habit is growing rapidly. The aim of this study was to identify the prevalence of waterpipe smoking and its relation to socio-demographic characteristics in Herat University students, Herat Province, Afghanistan.

Methods

Study design, place, and duration: This cross-sectional study was conducted between July and December 2018, among Herat University students.

Sample size: Sample size was calculated using the sample calculation approach for prevalence studies. In this approach, waterpipe smoking was taken as 0.140 which was the results of a small-scale local study (unpublished), d was taken as 0.02, and z was taken as 1.96. The minimum sample size was calculated as 1156 people (). The minimum sample size to be reached for Z = 1.96 was calculated as 1156 people. When the total number of samples was stratified by gender, 514 women and 642 men were included in the study.

Sampling procedures and eligibility criteria: All Herat University students who were enrolled in the second semester of 2018 and signed an informed consent were included in this study. University attendance sheets were used as a sampling frame. The total number of Herat University students was divided by the number of sample size. The resultant number was used as an index for the calculation of number of samples which were randomly selected for each class.

Data collection: Each participant filled a self-administered questionnaire containing 53 items. The 53 items were grouped in 3 subscales: the socio-demographic subscale (11 items), the waterpipe use subscale (33 items), and the general belief subscale (9 items). The definition of waterpipe smoking in this study was "ever smoking", encompassing anyone who used waterpipe even once in his/her life.

Assessment of reliability and validity of the questionnaire: Prior to initiating the main study, a pilot test was conducted and 80 students completed the questionnaire. Cronbach's alpha coefficient was performed for internal consistency, which resulted in values over 0.8 for all items. The correlation between each item and its own subscale was assessed to ensure convergent validity, which was considered acceptable only if it was above 0.5. Discriminant validity was tested by comparing the correlation of each item and its own subscale to the correlation of that item with other subscale; this was acceptable when items were correlated with their own subscale more than other subscales.

http://ahj.kmu.ac.ir, 06 October

Dataset was evaluated by SPSS software (version 25, IBM Corporation, Armonk, NY) at Department of Biostatistics and Medical Informatics, Ege University, Izmir, Turkey. Categorical variables were presented with numbers (n) and percentages (%) and chi-square test was used to observe differences between categorical variables. In bivariate analysis, all independent variables with P-value less than 0.20 were put in the model; forward likelihood ratio (LR) method was used for the strength of the association between dependent and independent variables. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated and P-value less than 0.05 was considered as statistically significant. All-important variables were separately evaluated for men and women in logistic regression models.

The Human Ethics Committee of Herat University approved the study protocol (approval code: #0518).

Results

Of all participants included in the study, 66.8% (54.1% of men and 81.7% of women) had used waterpipe at least once; 18.1% of the participants (27.0% of men and 7.6% of women) were current users. Moreover, 15.1% of participants (18.9% of men and 10.7% of women) had never used waterpipe. The difference in distribution of waterpipe use according to gender was statistically significant (P < 0.001) (Table 1).

The prevalence of ever waterpipe use according to age groups was statistically significant in men (P = 0.018) but not in women (P = 0.506). Marital status and father's employment were not statistically significantly associated with ever waterpipe use in men (P = 0.680 and P = 0.906, respectively) and women (P = 0.550 and P = 0.317, respectively). On the other hand, father's education, mother's education, and self-perception of economic status were significantly associated with the rate of ever waterpipe use in men (P = 0.001, P = 0.001, and P = 0.020, respectively), but not in women (P = 0.947, P = 0.211, and P = 0.213, respectively). Mother's employment was significantly associated with ever waterpipe use in men (P = 0.008) and in women (P = 0.026) (Table 2).

Significantly higher percentage of male and female participants indicated that they had friends that used waterpipe (P < 0.001 and P < 0.001, respectively), had someone in their families that used waterpipe (P < 0.001 and P = 0.001, respectively), and had friends that smoked cigarette (P < 0.001 and P < 0.001, respectively). No significant difference was found in the percentage of waterpipe users in this study who had or did not have someone in their families that smoked any kind of tobacco product, both in men and women (P = 0.431 and P = 0.458, respectively) (Table 3).

More male ever waterpipe users believed to be addicted to waterpipe than non-users (40.0% vs. 4.2%, respectively, P < 0.001), cigarette was more harmful than waterpipe (34.7% vs. 17.7%, P < 0.001), cigarette was more addictive than waterpipe (41.7% vs. 33.2%, P < 0.001), and cigarette smoke had more nicotine (43.7% vs. 32.1%, P = 0.001). More female ever waterpipe users believed to be addicted to waterpipe than non-users (35.0% vs. 3.4%, respectively, P < 0.001) and waterpipe was more addictive than cigarette (28.2% vs. 23.0%, P < 0.050) (Table 4).

The variables in multivariate logistic regression analysis for men and women were found to be statistically significantly associated with ever waterpipe use (Table 2). Men regression model included following variables: participant's age, father's education, friends' waterpipe use, and family waterpipe use which were associated with the increased waterpipe use in participants (P < 0.050) (Table 5). The use of waterpipe in men showed a significant increase in accordance to participant's age (OR = 1.162, 95% CI: 1.049-1.288). Also, father's education was associated with waterpipe use, such that individuals whose fathers were university graduates were less likely to use waterpipe than those whose fathers were primary school graduates (OR = 0.609, 95% CI: 0.381-0.972).

Table 1. Distribution of waterpipe use according to gender

Waterpipe use	Male	Female	Total	P*
	n (%)	n (%)	n (%)	
Ever use	344 (54.1)	444 (81.7)	788 (66.8)	< 0.001
Current use	172 (27.0)	41 (7.6)	213 (18.1)	
Never use	120 (18.9)	58 (10.7)	178 (15.1)	
Total	636 (100)	543 (100)	1179 (100)	

*Chi-square test, P < 0.05 was the significance level

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Table 2. Ever waterpipe use in male and female university students by socio-demographic characteristics

Variable	Ever waterpipe use							
	Male			P*	Female			P*
	Yes (%)	No (%)	Total (n)		Yes (%)	No (%)	Total (n)	
Age groups (year)								
17-18	10.5	89.5	38	0.018	5.3	94.7	76	0.506
19-20	23.0	77.0	200		5.6	91.4	221	
21-22	32.1	67.9	221		6.1	93.9	180	
23-24	28.8	71.2	177		10.6	89.4	66	
Total	27.0	73.0	636		7.6	92.4	543	
Marital status								
Single	27.1	72.8	558	0.680	7.2	92.8	414	0.550
Married	25.0	75.0	76		8.9	91.1	124	
Total	27.0	73.0	634		7.6	92.4	538	
Father's employment								
No	27.7	72.3	264	0.906	9.7	90.3	155	0.317
Yes	27.2	72.8	349		7.1	92.9	353	
Total	27.4	72.6	613		4.9	92.1	508	
Father's education								
Illiterate	32.8	67.2	116	0.001	6.8	92.3	88	0.947
Primary and secondary school	17.6	82.4	221		7.8	92.2	180	
High school	29.5	70.5	129		9.2	90.8	98	
University	35.0	65.0	143		8.0	92.0	150	
Total	27.1	72.9	609		7.9	92.1	516	
Mother's employment								
No	25.7	74.3	567	0.008	6.5	93.5	462	0.026
Yes	42.1	57.9	57		13.6	86.4	81	
Total	27.2	72.8	624		7.6	92.4	543	
Mother's education								
Illiterate	24.7	75.3	259	0.001	7.5	92.5	173	0.211
Primary and secondary school	24.1	75.9	249		7.4	92.6	204	
High school	31.3	68.8	64		4.2	95.8	71	
University	50.0	50.0	52		13.3	86.7	75	
Total	27.2	72.8	624		7.8	92.2	523	
Self-perception of current economic status								
Very poor	33.3	66.7	12	0.020	0	100	7	0.213
Poor	13.8	86.2	58		11.9	88.1	42	
Good	26.5	73.5	445		6.0	94.9	331	
Excellent	35.6	64.4	118		10.4	89.6	154	
Total	27.2	72.8	633		7.7	92.3	534	

*Chi-square test, P < 0.05 was the significance level

Friends' waterpipe use was found to significantly increase the risk of participant's waterpipe use 4.1 times (OR = 4.165, 95% CI: 2.726-6.365). The risk of waterpipe use was 2.4 times higher among participants whose family used waterpipe (OR = 2.420, 95% CI: 1.468-3.989) (Table 5).

Table 3. Demographic characteristics of the habits of individuals in the environment

Smoking person around	Ever waterpipe use							
	Male			P*	Female			P*
	Yes (%)	No (%)	Total (n)		Yes (%)	No (%)	Total (n)	
Having friends using waterpipe	34.7	65.3	435	< 0.001	21.3	78.7	150	< 0.001
Having someone in family using waterpipe	50.0	50.0	96	< 0.001	14.3	85.7	133	0.001
Having friends smoking	41.7	58.3	288	< 0.001	27.1	72.9	48	< 0.001
Having someone in family who smokes any type of tobacco	33.3	66.7	57	0.431	5.4	94.6	56	0.458

*Chi-square test, P < 0.05 was the significance level

http://ahj.kmu.ac.ir, 06 October

Table 4. Evaluation of emotional states related to the use of waterpipe in men and women

Emotional states	Ever waterpipe use							
	Male			P*	Female			P*
	Yes (%)	No (%)	Total (n)		Yes (%)	No (%)	Total (n)	
Believing to be addicted to waterpipe								
Yes	40.0	4.2	83	< 0.001	35.0	3.4	23	< 0.001
No	60.0	95.8	448		65.0	96.6	285	
Total	100	100	531		100	100	308	
Perceived harm of waterpipe compared to cigarettes								
The same	11.8	24.8	128	< 0.001				0.157
Cigarettes are more harmful than the waterpipe	34.7	17.7	136		20.5	35.9	155	
Waterpipe is more harmful than the cigarettes	53.5	57.5	341		43.6	35.4	162	
Total	100	100	605		35.9	28.8	132	
Perceived addiction of waterpipe compared to cigarettes								
The same	14.9	25.8	137	< 0.001	15.4	29.8	128	0.002
Cigarettes are more addictive than waterpipe	41.7	33.2	214		35.9	41.6	184	
Waterpipe is more addictive than cigarettes	23.8	32.5	181		28.2	23.0	105	
Not addictive	19.6	8.5	70		20.5	5.6	31	
Total	100	100	602		100	100	448	
Perception of waterpipe smoke nicotine content compared to cigarette smoke								
Pretty much the same	10.2	16.9	89	0.001	12.8	27.1	119	0.149
Cigarette smoke has more nicotine	47.3	32.1	216		53.8	45.0	210	
Waterpipe smoke has more nicotine	42.5	51.1	289		33.3	27.9	130	
Total	100	100	594		100	100	459	
Perception of reduced health risk of switching from cigarettes to waterpipe								
No reduction	54.5	60.1	346	0.145	43.6	48.8	219	0.889
Small reduction in health risk	24.6	18.2	118		28.2	24.4	112	
Moderate reduction in health risk	13.2	10.4	66		15.4	16.4	74	
Large reduction ın health risk	7.8	11.3	61		12.8	10.4	48	
Total	100	100	591		100	100	453	

*Chi-square test, P < 0.05 was the significance level

Women regression model included following variables: friends' waterpipe use, family waterpipe use, and economic status which were associated with the increased waterpipe use in participants. In women, friends' waterpipe use was found to significantly increase the risk of participant's waterpipe use 5.2 times (OR = 5.239, 95% CI: 3.134-8.758). The risk of waterpipe use was 1.8 times higher among participants whose family used waterpipe (OR = 1.816, 95% CI: 1.075-3.069). Waterpipe use was found to be associated with women's economic status. However, there was no significant difference between the economic levels (Table 5).

The goodness of fit test of the logistic regression model was evaluated via Hosmer-Lemeshow chi-square test. The fit of the model was adequate with P = 0.317 in men and P = 0.458 in women. Also, Cox and Snell's R^2 values were examined and Nagelkerke R^2 explained the variance of 20.9 in men and 31.7 in women.

Discussion

This study represents the first survey investigating the prevalence of waterpipe use and its association with socio-demographic characteristics in students at Herat University, in west region of Afghanistan. We found that 27.0% of male and 7.6% of female students were current waterpipe users. The findings of this study show a lower prevalence of waterpipe use than the results of similar studies conducted among university students in Jordan (36.6% of men and 88.6% of women),[9] Saudi Arabia (66.0% of men and 35.0% of women),[11] The Kurdistan Region of Iraq (49.0% of men and 10.0% of women),[13] and Britain (26.5% of men and 16.6% of women).[24]

http://ahj.kmu.ac.ir, 06 October

Table 5. Logistic regression models of ever waterpipe users in men and women

Variables	B	SE	Wald	df	P	Exp(B)	95% CI for Exp(B)	
							Lower	Upper
Men[1]								
Constant	-4.600	1.155	15.860	1	< 0.001	0.010		
Age	0.151	0.052	8.315	1	0.004	1.162	1.049	1.288
Father's education			8.641	3	0.034			
Father's education (illiterate)	0.130	0.277	0.220	1	0.639	1.138	0.662	1.959
Father's education (primary school)	-0.497	0.239	4.314	1	0.038	0.609	0.381	0.972
Father's education (high school)	-0.423	0.268	2.493	1	0.114	0.655	0.388	1.107
Having friends using waterpipe	1.427	0.216	43.489	1	< 0.001	4.165	2.726	6.365
Having someone in family using waterpipe	0.884	0.255	12.021	1	0.001	2.420	1.468	3.989
Women[2]								
Constant	-2.292	0.422	29.485	1	< 0.001	0.101		
Having friends using waterpipe	1.656	0.262	39.918	1	< 0.001	5.239	3.134	8.758
Having someone in family using waterpipe	0.597	0.268	4.975	1	0.026	1.816	1.075	3.069
Economic status (poor)			9,670	2	0.008			
Economic status (good)	-0.289	0.422	0.470	1	0.493	0.749	0.328	1.712
Economic status (excellent)	0.569	0.446	1.631	1	0.202	1.767	0.738	4.234

[1]$Age_{cont.}$, friend use (not using), family use (not using), father's education (university), economic status (poor), marital status (married), mother's job (no), father's job (no); P < 0.05 was the significance level

[2]$Age_{cont.}$, friend use (not using), family use (not using), economic status (poor), marital status (married), mother's job (no), father's job (no); P < 0.05 was the significance level

SE: Standard error; df: Degree of freedom; CI: Confidence interval

However, the rate of waterpipe use found in this study is higher than researches conducted among university students in the US (6.4% of men and 5.9% of women)[25] and Syria (25.5% of men and 4.9% of women).[26] The difference in the rate of waterpipe use in this research and studies conducted in the Middle East may be due to the fact that waterpipe use was more prevalent among university students in that region since decades ago, but it is getting popularity in Herat Province of Afghanistan only in recent years. The fact that men use waterpipe more than women has also been indicated in other studies.[7,10-13,27] While this difference could be true, it should also be noted that in some regions, women underreport the use of tobacco, due to cultural constraints.[13] Moreover, in societies like Afghanistan, less number of female university students are gathering together to study or socialize than their male counterparts. This minimizes the chance of female students to use waterpipe.

This study revealed that parents' higher education was statistically significantly associated with higher rate of waterpipe use. This finding is in accordance with results of studies conducted in the US and Iraq.[7,10] The latter two studies also found that higher parent's education was an important determinant of waterpipe use in children. Our study also revealed that self-perception on family economic status was associated with waterpipe use in male students, which is similar to research conducted in the US,[10] that claimed users' high income was an important factor for waterpipe use. This indicates that high economic status positively affects waterpipe smoking behavior among young people.

In this study, we found that marital status was not associated with the prevalence of waterpipe use in both men and women, which contradicts the results of a study conducted in Iraq which claimed that higher prevalence of waterpipe use was associated with being unmarried.[7] In fact, no other studies conducted among university students reported significant differences in waterpipe use between married and single individuals. This shows that unlike general public, marital status is not a significant factor for waterpipe use among university students.

Results of this study indicate that a high number of waterpipe users have a friend or someone in their family that uses waterpipe. This is similar to the findings of studies conducted elsewhere,[8,9] which claimed that having a smoker friend or family member was a significant factor in starting and continuing waterpipe use. Given that waterpipe smoking is mainly used as a social activity with family and friends, there is no doubt that a smoking family or friend greatly influences

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waterpipe use among young adults.[27,28] In fact, research indicates that family plays a major role as a facilitator for waterpipe use initiation,[29] and encouragement from family and friends positively influences waterpipe use.[9,27] Other studies indicated that having a friend who disapproved waterpipe tobacco was associated with less use.[30,31]

This study reveals that one quarter of male participants believe that waterpipe is less harmful than cigarette and one third of male participants believe that cigarettes has less nicotine than waterpipe. This finding is in accordance with research previously conducted in Jordan in which one third of participants agreed with the statement that "waterpipe smoking is less harmful than cigarette".[9] Another study conducted in Iran also found that the majority of participants believed that waterpipe smoking was cheaper and less hazardous than cigarette.[15] However, despite the improper belief that water filters out the toxic agents of smoke in the waterpipe instrument, research proved that waterpipe smokers inhaled higher levels of toxic material than cigarette smokers and were at greater risk of developing tobacco-related diseases such as cancer and cardiovascular diseases (CVDs).[20,28]

Conclusion

The results of this study indicate that the prevalence of waterpipe use is higher in male students than their female counterparts at Herat University. Results reveal that having a smoking friend or family member positively influences waterpipe use among Herat University students. Therefore, families should be advised not to smoke at home or before young children. Most waterpipe users in this study incorrectly believed that waterpipe was less hazardous than cigarette; hence, true information should be provided to young generation in the community to properly inform them of the risk associated with waterpipe tobacco use.

The findings of this study can be considered in planning and implementing strategies to reduce the rate of waterpipe use in the region.

Limitations: Due to cross-sectional design of this study, a causal inference of waterpipe among students could not be identified. Furthermore, because data were collected via self-administered questionnaires, it was assumed that participants were honest in filling the questionnaires. For a more reliable data, it would be preferred to collect data via interview-based questionnaires.

Conflict of Interests

The authors have no conflict of interest.

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Authors' Contribution

Conceptualization, data curation, data analysis, funding, investigation, methodology, software, supervision, writing-original draft, review and editing: AN; Conceptualization, data curation, funding, investigation, methodology, project administration, resources, writing-review and editing: NAS; Conceptualization, data curation, data analysis, writing-review and editing: SO; Conceptualization, data curation, funding, investigation, methodology, software, writing–review and editing: SAJ; Conceptualization, data curation, funding acquisition, investigation, methodology, project administration, supervision, resources, writing–reviewing and editing: HO.

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مصرف قلیان در بین دانشجویان دانشگاه هرات: شیوع، دیدگاه‌ها و عوامل وابسته

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مقاله پژوهشی

چکیده

مقدمه: مصرف قلیان از انواع قدیمی استعمال دخانیات می‌باشد که به پدیده‌ای جهانی تبدیل شده است. پژوهش حاضر با هدف شناسایی شیوع مصرف قلیان و ارتباط آن با ویژگی‌های دموگرافیک- اجتماعی دانشجویان دانشگاه هرات در غرب افغانستان انجام شد.

روش‌ها: در این مطالعه مقطعی، یک پرسش‌نامه ساختار یافته خودایفا شامل ۵۳ آیتم در سه خرده مقیاس، بین ماه‌های جولای و دسامبر سال ۲۰۱۸ توزیع شد تا مصرف قلیان را در بین دانشجویان دانشگاه هرات بررسی کند. از آزمون χ^2 جهت مشاهده تفاوت‌های بین متغیرهای رسته‌ای استفاده شد. تمام متغیرهای مهم به طور جداگانه برای دانشجویان دختر و پسر در مدل Logestic Regression بررسی گردید. در نهایت، داده‌ها در نرم‌افزار SPSS مورد تجزیه و تحلیل قرار گرفت. $P < ۰/۰۵$ به عنوان سطح معنی‌داری در نظر گرفته شد.

یافته‌ها: شیوع استفاده از قلیان (حداقل یک بار) در دانشجویان پسر و دختر به ترتیب ۵۴/۱ و ۸۱/۸ درصد بود. تحصیلات عالی والدین و وضعیت اقتصادی خانواده با بالاتر بودن میزان استفاده از قلیان (حداقل یک بار) در هر دو جنس ارتباط معنی‌داری داشت. از طرف دیگر، وضعیت تأهل و اشتغال والدین با مصرف قلیان ارتباطی را نشان نداد. ارتباط معنی‌داری بین استفاده از قلیان با استعمال دخانیات توسط دوستان یا اعضای خانواده در هر دو جنس مشاهده شد. مصرف‌کنندگان قلیان (دختر و پسر) معتقد بودند که دود سیگار نیکوتین بیشتری از قلیان دارد؛ در حالی که بیشتر پسران مصرف‌کننده قلیان معتقد بودند که سیگار از قلیان اعتیادآورتر است و بیشتر مصرف‌کنندگان دختر خلاف این موضوع را باور داشتند.

نتیجه‌گیری: شیوع مصرف قلیان در دانشجویان پسر دانشگاه هرات بیشتر است. داشتن یک دوست یا عضو خانواده که دخانیات مصرف می‌کند، به طور مثبت بر استفاده از قلیان در هر دو جنس تأثیر می‌گذارد. بیشتر مصرف‌کنندگان بر این باور بودند که استفاده از قلیان نسبت به سیگار خطر کمتری دارد.

واژگان کلیدی: مصرف قلیان؛ دانشجویان؛ افغانستان

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