



# Prevalence and Associated Factors of Tobacco Smoking in Jumla, Nepal

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## Abstract

**Introduction:** Globally, tobacco consumption is a major risk factor for mortality with an estimated five million deaths every year. Mortality due to cardiovascular diseases, cancer and respiratory conditions are the main cause of smoking. The rate of becoming smoker of teenagers increase day by day and 33% of them are believed to die due to consumption of tobacco. Almost 90% of them start smoking before the age of eighteen. The objective of this research is to study the prevalence, associated factors and behavior of cigarette smoking.

**Methods:** A descriptive cross-sectional study design was used to find the prevalence of smoking and other associated factors. A sample of 345 students were recruited purposively from the selected school and a self administered questionnaire were used to collect the data in 2020 using WHO step survey.

Data were entered in EPI data and Univariate and bivariate analysis was done using SPSS16. Logistic regression was used to find the associated factors. P value less than 0.05 was considered as statistical significant.

**Results:** Among 318 students, 65% were male. The average age of the students was  $18.03 \pm 1.65$  years with the range of 15 to 25 years. The prevalence of smoking was estimated 23.3% (male=31.9% and female = 7.2%). The mean age of initiation of smoking was 16.5 years. Presence of parental smoking and smoking status was significantly associated ( $P < 0.05$ ). Alcoholic habit was the predictor of smoking ( $p < 0.05$ ). Peer pressure (83.7%), exam load (55.8%), frustration (51.2%) family environment (43%), advertisement (34.9%), pleasure (26.7%) and curiosity (22.1%) were the main reason of starting smoking. They had the knowledge of harmful effects of smoking i.e. cause cancer (91.8%), chronic bronchitis (65.70%), laryngeal cancer (42.10%), heart disease (34.3%).

**Conclusion:** The prevalence of smoking was remarkably high in college students. Thus, it is important to address this preventable problem.

**Keywords:** Prevalence, smoking, students, Jumla, Nepal

## Introduction

Consumption of tobacco is a major risk factor for mortality and morbidity of every aged group. Among 8 billion deaths in the world, more than 7 million deaths are occurred due to the consumption of tobacco. Smoking causes cardiovascular diseases, cancer and respiratory disease and which directly lead the mortality. Out of 1.3 billion smokers worldwide, more than 80% live in low and middle income countries and suffering greatly from

burden of tobacco-related illness and death. More than one in five (22.3%) used tobacco consumption globally in 2020, among which male and female were 36.7% and 7.8% respectively<sup>1</sup>

The proportional mortality in Nepal from non-communicable diseases (NCDs) was 63.3% in 2015 and predicted 78.6% in 2040. The rate of mortality by smoking was around 14.9% of total death among the population aged 18 years and more. The prevalence of smoking was estimated in Nepal 21.6% which was varied from 10.7% to 38.4% (male=35.5% and female=9.2%)<sup>2-6</sup>

A study done in different ecological regions of Nepal indicated that prevalence of tobacco use was 68.4% in rural Kathmandu, 37.0% in urban Kathmandu, 54.7% in Terai region and 77.7% in mountain.

Cigarettes and Bidi are the most common source of tobacco smoking in Nepal.<sup>7</sup> The other form of tobacco consumption is in smokeless form such as Paan, Gutkha, Khaini, Shurti etc. which are highly prevalent in Nepal.<sup>8</sup> Studies showed that smokeless tobacco is addictive and harmful like smoking. Smokeless tobacco, especially in the form of chewing has been associated with various oral diseases including cancers and coronary heart disease and adverse reproductive outcomes.<sup>9-11</sup> A hospital based prevalence of smoking related diseases like COLD (Chronic obstructive lung disease), acute respiratory infection and coronary artery diseases is 30.8% in Jumla

Although having good knowledge of the health consequences, tobacco smoking is very common in world. One-third of the smokers who are adolescents are believed to die due to tobacco use. About 90% of smokers start smoking prior to the age of 18 years and approximately 1500 youth smoke their first cigarette within the age of 18 years every day.<sup>12</sup>

Several studies have reported that different forms of tobacco use in Nepal are increasing.<sup>13,14</sup> The prevalence of tobacco users in Nepal of age group 13 to 15 years was 7.2% (male = 9.5% and female = 4.8%). The cigarette smokers were 5% in total (male = 6.8% and female = 3.0%).<sup>15</sup>

In spite of information about factors affecting the cigarette smoking behavior of adolescents of this high latitude of Area of Nepal, there was inadequate information. Many factors may influence adolescents' decisions to start smoking or to use other tobacco products. Due to such gap in knowledge to adolescents' behavior and vulnerability to different risky behaviors like cigarette smoking, this studying helps to find out the smoking related information. The aim of this study was to determine the prevalence, distribution and its associated factors of tobacco smoking and chewing habit of students.

## Methods

A cross sectional study was done in Jumla, Karnali Province of Nepal from June 2020 to July 2020. A Self-administered questionnaire was distributed in the class room by the researcher. Before filling the questionnaire, researcher explained the objectives of the survey and process of data filling in the tools and the questionnaire was collected after completion. Four schools/institute of different discipline were selected among which two were from professional and two are from general discipline. The study populations were the students who were studying in plus two level and certificate/diploma level of health and other programs. The sample size was estimated based on prevalence of smoking ( $p=34%$ ) among adolescent (16) The allowable error and reliability coefficient was taken 5% and 95% ( $z = 1.96$ ) respectively.

Using Cochran Sample size formula ( $n = Z^2pq/d^2$ ), the estimated sample size was 345. The total 345 questionnaires were distributed to the students and the total of 318 forms was returned. So the response rate was 93%.

A non probability purposive sampling technique was used to select the schools. Due to the COVID-19 pandemic, four institutes from Chandannath Municipality of Jumla district were selected. After the selection of institute, classes of respective program were selected using simple random sampling and all the students were taken as a sample of the selected class. A WHO steps survey guideline for non-communicable disease were used to collect the data through self administered method. The researchers were involved in the data collection process.

Data was entered in EipData software and transferred into SPSS version 16.0 for analysis. As a Descriptive statistics; Frequency, percentage, mean and standard deviation were calculated; and chi-squared test and logistic regression were done to show the association between variables. P value less than 0.05 was considered as significant association. Goodness of fit of the model was tested by Hosmer Lemeshow test.

Ethical clearance was acquired from the Institutional Review Committee of Karnali Academy of Health Sciences dated on May 4, 2020 (Ref: 076/077/21). Permission was taken from respective school/institute and informed consent was taken from each students. Participations in the study were entirely voluntary and full confidentiality of the responses was maintained. None of the school authority was present at the time of data collection.

## Results

A total of 345 samples, 318(93%) students completed the questionnaires. Among the participants, about two third (65.1%) of them were male students. The sex ratio of the male to female students was 1.86. Majority of the students (43.7%) belonged to the age group below 17 years and

followed aged 18-19 years (40.3%). The mean, median and mode age of the students were 18.03, 18 and 17 years respectively. The age range was 15 to 25 years with standard deviation 1.65 years. Brahmin and Chhetri by ethnicity (82.15) was the predominant and followed by Janajati (9.7%) and very few were from Dalit (8.2%). Majority were from unmarried (90.9%). Regarding the program, more than one third (34.9%) was from plus two and very few (17.9%) were from engineering and remaining from health science background. Among smokers (n=74), about two third (62.2%) students had started smoking at the age of 15 years and more where as one third started smoking within 15 years. The mean age (median = mode) at initiation of smoking was 16 years (SD= 1.6 years). The range of initiation was 10 years to 19 years. They reported that more than half of (54.4%) of them consumed 5 or more sticks per day. They consumed 4.8 sticks in an average (SD=1.5 sticks) ranging from 2 sticks to 8 sticks per day. The prevalent smoking status of father and mother were 45.9% and 26.1% respectively. (Table 1)

The prevalence of current smokers was 23.3% (95% CI: 18.7 to 28.3) of which the male and female prevalence was 31.9% (95% CI: 25.6, 38.7) and 7.2% (95% CI: 3.1 to 13.7) respectively (Table 1 and 2) and this difference was statistically significant ( $P < 0.01$ ). Likewise the prevalence of current smokers among Janajati/others and Brahmin/Chhetri were 42.3% (95% CI: 23.4 to 63.8) and 21.6% (95% CI: 17.0 to 27.7) respectively which showed the statistically significant association ( $O = 0.017$ ). Regarding study program, the prevalence of smokers of none health sciences students (26.1%, 95% CI: 20.7 to 32.0) was significantly ( $p = 0.020$ ) higher than the health sciences students (13%, 95% CI: 6. to 23.3). Similarly, regarding studying year, the prevalence of smokers of first year (joining year) students (25.5%, 95% CI: 20.4 to 31.0) was significantly ( $p = 0.020$ ) higher than the students studying in other years (9.3%, 95% CI: 2.3 to 22.0). The proportion of smoking among the students those who had the habit of alcohol consumption was 47.4% (95% CI: 35.8 to 59.1) whereas it was only 15.7% (95% CI: 11.4 to 20.9) in the students those who did not take the alcohol. The difference was statistically significant ( $P < 0.001$ ). Regarding relationship between prevalence of smoking of students and their parents smoking status, a significant association ( $p = 0.001$ ) was found between the smoking status of students and their father's smoking habit (Yes: 32.6%, 95% CI: 24.8 to 41.1 and No: 16.4%, 95% CI: 11.3 to 22.5). Similarly there was a significant association ( $p = .043$ ) between smoking status of student and their mothers' smoking status (Yes: 31.3%, 95% CI: 22.0 to 24.4 and No: 20.4%, 95% CI: 15.5 to 26.1, Table 3).

**Table 1.** Distribution of demographic characteristics of students

Description	Frequency (n= 318)	Percentage
Sex		
Male	207	65.1
Female	111	34.9
Age (years)		
Upto 17	139	43.7
18-19	128	40.3
20 and above	51	16.0
Mean $\pm$ SD= 18.03 $\pm$ 1.65 years minimum = 15yrs and maximum = 25yrs		
Median = 18 and mode = 17 years		
Ethnicity		
Brahmin/Chhetri	261	82.1
Janajati	31	9.7
Under-privileged	26	8.2
Marital Status		
Unmarried	289	90.9
Married	29	9.1
Program/Faculty		
Plus two level	111	34.9
Agriculture/Forestry	81	25.5
Engineering	57	17.9
Health Sciences	69	21.7
Current smoking status of Students		
Yes	74	23.3
No	244	76.7
Initiation age (N=74)		
Below 15 years	28	37.8
Above 15 years	46	62.2
Mean $\pm$ SD : 16 $\pm$ 1.6 years Minimum = 10 years and Maximum = 19 years		
Median = 16 years and mode = 16 years		
No. of sticks per day(n=74)		
Up to 4 sticks	34	45.9
5 or more sticks	40	54.1
Mean $\pm$ SD: 4.85 $\pm$ 1.5 sticks/day Minimum = 2 and Maximum = 8 sticks/day		
Median = 5 and Mode = 4		
Smoking status of parents		
Father	135	42.5%
Mother	83	26.1%

Table 2 shows the opinions the reasons of smoking by students. Among 74 students, majority of the students agreed that they started smoking due to peer pressure (89.2%) and followed by family environment(47%), curiosity (47%), pleasure and relief tension (45.3%), tobacco advertisement(36.9%) and a very few of them answered that exam load (16.2%), low esteem(16.2%), loneliness (12.2%) and stress (10,8%) were the main reasons of smoking (Table 2).

**Table 2:** Reasons of Smoking (n= 74 )

Causes of smoking	No.	Percentage
Peer pressure	66	89.20
Family environment	35	47.30
Curiosity	35	47.30
Pleasure/relieve tension	34	45.90
Tobacco advertisement	27	36.50
Frustration	22	29.70
Offered by relatives	18	24.30
Exam load	12	16.20
Low esteem	12	16.20
Loneliness	9	12.20
Stress	8	10.80

### Bivariate Analysis

**Table 3:** Bivariate analysis for association between smoking status and selected factors

Variables	Smoking status		Total	$\chi^2$ value	P value	Crude Odds Ratio (95% CI)
	Yes(n,%)	No (n,%)				
Age of students						
Up to 17 years (ref)	35(25.2)	104(74.8)	139	0.506	0.77	1
18-19 years	28(21.9)	100(78.1)	128			1.20(0.68-2.12)
20 and more	11(21.6)	36(78.1)	51			1.22(0.567-2.64)
Total	74(23.3)	244(76.7)	318			
Sex of the respondents						
Male	66(31.9)	141(68.1)	207	24.64	<.001	3.97(1.96- 7.92)
Female (Ref)	8(7.20)	103(92.8)	111			1
Ethnicity						
Janajati and others	11(42.3)	15(57.7)	26	5.7	0.017	2.66 (1.16-6.09)
Brahmin/Chhetri (Ref)	63(21.6)	229(78.4)	292			1
Religion						
Hindu(Ref)	66(22.7)	225(77.3)	291	3.83	0.147	1
Buddhist	5(22.7)	17(77.3)	22			0.935(0.33-2.64)
Christian	3(60.0)	2(40.0)	5			0.195(0.03-1.19)
Marital status						
Unmarried	69(23.9)	220(76.1)	289	.065	0.420	1.50(0.55-4.09)
Married(Ref)	5(17.2)	24(82.8)	29			1
Program						
Non Health Sciences	65(26.1)	184(73.9)	249	5.16	0.023	2.35(1.10-5.013)
Health Sciences(Ref)	9(13.0)	60(87.0)	69			1
Studying year						

Joining year	70(25.5)	205(74.5)	275	5.4	0.020	3.32(1.14-9.65)
Final year (Ref)	4(9.3)	39(90.7)	43			
Alcohol Consumption						
Yes	36(47.4)	40(52.6)	76	32.48	<.001	4.83(2.73 - 8.52)
No (Ref)	38(15.7)	204(84.3)	242			

In the bivariate analysis, male students were 3.97 times more likely to use tobacco smoking than female students (OR= 3.97; 95% CI: 1.96 to 7.92). Students from Janajati and Dalit were 2.66 times more likely to use tobacco smoking than Brahmin and Chhetri students (OR= 2.66; 95% CI: 1.16 to 6.09). Students from non health sciences were 2.35 times more likely to use tobacco smoking than health sciences students (OR= 2.35; 95% CI: 1.10 to 5.01).

Students of first year were more likely to use tobacco

smoking than second or final year students (OR= 3.32; 95% CI: 1.14 to 9.65). Students those who had the habit of alcohol had more than 4 times the odds of using tobacco smoking than those were not use alcohol (OR= 4.83; 95% CI: 2.73 to 8.52; table 3). Students whose fathers were smokers were more likely to use tobacco than those whose fathers were not smokers (OR= 2.46; 95% CI: 1.44 to 4.19). Students whose mothers were smokers were more likely to use tobacco than those whose mothers were not smokers (OR= 1.77; 95% CI: 1.01- 3.11; (Table 4).

**Table 4:** Bivariate analysis for association between smoking status and selected factors of parents

Variables	Smoking status		Total	$\chi^2$ value	P value	COR (95%CI)
	Yes N(%)	No N(%)				
Smoking status of father						
Yes	44(32.6)	91(67.4)	135	11.418	.001	
No (Ref)	30(16.4)	153(83.6)	183			
Smoking status of mother						
Yes	26(31.3)	57(68.7)	83	4.08	.043	1.77(1.01- 3.11)
No (Ref)	48(20.4)	187(79.6)	235			
Education of father						
Illiterate	27(28.7)	67(71.3)	94	2.22	.136	1.51(0.875-2.63)
Literate (Ref)	47(21.0)	177(79.0)	224			
Education of mother						
Illiterate	34(20.7)	130(79.3)	164	1.22	.269	0.745(.442-1.25)
Literate(Ref)	40(26.0)	114(74.0)	154			
Occupation of father						
Agriculture	36(23.5)	117(76.5)	153	0.11	.916	1.028(0.611-1.73)
Others (Ref)	38(23.0)	127(77.0)	60			
Occupation of mother						
Agriculture	54(24.3)	168(75.7)	222	.457	0.499	1.22(0.684-2.18)
Others (Ref)	20(20.8)	76(79.2)	96			

**Table 5:** Multivariate analysis for association between smoking and selected factors

Variables	Categories	AOR	95% C.I. for OR		P value
			Lower	Upper	
Sex	Male	3.92	1.899	8.126	<0.01
	Female	1			
Ethnicity	Others	1.59	.599	4.221	0.351
	Brahmin/Chhetri	1			
Stream/Program	Non health sciences	1.54	.637	3.748	0.336
	Health sciences	1			
Studying year	Joining year	2.29	.699	7.542	0.171
	Final year	1			
Smoking status of father	Smoker	1.69	.894	3.199	0.106
	Non smoker	1			
Smoking status of mother	Smoker	1.02	.521	2.017	0.944
	Non smoker	1			
Habit of alcohol consumption	Yes	3.10	1.630	5.922	0.001
	No	1			

A multivariate logistic regression was performed to ascertain the predictors of gender, ethnicity, program, studying year, smoking status of father, smoking status of mother, habit of alcohol on the likelihood that participants having smoker. The logistic regression model was statistically significant, chi square = 52.9,  $P < 0.001$ . The model explained 24.0% (Nagelkerke  $R^2$ ) of the variance in smoking status using Hosmer Lemeshow test ( $p=0.52$ ) and correctly classified 80.8.0% of cases. Males were 3.92 times more likely to smoke than females ( $p<0.001$ ). Similarly those who have habit of alcohol were 3.10 time more likely to smoke than no alcoholic ( $p = 0.001$ ).

## Discussion

The modified WHO STEPS tools for Non Communicable Disease and National Global Youth Tobacco Survey (GYTS) were used to collect the data from students from selected school of aged 15 to 25 years. Tobacco use causes life-threatening diseases like lung cancer, respiratory disease, cancer of the mouth and esophagus. It also reduces fertility. Tobacco kills one person every four seconds. More than 8 million people die each year due to tobacco and 1.2 million Deaths are due to second-hand smoke exposure. Epidemically it has become a biggest public health threats in the world including Nepal. Every year in Nepal, there are 27,100 mortality, among which 90% of them due to the lung cancer which is directly associated to the tobacco smoking.<sup>13, 14</sup>

In present study, prevalence of smoking was 23.3% among students.. This result was quite similar to the study conducted in medical students (20.8%) in Kathmandu.<sup>19</sup> But

prevalence of smokers of this study is higher than the study conducted in various part of Nepal 17.9%, 17%, 16.2% and 8% respectively.<sup>6,20-22</sup> The smoking status is closer to the studies done among college students in different countries where cigarettes smokers was 22.4%, 19% and 20%.<sup>23-25</sup> The prevalence of smoker of 23.3% is higher than those reported in other college students' studies which had the prevalence of 37.7% and 38.4%.<sup>26,27</sup> A study conducted by Global Health Professional Survey, Nepal in 2006 showed that 40 to 64 percentage of the participants had used tobacco during their lifetime.<sup>3</sup> The difference of prevalence of smoking status of these studies may be the inclusion of students from various level and various program; and may be due to the cultural, geographical variation, and definitions of smoking used in study..

The prevalence of smoking status among male students was 31.9% and female students (7.2%). The difference of proportion was statistically significant. According to the study conducted in Dharan of Nepal, the most consistent finding was 33.6% in male and 4% in female.<sup>6</sup> Likewise our study's finding were in the line of study conducted in Kathmandu, in which prevalence of smoking in male was 28.4% and 5.38% in female.<sup>22</sup> The prevalence varied according to the ethnicity, the highest one in Janajai/Dalit (42.3%) and almost half (21.6%) of it in Brahmin/Chhetri, the differences of smoking status of these groups are statistically significant. A similar findings was shown by a study conducted in Dharan in which prevalence was 14.6% in Brahmin/Chhetri and Janajati/ Dalit was 29.4%.<sup>6</sup>

The prevalence of smoking status of respondent's father was 42.5 percent and mother 26.1 percent respectively. The prevalence of smoking status of participants was

significantly higher among those students whose father smoked (32.6%) compared to those who did not (16.4%). Likewise, the prevalence of smoking status of respondents was significantly higher among those students whose mother smoked (36.1%) compared to those who did not (18.7%). Similar results were found in the study done in Nepal, China and India.<sup>5,27-30</sup> Tobacco smoking by the parents exerts a strong influence over the smoking behavior of their children and this fact should be highlighted in the tobacco control and prevention activities targeted towards the youth.

Students from non health sciences were 2.35 times more likely to use tobacco smoking than health sciences students in which the smoking rate among non health sciences students was higher (26.1%) than the health sciences (13%) students (OR:2.3595%1.10-5.01). This finding was in the line to be study conducted in Nigeria.<sup>27</sup> this difference may be due to the awareness of smoking more in health science students than the non health sciences students. The status of smoking of first year students was 25.5% where as it was just 5.5% in another studying year. The difference of this prevalence was significant. Students of first year were more likely to use tobacco smoking than second or final year students (OR= 3.32; 95% CI: 1.14 to 9.65). Students those who had the habit of alcohol had more than 4 times the odds of using tobacco smoking than those who were not using alcohol (OR= 4.83; 95% CI: 2.73 to 8.52). The prevalence of smoking was 47.4% in the students those who used alcohol where as it was only 5.7% in non alcoholic group.

The average starting age of tobacco smoking of this study was found to be 16 years which was quite similar to the findings of study conducted in Nepal and India where the age of initiation was 16.6, 16.8 years, 16 years and 17 years respectively.<sup>5,22,27,31</sup> (30,32,33). A study conducted in Dharan of Nepal had reported the age of smoking initiation 13.8 years which is lower than this study.<sup>6</sup> In contrast, the mean age of initiation of smoking was lower in Canada (14.8 years) and higher in India (21.1 years).<sup>23,25</sup> A study conducted in Bangladesh in similar setting revealed that they started smoking at the age of 16 years which supports our study.<sup>34</sup> The minimum and maximum age of starting age of smokers was 10 years and 19 years respectively. This indicates that early and middle-adolescents are more vulnerable to initiation of smoking. An intervention is required to this group to reduce this habit.

There are number of factors influences an individual to start smoking. There are various reasons such as peer pressure, exam load, frustration, family environment. In our study, peer pressure was found to be major reasons for the initiation of smoking. Usually most of the teenagers start to use smoking due to the pressure of friends. More than 83% of the study participants said that they used to start smoking due to peer pressure. Our study was strongly supported by the study conducted in India in which the many teenagers

among smokers (84%) agree that smoking habit started due to friends. Like-wise family environment was another reasons of starting smoking which was 43% in our study. But this findings does not support to the study conducted in the same place which was (61%).<sup>35</sup> Similarly other reasons such as exam load (55.8%), frustration (51.2%), family environment (43%), advertisement (34.9%) and pleasure (26.7%) were supported by the various studies.<sup>5,30,31</sup>

## Conclusion

This study revealed that the smoking rate was still relatively high. It was observed that almost one in four students was a current smoker in Jumla district Peer pressure, exam load, pleasure, advertisement, frustration, family environment were the reasons of behavior of smoking of students. History of smoking status of parents (father and mother) helped to increase tobacco smoking among students. Alcohol consumption was the predictor of smoking in this study. Youths are very enthusiastic for learning the any things from their colleagues, family and society. So to reduce the prevalence of smoking among students, we have to aware first at school because early and middle adolescence are the age of initiating smoking. It would be better to incorporate harmful effect of tobacco smoking in school curriculum. As adolescents take parents as their role model, parents should be made aware about their smoking impact Academy of Health Ciencias;their smoking impact in shaping the smoking behaviour school curriculum. relationship between sin shaping the smoking behavior of their offspring.

## Limitations

Although, this study has explored the smoking status and its associated factors in a remote area of Nepal, it is not free from some limitations. The prevalence rate of this study is totally based on the self report of students. So the reliability and accuracy of data of this study may be fluctuating. Another limitation of this study was the study design. This was cross sectional study so the association found in the variables may not be a causal relationship. The prospective study design should be dopted to establish the causal link between the study characteristics and smoking behavior. The sample size of this study was small and specific to the students of higher secondary level of Jumla district of Nepal.

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