

# Prevalence and predictors of tobacco use among Bhutanese adolescents

Sonam Rinchen and Surasak Taneepanichskul  
*College of Public Health Sciences, Chulalongkorn University,  
Bangkok, Thailand, and  
Namgay Dawa  
District Health Sector, Wangdue Phodrang, Bhutan*

## Abstract

**Purpose** – The purpose of this paper is to examine the prevalence of tobacco use and associated factors influencing the use of tobacco among adolescents in a school setting.

**Design/methodology/approach** – A cross-sectional descriptive study was conducted amongst Bhutanese adolescents studying at high schools in the district of Wangdue Phodrang in May 2016. A total of 378 eighth-grade students from four schools participated in the study. A self-administered questionnaire was used to collect data. Bivariate and multivariate logistic regressions were carried out to describe the predictors of tobacco use.

**Findings** – Of the 378 student participants, 52.90 percent were girls and 47.10 percent boys. The age ranged from 11 to 19 years, and the majority lived in school hostels (82 percent). The prevalence of smoking was 10.80 percent while smokeless tobacco users constituted 11.10 percent in the month preceding the study. Gender, tobacco use by siblings and friends, ever having tried alcohol, consumption of alcohol in the last 30 days, previous experimentation with cigarettes/bidi and smokeless tobacco/baba ( $p$ -value < 0.05) were significantly related to the use of tobacco among students. In multivariate analysis, tobacco use by friends (AdjOR = 1.09; 95%CI = 0.01–2.48), ever having tried alcohol (AdjOR = 2.24; 95%CI = 1.75–3.72), current alcohol use (AdjOR = 2.63; 95%CI = 1.52–4.31), experimentation with cigarettes/bidi (AdjOR = 39.46; 95%CI = 11.91–90.63) or with smokeless tobacco/baba (AdjOR = 32.61; 95%CI = 11.78–90.30) were observed as the strong predictors of current tobacco use among adolescents.

**Originality/value** – These study results re-emphasized the rising public health concern of tobacco use among younger boys and girls. The findings may help the Bhutanese policy makers and managers to better understand the present situation of adolescent tobacco use and its associated determinants, and formulate appropriate tobacco control strategies for adolescents.

**Keywords** Adolescent health, Bhutan, Tobacco use

**Paper type** Research paper

## Introduction

Tobacco use is a major public health problem and kills about six million users each year[1]. Around 600,000 non-users die due to secondhand tobacco smoke of which 170,000 are children[2]. Tobacco use among adolescents is comparatively lower than that of adults[3]. Tobacco use starts at a young age, and the majority of adult smokers started using tobacco in their adolescence. When adolescent experimentation with tobacco becomes regular, it usually turns into a strong addiction, making it harder to quit later in life[4]. The earlier an adolescent first tries using tobacco products, the higher his or her chances of eventually becoming a regular tobacco user[4]. If the present global pattern of tobacco use continues,

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this may result in the death of 250 million children and young people, particularly in developing countries[5].

Tobacco use among 13–15 year olds is a major concern in several South-East Asian countries. The prevalence of tobacco use in this age group was highest in Timor-Leste (42 percent), followed by Bhutan (30 percent). The use of tobacco among boys was higher than for girls. Bhutan, Myanmar and Nepal have the highest rates of smokeless tobacco (SLT) use among adolescents. In all countries, SLT use among boys was higher than among girls[6–8]. The Global School-based Student Health Survey (2016) reported that 29.4 percent of students aged 13–17 years old were current users of tobacco[7]. Similarly, the Global Youth Tobacco Survey (2013) of Bhutan stated that 28.6 of boys and 11.1 percent of girls currently smoked tobacco. Furthermore, 27.2 percent of boys and 19.8 percent of girls are current users of smokeless tobacco, one of the highest in the South-East Asia[8]. Despite the stringent tobacco control acts and regulations in place Bhutan, the rise in tobacco use amongst adolescents may roughly be attributed to the widespread illegal trade in tobacco.

A recent survey in Bhutan showed that the trend of tobacco use among Bhutanese youth has increased substantially[8]. Even though Bhutan banned the sale of tobacco products since 2004, it has not prevented adolescents from accessing and using tobacco products. It also hints at the lack of or limited health education programs on the dangers of tobacco use.

Tobacco use among adolescents had been associated with socio-demographic factors, including age, gender, residence, tobacco use by parents, siblings and peers[9–15]. Studies have found associations between smoking and an adolescent's personality and self-esteem. Adolescents with an extrovert personality type[16–18] or having poor self-esteem[19, 20] had been found to be associated with their using tobacco products. Additionally, studies have reported that adolescents who consumed alcohol[21–25] and earlier experimented with cigarettes had been linked to initiation or use of tobacco[26]. In Bhutan, there are only a few number of studies on tobacco use among adolescents. However, information on the factors influencing adolescent's tobacco use is currently lacking. This study aimed to examine the prevalence of tobacco use and associated factors influencing the use of tobacco among adolescents in a school setting.

## Methods

### *Study design and participants*

This was a cross-sectional descriptive study. The data on tobacco use among Bhutanese adolescents and their characteristics were obtained in May 2016. The eighth-grade students studying at secondary schools in the district of Wangdue Phodrang comprised the study population. This district was selected because it was a high risk area for illegal sale of tobacco products. Four secondary schools were deemed eligible for this study as they included eighth-grade pupils. The sample size was estimated[27] using a confidence interval of 95%, a precision of 5 percent and the past reported proportion of adolescents (29 percent) using tobacco[7]. The minimum sample required was 318. However, all eighth-grade students (378) in the eligible schools were recruited for the study since the school authorities wanted all of them to participate.

### *Research instruments*

The research instrument was a self-administered questionnaire of close-ended questions on the following variables: age, sex, residence, occupation of parents, tobacco use among family members and friends, and alcohol use and personality type. Students who used tobacco in the past 30 days were considered current users. A pre-test was conducted with 30 students. The internal consistency of the instrument was estimated using Cronbach's  $\alpha$  coefficient. The acceptable coefficient value of 0.79 was obtained.

*Data collection*

The researcher selected four health workers from the community health centers near the study sites, and provided them with training on data collection procedures. The students were given a self-administered questionnaire, to maintain confidentiality and encourage honest reporting. The health workers collected completed questionnaires and submitted them to the researcher for data entry and further analysis. The Research Ethics Board of Health, Ministry of Health, Royal Government of Bhutan reviewed and approved the study proposal (REBH/Approval/2016/028).

*Data analysis*

SPSS version 22 was used for data analysis. Descriptive statistics were used to describe the participant's demographic characteristics and their tobacco use behavior. The bivariate analysis was done to find out the association between each independent variable and tobacco use. Multivariate logistic regression was performed to analyze the predictors of tobacco use where a  $p$ -value of  $< 0.05$  was considered statistically significant.

**Results***Demographic information*

As given in Table I, there were 378 students who took part in the study. Of them, 200 were girls (52.90 percent) and 178 boys (47.10 percent). Their ages ranged from 11 to 19 years with the majority of them between 14 and 16 years (74.87 percent). Most of them lived in school hostels (82 percent). The occupations of their parents were mostly farmers. Regarding the use of tobacco by the student's parents, 4 percent of their fathers and 2.1 percent of mothers were current tobacco users. Tobacco use among their friends (7.90 percent) was higher than their siblings (2.70 percent) and parents. There were 119 students (31.50 percent) who experimented with alcohol in the past, but only 30 students (7.90 percent) were currently drinking alcohol. Over half of the students (55.50 percent) described themselves as introverts and the rest as extroverts (44.40 percent). While most students regarded themselves as having a moderate self-esteem (69.30 percent), only 19.80 percent of them had a high self-esteem and 10.80 percent a low self-esteem.

*Tobacco use among adolescents*

Of the 378 students, 58 either smoked cigarettes/*bidis* or used smokeless tobacco/*baba* or both in the past 30 days, as shown in Table II. The proportion of adolescents who experimented with smokeless tobacco products (16.10 percent) was higher than those experimented with cigarettes (13.20 percent). Of the 58 current tobacco users, 41 smoked while 42 used smokeless tobacco. There were 25 users who took both smoking and smokeless forms of tobacco products.

*Associations between the independent variables and tobacco use among adolescents*

In Table III, a total of seven factors or characteristics were found to have associations with current tobacco use. Gender (OR = 3.22; 95%CI = 1.76–5.91), tobacco use by siblings (OR = 3.88; 95%CI = 1.06–14.19), tobacco use by friends (OR = 3.71; 95%CI = 1.66–8.28), ever having tried alcohol (OR = 8.28; 95%CI = 4.41–15.56), consumption of alcohol in the last 30 days (OR = 8.32; 95%CI = 3.79–18.28), experimentation with cigarettes/*bidi* (OR = 48.77; 95%CI = 22.10–107.57) and experimentation with smokeless tobacco/*baba* (OR = 48.69; 95%CI = 22.58–102.43) were related to the use of tobacco among Bhutanese adolescents. However, age, residence, personality type, self-esteem and parental use of tobacco were not associated with the use of tobacco products.

Characteristic	<i>n</i> = 378	%
<i>Gender</i>		
Boys	178	47.10
Girls	200	52.90
<i>Age (years)</i>		
11–13	53	14.02
14–16	283	74.87
17–19	42	11.11
<i>Residence</i>		
Home	59	15.60
Hostel	310	82.00
Other's house	9	2.40
<i>Father's occupation</i>		
Agriculture/farmer	239	63.20
Government servant	66	17.50
Business/private sector	36	9.50
Others	37	9.80
<i>Mother's occupation</i>		
Housewife	145	38.40
Agriculture/farmer	173	45.80
Government service	17	4.50
Business/private sector	32	8.50
Others	11	2.90
<i>Tobacco use by father</i>		
Never	244	64.50
Yes, in the past	119	31.50
Yes, in the last 30 days	15	4.00
<i>Tobacco use by mother</i>		
Never	269	71.20
Yes, in the past	101	26.70
Yes, in the last 30 days	8	2.10
<i>Tobacco use by siblings</i>		
Never	295	78.00
Yes, in the past	73	19.30
Yes, in the last 30 days	10	2.70
<i>Tobacco use by friends</i>		
Never	253	66.00
Yes, in the past	95	25.10
Yes, in the last 30 days	30	7.90
<i>Ever tried taking alcohol</i>		
Yes	119	31.50
No	259	68.50
<i>Used alcohol in the past 30 days</i>		
Yes	30	7.90
No	348	92.10
<i>Your personality</i>		
Extrovert	168	44.40
Introvert	210	55.60
<i>Your self-esteem</i>		
Low	41	10.80
Moderate	262	69.30
High	75	19.80

**Table I.**  
Demographic of  
participants

Variables	<i>n</i>	%
<i>Ever experimented with cigarettes/bidis</i>		
Yes	50	13.20
No	328	86.80
<i>Ever experimented with smokeless tobacco/baba</i>		
Yes	61	16.10
No	317	83.90
<i>Smoked in the past 30 days</i>		
Yes	41	10.80
No	337	89.20
<i>Used smokeless tobacco users in the past 30 days</i>		
Yes	42	11.10
No	336	88.90
<i>Used both cigarettes and SLT</i>		
Yes	25	6.61
No	353	93.39
<i>Amount of cigarettes/bidis per day (n = 41, % = 10.8)</i>		
1	27	7.20
2–5	9	2.40
6–10	3	0.80
11–20	1	0.20
> 20	1	0.20
<i>Number of days smokeless tobacco/baba used (n = 42, % = 11.10)</i>		
1–2	21	5.60
3–5	5	1.30
6–9	7	1.80
10–19	3	0.80
All 30	6	1.60

**Table II.**  
Proportions of  
students who were  
current users of  
tobacco products

Multiple logistic regression analysis determined that the students were more likely than others to use tobacco if their friends used tobacco (AdjOR = 1.09; 95%CI = 0.01–2.48), tried alcohol (AdjOR = 2.24; 95%CI = 1.75–3.72) and were currently consuming alcohol (AdjOR = 2.63; 95%CI = 1.52–4.31) (Table IV).

### Discussion

This study revealed that 10.80 percent of adolescents were current smokers and 11.10 percent current users of smokeless tobacco. This prevalence was low compared to the findings of the past surveys. This may be due to the fact that the sample was only from four schools representing only one district. Despite the stringent tobacco control regulations in place, the availability of non-cigarette products like *baba* and *khaini* brought into Bhutan illegally through porous Indian border is fueling the use of smokeless tobacco among adolescents[28]. In most countries of the South-East Asian Region, reported prevalence of tobacco use was higher among males than females for both youth and adults[6–8, 29].

Apart from smoked products, cheaper and locally produced smokeless tobacco products are widely available. There is a belief among users that smokeless tobacco products are less harmful than the smoked ones resulting in smokeless tobacco products being high in the region[30]. Globally, similar numbers of girls and boys smoked, and evidence suggests that most of these adolescents will continue to smoke into adulthood[31].

Independent variables	<i>n</i>	Currently using tobacco		OR(95% CI)	<i>p</i> -value
		Yes (%)	No (%)		
<i>Gender</i>					
Boys	178	23.0	77.0	3.22 (1.76–5.91) 1	> 0.001
Girls	200	8.5	91.5		
<i>Age (years)</i>					
11–13	53	11.3	88.9	0.36 (0.12–1.07) 0.48 (0.22–1.02) 1	0.070 0.060
14–16	283	14.5	85.5		
17–19	42	26.2	73.8		
<i>Residence</i>					
Home	59	11.9	88.1	0.47 (0.08–2.73) 0.66 (0.13–3.26) 1	0.471 0.607
Hostel	310	15.8	84.2		
Other's house	9	22.2	77.8		
<i>Tobacco use by father</i>					
Yes	15	26.7	73.3	0.48 (0.14–1.56) 1	0.227
No	363	14.9	85.1		
<i>Tobacco use by mother</i>					
Yes	8	25.0	75.0	1.87 (0.37–9.49) 1	0.451
No	370	15.1	84.9		
<i>Tobacco use by siblings</i>					
Yes	10	40.0	60.0	3.88 (1.06–14.19) 1	0.041
No	368	14.7	85.3		
<i>Tobacco use by friends</i>					
Yes	30	36.7	63.3	3.71 (1.66–8.28) 1	0.001
No	348	13.5	86.5		
<i>Ever tried taking alcohol</i>					
Yes	119	35.3	64.7	8.28 (4.41–15.56) 1	> 0.001
No	259	6.2	93.8		
<i>Used alcohol in the past 30 days</i>					
Yes	30	53.3	46.7	8.32 (3.79–18.28) 1	> 0.001
No	348	12.1	87.9		
<i>Your personality</i>					
Extrovert	168	16.1	83.9	0.88 (0.60–1.28) 1	0.503
Introvert	210	14.8	85.2		
<i>Your self-esteem</i>					
Low	41	9.8	90.2	1.05 (0.20–3.82) 2.12 (0.91–4.91) 1	0.941 0.079
Moderate	262	17.9	82.1		
High	75	9.3	90.7		
<i>Experimented with cigarettes/bidi</i>					
Yes	50	75.0	25.0	48.77 (22.10–107.57) 1	> 0.001
No	328	6.1	93.9		
<i>Experimented with SLT/baba</i>					
Yes	61	70.5	29.5	48.09 (22.58–102.43) 1	> 0.001
No	317	4.7	95.3		

**Table III.** Association between participant's demographic characteristics and tobacco use

In bivariate analysis, boys were 3.22 times more likely than girls to use tobacco. However, logistic regression analysis revealed that being boys was not significantly associated with current tobacco use contrary to other studies[6–8]. Interestingly, in high-income countries, girls having a higher risk than boys of becoming a smoker is widely reported[32].

Not surprisingly, the likelihood of using tobacco was higher for Bhutanese students whose friends used or smoked tobacco products than those whose friends did not use them[10–15, 33, 34]. Over 80 percent of the study participants resided in hostels, and this increases the likelihood of getting influenced by their peers being more than that of their parents or siblings. In contrast to past findings, this study also did not find association between adolescent’s tobacco use and their personality type and self-esteem.

Both the bivariate and multivariate analyses found a significant association between the student’s tobacco use and their past or current use of alcohol. Mendel *et al.* amongst other studies, found that adolescent drinking was the strong predictor of adolescent smoking[35, 36]. The Tobacco Atlas in 2015 showed that current smokers were more likely to be hazardous drinkers than those who never smoked or had previously smoked but stopped, and were at a higher risk of adverse effects of both smoking- and alcohol-related diseases[34]. Meanwhile, in other studies, smoking, alcohol and drug use have been found to be interrelated risk behaviors among adolescents[37–39]. Therefore, this study confirms the inextricable link between alcohol use and tobacco use among adolescents.

The odds of adolescents being a tobacco user was significantly higher among those who had experimented with cigarettes or smokeless tobacco in the past compared to others who did not experiment. Some studies mentioned that experimentation with smoking among adolescents was associated with peers or relatives who smoked, consumed alcohol and used illicit drugs[26, 40]. Thus, there is a definite association between experimentation with tobacco products and the probability of becoming a regular tobacco user among adolescents.

Despite making every effort to conduct sound research, this study has limitations. The district where the study took place was selected based on the convenience of the researchers. The schools in the study were located in rural or semi-rural areas. So, the findings are not generalizable to schools in other districts and places. Another limitation is that all schools currently prohibit tobacco use and are designated as “tobacco-free” places in accordance with the Tobacco Control Act of Bhutan. In this context, it is possible that students underreported their tobacco use status fearing reprisals from school authorities. Finally, some factors that were found to have association with adolescent’s tobacco use in the past findings were excluded from this study, such as the influence of multi-media, attitudes toward tobacco use, illicit use of drugs, etc. Also, less importance was accorded to the issues surrounding smokeless tobacco. Health promotion programs and schools may take these results into consideration while planning and developing tobacco control interventions for our adolescents.

### Conclusion

The proportion of current smokeless tobacco users was slightly higher than that of current smokers. Further, these study results reinforced past findings that having friends who are users of tobacco, ever tried alcohol before or current users of alcohol and experimented with tobacco in the past were significant predictors of the current tobacco use among adolescents.

**Table IV.**  
Multiple logistic  
regression analysis for  
predictors of current  
tobacco use among  
adolescents aged  
11–19 years

Independent variables	B (SE)	Adj. OR (95%CI)	p-value
Gender	0.45 (0.55)	0.57 (0.53–1.64)	0.407
Tobacco use by siblings	–1.31 (1.18)	0.27 (0.02–2.75)	0.269
Tobacco use by friends	0.18 (0.82)	1.09 (0.01–2.48)	0.021
Ever tried alcohol	1.81 (0.55)	2.24 (1.75–3.72)	0.047
Currently using alcohol	1.97 (0.82)	2.63 (1.52–4.31)	0.040
Experimented with cigarettes	3.68 (0.61)	39.46 (11.91–90.63)	> 0.001
Experimented with SLT	3.49 (0.52)	32.61 (11.78–90.30)	> 0.001

These findings may help Bhutanese policy makers and program managers to comprehend the present situation of adolescent tobacco use and formulate appropriate and effective tobacco control policies and programs for adolescents in schools.

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**Corresponding author**

Sonam Rinchen can be contacted at: [sonamrinchen9@gmail.com](mailto:sonamrinchen9@gmail.com)

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