



Prevalence of Smoking among High School Students in Thimphu, Bhutan

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Authors' contributions

This work was carried out in collaboration among all authors. Author PN researched the data collection and data analysis. Author TD supervised research, including research design and data analysis. Author KC drafted the manuscript and incorporated changes suggested by co-authors and reviewers. All authors read and approved the final manuscript.

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ABSTRACT

Smoking is common among youths due to the increasing pace of modernization. It is also a major public health problem worldwide, causing preventable deaths and giving socio-economic burdens to society. Despite strict surveillance and the Tobacco Control Act of Bhutan, Bhutanese youths are increasingly found smoking. However, Bhutan has limited studies on smoking, particularly focusing on high school students. Thus, this study determined the prevalence of smoking among high school students of Thimphu, Bhutan. The self-structured questionnaires were distributed to a sample of 357 students determined using the Yamane formula. The result showed that the overall prevalence of smoking was 48.5%. More male students (63.6%) were found smoking than female students (28.3%). Students smoked different forms of tobacco products, such as cigarettes, cigars, hookah, and bidis, but commonly used tobacco product was cigarettes (63.4%). The most cited reasons for smoking were addiction, followed by peer pressure and outlook fashion. The risks of tobacco use are highest among those who start early and continue its use for a long period. Therefore, the early age of smoking initiation underscores the urgent need to intervene and protect high school students from falling prey to smoking addiction.

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1. INTRODUCTION

Smoking is the most important cause of preventable death worldwide [1,2]. Each year a huge amount of money is being wasted on smoking. Smoking is dangerous and injurious to health, but still, teenagers do smoke [3]. The World Health Organization (WHO) estimates more than one billion smokers worldwide, with more than 80% living in low and middle-income countries [4]. Smoking is often associated with ill-health, disability, and death from non-communicable chronic diseases. It is also reported that tobacco smoking is associated with an increased risk of death from communicable diseases [5]. The 2013 World Health Assembly called on governments to reduce the prevalence of smoking by about a third by 2025, which would avoid more than 200 million deaths from smoking [6].

Smoking is a major public health problem globally. Approximately five million people die prematurely every year due to tobacco-related diseases, and this rate is projected to double by 2020 [7]. The consequence of smoking is irresistible. Smoke and cigarette butts were reported to affect the environment, resulting in air, water, and land pollution [8]. Youth smoking may also affect learning through its effects on health and nutrition [9].

Compared to non-smokers, men and women who smoke are 25 times more likely to die from lung cancer [10]. In the United States, six million teens continue to smoke, despite their knowledge of potential health hazards [11]. Smoking also contributes to world hunger as the tobacco industry diverts huge amounts of land from producing food to producing tobacco [12]. Students who smoke daily could experience serious effects on prefrontal cortex development and activation [13].

Tobacco control and smoking prevention are critical components of any public health plan due to the medical implications of tobacco use, particularly secondhand exposure. Increased tobacco taxation; stricter laws (and enforcement of laws) regulating who can purchase tobacco products; how and where they can be purchased; and restrictions on advertising and mandatory health warnings on pamphlets are preventive measures for smoking [14].

WHO has estimated about 1,100 million smokers worldwide, representing about one-third of the global population aged over 15 years [15,16]. The greatest increase in the prevalence of regular smoking occurs between the age of 12 and 15 years [17]. Bhutan is believed to have been one of the first countries to have a smoking control law as early as the 18th century based on religion and cultural significance [18]. However, as time passes, there is an increase in the use of tobacco products, particularly among the younger generations.

1.1 Problem Statement

Smoking is a chief preventable premature cause of death all over the world. Smoking largely contributes to the growing public health burden [6]. Despite anti-smoking campaigns and legislation enacted to control smoking, many young smokers are already addicted to nicotine [17]. Adolescence is when the inspiration is at the maximum level, and they are more conscious of their personality, styles, and making up their role models. However, in recent years, it is increasingly seen that youths are smoking in nooks and corners of Thimphu (the capital city of Bhutan). Nowadays, smoking cigarettes, hookah, cigars, and bidis, has become a fashionable culture among the Bhutanese youth. More seriously, smoking tobacco products has become a national issue, and Bhutan's government is trying its best to control smoking and tobacco products. This gives partial information on the prevalence of smokers in high schools. However, a very limited study is conducted on the subject matter. Therefore, this study determined the prevalence of smoking among high school students in Thimphu, Bhutan.

1.2 Objectives

To determine the prevalence of smoking among high school students in Thimphu, Bhutan.

2. MATERIAL AND METHODS

2.1 Study Area

The study was conducted among high school students of Thimphu. Thimphu, being the capital city of Bhutan, has the highest number of high school students and the higher percentage of substance abuse among students [19]. Moreover, 17% of the country's high school

students are in Thimphu [20,21]. There are eight high schools under the Ministry of Education in Thimphu, of which four schools, including Yangchenphug High school, Dechencholing High School, Kelki High School, and Nima High School, were chosen for the study (Fig. 1).

2.2 Sample Size

The total population was 3,074 students of classes 11 and 12 in four high schools in Thimphu. Population estimation was based on data provided by the school administration at the beginning of the academic session. The sample size was determined by using the Yamane formula as shown in Equation 1:

$$n = \frac{N}{1 + Ne^2} \quad (\text{Equation 1})$$

Where,

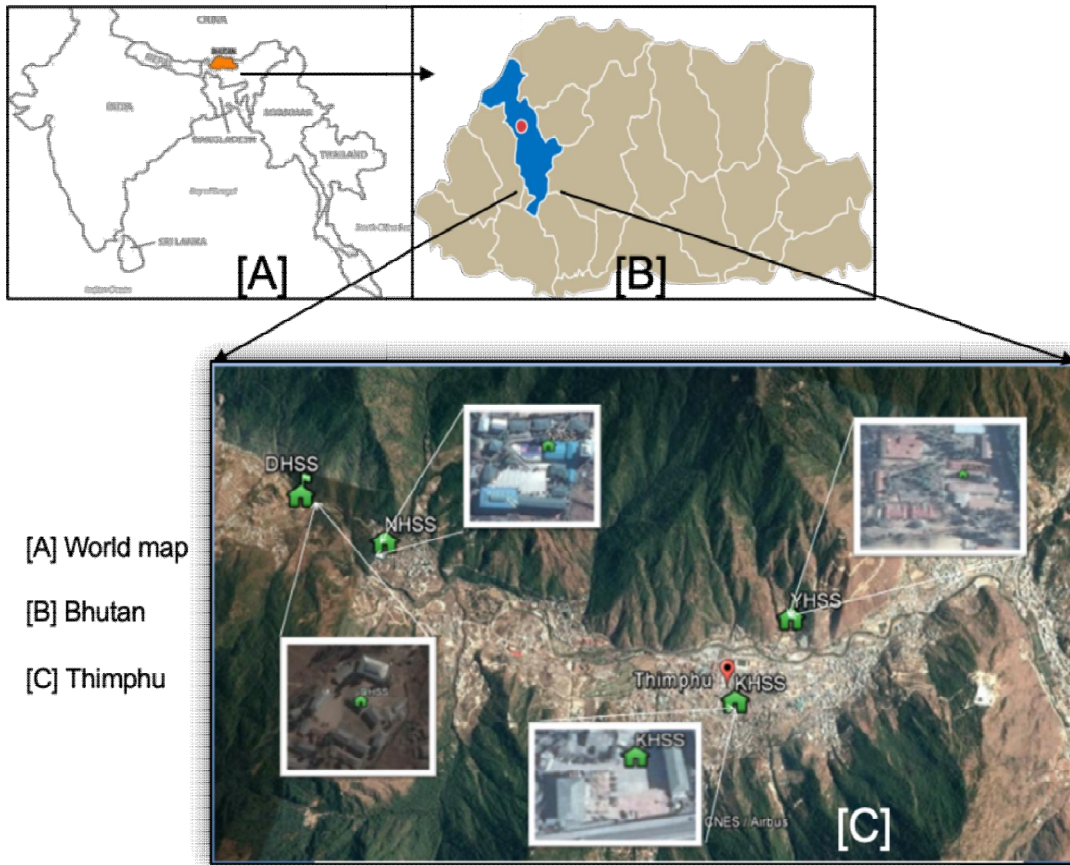
n = minimum required sample size,
N = target population (3,074), and

e = error term (5%).

Accordingly, the minimum sample size required was 354. However, for more representative of the sample, 357 students were surveyed. Thus, findings in this study are based on responses provided by 357 high school students of Thimphu.

2.3 Sampling

A multi-stage random sampling technique identified the study participants. At the first stage, simple random sampling was employed to select four (50%) out of eight higher secondary schools within Thimphu municipality. The second stage involved the random selection of 15 out of 49 sections in four selected high schools. In the third stage, we employed proportionate random sampling to select 354 students from 15 selected sections of four high schools to get representatives of each school.



[A] World map
[B] Bhutan
[C] Thimphu

Fig. 1. Thimphu showing four selected schools

2.4 Data Collection Procedures

Formal approval to conduct this survey was sought from the principals of four selected high schools. After that, self-administered questionnaires were distributed to selected students on an agreed date and time. They were assured that their data would be used only for this study and kept highly confidential. Students were not asked to mention their names to ensure privacy. The questionnaire had 22 questions and took less than 10 minutes to complete. The filled questionnaires were collected on the same day, immediately after completion.

2.5 Data Analysis

The data collected were analyzed using Microsoft Excel 2010 and SPSS program version 20. Data were analyzed using descriptive statistics such as frequencies and percentages. Results were presented in numerous tables and charts.

3. RESULTS AND DISCUSSION

3.1 Sample Characteristics

The respondents comprised more women (51.5%) than men (48.2%). More women respondents were observed in other studies as well [22]. Out of 257 students, most students were from Yangchenphug school (30.3%), followed by Kelki school (25.2%), Nima school (23.8%), and Dechencholing school (20.7%). Most students were with Arts background (45.9%), followed by Commerce (43.4%) and Science (10.6%). The age of the students ranged from 14 to 25 years with a mean age of 18.22 ± 1.81 years. Most of the students (60.8%) were aged 17 to 19 years, indicating that high school students in Bhutan are largely teenagers. Most students stayed with parents (53.2%) and siblings (14.0%). Supporting the current finding, similar other studies [23,24] also reported that most students lived with their parents and siblings.

3.2 Prevalence of Current Smokers

For this study, smoking in the past 30 days before the actual date of the survey is termed as a current smoker. The overall prevalence of smoking among high school students was 48.5% (Table 1). Male students smoked higher than female students (63.6% and 28.3%,

respectively). In support of this finding, other similar research [25,22] also showed that the prevalence of current smokers among male students was significantly higher than the female students.

3.3 Number of Tobacco Sticks Smoked by Current Smokers

Out of the 164 current smokers, most students smoked seven-nine sticks of tobacco per day (36.6%), followed by four-six sticks (30.5%) and more than ten sticks (15.9%). Only 17.1% of students smoked one-three sticks of tobacco products in a day (Fig. 2). The current finding reveals that most students were heavy smokers. Heavy smoking behaviour at such early age will have serious health implications. Smokers smoking more than ten sticks in a single day were reported in other studies [26,27]. The current finding suggests the addiction or lack of understanding on the disadvantages of smoking more sticks in a single day. Therefore, authorities concerned should educate high school students on the importance of gradually avoiding or minimizing the number of sticks.

3.4 Frequency of Smoking among Current Smokers

The frequency of smoking among current users is reported in Fig. 3. Daily smokers dominated the frequency of smoking with 43.9%. The finding indicates that larger portions of current smokers were regular smokers. Also, 18.2% of the current smokers smoked at least thrice a week, followed by four times a week (13.4%), twice a week (10.3%). Very few current smokers smoked once a month (6.09%) and once a week (6.1%). Other studies also corroborated with the current finding that most current smokers were smoke daily [28] [27,6]. High school students' daily smoking behaviour should be a concern for school management, parents, and the government. Therefore, stakeholders (e.g., school captains, teachers, and parents) should play an important role in educating students on the short- and long-term harmfulness of smoking.

3.5 Commonly Used Smoking Products

Current smokers were asked to indicate the type of tobacco products they usually smoke (Table 2). The most used tobacco product for high school students in Thimphu was cigarettes (63.4%). The second and third popular tobacco products used for smoking were Marijuana

(13.7%) and Hookah (13.0%), respectively. In comparing the preferences of a tobacco product by gender, both male and female students mostly proffered cigarettes. Several other studies have also reported that the most commonly smoke

tobacco product was cigarettes [29-31]. As shown in Table 2, the leased smoked tobacco product was Bidis. However, none of the female students smoked Bidis.

Table 1. Prevalence of current smokers

Current smokers	Total		Male		Female	
	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency
Yes	48.5	164	63.6	113	28.3	51
No	51.5	193	36.4	63	71.7	130
Total	100	357	100	176	100	181

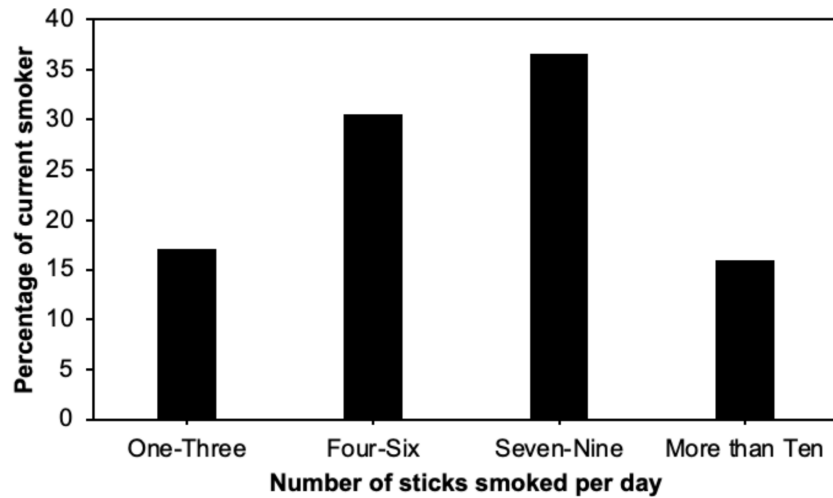


Fig. 2. Comparison of tobacco stick smoke by the student

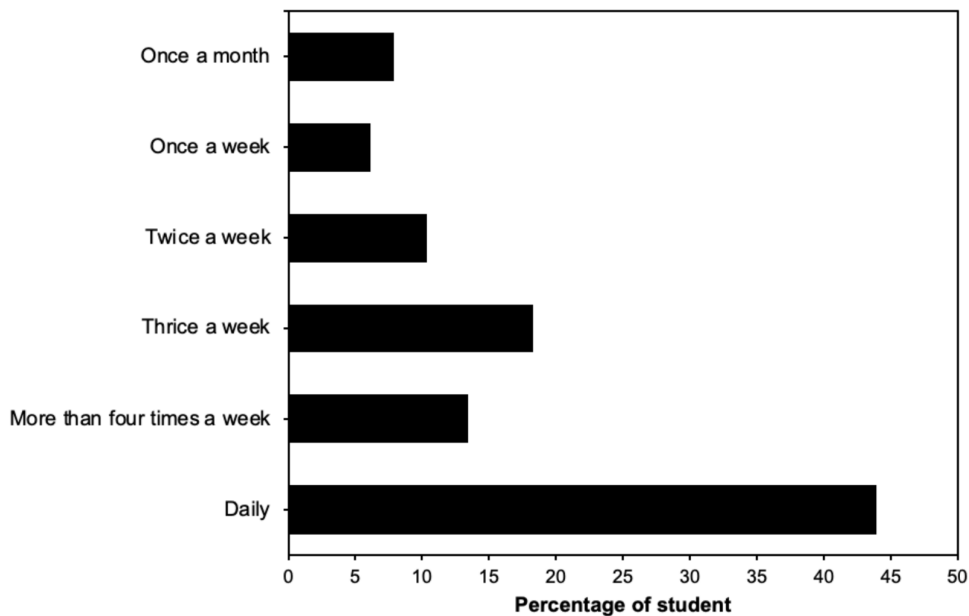


Fig. 3. Frequency of smoking among current smokers

Table 2. Commonly used smoking products

Type of tobacco product	Total		Male		Female	
	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency
Cigars	9.3	15	8	9	6	12.2
Cigarette	63.4	102	57.1	64	38	77.6
Hookah	13.0	21	16.1	18	3	6.1
Marijuana	13.7	22	17.9	20	2	4.1
Bidis	0.6	1	0.9	1	0	0.0
Total	100	161	100	112	49	100

3.6 Motivation of Smoking

The motivation for smoking among high school students in Thimphu is shown in Fig. 4. Most of the students stated that the addiction (30%) was the leading reason that impelled them to smoke, followed by peer influence (27%), fashion outlook (26%), and depression (15%). In agreement, a report by [32] showed that addiction is also reported as the primary motivation of smoking in another study [32]. According to WHO [33], tobacco products contain nicotine that makes smokers addicted to the substance. Teens that start smoking at a young age face more difficulties if they decide to stop smoking because of addiction. As such, the burden of chronic addictions of high school students will be huge to the country in the long run. Thus, programs to prevent non-smokers from smoking

and programs to treat addicts should be made available to high school students.

3.7 Students' Perceptions of Smoking

High school students expressed different perceptions of smoking. Of 357 students, most students (49.9%) agreed that smoking hampers their studies. In agreement, other research shows that smokers usually have poorer educational outcomes than their non-smoking peers [34,9]. However, another 50% of students did not feel that smoking will hamper their studies. It could be the reason why nearly half of the students (48.5%) were current smokers. Moreover, few students (2.9%) even perceived that smoking makes them intelligent. Nearly 30.21% of students reported that they smoke for leisure purposes. Some students (12.8%) also perceived that smoking makes lots of friends.

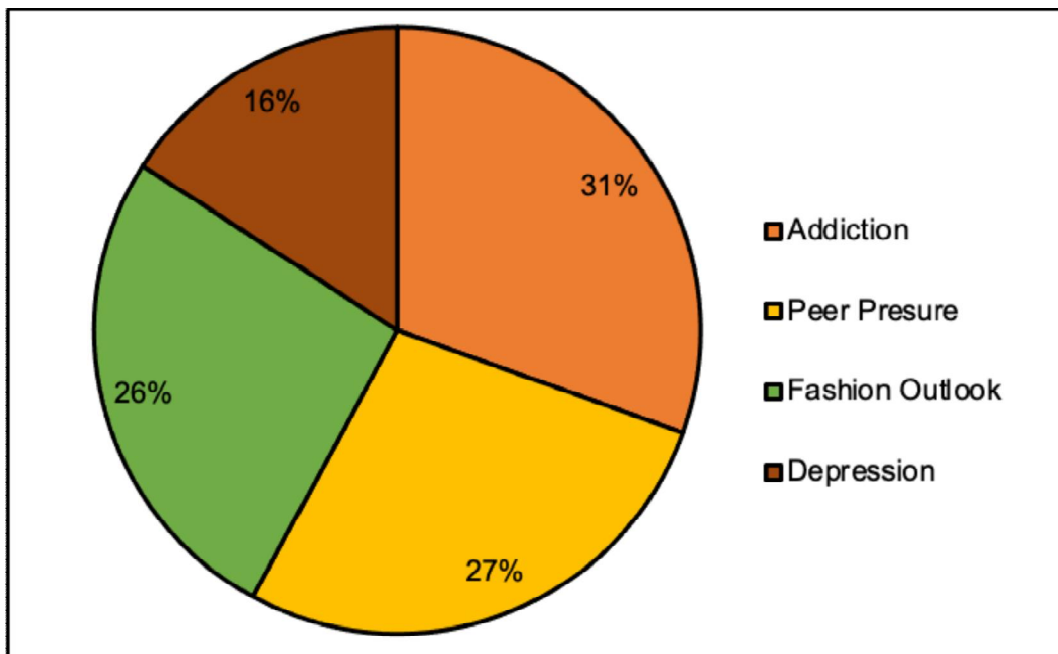


Fig. 4. Motivation of smoking

Table 3. Students' perceptions of smoking

Perceptions	Percentage (%)	Frequency
It hampers the studies	49.9	193
Leisure purposes	34.4	108
It makes lots of friends	12.9	46
It makes us intelligent	2.8	10
Total	100	357

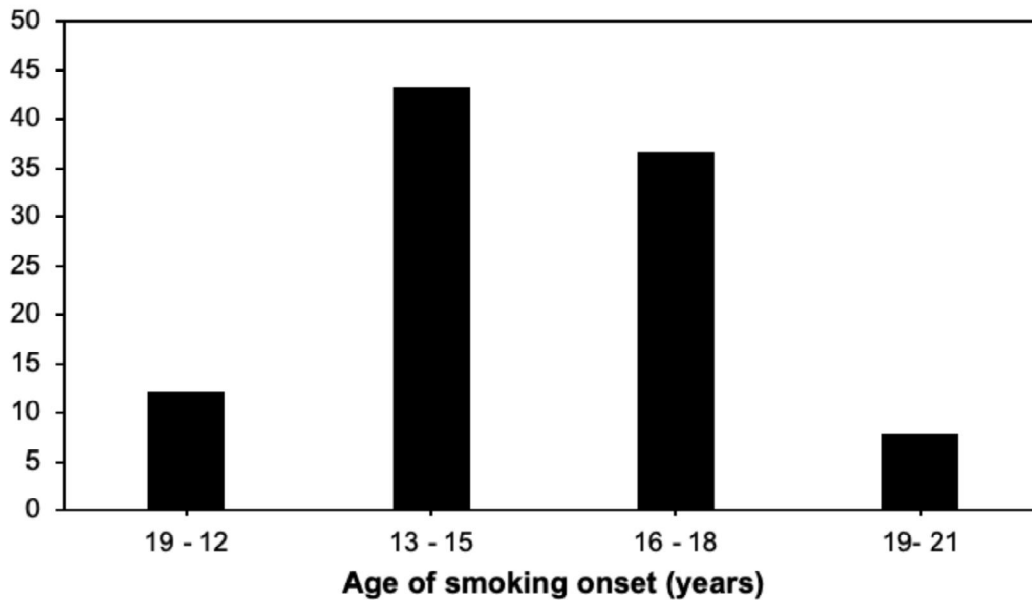


Fig. 5. The age of onset of smoking

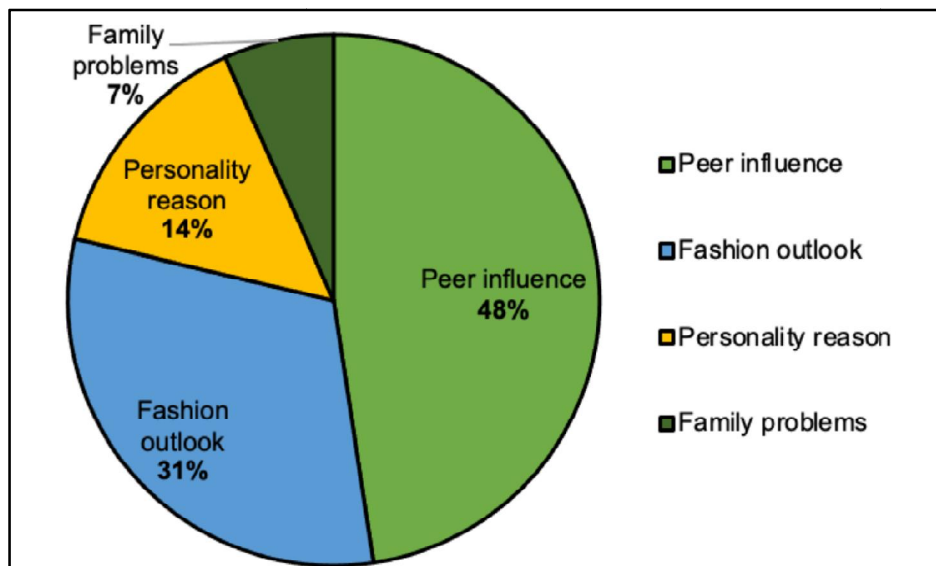


Fig. 6. Motivation of first smoking

3.8 Age of Smoking Onset

Students were also asked to report their onset age of smoking. As shown in Fig. 5, most students (43.3%) have started smoking at the age of 13 to 15 years, followed by 16 to 18 years with 36.6%. Some 20% of students have even started smoking at the age of as early as 9 to 12 years. Only 7.9% of students had their smoking onset at the age of 19 to 21 years. The findings indicate the prevalence of underage onset of smoking in Bhutan. Thus, substance use and abuse education should start at an early age. In practice, parents and schools should take the lead to create awareness of substance abuse as early as when children are in primary schools. Other studies on smoking also show that most students started their first smoking by 18 years [22,35].

3.9 Potential Motivation of First Smoking

The reasons for smoking among high school students in Thimphu are shown in Fig. 6. Many of the students (47.6%) stated that peer influence was the leading reason that motivated them to smoke for the first time in their life. This finding reminds parents of the importance of watching out for the circle of friends their children are having. Similar studies showed that friends and peer pressure motivated students to smoke for the first time [1,32]. Other than peer pressure, fashion outlook (31.1%), personality reason (14.6%), and family problems (6.7%) are some of the factors that influenced the onset of smoking.

4. CONCLUSION

The current study provides valuable information on the prevalence, pattern, and motivation of smoking among high school students in Thimphu, Bhutan. Nearly half of the sample (48.9% of 357) were found to be current smokers. Comparatively, more male students (63.6%) than female students (28.3%) smoke tobacco products. There is also evidence of the underage onset of smoking, where some students have started smoking as early as at the age of nine years. Most smokers smoke daily primarily due to addiction. Only about half of the students perceived that smoking would hamper their studies. The results are worrisome by the prevalence, frequency, perceptions, motivation, and onset age of smoking among high school students. The problems appear multi-dimensional requiring multiple approaches to

address the smoking problems. However, educating children from an early age on the use and abuse of tobacco products would be one reliable approach to curb this issue in the long run. Therefore, besides strict policies, stakeholders concerned such as parents and teachers have important roles to play. In practice, numerous educational platforms related to the substance should be made available for students of primary till high school.

However, results in this study were based on students' self-reported data, not on the real observations of smoking. Therefore, results could be slightly flawed.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Bassiony MM. Smoking in Saudi Arabia. Saudi Medical Journal. 2009;30(7):876-1.
2. Sarraf-Zadegan N, Boshtam M, Shahrokhi S, Naderi GA, Asgary S, Shahparian M, Tafazoli F. Tobacco use among Iranian men, women, and adolescents. The European Journal of Public Health. 2004; 14(1):76-8.

3. Khurshid F, Ansari U. Causes of smoking habit among the teenagers. *Interdisciplinary journal of contemporary business research*. 2012 Jan;3(9):848-55.
4. Swe KM, Bhardwaj A. Perception of youth on smoking among first-year medical students in Myanmar. *International Journal of Collaborative Research on Internal Medicine & Public Health*. 2012;4(11): 1828.
5. World Health Organization. WHO report on the global tobacco epidemic 2015: raising taxes on tobacco. World Health Organization; 2015.
6. Steinberg L. Adolescent decision making and the prevention of underage smoking. Temple University. Available: <https://www.jti.com/sites/default/files/global-files/documents/jti-pdf/steinberg.pdf>. 2010 Nov 30.
7. Christophi CA, Kolokotroni O, Alpert HR, Warren CW, Jones NR, Demokritou P, Connolly GN. Prevalence and social environment of cigarette smoking in Cyprus youth. *BMC Public Health*. 2008; 8(1):1-9.
8. Alzyoud S, Kheirallah KA, Weglicki LS, Ward KD, Al-Khawaldeh A, Shotar A. Tobacco smoking status and perception of health among a sample of Jordanian students. *International journal of environmental research and public health*. 2014;11(7):7022-35.
9. Zhao M, Konishi Y, Glewwe P. Does smoking make one dumber? Evidence from teenagers in rural China.
10. Bach, L. Health harms from Smoking and other tobacco use; 2016. Accessed on 6 August 2021. Available: http://www.tobaccofreekids.org/facts_issues/fact_sheets/toll/products/.
11. Arrazola RA, Dube SR, King BA. Tobacco product use among middle and high school students—the United States, 2011 and 2012. *MMWR. Morbidity and mortality weekly report*. 2013;62(45):893.
12. Shah A. *Global Issue*; 2004. Accessed on 28 March 2020. Available: <http://www.globalissues.org/article/533/tobacco>.
13. Bhatha P. Smoking can affect students' judgment; 2011. Accessed on 23 July 2021. Available: <http://dailytrojan.com/2011/03/09/smoking-can-affect-students'-judgment/>.
14. Ugen S. Bhutan: the world's most advanced tobacco control nation?. *Tobacco Control*. 2003;12(4):431.
15. Memon A, Moody PM, Sugathan TN, El-Gerges N, Al-Bustan M, Al-Shatti A, Al-Jazzaf H. Epidemiology of smoking among Kuwaiti adults: prevalence, characteristics, and attitudes. *Bulletin of the World Health Organization*. 2000;78:1306-15.
16. World Health Organization. *Global Youth Tobacco Survey 2013: Bangladesh factsheet*.
17. Wilson R, Duncan DF, Nicholson T. Public attitudes toward smoking bans in a tobacco-producing county. *Southern Medical Journal*. 2004;97(7):645-51.
18. Givel M. Tobacco use policymaking and administration in Bhutan; 2009.
19. BBS. Thimphu records the highest crime; 2014, Accessed on 10 August 2021. Available: <http://www.bbs.bt/news/?p=37705>
20. RGOB. *Statistical Yearbook of Bhutan*. Thimphu: Royal Government of Bhutan. 2013.
21. RGOB. *Brief Profile of Tobacco Control in Bhutan*; 2010. Accessed on 21 July 2021 Available: <http://www.searo.who.int/tobacco/documents/2010-pub1.pdf?ua=1>.
22. Lim KH, Amal NM, Hanjeet K, Mashod MY, Wan Rozita WM, Sumarni MG, Hadzrik NO. Prevalence and factors related to smoking among secondary school students in Kota Tinggi District, Johor, Malaysia. *Trop Biomed*. 2006;23(1):75-84.
23. Martini S, Sulistyowati M. The determinants of smoking behavior among teenagers in East Java Province, Indonesia.
24. YS K. Smoking habits among university students in Jordan: prevalence and associated factors.
25. *Global Youth Tobacco Survey. Bhutan (Ages 13-15) Global Youth Tobacco Survey (GYTS)*; 2009. Accessed on 24 March 2020. Available: <https://nccd.cdc.gov/gtssdata/Ancillary/DownloadAttachment.aspx?ID=1224>.
26. El-Sharkawy GF. Cigarette smoking among university students: family-related & personal risk factors. *Journal of American Science*. 2011;7(3):260-8.
27. Kutlu R, Selma C. The frequency and affecting factors of smoking among the

- high school teachers in Konya. TAF Preventive Medicine Bulletin. 2007;6.
28. Jane-Llopis EV, Matytsina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco, and illicit drugs. Drug and alcohol review. 2006;25(6):515-36.
 29. Centers for Disease Control and Prevention. (2013). Tobacco Product Use Among Middle and High School Students — the United States, 2011 and 2012; 62(45):894-907.
 30. FYTS. Youth Hookah Use; 2012. Accessed on 25 July,2021. Available:www.floridahealth.gov/statistics-and.../_documents/.../_documents/fs09-hookah.pdf.
 31. Jha P, Peto R. Global effects of smoking, of quitting, and of taxing tobacco. New England Journal of Medicine. 2014;370(1):60-8.
 32. Faucher, M. A.. Factors That Influence Smoking in Adolescent Girls; 2016. Accessed on 10 July 2021. Available:http://www.medscape.com/viewarticle/456476_2:
 33. WHO. (n.d.). Prevalence of Tobacco Use and Factors Influencing Initiation and Maintenance Among Women. World Health Organisation.
 34. Nora VD. smoking and its impact. (National Institute on Drug Abuse (NIDA). 2017. Accessed on 6 August 2021. Available:http://www.drugabuse.gov/...publications/research-reports/.
 35. Zhang L, Wang W, Zhao Q, Vartiainen E. Psychosocial predictors of smoking among secondary school students in Henan, China. Health education research. 2000; 15(4):415-22.

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