

# Youth Smoking Behavior and Policy Attitudes: A Study of High-School Students in the Maldives

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**Background:** Tobacco use significantly impacts health and economic sectors. In the Maldives, 4 out of 10 men smoke daily, despite anti-tobacco policies. The Maldives Global Youth Tobacco Survey (GYTS) shows fluctuating cigarette smoking prevalence among secondary school students: 6.9% (2004), 3.8% (2007), 4.3% (2011), and 4.7% (2019). No studies have investigated smoking prevalence and attitudes toward anti-smoking policies among higher-secondary students in Addu City. This study examines smoking habits, susceptibility, and attitudes toward anti-smoking regulations to support policy development.

**Methods:** We conducted an observational cross-sectional study using a self-administered survey based on the GYTS and the Canadian Student Tobacco, Alcohol and Drugs Survey (CSTADS), involving 335 high school students in Addu City. Variables included sociodemographic factors, ever-smokers, current smokers, age at first cigarette, smoking dependency, use of other tobacco products, smoking susceptibility, willingness to quit, and reasons to quit or not smoke. Results with p-values < 0.05 were statistically significant.

**Results:** 22.8% of the students had tried smoking, with 4.74% currently smoking, predominantly males. Additionally, 32.2% had tried e-cigarettes. Smoking susceptibility was 44.2%. Seven students showed smoking dependency, with a significant gender difference (75.4% boys vs 33.3% girls,  $p < 0.05$ ). Among smokers, 20% wanted to quit, and 70% cited cost as a deterrent. Only 20% of smokers supported a total ban on smoking in media compared to 49.8% of non-smokers ( $p = 0.03$ ). Non-smokers significantly supported anti-smoking measures (73% vs 12.5% of smokers).

**Conclusion:** Cigarette smoking among high school students in Addu is below the national average, but the high number of ever-smokers and interest in smoking and e-cigarettes suggest potential future increases. Policymakers should enact stronger legislation, enforce age restrictions, raise tobacco taxes, and implement comprehensive smoking cessation programs to address tobacco use effectively.

**Keywords:** cigarette smoking, higher-secondary school students, cigarette smokers, susceptible non-smokers, non-susceptible non-smokers, Anti-smoking policies, Maldives

## Introduction

Tobacco use presents a significant public health dilemma, imposing substantial health and economic costs, from medical expenses associated with tobacco-related illnesses to the depletion of human capital due to illness and death linked to tobacco use.<sup>1,2</sup> Although numerous anti-tobacco initiatives have been enacted, smoking rates remain elevated in the Republic of Maldives, where 40% of males smoke cigarettes daily.<sup>3-5</sup> Results from the Maldives Global Youth Tobacco Survey (GYTS) conducted in 2004, 2007, 2011 and 2019 show a gradual increase after a significant drop, in the current cigarette smoking prevalence; 6.9%, 3.8%, 4.3%, and 4.7 respectively among secondary school students (aged 13 to 15).<sup>6</sup> Meanwhile, in neighbouring country India, the current use declined by 42% from 2009 to 2019 among the youth.<sup>7</sup>

This habit-forming behaviour typically develops during adolescence, a phase marked by significant psychological and behavioural changes. These transitions render young individuals particularly vulnerable to social and environmental pressures that encourage tobacco use.<sup>8,9</sup> As adolescents spend a considerable amount of their time gaining an education,

the school environment remains an ideal target for many behavioural interventions.<sup>10,11</sup> Many countries have implemented multidimensional anti-tobacco policies ranging from increasing tobacco prices, smoke-free public places, mass media campaigns, health warnings on tobacco product packaging, etc. Awareness and acceptance of such anti-tobacco policies also influence adolescent smoking behavior in several ways. On the positive side, approval of such policies can help with the social denormalization of tobacco smoking, contribute to positive peer influence, and help enforce the implementation by reporting violations of anti-smoking policies and asking others not to smoke.<sup>12,13</sup>

Correspondingly, in 2010 the government of Maldives passed the first-ever tobacco-specific legislation called the Tobacco Control Act (Act No. 15/2010) in conjunction with the WHO Framework Convention on Tobacco Control.<sup>2</sup> Effective global anti-smoking policies that have been adopted so far in the Maldives include; bans on tobacco sales to individuals younger than 18 years of age, bans on tobacco advertisements, health warnings on tobacco packages, and smoke-free public places.<sup>4,8</sup>

According to the 2014 Maldives Global School-based Student Health Survey (GSHS) current cigarette smoking prevalence is higher among higher-secondary school students than secondary school students; 11.45% vs 8.7% respectively.<sup>14</sup> Addu City is the second-largest city in the Maldives with only two high schools that cater to students from six different administrative districts (islands). Yet few studies investigated cigarette smoking prevalence among higher-secondary school students in Addu City and their attitude towards national anti-tobacco policies. Therefore, understanding smoking prevalence in a local sociocultural context is important for planning effective interventions like school-based tobacco control programs.<sup>15</sup> Therefore, this study seeks to ascertain the rates of ever-smokers, current smokers, and smoking susceptibility, and to evaluate high school students' attitudes towards anti-smoking policies in Addu City, Maldives. This study primarily focuses on regular tobacco smoking behavior among high school students in Addu City, Maldives. However, it also includes a survey question about the use of other smoking types such as shisha, hookah, and e-cigarettes to capture a comprehensive view of smoking behaviors among students. It is important to note that e-cigarettes do not contain tobacco and function differently from traditional cigarettes, which burn tobacco to produce smoke.

## Materials and Methods

### Research Design and Target Population

A cross-sectional study design was adopted using a paper-based survey and was conducted in Addu City, the second-largest city in the Maldives with a population of 26,635 people.<sup>16</sup> The Maldivian education system is based on five levels; (1) pre-primary / foundation stage, (2) primary: grades 1 to 7, (3) lower secondary: grades 8 to 10, (4) higher secondary: grades 11 to 12, and (5) higher education: national universities and colleges. There are only two higher-secondary schools in Addu City which are both governmental with no private higher-secondary school.

The target population of this research was all the students studying in grade 11 and grade 12 in Addu City. The majority of the student's study at Addu High School, which has 319 students in total with 188 students in grade 11 and 131 students in grade 12. The other, Seenu Atoll School has 16 students studying in grade 12 with no students in grade 11 in the academic year 2022. In total, there are 335 higher-secondary school students out of which 147 are boys and 188 are girls.

### Research Instruments and Measures

The questionnaire was developed based on the Global Youth Tobacco Survey (GYTS), the Canadian Student Tobacco, Alcohol and Drugs Survey (CSTADS), and was reviewed by a panel of experts. The study variables included socio-demographic factors including age, gender followed by a question for ever-smokers, current smokers, age at trying the first cigarette, cigarette smoking dependency, use of other tobacco products, smoking susceptibility, willingness to quit, and reason to quit or not smoke. The questionnaire primarily focused on regular tobacco products such as cigarettes. Additionally, it included a question to capture the use of other types of smoking, such as shisha, hookah, and e-cigarettes. This was to understand the prevalence of alternative smoking methods among students.

Susceptibility to future tobacco cigarette smoking among non-smokers was assessed by using three previously validated measures:<sup>17</sup> "At any time during the next 12 months do you think you will use any form of tobacco?"; "If

one of your best friends offered you a cigarette, would you smoke?"; and "Do you agree or disagree with the following: "I think I might enjoy smoking a cigarette". If anyone responded as "definitely not" in all three above questions will be not susceptible to smoking. If anyone responded with anything other than "definitely not" to any one of two questions is considered susceptible to smoke.

Attitude toward tobacco control policy was assessed by asking the participants to rate their support on a Likert scale for four main policies including a ban on tobacco sale to individuals younger than 18 years of age, a ban on tobacco advertisements, increasing cigarette taxation, and smoke-free public places.

## Data Collection Techniques

In this study, field data were collected using a self-administered questionnaire with assistance from schoolteachers. All teachers involved were given a training session on the questionnaire and other relevant ethical measures to maintain during the fieldwork and they were given enough information and a chance to ask any questions about the research. An orientation session was given to the students explaining the objective and scope of this study along with verbal consent including voluntary participation.

## Data Analysis

Raw data were entered into an Excel sheet and cleaned followed by analysis using SPSS version 26 (IBM Inc., Armonk, New York). Frequency and percentage were reported as mean, median, or mode for quantitative variables where appropriate. Nominal data were analyzed and compared using the Chi-square test or Fisher exact test where applicable. A p-value less than 0.05 was considered significant statistically.

## Ethical Considerations

Ethical approval was obtained from the Alfaisal University ethical review board (Approval no: IRB-20043) and also from the National Health Research Committee of Maldives (Approval no: NHRC/2020/022). A written permission letter was sent to administrations of the schools informing them of the study objectives and protocols.

As almost all participants in this study were less than 18 years old, written consent was obtained from students' parents to safeguard their legal rights. Please refer to appendix A for the consent form. In the classrooms, the students were again informed of their right to abstain from participating or to withdraw at any time without any condition. Before data collection, the objectives and scope of this study, as well as confidentiality, were fully explained to the students in addition to taking verbal consent from all participants. In addition, this study was conducted conforming to the Declaration of Helsinki.

## Results

A total of 316 students were invited to participate in the survey and 259 completed the survey with a response rate of (81.5%). Among the completed surveys 48 surveys were excluded, including two smokers from the analysis due to missing data. In total, this study included 211 students ranging from 15 to 18 years with a mean age of 17.5 years of which 83 (39.3%) were males and 128 (60.7%) were females.

Table 1 shows the frequency and percentage of cigarette smoking prevalence and habits by gender among Addu higher-secondary school students. In this study, the prevalence of students who had smoked a cigarette at least one or two puffs was 48 (22.8%), with a significant difference between males, 31 (37.3%), vs females, 17 (13.3%). The median age range for first-time trying a cigarette was 14–15 years.

The prevalence of current cigarette smoking among the students stood at 10 (4.74%), distributed as 7 (8.43%) among males and 3 (2.34%) among females, showing comparable rates. Additionally, 7 (70.0) had symptoms of smoking dependency with a significant difference between boys and girls 6 (75.4%) vs 1 (33.3%),  $p < 0.05$ , respectively. Among the non-smokers in the study population, 49 (59%) of the males and 40 (31.2%) of the females were susceptible to smoking, and the difference between them was statistically significant.

Among the study population, a significantly higher number of males, 42 (50.6%), had tried e-cigarettes/vapes than females, 26 (20.3%). In contrast, fewer students had smoked other forms of tobacco, such as cigars, mini cigars/cigarillos

**Table 1** Frequency and Percentage of Cigarette Smoking Prevalence and Habits by Gender Among Addu Higher-Secondary School Students, Maldives

Variable	Total Study Population = 211		
	Males	Females	P value
<b>Gender</b>	83 (39.3%)	128 (60.7%)	
Ever smoked cigarette (1 or 2 puffs) (Yes)	31 (37.3)	17 (13.3)	0.001
<b>Tried the first Cigarette at the age of</b>			
I have never tried smoking a cigarette	51 (61.4)	111 (86.7)	
7 years old or younger	4 (4.8)	3 (2.3)	
8 or 9 years old	2 (2.4)	2 (1.6)	0.002
10 or 11 years old	–	1 (0.8)	
12 or 13 years old	9 (10.8)	3 (2.3)	
14 or 15 years old	9 (10.8)	5 (3.9)	
16 years old or older	8 (9.6)	3 (2.3)	
<b>In the past 30 days, I smoked cigarettes for number of days</b>			
0 days	76 (91.6)	125 (97.7)	
1 or 2 days	–	1 (0.8)	
3 to 5 days	–	–	0.04
20 to 29 days	2 (2.4)	–	
All 30 days	5 (6.0)	2 (1.6)	
<b>Number of cigarettes smoked per day in last 30 days</b>			
I did not smoke cigarettes during the past 30 days	76 (91.6)	125 (97.7)	
1 cigarette per day	2 (2.4)	1 (0.8)	0.03
2 to 5 cigarettes per day	4 (4.8)	–	
11 to 20 cigarettes per day	–	1 (0.8)	
More than 20 cigarettes per day	1 (1.2)	1 (0.8)	
<b>Tried any form of tobacco products other than cigarettes</b>			
No, I have never tried	40 (48.2)	100 (78.1)	0.001
Yes, E-cigarette / Vapes	42 (50.6)	26 (20.3)	0.001
Yes, Cigars, mini cigars/cigarillos	4 (4.8)	1 (0.8)	0.08
Yes, Waterpipes/hookah/shisha/hubble-bubble	6 (7.2)	3 (2.3)	0.16
Yes, Chewed tobacco/ packet Dhunfa	7 (8.4)	1 (0.8)	0.01
Yes, Bidi	2 (2.4)	2 (1.6)	0.65
<b>Smoking Dependency</b>			
Yes, I sometimes or always smoke a cigarette or feel like smoking a cigarette first thing in the morning	5 (71.1)	1 (33.3)	0.06
Strong desire to smoke again within 1 full day after smoking	1 (14.3)	–	0.90

(Continued)

**Table 1** (Continued).

Variable	Total Study Population = 211		
	Males	Females	P value
<b>Susceptible non-smokers (n = 201)</b>			
Non-smokers who are susceptible to future cigarette smoking	49 (24.3)	40 (19.9)	0.001
<b>Non-susceptible non-smokers (n = 201)</b>			
Non-smokers who are NOT susceptible to future cigarette smoking	34 (16.9)	78 (38.8)	0.001
<b>Cessation of Smoking</b>			
Desire to Stop Smoking	2 (0.9)	-	-

(4.8% males vs 0.8% females), and waterpipes/hookah/shisha/hubble-bubble (7.2% males vs 2.3% females). Additionally, 7 (8.4%) males and 1 (0.8%) female had chewed tobacco/packet *Dhunfa*, with the difference between them being statistically significant. Participants who had smoked *bidi* had comparable results.

In addition to traditional tobacco use, the survey included a question about other types of smoking. It was found that 32.2% of students had experimented with e-cigarettes or vapes. This indicates a significant interest in alternative smoking methods among the students. Among the smokers, 2 (20%) of the males expressed a desire to quit smoking. Additionally, 7 (70.0%) of the smokers in the study population cited the cost of cigarettes as a motivator to quit, followed by the detrimental health effects of smoking (20%), religious teachings (10%), and parental disapproval of smoking (10%), as detailed in Table 2. Whereas, among the non-smokers, the main reason to stay away from smoking was the harmful effects of smoking on health 159 (79.1%), religious teachings 74 (36.8%), and parental disapproval of smoking 65 (32.8%), and price of cigarettes 41 (20.4%), respectively.

The association between current smoking and Attitude toward Anti-Smoking Policies is shown in Table 3. The number of students who said that they favored a total ban on the portrayal of smoking in movies and on television was 2 (20%) among smokers which was less than that of 100 (49.8%) among non-smokers and the difference was significant, (p-value, 0.03). The number of students who said that they favored the minimum legal age to purchase all tobacco products to be changed to 21 was 1 (10.0%) among smokers which was significantly less than that of 156 (77.6%) among non-smokers.

The number of students who said that they favored the government to put more tax on all forms of tobacco products (cigarettes, cigars, Hookah, etc.) was 162 (80.6%) among non-smokers and 1 (10.0%) among smokers with a significant difference. The number of students who said that they favored banning smoking at outdoor public places like teashops,

**Table 2** Reasons to Quit Smoking or Stay Away from Initiating Smoking Among Addu Higher-Secondary School Students by Smoking Status

Reasons to Quit Smoking or Stay Away from Smoking	Current Smokers 10 (4.7%)	Non-Smokers 201 (95.3%)	Susceptible Non-Smokers 89 (42.2%)	Non-Susceptible Non-Smokers 122 (57.8%)
Harmful effects of smoking on health	2 (20.0)	159 (79.1)	57 (64.0)	104 (85.2)
Religious teaching	1 (10.0)	74 (36.8)	17 (19.1)	58 (47.5)
Disapproval of smoking in society	1 (10.0)	38 (18.9)	9 (10.1)	30 (24.6)
Parental disapproval of smoking	1 (10.0)	65 (32.8)	24 (27.0)	43 (35.2)
Price of cigarettes	7 (70.0)	41 (20.4)	26 (29.2)	22 (18.0)

**Table 3** Association Between Current Smoking and Attitude Towards Anti-Smoking Policies Among Addu Higher-Secondary School Students by Smoking Status, Maldives

Characteristics	Total Study Population = 211		p values Smoker vs Non-smoker
	Current Smokers 10 (4.7%)	Non-Smokers 201 (95.3%)	
<b>Do you support a total ban on the portrayal of smoking in movies and on television?</b>			
Oppose	7 (70.0)	48 (13.8)	p value = 0.03
Neither favor nor oppose	1 (10.0)	53 (26.4)	
Favor	2 (20.0)	100 (49.8)	
<b>Should the minimum legal age to purchase all tobacco products be changed to 21?</b>			
Oppose	5 (50.0)	19 (9.5)	p value = 0.001
Neither favor nor oppose	4 (40.0)	26 (12.9)	
Favor	1 (10.0)	156 (77.6)	
<b>Should the government put more tax on all forms of tobacco products (cigarettes, cigars, Hookah, etc.?)</b>			
Oppose	7 (70.0)	24 (12.0)	p value = 0.001
Neither favor nor oppose	2 (20.0)	15 (7.5)	
Favor	1 (10.0)	162 (80.6)	
<b>Are you in favor of banning smoking at outdoor public places like teashops, restaurants, cafés, and other food and beverage outlets?</b>			
Oppose	7 (70.0)	27 (13.5)	p value = 0.001
Neither favor nor oppose	2 (20.0)	5 (2.5)	
Favor	1 (10.0)	169 (84.1)	

restaurants, cafés, and other food and beverage outlets, was 1 (10.0%) among smokers which was significantly less than that of 169 (84.1%) among non-smokers.

### Discussion

In the study, the prevalence of ever-smokers among Addu Higher-secondary school students was 48 (22.8%), which is 39.9% higher than the national estimate of 16.3% reported in the Maldives GYTS 2019.<sup>6</sup> The median age range for first-time experimenting with smoking was 14 to 15 years. Similar findings were observed in the GYTS 2016–17 report of India where students experimented at a mean age of 17.2 years.<sup>18</sup> According to the Maldives GYTS 2019 survey, 23.7% of students had their first cigarette experience before turning ten.<sup>6</sup> Research has demonstrated that smoking cigarettes at an early age is linked to increased cigarette usage and poorer adult tobacco-related health consequences.<sup>19</sup> Several elements contribute to the initiation of smoking, including exposure to second-hand smoke, tobacco use among parents or peers, tobacco advertising, the perceived acceptance of tobacco use in social norms as depicted in movies or commercials, psychological factors such as depression, anxiety, or stress, and increased accessibility and affordability of tobacco products.<sup>11</sup>

In the study, the prevalence of current smoking (30 days prevalence) among the students was 4.74% which is lower than the national estimate of 11.4% reported in GHSH2014 for higher-secondary school students.<sup>20</sup> The most recent Maldives GYTS 2019 shows a very similar current smoking prevalence of 4.7% among middle school students.<sup>6</sup> In addition, another cross-sectional study done across teenagers aged 13 to 19 residing in Maarandhoo Island, Maldives showed that 10.6% of the participants were smokers.<sup>21</sup> A higher risk of smoking onset among youth is linked to a number

of factors, including older age or grade, lower socioeconomic status, poor academic performance, rebelliousness, susceptibility to smoking, intention to smoke in the future, smoking among family and friends, and exposure to smoking in movies.<sup>22</sup> As the Maldives is comprised of geographically separate islands variation in the prevalence of these factors can contribute to the observed difference.

It is possible that the low prevalence, despite a high number of ever-smokers could represent an overall success of anti-smoking policies like taxation but further studies are needed to investigate this. This could be also explained by other various anti-smoking policies that have been adopted so far in the Maldives which includes; bans on tobacco sales to individuals younger than 18 years of age, bans on tobacco advertisements, health warnings on tobacco packages, and smoke-free public places.

This is evident from the research of the reasons for quitting, which revealed that the cost of cigarettes was the main deterrent for smokers. There is strong evidence for the negative correlation between the pricing of cigarettes to youth tobacco smoking in SEAR (South-East Asia Region) countries.<sup>23–25</sup> Therefore, controlling cigarette pricing is vital to ending the cigarette smoking epidemic among youth. Although this is a positive indicator that taxation is working, there is still more room to increase taxation to raise the price of cigarettes. On the contrary, most non-smokers stated harmful effects, religious teaching, and parental disapproval for avoiding smoking with societal disapproval being the least important reason to avoid smoking. In this population, although 7 (70%) of smokers have symptoms of addiction, only 2 (20%) are willing to quit smoking. This shows more effort needs to be made to help smokers to quit smoking.

Another alarming finding from the study is that the percentage of susceptible smokers is significantly high at 44.2% of which a large proportion are male students 24.3% compared to female students 19.9%. Comparatively, Maldives GYTS 2019 showed a susceptibility of 18.7% among secondary school students.<sup>6</sup> This is very concerning given that many prospective longitudinal studies have reported that almost half of all susceptible adolescents begin smoking during the 2–3 year follow-up period.<sup>26,27</sup> Based on these projections, a significant number of nonsmokers may begin smoking in the upcoming year.

Astonishingly, the study showed that 32.2% of students (50% boys, 20% Girls) have used e-cigarettes which is a substantial increase from the Maldives GYTS 2019 which showed only 17.1% of students (23.1% boys and 10.7% girls) had ever used electronic cigarettes among middle school students.<sup>6</sup> However, the same GYTS 2019 study in neighbouring India showed a prevalence of 2.8% for e-cigarette use among its youth.<sup>7</sup> More youth are drawn towards trying e-cigarettes due to variations in the perceived risk, social acceptability, flavors, design, and promotion of the product leading to increased youth acceptance of the product<sup>28–30</sup> Several studies have demonstrated the harmful health effects of e-cigarette products, which can include harm to the immune system, central nervous system, lungs, and cardiovascular system.<sup>31</sup> Also, e cigarettes have been linked to EVALI (e-cigarette or vaping associated lung injury), which results from inhaling substances present in e-cigarettes. The long-term health implications of e-cigarette use remain incompletely understood and continue to be the subject of ongoing research. Moreover, beyond their intended use, e-cigarettes are also employed for the consumption of substances like THC, cocaine, fentanyl, and even date rape drugs, illustrating their diverse applications in substance delivery methods.

In order to stop teenagers from using e-cigarettes, the World Health Organization (WHO) and the Forum of International Respiratory Societies advise limiting product marketing.<sup>32</sup> Given that this form of smoking can lead to cigarette smoking, policymakers should take drastic decisions to control e-cigarettes.

The study provides the first-ever insight into students' attitudes towards tobacco control efforts in the Maldives. Attitude toward smoking policies is a good indicator of the successful denormalization of tobacco in society and support for anti-smoking policies in the future.<sup>12</sup> Several studies have shown that tobacco denormalization is an effective approach to reducing smoking rates at the population level.<sup>33</sup> In our sample, only 30% of current smokers support anti-smoking policies overall compared to 76.2% of non-smokers. Several studies consistently have found that non-smokers and former smokers are more supportive of smoking policies and tobacco control measures than current smokers.<sup>34</sup> Simultaneously, support for tobacco control measures was associated with the number of 24-hour quit attempts, and readiness to quit smoking among current smokers.<sup>35</sup>

Support for raising the cigarette tax was 55.1% among non-smokers and 10% among smokers. Raising tobacco taxes has proved to be the most effective way to reduce cigarette use even in the context of socioeconomic inequalities, save

millions of lives, and generate more revenue for the government.<sup>36,37</sup> The number of students who said that they strongly favored the minimum legal age to purchase all tobacco products to be changed to 21 years was 10% among smokers and 77.6% among non-smokers. Paradoxically, results from Maldives GYTS 2019 showed that 59.7% of smokers who bought cigarettes in a store were not refused purchase despite being under age.<sup>6</sup>

The Maldives' attempts to effectively reduce tobacco use are nevertheless seriously threatened by tobacco advertising, promotion, and funding. The number of students who said that they strongly favored a total ban on the portrayal of smoking in movies and on television was 20% among smoker's vs 49.8% among non-smokers. The trend analysis of GYTS data showed a significant drop in youth who noticed tobacco control messages in the media over the last decade.<sup>6</sup>

The number of students who said that they strongly favored banning smoking at outdoor public places like teashops, restaurants, cafés, and other food and beverage outlets, was 10% among smoker's vs 84.1% among non-smokers. After the enactment of full smoke-free legislation in Scotland and England, there was a drop in secondhand smoke exposure in public places and workplaces and an increase in cessation of smoking.<sup>38</sup> However, as of 2019, almost half of the students surveyed in the Maldives GYTS 2019 (47%) reported being exposed to secondhand smoke in public places highlighting the importance of effective implementation of such anti-smoking policies at ground level.<sup>6</sup>

We would like to acknowledge some limitations of this research. The study involved students from two higher-secondary schools in Addu City and therefore results obtained from the study cannot be generalized to the whole country. Additionally, the cross-sectional nature of the study, can only establish correlations between variables and cannot ascertain causation. While our findings provide valuable insights into associations between factors such as smoking prevalence and demographic characteristics, longitudinal studies would be necessary to establish causal relationships and better understand the temporal sequence of events. Another limitation is the reliance on self-reported feedback, as it could be susceptible to social desirability bias and the participants were children and the response could be affected by their attitudes. Additionally, dishonesty and survey fatigue are potential issues.

## Recommendation

Despite the highlighted limitations of this research, the results of this study can guide further practice and research. It is recommended to conduct further research on cigarette smoking predisposing factors including that of e-cigarettes and barriers to quitting at school age. Additionally, research on the impact of anti-smoking policies on the prevalence of cigarettes is recommended to measure the effectiveness of these policies. Also, it is very important to implement school-based smoking prevention programs for teenagers focused on skills like coping skills, good decision-making skills, self-control, and refusal skills to resist smoking along with the disadvantages of smoking, the negative social consequences, and problems faced by smokers. It is also recommended to increase awareness and build support for anti-smoking policies among students which will help its effective implementation in the community and denormalization of cigarette smoking.

## Conclusion

This study showed the prevalence of cigarette smoking among Addu higher-secondary school students is lower than the national average at 4.2%, despite a higher proportion of ever smokers which could suggest the success of anti-smoking policies like taxation. However, an alarmingly high prevalence of smoking susceptibility and e-cigarette use could potentially increase cigarette smoking in the coming years. Significantly less policy support was noted among the smokers compared to the non-smokers, suggesting reduced policy support as a potential risk factor for smoking initiation in the future. Further research is required to identify smoking initiation factors including that of e-cigarettes to tailor school-community-based prevention programs. Meanwhile, schools should maximize education for students about the harmful effects of smoking including that of e-cigarettes.

## Institutional Review Board Statement

Ethical approval was obtained from the Alfaisal University ethical review board (Approval no: IRB-20043) and from the National Health Research Committee of Maldives (Approval no: NHRC/2020/022).



## Data Sharing Statement

The data will be available from the corresponding author.

## Informed Consent Statement

As almost all participants in this study were less than 18 years old, written consent was obtained from students' parents to safeguard their legal rights. Before data collection, the objectives and scope of this study, as well as confidentiality, were fully explained to the students in addition to obtaining verbal consent from all participants.

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## Disclosure

The authors declare no conflicts of interest in this work.

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