

## Prevalence and Correlates of Current Cigarette Smoking Among Adolescents in East Timor-Leste

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### ABSTRACT

**Objectives:** To determine the prevalence and correlates for current cigarette smoking. **Design:** Secondary analysis of the East Timor-Leste Global Youth Tobacco Survey conducted in 2006. **Setting:** Public and private schools registered with the Ministry of Education. **Participants:** A two-stage cluster sample of 1790 students in Grades 7 to 9. Schools were selected with probability proportional to enrolment size, and classes were randomly selected in each school. All students in selected classes were eligible to participate in the survey. The school and student response rates were 96.0% and 84.5%, respectively. **Main Outcome Measure:** Prevalence of current cigarette smoking. **Results:** Out of 1790 adolescents, 52.1% were of ages less than 15 years, 51.8% were males, 42.8% reported having some pocket money in a month, and 72.7% had at least a parent who was a smoker. Prevalence of current cigarette smoking was 40.3%. Current smokers also reported having bought cigarettes from peddlers (32.4%), someone bought for them (16.7%), got from someone older (13.7%), borrowed (13.3%), and stole (3.4%). Males were more likely to be smokers than females (59.0% versus 19.3%). Factors positively associated with current smoking were: parental smoking; closest friend smoking; amount of pocket money; and exposure to anti-tobacco messages. **Conclusions:** East Timor has one of the highest prevalence of cigarette smoking among adolescents. The fact that exposure to anti-tobacco messages was associated with being a smoker may be evidence suggesting that anti-tobacco messages, especially from tobacco-related industry, may have unintended consequences.

**Key words:** Adolescent, East Timor, Prevalence, Smoking.

### INTRODUCTION

Tobacco use is the single most important preventable cause of morbidity and mortality from non-communicable diseases(1). There has been growing interest in adolescent tobacco smoking in the past decade(2). Adolescent tobacco use is of public health concern because it may lead to longterm smoking behavior into adulthood. Adolescent smokers may

also suffer from immediate or medium term effects such as incident asthma(3). Smoking among adolescents may also be a marker of many other lifestyle and health concerns(4,5). Francis, *et al.*(6) have reported that adolescents who smoke are at higher risk of psychopathology compared to adolescents who are non-smokers. This clustering of unhealthy lifestyles has also been observed among adults(7).

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The Global Youth Tobacco Survey (GYTS) has reported the prevalence of cigarette smoking among 13 to 15 year old in-school adolescents in East Timor-Leste(8). In this age group, prevalence of current cigarette smoking was 32.4%. We are however unaware of any published reports on social correlates of cigarette smoking among adolescents in this setting. Therefore, using data from the Global Youth Tobacco Survey, we conducted an analysis to identify the factors that are associated with cigarette smoking among in-school adolescents.

## METHODS

**Study design and participant recruitment:** Our study involved secondary analysis of data from the East Timor Global Youth Tobacco Survey (GYTS) conducted in 2006. The survey was school based and recruited students in Grades 7 to 9. The school population was all junior high school (both public and private schools) that were registered with the Ministry of Education, East Timor. Total number of schools was 127 and total number of students was around 41,000 students.

Study administration and sampling followed the GYTS process as described earlier(2). In brief, a two-stage cluster sample design was used to produce representative data for all of East Timor. At the first stage of sampling, schools were selected with probability proportional to enrolment size. At the second stage of sampling, classes were randomly selected and all students in selected classes were eligible to participate. The school response rate was 96.0%, while the student response rate was 84.5%, and the overall response rate was 81.1%. A total of 1,790 students participated in the survey.

**Study setting:** East Timor shares a border with Indonesia and lies 800 km to the northwest of Australia. East Timor is a former Portuguese colony that was annexed by Indonesia in 1975. In 1999, following a referendum on independence from Indonesia, violent civil conflict led to the destruction of much of East Timor's infrastructure. The country has an estimated population of about 1 million.

**Data collection:** A self-completed questionnaire with core and country-specific questions as outlined in the GYTS methodology(2) was used to collect

data. Completion of questionnaire occurred within one class period and coordinators supervised the process. Study participants were informed that they were free not to answer any of the questions they felt uncomfortable with.

**Data analysis:** Data analysis was performed using SPSS version 14.0 software (Chicago, Illinois, United States of America). Current cigarette smoking (the main outcome) was defined as having smoked a cigarette, even a single puff, in the last 30 days preceding the survey. The predictor variables were obtained from the literature as factors that have been previously reported as being associated with adolescent smoking in other settings. These factors include: smoking in close friends(9); gender(10); having pocket money or allowance(11); parental smoking(12) and exposure to tobacco related messages or advertisements(13).

A weighting factor was used in the analysis to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non-response. We obtained frequencies as estimates of prevalence. We conducted a backward logistic regression analysis to estimate the association between relevant predictor variables and current cigarette smoking.

## RESULTS

**Study participants' characteristics:** A total of 1790 in-school adolescents participated in the East Timor Global Youth Tobacco Survey in 2006. Overall, 52.1% of the participants were of ages less than 15 years, 51.8% were males, 42.8% reported having some pocket money in a month, and 72.7% had at least a parent who was a smoker. Prevalence of current cigarette smoking was 35.7%. Males were more likely to be smokers than females (59.0% versus 19.3%). Further description of the sample is presented in **Table I**.

**Sources of cigarettes in the past 30 days:** Of the current smokers, 24.1% reported that they usually bought their cigarettes in a store, and 41.2% who bought cigarettes in a store had never been refused purchase because of their age. Altogether, 21.9% of the smokers had ever been offered 'free' cigarettes by cigarette company representatives. Current

**TABLE I** CHARACTERISTICS OF STUDY PARTICIPANTS IN THE EAST TIMOR GLOBAL YOUTH TOBACCO SURVEY 2006

| Factor  | Total<br>n* (%) | Male<br>n* (%) | Female<br>n* (%)† |
|---|-----------------|----------------|-------------------|
| Age (years)   |                 |                |                   |
| <15   | 960 (52.1)      | 421 (45.5)     | 503 (57.4)        |
| 15+   | 815 (47.9)      | 476 (54.5)     | 330 (42.6)        |
| Sex   |                 |                |                   |
| Male  | 899 (51.8)      | —              | —                 |
| Female  | 836 (48.2)      |                |                   |
| Pocket money received (US\$)  |                 |                |                   |
| >5  | 212 (12.7)      | 120 (14.4)     | 81 (10.5)         |
| 1-5   | 161 (9.2)       | 93 (10.8)      | 64 (7.5)          |
| <1  | 376 (20.9)      | 205 (22.5)     | 160 (19.2)        |
| None  | 1026 (57.2)     | 472 (52.3)     | 528 (62.8)        |
| Parents smoked  |                 |                |                   |
| None  | 454 (27.3)      | 224 (26.5)     | 213 (27.6)        |
| Both  | 253 (16.2)      | 126 (15.9)     | 121 (16.9)        |
| Father only   | 867 (51.8)      | 455 (53.6)     | 392 (50.4)        |
| Mother only   | 74 (4.6)        | 33 (4.0)       | 38 (5.2)          |
| Close friends smoked  |                 |                |                   |
| None of them  | 622 (33.8)      | 231 (26.0)     | 378 (42.9)        |
| Some of them  | 398 (22.4)      | 208 (22.3)     | 184 (23.0)        |
| Most of them  | 325 (19.0)      | 194 (21.7)     | 117 (15.5)        |
| All of them   | 419 (24.8)      | 255 (30.0)     | 148 (18.5)        |
| Frequency of media messages seen on anti-smoking program  |                 |                |                   |
| A lot   | 856 (49.4)      | 424 (48.3)     | 410 (50.9)        |
| A few   | 380 (21.1)      | 198 (22.4)     | 166 (19.1)        |
| None  | 508 (29.4)      | 253 (29.3)     | 243 (30.1)        |
| Frequency of cigarette brand names seen when watched sports events or other programs on television (TV) |                 |                |                   |
| Never watched TV  | 486 (27.5)      | 226 (25.1)     | 246 (29.8)        |
| A lot   | 564 (31.5)      | 297 (33.0)     | 252 (30.1)        |
| Sometimes   | 343 (20.0)      | 183 (21.2)     | 151 (18.8)        |
| Never   | 358 (20.9)      | 173 (20.7)     | 175 (21.3)        |
| Frequency of cigarette advertisements seen on billboard   |                 |                |                   |
| A lot   | 725 (41.6)      | 384 (44.2)     | 328 (39.6)        |
| A few   | 414 (24.4)      | 211 (24.3)     | 185 (23.4)        |
| None  | 566 (34.0)      | 265 (31.4)     | 288 (37.0)        |
| Frequency of cigarette advertisements or promotion seen in magazines                                    |                 |                |                   |
| A lot   | 713 (40.5)      | 380 (43.1)     | 315 (38.0)        |
| A few   | 465 (26.5)      | 231 (26.8)     | 219 (25.9)        |
| None  | 562 (33.0)      | 259 (30.1)     | 286 (36.1)        |
| Currently smoking   |                 |                |                   |
| Yes   | 611 (40.3)      | 457 (59.0)     | 128 (19.3)        |
| No  | 979 (59.7)      | 339 (41.0)     | 620 (80.7)        |

\*unweighted frequency; † weighted percent

smokers also reported having bought cigarettes from peddlers (32.4%), someone bought for them (16.7%), got from someone older (13.7%), borrowed (13.3%), and stole (3.4%).

**Factors associated with current cigarette smoking:** We also assessed whether the selected predictor variables were associated with self-reported history of cigarette smoking. In a multivariate analysis, we found that parental smoking, peer smoking, increasing age, male gender, exposure to cigarette promotion media in magazines, and exposure to anti-smoking media messages were independently associated with being a current cigarette smoker (**Table II**).

## DISCUSSION

We have reported an overall prevalence of current cigarette smoking of 40.3% among in-school adolescents in East Timor in 2006. The prevalence of smoking among adolescents in East Timor is probably among the highest in the world. Rudatsikira, *et al.*(10) have reported prevalence of cigarette smoking of 4.5% and 1% among male and female adolescents, respectively in Ethiopia. Kyresi, *et al.*(14) reported a prevalence of current cigarette smoking of 16.2% among Greek in-school adolescents. Singh and Gupta(15) have reported current cigarette smoking of 2.1% and 1.7% among 13 to 18 year old males and females respectively in Jaipur, India. Among 7 to 9 graders in Thailand, Assanangkornchai, *et al.*(16) have reported prevalence of current cigarette smoking of between 8.8% and 14.6%.

There are at least two possible reasons for the high prevalence of smoking among adolescents in East Timor. Firstly, the proximity and free flow of persons between East Timor and Indonesia, where smoking is prevalent. Male smoking in Indonesia ranges from 50% to about 83%(17). As the Indonesian government has been developing policy aimed to prevent smoking in the last few years, the tobacco companies in Indonesia have started to pay more attention to East Timor for targeting customers. This will make it a more challenging situation if East Timor does not have strong policy and political will to tobacco control. Secondly prolonged periods of liberation fighting had compromised the public

**TABLE II** FACTORS ASSOCIATED WITH CURRENT SMOKING AMONG IN-SCHOOL ADOLESCENTS IN EAST TIMOR, 2006

| Factor  | Adjusted OR<br>(95%CI) |
|---|------------------------|
| Age <15 years   | 0.70 (0.68, 0.72)      |
| Male sex  | 2.52 (2.45, 2.60)      |
| Pocket money received (US\$)  |                        |
| >5  | 1.79 (1.67, 1.93)      |
| 1-5   | 0.73 (0.67, 0.79)      |
| <1  | 1.51 (1.43, 1.60)      |
| Parents smoked  |                        |
| None  | 0.56 (0.53, 0.60)      |
| Both  | 1.00 (0.93, 1.07)      |
| Father only   | 0.85 (0.81, 0.89)      |
| Close friends smoked  |                        |
| None of them  | 0.43 (0.41, 0.46)      |
| Some of them  | 1.04 (0.99, 1.10)      |
| Most of them  | 1.02 (0.97, 1.08)      |
| Frequency of media messages seen on anti-smoking program  |                        |
| A lot   | 1.16 (1.11, 1.20)      |
| A few   | 1.17 (1.12, 1.23)      |
| Frequency of cigarette brand names seen when watched sports events or other programs on television (TV) |                        |
| Never watched TV  | 0.64 (0.60, 0.67)      |
| A lot   | 0.87 (0.83, 0.91)      |
| Sometimes   | 1.74 (1.64, 1.84)      |
| Frequency of cigarette advertisements seen on billboard   |                        |
| A lot   | 0.73 (0.70, 0.77)      |
| A few   | 1.38 (1.31, 1.44)      |
| Frequency of cigarette advertisements or promotion seen in magazines                                    |                        |
| A lot   | 1.10 (1.05, 1.15)      |
| A few   | 1.06 (1.01, 1.11)      |

OR (95%CI) \* adjusted estimates for all the factors in the table in a backward logistic regression analysis

health infrastructure to enable concerted public health effort to prevent adolescent smoking.

We found that boys were more likely to have been smokers than girls. Another study in another setting has reported this observation(10). We believe the gender disparity could result from societal tolerant attitudes towards male smoking compared to female smoking. We also observed that having parents who

smoked or having close friends who were smokers were independently associated with smoking in the adolescents. The association between having a close friend who smoke and adolescent's own smoking may suggest that an adolescent who is a smoker may be more likely to choose other smokers as friends. Alternatively, having a friend who smokes may be an influence in initiating smoking. Livaudais, *et al.*(18) have reported that having friends who were smokers at baseline was associated with eventually becoming a smoker among Latino adolescents in the United States. Simmons-Norton(19) has reported on the socialization selection effects among adolescents regarding peer smoking.

The association between having a parent who is a smoker and adolescent's own smoking may be an indication of parental tolerance to smoking or easy availability and accessibility of cigarettes within the home. Adolescents who have parents who smoke may also have higher acceptability of smoking.

We also found that if the adolescent reported having been exposed to cigarette advertisements or promotion in magazines, he or she was more likely to be a current smoker than if the adolescent was not exposed. However we also found that exposure to anti-smoking advertisements was associated with being a smoker, while more exposure to cigarette brand names and promotional billboard were associated with lower likelihood of being a smoker. That exposure to pro-tobacco advertisements is associated with adolescent smoking has been reported elsewhere(20).

The apparent paradoxical finding where exposure to anti-smoking campaign was associated with increased likelihood of being a smoker is not a new finding. Henriksen, *et al.*(21) have reported that tobacco-industry supported anti-tobacco messages may have the opposite effect on adolescent smoking. Weiss, *et al.*(20) and Straub, *et al.*(22) have also reported that anti-smoking or anti-tobacco messages may not be adequate to prevent smoking among adolescents. It would appear that in our study, exposure to anti-tobacco messages in fact had the opposite effect on adolescents. This calls for evaluation of tobacco messages targeted towards adolescents.

**WHAT IS ALREADY KNOWN?**

- Tobacco is a leading cause of death and disability in the developed world and an emerging epidemic in developing nations.

**WHAT THIS STUDY ADDS?**

- Prevalence of cigarette smoking in East Timor-Leste appears to be among the highest in the world and exposure to anti-smoking messages did not appear to be associated with lower likelihood of being a smoker.

We also found that adolescents who received more than US\$ 5 as pocketmoney in a month and those who got less than US\$ 1 were more likely to be smokers. Unger, *et al.*(23) have suggested that limiting the amount of pocket money among adolescents who receive more money may be a reasonable intervention. We do not know why even those who received less than a dollar had higher likelihood of smoking than those in the middle-income group. This could be a spurious finding. In an environment where smoking is prevalent, adolescents may also access cigarettes from friends, borrow from someone, having their cigarettes bought by someone (without them having to pay for them) and stealing from their own parents. It may also be an indication that there may have been another confounder that was not measured.

Our study has a number of important limitations. Firstly data were obtained only from in-school adolescents. To the extent that out of school adolescents are different from in-school adolescents in their smoking habits, our results may not be extrapolated to the entire adolescent population in East Timor. Data were also collected from those adolescents who were present on the day of the survey. Those students who were absent were never followed up. We do however believe that any biases that may have been introduced as a result of non availability of study participants was likely to be minimal as the response rate was high *i.e.* 81.1%. Furthermore our analysis took into consideration the non-response rate by weighting the analysis. Thirdly, data were self-reported. Like in all surveys that rely on self-reported data, there is always a possibility of both inadvertent and deliberate mis-reporting. An evaluation of a similar methodology to the GYTS in the United States however has reported high reliability of adolescents reports(24).

**CONCLUSIONS**

The prevalence of smoking appears to be among the highest in the world. Exposure to anti-smoking messages did not appear to be associated with lower likelihood of being a smoker. Our findings suggest that health education or improving knowledge will be less effective to prevent smoking behavior without significant involvement or support from other aspects such as supportive environment, strong policy support, and community participation. There will be need for involvement and partnership from different stakeholders and community.

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