

ORIGINAL PAPER

# Tobacco smoking prevalence among in-school adolescents aged 13-15 years: baseline for evaluation of the implementation of the FCTC in Lusaka district, Zambia

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## ABSTRACT

**Background:** Tobacco use is a major public health concern worldwide. Zambia has been controlling tobacco use in terms of legislative interventions, and acceding to the World Health organization (WHO) Framework Convention on Tobacco Control (FCTC). The study was aimed to determine the baseline prevalence of current smoking to be used in the evaluation of the implementation of the WHO FCTC.

**Methods:** Survey data from the 2002 and 2007 Global Youth Tobacco Surveys (GYTS) were used to estimate the prevalence of tobacco use. The standard protocol for GYTS was used in the surveys, and only data for students aged 13 to 15 years was used in the analysis. Data were analyzed using SUDAAN (Research Triangle institute), and SPSS (version 11.5) software packages. Weighted analysis was used to produce estimates together with their 95% confidence intervals (CI).

**Results:** The current cigarette smokers were 9.2% in 2002 and 6.8% in 2007 ( $p>0.05$ ), with an overall rate of 7.4% (95%CI [7.1, 7.7]). No significant difference in current cigarette smoking rates was observed between sexes. However, compared to students of age 15 years, those of ages 13 and 14 years were less likely to be current smokers

(AOR=0.82, 95%CI [0.77, 0.88]) for 13 years, and AOR=0.90, 95%CI [0.85, 0.96] for 14 years).

**Conclusion:** The results of this study show that Lusaka district is in the first stage of the tobacco epidemic. There is urgent need, guided by the WHO FCTC, for effective interventions to be put in place before the epidemic becomes unmanageable.

## INTRODUCTION

Tobacco use is one of the major preventable causes of death in the world. The World Health Organization (WHO) attributes some 4 million deaths a year to tobacco use, a figure which is expected to rise to 8.4 million deaths a year by 2020<sup>1</sup>. Developing countries are in the first stage of the tobacco epidemic<sup>2</sup>. The initiation of tobacco smoking by most adults occurs early in life as adolescents or young adults. However, comprehensive tobacco prevention and control information on young people has been rare until recently when the Global Youth Tobacco Surveys (GYTS) started conducting surveys among in-school adolescents targeting those of ages 13-15 years<sup>3</sup>. To address the problem of lack of information on tobacco use in Zambia, the Global Youth Tobacco Survey (GYTS) was conducted in 2002 and a repeat GYTS in 2007. GYTS is an international surveillance project that generates comparisons of tobacco use between countries with the aim to enhance the capacity of countries to monitor tobacco use and to evaluate preventive programs.

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The aim of the GYTS is to enhance the capacity of a country to design, implement and evaluate comprehensive tobacco control programs. It is a school-based survey that focuses on adolescents aged 13 to 15 years. The specific objectives of the survey are: (1) To assess knowledge, attitudes and practices related to tobacco smoking, exposure, prevention, community programs and media interventions; (2) To make comparison over time between the initial GYTS and the repeat GYTS; and (3) To give suggestions to local partners on the best modalities for implementing and up-scaling of tobacco control programs.

Since the surveys in Zambia were conducted before Zambia accented to the WHO Framework Convention on Tobacco Control (FCTC), the current study aims to determine the prevalence of tobacco use as baseline to which the implementation of the WHO FCTC would be evaluated. Another objective of the current study was to compare these rates to determine if there were changes in the rates of tobacco smoking in the absence of tangible interventions.

## METHODS

### Study design and target population

The GYTS were school-based cross sectional surveys of students in grades 7 to 9, conducted in 2002 and 2007, to mainly enroll 13-15 years old adolescents in the surveys. Detailed descriptions of the purpose and methodology for GYTS have been described elsewhere <sup>4</sup>. In collaboration with the Ministry of Education (MOE), it was decided to conduct the survey in Lusaka province in which the capital city, Lusaka, is located. The province has four districts namely: Lusaka, Kafue, Chongwe, and Luangwa districts. The present study was limited to Lusaka district.

### Sampling

A two-stage cluster sample design was used to produce representative data for the district. At the first stage, schools were selected with probability proportional to enrolment size. At the second stage, classes were randomly selected and all students in selected classes were eligible to participate. The response rate in 2002 for schools was 96.0%, 87.5%

for students, with an overall response rate of 84% <sup>5</sup>. Meanwhile the response rates in 2007 for schools, students, and overall were 96%, 88.8%, and 85.3%, respectively (Zambia, Lusaka 2007 fact sheet, unpublished).

### Data Collection

A self-administered structured questionnaire was used to collect data. The questionnaire was completed within one class session. Students recorded their responses directly on answer sheets that were later scanned by computer for data entry. Although the questionnaire included questions on age, sex, history of ever smoked cigarettes, current cigarette smoking status, having parents or friends who smoked cigarettes, exposure to environmental tobacco smoke, and perceptions on cigarette smoking, the current study only used data on ever smoked cigarettes and current smoking status.

### Data Analysis

Although data was collected from all the adolescents irrespective of their ages in grades 7 to 9, for the purpose of comparison, only data from 13-15 year olds were analyzed. Data were analyzed using SUDAAN (Research Triangle institute), and SPSS (version 11.5) software packages. Tobacco rates were stratified by gender. Percents and their 95% confidence intervals are presented. The analysis was weighted in order to adjust for varying non response rate and probability of selection at the school, grade and student levels. The weight use has been described by The GYTS Collaborating Group <sup>6</sup>, and given as:

$$W=W1*W2*f1*f2*f3*f4$$

Where:

W1 = the inverse of the probability of selecting a school

W2 = the inverse of the probability of selecting a grade within a school

f1 = a school-level non response adjustment factor calculated by school size category (small, medium, large)

f2 = a grade-level non response adjustment factor calculated for each school

f3 = a student level non response adjustment factor calculated by grade

f4 = a post stratification adjustment factor calculated by grade

**Ethical considerations**

Informed consent was obtained from the respondents before data collection. For this purpose, an information sheet was read to respondents so that they were informed about the study. The survey procedures were designed to protect students' privacy by allowing for anonymous and voluntary participation.

**RESULTS**

Totals of 1241 adolescents in 2002, and 1362 in 2007 aged 13-15 years participated in the surveys. The samples comprised 50.7% males in 2002 and 40.3% males in 2007. The sample in 2007 tended to be in higher grades, and older than the sample in 2002. Table 1 shows the descriptions of the samples.

Table 1: Descriptions of the samples

Factor	2002 n* (%)**	2007 n* (%)**
Grade		
7	779 (83.0)	613 (45.8)
8	259 (8.5)	447 (25.7)
9	200 (8.4)	301 (28.5)
Age		
13	363 (32.7)	404 (28.7)
14	487 (38.6)	517 (38.4)
15	391 (28.7)	441 (32.9)
Sex		
Male	568 (50.7)	681 (40.3)
Female	660 (49.3)	681 (59.7)

\* unweighted frequency      \*\* weighted percent

Overall, 28.0% of the students had ever smoked cigarettes in 2002 compared to 22.3% in 2007. The current cigarette smokers were 9.2% in 2002 and 6.8% in 2007. The above comparisons were not significant (p>0.05) as shown in Table 2. The overall current smoking prevalence was 7.4% (95%CI [7.1, 7.7]).

Table 2: Prevalence rates of tobacco use among in-school adolescents in 2002 and 2007

Year/Factor	Total OR* (95%CI**)	Males OR* (95%CI**)	Females OR* (95%CI**)
2002			
Ever smoked cigarettes	28.0 (21.7, 35.3)	32.9 (23.0, 44.6)	22.8 (17.2, 29.6)
Current cigarette smoker	9.2 (6.7, 12.6)	9.4 (6.3, 13.9)	8.7 (4.6, 15.9)
2007			
Ever smoked cigarettes	22.3 (17.0, 28.8)	25.3 (19.9, 31.5)	20.4 (14.4, 28.0)
Current cigarette smoker	6.8 (4.3, 10.5)	6.7 (4.0, 11.1)	6.8 (4.0, 11.3)

\* unadjusted odds ratio      \*\* confidence interval

Table 3 shows comparisons of rates for ever smoked cigarettes and current cigarette smoking. Students in 2002 were 8% (AOR=1.08, 95%CI [1.05, 1.11]) more likely to have ever smoked cigarettes compared to students in 2007. Compared to students of age 15 years, those of age 13 years were 21% (AOR=0.79, 95%CI [0.76, 0.82]) less likely to have ever smoked cigarettes. Meanwhile, students of age 14 years were 4% (AOR=1.04, 95%CI [1.01, 1.08]) more like to have ever smoked cigarettes compared to students of age 15 years. Male students were 21% (AOR=1.21, 95%CI [1.18, 1.32]) more likely to have ever smoked cigarettes than female students.

Table 3: Comparison of ever smoked and current smoking prevalence rates between 2002 and 2007 adjusted for age, sex, and grade

Factor	Ever smoked AOR* (95%CI**)	Current smoker AOR* (95%CI**)
Year		
2002	1.08 (1.05, 1.11)	1.01 (0.96, 1.06)
2007	1	1
Age		
13	0.79 (9.76, 0.82)	0.82 (0.77, 0.88)
14	1.04 (1.01, 1.08)	0.90 (0.85, 0.96)
15	1	1
Sex		
Male	1.21 (1.18, 1.32)	0.99 (0.95, 1.03)
Female	1	1
Grade		
7	1.27 (1.22, 1.32)	1.80 (1.68, 1.93)
8	0.63 (0.60, 0.66)	0.70 (0.64, 0.76)
9	1	1

\* adjusted odds ratio      \*\* confidence interval

No significant differences in current smoking rates were observed between 2002 and 2007, and between sexes. However, compared to students of age 15 years, those of ages 13 and 14 years were less likely to be current smokers (AOR=0.82, 95%CI [0.77, 0.88]) for 13 years, and AOR=0.90, 95%CI [0.85, 0.96] for 14 years).

## DISCUSSION

We found no significant difference in the rates of current cigarette smokers between 2002 and 2007. The overall combined rate of current cigarette smokers was 7.4%. This rate compares very well with what has been reported in neighboring countries for males of 4.2 (+4.8)% in Blantyre, and 9.5 (+3.1)% in Lilongwe in Malawi; similar to that reported in Manicaland, Zimbabwe of 10.3% (+3.9)%; and in Mozambique of 5.0 (+2.5)% in Maputo and 5.0 (+3.9)% in Gaza Inhambe; lower than that observed in Harare of 11.6% (+3.0)%; and higher than that reported in Botswana of 3.9 (+1.6)%<sup>6</sup>. Compared to other rates observed in the neighboring countries for females, our rate was higher than that observed in Botswana (2.1 [+1.3])%, Malawi (0.9 [+0.5])% in Blantyre, and 3.1 [+2.1])% in Lilongwe), and in Mozambique (1.4 [+1.1])% in Maputo, and 3.2 [+2.3])% in Gaza Inhambe), but comparable to those obtained in Zimbabwe (9.9 [+5.0])% in Harare, and 8.7 [+4.2])% in Manicaland)<sup>7</sup>.

Considering the tobacco epidemic model proposed by Lopez et al (1994), the above rates are lower than 15%, suggesting that the tobacco epidemic is in its infancy in Zambia, and in its neighboring countries. The time to act to control this epidemic is now. However, before Zambia accented to the WHO FCTC on 28<sup>th</sup> May 2008, she had already started the campaign against tobacco. It 1992, it banned cigarette sales to minors who are less than 16 years of age (The Public Health (Tobacco) Regulation, 1992), and free products (The Public Health (Tobacco) Regulation, 1992; Health regulation-Statutory Instrument No. 163 of 1992; dated 7 December 1992). It also banned tobacco advertisement in mass media (Statutory Instrument No. 163, 1992), smoking in government buildings (The Public Health (Tobacco) Regulation, 1992; Health regulation-Statutory Instrument No. 163 of 1992; dated 7 December 1992), private worksites (Factory

Act), educational facilities, health care facilities, and public transport, and other public places (The Public Health (Tobacco) Regulation, 1992; Health regulation-Statutory Instrument No. 163 of 1992; dated 7 December 1992). There is a further restriction on the label design on packaging. Advertisements must display the warning "Warning: Tobacco is harmful to health" (The Public Health (Tobacco) Regulation, 1992). Each tobacco product pack must display the following warning "WARNING: TOBACCO IS HARMFUL TO HEALTH" (The Public Health (Tobacco) Regulation, 1992, Regulation 3). The warning must be printed on both sides of the larger surface area of the pack in bold letters against a contrasting background (The Public Health (Tobacco) Regulation, 1992, Regulation 3). More recently the Local government (Prohibition of Smoking in public Places) regulations, 2008 (The Local Government Act, Laws, Volume 16, Cap 281) has come into force. These pieces of tobacco control legislation will now be backed by the newly ratified WHO FCTC to make them more effective. The success of the implementation of the WHO FCTC in Zambia would depend on the maintenance or reduction of the 7.4% current smoking rate.

Since most adults who smoke may have started the habit when they were adolescents, a feasible intervention would be to control or prevent tobacco smoking among in-school adolescents. This is the target for the current study. Inclusion of tobacco control in primary and secondary school syllabi should be considered. Interventions targeting out-of-school adolescents should also be explored. Generally, Zambia should be guided by the WHO FCTC to formulate effective intervention policies and programs.

We observed no gender difference in the current cigarette smoking rates. This finding confirms what has been reported in Zimbabwe, and contradicts findings from Botswana, Malawi, and in Maputo in which more males than females were current cigarette smokers<sup>7</sup>.

Our finding of no sex difference in current smoking rate may be explained as follows: female adolescents may perceive smoking to be fashionable as equally as male adolescents do. Communities may also

tolerate adolescent smoking without respect to gender. On the contrary, gender differences in adolescent smoking may be due to differential perceptions communities have towards male and female adolescent smokers. Communities may be more tolerant to male than female smoking.

Younger age groups were less likely to smoke because the fewer who smoked may have been experimenting. Smoking even a single puff should be discouraged among the adolescents because this experimentation may develop into a habit.

### LIMITATIONS

Our study has several limitations. Data collection was limited to school-going adolescents and so may not be representative of all adolescents in Lusaka district, Zambia. Our results may be biased to the extent non respondents differed from the participants. Non respondents were not followed up to obtain information that could have been used to compare respondents and non respondents in order to determine the magnitude and direction of bias due to non respondents. Also the data were self-reported and so miss-reporting is possible whether deliberate or inadvertent. We are unable to determine the direction of bias that might have arisen in our results. However, we feel that the magnitude of bias that may have been introduced is not significant because of high response rates achieved in the surveys, and that most of the adolescents of school-going age were attending schools.

### CONCLUSIONS

The results of this study show that Lusaka district is in the first stage of the tobacco epidemic. There is urgent need, guided by the WHO FCTC, for effective interventions to be put in place before the epidemic becomes unmanageable.

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