

## ORIGINAL RESEARCH

# Tobacco use among high school students in a remote district of Arua, Uganda

---

L Mpabulungi<sup>1</sup>, AS Muula<sup>2</sup>

<sup>1</sup>CARE International in Uganda, Kampala, Uganda

<sup>2</sup>University of Malawi, Blantyre, Malawi

---

**Submitted:** 20 June 2006; **Resubmitted:** 20 September 2006; **Published:** 6 November 2006

Mpabulungi L, Muula AS

Tobacco use among high school students in a remote district of Arua, Uganda

*Rural and Remote Health* 6: 609. (Online), 2006

Available from: <http://rrh.deakin.edu.au>

## ABSTRACT

**Introduction:** Tobacco smoking is a risk factor for several non-communicable public health problems including cancer, ischaemic heart disease and chronic obstructive airways disease. The prevalence of smoking among adolescents and the associated environment deserve attention.

**Methods:** A cross-sectional descriptive study was carried out in 2001 to determine the prevalence of tobacco smoking, exposure to advertisements, environmental tobacco smoke exposure, deterrents from smoking and perception about smoking among high school students in a remote district of Arua, north-western Uganda.

**Results:** In total 1528 high school students participated in the study of which 21.9% were current smokers and 33.1% had ever used tobacco products. When the data were stratified according to sex, 81/452 (17.9%) females and 337/871 (38.7%) males had ever smoked ( $p < 0.05$ ). With regard to current smoking, defined as having smoked at least once in the past 30 days, 12.2% of females (55/452) and 25.5% males were current smokers. Approximately one-tenth perceived themselves as likely to initiate smoking within the next 12 months. Just under half (47.3%) were exposed to environmental (passive) smoking in the home and 19.4% of current smokers usually smoked at home. Approximately 60% of smokers had obtained tobacco from grocery stores and they had never been prevented because of their age. Media exposure to tobacco advertisements was high.

**Conclusion:** Many young people in Arua, Uganda, were current smokers and exposed to environments that seemed to facilitate uptake of tobacco smoking and other tobacco use. This could be explained in part, by the fact that the district relies heavily on



tobacco farming and exposure to facilitating environments is common. A concerted public health response is urgently required that will effectively alter the home and societal environment so as to discourage uptake of tobacco use by young people.

**Key words:** Arua, remote district, smoking, tobacco, Uganda, youth.

## Introduction

Non-communicable diseases are a growing public health concern globally. Tobacco use is an important risk factor for many non-communicable diseases many of which are among the leading causes of premature mortality globally. Tobacco associated deaths exceed 4.5 million annually, thus surpassing deaths caused by malaria, tuberculosis, and maternal causes<sup>1,2</sup>. However, tobacco use has not received as much attention as have some of these other diseases. Very little still has been reported about tobacco use among adolescents in rural areas of Africa.

Lawoyin *et al.* reported a prevalence of current tobacco use of 1.5% among 273 senior secondary school students in Nigeria<sup>3</sup>. In Zimbabwe's Nyanga district, 18.5% were reported to have ever used tobacco<sup>4</sup>. We have also previously reported a prevalence of 5.3% of current tobacco use among high school students aged 13-15 years in Kampala, the capital city of Uganda<sup>5</sup>. Liberal tobacco advertisement and exposure by young people to environments where use of tobacco is acceptable were thought to be the reasons for such a high prevalence of smoking.

There is, however, a paucity of data on tobacco use among young people in other regions of the country, and in particular in the rural areas. This is an important omission also observed by Townsend *et al.*<sup>6</sup> in a systematic review of the literature on adult tobacco use in Africa. The scanty data on tobacco use in other, particularly rural, regions does not allow for informed public health interventions that help curb this public health concern. We report on a cross-sectional study using the Global Youth Tobacco Survey (GYTS)

methodology aimed to determine the prevalence of tobacco use, and related experiences among high school students aged 13-15 years in a remote district of Arua, Uganda.

## Methods

### *Setting*

The study was conducted in a sample of schools in Arua district, located in north-western Uganda, one of the furthest districts from the capital city, Kampala. Of Arua's 6100 km<sup>2</sup> land area, there is only approximately 7 km of tarmac road, the rest being dirt roads. Approximately 94% of houses are thatch-roofed while wattle and un-burnt bricks are common materials used for walls. It is estimated that approximately 95% of the population earn their living from subsistence farming. Karugaba estimated that 70% of agricultural revenue in Arua is obtained from tobacco farming<sup>7</sup>. Only 9% of the workforce has formal employment.

For several years the population has faced constant insecurity due to rebels fighting the Ugandan government. The district also has a large refugee population from the Democratic Republic of Congo (DRC) and Sudan. Many Ugandan nationals living in Arua were themselves refugees in the 1980s in Sudan<sup>8</sup>. Young people, 15-30 years constitute approximately 60% of the population of Arua District. The population is estimated to exceed 709 600 by the mid 2000s.

### *Study design*

This was a cross-sectional study conducted as part of the GYTS described elsewhere<sup>5,9,10</sup>. A technical report (available online) of the work on the GYTS data from Uganda has been



published<sup>9</sup>. In the present report, we have emphasized the prevalence estimates in a rural district of Arua.

A two-stage cluster sampling technique was used in the identification of study participants. In the first stage of sampling, high schools with students in senior 1 to 3 were selected with the probability of being in the sample proportional to enrolment size. Enrolment information was obtained from the Ministry of Education and Sports. The second stage consisted of systematic equal probability sampling. Classes (senior 1 to senior 3) were randomly selected from within the selected schools and all the students within the selected class were eligible to participate in the survey. A self-administered questionnaire was used. The questionnaire consisted of 58 multiple choice questions with core items selected from the GYTS.

### ***Ethical considerations***

Permission to conduct the study was obtained from the Uganda Ministry of Health and the research office of the Uganda National Assembly. Students in the selected classes were free not to answer any questions on the questionnaire, which was completed in the absence the class teacher. The questionnaires did not request participants to record their names or any identifying detail.

### ***Questionnaire design***

The questionnaire used in this study was from the GYTS which consist of 58 core items. The GYTS survey tool was developed and validated by WHO, Tobacco Free Initiative, and UNICEF. Items in the questionnaire aim to obtain the following information: history and current status of tobacco use; exposure to environmental tobacco smoke; tobacco advertisement; education against tobacco use; perceptions about tobacco smoking; and desire to initiate or stop smoking. Current tobacco smoking was defined as having smoked at least once in the past 30 months.

### ***Statistical analysis***

The methods of analyses have been described before in Mpabulungi and Muula<sup>8</sup>. In this analysis we used Epi Info and SUDAAN software packages (vers. 7.0; Research Triangle Institute; NC, USA). Weighting was performed using the following estimation formula to reflect the probability of sampling each student and also to reduce bias:

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

Where,

W1 = the inverse of the probability of selecting a particular school

W2 = the inverse of the probability of selecting a class within the selected school

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

f2 = a class adjustment factor calculated by school

f3 = a student-level non-response adjustment factor calculated by class

f4 = a post-stratification adjustment factor calculated by sex and grade.

This article chiefly reports the descriptive results obtained from the analysis.

## **Results**

Twenty-five schools from Arua district were selected to participate in the study of which 22 participated and three did not because they were closed during study period. Schools that were not open during study period were not replaced.

Of the 2461 eligible participants, 1528 (70.5%) students aged between 13 and 15 years participated in the study. Sex was indicated by 1323 (86%), of whom 871 (65.8%) were male and 452 (34.2%) were female.



## *Prevalence of tobacco use*

Of the 1528 participants, 506 (33.1%) had ever used any tobacco products, while 334 (21.9%) were current cigarette smokers. In total, 324 (21.2%) were currently using other tobacco products (other than cigarettes) such as snuffs, chewing tobacco, cigarillos, cigars and pipes. Of the students, 168 (11%) perceived themselves likely to initiate smoking within the next 12 months.

When the data were stratified according to sex, 81/452 (17.9%) females and 337/871 (38.7%) males had ever smoked ( $p < 0.05$ ). With regard to current smoking (defined as having smoked at least once in the past 30 days), 12.2% of females (55/452) and 25.5% males were current smokers.

## *Perceptions about smoking*

Participants were asked about their perceptions about smoking in order to determine how acceptable they considered smoking. In total, 582 (38.1%) thought that boys who smoked had more friends; and 289 (18.9%) thought that girls who smoked had more friends than non-smokers. In all, 8.5% thought that girls who smoked were attractive compared with 11.4% who thought boys who smoked were attractive.

## *Access to tobacco by current smokers*

Study participants who were smokers were asked the place where they normally smoked and 19.4% reported that they usually smoked at home. On where they obtained cigarettes, 40.8% bought them from stores and 60.9% of those who obtained cigarettes from stores had never been refused purchase of cigarettes because of their young age.

## *Exposure to environmental tobacco smoke*

We also aimed to determine whether the social environment of the students exposed them to environmental tobacco smoke (ETS) or influenced their smoking behaviours. Of the students, 722 (47.3%) lived in households where others

smoked, and 66.9% reported being exposed to tobacco smoke at places outside the home. However only 31.9% thought that tobacco should be banned from public places, although a much higher proportion, 57.6% (487), thought ETS was harmful to them. In all, 37.7% had at least a parent who was a smoker and 10.4% had a friend who they knew was a current smoker.

## *Exposure to media and advertisements*

Study participants were asked to report whether in the 30 days prior to completing the questionnaire they had heard or seen an anti-smoking media message, a pro-cigarette advertisement on billboards, newspapers and/or magazines. Study participants were allowed to report as many possibilities as applied to them; therefore, the percentages in the table do not add up to 100%.

**Table 1: High school students' exposure to tobacco-related advertisements in Arua, Uganda**

Type of advertisement	Students <i>n</i> (%)
Anti-smoking media message	1129 (73.9)
Pro-cigarette ad on billboards	910 (59.6)
Pro-cigarette ad in newspaper/magazine	897 (58.7)
An object with a cigarette brand logo	366 (24.0)
Free cigarettes offered by tobacco firm	328 (21.5)

## *Exposure to anti-tobacco education*

We also aimed to determine exposure to anti-tobacco education in the school curriculum. This was done by asking the study participants if they had been taught in school about the dangers of smoking, or if they had had a discussion in school about the reasons people smoke. In total, 1176 (76.9%) had been taught about the dangers of smoking use, and 1040 (68.1%) had had a discussion on the reasons young people smoke. As opposed to being taught the dangers of tobacco smoking, 1221 (79.9%) had been taught about the wider effects of smoking.



## Discussion

In this rural district of Arua, Uganda, a significant proportion of high school students had ever smoked (33.1%) and 21.9% were current smokers. This high smoking prevalence was similar to the national prevalence observed among adult men in Uganda from the 2000-2001 Demographic and Health Survey<sup>11</sup>. Gadalla *et al.*, reporting on a study from rural Egypt stated that 29.5% of secondary school students had ever smoked, although current smokers were only 7.7%<sup>12</sup>. In this Egyptian study, 11.5% males were current smokers and there were no female current smokers. However this study by Gadalla *et al.* reported data from only two secondary schools and therefore the generalisability is questionable. Our data, however, are from a systematic sampling of all the secondary schools in a district.

With regard to current smoking, it is of particular note that the prevalence of smoking in the rural Arua district at 21.2% was much higher than the 5.3% we have previously reported for Kampala, the capital of Uganda among high school students aged 13-15 years<sup>5</sup>. One possible explanation for this difference is that Arua is a major tobacco growing district in Uganda. There may, therefore, be some tolerance of adolescent tobacco use in this area because of the difficulty for communities to advance an anti-tobacco message when the economy of the area relies heavily on tobacco. According to Arua Rural Community Development, between 1983 and 1993, Arua was producing between 48% and 85% of Uganda's tobacco crop<sup>13</sup>.

If the social environment is reviewed, it is instructive to note that exposure to tobacco-related advertisements were similarly high in Arua and Kampala<sup>5</sup>. This could be a reflection of the national legal environment in which tobacco advertisement and use among adolescents is permissive.

Kwamanga *et al.* in study of adolescents in schools in Nairobi, Kenya, reported an overall prevalence of ever-smoking by sex among the students was 38.6% of males and 17.9% of females<sup>14</sup>. This is similar to the prevalence in Arua

of 38.7% in males and 17.9% in females. Peltzer in a study from rural south Africa, reported a prevalence of current smoking of 9.1% among boys and 5% among girls<sup>15</sup>. However, Arua differs from Nairobi in that the former is a rural district while Nairobi is a metropolitan area. What these estimates probably indicate is that, depending on the social environment, tobacco smoking can be high and a major public health problem in a rural area as well as an urban area.

Many high school students in this rural area of Uganda are exposed to tobacco in the home, outside home and through friends. That study participants reported obtaining tobacco from stores and not being denied purchase is likely to be reflection of lack of enabling legislation that prohibits smoking and use of tobacco among individuals deemed by society as vulnerable and worth of protection, such as adolescents.

Uganda, like many other eastern and southern African countries, is burdened with a high prevalence of HIV and AIDS and other communicable diseases. Little research and public health attention has been applied to risk factors for non-communicable diseases such as tobacco nationally, much less in rural areas. There is a need to raise awareness about issues like tobacco smoking among various stakeholders in order to inform policy decisions.

The fact that Arua is home to a large number of refugees from neighboring countries, and that many of its national residents are themselves refugees in other countries, is important. Maternal health indicators in Arua are reported as much poorer than in other areas of Uganda<sup>16</sup>. The extent to which the refugee situation has contributed to this is unclear.

According to the Socio-economic Conditions Survey 2000 report, only 41% of the eligible school going population aged 6-24 years in Arua were in school. Of the remainder, 3% were reported as temporarily out of school, 28% had left school and approximately 28% had never attended school<sup>17</sup>. The results of our study, which was a school-based survey, need to be interpreted with this in mind. It is likely that the





prevalence estimates reported in our study are underestimates, because out-of-school adolescents are more likely to engage in smoking than those still going to school.

School-based anti-tobacco initiatives are likely to be an important intervention among school-going adolescents in Arua. This has been shown to be effective, especially if teachers, as role-models, are discouraged from smoking within school compounds<sup>18-20</sup>. However, these initiatives must be complemented by comprehensive approaches that involve community- and policy-level interventions<sup>21</sup>.

The study has several limitations. First, data on whether the schools were single-sex or co-educational were not included. It is possible that smoking patterns may differ between schools depending on whether they are single-sex or co-educational. Gadalla *et al.*<sup>12</sup> reported that the odds of smoking among secondary school students in Egypt was 0.4 in a boys-only school, than in a mixed-sex school. Smoking patterns in the district may, therefore, reflect the general pattern of smoking in the schools that dominated the study sample.

Also, two schools that were originally selected did not participate. Of the schools that participated, only 70.5% of the students participated. It is not known how the smoking patterns of the students who did not participate may have affected the overall general smoking habits of the district. If the mean smoking habits of these non-participating students were either higher or lower than the students who participated, the study means may also be shifted, either upwards or downwards. However, as the majority of eligible students participated, the shift in prevalence estimates is unlikely to be great.

The fact that there were more males - almost twice as many males as females (871 vs 542) - may have resulted in shifting the prevalence of smoking towards a higher figure. However, in many areas of Africa, boys are more likely to be enrolled in secondary school than girls. The prevalence estimates obtained from this study are therefore likely to represent the

school-going adolescent population rather than the general adolescent population.

## Conclusion

Tobacco use was found to be common among high school students living in the rural district of Arua, Uganda. There is a need for intensified health education activities that target rural communities and capitalize on community structures. The fact that the economy of Arua is heavily dependent on tobacco may be an important obstacle that any anti-smoking program will have to confront. This, therefore, calls for attention to contextual issues in any intervention program for a public health problem.

## Acknowledgements

We are grateful to the following people for their assistance in this study: Ms Leane Riley, Dr Wick Warren, Ms Juliette Lee, Mr Curtis Blanton (CDC), Dr Charles Maringo and Karen Klimowski (World Health Organisation, AFRO Region), and Mr Benjamin Sensai (WHO-Uganda). We also thank the Parliament of the Republic of Uganda and the Ministry of Education and Sports for permission to conduct the study, and the students who volunteered to participate in this study. None of the authors receives remuneration or is affiliated to the tobacco industry. The GYTS is a collaborative project of WHO/CDC/participating countries. Analyses of GYTS data are not necessarily endorsed by the WHO/CDC/participating countries.

## References

1. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray JL. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet* 2006; **367**: 1747-57.
2. Lopez AD, Mathers CD. Measuring the global burden of disease and epidemiological transitions 2002-2030. *Annals of Tropical Medicine and Hygiene* 2006; **19**: 481-419.



3. Lawoyin TO, Ajumobi OO, Abdul MM, Abdul Malik JO, Adegoke DA, Agbedeyi OA. Drug use among senior secondary school students in rural Nigeria. *African Journal of Medicine and Medical Sciences* 2005; **34**: 355-359.
4. Khan N, Arnott R. Substance use among rural secondary schools in Zimbabwe: patterns and prevalence. *Central African Journal of Medicine* 1996; **42**: 223-229.
5. Mpabulungi L, Muula AS. Tobacco use among high school students in Kampala, Uganda: a questionnaire study. *Croatian Medical Journal* 2004; **45**: 80-83.
6. Townsend L, Flisher AJ, Gilreath T, King G. A systematic literature review of tobacco use among adults 15 years and older in sub-Saharan Africa. *Drug and Alcohol Dependence* 2006; **84**: 14-27.
7. Karugaba P. *Tobacco litigation: making use of the US litigation experience in Uganda*. (Online) 2000. Available: <http://tean.globalink.org/Wctohpaper.html> (Accessed 15 September 2006).
8. Singh K, Karunakara K, Burnham G, Hill K. Using indirect methods to understand the impact of forced migration on long-term under-five mortality. *Journal of Biosocial Sciences* 2005; **372**: 741-760.
9. Mpabulungi L. *Global youth tobacco survey report Uganda*. Centre for Disease Control. (Online) 2003. Available: [www.cdc.gov/TOBACCO/global/GYTS/reports/pdf/uganda.pdf](http://www.cdc.gov/TOBACCO/global/GYTS/reports/pdf/uganda.pdf) (Accessed 15 September 2006).
10. Global Tobacco Surveillance System Collaborating Group. Global Tobacco Surveillance System (GTSS): purpose, production, and potential. *Journal of School Health* 2005; **75**(1): 15-24.
11. Uganda Bureau of Statistics. *Uganda demographic and health survey 2000-2001*. Entebbe: Uganda Bureau of Statistics, 2001.
12. Arua Rural Community Development. *Agriculture*. (Online) 2004. [http://www.arcodproject.kabissa.org/info\\_agriculture.html](http://www.arcodproject.kabissa.org/info_agriculture.html) (Accessed 15 September 2006).
13. Gadalla S, Aboul-Fotouh A, El-Setouhy M, Mikhail N, Abdel-Aziz F, Mohamed MK et al. Prevalence of smoking among rural secondary school students in Qalyobia governorate. *Journal of the Egyptian Society of Parasitology* 2003; **33**(3 Suppl): 1031-1050
14. Kwamanga DH, Odhiambo JA, Amukoye EI. Prevalence and risk factors of smoking among secondary school students in Nairobi. *East African Medical Journal* 2003; **80**: 207-212.
15. Peltzer K. Smokeless tobacco and cigarette use among black secondary school students in South Africa. *Substance Use and Misuse* 2003; **38**: 1003-1016.
16. Orach CG, De Brouwere V. Post-emergency health services for refugees and host populations in Uganda, 1999-2002. *Lancet* 2004; **364**: 611-612.
17. Arua District. *Arua District Development Plan 2001/02 – 2003/04*, Vol 1. Arua: Arua District, 2001; 6.
18. Sinha DN, Gupta PC, Warren CW, Asma S. Effect of school policy on tobacco use by school personnel in Bihar, India. *Journal of School Health* 2004; **74**: 3-5.
19. Sinha DN, Gupta PC, Pednekar MS, Jones JT, Warren CW. Tobacco use among school personnel in Bihar, India. *Tobacco Control* 2002; **11**: 82-83.
20. Sinha DN, Gupta PC, Pednekar MS. Tobacco use among school personnel in eight north-eastern states of India. *Indian Journal of Cancer* 2003; **40**: 3-14.
21. Swart D, Panday S, Reddy SP, Bergstrom E, de Vries H. Access point analysis: what do adolescents say about tobacco control programmes? *Health Education Research* 2006; **26**: 393-406.