Secondhand smoke exposure and susceptibility to initiating cigarette smoking among never-smoking students in selected African countries: Findings from the Global Youth Tobacco Survey

Kyung A. Lee [a,b], Krishna M. Palipudi [a], Lorna M. English [a], Nivo Ramanandraibe [c], Samira Asma [a], on behalf of GYTS collaborative group

[a] Office on Smoking and Health, Centers for Disease Control and Prevention, Atlanta, GA, United States
[b] Northrop Grumman Information Systems, Atlanta, GA, United States
[c] World Health Organization, Regional Office for Africa, Brazzaville, Congo

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ABSTRACT

Background. Exposure to secondhand smoke (SHS) causes premature death and illness in non-smokers. We examined SHS exposure at home and in public places, as well as susceptibility to initiate cigarette smoking among never cigarette smokers. We used 2006–2011 Global Youth Tobacco Survey (GYTS) data from 29 African countries (56,967 students).

Methods. GYTS is a nationally representative, self-administered school-based survey, conducted among students aged 13–15 years. Prevalence ratio, estimates and 95% confidence intervals were computed for SHS exposure in the homes and public places separately. The two-sample t-test was used to assess the difference in susceptibility to smoking by SHS exposure among never-smoking students ($\alpha = 0.05$).

Results. Among never-smoking students, exposure to SHS at home ranged from 12.7% (Cape Verde) to 44.0% (Senegal). The prevalence ratio (PR) comparing susceptibility to smoking initiation among never smokers exposed to SHS at home to those who were not exposed at home ranged from 1.2 to 2.6. Exposure to SHS in public places ranged from 23.9% (Cape Verde) to 80.4% (Mali). Of the countries being studied, 8 countries showed a significant difference in susceptibility to smoking initiation among never smokers exposed to SHS in public places compared to those not exposed in public places. (PR ranged from 0.5–3.5).

Conclusion. In many African countries in the study, a substantial proportion of students who never smoked are exposed to SHS at home and in public places. Majority of never smokers who were exposed to SHS at home and in public places had a higher prevalence of susceptibility to initiate smoking than those that were not exposed to SHS at home and in public places. Adoption and enforcement of smoke-free policies in public places and smoke-free rules at home could substantially contribute to reducing SHS exposure in many of these countries.

1. Introduction

Exposure to second hand smoke (SHS) causes premature death and illness in non-smokers (US Department of Health Human Services, 2006). More than 600,000 deaths among non-smokers worldwide are attributed to SHS exposure annually (Öberg et al., 2011). Tobacco smoking prevalence is increasing in many low and middle-income countries, and by 2030, it is estimated that 80% of all tobacco-related deaths will occur in developing countries (World Health Organization, 2008).

According to the U.S. Surgeon General Report, there is no risk-free, safe level of exposure to SHS (US Department of Health Human Services, 2006). To protect non-smokers from SHS exposure, the World Health Organization (WHO) recommends enacting and enforcing legislation to create smoke-free environments in all indoor, public places (World Health Organization, 2009). Although many countries have adopted comprehensive smoke-free legislation, 82% of the world's population remains unprotected by comprehensive smoke-free laws (World Health Organization, 2015).

Countries in the WHO African region have lower SHS exposure than other regions; however, as the prevalence of smoking in the region grows (Jemal et al., 2010), SHS exposure is likely to increase (Öberg et al., 2011; World Health Organization, 2008; Koh et al., 2011; Centers for Disease Control Prevention, 2007; Veeranki et al., 2015).

Exposure to secondhand smoke among youth has potential adverse effects on respiratory health in children (Lynch and Bonnie, 1994) and also creates an environment of social acceptability of smoking (Albers et al., 2008). Social acceptability of smoking increases the likelihood of

smoking initiation among youth (Albers et al., 2008). Evidence from other studies have shown that youth who have parents or close friends that smoke have an increased susceptibility to initiate smoking (Pierce et al., 1996; Jackson, 1998; Huang et al., 2005). At the same time, having parents and peers who smoke increases the likelihood of being exposed to SHS (Veeranki et al., 2015). Repeated exposure of children to SHS, which may cause significant health consequences among youth, may also lead to nicotine craving and therefore increase susceptibility to smoking initiation (Racicot et al., 2011; Bélanger et al., 2008).

Majority of people who become habitual smokers initiate the behavior in their teens (US Department, 2012). Identifying and addressing key factors that encourage initiation among youth is therefore important to reducing the tobacco epidemic in future.

Global Youth Tobacco Survey (GYTS) was initiated in 1999 to provide useful information on monitoring youth tobacco use and other tobacco-related indicators including exposure to SHS and susceptibility to smoking initiation. We use GYTS data from 29 countries in the WHO Africa region to explore prevalence of SHS exposure at home and in public places, as well as susceptibility to initiate cigarette smoking among youth who have never smoked in 29 African countries using GYTS data from 2006 to 2011. This study contributes to knowledge on youth exposure to SHS and susceptibility to smoking initiation across countries in WHO Africa region (Centers for Disease Control Prevention, 2007; The GTSS, 2006; Peltzer, 2011).

2. Methods

2.1. Data source

GYTS is a self-administered, school-based survey designed to monitor tobacco use and assess effectiveness of key tobacco control measures among students in grades associated with ages 13–15 years old (Warren et al., 2009). Standardized methods are used to construct sampling frames, select schools and classrooms, prepare the questionnaires, conduct field protocols, and process data. The GYTS uses a two-stage cluster sample design to produce a nationally representative sample of students aged 13–15. In the first stage, schools are selected as probability-proportional to enrollment size determined by the number of students in schools' specified grade associated with ages 13–15. In the second stage, classes from selected schools are randomly chosen. All students within selected classes attending school the day the survey is administered are eligible to participate.

Twenty-nine African countries (Botswana, Burundi, Cape Verde, Chad, Comoros, Congo, Côte d'Ivoire, Equatorial Guinea, Eritrea, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Namibia, Niger, Rwanda, Sao Tome and Principe, Senegal, Seychelles, South Africa, Swaziland, Togo, Uganda, and Zambia) have conducted a nationally representative GYTS at least once between 2006 and 2011. In countries that administered the GYTS more than once since 2006, only the most recent year of data was included in this analysis.

The total number of completed questionnaires in the 29 African countries ranged from 1508 in Seychelles to 11,069 in Kenya (data not shown). The overall response rate ranged between 55.7% in Zambia to 97.0% in Swaziland, and was greater than 60% in 27 countries (Table 1). For this study, we used never cigarette smoker sample from the 27 countries which ranged from 688 in Rwanda to 6768 in Kenya (Table 1).

2.2. Measures

Never smokers were defined as students who answered 'no' to the question, 'Have you ever smoked a cigarette, even one or two puffs?' Those who responded 'yes' were considered to be ever smokers. Students were considered to be exposed to SHS at home if they responded '1 or more days' to the question, 'During the past 7 days, on how many days has anyone smoked inside your home, in your presence?' Students were considered to be exposed to SHS in public places if they responded '1 or more days' to the question, 'During the past 7 days, on how many days has anyone smoked in your presence, inside any public place, other than your home' Those who responded '0 day' were considered to be unexposed to SHS in public places.

Susceptibility to smoking initiation was determined using two questions: 'If one of your best friends offered you a cigarette, would you smoke it?' and 'At any time during the next 12 months, do you think you will smoke a cigarette?' Those who responded 'probably not', 'probably yes' or 'definitely yes' to either question were considered to be susceptible to initiation (Pierce et al., 1998). Those who responded 'definitely not' to both questions were considered not susceptible to initiation. Only never smokers were included in the susceptibility analysis.

2.3. Analysis

For each country except Chad, Sao Tome and Principe, and Zambia, a weighting factor was applied to each student record to account for the selection probability of school and class, and adjusted for the non-response rates at school, class and student levels. Post-stratification adjustment was made to the non-response adjusted weights to account for variations in grade and gender in each country. As per GYTS standard protocol, the data was not weighted for the countries (Chad, Sao Tome and Principe) in which sampling information was not available. Similarly, the data was not weighted for Zambia in which overall response rates falls below 60%. However, these data are still included for providing the information in this report.

We computed both gender and overall prevalence estimates for all key indicators including 95% confidence intervals (95% CI). We used SUDAAN for the computations (Shah et al., 1997). A two-sample t-tests was computed to test for differences in susceptibility to smoking by SHS exposure. Prevalence ratios were computed to compare susceptibility to smoking initiation among never-smoking students. The differences in proportion were considered statistically significant, if the p-value was less than 0.05.

3. Results

3.1. Smoking status

The overall percentage of students who were never smokers ranged from 51.6% in Seychelles to 96.7% in Eritrea, and was over 90% in four countries (Eritrea, Ghana, Malawi, Sao Tome and Principe) (Table 1). The percentage of male students who never smoked was over 90% in two countries (Eritrea, Sao Tome and Principe) (Table 2). The percentage of female students who never smoked was over 90% in 13 countries (Cape Verde, Chad, Congo, Eritrea, Ghana, Guinea, Malawi, Niger, Rwanda, Sao Tome and Principe, Senegal, Swaziland, Togo) (Table 3).

3.2. SHS exposure in the home

The overall percentage of never smokers exposed to SHS at home ranged from 12.7% in Cape Verde to 44.0% in Senegal (Table 1). By gender, exposure to SHS at home among boys, ranged from 12.4% in Cape Verde to 44.7% in Senegal (Table 2), and among girls, it ranged from 12.8% in Malawi to 44.8% in Mali (Table 3). At least 20.0% of students who never smoked were exposed to SHS at home in 18 countries overall.

3.3. SHS exposure in public places

The overall percentage of never smokers exposed to SHS in public places ranged from 23.9% in Cape Verde to 80.4% in Mali (Table 1).