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Research Article

MPOWER Implementation in Senegal: A Look at Youth Tobacco Use and Control Efforts - Global Youth Tobacco Survey Senegal (GYTS)

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Abstract

Introduction: Tobacco use remains a major public health problem in developing countries, where its prevalence is constantly increasing.

Young people constitute a vulnerable population due to the behavioral changes of adolescence and are a major target for the tobacco industry. This national epidemiological surveillance survey of tobacco use in schools, commonly known as the Global Youth Tobacco Survey (GYTS), is the fourth of its kind in Senegal.

Objective: The Global Youth Tobacco Survey (GYTS), part of the Global Tobacco Surveillance System (GTSS), is a global standard for systematically monitoring tobacco use among young people (smokers and non-smokers) and tracking key tobacco control indicators.

It is a school-based survey of students aged 13 to 15 years old that aims to gather information on smoking prevalence and five determinants: accessibility/availability, exposure to tobacco, smoking cessation, advertising/media, and curriculum.

Methodology: The GYTS is a cross-sectional, nationally representative school-based survey of students aged 13 to 15 years old, conducted from January 3 to 31, 2020. We used a standardized global methodology that includes a two-stage sampling design with schools selected with probability proportional to enrollment size. Classes in the selected schools are randomly selected, and all students in the selected classes can participate in the survey using a standardized background questionnaire with a set of optional questions to measure key tobacco control indicators. The questionnaire covers the following topics: smoking (smokeless and non-smokeless), cessation, passive smoking, pro- and anti-tobacco media and advertising, access to and availability of tobacco products, and knowledge and attitudes regarding smoking. The questionnaire is self-administered and anonymous to ensure confidentiality. The research protocol was approved by the National Ethics Committee.

Results: The school participation rate was 94%. A total of 4,320 students responded to the survey, including 2,524 aged 13 to 15. 9.2% of students use tobacco in various forms, 11.6% of boys and 6.9% of girls. 7.2% of students smoke cigarettes and 3.4% use other forms of tobacco. Compared to the last GYTS 2013 survey, there was a significant decrease in overall prevalence of 2.8% and in cigarette use of 1.8% and 2.6%, respectively, among boys and girls. 78.6% of student smokers, or 8 out of 10, want to quit. 25.3% of students have been exposed to secondhand tobacco smoke in public places. 61.8% of children surveyed reported anti-smoking messages in the media, and 21% reported tobacco promotional messages at points of sale. 46.6% of them believe that other people's smoking is harmful to their health, and 53.8% support a ban on smoking in enclosed public places.

Conclusion: Senegal's anti-smoking policy is beginning to bear fruit, with a downward trend in the prevalence of smoking among children in schools, but the ban on smoking in public places is not always enforced.

Keywords

GYTS Survey, Prevalence.

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List of Abbreviations

GYTS: Global Youth Tobacco Survey, WHO: World Health Organization, DCMS: Division du Contrôle Médical Scolaire, ANSD: Agence Nationale de la Statistique et de la Démographie, CDC: Center for Disease Control and Prevention, PNLT: National Tobacco Control Program, SHS: Second Hand Smoke, LMICs: Low- and Middle-Income Countries.

Introduction

Tobacco use remains one of the leading causes of preventable death worldwide, causing an estimated 8 million lives globally annually [1]. This figure represents a significant increase, up from approximately 4 million deaths at the start of the 21st century [2]. According to the World Health Organization (WHO), tobacco kills half of its regular users and is a major driver of non-communicable diseases and global health inequities [1].

Smoking prevalence and its impact have been found to be significantly high in low-income populations, where it exacerbates poverty, reduces economic productivity, influences poor nutritional choices, and contributes to environmental degradation [3]. The long-term outlook is alarming: by 2030, tobacco-related deaths are projected to reach 10 million annually, with 70% occurring in developing countries [4].

Smoking initiation among youth is a critical global health concern, as the majority of smokers begin using tobacco early in life. A global study across 204 countries found that 65.5% of current smokers began smoking regularly before age 20 [5]. Alarmingly, recent data show rising prevalence among adolescents and a declining age of initiation in many regions. Each year, an estimated 200,000 young people across the world start smoking [6].

In Senegal, the 2013 Global Youth Tobacco Survey (GYTS) highlighted this vulnerability, reporting an average smoking initiation age of 10 years. It also revealed a concerning increase in smoking among girls under 15, rising from 2.7% in 2007 to 3.1% in 2013 [7]. These trends underscore the urgent need for robust, evidence-based control measures focused on young people.

The 2020 GYTS in Senegal was conducted to evaluate the effectiveness of national tobacco control efforts, particularly the implementation of Law 2014-14 (March 28, 2014), which regulates the sale, manufacture, packaging, and use of tobacco products [8]. Findings from this survey are essential to inform the development of more comprehensive and targeted tobacco control policies that are specifically tailored to protect youth.

Materials and Methods

Data

The study used Global Youth Tobacco Survey (GYTS) Senegal data from 2013 and 2020. GYTS is a school-based, cross-sectional, paper-and-pencil survey of students aged 13–15 years. The survey employs a standardized, globally representative methodology to facilitate cross-country comparisons. In Senegal, the GYTS was implemented by the School Medical Control Division (DCMS) and the National Agency for Statistics and Demography (ANSD) in 2013 and 2020.

Measures

The survey measured several key indicators of tobacco use. Current tobacco use was defined as the use of any tobacco product on at least one day in the past 30 days. Further, current cigarette smokers and current other tobacco smokers were identified based on smoking cigarettes or other tobacco products, respectively, on at least one day during the same period. The survey also captured lifetime use, defining "ever smoked cigarettes" or "ever smoked other tobacco" as having ever tried the product, even for one or two puffs. Finally, exposure to secondhand smoke at home was assessed based on a positive response to at least one of three questions: 'During the past 7 days, on how many days has anyone smoked inside your home, in your presence?'; 'How often do you see your father (stepfather or mother's partner) smoking in your home?'; and 'How often do you see your mother (stepmother or father's partner) smoking in your home?'.

Sampling

The surveys utilized a multistage cluster sample design. This two-stage sampling plan involved the selection of schools followed by the selection of classes within each school. All students in the selected classes who were present on the day of the survey were eligible to participate. They completed an anonymous, self-administered questionnaire to measure key tobacco control indicators.

Statistical Analysis

The statistical analysis was conducted by the Centers for Disease

Control and Prevention (CDC). A weight was calculated for each participating student to account for the probability of selection and to reduce bias by compensating for different non-response patterns.

The final weight (W) used for the estimations was calculated as: W=W1*W2*f1*f2*f3*f4

Where:

- W1 = the inverse of the probability of selecting the school.
- W2 = the inverse of the probability of selecting the class within the school.
- f1 = an adjustment factor for school-level non-response, calculated by school size category (small, medium, large).
- f2 = a class adjustment factor, calculated by school.
- f3 = an adjustment factor for student-level non-response, calculated by class.
- f4 = a post-stratification adjustment factor, calculated by gender and class.

Ethical Considerations

The survey procedure was based on voluntary student participation, anonymity, and confidentiality. The GYTS 2020 survey protocol received ethical approval from the national ethics committee (approval number 000000010 MSAS/DPRS, dated January 13, 2020). The surveys were conducted with technical and financial support from the World Health Organization (WHO) and CDC.

Results

Survey Population and Demographics

The Global Youth Tobacco Survey (GYTS) was conducted in Senegal by the Ministry of Health in 2013 and 2020. This analysis uses data from students aged 13–15 from both survey years. In 2013, the survey had a total of 1,728 eligible students, with a response rate of 81.3%. In 2020, the response rate was 93.9% with a total of 4,320 students surveyed.

Monitor Tobacco Use

As shown in Table 1, the overall prevalence of current tobacco use among students aged 13 to 15 was 7.8% in 2013 and 7.1% in 2020. Among boys, the prevalence was 9.7% in 2013 and 9.8% in 2020. Among girls, the prevalence was 4.7% in 2013 and 4.5% in 2020.

The overall prevalence of current cigarette smoking was 4.5% in 2013 and 3.4% in 2020. The overall prevalence of current other tobacco smoking was 4.9% in both years. The prevalence of students who had ever smoked other tobacco products was 7.6% in 2013 and 10.3% in 2020.

Protect from Secondhand Smoke

The prevalence of student exposure to secondhand smoke in 2013

Table 1: Global Youth Tobacco Survey Senegal 2013 and 2020.

Indicator	GYTS 2013			GYTS 2020		
	Overall	Boys	Girls	Overall	Boys	Girls
TOBACCO USE PREVALENCE						
Current Tobacco Smokers	7.8 (5.0 - 12.0)	9.7 (5.9 - 15.7)	4.7 (2.5 - 8.7)	7.1 (5.8 - 8.6)	9.8 (7.6 - 12.5)	4.5 (3.3 - 6.2)
Current Cigarette Smokers	4.5(2.6 - 7.7)	4.7 (2.6 - 8.5)	3.1 (1.2 - 7.6)	3.4 (2.5 - 4.7)	5.6 (3.7 - 8.2)	1.4 (0.8 - 2.3)
Regular Cigarette Smokers	0.8 (0.1 - 4.6)	0.7 (0.1 - 3.7)	0.9 (0.1 - 5.9)	0.2 (0.0 - 0.7)	0.3 (0.1 - 1.6)	0.1 (0.0 - 0.7)
Current Other Tobacco Smokers	4.9 (2.9 - 8.3)	6.3 (3.5 - 11.2)	3.3 (1.5 - 7.1)	4.9 (4.0 - 6.1)	6.1 (4.3 - 8.7)	3.9 (2.6 - 5.8)
Ever Smoked Cigarettes	9.8 (5.4 - 17.0)	13.0 (6.5 - 24.5)	5.8 (2.3 - 14.0)	9.5 (7.6 - 11.9)	15.3 (12.3 - 18.7)	4.6 (3.1 - 6.7)
Ever Smoked Other Tobacco	7.6 (4.7 - 11.9)	9.5 (5.3 - 16.4)	4.6 (2.6 - 16.4)	10.3 (8.3 - 12.8)	12.9 (10.0 - 16.3)	8.2 (6.2 - 10.8)
SMOKING CESSATION						
Current smokers wishing to quit	67.4% (33.8–89.3)*	55.2% (19.6–86.1)*	100%*	82.5% (65.1–92.3)	84.5% (65.4–94.0)*	74.7% (40.6–92.7)*
Current smokers who attempted to quit this year	77.7% (37.0–95.4)*	60.6% (35.1–81.4)*	81.8% (25.7–98.3)*	78.6% (62.6–89.0)	78.3% (57.2–90.7)	79.6% (58.1–91.7)
Received help/counseling to quit smoking	22.9 (11.0 - 41.6)	9.9 (4.3- 21.1)	--	--	--	--
SECONDHAND SMOKE (SHS) EXPOSURE & ATTITUDES						
Exposed to SHS at home	27.9 (20.0 - 37.4)	28.7 (19.5– 40.1)	26.0 (17.9 - 36.0)	13.0 (9.2 - 18.3)	14.0 (9.3 - 20.5)	11.9 (8.5 – 16.5)
Exposed to SHS in enclosed public places	45.2 (33.5 - 57.5)	49.8 (35.8 – 63.8)	40.0 (28.3 - 53.1)	25.3 (19.6 - 32.0)	24.4 (18.0- 32.2)	26.1(20.6- 32.5)
Exposed to tobacco smoke in open public places	42.0 (29.1 - 56.0)	45.5 (30.0 - 61.9)	38.1 (26.0 -51.9)	23.7 (19.3 - 28.8)	26.3 (20.3 - 33.2)	21.6 (17.4-26.5)
Seen someone smoking near their school	37.3 (25.0 – 51.5)	39.6 (23.9 - 57.8)	34.4 (23.6– 47.1)	42.1 (37.7 - 46.6)	40.2 (34.4 - 46.4)	43.9 (38.2 - 49.6)
Believed that SHS is harmful	45.6 (28.5 - 63.8)	43.9 (25.0 - 64.7)	47.8 (30.7 -65.4)	46.6 (40.0 - 53.4)	44.9 (37.2- 52.8)	48.3 (41.4- 55.3)
Support banning smoking in enclosed public places	64.6 (50.2 - 76.7)	67.4 (51.0 - 80.5)	61.5 (47.2 - 74.0)	53.8 (45.5 - 61.8)	53.5 (44.6- 62.2)	54.2 (45.6- 62.6)

Support banning smoking in outdoor public places	63.8 (49.4 - 76.1)	62.3 (45.9 - 76.3)	65.5 (51.7 - 77.0)	50.3 (43.8 - 56.9)	48.1 (40.5- 55.8)	52.2 (45.5- 58.9)
TOBACCO ADVERTISING & PROMOTION						
Noticed tobacco ads in the media	70.1 (54.0 - 82.4)	73.9 (56.7-86.0)	66.5 (49.8-79.9)	61.8 (57.1 - 66.4)	59.6 (53.2- 65.7)	63.8 (59.3 - 68.1)
Noticed anti-tobacco messages in media	70.1 (54.0 - 82.4)	73.9 (56.7-86.0)	66.5 (49.8-79.9)	61.8 (57.1 - 66.4)	59.6 (53.2- 65.7)	22.6 (19.8 - 25.6)
Noticed ads at points of sale	25.6 (15.8 - 38.8)	26.2 (15.2 - 41.2)	25.2 (15.5 - 38.3)	21.1 (18.7 - 23.7)	19.6 (16.3 - 23.3)	64.0 (58.8 - 68.9)
Noticed tobacco use in the media	54.6 (38.0 - 70.2)	55.1 (38.0 - 71.2)	54.3 (35.5 - 71.9)	63.5 (58.3 - 68.4)	63.6 (56.5 - 70.2)	6.5 (4.8 - 8.7)
Have possessed a tobacco brand item	11.9 (7.8 - 17.8)	13.3 (8.1 - 21.2)	10.5 (6.4 - 16.8)	10.9 (8.8 - 13.4)	12.2 (9.4 - 15.9)	9.9 (8.0 - 12.2)
Seen anti-smoking messages at events	40.2 (25.1 - 57.3)	40.3 (24.8- 58.1)	40.9 (24.6- 59.5)	34.1 (26.2 - 43.0)	35.9 (26.4- 46.8)	31.7 (23.6 - 41.0)
CIGARETTE ACCESS & PURCHASING						63.8 (59.3 - 68.1)
Purchased cigarettes from a store	38.3% (14.4–69.7)*	40.8% (12.7–76.5)*	9.4% (1.5–40.9)*	78.2% (65.9–87.0)*	78.4% (66.2–87.1)*	22.6 (19.8 - 25.6)
Not prevented from buying due to age	66.2% (27.8–90.9)*	70.3% (18.7–96.1)*	40.3% (7.2–85.4)*	50.1% (29.7–70.4)*	42.5% (20.5–67.9)*	64.0 (58.8 - 68.9)
KNOWLEDGE & ATTITUDES						
Educated at school about dangers of smoking	23.4 (19.9 - 27.4)	23.3 (18.5- 29.0)	23.8 (19.9- 28.2)	--	--	
Thought it is difficult to quit smoking	25.0 (20.6 - 30.1)	22.4 (17.8 - 27.7)	27.6 (22.7 - 33.1)	--	--	
Thought smoking makes them feel more comfortable	21.4 (19.2 - 23.7)	22.1 (18.9 - 25.6)	21.0 (17.9 - 24.5)	--	--	

and 2020 is presented in Table 1. In 2013, 27.9% of students reported exposure to secondhand smoke at home, with the figure at 13.0% in 2020. SHS exposure in enclosed public places was 45.2% in 2013 and 25.3% in 2020. In open public places, SHS exposure was 42.0% in 2013 and 23.7% in 2020.

The prevalence of students who reported seeing someone smoking on the street or near their school was 37.3% in 2013 and 42.1% in 2020. While students' belief that secondhand smoke is harmful was 45.6% in 2013 and 46.6% in 2020, support for banning smoking in enclosed public places was 64.6% in 2013 and 53.8% in 2020.

Offer: Smoking Cessation

As shown in Table 1, the proportion of current smokers who intended to quit was 67.4% in 2013 and 82.5% in 2020. The percentage of current smokers who attempted to quit in the past year was 77.7% in 2013 and 78.6% in 2020.

Warn

Based on the provided data, the percentage of students who noticed anti-tobacco media messages in Senegal was 70.1% in 2013. In 2020, this figure was 61.8%.

Among male students, the percentage who noticed anti-tobacco messages was 73.9% in 2013. The figure for boys in 2020 was 59.6%.

For female students, 66.5% noticed anti-tobacco messages in 2013. In 2020, the percentage of girls who noticed these messages was 63.8%.

The 2013 results on students' knowledge and attitudes toward smoking among students including support for cessation, alongside generally favorability for policy views. Only 23.4% of students reported being taught about the dangers of smoking in school, with identical rates for boys and girls. Access to professional cessation support was similarly low at 22.9% overall, showing a notable gender disparity as only 9.9% of boys reported receiving help.

In terms of perception, one quarter of all students (25.0%) believed it is difficult to quit smoking, a view held more strongly by girls (27.6%) than boys (22.4%). Awareness of the harm from secondhand smoke was moderate (46.6%). Despite these knowledge gaps, a clear majority of students (53.8%) supported banning smoking in enclosed public places, demonstrating consistent approval for smoke-free policies across genders.

Enforce

Based on the provided data, the percentage of students who noticed anti-tobacco media messages was 70.10% in 2013 and 61.80% in 2020. Among boys, 73.90% noticed these messages in 2013, with the figure at 59.60% in 2020. For girls, the percentage was 66.50% in 2013 and 63.80% in 2020.

The data also shows that the percentage of students who noticed anti-tobacco warning labels on tobacco products was 25.6% in 2013 and 21.1% in 2020. Among boys, the percentage was 26.2% in 2013 and 19.6% in 2020. The percentage of girls who noticed these labels was 25.2% in 2013 and 22.6% in 2020.

Raise Tobacco Taxes: Cigarette Purchase

Table 1 shows that the proportion of students purchasing cigarettes from a store was 38.3% in 2013 and 78.2% in 2020. The proportion of students who were not prevented from buying cigarettes due to age was 66.2% in 2013 and 50.1% in 2020.

Discussions

The global tobacco epidemic remains a serious public health crisis, responsible for over 8 million annual deaths worldwide, with the majority occurring in low- and middle-income countries (LMICs) [1]. In this challenging landscape, marked by aggressive marketing of novel tobacco products and constant industry interference [9], the establishment of robust surveillance systems, as recommended by the World Health Organization (WHO), is crucial [10].

Senegal has demonstrated a strong commitment to addressing this challenge by implementing a comprehensive anti-tobacco law and a national tobacco control program (PNLT) [11]. The results of the 2020 Global Youth Tobacco Survey (GYTS), which achieved an excellent 94% response rate from 4,320 students, provide a clear measure of the effectiveness of these efforts and simultaneously reveal the emerging challenges that must be urgently addressed [12].

The study indicates that Senegal's comprehensive tobacco control strategy is contributing to positive public health outcomes among students. Cigarette smoking prevalence has remained low, recording 7.1% in 2020, a slight decrease from in 2007, and staying below [12]. This low overall prevalence is lower than in most other countries globally, suggesting that the national tobacco control policies, including the implementation of the WHO MPOWER package, are having a protective effect [10,13].

Furthermore, the results showed remarkable progress in reducing exposure to secondhand smoke (SHS) among students. Prevalence of exposure at home decreased by more than half, with a similar significant reduction observed in enclosed public places [12]. In addition to this progress, the study found a strong motivation among young smokers to quit, with over three-quarters reporting an attempt to do so in the past year [12].

Despite these positive results, the GYTS data highlight significant challenges in tobacco use and key tobacco control indicators among students in Senegal. While cigarette use remained below 10.0%, the results indicate an emerging use of other tobacco products and a concerning trend toward a much younger age of initiation of tobacco use [12]. This trend may reflect a failure in the enforcement of policies on legal ban on sales to minors [14]. This is strongly suggested by the proportion of students who reported purchasing cigarettes from stores, which drastically increased from 38.3% in 2013 to 78.2% in 2020, with over half reporting that they were not prevented from purchasing due to their age [12]. The potential failure to enforce bans on sales to minors is compounded by the decreasing reach of anti-tobacco media messages and warning labels, even as tobacco advertising, particularly through digital channels, remains aggressively targeted at youth [12,15].

These findings lead to clear and urgent recommendations. To protect the gains made, Senegal must reinforce multi-sectoral collaboration and take decisive action in the following areas:

- **Strengthen Enforcement:** Rigorously enforce laws prohibiting the sale of tobacco to minors and smoking in schools, where bans are currently ineffective.
- **Prioritize Funding:** Secure sustainable financing for the national strategic plan by making tobacco control a budget priority within the Ministry of Health.
- **Increase Taxes:** Implement higher tobacco taxes in line with ECOWAS directives to reduce the affordability of cigarettes for youth.
- **Modernize Communication:** Use digital and social media to effectively target anti-tobacco campaigns to young people and counter industry marketing.
- **Enhance Education:** Integrate tobacco control into school curricula and strengthen partnerships with the education sector.

Conclusion

while Senegal's foundational measures have successfully kept overall tobacco prevalence low, the alarming decline in the age of initiation, the easy accessibility of products, and persistent enforcement gaps call for urgent and effective action from all government and educational authorities to safeguard the health of the nation's youth.

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