

Implementation of the Article 13 WHO FCTC measures and changes in cigarette smoking among youth in 42 countries

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ABSTRACT

Introduction Despite a decline in global smoking prevalence among adolescents, around 21 million youth report current cigarette smoking. Exposure to tobacco advertising, promotion and sponsorship (TAPS) is a risk factor for smoking initiation, and therefore the Article 13 of the WHO Framework Convention on Tobacco Control (WHO FCTC) requires comprehensive TAPS bans. We examined the associations between changes in youth cigarette smoking and implementation of Article 13.

Methods We used two rounds of cross-sectional data from the Global Youth Tobacco Survey (GYTS) for 42 countries: first between 2006 and 2015, and second between 2017 and 2020. The GYTS data were linked with the WHO FCTC implementation reports from 2016 and 2018. The outcome was current smoking. Multilevel binary logistic regression models, stratified by country income level, were used to test the prevalence differences between the latest and previous GYTS rounds and their associations with TAPS bans with postestimations using marginal analyses.

Results The percentage of students currently smoking decreased from 10.0% (95% CI 8.0 to 12.1) to 7.7% (95% CI 6.1 to 9.3) from first to second GYTS rounds ($p < 0.001$), adjusting for country clustering. In low-income and lower-middle-income countries, the degree of decrease significantly differed between countries with versus without bans on display, partial internet TAPS ban, ban on product placement and by number of TAPS measures, adjusting for age and sex of the respondents. In high-income and upper-middle-income countries, the degree of decrease significantly differed by presence (or absence) of partial or full internet TAPS ban, ban on product placement and by number of TAPS measures.

Conclusion Implementation of TAPS bans is associated with decreased smoking among adolescents both in high-income and low-income countries. Enhanced and continuous efforts are necessary to protect youth from the promotion of tobacco and nicotine products.

INTRODUCTION

Tobacco use remains a major public health challenge, resulting in over 8 million deaths and 230 million disability-adjusted life years lost in 2019 globally.¹ A study using data from

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ The tobacco industry continuously finds ways to promote tobacco and nicotine products through diverse channels to youth.
- ⇒ Exposure to tobacco advertising, promotion and sponsorship (TAPS) promotes youths' tobacco use.
- ⇒ The implementation of so-called tobacco demand reduction policies required or recommended under the WHO Framework Convention on Tobacco Control (WHO FCTC) has sparsely been studied among youth.

WHAT THIS STUDY ADDS

- ⇒ This study examined changes in adolescents' cigarette smoking prevalence in relation to TAPS bans implemented under the Article 13 of the WHO FCTC.
- ⇒ We found implementation of TAPS bans was significantly associated with a decrease in youth smoking prevalence.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ This study emphasises the need to fully implement the requirements and recommendations of Article 13 of the WHO FCTC to ensure adolescents are protected from TAPS.
- ⇒ Further research on proactive tobacco control interventions tailored for younger populations is needed to improve surveillance and development, adoption and implementation of preventive measures in different country income settings.

the Global Youth Tobacco Survey (GYTS) in 140 countries between 1999 and 2018 found the prevalence of cigarette smoking of at least 1 day during the past 30 days had decreased among adolescents in 80 countries. The prevalence of tobacco use decreased more in countries that had ratified the WHO Framework Convention on Tobacco Control (WHO FCTC).² However, an estimated 21 million adolescents aged 13–15 years around the world reported currently smoking cigarettes, and this number is expected to increase in many countries, especially in the WHO African region, due to ageing of the currently



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young population.³ In general, cigarette smoking prevalence is greater among male adolescents compared with female adolescents.^{2,4,5}

The WHO FCTC, a global response to tobacco and its adverse effects, entered into force in 2005. Even though 182 countries have ratified the treaty by 2022, the comprehensive implementation of the Article 13 measures lags behind.⁶ In 2007, eight countries reported having adopted a comprehensive ban on tobacco advertising, promotion and sponsorship (TAPS) required under the Article 13 of the WHO FCTC. Since then, an additional 58 countries have introduced TAPS bans.⁷ Altogether, in 2022, 46% of low-income countries, 36% of middle-income countries and 25% of high-income countries had comprehensive TAPS bans in place. At the same time, over 30% of low-income countries had either minimal TAPS bans or no bans at all.⁷ Based on the Article 13 implementation guidelines, comprehensive TAPS bans cover, for example, display and visibility of tobacco products at point of sales, domestic and global internet, product placement as means of advertisement or promotion and depiction of tobacco or tobacco use in entertainment media products.⁸

Smoking and tobacco-themed images have been presented broadly to adolescents in entertainment media and pop culture through movies, games and music videos, as well as on streaming services and social media.⁹ Still, the impact of the WHO FCTC implementation in regard to youth tobacco use has not been studied much.¹⁰ Marketing of tobacco products and exposure to smoking through films have been associated with increased risk of young people taking up smoking.^{11–13} Additionally, youth are exposed to point-of-sale tobacco advertising, which has been associated with smoking susceptibility. For example, point-of-sale promotion has been observed to be prevalent in stores close to schools.^{14,15} A study based on the WHO 'MPOWER' data linked with the 2007 and 2011 GYTS data from 130 countries showed a decrease in prevalence of youth smoking in countries with bans on tobacco advertising at point-of-sale.¹⁶

The purpose of our study was to examine differences in changes of cigarette smoking by youth in countries with and without TAPS bans required under the Article 13. The research questions were as follows: (a) Are there changes in youth cigarette smoking in different countries that have or have not implemented Article 13 TAPS bans? (b) Do age, gender and country income level influence these changes?

METHODS

Study design and participants

This was an observational study based on two panels of publicly available cross-sectional self-reported data from GYTS for 42 countries. Only countries with variables consistently collected across the latest two GYTS rounds were included in the study. Data from the first round in the countries were from 2006 and 2015, and data from

the second round were from 2017 to 2020. To capture the latest state of tobacco regulations between the two GYTS rounds, we linked data from the WHO FCTC implementation reports in 2016 and 2018 depending on the year of the latest available GYTS data.

GYTS is a worldwide collaborative surveillance initiative of governments and non-governmental organisations introduced in 1999 and carried out by the Office on Smoking and Health of the US Centers for Disease Control and Prevention (CDC) and WHO in its six WHO regions. GYTS uses a two-stage cluster sampling design. Classes are randomly chosen from schools identified using a selection probability proportional to enrolment size. As the classes are carefully identified to ensure sufficient sample size of students aged 13–15 years, students of all ages in the selected classes attending school on the day of the survey are eligible to participate in it. Hence, data from students aged <13 years or >15 years are also collected.¹⁷

Parties to the WHO FCTC are obligated by the Convention to report country-level, up-to-date information every two years on various aspects of implementation of the Articles.¹⁸ The data from the implementation reports are publicly available in the WHO FCTC Implementation database.¹⁹ In the present study, with the assistance from the WHO FCTC Knowledge Hub on Surveillance, we used full datasets derived from the reporting platform of the WHO FCTC, including updated information provided by the parties. We used the FCTC data collected at least a year prior to the latest GYTS round. The WHO FCTC reporting system changed in 2016, which is why 2016 was used as the first WHO FCTC data year. More details are provided in [table 1](#).

The final analytic sample of the study consisted of 42 countries with 148 151 observations from the latest GYTS round and 131 202 observations from the previous GYTS round conducted in each country.

Measures

Individual-level measures

As part of a self-administered standard core GYTS questionnaire, students were asked whether they had smoked cigarettes in the past 30 days. Those who responded they had smoked cigarettes on ≥ 1 day during the past 30 days, were classified as persons who currently smoke. Students also reported their age, ranging from '11 years old or younger' to '17 years old or older' and sex.

Country-level measures

Implementation of Article 13 of the WHO FCTC was measured using countries' responses on the adoption of four TAPS bans. Responses for bans covering display and visibility of tobacco products at the point of sale; product placement as means of advertisement or promotion, or depiction of tobacco or its use in entertainment media products (vs lack thereof) were dichotomised into 'yes' and 'no' prior to further analyses. Internet bans included domestic online settings and cross-border advertising

Table 1 Description of data sources used for the study by WHO country regions

WHO region	WHO FCTC party*	Latest GYTS round	Unweighted number of observations	Previous GYTS round	Unweighted number of observations	Year of the WHO FCTC parties' implementation report
African Region	Congo	2019	6396	2009	2431	2018
	Ghana	2017	5664	2009	8295	2016
	Madagascar	2018	2920	2008	1991	2016
	Mauritania	2018	3740	2009	4144	2016
	Senegal	2020	4320	2013	1728	2018
	Togo	2019	3917	2013	5298	2018
	Uganda	2018	3458	2011	3450	2016
Region of the Americas	Antigua and Barbuda	2017	2268	2009	1795	2016
	Bolivia (Plurinational State of Bolivia)	2018	5155	2012	3373	2016
	Jamaica	2017	1685	2010	1825	2016
	Panama	2017	2621	2012	5698	2016
	Paraguay	2019	4698	2014	6518	2018
	Peru	2019	4148	2014	3818	2018
	Saint Lucia	2017	1495	2011	1363	2016
	Saint Vincent and the Grenadines	2018	1519	2011	1544	2016
	Trinidad and Tobago	2017	4128	2011	2739	2016
Venezuela (Bolivarian Republic of Venezuela)	2019	6752	2010	2863	2018	
Eastern Mediterranean Region	Iraq	2019	2560	2014	2047	2018
	Qatar	2018	2071	2013	2109	2016
	Tunisia	2017	2448	2010	1751	2016
European Region	Albania	2020	5388	2015	4672	2018
	Georgia	2017	1345	2014	1379	2016
	Italy	2018	1680	2014	1822	2016
	Kyrgyzstan	2019	6145	2014	4273	2018
	Latvia	2019	4226	2014	4320	2018
	Lithuania	2018	3030	2014	3413	2016
	Republic of Moldova	2019	4717	2013	3905	2018
	Montenegro	2018	4216	2014	4027	2016
	Romania	2017	5409	2013	4801	2016
	San Marino	2018	624	2014	638	2016
	Serbia	2017	3861	2013	3994	2016
	Slovenia	2017	2629	2011	2039	2016
	Tajikistan	2019	4083	2014	3313	2018
	Ukraine	2017	4065	2011	3762	2016
Southeast Asia Region	Bhutan	2019	4712	2013	2319	2018
	Maldives	2019	4799	2011	2641	2018
Western Pacific Region	Brunei Darussalam	2019	2674	2013	1574	2018
	Kiribati	2018	2622	2009	1461	2016
	Mongolia	2019	4146	2014	7298	2018

Continued

Table 1 Continued

WHO region	WHO FCTC party*	Latest GYTS round	Unweighted number of observations	Previous GYTS round	Unweighted number of observations	Year of the WHO FCTC parties' implementation report
	Palau	2017	1484	2013	1574	2016
	Samoa	2017	2076	2007	1297	2016
	Vanuatu	2017	2257	2007	1900	2016

*Arranged alphabetically within WHO country region. FCTC, Framework Convention on Tobacco Control ; GYTS, Global Youth Tobacco Survey.

(including where the organisations that conduct TAPS may be located abroad), and the score captured the number of such bans in a country. To account for the differences in regulatory contexts, stratified analyses were conducted on low-income and lower-middle-income countries, as well as upper-middle-income and high-income countries separately using the World Bank classification of country economies.

Statistical analysis

Frequency counts and percentages were used to describe categorical individual-level and country-level characteristics of the study participants. Means, SD and ranges were calculated for students' ages and scores on strength of TAPS measures.

Multilevel binary logistic regression models with random intercept for countries were used to test the differences between the latest and previous GYTS rounds and their associations with policy regulations with postestimations using marginal analyses. Separate models were used for each Article 13 policy measure and other characteristics associated with the current use of combustible cigarettes in unadjusted analyses. To examine differential effects by country-income levels, we conducted stratified analyses of associations between each Article 13 policy measures and current smoking in low-income and lower-middle-income versus upper-middle-income and high-income countries, adjusting for students' age and sex. Given differences in weighting methods across the countries and study focus on associations rather than generalisability of findings, the analyses were not weighted.

Stata/SE V.14.2 was used for all analyses. Statistical significance level was set at 5%. All tests were two-tailed.

RESULTS

On average, the time difference between GYTS rounds of data collection was 6.4 years, ranging from 3 years in Georgia to 10 years in Madagascar. Slightly more than half of respondents were female (51.1%), aged 14 years on average (SD 1.5). As shown in [table 2](#), current use of cigarettes decreased from 10.3% in the previous round to 8.2% in the latest GYTS round in the total sample.

Less than half (n=17 of 42) of study countries reported having bans covering display and visibility of tobacco products at point of sales ([table 3](#)). Ten countries reported a ban covering TAPS in either domestic or global internet (partial ban), and eight countries reported a ban that covered both (full ban). More than half of the study countries (n=26) reported a ban covering product placement as a means of advertisement or promotion. Less than half of the countries (n=20) covered depiction of tobacco or tobacco use in entertainment media products. Sixteen countries had not implemented any TAPS measures; 14 countries implemented 2 or 3 TAPS measures, and 12 countries implemented 4 TAPS measures. None of the countries implemented one TAPS measure. There were 18 low-income and lower-middle-income countries and 24 high-income and upper-middle-income countries. There were no statistically significant differences in regulations between the two country income groups.

Table 2 Characteristics of the study participants from 42 countries

Characteristics	Previous GYTS (n=1 31 202)	Latest GYTS (n=1 48 151)
Current cigarette smoking		
No	111 222	129 519
Yes	12 723	11 555
Mean age category in years, SD (range <11–17/18)	129 304	140 453
Sex		
Male	63 955	71 207
Female	65 081	75 715

GYTS, Global Youth Tobacco Survey.

Table 3 Description of the FCTC country reported regulations in the 42 study countries by their income level

FCTC regulations	Low-income and lower-middle-income countries (n=18)		High-income and upper-middle-income countries (n=24)	
	Frequency	Country	Frequency	Country
Ban covers display and visibility of tobacco products at point of sales				
No	8	Bolivia, Georgia, Kyrgyzstan, Mauritania, Moldova, Uganda, Ukraine, Vanuatu	17	Albania, Antigua and Barbuda, Italy, Jamaica, Latvia, Lithuania, Montenegro, Palau, Paraguay, Peru, Romania, Saint Lucia, Saint Vincent and Grenadines, Serbia, Slovenia, Tunisia, Venezuela
Yes	10	Bhutan, Congo, Ghana, Kiribati, Madagascar, Mongolia, Samoa, Senegal, Tajikistan, Togo	7	Brunei Darussalam, Iraq, Maldives, Panama, Qatar, San Marino, Trinidad and Tobago
Ban covers domestic and global internet				
No	10	Bolivia, Georgia, Ghana, Kiribati, Madagascar, Mauritania, Senegal, Tajikistan, Uganda, Ukraine	14	Albania, Antigua and Barbuda, Iraq, Jamaica, Lithuania, Montenegro, Palau, Peru, Romania, Saint Lucia, Saint Vincent and Grenadines, San Marino, Tunisia, Venezuela
Either	3	Kyrgyzstan, Moldova, Samoa	7	Brunei Darussalam, Italy, Maldives, Paraguay, Qatar, Serbia, Trinidad and Tobago
Both	5	Bhutan, Congo, Mongolia, Togo, Vanuatu	3	Latvia, Panama, Slovenia
Ban covers product placement as means of advertisement or promotion				
No	6	Bolivia, Georgia, Mauritania, Tajikistan, Uganda, Ukraine	10	Albania, Antigua and Barbuda, Jamaica, Lithuania, Palau, Peru, Romania, Saint Lucia, Saint Vincent and Grenadines, Venezuela
Yes	12	Bhutan, Congo, Ghana, Kiribati, Kyrgyzstan, Madagascar, Moldova, Mongolia, Samoa, Senegal, Togo, Vanuatu	14	Brunei Darussalam, Iraq, Italy, Latvia, Maldives, Montenegro, Panama, Paraguay, Qatar, San Marino, Serbia, Slovenia, Trinidad and Tobago, Tunisia
Ban covers depiction of tobacco or tobacco use in entertainment media products				
No	7	Bolivia, Georgia, Ghana, Mauritania, Uganda, Ukraine, Vanuatu	15	Antigua and Barbuda, Italy, Jamaica, Lithuania, Palau, Peru, Qatar, Romania, Saint Lucia, Saint Vincent and Grenadines, San Marino, Serbia, Slovenia, Tunisia, Venezuela
Yes	11	Bhutan, Congo, Kiribati, Kyrgyzstan, Madagascar, Moldova, Mongolia, Samoa, Senegal, Tajikistan, Togo	9	Albania, Brunei Darussalam, Iraq, Latvia, Maldives, Montenegro, Panama, Paraguay, Trinidad and Tobago
TAPS measures*				
None	6	Bolivia, Georgia, Mauritania, Tajikistan, Uganda, Ukraine	10	Antigua and Barbuda, Jamaica, Lithuania, Palau, Peru, Romania, Saint Lucia, Saint Vincent and Grenadines, San Marino, Venezuela
2–3†	6	Ghana, Kiribati, Kyrgyzstan, Madagascar, Samoa, Vanuatu	8	Brunei Darussalam, Iraq, Italy, Latvia, Maldives, Paraguay, Serbia, Slovenia
4	6	Bhutan, Congo, Moldova, Mongolia, Senegal, Togo	6	Albania, Montenegro, Panama, Qatar, Trinidad and Tobago, Tunisia
In adjusted models for panel A: n=118 588 or 18 countries; for panel B: n=135 969 or 24 countries.				
*Tobacco sponsorship of advertisement, promotion, international events or activities, contributions from tobacco companies and cross-border advertising.				
†None of the countries had implemented one TAPS measure.				
FCTC, Framework Convention on Tobacco Control; TAPS, tobacco advertising, promotion and sponsorship.				

Based on marginal analyses following unadjusted multi-level logistic regression analyses (table 4), on average, in low-income and lower-middle-income countries, the percentage of students surveyed who currently smoke

decreased by 1.7 percentage points ($p<0.001$): from 8.5% (95% CI 5.4 to 11.7) to 6.8% (95% CI 4.2 to 9.3); whereas in high-income and upper-middle-income countries, the decrease was 2.9 percentage points ($p<0.001$): from

Table 4 Prevalence of current smoking among GYTS respondents by country income level

Regulations	Low-income and lower-middle-income countries			High-income and upper-middle-income countries		
	Prevalence of current smoking, %			Prevalence of current smoking, %		
	Latest GYTS	Previous GYTS	Significant difference in degree of change	Latest GYTS	Previous GYTS	Significant difference in degree of change
	6.8 (95% CI 4.2 to 9.3)	8.5 (95% CI 5.4 to 11.7)	Yes	8.5 (95% CI 6.5 to 10.4)	11.4 (95% CI 8.9 to 13.9)	Yes
Ban covers display (vs none)	6.1 (vs 7.7)	7.9 (vs 9.4)	No	7.2 (vs 9.1)	9.3 (vs 12.3)	No
Internet ban						
Partial (vs none)	6.5 (vs 6.1)	7.1 (vs 8.4)	Yes	7.7 (vs 8.9)	10.3 (vs 11.4)	No
Full (vs none)	8.5 (vs 6.1)	9.8 (vs 10.8)	Yes	8.5 (vs 8.9)	13.5 (vs 11.4)	Yes
Product placement (vs none)	7.8 (vs 5.0)	9.3 (vs 7.1)	Yes	8.3 (vs 8.7)	11.1 (vs 11.8)	No
Depiction (vs not)	6.2 (vs 7.8)	7.6 (vs 10.0)	No	6.4 (vs 9.9)	8.9 (vs 13.2)	No
TAPS strength						
Two-three measures* (vs none)	9.7 (vs 5.0)	11.5 (vs 7.1)	Yes	9.7 (vs 9.5)	13.2 (vs 11.7)	Yes
Four measures (vs none)	6.3 (vs 5.0)	7.5 (vs 7.1)	Yes	5.7 (vs 9.5)	8.8 (vs 11.7)	Yes

Reported percentages are estimated as predictive margins for the interaction term between indicators for the GYTS rounds and ban, considering both fixed and random effects, after the multilevel binary logistic regression models with random intercept for countries, unadjusted by respondents' age and sex. Number of observations: 124 822 survey respondents or 18 low-income and lower-middle-income countries; 140 197 survey respondents or 24 high-income and upper-middle-income countries. Significant differences in the degree of change are based on the alpha level of 0.05.

*None of the countries had implemented one TAPS measure.

GYTS, Global Youth Tobacco Survey; TAPS, tobacco advertising, promotion and sponsorship.

11.4% (95% CI 8.9 to 13.9) to 8.5% (95% CI 6.5 to 10.4). In low-income and lower-middle-income countries, the degree of decrease significantly differed between countries with versus without partial or full internet ban, ban on product placement and number of TAPS measures. In high-income and upper-middle-income countries, the degrees of decrease significantly differed between countries with a full internet ban versus those without it, and countries with several TAPS measures versus those with none.

When adjusting for respondents' age and sex (table 5), in low-income and lower-middle-income countries, the percentage of students surveyed who currently smoke decreased by 1.91 percentage points ($p < 0.001$): from 8.4% (95% CI 5.3 to 11.5) to 6.5% (95% CI 4.0 to 8.9); whereas in high-income and upper-middle-income countries: the decrease was 2.7 percentage points ($p < 0.001$): from 10.8% (95% CI 8.6 to 13.0) to 8.2% (95% CI 6.4 to 9.9) ($p < 0.001$). As shown on figure 1, there were significant differences in degree of decrease in current smoking prevalence in low-income and lower-middle-income countries with bans covering displays of tobacco products, partial internet ban, ban on depiction of tobacco products and by number of TAPS measures compared with countries without such bans. For example, in countries with bans covering displays of tobacco products,

2.1 percentage points fewer GYTS respondents were currently smoking compared with 1.7 percentage points in countries without such bans (table 5). In high-income and upper-middle-income countries, degree of decrease in current smoking prevalence among GYTS respondents differed significantly by implementation of partial or full internet ban, ban on product placement and by number of TAPS measures (figure 1). For instance, in countries with the ban on product placement, the decrease was 2.2 percentage points vs 3.4 points in countries without it (table 5). As shown in figure 1, the decrease in smoking was often smaller in countries with existing TAPS bans, as the smoking prevalence tended to be lower already in the previous GYTS round.

DISCUSSION

We examined differences in changes of cigarette smoking by youth in countries with and without TAPS bans required under Article 13 and if age, gender and country income level affect those changes.

We found a decrease in smoking among study participants from 42 countries. On average, the prevalence of cigarette smoking was 10.3% between 2006 and 2015 and was 8.2% between 2017 and 2020. Smoking prevalence was lower in low-income and lower-middle-income

Table 5 Adjusted prevalence of current smoking among GYTS respondents by country income level*

Regulations	Low-income and lower-middle-income countries			High-income and upper-middle-income countries		
	Prevalence of current smoking, %			Prevalence of current smoking, %		
	Latest GYTS	Previous GYTS	Significant difference in degree of change	Latest GYTS	Previous GYTS	Change difference in degree of change
	6.5 (95% CI 4.0 to 8.9)	8.4 (95% CI 5.3 to 11.5)	Yes	8.2 (95% CI 6.4 to 9.9)	10.8 (95% CI 8.6 to 13.0)	Yes
Ban covers display (vs not)	5.7 (vs 7.6)	7.8 (vs 9.2)	Yes	6.8 (vs 8.9)	8.5 (vs 11.9)	No
Internet ban						
Partial (vs none)	6.9 (vs 5.9)	7.4 (vs 8.0)	Yes	8.0 (vs 8.3)	9.6 (vs 11.0)	Yes
Full (vs none)	7.8 (vs 5.9)	9.7 (vs 8.0)	No	8.4 (vs 8.3)	12.9 (vs 11.0)	Yes
Product placement (vs not)	7.3 (vs 5.0)	9.5 (vs 6.5)	No	8.2 (vs 8.2)	10.3 (vs 11.6)	Yes
Depiction (vs not)	5.9 (vs 7.5)	7.2 (vs 10.4)	Yes	8.3 (vs 12.7)	8.3 (vs 12.7)	No
TAPS strength						
Two-three measures (vs none)	8.7 (vs 5.0)	12.8 (vs 6.5)	Yes	9.4 (vs 8.7)	11.6 (vs 11.7)	Yes
Four measures (vs none)	5.9 (vs 5.0)	7.0 (vs 6.5)	No	6.0 (vs 8.7)	8.8 (vs 11.7)	No

*Reported percentages are estimated as predictive margins for the interaction term between indicators for the GYTS rounds and ban, considering both fixed and random effects, after the multilevel binary logistic regression models with random intercept for countries, adjusted by respondents' age and sex. Number of observations: 118 588 survey respondents or 18 low-income and lower-middle-income countries; 135 969 survey respondents or 24 high-income and upper-middle-income countries. Significant differences in the degree of change are based on the alpha level of 0.05.
GYTS, Global Youth Tobacco Survey.

countries than in high-income countries. The results are consistent with a previous larger study,² which showed higher prevalence of cigarette smoking in high-income countries.³

Our results indicate greater reductions in smoking prevalence in high-income countries than in low-income and middle-income countries, while the latter had increased the number of TAPS bans during the last few years.²⁰ This seeming discrepancy might be explained by two factors: the stage of change of the smoking epidemic²¹ is much more advanced in high-income countries, reflected also in the youth smoking trends. Furthermore, the introduction of the WHO FCTC promoted tobacco policy measures in low-income and middle-income countries that had previously had fewer measures.²²

The current study found implementation of WHO FCTC Article 13 measures on TAPS had been significantly associated with a decrease in youth smoking prevalence. The finding aligns with a large study from 142 countries which showed that implemented TAPS bans are protective and decrease youth exposure to tobacco advertisement.²³ Additionally, higher income classification and WHO FCTC ratification has been contrarily associated with early cigarette smoking initiation.²³ When adjusted by respondents' age and sex, our results showed that implementation of two three TAPS measures were significantly associated with decrease in smoking in low-income and lower-middle-income countries, but implementation of four TAPS measures were not. It is possible

that when more measures are already implemented and smoking prevalence is lower, the improvement is harder to distinguish.

Less than half of the countries in our study had bans covering display and visibility of tobacco products at point of sales and bans covering domestic or global internet, and even fewer had bans on both. Corroborating earlier studies,²⁴ the results show the association between the adoption of the WHO FCTC measures and decreases in smoking prevalence.²⁵ These results suggest effectiveness of the WHO FCTC measures on youth tobacco use. Even though we cannot imply causality, tobacco control policies ensure or safeguard a country's trajectory of curtailing tobacco epidemic.^{26 27} Policies to reduce tobacco use reflect cultural commitment to ensure health of current and future generations.²⁸

Youth access entertainment media through diverse social media channels and streaming platforms, and the content is available regardless of country and location using smart phones, tablets and other devices. This provides a large market area for tobacco industry to promote products to youth.²⁹ Our results demonstrated a clear link between full internet bans (domestic and global) and reduction in use of combustible cigarettes among youth. This underlines the necessity to improve FCTC implementation to tackle cross-border TAPS.

The current study demonstrates that bans covering product placement as means of advertisement or promotion and bans covering depiction of tobacco or tobacco

Panel A. Low-income and lower-middle-income countries

Panel B. High-income and upper-middle-income countries

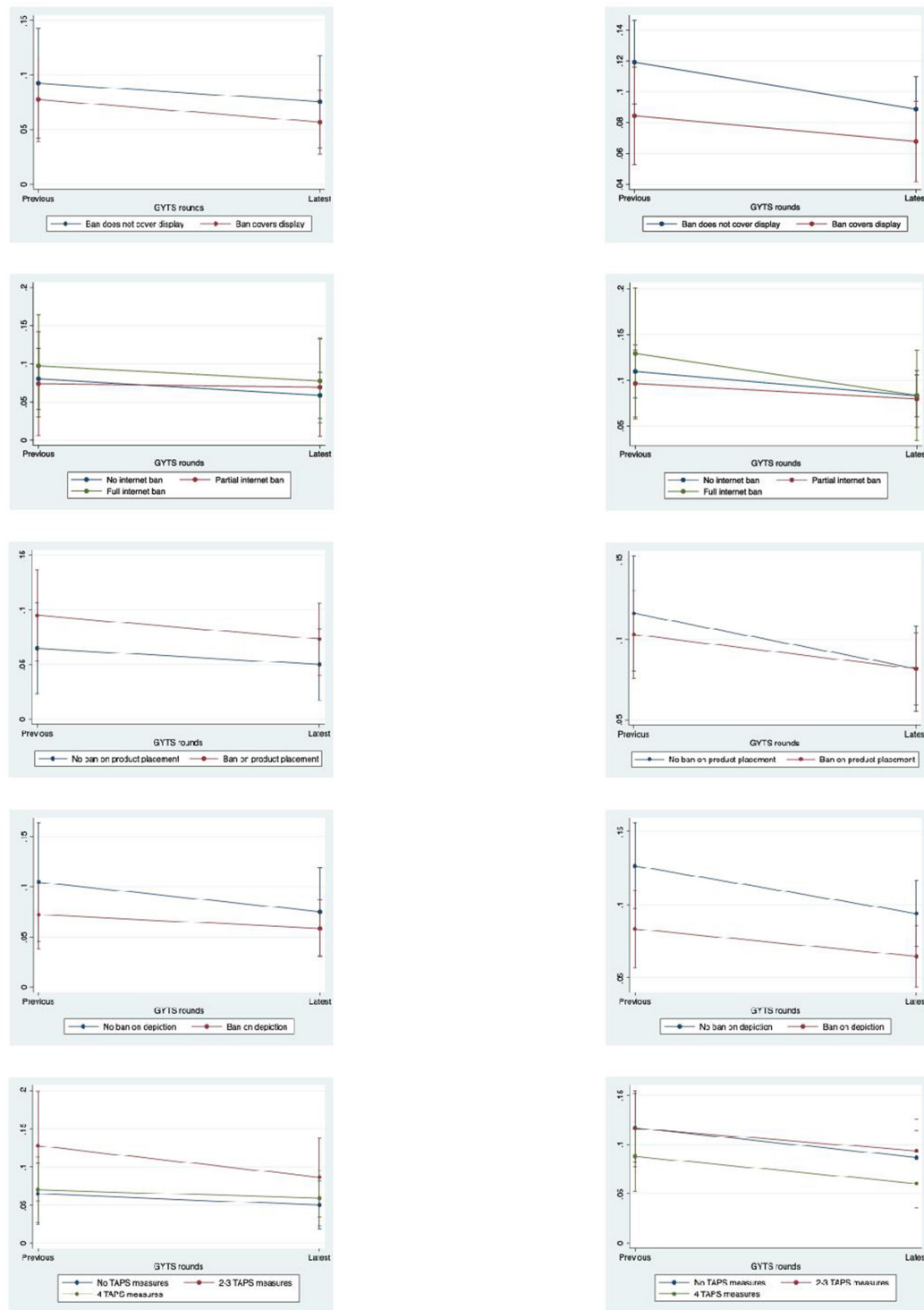


Figure 1 Proportion of Global Youth Tobacco Survey (GYTS) respondents currently smoking with 95% CIs, adjusting for age and sex in study countries. In adjusted models for (A): n=118 588 or 18 countries; for (B): n=135 969 or 24 countries. None of the countries had one tobacco advertising, promotion and sponsorship (TAPS) measure.

use in entertainment media products had been more frequently implemented among study countries versus other policy measures. According to WHO’s 2021 global progress report⁶ on implementation, while over half (n=103) of the parties had banned most TAPS, 19 parties

had implemented four or fewer TAPS measures and 45 countries had some restrictions but no bans. Progress is needed in most of Parties to implement a comprehensive TAPS ban.⁶ The purpose of the Global Strategy to Accelerate Tobacco Control is to guide the activities of the

parties to strengthen the implementation of the WHO FCTC, especially time-bound measures including TAPS bans by 2025, by setting clear priorities and by targeting effective means of assistance.³⁰

Strengths and limitations

Our study has several strengths. First, the study uses global survey data collected using standard procedures and methodology for the included countries, thus allowing cross-country comparisons and identification of development changes. Second, datasets for 42 countries, representing all 6 WHO regions were used (table 1). There are some limitations to this study. Our operational definition of current cigarette use included all respondents who reported having smoked one or more days in the past 30 days. This definition did not allow us to differentiate between daily versus occasional use. However, by defining current use as past month use, we were able to compare our findings with those from prior studies and WHO reports that have been operationalising current use as past month use. Since the definition of smoking includes both occasional smoking and daily smoking, future studies may examine whether the impact on attempts to smoke and occasional smoking differs from that of established daily smoking. Weights were not used so findings are not necessarily representative of all youth aged 13–15 years; however, our focus was on examining associations with policy regulations. Pre-post comparisons of smoking prevalence is not conducive to making causal inferences with respect to policy implementation. The selection of countries was based on the availability of data consistently collected in the latest two rounds of GYTS and FCTC TAPS reporting between the GYTS measurement points. Respondents in countries had different periods of exposure to TAPS bans; no data were available on the progress in implementing TAPS bans. The data on WHO FCTC implementation were based on self-reporting by the parties and were not collaborated through scrutiny of regulatory documents and their actual implementation.

CONCLUSIONS

Our study enriched the evidence base on the implementation of tobacco control policies impacting youth smoking. The results showed TAPS bans are associated with lower prevalence of smoking in later rounds of GYTS and there are some differences by income level. Continuous efforts are needed to protect youth from the promotion of tobacco smoking and other nicotine products by the tobacco industry.

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