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Self-reported exposure of Indonesian adolescents to online and offline tobacco advertising, promotion and sponsorship (TAPS)

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ABSTRACT

Objectives To quantify tobacco advertising, promotion and sponsorship (TAPS), self-reported exposure from online and offline platforms among adolescents in Indonesia.

Methods A cross-sectional school-based survey was conducted in 2017. In total, 2820 students aged 13–18 years were recruited from 22 schools in seven cities. Respondents reported TAPS exposure on online (online news, *YouTube*, *Facebook*, *Twitter* and *Instagram*), and offline platforms (broadcast media, tobacco industry sponsored events and outdoor advertising). For outdoor advertisements, respondents reported the locations where they were exposed. We used multilevel analysis to assess TAPS exposure by age, gender, smoking status and city.

Results Online TAPS exposure was high on *Instagram* (29.6%), and relatively low on *Twitter* (7.3%). Offline TAPS exposure was high via television (74.0%), billboards (54.4%) and live music events (46.2%), but low on radio (6.9%). In all cities, outdoor advertising was seen particularly on the streets and in minimarkets. Overall, TAPS exposure was higher among older than younger adolescents, boys than girls, and smokers than non-smokers.

Conclusions Overall TAPS exposure was high on both online and offline platforms. Banning online tobacco advertising, in addition to complete bans on outdoor and television advertising, is essential to adequately protect Indonesian adolescents from tobacco advertising.

INTRODUCTION

Exposure to cigarette advertising and promotion is associated with smoking uptake among adolescents.^{1–3} By the end of 2018, 131 countries worldwide had reported having complete bans on tobacco advertising, promotion and sponsorship (TAPS).⁴ However, low-income and middle-income countries primarily implemented partial TAPS bans, allowing the tobacco industry there to advertise via multiple media platforms. A large proportion of advertising is communicated through conventional media such as television, print media and outdoor advertising. However, an increasing proportion of it takes place online, on social media⁵ and at music and sports events which are increasingly popular.^{6–11} Moreover, social media is borderless and can reach out to the populations beyond a country's administrative borders. Adolescents may therefore be vulnerable to exposure to tobacco advertising from countries with insufficient legislation.

Indonesia has not signed and ratified the WHO Framework Convention on Tobacco Control (FCTC) and has limited restrictions on TAPS. At the national level, Indonesia has restricted tobacco advertising on broadcast media during the day since 2005, but it is still allowed during the night, from 09:30 PM to 05:00 AM.¹² Tobacco company sponsorship of activities involving children has been banned through national policy since 2012.^{12–13} Encouraged by the national government regulation, some districts have started implementing stricter TAPS bans, often in the form of partial outdoor advertising bans (eg, billboards and banners).¹³ Exposure to TAPS may therefore vary across districts and provinces in Indonesia. Only a few studies have estimated TAPS exposure in Indonesia. A survey of 10 Indonesian cities showed that cigarette advertising through graphic promotions was highly visible on the streets and in minimarkets across all 10 cities.¹⁴

Due to its lenient policy, many forms of advertising are still found in Indonesia. Previous studies have demonstrated that the tobacco industry targets young people.^{10–11} Even though the national sponsorship ban in 2012 is seemingly quite strict, the tobacco industry still sponsors music and sports events that involve children; a recent example from Indonesia was the sponsorship of a youth badminton player audition in 2019.¹⁵ A study from Bali, Indonesia, showed that advertising at the point of sale (PoS) is omnipresent, and tobacco companies link these offline campaigns to online content by using hashtags on their posters that refer to social media posts and accounts.¹¹ The use of online advertising is also demonstrated by a study from the USA, showing that each cigarette brand in the USA uses at least two social media platforms for promotion and posts approximately two new posts per week on *Facebook* and *Instagram*.¹⁶ Most of these online ads have no age restriction statement, which indicates that contents are visible to youth.¹⁶

Adolescent smoking prevalence in Indonesia increased from 7.2% in 2013 to 9.1% in 2018.¹⁷ Many Indonesian adolescents reported to notice cigarette advertising at PoS (65.2%), on television (56.8%), outdoor media (60.9%) and social media (36.2%).¹⁸ The Indonesian Ministry of Health proposed a ban on internet tobacco advertising in June 2019,¹⁹ arguing that the increase in smoking prevalence among Indonesia's youth is due to tobacco promotion on social media.¹⁸ However, the extent of exposure to TAPS among adolescents in Indonesia and the relative importance of social media advertising on specific platforms have

Table 1 Tobacco advertising, promotion and sponsorship bans (complete, partial or no) at national and regional levels in study area

	TAPS ban			10–19 years old population density (people/km ²)	
	Broadcasting (television and radio)	Outdoor bans			
		District	Province	Sponsorship	
National	Partial: cigarette commercials are not allowed from 09:30 PM until 05:00 AM (2005)	–	–	Partial: sponsorship is not allowed when involving children under 18 years old (2012)	–
City					
Malang		No	No	–	986.6
Pekanbaru		No	No	–	290.2
Pontianak		No	No	–	1015.2
Gorontalo		No	Partial: billboards are prohibited to exceed 72 m ² and in major arterial roads (2014)	–	458.2
Denpasar		Partial: outdoor billboards are not allowed (2013)	No	–	1123.8
Samarinda		Partial: billboards are prohibited to exceed 72 m ² and in major arterial roads (2012)	No	–	185.2
Cimahi		Complete (2017)	No	Complete (2017)	1919.3

not been quantified. To date, the proposed ban has not been adopted. Moreover, there is limited information available on who are most exposed and where exposure occurs most. This information is important in determining the future direction of Indonesia's TAPS bans.

This study aimed to assess self-reported exposure to TAPS among adolescents in Indonesia. Our specific objectives were as follows: (i) to assess to what extent adolescents were exposed to online and offline TAPS; (ii) to compare TAPS exposure among adolescents between selected cities and locations and (iii) to estimate exposure according to age, gender, and smoking status.

METHODS

Data collection, study design and participants

A cross-sectional school-based survey was conducted in March–June 2017 by the researcher (WS) and trained enumerators in seven Indonesian cities from five different islands among 2860 students aged 10–18 years old. Cities were purposively selected to reflect the variation in tobacco control policy between cities (see table 1 for TAPS bans in each city) and for similarity in terms of GDP per-capita which ranged from 2406 to 3720 US\$/person. Rural settings were not included in our study to maintain similarity in other respects as well. The population density of adolescents aged 10–19 years ranged from 185.2 (Samarinda) to 1919.3 (Cimahi) people per km.² In cities with partial outdoor TAPS bans, tobacco advertising is still allowed under certain

conditions (eg, in establishments of less than 72 m², not on the main arterial roads or within smoke-free areas), while in cities with complete bans, there are no exceptions for any forms of cigarette advertising. At the national level, there is a partial ban of tobacco industry sponsorship of music and sport events: it is prohibited if the event involves children and adolescents. Some cities completely prohibit the sponsorship of events regardless of age.

Using two-stage cluster random sampling, students were recruited from 22 public schools (see table 2 for division over cities). The schools were purposively selected to represent schools at varying distances to the City Hall. Selected schools were not situated in the same subdistrict. We invited 29 public schools with general education systems; seven schools did not participate due to national examinations around the time of data collection. In grades 7–9 of junior high school and 10–12 of senior high school (typical age range 13–18 years), at least one class within each grade was randomly selected (ie, minimum three classes per school, 134 in total). All students who were in the selected classes during the survey were invited to voluntarily participate. In line with the National Guidelines for Health Research Ethics for adolescents, written permission from all school principals was required before data collection, students gave written consent before starting the survey and parents were informed after the survey. As per the guideline (Ministry of Health Decision concerning Guidelines of National Ethics No

Table 2 Description of the individual's study sample stratified by city

Total	Malang	Pekanbaru	Pontianak	Gorontalo	Denpasar	Samarinda	Cimahi
Total number of schools	22	4	3	3	4	2	3
Total number of individuals	2820	479	467	463	437	240	267
Individual characteristics							
Age (in years)							
13–14	34.4	35.7	34.5	36.9	36.6	0*	47.8
15–16	37.6	44.0	15.4	42.1	50.8	44.6	29.9
17–18	28.0	20.3	50.1	21.0	12.6	55.4	22.3
Gender							
Female	58.5	58.5	64.5	49.7	41.2	57.5	46.7
Male	41.5	41.5	35.5	50.3	58.8	42.5	53.3
Smoking status							
Non-smokers	84.3	84.3	95.5	81.2	68.4	85.0	76.4
Smokers	15.7	15.7	4.5	18.8	31.6	15.0	23.6

*Students of seventh and eighth grades (13–14 years) in Denpasar, Bali, were not present during survey because of the examination days of ninth grade.

1031/Menkes/SK/VII/2005, the explanatory section of clause 14), active parental consent was not required, because our study was not a clinical trial. In order to give participants high confidentiality, teachers left the class during the survey and questionnaires were filled in anonymously. Before conducting the survey, we consulted a teacher on simplifying the language in the questionnaire, and pilot tested the questionnaire in a convenience sample of students in Jakarta and discussed any encountered difficulties. We also held a focus group discussion with a subsample of these students to discuss interpretations of the meaning of the questions in depth. All feedback was incorporated in the questionnaire, and we conducted a second pilot to test the revised questionnaire.

All students invited to participate in all classes consented to fill in the survey. All 2860 students present at the day of the survey filled in the self-administered questionnaire, no students left class during the survey. Participants who had no response on age and were below the age of 13 (3.2%), gender (0.4%) and smoking status (0.5%) were excluded from this study, resulting in an analytical sample of 2820 students.

Measures

Taps exposure

Respondents were asked, 'How often do you see or hear tobacco product advertisements on the following media?'. Response options for each media platform (including *YouTube*, *Facebook*, *Twitter*, *Instagram*, radio, television, billboards, outdoor banners and online news) were 'never', 'sometimes' and 'often'. For social media, the response option 'no account' was added and these respondents were categorised into 'never'. We also asked adolescents, 'How often do you see tobacco product advertisements in the following locations': on the street, near the school entrance, in public transportation, in the mall, in the minimarket, in the park and in places of worship. The same response categories of 'never', 'sometimes' and 'often' were used.

Tobacco sponsorship exposure was determined by two questions: 'Did you see any tobacco product advertisements during [sport/music] events?' Responses to these questions were 'no' and 'yes'. Students who had never been to music or sport event were asked to tick 'no'.

Individual characteristics

Individual characteristics included age, gender and smoking status. Adolescents were categorised into three age groups: 13–14, 15–16 and 17–18 years old. Gender distinguished boys and girls. Adolescents' smoking status was determined from the question 'How many cigarettes did you smoke in the last 30 days?'. Adolescents who responded 'never smoked' or 'none' were categorised as non-smokers, while those with any other response (ie, one cigarette or more) were categorised as current smokers.

Statistical analyses

First, the study sample's age, gender and smoking status were described, stratified by city. Second, adolescents' level of exposure to TAPS on each media platform was specified. For outdoor advertising, locations of exposure were additionally detailed. Third, the percentage of adolescents who were often exposed to outdoor advertising in different locations was specified by city. Fourth, exposure via each platform was described, stratified by individual characteristics. P values for the differences in TAPS exposure between groups of age, gender and smoking were estimated using the Wald test of multilevel (individual at

level 0, school at level 1 and city at level 2) logistic regression analysis through generalised structural equation model in Stata V.14.²⁰ Models estimating differences between smokers and non-smokers, and boys and girls were adjusted for age. A sensitivity analysis of TAPS exposure on social media platforms (ie, *YouTube*, *Facebook*, *Twitter* and *Instagram*) was performed in which we excluded respondents who did not have an account on the social media platform in question.

RESULTS

Table 2 presents characteristics of the study population stratified by city. The largest age group was 15–16 years old (37.6%), followed by 13–15 years old (34.4%) and 17–18 years old (28.0%). More than half of participants were female (58.5%). The smoking prevalence was 15.7% and varied by city, being highest in the samples from Gorontalo (31.6%) and Samarinda (23.6%), and relatively low in Pekanbaru (4.5%).

In **table 3**, TAPS exposure on various platforms and in different locations was assessed. Exposure via online media was high overall, especially on *Instagram* (29.6%), followed by *Facebook* (26.8%), online news (26.6%) and *YouTube* (23.7%). Not many students were exposed via *Twitter* (7.3%). Exposure to outdoor TAPS most often occurred through billboards (54.4%), and exposure was highest on the street (58.1%). Adolescents also reported being often exposed to TAPS in minimarkets (32.2%). However, not many respondents reported exposure near the school entrance (4.7%) and in places of worship (4.8%). Television was a major source of TAPS exposure (74.0%), while the exposure was low on radio (6.9%). Adolescents reported that tobacco industry sponsorship was often seen at live music (46.2%) and sport events (35.0%).

Table 4 shows the percentage of respondents who reported being often exposed to TAPS, stratified by city. Overall, differences of TAPS exposure from different channels between cities were inconsistent and relatively small. Differences in exposure through online platforms, outdoor advertising, broadcast media and by location were not significant across cities. In Pekanbaru, the exposure to advertising on the street was the highest of all cities (68.7%), but exposure in other locations was relatively low. Cimahi showed the highest level of reported exposure in public transportation (26.6%), malls (28.1%), minimarkets (38.2%) and parks (18.7%). Advertising exposure near the school entrance was relatively rare in all cities except for Denpasar (9.6%).

table 5 presents the percentage of being often exposed to TAPS stratified by adolescents' characteristics. In general, the exposure was higher among older than younger adolescents, boys than girls and smokers than non-smokers. Exposure on online platforms did not differ consistently by gender. Outdoor advertising exposure tended to be similar across groups defined by age, gender and smoking status. Exposure to television advertising only differed by age, with a lower exposure among younger adolescents. Exposure to sponsorship at music and sports events was less prevalent among younger adolescents and non-smokers, but was selected not consistently different by gender.

Online supplemental table 1 and online supplemental table 2 present the sensitivity analysis from results when respondents who did not have a social media account were excluded. The percentage often exposed was slightly higher in our sensitivity analysis, as some of the 'never exposed' without an account were excluded, but we did not observe large differences with the main analysis. The patterns across cities (online supplemental table 1)

Table 3 Frequency of exposure (in %) to tobacco advertising, promotion and sponsorship among adolescents on various platforms of media and locations (n=2820)

	N (%)			
	Not having account	Frequency of exposure		
		Never	Sometimes	Often
Internet				
Instagram	240 (8.5)	572 (20.3)	1173 (41.6)	835 (29.6)
Facebook	207 (7.4)	590 (20.9)	1267 (44.9)	756 (26.8)
YouTube	261 (9.2)	798 (28.3)	1094 (38.8)	667 (23.7)
Twitter	661 (23.5)	1447 (51.3)	505 (17.9)	207 (7.3)
Online news	–	1047 (37.1)	1023 (36.3)	750 (26.6)
Outdoor advertising				
Type of media				
Billboard	–	494 (17.5)	792 (28.1)	1534 (54.4)
Electric banner	–	1365 (48.4)	798 (28.3)	657 (23.3)
Location				
On street	–	271 (9.6)	911 (32.3)	1638 (58.1)
Minimarket	–	807 (28.6)	1105 (39.2)	908 (32.2)
Mall	–	1156 (41.0)	1072 (38.0)	592 (21.0)
Public transportation	–	1018 (36.1)	1224 (43.4)	578 (20.5)
Park	–	1379 (48.9)	1021 (36.2)	420 (14.9)
Places of worship	–	2448 (86.8)	237 (8.4)	135 (4.8)
Near school entrance	–	2327 (82.5)	361 (12.8)	133 (4.7)
Broadcast media				
Television	–	124 (4.4)	609 (21.6)	2087 (74.0)
Radio	–	1971 (69.9)	654 (23.2)	195 (6.9)
Tobacco industry sponsorship*				
Live music	–	1517 (53.8)	–	1303 (46.2)
Sport event	–	1833 (65.0)	–	987 (35.0)

*Responses were only 'no' and 'yes'.

Table 4 Percentage of adolescents who were often exposed to tobacco advertising, promotion and sponsorship on online and offline platforms, at outdoor and in different locations, stratified by city (n=2820)

	Cities							P value*	Variance (SD) [†]	
	Malang	Pekanbaru	Pontianak	Gorontalo	Denpasar	Samarinda	Cimahi		City	School
Internet										
Instagram	33.0	29.3	19.0	30.9	36.7	25.3	41.6	0.48	0.45 (0.19)	0.48 (0.12)
Facebook	31.3	17.7	28.3	28.4	17.5	32.6	27.7	0.97	0.14 (0.55)	0.74 (0.17)
YouTube	23.4	18.6	21.6	33.0	15.8	25.7	24.7	0.64	0.23 (0.13)	0.33 (0.10)
Twitter	7.1	6.6	5.0	12.1	6.7	5.1	9.7	0.82	0.25 (0.17)	0.39 (0.13)
Online news	23.8	28.9	24.0	29.1	29.2	25.3	29.1	0.51	0.01 (0.13)	0.31 (0.07)
Outdoor advertising										
Billboard	57.6	62.5	44.3	52.0	45.8	56.5	60.3	0.86	0.35 (0.20)	0.52 (0.13)
Electric banner	37.0	29.8	11.9	16.9	22.5	18.2	27.7	0.52	0.55 (0.21)	0.55 (0.13)
Broadcast media										
Television	76.0	73.0	73.2	74.4	68.8	71.7	81.7	0.97	0.15 (0.23)	0.28 (0.16)
Radio	5.4	7.9	5.2	8.0	10.8	6.4	6.4	0.54	0.14 (0.13)	0.11 (0.21)
Tobacco industry sponsorship[‡]										
Live music	49.5	41.1	35.6	52.9	49.6	43.0	58.8	0.21	0.22 (0.10)	0.23 (0.07)
Sport event	33.6	33.4	31.8	38.2	35.4	33.8	42.3	0.08	0.07 (0.07)	0.01 (0.09)
Locations										
On the street	63.3	68.7	49.5	48.3	47.1	59.7	68.2	0.93	0.64 (0.25)	0.61 (0.16)
Minimarket	34.9	37.5	26.3	25.6	32.1	32.8	38.2	0.36	0.32 (0.13)	0.32 (0.09)
Mall	20.5	22.3	17.1	20.4	22.1	20.1	28.1	0.12	0.27 (0.12)	0.27 (0.09)
Public transportation	20.7	21.6	19.7	15.8	18.3	22.1	26.6	0.52	0.36 (0.16)	0.41 (0.10)
Park	15.2	12.2	12.5	16.5	14.6	15.8	18.7	0.12	0.01 (0.26)	0.31 (0.08)
Places of worship	3.5	5.4	6.3	4.8	7.9	3.6	2.6	0.56	0.01 (0.24)	0.39 (0.13)
Near school entrance	1.9	6.2	3.9	6.9	9.6	2.6	3.7	0.67	0.50 (0.17)	0.01 (0.23)

*P value was derived from the Wald test in age-adjusted multilevel logistic regression model with no exposure versus often exposure through internet, outdoor advertising, broadcast media and tobacco industry sponsorship as the outcomes, and cities as independent variable.

[†]The variance in exposure between schools and cities, respectively.[‡]Responses were only 'no' and 'yes'.

Table 5 Percentage of adolescents who were often exposed to tobacco advertising, promotion and sponsorship, stratified by individual characteristics (n=2820)

	Age in years			P value*	Gender		P value*†	Smoking status		P value*†
	13–14	15–16	17–18		Girls	Boys		Non-smoker	Smoker	
Internet										
Instagram	23.9	32.2	33.2	<0.01	30.1	29.1	0.02	28.9	32.7	0.39
Facebook	23.1	30.4	26.6	<0.01	24.7	29.1	0.16	25.6	32.1	0.59
YouTube	20.6	28.1	21.5	0.12	19.3	28.4	<0.01	20.6	37.1	<0.01
Twitter	4.9	9.0	8.1	<0.01	5.1	9.8	<0.01	6.3	12.1	<0.01
Online news	22.4	28.3	29.5	0.02	27.9	25.2	0.02	26.4	27.5	0.99
Outdoor advertising										
Billboard	54.4	52.0	57.7	0.13	55.3	53.5	0.01	55.3	50.7	<0.01
Electric banner	22.6	22.6	25.3	0.13	23.0	23.7	0.01	24.1	19.9	0.85
Broadcast media										
Television	73.5	74.5	73.9	0.02	73.1	75.0	0.06	74.1	73.6	0.12
Radio	4.5	7.1	9.6	<0.01	6.4	7.5	0.54	6.5	8.6	0.33
Tobacco industry sponsorship‡										
Live music	37.5	47.8	54.7	<0.01	59.4	47.9	<0.01	42.9	60.6	<0.01
Sport event	28.5	36.4	41.1	<0.01	31.0	60.7	<0.01	33.7	40.7	0.04

*P value was derived from the Wald test in multilevel logistic regression model with no exposure vs often exposure.

†Responses were only 'no' and 'yes'.

‡Models comparing boys and girls, and smokers and non-smokers were adjusted for age.

and individual characteristics (online supplemental table 2) were similar to the main findings.

DISCUSSION

Key findings

We found that TAPS exposure among adolescents was frequent on online and offline platforms. Exposure to tobacco advertising was particularly high on offline media (ie, television and billboards), but also on online media (mostly *Instagram*). In all cities, outdoor advertising was seen especially on the streets and in minimarkets, but much less often near school entrances and in places of worship. Differences in TAPS exposure across age, gender and smoking status were fairly small and inconsistent, although overall, TAPS exposure was higher among older than younger adolescents, boys than girls and smokers than non-smokers. Differences in TAPS exposure between cities were not consistent, but reported exposures were relatively low in Pekanbaru and relatively high in Cimahi.

Interpretation of results

Tobacco advertising exposure was high on the streets and in minimarkets but was low in places of worship and near school entrances. This corresponds with a recent survey of 10 Indonesian cities that observed frequent outdoor advertising on streets and at the PoS, but not in places of worship and near schools¹⁴ and with Astuti *et al* who found that at the PoS tobacco advertisements are often displayed and that retailers regularly sell cigarettes to young people.¹¹ Due to TAPS bans being partial, the tobacco industry shifts its strategy to optimally use those advertising options that are still legal, which include streets, minimarkets, kiosks and malls. By linking campaigns in minimarkets to advertisements on social media and tobacco companies' websites, the industry increases its reach among young people.¹¹ The importance of PoS for tobacco advertising was also reported in Vietnam, where after the 2007 TAPS ban, PoS advertising became the second most important medium for tobacco promotion after the internet.^{21 22} Banning advertising from shops in Indonesia is therefore highly recommended.

Due to the absence of advertising ban for online platforms, tobacco industry has expanded tobacco advertising to these

platforms. Many tobacco advertisements in Indonesia display courageous, sporty images and hashtags that link to promotions on online platforms.^{11 14} This strategy seems designed to appeal to the younger generation target market, among whom advertising exposure on online platforms was high. Indonesia is the fourth biggest country in terms of its social media users after the USA, India and Brazil. About 15% of Indonesia's 150 million active social media users is 13–17 years old.²³ Algorithms used by social media platform target advertising based on users' data such as demographics and website visits. As a result, adolescents who often visit websites, forums and groups or click hashtags that promote smoking, may increase tobacco advertising in their social media timeline. Banning advertising on online platforms is an important step in reducing TAPS exposure among adolescents, especially since there is a general shift of marketing activity from the offline to the online realm.^{11 24}

Of all media platforms included in this study, exposure to tobacco advertising on television was particularly high; more than 95% of adolescents reported having seen tobacco advertising on TV at least sometimes. The national ban on TV tobacco advertising during the day clearly did not adequately protect adolescents from being exposed.^{13 25} Adolescents in this study are likely to be exposed to tobacco commercials after 09:30 PM. Notably, as tobacco companies are prohibited from showing direct images of smoking and tobacco products in their TV commercials, the commercials instead link tobacco brands to fun, adventurous, self-confident lifestyles,¹⁴ with adolescents now recognising these as tobacco advertising. More comprehensive policies to ban TV advertising in Indonesia are required.

For some media platforms, adolescents reported relatively low exposure, for example radio and *Twitter*. One obvious explanation may be the lower use of these media by adolescents compared with for example TV or *Instagram* although *Twitter* is still popular among Indonesian adolescents. In Indonesia, the *Twitter*'s growth was the highest at global scale (41%) in 2018, the majority of users are in population aged 16–24 years, and 76.6% students in our study had accessed to it.²⁶ However, exposure on *Twitter* was also relatively low among respondents with a *Twitter* account. *Twitter*'s algorithms prioritising most popular tweets and tweets from people who users often interact seem

less effective for tobacco advertising. Another difference with other platforms is the lower use of visuals. Visuals are essential in advertising and promotion to attract potential customer²⁷ as the human brain can process graphical content faster than audio or written text. However, graphical contents are increasingly more used on *Twitter* as well. Young people are more susceptible to cigarette advertising with visual elements,²⁸ and images may be more memorable. Banning graphical tobacco promotions is important in preventing positive perceptions among adolescents towards tobacco products.

Differences in TAPS exposure between cities were relatively small. We did not find that the exposure was lower in cities with stronger TAPS bans: even though Cimahi had the strongest policies it also had one of the highest levels of exposure. This may be due to the recent implementation of the TAPS ban in Cimahi,²⁹ where high levels of TAPS before implementation may have driven policy adoption. Outdoor cigarette advertising was restricted earlier in Denpasar and Samarinda, where billboards have been restricted on major arterial roads in particular.^{30 31} However, despite these outdoor advertising bans, exposure on the streets was not consistently lower in Denpasar and Samarinda compared with other cities. A recent study from Botswana found that a partial TAPS ban did not reduce TAPS exposure among adolescents within the first 4 years of its implementation in 2004.³² On the other hand, a study from Vietnam found that the implementation of comprehensive TAPS ban policies in 2007 significantly reduced adolescent exposure to outdoor TAPS from 53.6% in 2007 to 11.5% in 2014.³³ Local bans on advertising in outdoor spaces, PoS and public transport in Indonesia are mostly partial, frequently violated³⁴ and not sufficiently enforced.¹⁴ This will need to be improved for these bans to contribute to smoking prevention.

Although TAPS exposure was high in all subgroups, older adolescents, boys and smokers generally reported higher exposure than younger adolescents, girls and non-smokers. Studies from India and Vietnam also reported particularly high TAPS exposure among boys and smokers.^{33 35} Among Asian countries and in Indonesia particularly, smoking is more prevalent among male adults and adolescents than among females.^{21 36–38} This gender divide is reflected in and perhaps magnified by tobacco advertisements, which are mostly targeting boys with images of masculinity and adventurous behaviour.³⁹

We observed high exposure to sponsoring at music and sport events, despite the national ban on tobacco sponsoring of events involving minors.¹³ Many music events in Indonesia are still sponsored by tobacco companies.⁴⁰ Adolescents may attend these events, because age is not checked at admittance. Moreover, tobacco companies still use sponsoring of events to show their 'goodwill' and support for the community.⁴¹ Sports events often welcome these funds, and among the general Indonesian public, it is not considered a problem if such sponsoring takes place.⁴² In 2019, when the National Commission of Indonesian Child Protection (KPAI) rebuked a tobacco company sponsoring a youth badminton audition, the tobacco company countered by cancelling the audition and thus evoking a public outrage towards the KPAI.¹⁵

The lack of implementation and enforcement of tobacco advertising bans and the general public's acceptance of tobacco advertising in Indonesia hampers effective tobacco prevention among adolescents. The continued increase in smoking prevalence among adolescents underlines the need for more and stronger tobacco control policies, among which the restriction of the tobacco industry's advertising opportunities is essential. It is imperative that current partial TAPS ban policies at

national and local levels are transformed into a comprehensive TAPS ban in order to reduce and prevent high TAPS exposure. This reformation can be petitioned through a strong community participation. It also has been demonstrated that a strong antitobacco coalition is key for a successful tobacco control,⁴³ consisting of NGOs, unions of race, religious groups and individuals. The coalition aims at supporting the implementation of tobacco control policies and protecting public health policymaking from tobacco industry involvement.⁴³ Moreover, the WHO FCTC is required to be ratified by the Indonesian government so commitment to tobacco control including TAPS ban is strengthened.

Limitations

In interpreting the results of this study, some potential limitations need to be taken into account. First, our sample was derived only from urban settings and did not include adolescents from rural settings. Consequently, our study may not be generalisable to all areas in Indonesia. We may expect that exposure to TAPS is higher in urban areas than in rural areas, as the population density is higher and there are more advertising opportunities for tobacco companies. Second, due to the measurement of exposure through self-reports, we cannot rule out observation and recall bias, which may have led to an overestimation or underestimation of TAPS exposure. Underreported exposure may also be resulted from adolescents who did not recognise the tobacco advertising. Third, the questions regarding TAPS exposure did not indicate the period over which exposure should be reported. The question may therefore have been interpreted as lifetime exposure or as the general level of exposure over the past few weeks. This means that we cannot be certain whether in cities with TAPS bans exposure reflects levels after implementation of

What this paper adds

- ▶ High exposure to tobacco advertising, promotion and sponsorship (TAPS) is a risk factor for smoking initiation among adolescents.
- ▶ In Indonesia, as in many low-income and middle-income countries, TAPS bans remain weak, allowing the tobacco industry to advertise tobacco products via conventional media such as television, print media and outdoors.
- ▶ Additionally, the tobacco industry actively promotes cigarettes on social media, which are not covered by existing TAPS bans.
- ▶ The extent of exposure to TAPS among adolescents in Indonesia and the relative importance of social media advertising have not been quantified.
- ▶ Moreover, there is limited information available on who are most exposed and where exposure occurs most.
- ▶ We found that large proportions of Indonesian adolescents were exposed to TAPS offline (via TV, billboards, live music events) and online (mostly via *Instagram*), but that exposure was relatively low on radio and *Twitter*.
- ▶ Exposure was high across all seven studied cities, despite some cities having adopted local bans on outdoor tobacco advertising.
- ▶ Exposure via TV was high (74%) despite a national partial ban on TV tobacco advertising.
- ▶ These findings imply that more comprehensive and well-enforced TAPS bans are needed.

these bans or also before implementation. Fourth, our survey did not measure how often adolescents accessed social media platforms in a certain period of time, independent of whether they had an account. Therefore, we could not measure TAPS exposure by frequency of accessing social media.

Conclusion

As high exposure to tobacco advertising and sponsoring was observed among Indonesian adolescents, strengthening of the currently partial TAPS bans is needed, especially on television, outdoors and at PoS. TAPS bans should be comprehensive and include bans on visual (ie, images, videos) promotions. A TAPS ban on online platforms is therefore necessary to reduce the high online TAPS exposure. Reinforced TAPS bans will need continuous monitoring, enforcement and evaluation to be effective in reducing adolescents' exposure to TAPS.

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