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Effectiveness of tobacco advertising, promotion and sponsorship bans on smoking prevalence, initiation and cessation: a systematic review and meta-analysis

Christina Saad, Brandon (Hsu-Chen) Cheng, Ryo Takamizawa, Arya Thakur, Chae-Weon Lee, Lachlan Leung, J Lennert Veerman, Leopold Ndemnge Aminde

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Griffith University School of Medicine and Dentistry, Gold Coast, Queensland, Australia

Correspondence to
Christina Saad;
christina.saad@griffithuni.edu.au

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ABSTRACT

Background Bans on tobacco advertising, promotion and sponsorship (TAPS) have the potential to influence smoking behaviour. However, many countries are yet to implement such strategies.

Objective This study aimed to synthesise contemporary evidence on the effectiveness of TAPS bans on smoking prevalence, initiation and cessation.

Data sources Medline, EMBASE, Scopus, Cochrane Library and Web of Science databases were searched up to 11 April 2024. Sixteen eligible studies were included.

Data selection and extraction Two reviewers independently screened each study and extracted relevant data. Quality assessment was performed in duplicate using the ROBINS-I tool. Discrepancies were resolved via consensus or a third reviewer. Random effects meta-analyses were conducted for reasonably comparable studies.

Data synthesis The meta-analyses showed that TAPS bans were associated with a lower prevalence of current smoking (pooled OR= 0.80, 95% CI 0.68 to 0.95, I^2=98.7%) and a reduced risk of smoking initiation (pooled HR=0.63, 95% CI 0.48 to 0.82, I^2=95%). There was no association between TAPS bans and smoking cessation (pooled OR=1.10, 95% CI 0.86 to 1.40, I^2=58.5%). Subgroup analyses revealed the effects of TAPS bans on smoking prevalence differed by duration of evaluation (p<0.01).

Conclusions This review showed that TAPS bans were associated with a 20% lower odds of current smoking and a 37% reduced risk of smoking initiation. The available evidence suggests that TAPS bans influence smoking behaviour, which strengthens calls for the implementation and enforcement of these policies.

INTRODUCTION

Tobacco smoking remains a leading cause of preventable death globally with approximately 1.2 billion people regularly smoking tobacco[1] and an estimated 7.7 million deaths in 2019.[2] To help curb this significant public health problem, WHO developed MPOWER, which provides six measures to guide countries in the effective implementation of tobacco demand-reduction strategies as outlined in the Framework Convention on Tobacco Control (FCTC).[2 3] Among these measures are tobacco advertising, promotion and sponsorship (TAPS) bans. Under Article 13, Parties to the FCTC are required to implement a comprehensive ban on tobacco advertising, promotion and sponsorship.[2] Tobacco advertising and promotion refers to 'any form of commercial communication, recommendation or action with the aim, effect or likely effect of promoting a tobacco product or tobacco use either directly or indirectly'.[4] Sponsorship of cigarette products is 'any form of contribution to any event, activity or individual with the aim, effect or likely effect of promoting a tobacco product or tobacco use either directly or indirectly'.[4] Direct TAPS largely includes the use of television, radio, social media platforms, print publications, billboards and point-of-sale (POS) retail outlets, while indirect TAPS includes (but is not limited to) promotional discounts, free distribution of products, brand sharing, brand stretching (using an existing well-known brand name to market a new product or enter new markets), free distribution and the sponsorship of musical and sporting events.[5]

Systematic reviews have demonstrated that exposure to POS marketing is associated with increased susceptibility to smoking, cigarette cravings and impulse purchases.[6 7] Hence, policies that prohibit TAPS are likely to influence smoking behaviour. Implementation levels of comprehensive TAPS bans are much lower across Parties to the FCTC, compared with other articles in the treaty.[8] Despite 145 Parties reporting that they had a comprehensive TAPS ban, only 17 of 182 Parties have implemented comprehensive bans of all listed types of TAPS according to the WHO FCTC. One hundred and five parties have banned most means of TAPS, 23 have banned one to four types of TAPS, while 37 Parties, mostly in low- and middle-income countries (LMICs), apply only restrictions or no TAPS bans at all.[8] Comprehensive TAPS bans are crucial for preventing the tobacco industry's aggressive attempts at undermining the legislation often through social and digital media, POS and event sponsorship.[9] The tobacco industry has a long track record of undermining WHO's tobacco control efforts, finding tactics to continue promoting their products, particularly through marketing loopholes (including POS and social media),[9 10] legal challenges to policy and influencing political change.[11]

Most of the evidence on the effectiveness of TAPS bans has focused on the impact on tobacco consumption.[12–14] It is estimated that independent of other tobacco control interventions, TAPS bans reduce tobacco consumption by up to 7%.[12] By limiting the avenues through which tobacco companies promote their products, TAPS bans can be similarly expected to reduce the risk of smoking initiation among never users, mitigate relapse

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among quitters and reduce the overall prevalence of people who smoke.[9] Available estimates of the effect of advertising bans on smoking prevalence are from a literature review published in 2018 by Levy and colleagues, who estimated that advertising bans can reduce smoking prevalence by 4% (2–6%) in the short-term and 6% (3–9%) in the long term.[5] However, these prevalence changes are based on an assumption that half the reduction in per capita consumption due to TAPS bans[15] can be attributed to decreased prevalence. Hence, there is need for empirical evidence quantifying the effectiveness of TAPS bans.

Data from systematic reviews are also scarce. In a systematic review published in 2012, Wilson *et al* analysed the impact of tobacco control interventions on smoking initiation, cessation and prevalence and noted a significant lack of direct evidence quantifying the effects of bans on advertising and sponsorship.[16] Similarly, another review published in 2015 could not draw conclusions between POS display bans and smoking prevalence due to the limited number of studies.[7] It can be argued that the existing conclusions are dated and might not reflect the contemporary evidence.[9 17]

The media and advertising landscape is evolving, with social media platforms serving as a means for tobacco companies to expose users to tobacco imagery.[9] These cross-border forms of TAPS can provide the tobacco industry with a way to bypass existing legislation.[9] As such, policymakers need contemporary and robust evidence to guide efforts to implement de novo, or to adapt and enforce existing TAPS bans. Thus, this systematic review aims to address this evidence gap by updating the literature and addressing the research question: In the global general population, what are the effects of TAPS bans on current smoking prevalence, initiation and cessation?

METHODS

Protocol registration

The protocol for this review was preregistered in PROSPERO (CRD42023406642). The full review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (online supplemental material appendix A).[18]

Search strategy

A comprehensive search of Medline, EMBASE, Scopus, Cochrane Library and Web of Science was conducted from inception to 10 March 2023, with an updated search conducted on 11 April 2024. A search strategy was developed using relevant medical subject heading (MeSH) terms combined with Boolean operators, and exploding key terms 'tobacco prevalence', 'smoking behaviour', 'advertising', 'promotion' and 'sponsorship'. The detailed search strategy is provided in online supplemental appendix B.

Eligibility criteria and screening

Table 1 provides the eligibility criteria used to include studies for this review. Following the database search, all records were uploaded to the Covidence online collaborative platform,[19] and duplicates were removed. Two pairs out of the following reviewers (CS, BC, RT, AT) independently screened the titles and abstracts of each record. The full texts of potentially eligible studies were also retrieved and screened by two reviewers independently, and all conflicts were resolved via consensus or the arbitration of a third reviewer (LNA). Cohen's κ was used to assess inter-rater reliability between reviewers. The κ rating was 0.59, representing moderate agreement between the reviewers.[20] The reference lists of included studies were screened for additional studies.

Data extraction

A prespecified data extraction tool was developed in Microsoft Excel. The following items were extracted from the included studies; general characteristics: year of publication, surname of first author, country, age (mean and range) of study participants, proportion of females; study characteristics: study design, study setting, sampling method, data sources, sample size, period of data collection, definition of current smoking, smoking initiation and smoking cessation as reported by the authors; intervention: description of TAPS ban intervention (for instance, advertising, POS, marketing, sponsorship) and control (where applicable), timing of the ban and nature of the bans (comprehensive or partial). Comprehensive bans were defined according to WHO FCTC guidelines as bans covering all advertising, promotion and sponsorship, including, direct and indirect TAPS, acts that aim at promotion or likely to have a promotional effect, tobacco promotion, commercial communications, contribution of any kind to any event, activity or individual, tobacco brand name advertising, promotion and corporate promotion and advertising via traditional media and all media platforms (including the internet, mobile phones, films and other new technologies).[21] Outcomes: prevalence (95% CIs) of current smoking,

Table 1 Inclusion and exclusion criteria for the systematic review

Criterion	Studies eligible for inclusion and exclusion
Study design	Inclusion: observational and interventional studies with relevant outcome data on the effectiveness of TAPS bans. including (repeated) cross-sectional studies, case–control studies, cohort studies, time series analysis, quasi-experimental and (cluster) randomised controlled trials. Studies were included if they reported outcome data before and after the implementation of a TAPS ban (with or without a control group) Exclusion: ecological studies, editorials, letters to the editor, studies with unclear or lacking explicit description of methods, commentaries and studies with fewer than 30 participants
Sample population	Inclusion: general population of any age
Intervention/exposure	Inclusion: comprehensive or partial bans on tobacco advertising, promotion, or sponsorship
Comparator	Inclusion: no intervention or current practice. For studies with a control group, the control group was considered the comparator, while for studies without a control group, the baseline data (pre-TAPS ban) were considered comparators
Outcomes	Inclusion: changes in smoking prevalence, changes in quit rates and changes in initiation rates; measures of association linking TAPS bans to any of these three outcomes (or studies providing enough data to compute these) Exclusion: studies with incomplete data. Studies without relevant data to quantitatively assess the effect of TAPS bans on the outcomes.
Language	No restrictions
Publication date	Inclusion: all published and unpublished literature up to 11 April 2024.

TAPS, tobacco advertising, promotion and sponsorship .

smoking initiation and smoking cessation before and after the ban, percentage change in smoking variables or measures of association (odds ratios [OR], risk ratios [RR], hazard ratios [HR]) between TAPS bans and smoking outcome variables, confounders and other variables adjusted for in the multivariable models and analytical method used were also extracted. A third round of data checking was conducted by two other reviewers to ensure accuracy of the extracted data.

Quality assessment

Two authors independently evaluated the quality of each included study using the Cochrane Risk of Bias In Non-Randomised Studies—of Interventions (ROBINS-I) tool.[22] In line with Cochrane guidance, the tool was adapted to reflect the three broad categories of non-randomised studies of interventions: follow-up study, uncontrolled before–after and controlled before–after studies.[23] This tool assesses studies based on seven domains: bias due to confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes and selection of the reported result. Any discrepancies were resolved via consensus.

Statistical analyses

Random-effects meta-analyses were conducted to estimate the impact of TAPS bans on smoking outcome variables. To be included in the meta-analysis, studies needed to report effects for the general population, with comparable measures of association for outcomes explicitly measured before and after the TAPS ban. For current smoking, most studies reported the OR of current smoking postintervention compared with preintervention. Where available, prevalence data was used to calculate the OR, which was used in the analysis. Relative change in the prevalence of smoking was estimated using the following formula: $\frac{Prev_{T2} - Prev_{T1}}{Prev_{T1}}$, where $Prev_{T1}$ is the prevalence of smoking before the TAPS ban and $Prev_{T2}$ is the prevalence of smoking after the TAPS ban and reported for individual studies. However, where authors used regression models to estimate the relative change in smoking prevalence and adjusted for confounders, we extracted and reported these adjusted estimates. For smoking cessation, all but one study reported ORs.[24] Hence, for consistency in the meta-analysis, the RR of that study was converted to OR before pooling the results.

Heterogeneity was assessed using the Cochran's Q test and quantified using I^2 statistic. Any I^2 values <30%, 30–49%, 50–74% and ≥75% represented low, moderate, substantial and considerable heterogeneity, respectively.[23] Subgroup analyses were conducted to investigate potential sources of heterogeneity using the following variables: study design, study quality/risk of bias, period of evaluation of intervention, coverage of the ban (partial vs comprehensive), geographical region, country income level, age (adolescent vs adult vs both) and definition of current smoking. We used the Q-test, which is based on an analysis of the variance across subgroup effects relative to the variance within subgroups to test for between group differences.[25] Studies that could not be meta-analysed were qualitatively examined. Sensitivity analysis was performed to assess the effects of TAPS bans on smoking prevalence, excluding studies that did not report handling of missing data. Publication bias was assessed using Egger's regression test and visualised with a funnel plot. All statistical analysis were conducted using R Studio (R Foundation for Statistical Computing, Vienna, Austria; version 4.2.3).

RESULTS

Study selection

The search yielded 18 800 studies, from which 6411 duplicates were excluded. A further 12 232 irrelevant records were excluded during title and abstract screening. Of the 150 full texts retrieved and examined, 135 were excluded with reasons provided in the PRISMA flow diagram (figure 1).[26] Citation searching and examination of prior systematic reviews yielded one additional study resulting in the final 16 studies included in this review.

Study characteristics

Study designs and setting

Of the 10 studies examining current smoking prevalence, there were six uncontrolled before–after studies,[27–32] one controlled before–after study[33] and three interrupted time-series analyses[34–36] (table 2). Three follow-up studies[37–39] and one uncontrolled before–after study[29] analysed smoking initiation (table 3). Two follow-up studies[24 40] and one uncontrolled before–after study[41] analysed smoking cessation (table 4).

Overall, four studies[28 32 33 41] were multi-country analyses (including mainly European countries[28 33 41], and a mix of 42 countries[32] across Africa, the Americas, Eastern Europe, Eastern Mediteranean, Southeast Asia and Western Pacific regions), two studies each from Australia,[30 31] Canada,[24 40] and Ireland,[34 36] and one each from New Zealand,[29] Scotland,[38] England,[35] the United States of America,[27] Chile[37] and Poland.[39]All 16 studies were published in the English language.

TAPS ban coverage and components

In terms of TAPS ban coverage, 9 of the 10 studies on the current smoking prevalence outcome evaluated partial TAPS bans,[27 29–36] while the remaining one evaluated comprehensive bans[28] (table 2). For smoking initiation, three studies evaluated partial bans[29 37 38] while the other evaluated a comprehensive TAPS ban[39] (table 3). All three studies assessing smoking cessation outcome evaluated partial TAPS bans[24 40 41] (table 4). Eight studies analysed POS bans only,[24 30 33–36 38 40] three explored advertising, POS, promotion and sponsorship bans,[29 31 39] two analysed advertising bans only,[37 41] and one each examined POS and sponsorship bans, POS and promotion bans,[27] and advertising and promotion bans.[32]

Duration of evaluation of TAPS bans

For studies that examined current smoking prevalence, two analysed the intervention over a period of <5 years,[29 30] five over a period of 5–10 years[27 32 33 35 36] and three over more than 10 years.[28 31 34] Smoking initiation was evaluated over a period of <5 years for two studies[29 38] and >10 years in the other two analyses.[37 39] All three studies examining smoking cessation evaluated the intervention over a 5–10 year period.[24 40 41]

Effect of TAPS bans on current smoking

Overall, the weighted average absolute change in smoking prevalence post-TAPS ban compared with pre-TAPS ban was −3.9%, while the weighted average relative change in smoking prevalence was −23.4% (see online supplemental table S1).

Meta-analysis

The meta-analysis of crude and adjusted ORs showed that implementation of TAPS bans was associated with a significant reduction in the odds of current smoking post-ban compared with pre-ban (pooled OR=0.84, 95% CI 0.75 to 0.93, eight studies,

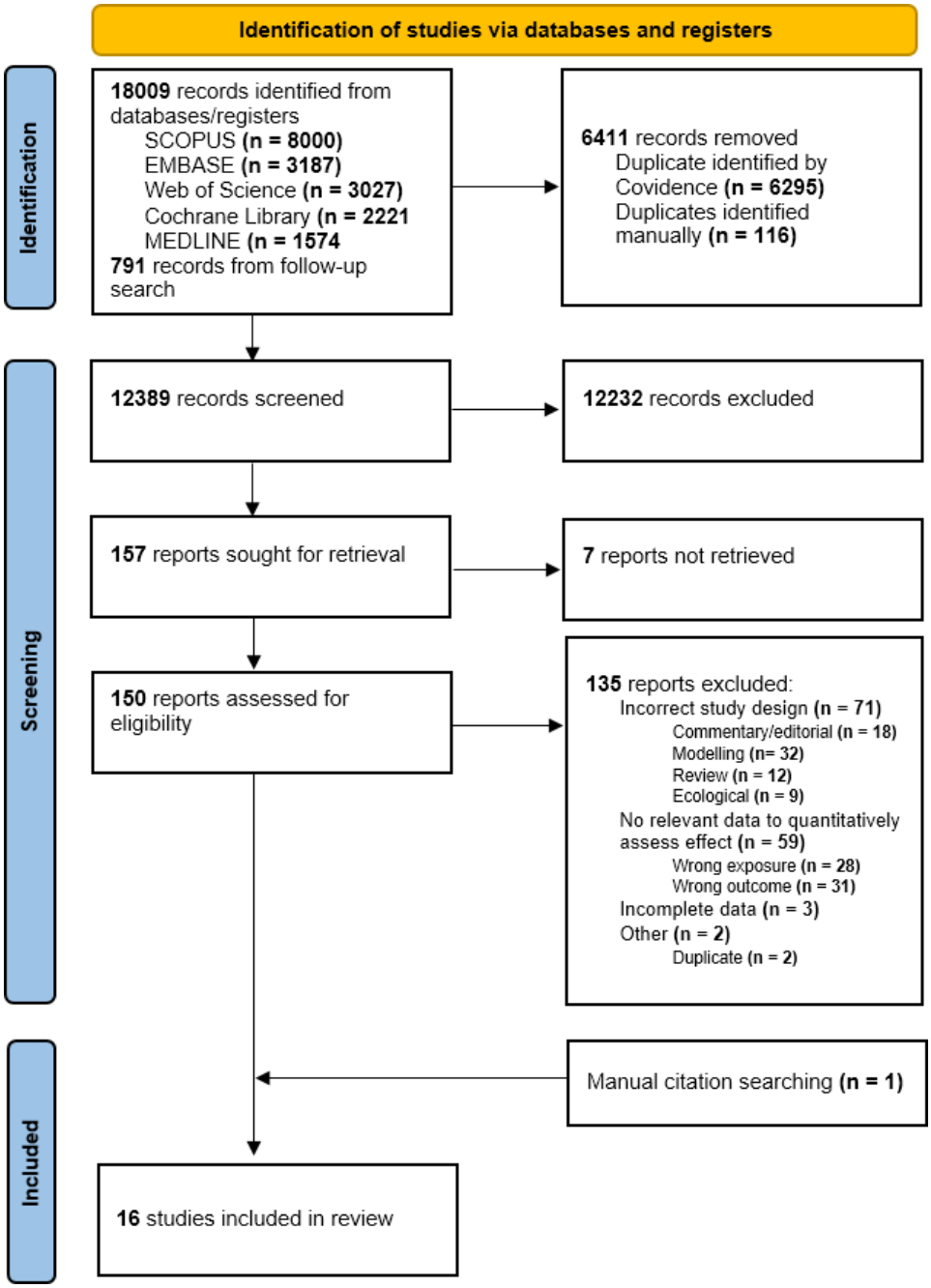

Figure 1 Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) diagram summarising the study selection process.

I^2=98%) (see online supplemental figure S1). After excluding three studies with crude ORs and considering only those that adjusted for confounding and/or co-occurring tobacco control interventions, the meta-analysis showed a 20% lower odds of current smoking post-TAPS ban compared with pre-TAPS ban (pooled aOR=0.80, 95% CI 0.68 to 0.95, five studies, I^2=99%) (figure 2). Sensitivity analysis excluding studies that did not report handling of missing data had a similar effect on smoking prevalence (aOR=0.78, 95% CI 0.65 to 0.93, two studies, I^2=87%) (online supplemental figure S2).

The subgroup analysis showed that the effects of TAPS bans on current smoking varied by the study evaluation period (aOR=0.84, 95% CI 0.77 to 0.91, for <5 years; aOR=0.74, 95% CI 0.72 to 0.76, for studies evaluating a 5–10 year period; and aOR=1.03, 95% CI 1.01 to 1.05, for studies evaluating effects over >10 years; p value for between-group difference <0.01). In terms of TAPS ban component, studies evaluating only POS bans showed a reduction in the odds of smoking post-ban of 29% (aOR=0.71, 95% CI 0.65 to 0.79), while multicomponent TAPS bans reduced the odds of smoking post-implementation by up to 16% (aOR=0.84, 95% CI 0.72 to 0.97). However, there was no difference between the groups (p=0.08).

Subgroup analysis by study design found a significant difference when adjusted and crude ORs were analysed (OR=0.85, 95% CI 0.74 to 0.98 for uncontrolled before–after design; OR=0.71, 95% CI 0.64 to 0.79 for controlled before–after design; and OR=0.87, 95% CI 0.84 to 0.89 for interrupted time-series design; p value for between-group difference <0.01), but no significant difference when only adjusted ORs were included. When considering crude and adjusted ORs combined, there was

Table 2 Summary of studies reporting the impact of tobacco advertising, promotion, and sponsorship (TAPS) bans on smoking prevalence post-ban compared with pre-ban

Author (year), country	Study design	Data sources and period of data collection (sample size)	Age range; (% female)	Intervention description (coverage of the ban*)	Definition of current smoking	Analytical method and results	Variables adjusted for in analysis
Pearlman (2019), USA[27]	Uncontrolled before–after	Annie E Casey Foundation Evidence2Success Youth Experience Surveys in 2012, 2016 (n=2062), 2018 (n=2223)	15–18 years	Point-of-sale ban, ban of promotional discounts (partial)	Smoking within 30 days of the survey	Descriptive and one-way ANOVA. The prevalence of smoking decreased from 3.2% in 2012 to 3.0% in 2018. *Calculated relative change: –6.3%*	None
Hu (2017), Finland, Ireland, Great Britain, Austria, The Netherlands, France, Italy, Portugal, Spain[28]	Uncontrolled before–after	Period and sample size varies according to country† Multiple surveys used‡	30–79 years	Comprehensive advertising and promotion bans, smoking bans or restrictions, health warning labels, cessation services (comprehensive)	Daily or occasional smoking in all countries (only daily smoking included in Austria)	Multivariable logistic regression with fixed effects analysis calculated the OR among the total population 0.95 (95% CI 0.91 to 0.99) Sex-specific analysis adjusting for confounders showed OR for men at 0.99 (95% CI 0.89 to 1.09) and women 0.95 (95% CI 0.91 to 1.12)	Cheapest cigarette price, age, age squared, GDP, time periods and country dummies
Li (2020), Ireland[34]	Interrupted time series	The European School Survey Project on Alcohol and Other Drugs (ESPAD) survey (waves 2007, 2011, 2015) 1995–2015 (n=12394)	16 years	POS ban of tobacco products introduced in 2009 (partial)	Smoking in the last 30 days	Multivariable logistic regression analysis found the POS ban resulted in a 7.02% (95% CI 1.65% to 12.40%) increase in smoking prevalence for boys, with an aOR=1.48 (95% CI 1.10 to 2.00) No estimates reported for girls	All other tobacco control policies and cigarette price
Kuipers (2017), England[35]	Interrupted time series	Smoking Toolkit Study, monthly surveys from Jan 2009 to Feb 2015 (n=129957)	≥18 years (51.9%)	Partial POS ban across large shops (>280m^2 floor area) in April 2012 (partial)	Smoking cigarettes (including hand-rolled) or some kind of tobacco every day or not everyday	Segmented regression with generalised additive modelling Multivariable log binomial models adjusting for all confounders and seasonality found a decrease in smoking prevalence post-ban compared with pre-ban (percentage change: –0.46, 95% CI –0.72 to –0.20). Results were consistent in sensitivity analysis with Poisson models additionally controlling for autocorrelation (percentage change: –0.56, 95% CI –0.82 to –0.29)	Age, gender, social grade, e-cigarettes, seasonality, autocorrelation and manual/non-manual occupation
Edwards (2017), New Zealand[29]	Uncontrolled before–after	Action on Smoking and Health (ASH) NZ, 2011–2014 (n=114051)	14–15 years (~49%)	Smoke-Free Environments Act (2011) included the complete removal of POS ads, banned 'covert' tobacco sponsorship of events (eg, fashion and music shows) and banned brands on internet sale sites (partial)	Smoking at least monthly	Multivariable binary logistic regression analysis found smoking prevalence decreased after the TAPS ban compared with pre-ban (aOR=0.71, 95% CI 0.64 to 0.79). *Calculated relative change: –28.4%*	Age, sex, ethnicity, socioeconomic status, friend and parent smoking status, smoking in home
Van Hurck (2019), 25 European countries§[33]	Controlled before–after	European Survey Project on Alcohol and Other Drugs surveys in 2007, 2011, 2015 (n=174878)	15–16 years	Partial POS tobacco display ban (partial)	Non-regular smokers = <1 cigarette per week or <1 cigarette per day; regular smokers=1–5 cigarettes per day or more	After controlling for confounding in multilevel logistic regression analysis, the TAPS ban was estimated to reduce the odds of smoking between 2007 and 2015 (aOR=0.85, 95% CI 0.79 to 0.91). *Calculated relative change: –29.6%*	Time, POS display ban implementation, gender, parent education, age restriction and Tobacco Control Scale score
Dunlop (2015), Australia[30]	Uncontrolled before–after	Tobacco Promotion Impact Study, June 2010 to June 2012 (n=6014)	12–24 years	NSW introduced POS bans in July 2010 and Qld in November 2011 (partial)	Smoked more than 100 cigarettes in their lifetime and smoked in the past month	Multivariable logistic regression revealed a reduction in odds of smoking: 7–12 months post-ban: aOR=0.84 (95% CI 0.69 to 1.03); 24 months post-ban aOR=0.73 (95% CI 0.55 to 0.96) *Calculated relative change: –21.4%*	Store visits, age, sex, state, socioeconomic status, seen anti-smoking ads, smoker exposure
White (2011), Australia[31]	Uncontrolled before–after	Surveys of Australian secondary students conducted triennially between 1990 and 2005 (sample size differs by survey year¶)	12–17 years (50.2–53.8%)	National TV and radio, POS, billboard and outdoor advertising bans; promotional discounts bans; free samples and value-added tobacco promotion ban, sponsored events ban (partial)	Smoking in the past month	Percentage change in smoking prevalence: Australia wide –0.42%; Multivariable regression analysis showed an increase in odds of smoking post TAPS ban (aOR=1.03, 95% CI 1.01 to 1.05)	School type, state, other policies, demographics, survey year
McNeill (2011), Ireland[36]	Interrupted time series	Ipsos MRBI, July 2002 to July 2010 (n=180 for youths, n=1000 for adults)	≥15 years	Legislation banning POS tobacco promotion (partial)	Current regular smoker=smokes one cigarette/week	ARIMA interrupted time series analysis comparing level and trend of smoking prevalence 12 months post-ban compared with 84 months pre-ban demonstrated a non-significant immediate change in smoking prevalence (percentage change=–0.171, 95% CI –0.580 to 0.237)	Data weighted for age, gender, social class and region. Adjusted for underlying trends and autocorrelation

Continued

Table 2 Continued

Author (year), country	Study design	Data sources and period of data collection (sample size)	Age range; (% female)	Intervention description (coverage of the ban*)	Definition of current smoking	Analytical method and results	Variables adjusted for in analysis
Ylitörmänen (2023), 42 countries**[32]	Uncontrolled before–after	Global Youth Tobacco Survey (GYTS) Two rounds of GYTS: first round 2006–2015 (n=131202) and second from 2017–2020 (n=148151)	11 to ≥17 years (51.1%)	Bans on display, partial or full internet TAPS ban, ban on depiction of tobacco products and by number of TAPS measures (partial)	Smoked one or more days in the past 30 days	Multilevel binary logistic regression models. Marginal analysis presented separately for low-income (LIC) and lower-middle-income countries (LMIC) combined, and high-income (HIC) and upper-middle-income countries (UMIC) combined. Compared with pre-ban smoking prevalence significantly decreased post-ban: LIC+LMIC: decreased 1.9 percentage points, from 8.4% (95% CI 5.3% to 11.5%) to 6.5% (95% CI 4.0% to 8.9%). HIC+UMIC: decreased 2.6 percentage points, from 10.8% (95% CI 8.6% to 13.0%) to 8.2% (95% CI 6.4% to 9.9%)	Age, sex with random intercept for countries in regression models

NB: Italicised values are calculations of relative change by the authors of this review.
*WHO recommends that a comprehensive TAPS ban should cover all advertising, promotion and sponsorship, including, direct and indirect TAPS, acts that aim at promotion or likely to have a promotional effect, tobacco promotion, commercial communications, contribution of any kind to any event, activity or individual, tobacco brand name advertising, promotion and corporate promotion and advertising via traditional media and all media platforms (including the internet, mobile phones, films and other new technologies).[21] This includes all 10 measures of TAPS - (1) display of tobacco products at points of sales; (2) domestic internet; (3) global internet; (4) brand stretching and/or sharing; (5) product placement; (6) the depiction/use of tobacco in entertainment media; (7) tobacco sponsorship of international events/activities; (8) corporate social responsibility; (9) cross-border advertising originating from the country; and (10) cross-border advertising entering the country.[8]
†Finland: 1993, 95, 97, 01, 03, 05, 07 (n=3792–4069). Ireland: 1998, 02, 07 (n=4235–7638). Great Britain: 1990, 96, 00, 05 (n=9967–15 722). Austria: 1991, 99, 06 (n=27 817–28 817). Netherlands: 1990, 97, 00, 05 (n=3472 and 5665–6169). France: 2000, 05 (n=9641–20 105). Italy: 1990, 00, 05 (n=38 591 and 82 040–87 673). Poland: 1995–6, 1998–9, 2005–6 (n=26 091–30 199). Spain: 1993, 01, 06 (n=14 187–23 396).
‡Finland - Health Behaviour and Health; Ireland - Survey of Lifestyle and Nutrition; Great Britain - General Household Survey; Austria - Micro Census; Netherlands - Ongoing Survey of Living Condition and Permanent Survey on Living Conditions; France - Baromètre Santé; Italy - Multipurpose Family Survey and Health and Healthcare Utilisation; Portugal - National Health Survey; Spain - National Health Survey.
§Austria, Belgium (Flanders), Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Greece, Iceland, Ireland, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Ukraine, United Kingdom.
¶1990 - Australia-wide (n=24 830). 1993 - Australia-wide (n=22 623). 1996 - Australia-wide (n=27 480). 1999 - Australia-wide (n=22 897). 2002 - Australia-wide (n=21 628). 2005 - Australia-wide (n=20 560).
**Includes WHO regions: African Region (Congo, Ghana, Madagascar, Mauritania, Senegal, Togo, Uganda), Region of the Americas (Antigua and Barbuda, Bolivia, Jamaica, Panama, Paraguay, Peru, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Venezuela), Eastern Mediterranean Region (Iraq, Qatar, Tunisia), European Region (Albania, Georgia, Italy, Kyrgyzstan, Latvia, Lithuania, Republic of Moldova, Montenegro, Romania, San Marino, Serbia, Slovenia, Tajikistan, Ukraine), Southeast Asia Region (Bhutan, Maldives) and Western Pacific Region (Brunei Darussalam, Kiribati, Mongolia, Palau, Samoa, Vanuatu).
POS, point-of-sale; TAPS, tobacco advertising, promotion and sponsorship .

difference in effect by TAPS ban coverage (OR=0.82, 95% CI 0.75 to 0.90 for partial; OR=0.95, 95% CI 0.91 to 0.99 for comprehensive, p value for between-group difference <0.01); however, owing to the absence of studies with comprehensive bans providing adjusted ORs, subgroup analysis of adjusted values only was not performed.

For country-income levels, there was a difference between groups when considering crude and adjusted odds ratios (OR=0.85, 95% CI 0.77 to 0.94 for high-income countries and upper-middle-income countries; OR=0.76, 95% CI 0.73 to 0.79 for low-income countries and low-middle-income countries, p=0.03), but no difference in subgroup analysis of only adjusted ORs.

Similarly, there was a difference in effect between population age groups when crude and adjusted ORs were analysed (OR=0.82, 95% CI 0.73 to 0.92 for adolescents only; OR=0.95, 95% CI 0.91 to 0.99 for adults only; OR=0.84, 95% CI 0.74 to 0.96 for both, p=0.03), but no difference was found when analysing only adjusted ORs.

There was no difference in the effects of TAPS bans by study quality, geographical location/continent or definition of current smoking. See online supplemental figure S2 to S10.

Narrative synthesis

Four studies reported the percentage change in smoking prevalence post-ban compared with pre-ban after controlling for confounders (table 2). Using monthly smoking prevalence data between 2009 and 2015, Kuipers *et al* assessed the impact of a partial POS ban implemented in England. After controlling for age, sex, social grade, e-cigarette use, seasonality and autocorrelation, they found no immediate step-level change in smoking prevalence (percentage change=−3.69, 95% CI −7.94 to 0.75). However, there was a significant steeper reduction in the trend in smoking prevalence post-ban compared with pre-ban (percentage change=−0.46, 95% CI −0.72 to −0.20).[35] Li and colleagues analysed data from the European School Survey Project on Alcohol and Other Drugs (ESPAD) survey conducted every 4 years between 1995 and 2015 to assess the impact of a POS tobacco ban implemented in 2009 in Ireland. They found a significant increase in smoking prevalence (+7.02%, 95% CI 1.65% to 12.40%) among boys aged 16 years but did not report the effect for girls.[34] In another Irish study using different surveys between 2002 and 2010, after adjusting for underlying trends and autocorrelation, removing POS tobacco displays did not have an immediate change in smoking prevalence (percentage change=−0.171, 95% CI −0.580 to 0.237) among those aged 16 years and above.[36] Finally, Ylitörmänen and colleagues conducted a multicountry analysis using two rounds of the Global Youth Tobacco Survey. They found that TAPS bans were associated with a 1.9 percentage point reduction (from 8.4% to 6.5%, p<0.001) in smoking prevalence in low-income and lower-middle-income countries, and a 2.6 percentage point reduction (from 10.8% to 8.2%, p<0.001) in upper-middle-income and high-income countries combined.[32]

Effect of TAPS bans on smoking initiation

Four studies assessed the effects of TAPS bans on smoking initiation. A meta-analysis was conducted for the three follow-up studies that reported adjusted hazard ratios and found that TAPS bans significantly reduced the risk of smoking initiation (pooled aHR=0.63, 95% CI 0.48 to 0.82, I^2=95%) (figure 3). In a before–after study among New Zealand youths between 2011 and 2014, Edwards and colleagues reported a significantly lower odds of initiating cigarette smoking following the implementation of POS advertising and event sponsorship bans (adjusted OR=0.91, 95% CI 0.84 to 0.98).[29]

Table 3 Summary of studies reporting the impact of TAPS bans on smoking initiation post-ban compared with pre-ban

Author (year), Country	Study design	Data sources and period of data collection (sample size)	Age range, gender (% female)	Intervention description (coverage of the ban*)	Definition of smoking initiation	Analytical method and results	Variables controlled
Guindon (2019), Chile[37]	Follow-up	Encuesta de Población Escolar de Chile (Chilean School Population Survey). eight waves biennially from 2001 to 2015 (n=181624)	16–19 years	Law 20 105 introduced in 2006 (banned all tobacco advertising except for POS) (partial)	Smoking onset (the transition between never smoking and smoking)	Discrete-time hazard regression models in conjunction with complementary log-log specification (clog-log) duration models derived a HR of 0.83 (95% CI 0.81 to 0.85) in the maximally adjusted model, indicating smoking initiation significantly decreased after implementation of Law 20 105.	Sex, mother's education level of primary or less, mother's education level of secondary or less, mother's educational level of more than secondary, public school, subsidised school, private school
Edwards (2017), New Zealand[29]	Uncontrolled before–after	Action on Smoking and Health (ASH) NZ. 2012–2014 (n=114051)	14–15 years (~49%)	Smoke-Free Environments Act (2011) included the complete removal of POS ads, banned 'covert' tobacco sponsorship of events (eg, fashion and music shows) and banned brands on internet sale sites (partial)	Trying a cigarette/ tobacco for the first time in the past year	Multivariable binary logistic regression models found smoking initiation significantly decreased after the implementation of POS and sponsorship bans (aOR=0.91, 95% CI 0.84 to 0.98)	Age, sex, ethnicity, socioeconomic status, friend and parent smoking status, smoking in home
Haw (2020), Scotland[38]	Follow-up	DISPLAY schools survey from Feb 2013 to March 2015 (n=8214 (never smokers))	13–15 years (in 2013–2014) 12–17 years (in 2015)	POS advertising ban (partial)	Never smokers who had smoked since the previous survey wave	Discrete time survival analysis and complementary log-log models showed that smoking initiation significantly declined after the partial POS ban in 2014 (adjusted HR=0.72, 95% CI 0.59 to 0.88). The risk of smoking initiation declined further after the more comprehensive POS ban was implemented in 2015 (adjusted HR=0.35, 95% CI 0.25 to 0.48)	E-cigarette use, age, ethnicity, Family Affluence Scale score, pupil's school attributes, family and friends' smoking status
Stoklosa (2022), Poland[39]	Follow-up	Global Youth Tobacco Survey (GYTS) in 2003, 09 and 16 and PolNico Youth survey in 2019 (n=22541)	11–17 years (in 2003, 09 and 16) 15–18 years (in 2019) (52%)	1999 comprehensive advertising ban (all advertising, POS, promotion and sponsorship) (comprehensive)	'How old were you when you first tried a cigarette?' in GYTS. In PolNico Youth survey, individuals asked if he or she had ever used cigarettes	Split-population survival models found that smoking initiation significantly decreased after the introduction of a comprehensive advertising ban in 1999 (HR=0.69, 95% CI 0.62 to 0.77, p<0.01 model 5)	Cigarette price, gender, parents' smoking status, mother's education, father's education, duration of dependence and other tobacco control policies (smoke-free law, large pictorial health warnings).

*WHO recommends that a comprehensive TAPS ban should cover all advertising, promotion and sponsorship, including, direct and indirect TAPS, acts that aim at promotion or likely to have a promotional effect, tobacco promotion, commercial communications, contribution of any kind to any event, activity or individual, tobacco brand name advertising, promotion and corporate promotion and advertising via traditional media and all media platforms (including the internet, mobile phones, films and other new technologies).[21] This includes all 10 measures of TAPS - (1) display of tobacco products at points of sales; (2) domestic internet; (3) global internet; (4) brand stretching and/or sharing; (5) product placement; (6) the depiction/use of tobacco in entertainment media; (7) tobacco sponsorship of international events/activities; (8) corporate social responsibility; (9) cross-border advertising originating from the country; and (10) cross-border advertising entering the country.[8]
POS, point-of-sale; TAPS, tobacco advertising, promotion and sponsorship .

Effect of TAPS bans on smoking cessation

Three studies analysed the effects of TAPS bans on smoking cessation. Two were follow-up studies,[24 40] while the third study was an uncontrolled before–after study involving 27 European countries.[41] The meta-analysis (figure 4) showed no association between TAPS bans and smoking cessation (adjusted OR=1.10, 95% CI 0.86 to 1.40, I^2=58.5%).

Study quality and publication bias

Detailed study quality and risk of bias evaluations are provided in online supplemental material appendix D. Figure 5 summarises the risk of bias results for the included studies. Overall, 12 studies (81.3%) had a moderate risk of bias, and three studies (18.7%) had a serious risk of bias. Bias due to confounding had the highest percentage of studies, with most studies having moderate and serious risk of bias.

Visual inspection of the funnel plot showed no evidence of asymmetry for the smoking prevalence outcome, which was confirmed in the Egger's regression test (p=0.219) (online supplemental material appendix E). We did not test for publication bias on the initiation and cessation outcomes owing to the limited number of studies.

Table 4 Summary of studies reporting the impact of TAPS bans on smoking cessation post-ban compared with pre-ban

Author (year), Country	Study design	Data sources and period of data collection (sample size)	Age range, gender (% female)	Intervention description (coverage of the ban*)	Definition of smoking cessation	Analytical method and results	Variables controlled
Usidame (2023), Canada[24]	Follow-up	International Tobacco Control (ITC) Canada Survey. October 2005 to April 2011 (n=1186)	≥25 years (45.1%)	Point-of-sale advertising ban (partial)	Participant who made a quit attempt from the quit analytic sample	Generalised estimating equation multivariable Poisson regression models found smoking cessation increased following the POS advertising ban (0–24 months post-ban: aRR=1.03, 95% CI 0.83 to 1.42), with significant increases after a minimum of 24 months post POS ban (aRR=1.49, 95% CI 1.08 to 1.52)	Age (linear and quadratic effects), sex, education, annual income, provincial cigarette price, and province indicator
Bosdriesz (2016), 27 European countries†[41]	Uncontrolled before–after	Eurobarometer surveys 2006–2012 (n=73617)	≥20 years (56.2%)	Advertising bans (partial)	Yes to 'you used to smoke but you have stopped'	Multilevel logistic regression models found a non-significant association between advertising bans and smoking cessation in the overall population (aOR=1.03, 95% CI 0.99 to 1.07), low education (aOR 1.00, 95% CI 0.96 to 1.05) and middle education participants (aOR 1.03, 95% CI 1.00 to 1.07). Advertising bans were significantly associated with smoking cessation for higher educated participants (aOR=1.06, 95% CI 1.02 to 1.10)	Age, sex, ever smoking prevalence (to control for the historic pattern of smoking uptake within the country), and survey wave. Also adjusted for other subscales/ domains representing other tobacco control interventions.
Fleischer (2019), Canada‡[40]	Follow-up	International Tobacco Control (ITC) Canada Survey. October 2006 to April 2011 (n=2,024)	≥25 years (55.2%)	POS advertising ban (partial)	Quit smoking for at least 1 month since previous wave (t+1) and had still quit at the time of being surveyed	Generalised estimating equation multivariable logistic regression models found no association between POS advertising bans and smoking cessation in the maximally adjusted model (aOR=0.92, 95% CI 0.66 to 1.30)	Age, sex, education, income, province, provincial cigarette prices, quit attempts, retailer density and proximity

*WHO recommends that a comprehensive TAPS ban should cover all advertising, promotion and sponsorship, including direct and indirect TAPS, acts that aim at promotion or likely have a promotional effect, tobacco promotion, commercial communications, contribution of any kind to any event, activity or individual, tobacco brand name advertising, promotion and corporate promotion and advertising via traditional media and all media platforms (including the Internet, mobile phones, films and other new technologies).[21] This includes all 10 measures of TAPS - 1) display of tobacco products at points of sales; 2) domestic Internet; 3) global Internet; 4) brand stretching and/or sharing; 5) product placement; 6) the depiction/use of tobacco in entertainment media; 7) tobacco sponsorship of international events/activities; 8) corporate social responsibility; 9) cross-border advertising originating from the country; and 10) cross-border advertising entering the country.[8]
†Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.
‡In Manitoba, Saskatchewan and Prince Edward Island prior to the beginning of the study period in October 2006; in Nova Scotia in March 2007; in British Columbia, Ontario, Quebec and Alberta between March and July 2008 (corresponding to a period between study waves); in New Brunswick in January 2009; and in Newfoundland and Labrador in January 2010.
POS, point-of-sale; TAPS, tobacco advertising, promotion and sponsorship .

DISCUSSION

This systematic review synthesised 16 studies that explored the effects of TAPS bans on smoking prevalence, initiation and cessation, extending the evidence base on the impact of tobacco control policies. While most included studies evaluated partial TAPS bans, our results suggest that they can be effective in reducing smoking prevalence and the risk of smoking uptake. However, we found no significant association between TAPS bans and smoking cessation.

Our pooled results from before–after repeated surveys and interrupted time-series analyses showed that TAPS bans reduced the odds of smoking by up to 20%. The relative reduction in smoking prevalence was 23.4%, which is higher than the prevalence of up to 9% reported by Levy and colleagues.[5] This might be because our relative change in smoking prevalence is not adjusted for confounders. Our overarching findings are corroborated with prior reviews,[5–7 9 16] and in line with literature that has shown that TAPS bans reduce the cue for tobacco purchase, which subsequently decreases current smoking prevalence.[35] Most of the studies included in this review evaluated partial bans, which is in part reflective of the level of implementation among Parties to the FCTC. WHO FCTC requires countries to implement comprehensive TAPS bans.[21] Given the findings of this review, it is likely that such comprehensive TAPS bans would have greater impacts on smoking behaviour. The effects in our review were consistent in direction in all but two primary studies that reported an increase in smoking prevalence after the introduction of POS and outdoor advertising bans[31] and after a POS display ban was implemented with other tobacco control programs.[34] Potential explanations for this difference relate to

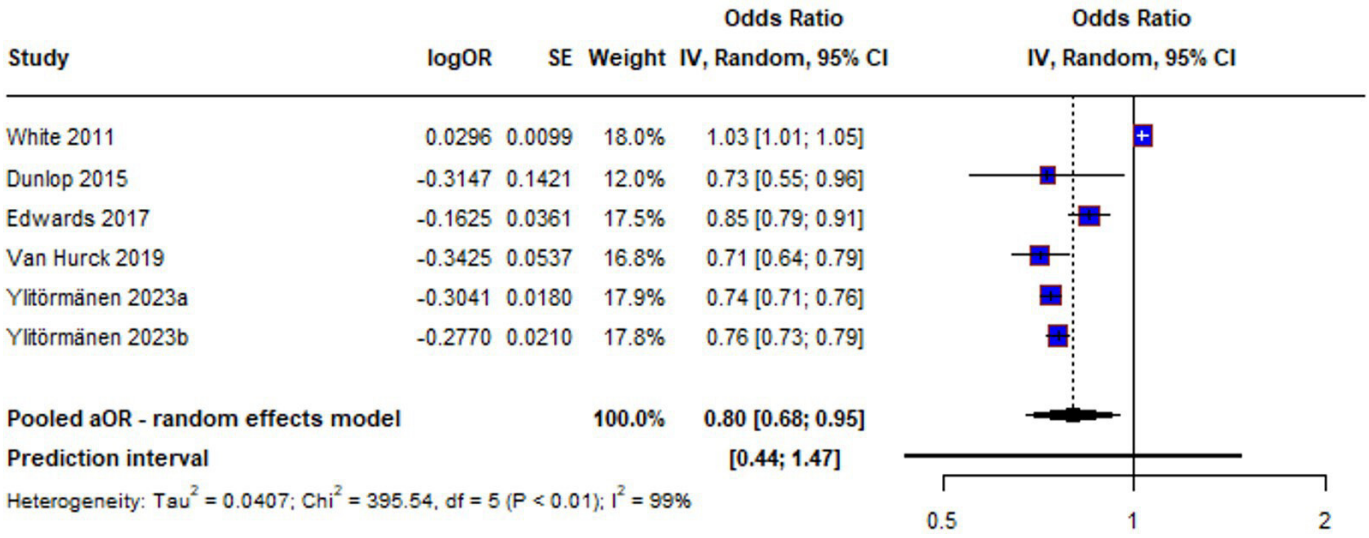

Figure 2 Forest plot of adjusted ORs depicting the impact of tobacco advertising, promotion, and sponsorship (TAPS) bans on current smoking.

the demographic distribution; these studies mostly included adolescents. As some of these participants were below the legal age for purchasing cigarettes, it is likely that they used alternative methods to access cigarettes, which might be unaffected by the POS ban. In addition, the incongruent findings might also be due to the use of retail loopholes between 1995 and 2005 in Australia, whereby retailers sometimes displayed single packets of products as a permissible form of promotion despite the TAPS bans.[31]

Our subgroup analysis shows that the effect of TAPS bans in reducing smoking prevalence was greater in studies evaluating the policy over 5 to 10 years than in those evaluating shorter periods of <5 years. This is on par with findings from a comprehensive literature review by Levy and colleagues that reported direct advertising bans reduced smoking prevalence by 4% (2–6%) in the short term and 6% (3–9%) in the long term.[5] However, we found no effect for studies evaluating the TAPS ban policy over periods longer than 10 years. This could possibly reflect reduced enforcement efforts over time or changes in policy priorities that accompany changes in political cycles.[42] Funding to enforce and evaluate tobacco control policies might wane over time causing reduced enforcement and weaken the effects of TAPS bans in periods longer than 10 years.[11] In addition, tobacco industry exploitation of marketing loopholes, including at the POS, internet and social media platforms might also explain this lack of effect.[9 10] There was a significant difference in effect between studies evaluating partial bans compared with comprehensive bans when analysing crude and adjusted ORs. However, this could not be confirmed using adjusted values only because no studies with comprehensive TAPS bans provided adjusted ORs. Caution must be taken when interpreting these results as only one study evaluated comprehensive bans. In combined crude and adjusted results, there appeared to be a significant difference in effectiveness between adolescents and adults, as well as by country income levels. However, when only adjusted ORs were meta-analysed, there was no difference. These findings might indicate an absence of a true difference after controlling for confounding variables, but the small number of studies in the analysis of only adjusted ORs limits the extent to which we can draw conclusions, with some subgroups containing only one study.

The meta-analysis revealed that TAPS bans are associated with a significantly reduced risk of smoking initiation. This aligns with a Cochrane review by Lovato and colleagues that found a positive association and a dose–response relationship between youth exposure to tobacco advertising and promotion and smoking uptake.[43] Tobacco advertising and promotion increase awareness and receptivity towards cigarettes and provoke positive attitudes towards tobacco smoking.[43] Youth and young adult populations are particularly susceptible to the negative influences of tobacco

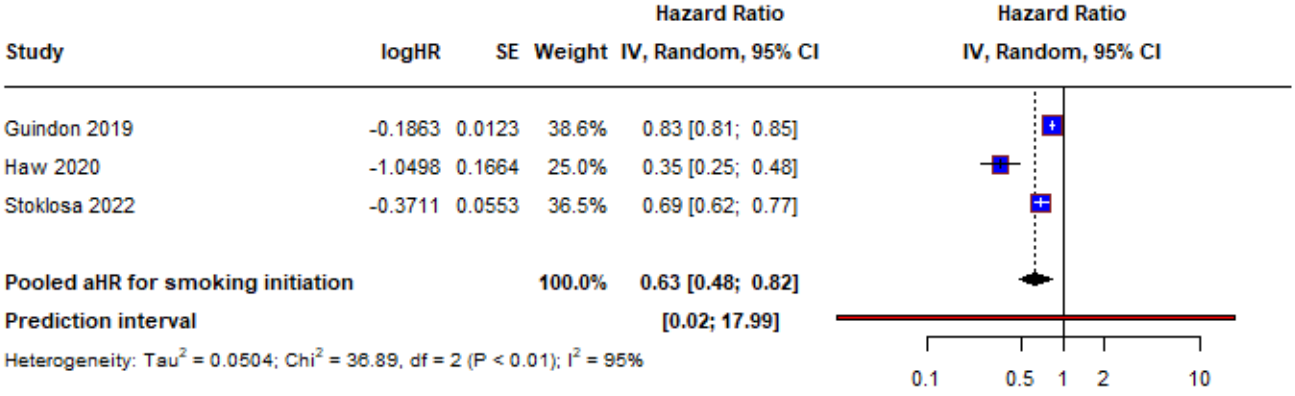

Figure 3 Forest plot of adjusted HRs depicting the impact of tobacco advertising, promotion, and sponsorship (TAPS) bans on smoking initiation.

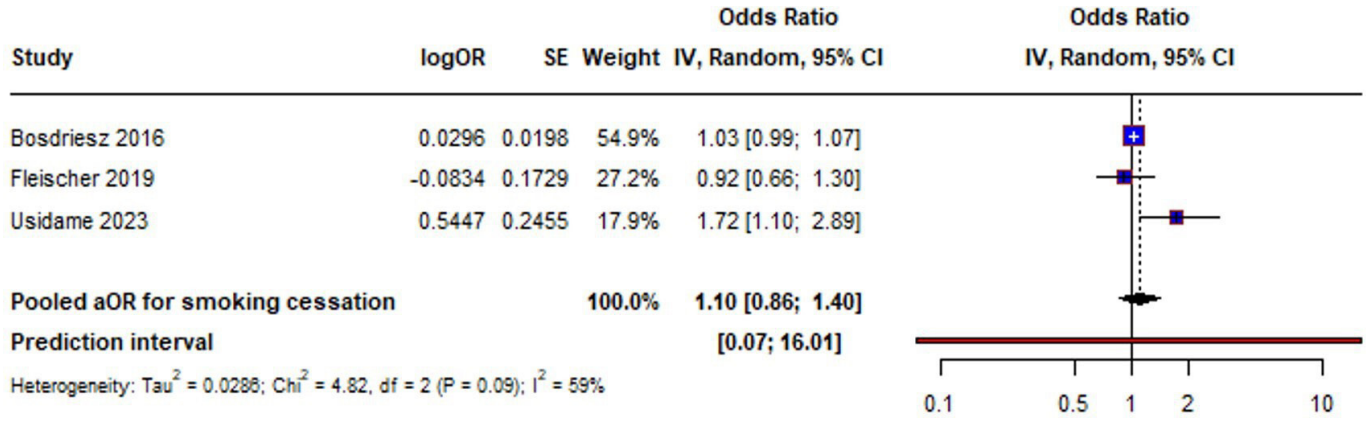

Figure 4 Forest plot depicting the impact of tobacco advertising, promotion, and sponsorship (TAPS) bans on smoking cessation.

advertisement[44 45] as exposure to tobacco marketing more than doubles their chances of smoking initiation.[46] The evidence suggests that prohibiting POS tobacco displays and promotion is also associated with a decreased perception of peer smoking prevalence and the denormalisation of tobacco smoking among adolescents.[7] Thus, policies banning tobacco advertisements and displays can reduce their exposure, leading to reduced uptake and smoking prevalence,[44 45] as demonstrated in this review.

This review found that TAPS bans did not influence smoking cessation. Potential reasons for this include the small number of studies included and the relatively high attrition rates noted in these studies. Furthermore, while the authors adjusted for several covariates, including cigarette price, there remains the possibility of residual and unmeasured confounders from the tobacco environment, such as tobacco retailer density and relative access to cessation aids or treatments. In addition, tobacco marketing and promotion generally incentivise consumers to start smoking. Thus, TAPS bans are primarily designed as a smoking prevention strategy rather than a smoking cessation tool, which might also explain the absence of an effect on cessation in this review. At the individual level, achieving successful abstinence from smoking is multifactorial with motivation to quit, socioeconomic status, cigarette price and self-confidence in quitting among the factors associated with quitting.[47]

Strengths and limitations

This review has some limitations. First, most of the studies evaluating the smoking prevalence outcome were uncontrolled repeated cross-sectional designs, which limits their ability to make causal inferences. For the smoking initiation and cessation outcomes, most studies were longitudinal in design. While this ensures temporality, some studies were liable to attrition biases which could have affected the overall results.

Second, most of the primary studies had a moderate risk of bias, with three studies having serious risk of bias. This was predominantly due to confounding and potential misclassification of outcome status due to the self-reporting, which was

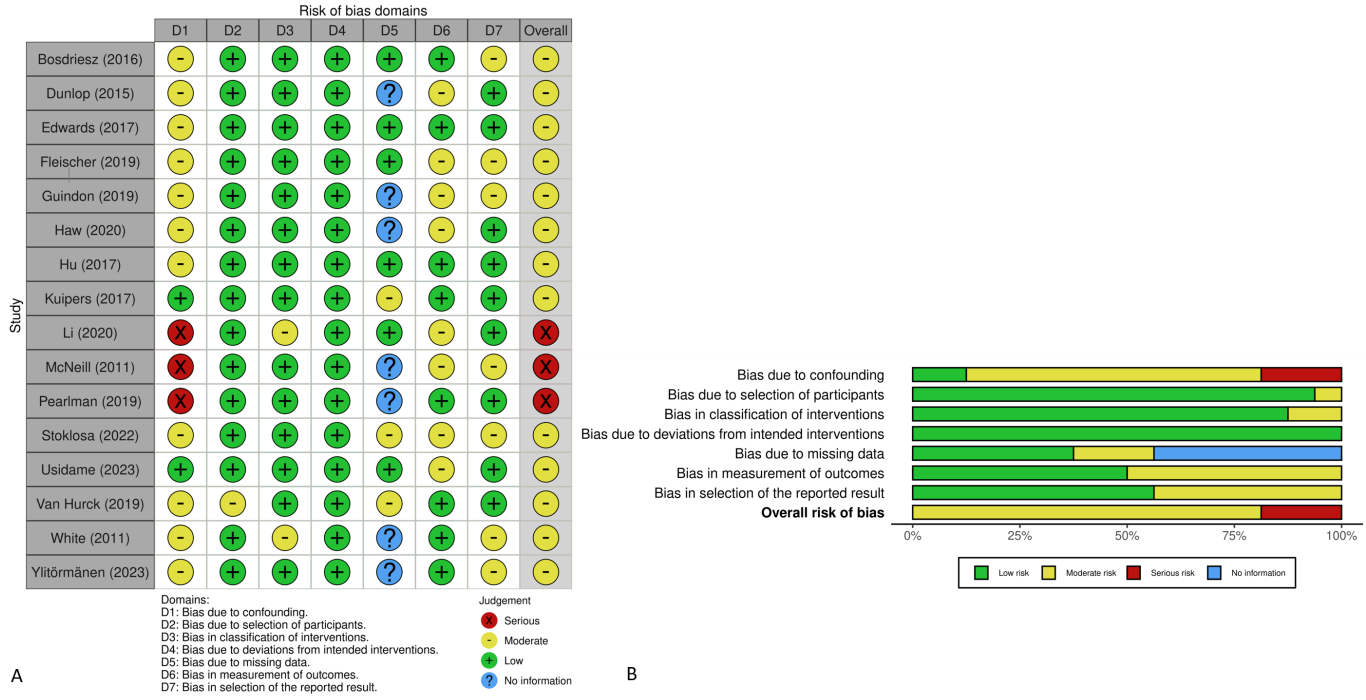

Figure 5 Summary of the risk of bias assessment for individual studies (panel A) and the overall assessment by bias domains (panel B).

inevitable owing to the nature of the public health policy being evaluated. Some studies attempted to address this by adjusting for a range of demographic and socioeconomic factors, co-occurring tobacco control policies and temporal trends in smoking and autocorrelation. However, the differing covariates and confounders adjusted for in the primary studies should be considered when interpreting the findings.

Third, there was substantial heterogeneity in the meta-analysis, which we investigated through a range of subgroup analyses for the smoking prevalence outcome. We were unable to separately assess the effects of direct versus indirect TAPS bans owing to the limited number of studies and an inability to reliably disaggregate those effects for studies evaluating both direct and indirect bans. For smoking initiation and cessation, a small number of studies assessed these outcomes, which precluded any meaningful subgroup analysis. Hence, due to the limited number of studies, caution is required when interpreting the results for the latter outcomes. In addition, one multicountry study reported the effects of advertising bans on smoking cessation but did not provide the specific components or range of coverage of the advertising bans,[41] which potentially limits the interpretability of its findings.

This review has several strengths. First, this review extends the evidence base, given that a previous review[16] was unable to draw conclusions on the effects of TAPS bans on smoking prevalence owing to insufficient or low-quality evidence, and the absence of studies assessing smoking cessation or initiation.

Second, this review strengthens the literature on the impact of POS display bans on smoking prevalence by including studies with data over longer periods of up to 8 years. This allowed for the adjustment of temporal trends in smoking, as opposed to prior evidence with studies limited to 1-year evaluation periods.[7]

Third, the comprehensive search and screening across five separate databases, grey literature and reference lists without language restrictions, duplicate data extraction and quality assessment, with a third round of data-checking, enhanced the robustness of our methods.

Fourth, the pooled evidence in the meta-analysis is, to our knowledge, unique to this review, which enabled the quantification of the effects of TAPS bans on smoking prevalence, initiation and cessation.

Implications for future research

Further research is needed to address with the issue of causality. Evolving literature should adopt more robust study designs, such as the multiple baseline design and longitudinal or follow-up studies with control groups, to determine with greater certainty if the change in smoking outcomes are indeed due to the TAPS policy. WHO reinforces the observation that partial TAPS bans are limited in their effects and comprehensive bans are optimal for long-term tobacco control.[48] Our review of mostly partial TAPS bans shows that they are effective in reducing smoking prevalence and initiation. More research evaluating the effects of comprehensive TAPS bans is needed to quantify the magnitude of their effectiveness, particularly for smoking cessation.

There are limited data on TAPS bans and smoking behaviour in low- and middle-income countries (LMICs). More research is needed in these countries, particularly because approximately 80% of people who smoke globally reside in LMICs.[3] It is possible that limited resources contribute to difficulties in reliably evaluating and reporting the impacts of TAPS bans on smoking prevalence, initiation and cessation in LMICs.[49] However, such context-specific quantitative evidence could incentivise policymakers in these settings to invest in, and enforce, these policies as part of broader tobacco control strategies. Future research could investigate the effects of TAPS bans in priority populations, including adolescents, people experiencing mental health problems, socioeconomically disadvantaged, ethnic and sexual identity minorities.

TAPS outlets are evolving and social media platforms like Facebook, Instagram, Twitter, YouTube and TikTok have the potential to circumvent existing tobacco advertising policies. Despite being recognised as areas for improvement in current TAPS laws,[9] only one study in this review analysed these new forms of cross-border TAPS.[32] Future research should examine these areas to generate evidence to inform the implementation of comprehensive tobacco control policies.

CONCLUSION

This review demonstrates that TAPS bans significantly decreased smoking prevalence and reduced the risk of smoking initiation. However, they did not have a significant effect on smoking cessation. The findings reinforce the need for countries to implement and enforce existing TAPS bans to reduce tobacco smoking and its consequences. More research is needed to substantiate these findings, especially for smoking uptake and cessation.

X Leopold Ndemnge Aminde @LN_Aminde

Contributors CS: conceptualisation, investigation, methodology, project administration, supervision, data extraction, quality assessment, formal analysis, evidence table, writing - initial draft, review and editing. BC: investigation, data extraction, quality assessment, writing - review and editing. RT, AT, CL, LL: data extraction, quality assessment, writing - review and editing. JLV: writing – review and editing. LNA: conceptualisation, investigation, methodology, project administration, supervision, formal analysis, writing - review and editing. CS and LNA are the guarantors of this review.

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ORCID iDs
Christina Saad http://orcid.org/0009-0006-9962-886X
Leopold Ndemnge Aminde http://orcid.org/0000-0003-2787-7518

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