



# Opinion of teenagers on smoking-free policy in public places and its determinants – evidence from a global youth tobacco survey in five European countries

Beata Świątkowska<sup>1,A,C-F</sup>✉, Aleksandra Olewnik<sup>1,A,D-F</sup>, Dorota Kaleta<sup>1,A-F</sup>

<sup>1</sup> Department of Hygiene and Epidemiology, Medical University, Łódź, Poland

A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Świątkowska B, Olewnik A, Kaleta D. Opinion of teenagers on smoking-free policy in public places and its determinants – evidence from a global youth tobacco survey in five European countries. *Ann Agric Environ Med*. doi: 10.26444/aaem/173531

## Abstract

**Introduction and Objective.** Smoking-free policies protect non-smokers from the negative effects of smoking, but many young adults still use products containing nicotine. The aim of this article is to analyze the factors that influence young people's attitudes towards the ban on smoking in public places.

**Materials and method.** Data were obtained from a representative sample of young adults aged 13–15 from the Global Youth Tobacco Survey (GYTS) conducted in the Czech Republic, Lithuania, Romania, Slovakia and Slovenia. Logistic regression analysis was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs).

**Results.** At least a quarter of the adolescents were exposed to cigarette smoking, about 40% have parents who smoke and over 50% declared that they have peers who smoke. A higher proportion of adolescents have knowledge about the harmful effects of second-hand smoking (62.6–71.9%), but at least one-fifth of young people are still exposed to the marketing of tobacco products. Compared with current smoking, those with never smoked were significantly associated with positive attitude toward to restricting smoking in all five analyzed countries, with an AOR= 4.74 (95% CI: 3.61–6.23), AOR=4.33 (95% CI: 2.32–8.07), AOR=2.85 (95% CI: 2.19–3.70) and AOR=2.45 (95% CI: 1.65–3.64), respectively. Gender, age, smoking, exposure to second-hand smoke, knowledge about the harmful effects of smoking, anti-smoking education, seeing people using tobacco and exposure to tobacco marketing, were significantly associated with the attitudes of young people towards restricting smoking in public places.

**Conclusions.** The study provides useful information on factors that should be taken into account when planning anti-smoking strategies so that young people are able to resist the pressure to use tobacco products.

## Key words

tobacco smoking, teenagers, cigarettes, public opinion, smoke-free policy, limiting smoking

## INTRODUCTION AND OBJECTIVE

Tobacco use most often begins in childhood or adolescence and has an undeniable impact on health. Despite the many negative effects of smoking, many young people still start smoking. In 2022, nearly 11% of middle and high school students reported current use of tobacco products. This means that every nine high school student is exposed to the negative effects of smoking [1]. Therefore, the issue of smoking bans in public places is important not only for non-smokers, but also for young people who are particularly exposed to the negative effects of smoking. Tobacco products are legally available on the market, but due to their high health hazard, effective tobacco control measures are taken to prevent addiction to the use of tobacco and tobacco products and to protect health before its consequences. Anti-smoking policies have been implemented on a large scale across Europe and attempt to shape pro-health attitudes by raising the prices of tobacco products, controlling advertising and sales, and limiting public places where smoking is permitted [2, 3]. One

of the main strategies for preventing smoking in different countries is the implementation of smoke-free places to reduce the number of smokers and protect non-smokers from the negative effects of cigarette smoke [4, 5].

In Poland, the basic legal Act aimed at protecting the rights of non-smokers by controlling tobacco consumption and creating a smoke-free environment is the Act of 9 November 1995 on the protection of health against the consequences of tobacco use and tobacco products [6]. According to recently confirmed scientific data, the implementation of anti-smoking policies, ten years after the adoption, has resulted in a significant reduction in exposure to secondhand smoke (SHS) in work and public places [7]. The ban on smoking in public places also affects the behavior of smokers, influencing the intensity of smoking and the prevalence of smoking, bringing benefits to non-smokers, reducing exposure [8].

Young people's attitudes to the ban on smoking in public places are varied and depend on many factors, some young people support the ban because believe this is a necessary step to protect public health, while others believe it is a violation of their personal freedom. Preventing young people from starting to use and become addicted to tobacco products is at the heart of any strategy to end the tobacco epidemic. Smoking initiation occurs mainly among young people.

✉ Address for correspondence: Beata Świątkowska, Department of Hygiene and Epidemiology, Medical University, Żeligowskiego 7/9, 90-752 Łódź, Poland  
E-mail: beata.swiatkowska@umed.lodz.pl

Received: 14.09.2023; accepted: 06.10.2023; first published: 20.10.2023

Adolescents who use tobacco products are at greater risk of developing nicotine dependence and may be more likely to continue using tobacco into adulthood. In contrast, little progress has been made in reducing the prevalence of smoking among young people. Therefore, only current and comparable estimates for all countries are needed for targeted interventions and policies [9]. Smoking-free policies aim to protect people from the harmful effects of exposure to tobacco smoke, however, in implementing such policies, information on public support is essential for policy makers.

The aim of this work is to analyze the factors that influence young people's attitudes towards the ban on smoking in public places.

## MATERIALS AND METHOD

**Study Design and data collection.** This paper uses The Global Youth Tobacco Survey (GYTS) data developed by the World Health Organization and the Centers for Disease Control and Prevention to help countries fulfill obligations arising from the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) to generate comparable data within and between countries [10]. Detailed information on the research methodology and the questionnaire are publicly available at the Global Youth Tobacco Survey website [11].

The GYTS is one of the globally standardized surveys of the Global Tobacco Surveillance System. It is a cross-sectional school-based survey that collects data on tobacco use among young people and key tobacco-control indicators using a two-stage cluster sample design to produce a representative sample of students aged 13–15 years. The results presented in this analysis concern the 16,045 respondents who took part in the survey from five countries: Czech Republic (2016), Slovakia (2016), Slovenia (2017), Romania (2017), and Lithuania (2018).

## MATERIALS AND METHOD

The GYTS survey uses a standard methodology and a two-stage sample design for constructing sampling frames, selecting schools, preparing the questionnaire, carrying out field procedures to produce representative, independent, cross-sectional estimates. The GYTS questionnaire is a school, self-administered and anonymous based instrument. Questionnaire contained core questions about major tobacco concerns focusing on prevalence of smoking among teenagers, their access to different tobacco products and second-hand smoke (SHS), exposure to media and advertising in young people's use of cigarettes, as well as the knowledge and attitudes of young people towards cigarette smoking.

The data presented in this study are based on responses to questions in two areas: attitudes of young people towards limiting smoking in public places (enclosed and outdoor) and factors that may have a positive impact on young people's support for such actions, based on a positive response to the questions, 'Are you in favour of banning smoking in outdoor public places (such as: playgrounds, sidewalks, entrances to buildings, parks)?' And 'Are you in favour of banning smoking inside enclosed public places (such as: schools, shops, restaurants, shopping malls, cinemas and clubs)?'

The independent variable included demographic and exposure-specific data: gender, age, smoking, second-hand smoke at home or public places, parents smoke; having friends who smoke; holding the belief that tobacco smoke is harmful, having seen anyone smoke inside the school building or outside on school, having seen pro- and anti-tobacco media and advertising, anti-smoking education provided by family or school.

**Statistical Methods.** Univariate and multivariate logistic regression analysis to identify factors associated with the attitudes of young people towards restricting smoking in public places, were performed as odds ratios (OR) with 95% confidence intervals (CIs). The analyses were performed separately for each of the five countries. The variance inflation factor (VIF) to test multi-collinearity between variables was calculated. For the multivariable analysis, the level of significance was set at  $p < 0.05$ .

Statistical analysis of the data was performed using Statistica version 10.0 (Dell Software, Arizona, CA, USA).

## RESULTS

**Characteristics of the study population.** Demographic and exposure-specific data are shown in Table 1. The majority of adolescents in all five countries were female (49.9–52.5%); the age distribution was also similar, with the largest group being 14 years old (35.8–41.2%).

Teenagers who had ever smoked cigarettes ranged from almost 50% in Lithuania, Slovakia, Czech Republic, and to 30.6% in Romania and 23.9% in Slovenia. Current cigarette smoking ranged from several percent in Lithuania (17.1%), Slovakia (16%) and Czech Republic (14.6%), to 8.6% in Romania and 7.6% in Slovenia. Exposure of young people to environmental tobacco smoke was very high in all countries; at least a quarter of young people were exposed to cigarette smoking by other household members; in Lithuania it was over 43%. About 40% of the adolescents in all five countries have parents who smoke, while the highest prevalence of parental smoking (52.4%) was in Romania. More than 50% of the teenagers surveyed in all countries declared that they had peers who smoked (50.3–63.9%). The highest percentage, as much as 63.9%, was recorded in Slovakia. A higher proportion of adolescents in Lithuania and Slovakia, were also exposed to second-hand smoke in public places, 53.4% and 51.1% respectively.

A higher proportion of young people in the Czech Republic, Slovakia, Lithuania and Romania have knowledge about the harmful effects of second-hand smoking (90.2%, 89.6%, 82.6% and 82.5, respectively) than in Slovenia (69.0%). Most teenagers (62.6–71.9%) have received education about the harmful effects of smoking from their families. The percentage of respondents who reported having been taught in school about the effects of tobacco use varied from over 62% in Lithuania to approximately 43% in the Czech Republic, Slovakia, Romania and Slovenia. Anti-tobacco messages were widely seen by half of young respondents. In the analyzed countries, 46–60% of teenagers had seen an anti-smoking message during the 30 days preceding the survey.

**Exposure to tobacco product marketing.** In contrast, at least one-fifth of young people are still exposed to the marketing of tobacco products. The percentage of teenagers who were

**Table 1.** Characteristic of study population (n=16,045)

Characteristics	Czech Republic n (%)	Lithuania n (%)	Romania n (%)	Slovakia n (%)	Slovenia n (%)
<b>Gender</b>					
male	1745 (49.6%)	1249 (49.0%)	2128 (48.5%)	1781 (50.1%)	951 (47.5%)
female	1776 (50.4%)	1298 (51.0%)	2259 (51.5%)	1776 (49.9%)	1051 (52.5%)
<b>Age (years)</b>					
≤13	1185 (33.6%)	570 (22.4%)	1789 (40.7%)	1204 (33.8%)	463 (23.0%)
14	1274 (36.2%)	994 (39.0%)	1809 (41.2%)	1277 (35.8%)	767 (38.1%)
≥15	1062 (30.2%)	985 (38.6%)	797 (18.1%)	1084 (30.4%)	785 (38.9%)
<b>Parental smoking</b>					
no	1883 (59.6%)	1238 (50.7%)	2038 (47.6%)	1943 (56.2%)	N/A
yes	1539 (40.4%)	1204 (49.3%)	2246 (52.4%)	1516 (43.8%)	N/A
<b>Peers smoking</b>					
no	1585 (45.1%)	1003 (39.5%)	2162 (49.7%)	1280 (36.1%)	N/A
yes	1926 (54.9%)	1537 (60.5%)	2191 (50.3%)	2269 (63.9%)	N/A
<b>Exposure to secondhand smoking at home</b>					
no	2301 (65.6%)	1426 (56.5%)	2798 (64.1%)	2191 (62.0%)	1435 (71.5%)
yes	1208 (34.4%)	1096 (43.5%)	1568 (35.9%)	1341 (38.0%)	573 (28.5%)
<b>Exposure to secondhand smoking in public places</b>					
no	2038 (58.0%)	1180 (46.6%)	2868 (65.6%)	1730 (48.9%)	1536 (76.5%)
yes	1476 (42.0%)	1351 (53.4%)	1501 (34.4%)	1810 (51.1%)	472 (23.5%)
<b>Smoking (traditional cigarettes)</b>					
never	1781 (51.1%)	1190 (49.4%)	2972 (69.4%)	1794 (51.0%)	1485 (66.1%)
ever	1708 (48.9%)	1313 (50.6%)	1312 (30.6%)	1727 (49.0%)	508 (23.9%)
current	494 (14.6%)	418 (17.1%)	370 (8.6%)	555 (16.0%)	150 (7.6%)
<b>Knowledge about harmful effect of secondhand smoking</b>					
no	345 (9.8%)	443 (17.4%)	761 (17.5%)	371 (10.4%)	131 (31.0%)
yes	3168 (90.2%)	2097 (82.6%)	3597 (82.5%)	3185 (89.6%)	1876 (69.0%)
<b>Anti-smoking education provided by family</b>					
no	1243 (35.7%)	920 (37.4%)	1195 (28.1%)	N/A	625 (31.7%)
yes	2240 (64.3%)	1538 (62.6%)	3061 (71.9%)	N/A	1349 (68.3%)
<b>School discussion about health effect of smoking</b>					
no	1963 (56.1%)	1004 (37.3%)	2460 (57.0%)	2010 (56.7%)	1144 (57.1%)
yes	1539 (43.9%)	1521 (62.7%)	1853 (43.0%)	1534 (43.3%)	860 (42.9%)
<b>Exposure to anti-tobacco media messages</b>					
no	1853 (52.9%)	1330 (53.8%)	1723 (40.1%)	1864 (53.2%)	1081 (54.1%)
yes	1648 (47.1%)	1144 (46.2%)	2574 (59.9%)	1638 (46.8%)	918 (45.9%)
<b>Seen anyone smoking inside or outside school, or on school property</b>					
no	2307 (65.9%)	1168 (46.7%)	2324 (54.5%)	2179 (61.6%)	1078 (54.0%)
yes	1195 (34.1%)	1334 (53.3%)	1951 (45.5%)	1360 (38.4%)	918 (46.0%)
<b>Seen people using tobacco when watching TV, videos or films</b>					
no	935 (26.6%)	1061 (42.6%)	1920 (44.3%)	1535 (43.8%)	493 (24.5%)
yes	2579 (73.4%)	1429 (57.4%)	2410 (55.7%)	1968 (56.2%)	1516 (75.5%)
<b>Exposure to tobacco marketing</b>					
no	1815 (51.6%)	1504 (59.6%)	1980 (68.2%)	2235 (63.4%)	1339 (66.7%)
yes	1700 (48.4%)	1021 (40.4%)	551 (21.8%)	1290 (36.6%)	667 (33.3%)

N/A, data not available

exposed to tobacco advertising was the highest in the Czech Republic (48.4%) and Lithuania (40.4%), while in Slovakia and Slovenia it was over 30%; the lowest rate was recorded among young people in Romania (21.8%). The majority of respondents reported that they had seen someone smoking inside school, or outside on school property (from 34.1% in

the Czech Republic to 53.3% in Lithuania), and that they had seen people using tobacco when they watched TV, videos, or movies (from 55.7% in Romania to 75.5% in Slovenia).

**Factors associated with the attitudes of young people toward restricting smoking in enclosing public places.**

**Table 2.** Factors associated with the attitudes of young people towards restricting smoking in enclosing public places - multivariate logistic regression

Characteristics	Czech Republic AOR adjusted odds ratio (95% CI)	Lithuania AOR adjusted odds ratio (95% CI)	Slovakia AOR adjusted odds ratio (95% CI)	Slovenia AOR adjusted odds ratio (95% CI)
<b>Gender</b>				
male (ref.)				
female	NS	1.69 (1.39-2.05)	1.35 (1.09-1.67)	2.20 (1.44-3.37)
<b>Age (years)</b>				
≥15 (ref.)				
14	0.92 (0.71-1.18)	NS	0.99 (0.78-1.27)	NS
≤13	0.91 (0.69-1.20)	NS	1.07 (0.81-1.40)	NS
<b>Parental smoking</b>				
yes (ref.)				
no	1.56 (1.20-2.02)	1.26 (0.90-1.76)	0.96 (0.75-1.24)	N/A
<b>Peers smoking</b>				
yes (ref.)				
no	1.52 (1.17-1.97)	1.20 (0.85-1.71)	1.68 (1.27-2.22)	N/A
<b>Exposure to secondhand smoking at home</b>				
yes (ref.)				
no	1.04 (0.80-1.36)	1.07 (0.75-1.52)	1.29 (1.00-1.68)	1.01 (0.64-1.59)
<b>Exposure to secondhand smoking in public places</b>				
yes (ref.)				
no	1.92 (1.52-2.43)	1.53 (1.08-2.17)	1.20 (0.93-1.54)	1.32 (0.83-2.09)
<b>Ever smoking (traditional cigarettes)</b>				
yes (ref.)				
no	1.48 (1.13-1.94)	1.26 (0.88-1.80)	2.07 (1.59-2.68)	1.80 (1.09-2.97)
<b>Current smoking (traditional cigarettes)</b>				
yes (ref.)				
no	4.74 (3.61-6.23)	2.45 (1.65-3.64)	2.85 (2.19-3.70)	4.33 (2.32-8.07)
<b>Knowledge about harmful effects of secondhand smoking</b>				
no (ref.)				
yes	2.48 (1.83-3.35)	2.34 (1.63-3.37)	3.15 (2.37-4.18)	4.91 (2.88-8.36)
<b>Anti-smoking education provided by family</b>				
no (ref.)	NS	1.27 (0.93-1.73)	NA	NS
yes				
<b>School discussion about health effect of smoking</b>				
no (ref.)				
yes	1.26 (1.01-1.57)	1.79 (1.30-2.45)	1.36 (1.09-1.69)	NS
<b>Exposure to anti-tobacco media messages</b>				
no (ref.)				
yes	1.20 (0.96-1.50)	1.51 (1.11-2.06)	1.34 (1.08-1.67)	NS
<b>Seen anyone smoking inside or outside school, or on school property</b>				
no (ref.)				
yes	1.10 (0.88-1.38)	NS	1.02 (0.82-1.21)	NS
<b>Seen people using tobacco when watched TV, videos or films</b>				
yes (ref.)				
no	1.35 (1.03-1.76)	1.02 (0.74-1.39)	NS	NS
<b>Exposure to tobacco marketing</b>				
yes (ref.)				
no	1.09 (0.87-1.36)	1.26 (0.89-1.79)	1.18 (0.95-1.47)	1.36 (0.90-2.06)

NS, not significant in univariable model (at significance level  $p=0.05$ ); OR, odds ratio; CI, 95% confidence interval



Table 2 shows the results of a multivariate logistic regression analysis to identify factors associated with the attitudes of young people towards restricting smoking in enclosed public places. The analysis was conducted in four countries: the Czech Republic, Lithuania, Slovakia, and Slovenia. The study found that females were more likely than males to have a positive attitude towards restricting smoking in enclosed public places (AOR=2.20, 95% CI: 1.44–3.37 in Slovenia; AOR=1.69, 95% CI: 1.39–2.05 in Lithuania and AOR=1.35, 95% CI: 1.09–1.67 in Slovakia). Also, older adolescents were more likely than younger adolescents to have a positive opinion on actions to reduce smoking in closed public places.

Regarding smoking attitudes, the analysis showed that the lack of tobacco smoking among teenagers is a positive factor for efforts to reduce smoking in public places. Young adults who had never smoked compared to smokers, had a positive attitude towards reducing smoking (AOR=2.07, 95% CI: 1.59–2.68 in Slovakia; AOR=1.80, 95% CI: 1.09–2.97 in Slovenia; AOR=1.48, 95% CI: 1.13–1.94 in Czech Republic and AOR=1.26, 95% CI: 0.88–1.80 in Lithuania). Furthermore, compared with current smoking, those who had never smoked were also significantly associated with positive attitude toward restricting smoking in all five analyzed countries, with an AOR= 4.74 (95% CI: 3.61–6.23), AOR=4.33 (95% CI: 2.32–8.07), AOR=2.85 (95% CI: 2.19–3.70) and AOR=2.45 (95% CI: 1.65–3.64), respectively.

Additionally, a relationship was found between secondhand smoke exposure in the respondents' homes and positive attitudes towards restrictive smoking activities. The analysis showed that respondents from the Czech Republic (AOR=1.56, 95% CI: 1.20–2.02) and Lithuania (AOR=1.26, 95% CI: 0.90–1.76) whose parents do not smoke, were more positive about reducing smoking in enclosed public places compared to teenagers whose parents smoke. This relationship was not observed for adolescents from Slovakia, where the risk was AOR=0.96 (95% CI: 0.75–1.24).

The situation was similar in the case of passive smoking. The study found that adolescents who were not exposed to secondhand smoke at home were more likely to have a positive attitude towards restricting smoking in enclosed public places, than adolescents who are exposed to secondhand smoke. Statistically significant risk was recorded for respondents from Slovakia (AOR=1.29, 95% CI: 1.00–1.68). Young people who had peers who smoked were mostly associated with an increase in acceptance of banning smoking inside enclosed public places. The analysis showed that young adults who did not have peers who smoke were, on average, 50% (AOR=1.68, 95% CI: 1.27–2.22 in Slovakia and AOR=1.52, 95% CI: 1.17–1.97 in the Czech Republic) more likely to support anti-tobacco activities in enclosing public places than those who have peers who use tobacco products. For those who did not report being exposed to secondhand smoke in public places in the Czech Republic and Lithuania, a statistically significant positive attitude was observed; AOR – 1.92 (95% CI: 1.52–2.43) and 1.53 (95% CI: 1.08–2.17), respectively.

The study found that adolescents who had knowledge about the harmful effects of secondhand smoke were more likely to have a positive attitude towards restricting smoking in enclosed public places, than adolescents who did not have this knowledge. Young people who received knowledge about the harmful effects of smoking were 2–5 times more likely to support the ban on smoking in enclosed public places than teenagers who did not have such knowledge. The highest

positive correlation was shown in Slovenia (AOR=4.91; 95% CI: 2.88–8.36) and Slovakia (AOR=3.15; 95% CI: 2.37–4.18), while in the Czech Republic and Lithuania, this relationship was statistically significant – AOR=2.48 (95% CI: 1.83–3.35) and AOR=2.34 (95% CI: 1.63–3.37), respectively.

The study also showed that among the respondents who attended schools where anti-smoking education classes were conducted, they were statistically significantly more positive about tobacco bans, compared to students who did not receive such an education in their schools (AOR=1.79, 95% CI: 1.30–2.45 in Lithuania; AOR=1.36, 95% CI: 1.09–1.69 in Slovakia and AOR=1.26, 95% CI: 1.01–1.57 in the Czech Republic). In addition, young people exposed to anti-tobacco messages were significantly (AOR=1.51, 95% CI: 1.11–2.06 in Lithuania and AOR=1.34, 95% CI: 1.08–1.67 in Slovakia) more likely to support smoking bans in public places than those who were not exposed. In contrast, lack of exposure to smoking marketing among adolescents was associated with greater acceptance of the smoking ban, but the results obtained were not statistically significant.

#### **Factors associated with the attitudes of young people towards restricting smoking in outdoor public places.**

Table 3 shows the results of a multivariate logistic regression analysis of factors related to teenagers' attitudes towards smoking bans in outdoor public places in the five countries: Czech Republic, Lithuania, Romania, Slovakia, and Slovenia. With regard to the multivariate logistic regression analysis of these factors, the obtained results showed similar relationships. The study found that several factors were significantly associated with the attitudes of young people towards restricting smoking in outdoor public places. These factors include: gender, age, ever and current smoking, parents and peers smoking, exposure to second-hand smoke at home and in outdoor public places, knowledge about the harmful effects of secondhand smoke, anti-smoking education provided by family, school discussion about health effect of smoking, seen people using tobacco when watched TV, videos or movies and exposure to tobacco marketing.

Females and younger people were more likely than males and older adolescents to support restricting smoking in outdoor public places. Similar to the analyzes of indoor smoking ban factors, the results of this part of the study suggest that young people who have no personal experience with smoking or secondhand smoke are more likely to support reducing smoking in outdoor public places. The statistically significant association between never smokers and support for restricting smoking was strongest in the Slovenia (AOR=2.31; 95% CI: 1.78–2.99), the Czech Republic (AOR=1.87; 95% CI: 1.58–2.22) and Slovakia (AOR=1.72; 95% CI: 1.45–2.04). In Romania and Lithuania the risk was 1.58 (95% CI: 1.27–1.97) and 1.36 (95% CI: 1.05–1.76), respectively. No current smoking increased this relationship to AOR=3.16, 95% CI: 2.36–4.22 in the Czech Republic; AOR=2.81; 95% CI: 1.65–4.78 in Slovenia; AOR=2.48, 95% CI: 1.76–3.45 in Lithuania; AOR=2.06; 95% CI: 1.47–2.88 in Romania and AOR=1.53; 95% CI: 1.19–1.97 in Slovakia.

In addition, young people who are not exposed to secondhand smoke at home were also more likely to support restricting smoking than those who are exposed; significant statistical results were obtained for Lithuania (AOR=1.39; 95% CI: 1.08–1.78) and Slovenia (AOR=1.79; 95% CI: 1.42–2.27). For exposure to smoking in public places, there was

**Table 3.** Factors associated with the attitudes of young people towards restricting smoking in outdoor public places - multivariate logistic regression

Characteristics	Czech Republic AOR adjusted odds ratio (95% CI)	Lithuania AOR adjusted odds ratio (95% CI)	Romania AOR adjusted odds ratio (95% CI)	Slovakia AOR adjusted odds ratio (95% CI)	Slovenia AOR adjusted odds ratio (95% CI)
<b>Gender</b>					
Male (ref.)					
Female	NS	0.65 (0.52-0.81)	NS	1.28 (1.10-1.48)	1.15 (0.94-1.41)
<b>Age (years)</b>					
≥15 (ref.)					
14	1.04 (0.86-1.25)	0.77 (0.60-0.99)	1.35 (1.07-1.71)	1.11 (0.92-1.33)	1.25 (0.98-1.59)
≤13	1.26 (1.04-1.52)	1.00 (0.73-1.36)	1.54 (1.20-1.99)	1.19 (0.98-1.44)	1.28 (0.96-1.69)
<b>Parental smoking</b>					
yes (ref.)					
no	1.09 (0.91-1.32)	1.08 (0.84-1.38)	1.32 (1.06-1.63)	1.12 (0.93-1.34)	N/A
<b>Peers smoking</b>					
yes (ref.)					
no	1.53 (1.30-1.80)	1.26 (0.98-1.61)	1.41 (1.16-1.71)	1.35 (1.14-1.60)	N/A
<b>Exposure to secondhand smoking at home</b>					
yes (ref.)					
no	1.15 (0.94-1.40)	1.39 (1.08-1.78)	0.92 (0.73-1.16)	1.06 (0.87-1.29)	1.79 (1.42-2.27)
<b>Exposure to secondhand smoking in outdoor public places</b>					
yes (ref.)					
no	1.30 (1.08-1.55)	NS	1.26 (1.03-1.55)	1.23 (1.02-1.48)	1.20 (0.95-1.51)
<b>Ever smoking (traditional cigarettes)</b>					
yes (ref.)					
no	1.87 (1.58-2.22)	1.36 (1.05-1.76)	1.58 (1.27-1.97)	1.72 (1.45-2.04)	2.31 (1.78-2.99)
<b>Current smoking (traditional cigarettes)</b>					
yes (ref.)					
no	3.16 (2.36-4.22)	2.48 (1.79-3.45)	2.06 (1.47-2.88)	1.53 (1.19-1.97)	2.81 (1.65-4.78)
<b>Knowledge about harmful effects of secondhand smoking</b>					
no (ref.)					
yes	2.17 (1.64-2.88)	1.51 (1.11-2.05)	2.98 (2.36-3.76)	1.66 (1.26-2.18)	1.60 (1.02-2.51)
<b>Anti-smoking education provided by family</b>					
no (ref.)					
yes	NS	NS	1.36 (1.11-1.66)	NA	1.38 (1.11-1.71)
<b>School discussion about health effect of smoking</b>					
no (ref.)					
yes	NS	1.24 (0.78-1.58)	1.14 (0.95-1.36)	1.35 (1.16-1.57)	1.06 (0.86-1.30)
<b>Exposure to anti-tobacco media messages</b>					
no (ref.)					
yes	1.30 (1.12-1.52)	1.22 (0.98-1.53)	1.20 (1.01-1.44)	1.24 (1.07-1.45)	NS
<b>Seen anyone smoking inside or outside school, or on school property</b>					
no (ref.)					
yes	NS	NS	1.55 (1.29-1.87)	NS	1.00 (0.80-1.24)
<b>Seen people using tobacco when watched TV, videos or films</b>					
yes (ref.)					
no	1.30 (1.08-1.55)	NS	NS	1.11 (0.95-1.30)	1.36 (1.06-1.75)
<b>Exposure to tobacco marketing</b>					
yes (ref.)					
no	1.17 (1.00-1.37)	NS	NS	1.15 (0.98-1.35)	1.17 (0.94-1.46)

NS - not significant in univariable model (at significance level  $p=0.05$ ); OR - odds ratio; CI - 95% confidence interval

an approximately 20–30% increase in risk, ranging from AOR=1.30 (95% CI: 1.08–1.55) in the Czech Republic to 1.26 (95% CI: 1.03–1.55) in Romania and 1.23 (95% CI: 1.02–1.48) in Slovakia.

Respondents who had knowledge about the harmful effects of secondhand smoke were more likely to have a positive attitude towards restricting smoking in outdoor public places. The association between knowledge about the harmful effects of second-hand smoke and support for restricting smoking was strongest in Romania and the Czech Republic – AOR=2.98 (95% CI: 2.36–3.76) and 2.17 (1.64–2.88), respectively. Analysis also showed that adolescents who had received anti-tobacco education at home or school had a positive attitude towards measures to reduce smoking in enclosed public places. In turn, a statistically significant relationship between exposure to anti-tobacco media messages and support for restricting smoking, was observed for young respondents from the Czech Republic (AOR=1.30; 95% CI: 1.12–1.52), Romania (AOR=1.20; 95% CI: 1.01–1.44) and Slovakia (AOR=1.24; 95% CI: 1.07–1.45). In contrast, exposure to tobacco advertising showed an increased risk of lower support among adolescents due to smoking bans in outdoor public places, but these associations were not statistically significant.

## DISCUSSION

More than seven million deaths per year worldwide are the result of direct tobacco smoking, and approximately 1.3 million are the result of exposure of non-smokers to secondhand smoke [12]. Smoking is the leading preventable cause of death and a major burden on economic development, so the scale of the damage to public health caused by tobacco is no longer in question [13, 14, 15]. Although smoking prevalence has declined in high-income countries during recent decades, at the same time tobacco products have become popular and fashionable among adolescents and young adults. The growing popularity of tobacco products, including novel tobacco products, is a legitimate cause for concern because adolescence is the period when most smokers start smoking. Cigarette smoking is one of the main unfavourable behaviours among children and young people, and regular smoking of tobacco products is already a serious problem among young people. The presented survey shows that every tenth teenager admitted to smoking cigarettes in the last 30 days. Additionally, at least a quarter of young people had been exposed to secondhand smoke, both at home and in outdoor public places and indoor public places, and more than 50% of the teenagers declared that they had peers who smoked. In contrast, many respondents said that their families did not provide them with anti-smoking education, or that there was no discussion at school about the health effects of smoking.

In the presented study the lack of knowledge about the harmfulness of passive smoking and the lack of anti-smoking education in the family and school were indicated as an important factor influencing the lack of acceptance of smoking bans among young people. The study found that young people who received knowledge about the harmful effects of smoking were 2–5 times more likely to support a smoking ban than teenagers who did not have such knowledge. Knowledge about smoking and its consequences enhances the development of social competences and influences adolescents' attitudes and beliefs, especially if they

are incorrect or influenced by social or environmental factors such as tobacco marketing [16]. Therefore, one of the key elements of a tobacco control strategy is the dissemination of knowledge about the harmful effects of smoking and passive smoking. An important element of the anti-smoking strategy is the health education of youth on the harmful effects of tobacco smoking, and limiting places where young adults would be exposed to the risk of secondhand smoke.

The awareness that smoke from other people's smoking is harmful to passive smokers influences young people's support for banning smoking in public places. These results, as in other studies, indicate the need to create smoke-free environments with the effective enforcement of legal regulations [17, 18].

An important tool to reduce exposure to tobacco smoke is the introduction of a legal ban on smoking in public places. It is an effective method of reducing the use of nicotine products, recommended by the World Health Organization, as well as the negative effects of passive smoking among children and adolescents [19]. The findings of this study suggest that young people's attitudes towards restricting smoking in indoor and outdoor public places are influenced by their personal experiences with smoking and second-hand smoke, as well as their exposure to anti-tobacco messages. However, there are some differences in the prevalence of smoking and exposure to tobacco use between the countries. These differences may be due to a number of factors, such as cultural norms, tobacco control policies, and access to tobacco.

The study also has some limitations, related mainly to the cross-sectional nature of the study in which data were collected in one period of time, and the analysis of their occurrence and relationships concerns a given moment, therefore it is difficult to establish a causal relationship and examine the temporal relationship between the results and risk factors. Second, the results of the study relied on self-completion of the questionnaire, which may have been affected by reporting bias. In addition, the GYTS questionnaire contains several basic questions, with the possibility of selecting or adding additional questions, depending on the country or specific topics studied. Therefore, some variables were not available in all analyzed populations, hence the missing data in some of the respondents' answers.

However, the study has important implications, and highlights the importance of the topic of the factors that influence young people's attitudes towards the ban on smoking in public places for further research into the interpretation of the obtained results. The main strength of this study is the large and heterogeneous study population, which allows generalization of the results to determine the prevalence and associations of multiple exposures and outcomes.

The study shows that young people's attitudes towards banning smoking in public places vary and depend on a variety of factors, including: knowledge of the dangers of smoking (the more young people know about the dangers of smoking, the more they support smoking bans), experience of secondhand smoke (young people who have not been exposed to second-hand smoke are more likely to support smoking limiting in public places), exposure to pro-smoking campaigns (advertising may not have a positive effect on supporting smoking restricting in public places among young people), parental attitudes towards smoking (if parents do not smoke, their children are more likely to support smoking bans), and peer pressure (youths who have friends who smoke



are more likely to disapprove of restricting smoking). These findings can be used to develop interventions to increase support for smoke-free indoor and outdoor spaces.

Strategies to reduce tobacco consumption and use of nicotine-containing products among adolescents is one of the most important challenges facing the public health sector today [20, 21, 22]. Young people are an important target group because smoking most often begins in adolescence, and experiments with cigarettes often lead to later nicotine addiction [23]. Health behaviours shaped in the early stages of development, reinforced by patterns environmental and social norms, have a huge impact on attitudes and behaviour. Social acceptance of smoking and popularization of products containing nicotine through advertising or promotion, may lead to the belief that smoking is a normal behaviour and influence the initiation of smoking by young people [24]. Understanding how youths respond to tobacco control efforts can help develop effective tobacco control strategies and health protection against the consequences of using tobacco products. The attitude of young people towards smoking cigarettes is very context-specific, depending on the socio-cultural environment, and may be contrary to legal regulations. Therefore, it is crucial to monitor tobacco use among young people, study the social environment and its impact on the effectiveness of tobacco control policies.

## CONCLUSIONS

The current epidemiological situation related to an increased risk of subsequent cigarette smoking and secondhand smoke exposure among adolescents, remains a serious challenge for public health. It is important to introduce more comprehensive smoking bans in public places where children and young people are present. The results obtained in this study suggest which factors may increase the support of counseling for tobacco control policies. These findings provide evidence of the most important factors that influence young people's attitudes to smoking bans in public places, and can be used to develop interventions to promote support for restricting smoking in enclosed public places among young people. The focus of these interventions should be particularly on the target group of those young people who are more likely to be opposed to smoking reduction, such as males, younger adolescents, young people who have parents who smoke, and who are exposed to secondhand smoke, teenagers who have ever smoked cigarettes, and young people who do not have knowledge about the harmful effects of secondhand smoking.

## Acknowledgements

This paper uses data from the Global Youth Tobacco Survey (GYTS). GYTS is supported by the World Health Organization and the US Centers for Disease Control and Prevention.

## REFERENCES

- Park Lee E, Ren C, Cooper M, et al. Tobacco Product Use Among Middle and High School Students – United States, 2022. *Morbidity and Mortality Weekly Report*. 2022;71:45. <https://www.cdc.gov/mmwr/volumes/71/wr/mm7145a1.htm> (access: 2023.08.28).
- Lagerweij NA, Kuipers MAG, et al. The visibility of smoking in Europe and its relationship with youth's positive beliefs about smoking. *Int J Public Health*. 2019;64(9):1335–1344. <https://doi:10.1007/s00038-019-01288-z>
- Kang H, Cho SI. Cohort effects of tobacco control policy: evidence to support a tobacco-free norm through smoke-free policy. *Tob Control*. 2020;29(1):96–102. <https://doi:10.1136/tobaccocontrol-2018-054536>
- U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012. [https://www.ncbi.nlm.nih.gov/books/NBK99237/pdf/Bookshelf\\_NBK99237.pdf](https://www.ncbi.nlm.nih.gov/books/NBK99237/pdf/Bookshelf_NBK99237.pdf) (access: 2023.08.28).
- Centers for Disease Control and Prevention. *Best Practices for Comprehensive Tobacco Control Programs—2014*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014. <https://www.cdc.gov/tobacco/stateandcommunity/guides/index.htm> (access:2023.08.28).
- The Act of 9 November 1995 on Health Protection against the Consequences of Tobacco and Tobacco Products. *J Laws* 1996, No. 10, item 55, as amended.
- Jankowski M, Rees V, Zgliczyński WS, et al. Self-reported secondhand smoke exposure following the adoption of a national smoke-free policy in Poland: analysis of serial, cross-sectional, representative surveys, 2009–2019. *BMJ Open*. 2020;10(9):e039918. <https://doi:10.1136/bmjopen-2020-039918>
- Catalano MA, Gilleskie DB. Impacts of local public smoking bans on smoking behaviors and tobacco smoke exposure. *Health Econ*. 2021;30(8):1719–1744. <https://doi:10.1002/hec.4280>
- Reitsma MB, Flor LS, Mullany EC, et al. Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and initiation among young people in 204 countries and territories, 1990–2019. *Lancet Public Health*. 2021;6(7):e472–e481. [https://doi:10.1016/S2468-2667\(21\)00102-X](https://doi:10.1016/S2468-2667(21)00102-X)
- Centers for Disease Control and Prevention. *Global tobacco surveillance system data*. <https://www.cdc.gov/tobacco/global/gtss/gtssdata/index.html> (access: 2023.08.28).
- World Health Organization. *Global Youth Tobacco Survey*. <https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/global-youth-tobacco-survey> (access: 2023.08.28).
- GBD 2019 Tobacco Collaborators. Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and attributable disease burden in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019. *Lancet*. 2021;397(10292):2337–2360. [https://doi:10.1016/S0140-6736\(21\)01169-7](https://doi:10.1016/S0140-6736(21)01169-7)
- Goodchild M, Nargis N, Tursan d'Espaignet E. Global economic cost of smoking-attributable diseases. *Tobacco Control*. 2018;27:58–64. <https://doi:10.1136/tobaccocontrol-2016-053305>
- World Health Organization. *WHO global report on trends in prevalence of tobacco use 2000–2025, fourth edition*. WHO, Geneva, 2021 <https://www.who.int/publications/i/item/9789240039322> (access: 2023.08.28).
- Wen H, Xie C, Shi F, et al. Trends in Deaths Attributable to Smoking in China, Japan, United Kingdom, and United States From 1990 to 2019. *Int J Public Health*. 2022;67:1605147. <https://doi:10.3389/ijph.2022.1605147>
- Harvey J, Chadi N. Canadian Paediatric Society, Adolescent Health Committee. *Preventing smoking in children and adolescents: Recommendations for practice and policy*. *Paediatr Child Health*. 2016;21(4):209–21. <https://doi:10.1093/pch/21.4.209>
- World Health Organization. *WHO Report on the Global Tobacco Epidemic, 2009: implementing smoke-free environments*. <https://apps.who.int/iris/handle/10665/44229> (access: 2023.08.28).
- Polanska K, Znyk M, Kaleta D. Susceptibility to tobacco use and associated factors among youth in five central and eastern European countries. *BMC Public Health*. 2022;11;22(1):72. <https://doi:10.1186/s12889-022-12493-6>
- National Cancer Institute. *Influence of Tobacco Marketing on Smoking Behavior*. [https://cancercontrol.cancer.gov/sites/default/files/2020-06/m19\\_7.pdf](https://cancercontrol.cancer.gov/sites/default/files/2020-06/m19_7.pdf) (access: 2023.08.28).
- Levy DT, Wijnhoven TMA, Levy J, et al. Potential health impact of strong tobacco control policies in 11 South Eastern WHO European Region countries. *Eur J Public Health*. 2018;28(4):693–701. <https://doi:10.1093/eurpub/cky028>
- Flor LS, Reitsma MB, Gupta V, et al. The effects of tobacco control policies on global smoking prevalence. *Nat Med*. 2021;27(2):239–243. <https://doi:10.1038/s41591-020-01210-8>
- Jenssen BP, Walley SC, Boykan R, et al. Protecting Children and Adolescents From Tobacco and Nicotine. *Pediatrics*. 2023;151(5):e2023061804. <https://doi:10.1542/peds.2023-061806>
- World Health Organization. *Regional Office for the Eastern Mediterranean. Young people and tobacco use*. [https://apps.who.int/iris/bitstream/handle/10665/204208/Fact\\_Sheet\\_TFI\\_2014\\_EN\\_15319.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/204208/Fact_Sheet_TFI_2014_EN_15319.pdf?sequence=1&isAllowed=y) (access: 2023.08.28).
- World Health Organization. *WHO report on the global tobacco epidemic, 2017: monitoring tobacco use and prevention policies*. <https://apps.who.int/iris/handle/10665/255874> (access: 2023.08.28).