

THE USE OF DIFFERENT TOBACCO AND RELATED PRODUCTS, WITH AND WITHOUT FLAVOURS, AMONG 15-YEAR-OLDS IN SLOVENIA UPORABA RAZLIČNIH TOBAČNIH IN S TOBAKOM POVEZANIH IZDELKOV Z OKUSOM ALI BREZ NJEGA MED PETNAJSTLETNIKI V SLOVENIJI

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ABSTRACT

Keywords:

smoking, tobacco,
adolescents

Background. Different tobacco and related products, like waterpipe, e-cigarettes, are gaining popularity among adolescents in different countries; the data for Slovenia is currently limited. The purpose of this paper is to present the latest data on the use of different tobacco and related products, with or without flavours, among 15-year old students in Slovenia.

Methods. Data for 15-year-old students were drawn from 2014 Slovene database of the cross-national survey Health Behaviour in School-Aged Children. The survey sample was selected with stratified two-stage sampling method. The survey was performed in schools with a self-administered web questionnaire. The survey questionnaire included international compulsory, selected optional and national questions, all on a variety of topics related to youth health behaviour.

Results. 25.2% of 15-year-old students reported current (past 30-day) use of any tobacco related product, mainly cigarettes (93.1% of users), followed by waterpipe (11.7%) and cigars, cigarillos and pipes (9.4%). Exclusive use of unconventional products is low (5.1% of users). 85.5% of users of any product used one product, 48.5% of users used products with flavours. The use of different products, one or more products, and flavoured products was related to gender.

Conclusion. A comprehensive tobacco control and prevention must address all tobacco and related products.

IZVLEČEK

Ključne besede:

kajenje, tobak,
adolescenti

Uvod. Med mladostniki v tujini postajajo vedno bolj popularni različni tobačni in s tobakom povezani izdelki, kot so vodne pipe ali elektronske cigarete, za Slovenijo pa imamo o tem na voljo omejene podatke. Namen prispevka je prikaz najnovejših podatkov o uporabi tobačnih in s tobakom povezanih izdelkov z okusom ali brez njega med vsolanimi petnajstletniki v Sloveniji.

Metode. Uporabili smo podatke za vsolane petnajstletnike iz slovenske podatkovne baze presečne raziskave Z zdravjem povezana vedenja v šolskem obdobju 2014. Za oblikovanje vzorca je bilo uporabljeno dvostopenjsko stratificirano vzorčenje. Anketiranje je potekalo v šolah s pomočjo spletne ankete. Vprašalnik obsega niz mednarodnih obveznih in opcijskih vprašanj ter nekaj nacionalnih vprašanj o različnih področjih z zdravjem povezanih vedenj mladostnikov.

Rezultati. O uporabi vsaj enega tobačnega ali s tobakom povezanega izdelka v zadnjih 30 dneh je poročalo 25,2% vsolanih petnajstletnikov, največ o uporabi cigaret (93,1% uporabnikov), vodnih pip (11,7%) ter cigar, cigariloso in pip (9,4%). Izključna uporaba nekonvencionalnih izdelkov je nizka (5,1% uporabnikov). 85,5% uporabnikov kateregakoli izdelka je uporabljalo en izdelek, 48,5% izdelke z dodanimi okusi. Uporaba različnih tobačnih in s tobakom povezanih izdelkov, enega ali več izdelkov in izdelkov z dodanimi okusi se je razlikovala med spoloma.

Zaključek. Celovit program nadzora nad tobakom in preprečevanje rabe tobaka morata vključevati vse različne tobačne in s tobakom povezane izdelke.

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1 INTRODUCTION

Tobacco use is the leading preventable cause of death in Slovenia (1), and one of the leading risk factors in terms of attributable DALYs (2). Smoking is initiated mainly by adolescents; 84.7% of ever smokers in Slovenia, aged 35-44, first smoked at 19 years of age or less (3). Although data on adolescent prevalence and trends of tobacco use in Slovenia is available (4-6), much less is known about adolescents' use of different types of tobacco and related products. Different patterns and trends of use are present in different countries; in some the situation changed extensively in only a few years, which shows the importance of a regular surveillance of the use of these products (7, 8). In the United States of America (the USA), adolescents' use of electronic cigarettes (e-cigarettes) and waterpipe surpassed cigarette use. In 2014, those aged 14-18 mostly used e-cigarettes (13.4%) and waterpipe (9.4%), followed by cigarettes (9.2%) and cigars (8.2%). E-cigarette use tripled and waterpipe use almost doubled from 2013 to 2014, while the use of cigarettes and cigars equivalently decreased (7). In Canada, where e-cigarettes and liquids with nicotine are not approved for sale, 2.6% of 15-19-year-olds reported current use of e-cigarettes in 2013 (9). In Poland, 29.9% of 15-19-year-olds used e-cigarettes in 2013-2014, the share increased from 5.5% in 2010-2011 (8). In Finland, 2.0% of 12-18-year-olds in 2013 reported the use of e-cigarettes more than 20 times in life (10), while in the United Kingdom, 3.0% of 11-16-year-olds reported at least monthly use of e-cigarettes in 2014 (11). Waterpipe is also gaining popularity among youth (7, 12). Current waterpipe use was reported by 10.2% of 15-year-olds in Sweden in 2011 (13), 34.9% of 15-year-olds in Estonia in 2006 (14), 22.4% of 13-15-year-olds in Czech Republic, and 13.8% of 13-15-year-olds in Slovakia in 2011 (15). Hand-rolled cigarettes are another popular product among youth (16, 17). In Croatia, 13% of 13-15-year-olds smoked hand-rolled cigarettes in 2011, in Slovakia 6.2% in 2011, and in Italy 8.2% in 2010 (15). In Canada in 2008-2009, 24.2% of current smokers, aged 14-18 years, smoked hand-rolled cigarettes (16). Flavours in tobacco and related products increase the appeal of these products to youth (18). In Poland in 2009-2010, 12.3% of 15-19-year-olds used flavoured cigarettes (19). In Canada, 50.0% of 14-18-year-old users of any tobacco product reported the use of products with flavours in 2012/13, and in the USA, 73.0% in 2014 (both countries have already introduced bans on flavours (excluding menthol) in selected tobacco products) (20, 21). Limited data also shows high shares of adolescents reporting current use of more than one tobacco or related product. In the USA in 2014, 51.3% of 14-18-year-old users of any product used more than one product (7).

The latest data on the use of different tobacco and related products among Slovene youth is available from

2011/2012 (15, 17). The most used products in 15-24 age group are manufactured cigarettes, hand-rolled cigarettes and waterpipe (92.7%, 18.0% and 3.9% of current users, respectively) (17). Among 13-15-year-olds, 23.8% used manufactured cigarettes, 10.9% hand-rolled cigarettes, 9.8% waterpipe, 7.9% cigars, mini cigars or cigarillos, and 3.6% chewing tobacco or snus, while the study gives no data on the use of e-cigarettes (15). We found no published data on the use of flavoured products and more than one tobacco and related product among adolescents in Slovenia. The aim of this article is to present the most recent data on the use of different tobacco and related products (with and without flavours), and multiple tobacco and related products among 15-year-old students in Slovenia, and to explore differences in the use of these products by gender, age at smoking initiation, and the frequency of current smoking.

2 METHODS

Data for 15-year-old students were drawn from 2014 Slovene database of the cross-sectional survey Health Behaviour in School-Aged Children, carried out on a nationally representative sample of 11-, 13- and 15-year-old students attending schools. The basis for the sample were the data from the Ministry of education, science and sport about the enrolment and number of classes for the school year 2013/2014. The sample was drawn from the list of all relevant classes. The primary sampling unit was school class; classes were randomly selected. Stratified two-stage sampling was used. At the first stage, primary and secondary schools were selected, and at the second stage, among secondary schools, classes within different school programmes were selected (grammar school, 4-year technical school, middle vocational school and lower vocational school). The survey was performed in schools with a self-administered web questionnaire from 3rd to 14th February 2014. The final response rate (based on selected classes) was 92.7%. The sampling procedure met all international requirements on representativeness, so we did not decide to weight the data, despite minor differences in gender distribution of the sample in comparison to population gender distribution at the beginning of the school year. Survey methodology in detail is available elsewhere (4). The survey questionnaire included international compulsory, selected optional and national questions, all on a variety of topics related to youth health behaviour (questions on different demographic factors, eating habits, weight control and body image, physical activity, sedentary behaviour, risk behaviour, sexual health, violence and injuries, family culture, peer culture, health and wellbeing, school and social inequality), including tobacco and related products use. Questions on the use of different tobacco and related products, flavoured products, the number of cigarettes

smoked in the last 30 days, and age at first cigarette smoking were answered only by 15-year-old students.

The use of different tobacco and related products was assessed by a national question, asking about the use of different products during the last 30 days (manufactured cigarettes, hand-rolled cigarettes, cigarillos, cigars, pipes, smokeless tobacco, e-cigarettes, waterpipe, others). For a part of our analysis, we merged products in two categories, namely conventional (cigarettes, cigarillos, cigars, pipes) and unconventional (smokeless tobacco, e-cigarettes, waterpipe, others) products.

The use of flavoured products was assessed by a national question, asking about the use of products with flavours during the last 30 days (yes, I used only products with flavours; yes, I used products with and without flavours; no; I do not know). The share of those using flavoured products was calculated by combining the first two answers.

The number of cigarettes smoked during the last 30 days was assessed by an optional question (none; less than one a week; less than one a day; 1-5 a day; 6-10 a day; 11-20 a day; more than 20 a day). The age at cigarette smoking initiation (more than one puff) was assessed by a compulsory question (never; 11 or earlier; 12; 13; 14; 15 and 16 years of age or more). Both questions were used or adapted from the European School Survey Project on Alcohol and Other Drugs (ESPAD) survey. The data on current tobacco smoking was acquired by a compulsory question (every day; at least once a week, but not every day; less than once a week; I do not smoke).

To estimate the number of tobacco and related products users among 15-year-old students in Slovenia, we used the data from Statistical office on the number of 15-year-old inhabitants of Slovenia in the first half of 2014 (18.532 15-year-olds).

All analyses were conducted in IBM SPSS 21. We used the Chi-square test (χ^2) and correlation matrix to examine the association and correlation between selected variables; the significance level used was 0.05. If estimations are of lower accuracy, they are labelled with letters M (standard error of share on interval from 5% to 15%) and should be used with caution.

3 RESULTS

Our final sample comprised of 4.997 11-, 13- and 15-year-old students and was representative of the whole population of 11-, 13- and 15-year-old students in Slovenia. The final response rate was 92.7%. Both genders were equally represented (51.0% female, 49.0% male). In our final sample, 68.3% of all students attended primary, 12.9% grammar, 12.1% technical and 6.7% vocational schools. The sample of 15-year-old students, analysed in this study, consisted of 1.615 pupils, 46.1% male and 53.9% female.

Any tobacco or related product use during the last 30 days was reported by 25.2% of 15-year-old students (Table 1). The use of the majority of different types of tobacco and related products was related to gender.

Table 1. The use of different tobacco and related products during the last 30 days among all 15-year-old students (n=1558) and users of any product (n=392).

	Both genders			Boys			Girls			P (diff. among genders for all 15-year-old students)	Estimated number of users among 15-year-olds of both genders
	n	% among all 15-year-old students*	% among users**	n	% among all 15-year-old male students*	% among users**	n	% among all 15-year-old female students*	% among users**		
any product	392	25.2%	100.0%	182	25.6%	100.0%	210	24.8%	100.0%	0,869	4670
manufactured cigarettes	300	19.3%	76.5%	118	16.6%	64.8%	182	21.5%	86.7%	0.016	3577
hand-rolled cigarettes	162	10.4%	41.3%	94	13.2%	51.6%	68	8.0%	32.4%	0.001	1927
waterpipe	46	3.0%	11.7%	31	4.4%	17.0%	15	1.8%	7.1%	0.003	556
cigarillos, cigars, pipes	37	2.4%	9.4%	25	3.5%	13.7%	12	1.4%	5.7%	0.007	445
e-cigarettes	14	0.9%	3.6%	11	1.5%	6.0%	3	0.4%	1.4%	0.013	167
smokeless tobacco	11	0.7%	2.8%	8	1.1%	4.4%	3	0.4%	1.4%	0.070	130
other	6	0.4%	1.5%	4	0.6%	2.2%	2	0.2%	1.0%	0.299	74

*the sum of shares for each product exceeds the share of users of any product as one person can use more than one product

**shares for each product together exceed 100% as one person can use more than one product

Regardless of the type, cigarettes were used by 93.1% of all 15-year-old students that used any tobacco or related product, by 87.9% of boys and 93.3% of girls. The number of cigarettes smoked during the last 30 days (Figure 1) was not related to gender ($p=0.455$).

When considering manufactured and hand-rolled cigarettes as one product, the majority of 15-year-old students that used any tobacco or related product (85.5%) used one product (Table 2); the use was related to gender ($p=0.001$). The most frequent combinations used were cigarettes with waterpipe or e-cigarette. Only one 15-year-old student used solely e-cigarettes, others used e-cigarettes and other products (12 of 14 e-cigarette users also smoked cigarettes). 15 of 46 waterpipe users used solely waterpipe, others used also other products (29 of 31 waterpipe users also smoked cigarettes).

The use of one or more tobacco and related products is not linked to the frequency of current smoking (Table 3); however, it is associated with the age at smoking initiation (Table 4).

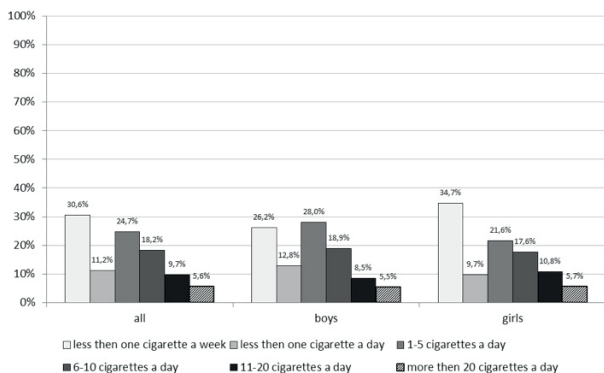


Figure 1. The number of cigarettes smoked during the last 30 days among 15-year-old students who are cigarette smokers ($n=340$).

Table 3. The use of one or more tobacco or related products among 15-year-old students who are current smokers by the frequency of smoking tobacco.

	Smoking tobacco weekly or more often		Smoking tobacco less than weekly		p
	n	%	n	%	
All					
one	168	85.3%	74	83.1%	0.643
two or more	29	14.7%	15	16.9%	
Boys					
one	76	77.6%	27	75.0% ^M	0.756
two or more	22	22.4%	9	25.0% ^M	
Girls					
one	92	92.9%	47	88.7%	0.372
two or more	7	7.1%	6	11.3%	

^M-less precise estimate

Correlation matrix indicates weak negative correlation between the age at smoking initiation and the number of cigarettes smoked during the last 30 days (-0.219 , $p=0.01$). It indicates that the number of cigarettes smoked during the last 30 days decreases by increasing the age at smoking initiation.

Weekly or daily smoking is not related to the type of cigarettes used when comparing those using only manufactured cigarettes with those using hand-rolled cigarettes only or in combination with manufactured cigarettes (weekly smoking: $p=0.052$; daily smoking: $p=0.092$).

Table 2. The use of one or more tobacco and related products during the last 30 days among all 15-year-old students ($n=1558$) and users of any product ($n=392$).

	Both genders			Boys			Girls			Estimated number of users among 15-year-olds of both genders
	n	% among all 15-year-old students*	% among users**	n	% among all 15-year-old male students*	% among users**	n	% among all 15-year-old female students*	% among users**	
one	335	21.5%	85.5%	144	20.3%	79.1%	191	22.5%	91.0%	3984
two or more	57	3.7%	14.5%	38	5.4%	20.9%	19	2.2%	9.0%	686

Table 4. The use of one or more tobacco or related products among 15-year-old students who are ever smokers by the age of smoking initiation.

	First smoked cigarettes at 13 or less		First smoked cigarettes at 14 or more		P
	n	%	n	%	
All					
one	114	79.7%	213	89.1%	0.011
two or more	29	20.3%	26	10.9%	
Boys					
one	43	67.2% ^M	95	85.6%	0.004
two or more	21	32.8% ^M	16	14.4%	
Girls					
one	71	89.9% ^M	118	92.2%	0.566
two or more	8	10.1% ^M	10	7.8%	

^M-less precise estimate

A vast majority of 15-year-old students used conventional products (Table 5) and the use was not related to gender. 48.5% of 15-year-old students that used any product used products with flavours; the use was related to gender (Table 6), but not to the frequency of smoking (Table 7) or age at smoking initiation (Table 8).

Table 5. The use of conventional and unconventional products during the last 30 days among all 15-year-old students (n=1558) and users of any product (n=392).

	Both genders			Boys			Girls			P (diff. among genders for all 15-year-old students)	Estimated number of users among 15-year-olds of both genders
	n	% among all 15-year-old students*	% among users**	n	% among all 15-year-old male students*	% among users**	n	% among all 15-year-old female students*	% among users**		
conventional	372	23.9%	94.9%	167	23.5%	91.8%	205	24.2%	97.6%	0.763	4429
unconventional	66	4.2%	16.8%	44	6.2%	24.2%	22	2.6%	10.5%	<0.001	778
only unconventional	20	1.3%	5.1%	15	2.1%	8.2%	5	0.6%	0.2%	0.008	241

*shares for each group together exceed the share of users as one person can use more products

**shares for each product together exceed 100% as one person can use more products

Table 6. The use of flavoured tobacco and related products during the last 30 days among 15-year-old students and users of any product.

	All		Boys		Girls		P
	n	%	n	%	n	%	
Flavoured products	189	48,5	75	40,3	114	55,9	0,002

Table 7. The use of flavoured tobacco and related products during the last 30 days among 15-year-old students who are current smokers by the frequency of smoking tobacco.

	Smoking tobacco weekly or more often		Smoking tobacco less than weekly		P
	n	%	n	%	
All	84	44.2%	41	50.0% ^M	0.379
Boys	38	40.0% ^M	13	39.4% ^M	0.951
Girls	46	48.4% ^M	28	57.1% ^M	0.321

Table 8. The use of flavoured tobacco and related products during the last 30 days among 15-year-old students who are ever smokers by the age of smoking initiation.

	First smoked cigarettes at 13 or less		First smoked cigarettes at 14 or more		P
	n	%	n	%	
All	61	44.5%	120	50.6%	0.255
Boys	22	36.7% ^a	47	41.2%	0.559
Girls	39	50.6% ^a	73	59.3%	0.228

4 DISCUSSION

In Slovenia, a vast majority of 15-year-old students that are users of any tobacco or related products use cigarettes (mostly manufactured cigarettes, but hand-rolled cigarettes are also used substantially), followed by waterpipe and later by cigars, cigarillos and pipes. A vast majority therefore uses conventional products. Every sixth student uses unconventional products, whilst the exclusive use of unconventional product is low (mainly the exclusive use of waterpipe). There are significant differences in the use of different types of tobacco and related products between genders; girls are more likely to use manufactured cigarettes, while boys are more likely to use hand-rolled cigarettes, waterpipe, cigarillos, cigars and pipes, and e-cigarettes. Almost half of those that use any product - significantly more girls than boys - use products with flavours. Approximately every seventh 15-year-old student who uses any product uses more than one product - significantly more boys than girls and significantly more those that started smoking cigarettes earlier. Most frequent combinations are cigarettes and waterpipe or cigarettes and e-cigarettes.

Only limited comparisons on current use of different tobacco and related products with other studies are possible mainly due to different age groups, the range of monitored products, definitions of use and a limited number of published studies with nationally representative samples. When comparing our results to results of other available studies among youth in Slovenia, we find the same order of mostly used products, while shares differ (15, 17), which is most likely attributable to the difference in age groups of respondents, different year of the survey and methodological differences. The comparison with adult population in Slovenia shows lower shares of the use of manufactured cigarettes among 15-year-old students, while shares of the use of all other tobacco and related products are higher in students. The use of more than one product among adult population is around half of the use of more than one product among 15-year-old students (17). Adolescents are obviously prone to use different and

unconventional products and more than one product. There is no data available to compare the use of flavoured products. The comparison of available data for similar age groups in other countries show that shares of the use of waterpipe, e-cigarette and unconventional products in general and more than one product are currently most likely lower in Slovenia (7-15, 22).

The use of any product containing nicotine is problematic in adolescence, which is a sensitive developmental period of enhanced clinical vulnerability to nicotine. Adolescents are more likely than adults to become addicted to nicotine; nicotine acts as a gateway to other substances, affects brain development and has long-term negative consequences on cognition (22, 23). Adolescents that might never use conventional products are using unconventional products (8-11, 14). Those could act as a gateway to conventional tobacco products use by exposing youth to nicotine, and increase the overall number of youth initiating tobacco use. A limited number of longitudinal studies on waterpipe and e-cigarette ever users shows an increased risk of later conventional tobacco use initiation in adolescents (25-27). Flavoured products are tobacco industry's innovation to increase the appeal of smoking in youth. They can promote youth smoking initiation and help young occasional smokers to become daily smokers by reducing or masking the natural harshness and taste of tobacco smoke (18). Young people who start smoking menthol cigarettes are at greater risk of progression to regular smoking and nicotine addiction than those who start smoking non-menthol cigarettes (28). Flavours are also one of the most important reasons for increasing the popularity of waterpipe (12) and e-cigarettes among youth (29). Hand-rolled cigarettes are popular among youth also due to lower prices compared to manufactured cigarettes (30, 31). Some studies indicate that youth using hand-rolled cigarettes are more likely heavier and more frequent smokers (16, 32), more addicted to nicotine and less likely considering quitting smoking, when compared to users of manufactured cigarettes (32). Our study does not show more weekly or more daily smoking among 15-year-old students that use hand-rolled cigarettes compared to those that use only manufactured cigarettes. Studies also indicate increased nicotine addiction in users of more than one product (33). All this underlines the importance of continuous surveillance, timely implementation and strict enforcement of all necessary measures to prevent children and adolescents from using all nicotine containing products, and the inclusion of all different products in prevention and cessation programmes. Products gaining popularity among youth are currently mostly unregulated or inadequately regulated, available to minors and/or more affordable, also in Slovenia. The World Health Organization recommends regulation for waterpipe and e-cigarettes as for any other tobacco product (34, 35).

Our research is the first in Slovenia to give insight into the use of different tobacco and related products, including e-cigarettes, flavoured products and the use of more than one product, on a representative sample of adolescents in schools. Our study has some limitations. The cross-sectional design of the study does not allow for any conclusions on causality or chronology. Under-reporting of smoking and the use of different products is possible. We collected data only from 15-year-olds that attend school and we can generalize data only to the group of 15-year-old students. We did not ask about nicotine content of liquids for e-cigarettes and the use of tobacco (rather than herbal products) for waterpipe. Regardless of limitations, our study offers valuable data for tobacco control and prevention.

5 CONCLUSIONS

15-year-old students in Slovenia currently use mostly conventional products, very often they use products with flavours and mostly they use only one product. However, situation in other countries shows that a pattern of use can change quickly, especially due to non-existent or inadequate regulation of certain products or their characteristics, such as flavours. Regular surveillance, addressing all different products in prevention and cessation programmes, and timely and effective regulation, comparable for all different products, combined with strict enforcement are necessary for effective prevention of the use of all products containing nicotine among youth in Slovenia.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exists.

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ETHICAL APPROVAL

The study was approved by the Republic of Slovenia National Medical Ethics Committee on 29 October 2013 under the number 139/10/13.

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