Ann Ig. 2025 Sep-Oct;37(5):625-632. doi: 10.7416/ai.2025.2687

Interest in online information about cigarettes and tobacco among adolescents

Tatjana Gazibara[1], Milica Cakic[1], Jelena Cakic[1], Anita Grgurevic[1], Tatjana Pekmezovic[1]

Keywords: Internet; cigarettes; tobacco; adolescents; online health information seeking; Belgrade, Serbia
Parole chiave: Internet; sigarette; tabacco; adolescenti; ricerca di informazioni sanitarie online; Belgrado, Serbia

Abstract

Background. *While growing up, adolescents find themselves in various situations, where they are exposed to harmful factors, such as tobacco and psychoactive substances (PAS). Expectedly, they might want to know more about them, but are often not willing to ask anyone in person.*
Aim. *To explore the prevalence and factors associated with the online information seeking about tobacco smoking in a sample of high school students.*
Study design. *Cross-sectional.*
Methods. *This study included 702 students from four public high schools in Belgrade, Serbia. Data were collected by using an anonymous questionnaire on socio-demographic characteristics, use of online platforms and interest in topics such as cigarettes/tobacco, psychoactive substances and fitness. The study outcome was opting for cigarettes/tobacco as a topic when searching for online information. Electronic health literacy was examined by the electronic health literacy.*
Results. *The prevalence of online information seeking about cigarettes/tobacco was 9.4% (66/702). Having a lower grade point average, having parents of a higher education level, using social media and websites run by health institutions and searching for information about psychoactive substances online were independently associated with the online information seeking about cigarettes/tobacco.*
Conclusion. *To help high school students understand health-related implications of tobacco exposure, it would be useful to provide hands-on education about tobacco in high schools. These could include online learning platforms, such as websites run by health institutions and social media. Addressing tobacco in the context of health education in high schools might be relevant for future health behavior.*

[1] *Institute of Epidemiology, Faculty of Medicine, Belgrade, Serbia*

Annali di Igiene : Medicina Preventiva e di Comunità (Ann Ig)
ISSN (print) 1120-9135 ISSN (online) 3035-5559

https://www.annali-igiene.it

Introduction

There are numerous online websites including social media and YouTube that allow adolescents to read or listen to health professionals, influencers or other lay people who share different health-related information (1). Typically, teenagers most often seek information about sexual and reproductive health online, because their identity remains unknown and are, therefore, less likely to feel embarrassed (2,3). However, adolescents have a widespread interest in health-related topics, because - while growing up - they are often exposed to different situations and harmful factors, such as smoking, alcohol intake, and psychoactive substances. Expectedly, teenagers might want to know more about these topics, but they may not want to ask anyone in person.

For example, a previous study in the adult population of the US found that people seek health-related information about tobacco itself more than information about tobacco products (4). Also, most people consider doctors and health organizations as a trustworthy source of such information (4). Yet, thus far, similar studies were not conducted among adolescents and it is not sufficiently known how adolescents search websites to obtain information about tobacco. Adolescents are online practically all the time via their smartphones, so they are able to access the Internet at any moment. The identification and characterization of adolescents who seek online information about cigarettes and tobacco could help educators tailor educational materials about smoking in order to help them to never start smoking. The purpose of this study was to explore the prevalence and factors associated with the online information seeking about tobacco smoking in a sample of high school students.

Methods

This study was organized and carried out among students from four high schools in Belgrade, Serbia, in December 2016 and January 2017. The schools were randomly selected out of 21 public high schools located in the Belgrade city area. Secondary education institutions, such as high schools, are predominantly funded by the government. High schools take a total of 4 years to complete. While students in high schools receive general education, they must choose one out of two programs (science-mathematics and humanities-languages). The two programs are quite similar, but differ in the number of classes in science (mathematics, physics, chemistry and biology) and languages/social sciences (history, geography, art).

Given that most high school students were minors (as the age of majority in Serbia is 18 years), the schools informed the parents about the study by sending them an information sheet and the questionnaire intended for students. Parents were offered the possibility to opt-out on behalf of their children. This meant that those parents who refused participation were asked to choose the option “reject”, sign the information sheet and send it back to the school principal. However, none of the parents rejected participation. All students who were minors provided parents’ assent and students who were 18 and 19 years old provided consent for participation.

Selection of the participants

The goal of the research team was to include students in all four study years. After contacting the school and arranging the study, the research team received the information about the number and distribution of classrooms per each study year. Two out of four schools had 16 classrooms and the other two schools had 14 classrooms. To randomly choose the classrooms, numbers of classrooms were printed on paper slips and were placed in a container. A researcher, who was blinded to the preparation of paper slips, chose 7 slips with classroom numbers in schools with 14 classrooms and 8 slips in schools with 16 classrooms.

This study is part of a larger research on electronic health literacy and Internet use among adolescents to seek information about health-related topics. The sample size calculation was carried out based on the 5% margin of error, 95% confidence interval, population size of adolescents aged 15 to 19 in Belgrade of 20,000 and population distribution (i.e. the prevalence of online health information seeking) of 50%. Previously published data shows that around 40-45% of adolescents used the Internet for health information seeking (5). For this reason, we anticipated that at least 50% of students would confirm that they used Internet to search health-related information. The calculations were performed using an online sample size calculator (6). The estimated minimum sample size was 655. We increased the sample size by 10% to ensure that the adequate number of participants would be included.

The research team registered the number of absent high school students when the questionnaire was distributed. In all four schools (i.e. 30 classrooms),

a total of 52 students were absent. This means, that the study sample captured 93% of students in the selected schools.

Data collection

All data were collected using an anonymous pen-and-paper questionnaire. The questionnaire was classified into several segments.

The first segment focused on socio-demographic information: age, type of school program [science-mathematics vs. humanities-languages], grade point average (GPA) and parental education level. Possible grades in high school ranged from 1 (the lowest, fail) to 5 (the highest). The range of GPA was 2.0-5.0. Parental education level was categorized as primary (≤8 years at school), secondary (9-12 years at school) and higher i.e. University (>12 years at school). Few parents had a primary education level, so this category was merged with the parents who had a secondary education level.

The second segment in the questionnaire explored digital consumer behaviors: Internet use, age at first Internet use, browsing health blogs, health forums, social media, websites run by physicians, websites run by health institutions and YouTube. Websites run by health institutions accounted for those Internet pages that belonged to an organization which was part of the healthcare system, such as institutes, primary health centers, hospitals etc. Websites run by physicians accounted for those Internet pages that belonged to individual doctors/teams of doctors who were either general practitioners or specialists (e.g. those who have their own private practice).

This segment also explored students' interest in other health-related topics, such as fitness and psycho-active substances ([PAS], defined as alcohol and illicit drugs such as cannabis, ecstasy, LSD, cocaine, heroin, etc.), because these health topics were related to health behaviors and lifestyle, and could be, therefore, associated with the study outcome. This part also included the question about cigarettes/tobacco. The spectrum of digital platforms was retrieved from a previous study of Sebelefsky et al. (7) and Kim et al. (8). Answers were classified as "yes" and "no".

The third segment of the questionnaire included the e-health literacy scale (eHEALS) (9). A total of 8 items in this scale examined students' performance at seeking, recognizing and evaluating online health information. The goal of this process is to make informed health-related decisions (10). Responses were ranked from 1 (strongly disagree) to 5 (strongly agree). Ranks were added to a summary eHEALS score (possible range 8-40). Higher scores suggested better e-health literacy. The eHEALS has been translated to Serbian language using a widely accepted methodology where two translators performed a "forward translation" (from English to Serbian) and a third translator, who was blinded to the original questionnaire, performed "back translation" (from Serbian back to English). The final version of the eHEALS in Serbian was defined after consensus. The psychometric testing of the eHEALS in Serbian suggested that the internal consistency measured by the Cronbach's alpha coefficient 0.849 (11). The confirmatory factor analyses indices suggested that the questionnaire consisted of one single domain with 8 items thereby supporting good construct validity.

Study outcome

We asked the students whether they sought information about health online (yes vs. no). In case of an affirmative reply, we asked them to specify the health topics they were searching online. Students were provided a short list of topics (cigarettes/tobacco, psychoactive substances, fitness, sexually transmitted infections, cancer and medications). The answer cigarettes/tobacco was defined as the interest in searching for information about cigarettes/tobacco and was observed as the study outcome. All participants who responded as being interested in this health topic online were classified as 1-"yes/interested". All participants who did not answer were classified as 0-"no/not interested".

Data analysis

The continuous variables were tested for normality of the distribution. None of the variables had normal distribution. For this reason, a non-parametric test (Mann-Whitney test) was used to test the differences between the two groups. The differences in categorical variables were tested by the Chi squared test.

To explore factors associated with the online search for information about cigarettes/tobacco, we defined three logistic regression models. The Model 1 included demographic characteristics and internet literacy (gender, age, type of school program, GPA, parental education level, age at first Internet use and eHEALS score). The Model 2 was composed of variables such as health blogs, health forums, social media, websites run by physicians, websites run by health institutions and YouTube in addition to the variables in the Model 1. The Model 3 was built by adding the variables being interested in browsing fitness and PAS on the Internet to the variables already included in the Model 2.

Multicollinearity was examined using the Variance Inflation Factor (VIF). The VIF above 2.0 suggests the presence of multicollinearity. In the three previously described models, none of the VIFs was above the multicollinearity threshold, suggesting no multicollinearity.

Statistical analyses were performed in the Statistical Package for Social Sciences (SPSS Inc, Chicago, IL, USA), version 20. The probability level of $p<0.05$ was considered as statistically significant.

Results

All 702 students included in the study were Internet users. The prevalence of online information seeking about cigarettes/tobacco was 9.4% (66/702). Socio-demographic features as well as the use of Internet platforms and interest in health-related topic are shown in Table 1.

The prevalence of online information seeking about cigarettes/tobacco was higher for boys than for girls (54.5% vs. 45.5%). However, there were significantly more students who did not look for information about cigarettes/tobacco online compared to those who did (p=0.028) (Table 1). Students who sought information about cigarettes/tobacco online had a slightly lower GPA compared to students who did not look for this information on the Internet (p=0.035). Also, students who searched for information on cigarettes/tobacco more frequently browsed websites run by health institutions (p=0.007), but they less frequently browsed websites run by physicians (p=0.043). These students were more frequent users of social media compared to students who did not look for information about cigarettes/tobacco online (p=0.001). Finally, students who sought information about cigarettes/tobacco on the Internet, also more frequently browsed information about PAS (p=0.001), but less frequently about fitness (p=0.001) (Table 1).

The series of logistic regression models examining factors associated with the search of online information about cigarettes/tobacco is presented in Table 2. The Model 1 showed that students who had a lower GPA

Table 1 - Socio-demographic charactersitics, digital literacy, browsing online platforms and topics according to seeking online health information about cigarettes/tobacco

Variable	Seeking online health information about cigarettes/tobacco		P for difference
	Yes N=66 n (%)	No N=636 n (%)	
Gender			
Female	30 (45.5)	378 (59.4)	**0.028**
Male	36 (54.5)	258 (40.6)	
Age*	16.0 (2.0)	17.0 (3.0)	0.540
Type of school program			
Science-mathematics	37 (56.1)	354 (55.7)	0.950
Humanities-languages	29 (43.9)	282 (44.3)	
Grade point average*	4.23 (0.84)	4.53 (1.0)	**0.035**
Parental education			
Primary and secondary	5 (7.6)	171 (26.9)	**0.001**
University	61 (92.4)	465 (73.1)	
Age at first internet use*	9.0 (3.25)	10.0 (3.0)	0.182
eHEALS score*	25.5 (10.0)	26.0 (10.0)	0.402
Use of websites run by physicians	6 (9.1)	122 (19.2)	**0.043**
Use of websites run by health institutions	16 (24.2)	78 (12.3)	**0.007**
Use of health blogs	5 (7.6)	60 (9.4)	0.620
Use of health forums	18 (27.3)	130 (20.4)	0.195
Use of social media	14 (21.2)	45 (7.1)	**0.001**
Use of YouTube	20 (30.3)	165 (25.9)	0.444
Browsing content about fitness	21 (31.8)	347 (54.6)	**0.001**
Browsing content about PAS	45 (68.2)	117 (18.4)	**0.001**

Legend: eHEALS – e-health literacy scale; * median (interquartile range)

Table 2 - Factors associated with seeking online information about cigarettes/tobacco among high school students in Belgrade

Variable	Model 1		Model 2		Model 3	
	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p
Gender Girls vs. boys	1.53 (0.89-2.63)	0.125	1.43 (0.81-2.51)	0.218	1.08 (0.57-2.04)	0.811
Age	0.81 (0.64-1.03)	0.082	0.82 (0.64-1.06)	0.134	0.79 (0.59-1.05)	0.107
Type of school program Science vs. Humanities	1.08 (0.63-1.83)	0.781	1.29 (0.73-2.25)	0.377	1.21 (0.66-2.24)	0.535
Grade point average	0.47 (0.30-0.75)	**0.002**	0.45 (0.28-0.74)	**0.002**	0.54 (0.31-0.93)	**0.026**
Parental education Primary/secondary vs. Uni	5.07 (0.97-13.02)	**0.001**	5.00 (1.91-13.05)	**0.001**	5.60 (1.97-15.93)	**0.001**
Age at first internet use	1.00 (0.90-1.12)	0.925	1.02 (0.91-1.14)	0.774	1.04 (0.92-1.17)	0.505
eHEALS score	0.98 (0.94-1.01)	0.246	0.96 (0.93-1.00)	0.082	1.01 (0.96-1.05)	0.739
Use of websites run by physicians			0.29 (0.11-0.77)	**0.013**	0.25 (0.09-0.69)	**0.008**
Use of websites run by health institutions			3.73 (1.78-7.82)	**0.001**	2.50 (1.06-5.85)	**0.035**
Use of health blogs			0.59 (0.20-1.72)	0.333	0.43 (0.14-1.34)	0.145
Use of health forums			1.35 (0.70-2.60)	0.373	0.97 (0.45-2.05)	0.930
Use of social media			4.01 (1.81-8.87)	**0.001**	2.90 (1.19-7.07)	**0.019**
Use of YouTube			1.08 (0.56-2.09)	0.807	0.84 (0.40-1.34)	0.661
Seeking online information about fitness					0.36 (0.19-0.68)	**0.002**
Seeking online information about PAS					9.16 (4.83-17.38)	**0.001**

Legend: OR- odds ratio; CI-confidence interval; p-probability; eHEALS – e-health literacy scale; PAS – psychoactive substances; Bold values denote statistical significance.

and whose parents had a higher education were more likely to seek information about cigarettes/tobacco on the Internet (Table 2). The Model 2 showed that, in addition to the GPA and education level of parents, students who sought online information about cigarettes/tobacco were more likely to browse social media and websites run by health institutions, but less likely to browse websites run by physicians (Table 2). Based on the Model 3, all variables from the previous two models remained associated with the outcome. In addition, students who browsed online information about PAS, but not about fitness, were more likely to seek online health information about cigarettes/tobacco.

Discussion and conclusions

This research provides unique insights into the interest of adolescents about cigarettes/tobacco-related information on the World Wide Web. It was found that about 10% of high school students seek information about cigarettes/tobacco on the Internet. Adolescents who had lower academic achievements and highly educated parents, who used social media and websites run by health institutions and who were interested in information about PAS were more likely to search for online information about cigarettes/tobacco. These adolescents were less likely to have an interest in online information about fitness.

Evidence suggests that only 2.3% of adolescents actually visit the websites of tobacco companies and products (12). What seems to be more enticing for young people are the images of tobacco products and promotion of a certain lifestyle, because they may be endorsed by celebrities or influencers or be featured in movies (13,14). Furthermore, adolescents are being unwillingly exposed to tobacco-related products through videogames (15), influencers on Instagram (16), Tik Tok (17) and Twitter (18). Thus, accessing tobacco-related content on the Internet may not necessarily be motivated by the urge to buy and consume tobacco products. Some authors suggest that adolescents' curiosity and the initiative to actually learn more about tobacco-related content are the main drivers of online search for tobacco-related content (19). This is because tobacco may be smoked by adults who adolescents look up to and seeking such

information could make them feel fictitiously closer to those individuals.

A recent study of health information needs among adolescents in Croatia suggested that 17.5% expressed a desire to learn more about smoking (20). In fact, the interest in this type of information is similar for boys and girls, as opposed to reproductive health and nutrition information where significant differences in interest between genders were found (21). In this study, we observed that approximately 10% of high school students were looking for information about cigarettes/tobacco online. Since there is a lack of studies examining this issue in adolescents, our findings cannot be meaningfully compared to other populations. The prevalence of tobacco information seeking from any source including the Internet among US adolescents ranged from 23% to 32% depending on race/ethnicity (4). These findings suggest that some adolescents are interested in learning more about tobacco, and this could be organized in high schools though workshops and discussions. Even though the prevalence of information seeking about cigarettes observed in our study may appear low, it cannot be assumed that the remainder of adolescents would not engage in discussion about harmful effects of smoking at school or in peer-education.

This study suggests that adolescents who had lower grades at school were more likely to seek information about cigarettes/tobacco on the Internet. Young people are exposed to extensive tobacco-related content on the Internet (13). These could be visual images, advertisements, selling products (13). It is possible that visual appeal draws adolescents to browse these web pages and may also be perceived as a relief from academic demands at school. Few adolescents actually visit the websites of tobacco companies (12). This means that young people seek other tobacco-related information and it may be difficult to regulate (21).

The use of social media and websites run by health organizations was associated with the online information seeking about cigarettes/tobacco in this study. Social media, as a participatory online platform, appeals to younger audience because they can follow and engage with the content creators. As such, social media plays an important role in dissemination of information including that about cigarettes/tobacco, including smoking prevention (22), health risks of smoking (23) or smoking cessation campaigns. On the other hand, social media could be used to promote tobacco products (24) which may influence adolescents to start smoking (25,26). Websites of health institutions provide comprehensive data about smoking and its long-term effect on health. Therefore, it is not surprising that adolescents use those websites to seek reliable information about tobacco. Trust in health organizations in terms of tobacco information was previously observed among adults (4). Approaches to prevention of tobacco use should include digital media and involve health organizations and other stakeholders in the efforts to decrease tobacco use among young people.

Adolescents who sought information about cigarettes/tobacco on the Internet were more likely to seek information about PAS. This finding could be explained by the overall interest of adolescents in substances that alter perception and mood, as they only begin to learn about them. In Serbia, selling tobacco and alcohol to minors is forbidden and other PAS are illegal (including marijuana). As such, they might have a certain appeal to some young people. On the other hand, their detrimental health effects may have been discussed by adolescents' parents, teachers and other adults; however, such a strategy may lack additional information and context. For this reason, simultaneous interest in searching for information about tobacco and PAS online could provide a more detailed insight into what adolescents' truly want to know about these issues, especially considering the accounts of other adolescents on social media about their experiences (27).

Contrary, students who sought online information on cigarettes/tobacco were less likely to browse fitness-related content. Evidence suggests that teenagers who smoke are less likely to engage in regular physical activity (28,29). Also, those adolescents who smoke are more likely to quit smoking when they begin to practice sports (30). As a result, their interest in these topics can change, along with their browsing preferences online. This phenomenon may explain the interest in searching for tobacco and PAS, while not being interested in fitness and sport-related topics online.

Some study limitations need to be considered. All data collected in this study were self-reported. It is possible that some participants did not report online information seeking about cigarettes/tobacco. Due to the school review of the questionnaire, we were restricted to collect only basic data which did not include questions related to past smoking or PAS use experiences. In the questionnaire, the outcome of interest included all searches about cigarettes/tobacco and not specific information related to smoking, health-related consequences of smoking or promotional tobacco products. This study was carried

out among high school students, thus the observed results cannot be generalized to the entire city or country, because the Internet access may be more available to the participants compared to students in rural areas. Because of the cross-sectional study design, the association observed in this study cannot provide inferences about causality.

In conclusion, we found that 9.4% of high school students seek online information about cigarettes/tobacco. These students were more likely to have lower school achievement, highly educated parents, they were more likely to use social media and websites run by institutions and seek online information about PAS. These online platforms could be a helpful tool in the efforts to disseminate information about tobacco smoking. Since high school students show interest in learning about cigarettes/tobacco, discussions about this topic and its health effects could be implemented in the high school curricula. Providing opportunities to learn about tobacco in a safe school environment may have long-lasting effects on future behavioral trajectories. Further research about specific issues surrounding cigarettes/tobacco that draw adolescents' interest is warranted.

Statements of ethical approval: Ethical approval for the study was obtained from the Institutional Review Board of the Faculty of Medicine, University of Belgrade (approval no. 747/I).
Funding: The study was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (grant no. 200100).
Competing Interest: The authors declare that they do not have conflict of interest.

Riassunto

Interesse per le informazioni online su sigarette e tabacco tra gli adolescenti

Background. Durante la crescita gli adolescenti si trovano in diverse situazioni in cui sono esposti a fattori dannosi, come il tabacco e le sostanze psicoattive. Presumibilmente, potrebbero voler saperne di più, ma spesso non sono disposti a chiedere a nessuno di persona.

Obiettivi. Esplorare la prevalenza e i fattori associati alla ricerca di informazioni online sul fumo di tabacco tra gli studenti dei licei.

Disegno. Studio trasversale.

Metodi. Questo studio includeva 702 studenti di quattro licei di Belgrado, Serbia. I dati sono stati raccolti utilizzando un questionario anonimo che ha esaminato le informazioni sociodemografiche, l'uso di piattaforme online e l'interesse per sigarette/tabacco, sostanze psicoattive e fitness. Il risultato dello studio è stato la scelta delle sigarette/tabacco come argomento durante la ricerca di informazioni online. L'alfabetizzazione sanitaria elettronica è stata esaminata dalla scala di alfabetizzazione sanitaria elettronica.

Risultati. La prevalenza della ricerca di informazioni su sigarette/tabacco online è stata del 9,4% (66/702). Avere un voto inferiore a scuola, avere genitori di livello di istruzione superiore, l'utilizzo di social media e siti Web gestiti da istituzioni sanitarie e la ricerca di informazioni sulle sostanze psicoattive online erano associati alla ricerca di informazioni online su sigarette/tabacco.

Conclusione. Per aiutare gli studenti dei licei a comprendere le implicazioni dell'esposizione al tabacco riguardo alla salute, sarebbe utile fornire un'istruzione pratica sul tabacco nei licei. Questi potrebbero includere piattaforme di apprendimento online, come siti Web gestiti da istituzioni sanitarie e social media. Affrontare il problema del tabacco nel contesto dell'educazione sanitaria nei licei potrebbe essere rilevante per il futuro comportamento sanitario.

References

1. Goodyear VA, Armour KM, Wood H. Young people and their engagement with health-related social media: new perspectives. Sport Educ Soc. 2019 Jan 25;**24**(7):673-88. doi: 10.1080/13573322.2017.1423464. PMID: 31814804.
2. Holstrom, AM. Sexuality Education Goes Viral: What We Know About Online Sexual Health Information. Am J Sex Educ. 2015;**10**:277-94. doi: 10.1080/15546128.2015.1040569.
3. Olumide AO, Ojengbede OA. The media as a critical determinant of the sexual and reproductive health of adolescents in Ibadan, Nigeria. Sex Reprod Healthc. 2016 Jun;**8**:63-74. doi: 10.1016/j.srhc.2016.02.006. Epub 2016 Feb 27. PMID: 27179380.
4. Nguyen AB, Robinson J, Keely O'Brien E, Zhao X. Racial and Ethnic Differences in Tobacco Information Seeking and Information Sources: Findings From the 2015 Health Information National Trends Survey. J Health Commun. 2017 Sep;**22**(9):743-52. doi: 10.1080/10810730.2017.1347216. Epub 2017 Aug 1. PMID: 28762887.
5. Ettel G 3rd, Nathanson I, Ettel D, Wilson C, Meola P. How do adolescents access health information? And do they ask their physicians? Perm J. 2012 Winter;**16**(1):35-8. doi: 10.7812/TPP/11-125. PMID: 22529757.
6. Raosoft. Sample size calculator. Available from: http://www.raosoft.com/samplesize.html; 2016 [Last accessed: 2025 Jan 25].
7. Sebelefsky C, Karner D, Voitl J, Klein F, Voitl P, Böck A. Internet health seeking behaviour of parents attending a general paediatric outpatient clinic: A cross-sectional observational study. J Telemed Telecare. 2015 Oct;**21**(7):400-7. doi: 10.1177/1357633X15583431. Epub 2015 May 29. PMID: 26026180.
8. Kim SU, Syn SY. Research trends in teens' health information behaviour: a review of the literature. Health Info Libr J. 2014 Mar;**31**(1):4-19. doi: 10.1111/hir.12057. PMID: 24751225.
9. Norman CD, Skinner HA. eHEALS: The eHealth Literacy Scale. J Med Internet Res. 2006 Nov 14;8(4):e27. doi: 10.2196/jmir.8.4.e27. PMID: 17213046.
10. Norman CD, Skinner HA. eHealth Literacy: Essential Skills for Consumer Health in a Networked World. J Med Internet

Res. 2006 Jun 16;**8**(2):e9. doi: 10.2196/jmir.8.2.e9. PMID: 16867972.
11. Gazibara T, Cakic J, Cakic M, Pekmezovic T, Grgurevic A. eHealth and adolescents in Serbia: psychometric properties of eHeals questionnaire and contributing factors to better online health literacy. Health Promot Int. 2019 Aug 1;**34**(4):770-8. doi: 10.1093/heapro/day028. PMID: 29800141.
12. Unger JB, Bartsch L. Exposure to tobacco websites: Associations with cigarette and e-cigarette use and susceptibility among adolescents. Addict Beha. 2018 Mar;**78**:120-3. doi: 10.1016/j.addbeh.2017.11.012. Epub 2017 Nov 10. PMID: 29154150.
13. Donaldson SI, Dormanesh A, Perez C, Majmundar A, Allem JP. Association Between Exposure to Tobacco Content on Social Media and Tobacco Use: A Systematic Review and Meta-analysis. JAMA Pediatr. 2022 Sep 1;**176**(9):878-85. doi: 10.1001/jamapediatrics.2022.2223. PMID: 35816331.
14. Ribisl KM. The potential of the internet as a medium to encourage and discourage youth tobacco use. Tob Control. 2003 Jun;**12** Suppl 1(Suppl 1):i48-59. doi: 10.1136/tc.12.suppl_1.i48. PMID: 12773785.
15. Vassey J, Allem JP, Barker J, Cruz TB, Pang R, Unger JB, et al. E-cigarette use and promotion by social media influencers during videogame play on Twitch. Tob Control. 2023 Jul;**32**(4):526-7. doi: 10.1136/tobaccocontrol-2021-056828. Epub 2021 Oct 8. PMID: 34625511.
16. Vassey J, Valente T, Barker J, Stanton C, Li D, Laestadius L, et al. Cruz TB, Unger JB. E-cigarette brands and social media influencers on Instagram: a social network analysis. Tob Control. 2023 Aug;**32**(e2):e184-91. doi: 10.1136/tobaccocontrol-2021-057053. Epub 2022 Feb 7. PMID: 35131947.
17. Vassey J, Donaldson SI, Dormanesh A, Allem JP. Themes in TikTok Videos Featuring Little Cigars and Cigarillos: Content Analysis. J Med Internet Res. 2022 Nov 16;**24**(11):e42441. doi: 10.2196/42441. PMID: 36383406.
18. McCausland K, Maycock B, Leaver T, Wolf K, Freeman B, Thomson K, et al. E-Cigarette Promotion on Twitter in Australia: Content Analysis of Tweets. JMIR Public Health Surveill. 2020 Nov 5;**6**(4): e15577. doi: 10.2196/15577. PMID: 33151159.
19. Soneji S, Knutzen KE, Moran MB. Reasons for engagement with online tobacco marketing among US adolescents and young adults. Tob Induc Dis. 2019 Jan 10;**17**:02. doi: 10.18332/tid/99540. PMID: 31582914.
20. Martinović I, Kim SU, Stanarević Katavić S. Study of Health Information Needs Among Adolescents in Croatia Shows Distinct Gender Differences in Information Seeking Behaviour. Health Info Libr J. 2023 Mar;**40**(1):70-91. doi: 10.1111/hir.12369. Epub 2021 Apr 16. PMID: 33861517.
21. Fitzpatrick I, Byrne D, Gilmore AB, Hasan F, Cranwell J. Quantifying and characterising tobacco content in the most in-demand streamed series in 10 low/middle-income countries in 2019. Tob Control. 2023 Dec 13;**33**(1):45-51. doi: 10.1136/tobaccocontrol-2022-057278. PMID: 35750485.
22. Kousoulis AA, Kympouropoulos SP, Pouli DK, Economopoulos KP, Vardavas CI. From the Classroom to Facebook: A Fresh Approach for Youth Tobacco Prevention. Am J Health Promot. 2016 May;**30**(5):390-3. doi: 10.1177/0890117116646345. Epub 2016 May 5. PMID: 27404648.
23. Schwartz J, Bottorff JL, Ratner PA, Gotay C, Johnson KC, Memetovic J, et al. Effect of web-based messages on girls' knowledge and risk perceptions related to cigarette smoke and breast cancer: 6-month follow-up of a randomized controlled trial. JMIR Res Protoc. 2014 Sep 30;**3**:e53. doi: 10.2196/resprot.3282. PMID: 25271096.
24. Dunlop S, Freeman B, Perez D. Exposure to Internet-Based Tobacco Advertising and Branding: Results From Population Surveys of Australian Youth 2010-2013. J Med Internet Res. 2016 Jun 23;**18**(6): e104. doi: 10.2196/jmir.5595. PMID: 2733876.
25. Unger JB, Bartsch L. Exposure to tobacco websites: Associations with cigarette and e-cigarette use and susceptibility among adolescents. Addict Behav. 2018 Mar;**78**:120-3. doi: 10.1016/j.addbeh.2017.11.012. Epub 2017 Nov 10. PMID: 29154150.
26. Soneji S, Yang JW, Knutzen KE, Moran MB, Tan ASL, Sargent J, et al. Online Tobacco Marketing and Subsequent Tobacco Use. Pediatrics. 2018 Feb;**141**(2):e20172927. doi: 10.1542/peds.2017-2927. Epub 2018 Jan 2. PMID: 29295893.
27. Evans W, Andrade E, Pratt M, Mottern A, Chavez S, Calzetta-Raymond A, et al. Peer-to-Peer Social Media as an Effective Prevention Strategy: Quasi-Experimental Evaluation. JMIR Mhealth Uhealth. 2020 May 6;**8**(5):e16207. doi: 10.2196/16207. PMID: 32374270.
28. Ali MM, Amialchuk A, Heller LR. The influence of physical activity on cigarette smoking among adolescents: evidence from Add Health. Nicotine Tob Res. 2015 May;**17**(5):539-45. doi: 10.1093/ntr/ntu171. Epub 2014 Sep 3. PMID: 25187062.
29. Aira T, Vasankari T, Heinonen OJ, Korpelainen R, Kotkajuuri J, Parkkari J, et al. Psychosocial and health behavioural characteristics of longitudinal physical activity patterns: a cohort study from adolescence to young adulthood. BMC Public Health. 2023 Nov 3;**23**(1):2156. doi: 10.1186/s12889-023-17122-4. PMID: 37924075.
30. Loprinzi PD, Walker JF. Association of Longitudinal Changes of Physical Activity on Smoking Cessation Among Young Daily Smokers. J Phys Act Health. 2016 Jan;**13**(1):1-5. doi: 10.1123/jpah.2014-0605. Epub 2015 May 12. PMID: 25966498.

Corresponding Author: Tatjana Gazibara, Institute of Epidemiology, Faculty of Medicine, University of Belgrade, Visegradska 26a, 11000 Belgrade, Serbia
e-mail: tatjanagazibara@yahoo.com; tatjana.gazibara@med.bg.ac.rs