



Leisure Activity and Smoking among Ukrainian Adolescents

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Abstract

Background: The aim of this paper was to investigate associations between engagement in specific types of leisure activities and smoking among Ukrainian adolescents.

Methods: We conducted a cross-sectional survey of 1075 adolescents enrolled in the Family and Children of Ukraine birth cohort study using a self-administered questionnaire to determine their leisure activities and smoking behaviors. Data analysis included descriptive statistics, calculation of odds ratios with 95% confidence intervals, and gender-stratified analyses using Mantel Haenszel methods.

Results: 51.6% of males and 41.4% of females reported ever smoking and 22.8% of males and 15.8% of females had smoked within the past 30 days. Risk factors for ever having smoked include socializing on the internet (OR=1.84; 95% CI: [1.25-2.71]), playing sports (OR=1.48; 95% CI: [1.07-2.04]), and visiting entertainment venues (OR=1.94; 95% CI: [1.44-2.61]). Reading books for leisure was protective against both ever having smoked (OR=0.53; 95% CI: [0.40-0.70]) and smoking in the past 30 days (OR=0.45; 95% CI: [0.32-0.63]). Engaging in drawing or crafts was also protective against both ever having smoked (OR=0.61; 95% CI: [0.45-0.80]) and smoking in the past 30 days (0.58; 95% CI: [0.40-0.82]). Leading a cultural life (going to theaters, concerts, museums) was protective against having smoked in the past 30 days (OR=0.62; 95% CI: [0.44-0.87]).

Conclusions: We conclude that engagement in specific types of leisure activities can affect the risk of adolescents' smoking behaviors.

Keywords: Adolescence; Leisure; Smoking

Abbreviations: ALSPAC: Avon Longitudinal Study of Pregnancy and Childhood; ELSPAC: European Longitudinal Study of Pregnancy and Childhood; FCOU: Family and Children of Ukraine Study; WHO: World Health Organization

Introduction

Smoking is the fourth leading risk factor for disease burden in Ukraine, accounting for 13% of Disability Adjusted Life Years [1]. Smoking initiation by young people constitutes one of the main challenges for tobacco control [2]. Webb, et al. [3] found that smoking initiation in Ukraine occurred primarily during the teenage years. Intervention at a young age is therefore important in combatting smoking dependence among this population. The

choice of leisure activity is important to adolescent development and may influence engagement in risky behaviors such as smoking. Understanding the associations between leisure activities and smoking may offer opportunities to develop effective leisure-based interventions.

Participation in leisure activities has been associated with higher academic achievement, adolescent identity, and autonomy development [4]. Leisure activities can be structured, such as participation in team sports or guided tours, or unstructured, such as hiking or playing video games. Most previous studies have focused on the benefits of structured rather than unstructured leisure activities [4]. Previous investigators have shown that adolescents who participate in structured leisure activities are less antisocial and less likely to smoke or use marijuana or other drugs [5]. Sekulic et al. found that quitting sports at baseline was associated with

an increased risk of smoking [6]. Lund and Scheffels [7] found that among Norwegian adolescents, abstainers (neither alcohol nor tobacco use) tended to have more hobby-related leisure time activities. They concluded that promoting hobby-based activities might be a useful strategy for preventing alcohol and tobacco use in young people. Unstructured activities, such as spending unsupervised time with peers, have been shown to increase the odds of tobacco use [8]. Lesjak and Stanojevic-Jerkovic [9] found that daily smoking was significantly associated with spending two or more hours on the computer each day.

The classification of leisure activities as simply structured versus unstructured may be too simplistic for evaluating associations with risky behaviors, such as smoking. Previous research on specific types of leisure activities and tobacco use has been limited [10]. A better understanding of the risks associated with specific types of leisure activities is necessary to develop effective interventions for smoking among adolescents. Our aim was to determine whether engagement in specific types of leisure activities is associated with increased or decreased risks of smoking in this population.

Methods

Study Population

The study population consisted of 1075 adolescents and their mothers/caregivers from the city of Kamianske who were enrolled in the Family and Children of Ukraine (FCOU) birth cohort study and who previously completed the FCOU 3-years-of age assessment. The FCOU study is the Ukrainian component of the European Longitudinal Study of Pregnancy and Childhood (ELSPAC). For this subcohort, we originally recruited all pregnant women in Kamianske from December 1992 to June 1994, and 2156 chose to participate. 1467 completed the 3-years-of age assessment, and 1075 of those children completed the 18-years-of-age assessment in 2011.

Survey Instruments

FCOU mothers/caregivers completed self-administered questionnaires at the time of pregnancy, at birth, child's 6 months of age, 3 years of age, and 7 years of age. In 2011 we administered the 18-years-of age ELSPAC questionnaires to the 1075 adolescents and their mothers/caregivers enrolled in the FCOU study. The self-administered questionnaires were constructed by researchers from the Institute of Pediatrics, Obstetrics, and Gynecology in Kyiv and the University of Illinois School of Public Health on the basis of similar survey instruments prepared for two other ELSPAC study sites: Avon, UK (the ALSPAC study) and Brno, Czech Republic (current ELSPAC coordinating center). All study instruments were translated from English into Ukrainian and/or Russian and reverse

translated into English. The questionnaire data were entered and coded by the Louise Hamilton UIC Data Management Center in Kyiv, Ukraine. Adolescents were asked the question: "How do you spend your free time?" Adolescents who responded that they engage in specific leisure activities frequently or sometimes were compared to adolescents who said that they never engage in these activities. Adolescents were asked "how many times in your life, if ever, did you smoke cigarettes?" Those who responded "0 times" were classified as never smoked while those who smoke 1 or more times were classified as ever smoked. Adolescents were also asked "how many times did you smoke cigarettes in the past 30 days". Those who responded "not even once," were classified as "had not smoked." While those who smoked 1 or more times, were classified as "having smoked in the past 30 days".

Statistical Analysis

Groups engaging in specific leisure activities (Frequently and Sometimes) were compared to those who never engaged in those specific activities with regards to ever smoked and smoked within the past 30 days using odds ratios and confidence intervals. Groups showing significant associations were further stratified on gender and compared using Mantel Haenszel methods and the Woolf test for homogeneity of odds ratios. Data were analyzed using the Statistical Package for the Social Sciences and EpiTools (http://epitools.ausvet.com.au/content.php?page=mantel_haenszel).

This study was approved by the Institutional Review Board at the University of Illinois at Chicago and the Institute of Pediatrics, Obstetrics, and Gynecology in Kyiv, Ukraine.

Results

The characteristics of the study population are presented in Table 1. The adolescents had a mean age of 16.2 (range 15.1 to 18.2) and 50.5% were male. Their mothers/caregivers had a mean age of 40.6 and fathers had a mean age of 43.0. The overall prevalence of ever smoking was 46.5% and was higher for males (51.6%) than females (41.4%). 19.3% of adolescents smoked in the past 30 days, and the prevalence was again higher for males (22.8%) than females (15.8%).

	n	%
Gender		
Male	543	50.5
Female	532	49.5
Ever Smoked		
Males		
Yes	280	51.6
No	219	40.3
Missing	44	8.1
Females		

Yes	220	41.4
No	288	54.1
Missing	24	5.5
Total		
Yes	500	46.5
No	507	47.2
Missing	68	6.3
Smoked in Past 30 Days		
Males		
Yes	124	22.8
No	382	70.3
Missing	37	6.8
Females		
Yes	84	15.8
No	417	78.4
Missing	31	5.8
Total		
Yes	208	19.3
No	799	74.3
Missing	68	6.3

Table 1: Smoking Habits of Adolescents from Kamianske (n=1075).

Table 2 presents engagement in various types of leisure activities by decreasing order of frequency. Socializing with friends and family were the most popular activities while more independent activities such as reading, drawing, playing a musical instrument, leading a cultural life (going to the theater, concerts, museums), and tourism were the least popular.

Leisure Activity	Frequently N (%)	Sometimes N (%)	Never N (%)	Missing N (%)
Socialize with friends	886 (82.3)	152 (14.1)	3 (0.3)	34 (3.3)
Socialize with family	587 (54.6)	398 (37.0)	7 (0.7)	83 (7.8)
Watch TV	540 (50.2)	410 (38.1)	34 (3.2)	91 (8.6)
Use social media	536 (49.8)	285 (26.5)	131 (12.2)	123 (11.5)
Sit at computer	530 (49.3)	360 (33.5)	78 (7.2)	107 (10.0)
Play sports	322 (29.9)	427 (39.7)	198 (18.4)	128 (12.0)
Visit entertainment venues (discos)	187 (17.4)	486 (45.2)	268 (24.9)	134 (12.5)
Read books	137 (12.7)	451 (41.9)	331 (30.8)	156 (14.6)

No free time	120 (11.2)	359 (33.4)	269 (25.0)	327 (30.5)
Draw and crafts	96 (8.9)	284 (26.4)	502 (46.7)	193 (18.0)
Play musical instrument	85 (7.9)	95 (8.8)	690 (64.1)	205 (19.1)
Lead cultural life	60 (5.6)	401 (37.3)	424 (39.4)	190 (17.8)
Tourism	42 (3.9)	264 (24.5)	578 (53.7)	191 (17.8)

Table 2: Frequency of engagement in various leisure activities by Ukrainian Adolescents (N=1075).

Table 3 presents the relative odds of smoking with engagement in various types of leisure activities (frequently and sometimes vs never). Factors associated with significantly increased relative odds of ever having smoked include socializing on the internet, playing sports, and visiting entertainment venues. Visiting entertainment venues also significantly increased the odds of smoking in the past 30 days. Reading books for leisure and engaging in drawing or crafts significantly decreased the odds of both ever smoked and smoking in the past 30 days. Leading a cultural life (going to the theater, concerts, museums) significantly decreased the odds of having smoked in the past 30 days.

Leisure Activity	Ever Smoked OR (95% CI)	Smoked in Past 30 Days OR (95% CI)
Socialize with friends	2.99 (0.31-28.82)	0.78 (0.08-7.56)
Socialize with family	1.52 (0.25-9.12)	1.55 (0.19-12.98)
Watch television	1.00 (0.49-2.02)	1.31 (0.49-3.46)
Socialize on internet	1.84 (1.25-2.71)	1.38 (0.83-2.29)
Sit at computer	1.19 (0.73-1.93)	1.46 (0.75-2.83)
Play sports	1.48 (1.07-2.04)	0.94 (0.64-1.40)
Visit entertainment venues	1.94 (1.44-2.61)	1.72 (1.17-2.54)
Read books	0.53 (0.40-0.70)	0.45 (0.32-0.63)
No free time	0.75 (0.55-1.01)	0.96 (0.65-1.41)

Draw and crafts	0.61 (0.45-0.80)	0.58 (0.40-0.82)
Play musical instrument	1.10 (0.79-1.55)	0.85 (0.56-1.31)
Lead cultural life (visit theaters, concerts, museums)	0.85 (0.64-1.11)	0.62; (0.44-0.87)
Tourism (travel)	1.27 (0.95-1.69)	0.94 (0.67-1.34)

Table 3: Leisure Activity and Relative Odds of Smoking Among Ukrainian Adolescents.

Table 4 presents the relative odds of tobacco use for specific leisure activities stratified by gender. Socializing on the internet was significantly associated with ever having smoked for both boys and girls separately and combined. Playing sports significantly increased the odds of ever having smoked for boys but not girls, and this modification of the risk by gender was statistically significant.

Smoking	Males OR (95%CI)	Females OR (95%CI)	Total OR ^{MH} (95%CI)
Socialize on Internet			
Ever smoked	1.80 (1.01-3.19)	1.26 (1.04-1.51)	1.79 (1.21-2.65)
Last 30 days	1.30 (0.65-2.63)	1.38 (0.65-2.92)	1.34 (0.80-2.23)
Play Sports			
Ever smoked	3.11 (1.47-6.54)	0.92 (0.62-1.37)	1.22 (0.87-1.72)*
Last 30 days	0.86 (0.37-2.00)	0.67 (0.41-1.12)	0.72 (0.47-1.11)
Visit Entertainment Venues			
Ever smoked	2.05 (1.35-3.11)	1.98 (1.23-3.04)	2.01 (1.49-2.72)
Last 30 days	1.67 (1.02-2.74)	1.99 (1.05-3.77)	1.79 (1.21-2.65)
Read Books			
Ever smoked	0.61 (0.41-0.92)	0.52 (0.34-0.78)	0.56 (0.42-0.75)
Last 30 days	0.54 (0.34-0.85)	0.40 (0.24-0.67)	0.48 (0.34-0.67)

Draw and Crafts			
Ever smoked	0.71 (0.47-1.08)	0.57 (0.39-0.84)	0.63 (0.48-0.84)
Last 30 days	0.72 (0.44-1.16)	0.50 (0.30-0.84)	0.61 (0.43-0.87)
Lead a Cultural Life			
Ever smoked	1.19 (0.80-1.78)	0.58 (0.69-0.47)	0.89 (0.68-1.18) ⁺
Last 30 days	0.76 (0.48-1.20)	0.54 (0.33-0.89)	0.65 (0.46-0.91)
*Woolf test for homogeneity of odds ratios, p < 0.05			
⁺ Woolf test for homogeneity of odds ratios, p=0.053			

Table 4: Specific leisure activities and relative odds of smoking among Ukrainian adolescents stratified by gender.

Visiting entertainment venues significantly increased the odds of ever having smoked and smoking in the past 30 days for boys and girls separately and combined with no evidence of interaction by gender.

Reading books as a leisure activity was protective against ever having smoked and smoking in the past 30 days for boys and girls separately and combined with no evidence of interaction by gender. Engaging in drawing or crafts was protective against ever having smoked and having smoked in the past 30 days, especially for girls. Leading a cultural life was protective against ever having smoked and having smoked in the past 30 days for girls but not boys and demonstrated significant effect modification by gender.

Discussion

The onset of cigarette smoking typically occurs in childhood and early adolescence [11]. Identifying predictors of smoking initiation and continuation can lead to the development of effective interventions. Established predictors of the onset of smoking in youth worldwide include: age, lower socioeconomic status, poor academic performance, sensation seeking, receptivity to tobacco promotion efforts, family members' smoking, friends smoking, and exposure to films, whereas higher self-esteem and parental monitoring appear to protect against smoking onset [11]. In Ukraine, factors associated with increased risk of smoking initiation include being raised in a city, current alcohol use, low religiosity, parental anti-social behavior, exposure to secondhand smoke, no household smoking restrictions and early-life stress [3,12-17]. Few studies have looked at the influence of leisure activities on smoking among Ukrainian adolescents.

In our study, we investigated associations between smoking behaviors and a range of leisure activities. We found that socializing on the internet increased the odds of smoking (both ever and during the past 30 days). Ninety percent of a national sample of Ukrainians ages 15-24 had used a social networking site in the past week [18]. Previous studies have shown that smoking by social network members and receptivity to pro-tobacco marketing are two predictors of adolescent smoking. Huang, et al. [19], in their study of online social networking and risky behaviors among California high school students found that exposure to friends' online pictures of partying or drinking was significantly associated with both smoking and alcohol use. Cranwell, et al. [20] looked at adolescents aged 11-17 and found that those who had played at least one video game were significantly more likely to ever have tried smoking. This finding supports our data as video games are becoming more interactive and intertwined with social networking. Poor self-esteem has been shown to be a risk factor for adolescent smoking. Oliva et al. [21] found that participants who spent more time on social media reported being in a more negative state of mind than those who spent less time on the site.

We found that playing sports was associated with increased risk of smoking for males but not females. This modification of the results by gender was statistically significant. Participation in organized activities, such as sports, is often associated with reduced involvement in antisocial activities, including smoking. Sekulik, et al. [6] recently found a high risk for smoking initiation among adolescents who: (1) quit sport, (2) reported low competitive success, and (3) had a relatively short period of involvement in sport. Lesjak and Stanojevic-Jerkovic [9] found that high school children who are physically less active have greater odds of reporting daily cigarette smoking, while others have not found a consistent protective association between specific sports/physical activities and substance use. The incongruity between our results and those of previous investigators may be explained in part by similar findings from the alcohol and sports literature. Vest, et al. [22] found that athletes were likely to use alcohol if their sports friends and teammates had high alcohol use, suggesting that the association between engagement in sports and alcohol use is mediated through peer relations. This association between sports and peer influence could potentially apply to smoking though it needs to be further explored.

In our study, boys and girls who visited entertainment venues were more likely to have ever smoked and be current smokers than those who never visited entertainment venues. These findings are logical in that entertainment venues, like discos and recreation centers, are likely to expose adolescents to peer smoking and tobacco advertising. Rahman et al. [17] found that Ukrainian adolescents who were frequently exposed to secondhand smoke in public places were more likely to smoke than those who were not

exposed. They concluded that public-place-targeted policies could play an important role in reducing smoking prevalence among Ukrainian adolescents.

We found that several types of leisure activities were protective against smoking for both boys and girls. These included reading, engaging in drawing or crafts, and leading a cultural life (going to the theater, concerts, museums). Secondary analysis of data from the Norwegian component of the European School Survey Project on Alcohol and Drugs revealed that adolescents who engaged in hobby-related leisure (such as singing, drawing, playing an instrument, and/or reading books because you want to) were more likely to abstain from tobacco and alcohol [7]. These results are intriguing and deserve further study. A variety of influences may be at play including less exposure to peers who are smoking, less exposure to tobacco marketing, more parental supervision, higher self-esteem, reduced stress, higher academic achievement, and others.

The major limitations of our study are a cross-sectional, rather than longitudinal, assessment of smoking and leisure activities; lack of specificity for some of the leisure activities (e.g. type of sport); potential confounding by factors other than gender; and incomplete response rates for some of the variables studied. Nevertheless, in the previous literature, the range of leisure activities studied in relation to smoking has been limited. Ours is one of the few studies to investigate these associations within the framework of a large, birth cohort study in Ukraine. Moreover, our findings on the increased risks of smoking associated with social media use and visiting entertainment venues are consistent with other studies in other parts of the world. Our findings about the protective effect of reading books, engaging in drawing or crafts, and leading a cultural life are intriguing and warrant investigation in future studies [23].

We conclude that engagement in specific types of leisure activities can affect the risk of adolescents' smoking behaviors. Specifically, socializing on the internet and visiting entertainment venues are associated with an increased risk of smoking, while reading books, engaging in drawing and arts and crafts, and leading a cultural life (going to theaters, concerts, museums) are associated with reduced risks of smoking.

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Ethics Approval and Consent to Participate

Nurses from the Kamianske Polyclinic obtained adolescents' assent and parental consent after explaining the risks, benefits, and procedures for participation in the survey during home visits. This study has been approved by the IRB Committees at the University of Illinois at Chicago and the Institute of Pediatrics, Obstetrics, and Gynecology of the National Academy of Sciences of Ukraine.

Availability of Data and Material

The datasets generated and/or analyzed during the current study are not publicly available since access to the data is governed by the Family and Children of Ukraine Steering Committee. Data are available from the Family and Children of Ukraine Steering Committee on reasonable request.

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Authors Contributions

DH, AZ, and ZSN designed the research, provided funding acquisition, project administration, and resources; NH, AZ, and NG analyzed the data; AZ, ZSN, and NG conducted review and editing; NH and DH wrote the paper. All authors have read and approved the manuscript.

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