



Leisure activity and alcohol use among Ukrainian adolescents

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ABSTRACT

The aim of this paper was to investigate associations between engagement in various types of leisure activity and alcohol use among Ukrainian adolescents. We conducted a cross-sectional survey of 1075 adolescents who were enrolled in the *Family and Children of Ukraine* birth cohort study using a self-administered questionnaire to determine how they prefer to spend their leisure time and their use of alcohol. Use of social media was associated with a higher risk of ever having used alcohol (OR = 2.11; 95%CI: [1.40–3.19]), used alcohol in the past 12 months (OR = 2.60; 95%CI [1.73–3.90]), and used alcohol in the past 30 days (OR = 2.35; 95%CI [1.50–3.70]). Visiting entertainment establishments (discos, recreation centers) was associated with a higher risk of ever used alcohol (OR = 1.84; 95%CI [1.33–2.56]), used alcohol in the past 12 months (OR = 2.09 95%CI [1.52–2.87]), and used alcohol in the past 30 days (OR = 2.29; 95%CI [1.65–3.17]). Reading books was protective against using alcohol in the past 12 months (OR = 0.59; 95%CI [0.42–0.82]) and the past 30 days (OR = 0.47; 95%CI [0.35–0.63]). Engaging in cultural leisure activities was protective against alcohol use in the past 30 days (OR = 0.72; 95% CI [0.54–0.95]). We conclude that among Ukrainian adolescents, engagement in sports, social media use and visiting entertainment establishments are associated with increased risk for alcohol use while reading books and engaging in cultural leisure activities are protective.

1. Introduction

Alcohol is the third leading risk factor for burden of disease in Ukraine (<http://www.healthmetricsandevaluation.org>). Alcohol use tends to emerge during adolescent years, and early adolescent alcohol use has been linked to harmful social and behavioral function throughout adolescence and into adulthood. Observations from the Health Behavior in School-aged Children (HBSC) WHO collaborative cross-national study indicate that in 2014, 17% of boys and 10% of girls age 15 years drank alcohol weekly (WHO et al., 2018). While the prevalence has decreased significantly since 2002, use of alcohol by adolescents remains a serious health problem in Ukraine.

Numerous risk factors have been associated with alcohol abuse in adolescents (Hawkins, Catalano, & Miller, 1992). These include contextual factors, such as laws and cultural norms; availability; socio-economic situation; and neighborhood disorganization. Individual and interpersonal factors include sensation seeking; genetics; family behavior, attitudes and conflicts (Sumskas & Zaborskis, 2017); low commitment to school; peer rejection; alienation and rebelliousness; and

association with substance-abusing peers. School misbehavior and peer-encouragement of school misbehavior are additional risk factors, while school interest, school effort, and academic achievement are protective factors (Bryant, 2003).

Choice of leisure activity is important to adolescent development. Participation in leisure activities has been associated with higher academic achievement, adolescent identity, and autonomy development (Caldwell & Faulk, 2013; Coatsworth, Palen, Sharp, & Ferrer-Wreder, 2006; Eccles, Barber, Stone, & Hunt, 2003).

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, as opposed to unstructured leisure activities (Caldwell & Faulk, 2013).

Lee and Vandell (2015) using data from the Study of Early Child Care and Youth Development found that unsupervised time with peers increased the odds of alcohol use in U.S. 15-year olds. The data on participation in sports and alcohol use among adolescents has been conflicting. Many studies have reported that engagement in sports is a risk factor for alcohol use (Bedendo, Opaleye, Andrade, & Noto, 2013;

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Mays et al., 2010); Tahiraj et al., 2016; Devcic et al., 2018; Zenic et al., 2018; Chen et al. Anon, 2019) while a few have found sports and physical activity to be protective (Lesjak & Stanojevic-Jerkovic, 2015; Villalba, Garcia, Canto, & Soto, 2016). Moore and Werch (2005) point out that the type of sports activity is important to consider, with some, like out-of-school swimming being protective against alcohol use.

Lund and Scheffels (2018) studied the characteristics and lifestyle factors among Norwegian adolescents who abstain from alcohol. Unorganized leisure time reduced the odds of being an abstainer. Engaging in hobby-related leisure time (reading books because you want to; doing some hobby activity such as singing, drawing, or playing an instrument) increased the odds of being an abstainer.

Adolescents are increasingly spending their leisure time on social media. Social media may influence alcohol use through alcohol advertising and peer alcohol behavior (Moreno & Whitehill, 2014). Exposure to alcohol content can be passive, e.g. by viewing peer's pro-alcohol or ads, or active, by posting one's own pro-alcohol content or following sites that promote alcohol use (Cabrera-Nguyen, Cavazos-Rehg, Krauss, Bierut, & Moreno, 2016). Among U.S. university students, current alcohol use was predictive of displaying alcohol use posts on social media (Moreno, Arseniev-Koehler, Litt, & Christakis, 2016). Profile owners who displayed references to intoxication/problem drinking were also more likely to score in the problem drinking category of the (Alcohol Use Disorder Identification Test) AUDIT scale (Moreno, Christakis, Egan, Brockman, & Becker, 2012). In a Mexican sample of young, university students, seeing ads with alcohol on Facebook was significantly related to alcohol consumption (Oliva, Gherardi-Donato, Bermudez, & Facundo, 2018).

Previous studies have observed interactions between leisure activities, alcohol use, and gender (Moore & Werch, 2005). Patterns of alcohol use are known to vary by gender, including European adolescents (Schulte, Ramo, & Brown, 2009; Wicki, Kuntsche, & Gmel, 2010). Similarly, adolescents vary by gender in their leisure participation and psychosocial adjustment (Bradley & Inglis, 2012). For these reasons we chose to present both unadjusted and gender-adjusted odds ratios and to test for evidence of interaction.

We are one of the first studies, to our knowledge, to look at the association between specific types of leisure activities and alcohol use among a birth cohort Ukrainian adolescents. *Family and Children of Ukraine* is the Ukrainian component of the *European Longitudinal Study of Pregnancy and Childhood* (ELSPAC). During the "18-years of age" assessment phase of this study, adolescents were asked to report their engagement in leisure activities and alcohol use. The aim of this paper was to determine whether engagement in specific types of leisure activities is associated with increased or decreased risks of alcohol use.

2. Methods

2.1. Study population

The study population consisted of 1075 adolescents and their mothers/caregivers from Kamianske who were enrolled in the *Family and Children of Ukraine* (FCOU) birth cohort study and who had also 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 from the city of Kamianske from December 1992 to June 1994, and 2156 chose to participate. 1467 completed the 3-years-of age assessment and of these 1075 children completed the 18 years of age assessment in 2011.

2.2. 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 in the current 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 Avon Longitudinal Study of Pregnancy and Childhood SPAC) 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 also asked the questions: "How many times in your life have you drunk alcoholic beverages, during your life, over the past 12 months, and over the past 30 days?"

2.3. Statistical analysis

The characteristics of the study population were presented using descriptive statistics. Groups engaging in specific leisure activities (Frequently and Sometimes) were compared to those who never engaged in those specific activities with regards to ever used alcohol, used alcohol in the last 12 months, and used alcohol in the past 30 days using odds ratios and confidence intervals. Groups showing significant associations were further stratified on gender and examined for confounding and interaction using Mantel Haenzel methods and the Woolf test for homogeneity of odds ratios.

This study was approved by the IRB at the University of Illinois at Chicago and the Institute of Pediatrics, Obstetrics, and Gynecology in Kyiv, Ukraine. The datasets generated and/or analysed 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.

3. Results

The characteristics of the study population are presented in Table 1. The adolescents had a mean age of 16.2 with standard deviation of 0.47 years and a range of 15.1 to 18.2 years. 50.5% were male. 67.4% reported ever having drunk alcohol in their lifetime. 58.7% of these had drunk alcohol in the past 12 months and 35.6% in the past 30 days.

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 cultural leisure 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.

Table 3 presents the relative odds of alcohol use with engagement in various types of leisure activities (frequently and sometimes vs never). Visiting entertainment establishments was significantly associated with increased relative odds of ever used alcohol, used alcohol in past 12 months, and used alcohol in the past 30 days. Playing sports was significantly associated with increased relative odds of ever used alcohol, but not with recent alcohol use. Use of social media was significantly associated with increased relative odds of ever used alcohol, used alcohol in the past 12 months, and used alcohol in the past 30 days. Reading books was protective against alcohol use in the past 12 months and in the past 30 days. Engaging in cultural leisure activities was protective against alcohol use in the past 30 days.

Table 4 presents the relative odds of alcohol use for specific leisure activities stratified by gender. When stratified by gender, entertainment establishments such as discos and recreation centers were significantly

Table 1
Characteristics of the study population (N = 1075).

	n	%
Gender		
Male	543	50.5
Female	532	49.5
Ever drank alcohol		
Males		
Yes	347	63.9
No	144	26.5
Missing	52	9.6
Females		
Yes	356	66.9
No	120	22.6
Missing	56	10.5
Total		
Yes	725	67.4
No	264	24.6
Missing	86	8.0
Used alcohol in past 12 months		
Males		
Yes	301	55.4
No	151	27.8
Missing	91	16.8
Females		
Yes	331	62.2
No	134	25.2
Missing	67	12.6
Total		
Yes	632	58.7
No	285	26.5
Missing	159	14.8
Used alcohol in past 30 days		
Males		
Yes	182	33.5
No	274	50.5
Missing	87	16.0
Females		
Yes	199	37.4
No	257	48.3
Missing	76	13.3
Total		
Yes	383	35.6
No	532	49.5
Missing	160	14.9

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

Leisure activity	Frequently		Sometimes		Never		Missing	
	N	(%)	N	(%)	N	(%)	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 establishments	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)

associated with ever having used alcohol for girls but not for boys. Similarly, visiting entertainment establishments was associated with having used alcohol in the past 12 months for girls but not for boys.

Playing sports was significantly associated with ever having used alcohol for boys but not for girls. Use of social media was significantly associated with ever having used alcohol and used alcohol in the past 12 months for girls but not for boys. Use of social media was significantly associated with alcohol use in the past 30 days for both girls and boys.

Reading books was protective against using alcohol in the past 12 months for both girls and boys. Similarly, reading books was protective against using alcohol in the past 30 days for both girls and boys.

4. Discussion

In our sample of 1075 adolescents, age 15–18 years, from the city of Kamianske, Ukraine, 67.5% reported ever having drunk alcohol and 35.6% reported having used alcohol in the past 30 days. In 2011 the European School Survey Project on Alcohol and Other Drugs (ELSPAD) collected data from Ukrainian children from a national school sample of 99 schools. These Ukrainian adolescents, with an average age of 15.8 years, reported a 79% prevalence of ever having drunk alcohol, 79% prevalence in the past 12 months, and 54% prevalence in the past 30 days. In both the ELSPAD and our study, Ukrainian girls had a slightly higher prevalence of alcohol use than boys. The prevalence of alcohol use in our cohort is lower than ELSPAD, which suggests that the Kamianske adolescents differ from the national sample or that there may be underreporting of alcohol use in our sample.

We found that visiting entertainment establishments such as discos and recreation centers was associated with a significantly higher risk of ever having used alcohol, used alcohol in the past 12 months, and in the past 30 days after adjusting for gender. The risk for females was higher than for males and demonstrated significant interaction for alcohol use during the past 12 months. Drinking can occur at a variety of places such as bars, homes of friends and relatives, parties, and special events. Results from the ELSPAD study indicate that the majority of 15 year olds in Ukraine consumed alcoholic beverages on-premises (Kuntsche & Gmel, 2013). It is not surprising that adolescents who visit entertainment establishments have a greater risk of alcohol use than those who never visit such places.

Reading books as a leisure activity was protective against alcohol use as compared to those who never read books for leisure for both boys and girls. Secondary analysis of data from the Norwegian component of the ELSPAD study 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 alcohol (Lund & Scheffels, 2018). The protective effect of reading books for leisure against alcohol use is a relatively new finding in the literature and should be further explored.

Our finding that adolescents who “lead a cultural life” (e.g. go to the theater, concerts, and museums) are less likely to be current drinkers is intriguing. In our study adolescents who reported that they lead a cultural life were significantly more likely to read books, draw/construct, play a musical instrument, engage in tourism, play sports, visit entertainment establishments, and use social media. Leading a cultural life was not protective for ever having used alcohol or alcohol use in the past 12 months which suggests that could be a false positive finding due to multiple comparisons. On the other hand, previous studies have shown that participation in cultural activities has been associated with improved self-perception of health, higher self-esteem, higher life satisfaction, and improved longevity (Bygren, Konlaan, & Johansson, 1996; Hansen, Sund, Skjei Knudtsen, Krokstad, & Homen, 2015; Wilkinson, Waters, Bygren, & Tarlov, 2007). The potentially protective effect of engaging in cultural leisure activities on alcohol use warrants investigation in future studies.

Several previous investigators have found that engagement in sports increases the risk of alcohol use in adolescents in different parts of the world (Bedendo et al., 2013; Mays et al., 2010); Dorica et al., 2016; Tahiraj et al., 2016; Devcic et al., 2018; Zenic et al., 2018; Chen et al.

Table 3
Leisure activity and relative odds of alcohol use among Ukrainian adolescents.

Leisure activity	Ever used alcohol OR (95% CI)	Used alcohol in past 12 months OR (95% CI)	Used alcohol in past 30 days OR (95% CI)
Socialize with friends	1.34 (0.12–14.86)	2.22 (0.14–35.6)	1.43 (0.13–15.86)
Socialize with family	0.39 (0.05–3.16)	0.37 (0.05–3.11)	0.95 (0.21–4.29)
Visit entertainment establishments	1.84 (1.33–2.56)	2.09 (1.52–2.87)	2.29 (1.65–3.17)
Read books	0.77 (0.55–1.07)	0.59 (0.42–0.82)	0.47 (0.35–0.63)
Draw and crafts	0.85 (0.61–1.18)	0.80 (0.58–1.09)	0.78 (0.59–1.05)
Play music	1.10 (0.74–1.65)	0.89 (0.61–1.30)	0.90 (0.63–1.28)
Watch TV	1.05 (0.48–2.28)	0.82 (0.36–1.86)	0.71 (0.34–1.48)
Play sports	1.62 (1.13–2.33)	1.23 (0.86–1.76)	1.15 (0.82–1.62)
Tourism	1.05 (0.75–1.47)	1.03 (0.75–1.43)	0.92 (0.68–1.23)
Lead cultural life	1.13 (0.82–1.56)	0.91 (0.67–1.24)	0.72 (0.54–0.95)
Sit at computer	1.18 (0.68–2.06)	1.54 (0.90–2.62)	1.25 (0.73–2.13)
Use social media	2.11 (1.40–3.19)	2.60 (1.73–3.90)	2.35 (1.50–3.70)
No free time	1.04 (0.72–1.52)	1.17 (0.82–1.68)	0.79 (0.58–1.09)

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

Alcohol use	Males OR (95%CI)	Females OR (95%CI)	Total _{MH} OR (95%CI)
Visit entertainment establishments			
Ever	1.38 (0.88–2.17)	2.50 (1.55–4.02)	1.82 (1.31–2.52)
Past 12 months	1.49 (0.95–2.34)	2.90 (1.84–4.56)	2.05 (1.49–2.83)*
Past 30 days	2.14 (1.35–3.38)	2.42 (1.52–3.86)	2.27 (1.64–3.15)
Read books			
Ever	0.78 (0.50–1.21)	0.69 (0.41–1.17)	0.74 (0.53–1.03)
Past 12 months	0.63 (0.41–0.95)	0.46 (0.41–0.96)	0.55 (0.40–0.78)
Past 30 days	0.36 (0.24–0.55)	0.57 (0.37–0.88)	0.45 (0.34–0.61)
Playing sports			
Ever	5.21 (2.53–10.73)	1.29 (0.80–2.08)	1.95 (1.32–2.87)*
Past 12 months	3.08 (1.45–6.55)	1.06 (0.68 = 1.67)	1.40 (0.95–2.05)*
Past 30 days	1.98 (0.86–4.57)	1.11 (0.73–1.67)	1.25 (0.87–1.80)
Use social media			
Ever	1.66 (0.91–3.04)	2.74 (1.55–4.85)	2.14 (1.42–3.24)*
Past 12 months	1.84 (0.93–3.39)	3.65 (2.10–6.33)	2.65 (1.76–3.99)
Past 30 days	2.62 (1.26–5.43)	2.28 (1.27–4.10)	2.41 (1.53–3.81)

* Woolf test for homogeneity of odds ratios ≤ 0.05.

Anon, 2019). In our study, engagement in sports and alcohol use exhibited a significant interaction with gender, with elevated risks for boys but not girls. Vest and Simpkins (2013) 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. Mays et al. (2010) found that after controlling for demographics and sports-specific factors, perceived peer drinking was significantly associated with total alcohol-related behaviors among U.S. high school adolescents. Moore and Werch (2005) found that the association between engagement in sports and alcohol abuse varies by type of sport and by gender.

At the time of the survey, Ukrainian adolescents were accessing both Russian and western social networking sites, including Facebook and Twitter. Ninety percent of a national sample of Ukrainians ages 15–24 had used a social networking site in the past week (BBG, n.d.). In our study, use of social media was significantly associated with increased risk of ever using alcohol, using alcohol in the past 12 months, and using alcohol in the past 30 days among both boys and girls. Previous studies have shown that social media influences alcohol use through advertising and peer alcohol behavior (Moreno & Whitehill, 2014). Students who use alcohol are more likely to post alcohol-related content and to engage in problem drinking (Moreno et al., 2012, Moreno et al., 2016). Seeing ads with alcohol on social media has also been associated with increased alcohol consumption (Oliva et al., 2018).

Our study has several major limitations. Even though we are

assessing participants in a birth cohort, the survey of leisure activities and alcohol use was cross-sectional. The design of the *Family and Children of Ukraine* studies consists of surveys and medical record reviews conducted at specific ages. Prior to the eighteen years of age assessment, the previous assessment was at 7 years which precluded our looking at the data longitudinally. While we attempted to investigate specific types of leisure activities, a few of the categories could have benefited from even more specificity, e.g. type of sport or type of cultural leisure activity. Our response rates were incomplete for some of the variable studies. Finally, given the multiple comparisons with types of leisure activities and patterns of alcohol use, it is possible that a few of our significant associations are false positives. Given these limitations the associations that we observed should not be interpreted as causal.

Nevertheless, this is an observational, hypothesis-generating study of an understudied population, and these findings may lead to the development of effective interventions in this population. While the design is cross-sectional, the participants in the *Family and Children of Ukraine* study were drawn from all pregnancies in Kamianske during the study period. As a result, our sample has high external validity and is representative of adolescents in Kamianske. The associations that we observed, while susceptible to multiple comparison bias, are consistent with the results of previous studies on the associations of alcohol use among adolescents with sport, visiting entertainment establishments, and use of social media. We observed the same gender-interactions with alcohol use and sport as did previous investigators. Our findings on the protective effects of reading and engaging in cultural activities are especially intriguing and warrant further investigation in future studies.

Declaration of Competing Interest

The authors have no conflicts of interest.

References

Anon (2019). *Global burden of diseases, injuries, and risk factors study 2010*. Ukraine: GBD Profile. Retrieved from <http://www.healthmetricsandevaluation.org>.

Bedendo, A., Opaleye, E. S., Andrade, A. L. M., & Noto, A. R. (2013). Heavy episodic drinking and soccer practice among high school students in Brazil: The contextual aspects of this relationship. *BMC Public Health*, 13(247).

Bradley, G. L., & Inglis, B. S. (2012). Adolescent leisure dimensions, psychosocial adjustment, and gender effects. *Journal of Adolescence*, 35, 1167–1176.

Broadcasting Board of Governors Contemporary media use in Ukraine. <https://www.bbg.gov/wp-content/media/2014/06/Ukraine-research-brief.pdf>, Accessed date: 13 March 2019.

Bryant, A. L. (2003). How academic achievement, attitudes, and behaviors relate to the course of substance use during adolescence: A 6-year, multiwave national longitudinal study. *Journal of Research on Adolescence*, 13(3), 361–397.

Bygren, L. O., Konlaan, B. B., & Johansson, S. E. (1996). Attendance at cultural events, reading books or periodicals, and making music or singing in a choice as determinants for survival: Swedish interview survey living conditions. *BMJ*, 13(7072), 1577–1580.

Cabrera-Nguyen, E. P., Cavazos-Rehg, P., Krauss, M., Bierut, L. J., & Moreno, M. A.

- (2016). Young Adults' exposure to alcohol-and marijuana-related content on twitter. *Journal of Studies on Alcohol and Drugs*, 77(2), 349–353.
- Caldwell, L. L., & Faulk, M. (2013). Adolescent leisure from a developmental and prevention perspective. *Positive leisure science: From subjective experience to social contexts* (pp. 41–60). Spring Science + Business Media.
- Coatsworth, J. D., Palen, L., Sharp, E. H., & Ferrer-Wreder, L. (2006). Self-defining activities, expressive identity and adolescent wellness. *Applied Developmental Psychology*, 10, 157–170.
- Devic, S., Sekulic, D., Ban, D., Kutlesa, Z., Rodek, J., & Sajber, D. (2018). Evidencing protective and risk factors for harmful drinking in adolescence: A prospective analysis of sport-participation and scholastic-achievement in older adolescents from Croatia. *International Journal of Environmental Research and Public Health*, 15, 986.
- Eccles, J. S., Barber, L. B., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues*, 59(4), 865–889.
- Hansen, E., Sund, E., Skjei Knudtsen, M., Krokstad, S., & Homen, T. (2015). Cultural activity participation and associations with self-perceived health, life-satisfaction and mental health: The Young HUNT Study, Norway. *BMC Public Health*, 15, 544. <https://doi.org/10.1186/s12889-015-1873-4>.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drugs problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112(1), 64–105.
- Kuntsche, S., & Gmel, G. (2013). Alcohol consumption in late adolescence and early adulthood – Where is the problem? *The European Journal of Medical Sciences*. <https://doi.org/10.4414/smwm.2013.13826>.
- Lee, K. T. H., & Vandell, D. L. (2015). Out-of-school time and adolescent substance use. *Journal of Adolescent Health*, 57, 523–529.
- Lesjak, V., & Stanojevic-Jerkovic, O. (2015). Physical activity, sedentary behavior and substance use among adolescents in Slovenian urban area. *Zdrav Var*, 54(3), 168–174.
- Lund, I., & Scheffels, J. (2018). 15-year-old tobacco and alcohol abstainers in a drier generation: Characteristics and lifestyle factors in a Norwegian cross-sectional sample. *Scandinavian Journal of Public Health*, 1–7.
- Mays, D., Thompson, N., Kushner, H. I., Mays, D. F., Farmer, D., & Windle, M. (2010). Sports-specific factors, perceived peer drinking, and alcohol-related behaviors among adolescents participating in school-based sports in Southwest Georgia. *Addictive Behaviors*, 35, 235–241.
- Moore, M. J., & Werch, C. E. (2005). Sport and physical activity participation and substance use among adolescents. *Journal of Adolescent Health*, 36(6), 486–493.
- Moreno, M. A., Arseniev-Koehler, A., Litt, D., & Christakis, D. (2016). Evaluating college students' displayed alcohol references on Facebook and Twitter. *Journal of Adolescent Health*, 58(5), 527–532.
- Moreno, M. A., Christakis, D. A., Egan, K. G., Brockman, L. N., & Becker, T. (2012). Associations between displayed alcohol references on Facebook and problem drinking among college students. *Archives of Pediatrics and Adolescent Medicine*, 166(2), 157–163.
- Moreno, M. A., & Whitehill, J. M. (2014). Influence of social media on alcohol use in adolescents and young adults. *Alcohol Research: Current Reviews*, 36(1), 91–100.
- Oliva, E. I. P. N., Gherardi-Donato, E. C. D. S., Bermudez, J. A., & Facundo, F. R. G. (2018). *Ciencia & Saude Coletiva*, 23(11), 3675–3681.
- Schulte, M. T., Ramo, D., & Brown, S. A. (2009). Gender difference in factors influencing alcohol use and drinking progression among adolescents. *Clinical Psychology Review*, 29(6), 535–547.
- Sumskas, L., & Zaborskis, A. (2017). Family social environment and parenting predictors of alcohol use among adolescents in Lithuania. *International Journal of Environmental Research and Public Health*, 14(19), 1037.
- Tahiraj, E., Cubela, M., Ostojic, L., Rodek, J., Zenic, N., Sekulic, D., & Lesnik, B. (2016). Prevalence and factors associated with substance use and misuse among Kosovar adolescents; cross sectional study of scholastic, familial, and sports-related factors of influence. *International Journal of Environmental Research and Public Health*, 13(5), 502.
- Vest, A. E., & Simpkins, S. D. (2013). When is sport participation risky or protective for alcohol use? The role of teammates, friendships, and popularity. *New Directions for Child and Adolescent Development*, (140), 37–55.
- Villalba, F. J. L., Garcia, P. L. R., Canto, E. G., & Soto, J. P. (2016). Relationship between sport and physical activity and alcohol consumption among adolescent students in Murcia (Spain). *Archivos Argentinos de Pediatría*, 114(2), 101–106.
- Wicki, M., Kuntsche, E., & Gmel, G. (2010). Drinking at European universities? A review of students' alcohol use. *Addictive Behaviors*, 35, 913–924.
- Wilkinson, A. V., Waters, A. J., Bygren, L. O., & Tarlov, A. T. (2007). Are variations in rates of attending cultural activities associated with population health in the United States? *BMC Public Health*, 7(226), <https://doi.org/10.1186/1471-2458-7-226>.
- World Health Organization. Inchley J., Currie D, Vieno A, Torsheim T, Ferreira-Borges Ca, Weber MM, Barnikow V, and Breda J (Eds). Adolescent alcohol-related behaviors: Trends and inequalities in the WHO European region, 2002-2014 (2018). http://www.euro.who.int/_data/assets/pdf_file/0007/382840/WH15-alcohol-report-eng.pdf?ua=1 Accessed March 13, 2019.
- Zenic, N., Terzic, A., Ostojic, L., Sisic, N., Saavedra, J. M., Kristjansdottir, H., ... Sekulic, D. (2018). Educational and sport factors as predictors of harmful alcohol drinking in adolescence: A prospective study in Bosnia and Herzegovina. *International Journal of Public Health*. <https://doi.org/10.1007/s00038-018-1168-5>.