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CAN WE CONSIDER SPORT AS A PROTECTIVE FACTOR AGAINST SUBSTANCE MISUSE IN ADOLESCENCE?

LAHKO ŠPORT OBRAVNAVAMO KOT ZAŠČITNI DEJAVNIK PROTI ZLORABI SUBSTANC V ADOLESCENCI?

ABSTRACT

Substance use and misuse (SUM), which includes the consumption of alcohol, cigarette smoking, the consumption of drugs and other behaviours, is a significant public health issue in the world today. In addition to being a serious, health-threatening behaviour, SUM is often associated with detrimental consequences and creates certain difficulties for not only the individuals who misuse the substances but also their parents, families, school, peers, and society as a whole. Physical activity and sports (PA&S) helps to reduce the risk of a number of critical health problems, including obesity, heart disease, stroke, colon cancer, diabetes and osteoporosis. In addition, participation in PA&S by young people (i.e. adolescents) has been shown to promote their social well-being, physical and mental health, academic achievement, self-discipline, and socialisation. It is often uncritically hypothesised that participation in PA&S will reduce the tendency of adolescents to abuse substances. However, the literature to date has not consistently validated the perception that PA&S are factors which can buffer SUM. In this paper, we present data from our studies which examined the associations between PA&S and adolescent SUM. Special attention is paid to the cultural, traditional and social value of sport in countries and societies from where the samples of participants were drawn. Further, individual and team (competitive) sports are differentially evaluated with regard to their effect on SUM. Finally, proposals for future research are noted.

Key words: physical exercising, protective factor, risk factor, association

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IZVLEČEK

Uporaba in zloraba substanc (UZS), ki vključuje uživanje alkohola, kajenje cigaret, uživanje drog in druga ravnanja, je v današnjem svetu pomemben problem javnega zdravstva. Poleg tega, da gre za resno in zdravje ogrožajoče ravnanje, se UZS pogosto povezuje s škodljivimi posledicami ter ustvarja specifične težave ne samo za posameznike, ki substance zlorablajo, ampak tudi za njihove starše, družino, šolo, vrstnike in družbo kot celoto. Telesna dejavnost in šport (TDŠ) pomagata zmanjševati tveganje za številne kritične zdravstvene težave, vključno z debelostjo, srčno boleznijo, kapjo, rakom debelega črevesa, sladkorno boleznijo in osteoporozo. Poleg tega ukvarjanje s TDŠ pri mladih (adolescentih) dokazano spodbuja družbeno blaginjo, telesno in duševno zdravje, akademske dosežke, samodisciplino in socializacijo. Pogosto se nekritično domneva, da ukvarjanje s TDŠ pri mladostnikih zmanjšuje nagnjenost k zlorabi substanc. Vendar pa se v dosednji literaturi ni dosledno potrdilo opažanja, da so TDŠ dejavniki, ki lahko prispevajo k zmanjšanju UZS. V tem prispevku predstavljamo podatke iz naših raziskav, v katerih smo preučili povezave med TDŠ in UZS. Posebna pozornost smo namenili kulturni, tradicionalni in družbeni vrednosti športa v državah in družbah, iz katerih so bili naši vzorci sodelujočih. Poleg tega smo posamične in ekipne (tekmovalne) športe ocenjevali razlikovalno glede na njihov učinek na UZS. Nazadnje smo ponudili tudi nekaj predlogov za nadaljnje raziskave.

Ključne besede: telesna vadba, zaščitni dejavnik, dejavnik tveganja, povezava

INTRODUCTION

Adolescent substance abuse (SA), which includes the consumption of alcohol, cigarette smoking, the consumption of drugs and other behaviours, is a significant public-health issue in the world today. In addition to being a serious, health-threatening behaviour, SA is often associated with detrimental consequences and creates certain difficulties for not only the individuals who misuse the substances but also their parents, families, school, peers, and society as a whole (Clark, Lynch, Donovan, & Block, 2001; Verdurmen, Monshouwer, van Dorsselaer, ter Bogt, & Vollebergh, 2005; DuRant, Smith, Kreiter, & Krowchuk, 1999). Today, it is generally accepted that the earlier a child begins to use substances, the greater the chance that they will become addicted, while those who reach the age of 21 without smoking, consuming illegal drugs or binge drinking are likely to never engage in these behaviours (Hingson, Heeren, & Winter, 2006). Therefore, it is particularly important to find any possible protective factors or risk factors for SA among adolescents.

The importance of physical exercising and sport participation (PE&S) is well known. Physical activity helps to reduce the risk of a number of critical health problems, including obesity, heart disease, stroke, colon cancer, diabetes and osteoporosis (Stahl, Rutten, Nutbeam, & Kannas, 2002; Steinbeck, 2001). In addition, participation in PE&S by young people has been shown to promote their social well-being, physical and mental health, academic achievement, self-discipline, and socialisation (Moore & Werch, 2005). It is also hypothesised that participation in PE&S will reduce the tendency of young people to abuse substances. However, the literature to date has not consistently validated the perception that PE&S factors are factors which can buffer SA among children and adolescents. While some investigations have indicated a lower likelihood of SA in those adolescents systematically involved in PE&S (Ferron, Narring, Cauderay, & Michaud, 1999; Guo, Reeder, McGee, & Darling, 2011), other studies have shown that PE&S are associated with an increased likelihood of SA (Gutgesell, Timmerman, & Keller, 1996; Schneider & Greenberg, 1992).

In this paper, we present recent studies that examined sport and physical exercising with regard to SA among adolescents. All studies were carried out in the region (i.e. former Yugoslav territory, and examined 17- to 18-year-old adolescents using a similar methodological approach. Therefore, the results are relatively comparable.

Study 1: Substance use and misuse in Croatian 17- to 18-year-old adolescents: correlation with scholastic variables and sport factors (Modric, Zenic, & Sekulic, 2011)

Background, aim and methods: At the time this study was conducted, studies considering incidence as well as factors related to SA in adolescents in Croatia were scarce. Further, for all age groups, PE&S had rarely been studied in relation to SA. Although some authors have examined sport (physical activity) and SA, they solely included adult athletes in the territory of Croatia and surrounding countries and primarily focused on doping issues (Kondric, Sekulic, & Mandic, 2010; Sekulic, Kostic, Rodek, Damjanovic, & Ostojic, 2009; Zenic, Peric, Zubcevic, Ostojic, & Ostojic, 2010). The aim of this study was: (1) to investigate the SA habits of Croatian adolescents (17 to 18 years of age) randomly sampled in Split, the second-largest city in Croatia; and (2) to study potential gender-specific interrelationships between scholastic and PE&S factors in relation to SA within the sampled subjects. The sample of subjects in this study comprised 472 17- to 18-year-old adolescents (254 males and 218 females) from seven middle schools in Split,

the second-largest city in Croatia. All subjects were seniors and randomly sampled from the population of 4,781 seniors from 27 middle schools in the city.

Results: The males were more advanced in sport factors and more prone to SA. When compared to obtainable data, the frequency of smoking among Croatian adolescents is found to be alarmingly high (30% of subjects regularly smoked, while 40% of the boys and 20% of the girls practised harmful drinking. The teenagers included in the current study used some illegal drugs (marijuana, hashish, and amphetamines) but none of them declared themselves as a regular user, and prevalence is generally comparable with data reported for the EU (i.e. ESPAD). The scholastic variables were negatively related to all SA variables in both genders, which is consistent with previous findings (Choi 2007; Bachman et al. 2007). The sport factors were inversely related to SA in males (i.e. sport was found to be protective against SA) but, conversely, in females the positive correlation between sport achievement and alcohol consumption reached statistical significance.

Discussion & Conclusions: While some authors reported an increased likelihood of substance use in sport participants, others found a certain protective effect of participation in sports against SA. Some authors even suggest that participation in particular sports is associated with a higher risk for a certain SA, whereas participation in other sports is associated with a lower risk for certain SA. In our study, sport factors were inversely related to SA in males but, conversely, in females the positive correlation between sport achievement and alcohol consumption reached statistical significance. Although previous studies found that sport achievement (due to the accumulated sport stress) contributes as a risk factor to alcohol consumption, as far as we are aware this is noted for high-level athletes exclusively. However, the differential influence of sport factors on the SA (in our case gender-specific) relationship between sport/exercise and SA highlights the need for future research within the field. Although the current investigation was a pilot study, it allowed us to detect several important findings and identify certain topics that should be studied more precisely in the future. In doing future research, we strongly suggest observing more of the sport-related-issues (e.g., socio-cultural context of the sport; type and intensity of the sport; team vs. individual sports etc.). Interpretation of the reasons why females are less engaged in sports will most probably improve our understanding of sport-SA relationships. Future studies should investigate the influence of sport factors on SA among adolescents from other regions. Finally, and because of the evidently high incidence of alcohol drinking and cigarette smoking, in future research it will be useful to focus on only one of these drugs. Most likely, this would allow investigators to study the problem more specifically.

Study 2: Substance abuse and its relationship with scholastic achievement and sport factors: An analysis among adolescents of the Herzegovina–Neretva Canton in Bosnia and Herzegovina (Sekulic, Ostojic, Ostojic, Hajdarevic, & Ostojic, 2012)

Background, Aim & Methods: In Bosnia and Herzegovina (B&H), findings regarding SA among adolescents are limited, and few papers have investigated SA within this country, but the data show the high prevalence of smoking and alcohol drinking (Ivankovic et al., 2010; Juric, Carapina, Gilja, & Simic, 2010; Pilav, Nissinen, Haukkala, Niksic, & Laatikainen, 2007; Skobic, Sinanovic, Bovan, Ivankovic, & Skobic, 2010; Vasilj, Pilav, Maslov, & Polasek, 2009). The alarmingly high incidence of SA has been explained by the fact that B&H is a society that has experienced past trauma. It is likely that the country is still suffering from the effects of the recent war that caused great material and social damage and led to an increase in SA among the overall population.

Because policy and prevention strategies against SA as a serious public health problem should rely on accurate data for each country, territory, culture, socio-demographic circumstances, and so on, we have determined that the problems of SA are particularly important. Therefore, the aims of this study were to investigate SA among adolescents in B&H and to assess the potential gender-specific relationships between sport factors, scholastic achievement, and SA among 17- to 18-year-old adolescents from B&H. Due to the well-known cultural and religious differences that exist in B&H, we wanted to study a relatively homogenous sample of subjects. We therefore only sampled ethnic Croats from the Herzegovina-Neretva Canton (HNC).

Results: More than one-third of the boys and one-quarter of the girls were smokers. In our sample, opiates, marijuana and hashish were rarely consumed. However, approximately 6% of the boys consumed marijuana. Interestingly, party drugs, such as speed and ecstasy, were rarely consumed. Forty-seven percent of the boys and 18% of the girls engaged in harmful drinking. In general, boys were more prone to abuse substances than girls. Because AUDIT was the only variable that the K-S test recognised as parametric in nature, the t-test that was calculated between genders revealed that boys were more prone to consuming alcohol than their female peers. Girls were more successful in educational achievements, and significant differences were identified between the sexes in all four of the scholastic variables. Boys dominated in all of the sport factors that we studied. Briefly, they were more involved in individual and team sports, they practised sports for a longer amount of time, and they achieved a higher competitive status (result) than girls. In both genders, SA was negatively correlated with most of the scholastic variables. The sport factors (i.e., time of sport involvement and competitive status) results were significantly but numerically low and were negatively correlated with smoking habits. No significant correlation between SA and sport factors was identified among the girls. Due to the low correlation coefficients (and, therefore, the hardly identifiable relationships between sport factors and SA), we used current participation in individual and team sports, daily smoking and harmful alcohol consumption to determine the associations between sport factors and SA (Figures 1 and 2).

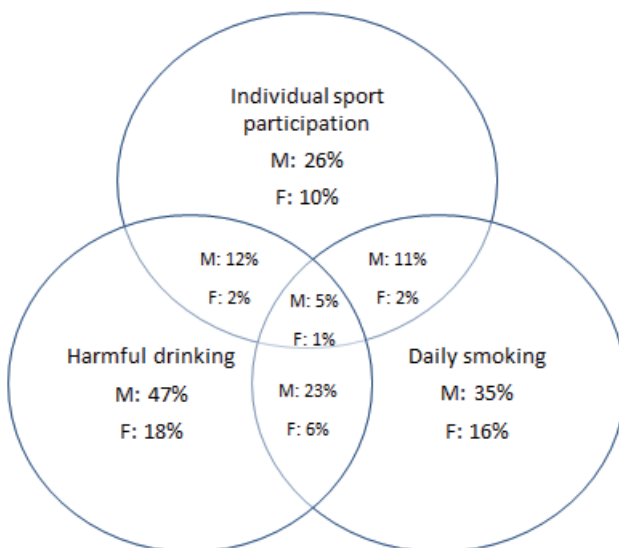


Figure 1. Association between individual sport participation, harmful drinking and daily smoking (F – females; M – males)

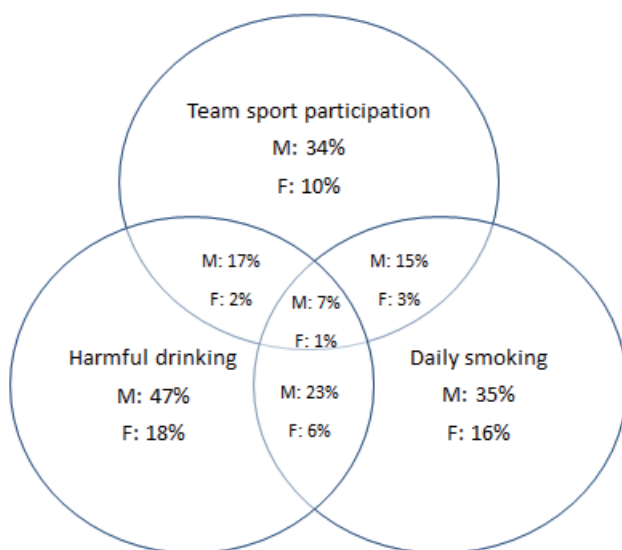


Figure 1. Association between team sport participation, harmful drinking and daily smoking (F – females; M – males)

Discussion & Conclusions: In general, the rates of alcohol consumption and cigarette smoking demonstrate the need for an intervention strategy against the consumption of these substances among adolescents from the HNC. The incidence of cigarette smoking in B&H (35% of boys and 16% of girls smoke cigarettes on a daily basis) is one of the highest reported prevalence levels among European countries. Alcohol consumption has also reached alarming rates, especially among adolescent males, as we identified harmful drinking behaviours among 50% of the subjects we tested. Both problems are likely related to the high occurrence of cigarette smoking and alcohol consumption throughout the country and to the social norms that find smoking and drinking acceptable. Smoking is not banned in open or closed facilities, such as nightclubs, bars and other public places, and age is not verified when cigarettes and alcohol are sold; moreover, the entire territory of the HNC is traditionally known for growing grapevines and tobacco. Of note, opiates, cannabinoids and party drugs (e.g., speed and ecstasy) were rarely used by the studied population. Our analysis revealed that smoking is negatively correlated with educational achievement. However, the relationship between SA and education is more obvious among girls, likely due to the lower consumption rates of substances in this group. To a lesser extent, scholastic failures are also associated with alcohol consumption. Because the methodological approach we used does not allow us to define how SA influences educational failure or vice versa, we can highlight the clear need for an additional analysis of this problem in future studies. The relationship that was identified between sport factors and SA revealed that sports should not be considered a factor which is negatively associated with SA among adolescents. Among the boys, the relationship between sport factors and SA was negligible but, among the girls, the data highlighted an increased tendency to smoke among those girls who were involved in team sports. Therefore, sports are not considered to be a risk factor for SA for girls, but rather those girls who are involved in sports are generally less traditionally oriented and thus simultaneously gravitate toward substance use and sport participation.

Study 3: Gender-specific predictors of cigarette smoking in adolescents; an analysis of sport participation, parental factors and religiosity as protective/risk factors (Sekulic, Ostojic, Vasilj, Coric, & Zenic, 2014)

Background, Aim & Methods: Previous studies have attempted to identify different factors that influence cigarette smoking among adolescents (Becerra & Castillo, 2011; Shi & Mao, 2011). Parental monitoring has generally been found to be a protective factor against cigarettes, and the studies are consistent with regard to this finding, regardless of differences in the study subjects (Bachman, O'Malley, Johnston, Schulenberg, & Wallace, 2011). The relationship between religiosity and cigarette smoking among adolescents is not as clear. In certain studies, the authors found gender-specific associations between religiosity and substance use (Baker et al., 1999), and religiosity has been found to be more protective for boys than for girls. The results from a very recent study (Kiesner, Poulin, & Dishion, 2010) show that religiosity reduces the odds of tobacco use among adolescents from the USA. In contrast, a Mexican study (Bachman et al., 2011) found that adolescents who attend church less and attribute less importance to religion are less likely to use cigarettes. Studies to date have not consistently validated the opinion that sports participation acts as a buffer factor for cigarette smoking in adolescence (see the previous studies presented above). The aim of this study was to investigate gender-specific relationships between religiosity, parental monitoring, parental education, and sports factors as predictors of daily cigarette smoking among adolescents from B&H. The sample in this study included 1,036 17- to 18-year-old adolescents (435 boys and 601 girls). All participants were in their last year of high school. The sample represents 11% of high school-aged children in the HNC, which is approximately 21% of high school seniors in the HNC (see the previous study for more details on the subjects and sampling procedure).

Results: For girls, a higher level of conflict with parents is a factor of increased risk for daily smoking (Odds Ratio: 2.17; Confidence Interval: 1.61-2.91). More advanced participation in team sports is recognised as a risk factor for daily smoking in boys (Odds Ratio: 2.17; 95% Confidence Interval: 1.53-3.10). Among boys, protective factors were found in: lower maternal education (Odds Ratio: 0.69; 95% Confidence Interval: 0.53-0.91), lower level of conflict with parents (Odds Ratio: 1.44; 95% Confidence Interval: 1.12-1.83), and more advanced individual sport participation (Odds Ratio: 0.66; 95% Confidence Interval: 0.48-0.92).

Discussion & Conclusion: Although sports authorities frequently suggest the value of sports participation in preventing substance abuse, empirical studies have provided unequivocal conclusions with regard to this problem (Ferron et al., 1999; Garry & Morrissey, 2000; Guo et al., 2011; Modric et al., 2011). Supportively, this study found very specific relationships between sports and cigarette smoking. While individual sports participation was found to be protective against cigarette smoking, team sports participation should be considered a risk factor for cigarette smoking among boys. Team sports as a leisure activity clearly facilitate pro-social group membership. It reduces the time available for unstructured activities with antisocial peers (Guo et al., 2011) but is associated with post-event gatherings, which frequently take place in bars and clubs. In New Zealand (Guo et al., 2011) and the USA (Castrucci, Gerlach, Kaufman, & Orleans, 2004; Pate, Trost, Levin, & Dowda, 2000), where authors found protective effects of team sports against cigarette smoking, there are strict policies prohibiting smoking in public places or selling cigarettes to minors. At the same time, B&H is one of the most liberal European countries with regard to tobacco control. Tobacco advertising is allowed, cigarettes are cheap (packs rarely cost more than USD 3), social norms are permissive of adolescents smoking, the entire territory of

the HNC is traditionally known for growing tobacco, and smoking is not banned in open or closed facilities or public places. Finally, age is not verified when cigarettes are sold (Sekulic, Ostojic, Ostojic, Hajdarevic, & Ostojic, 2012). In addition, there are differences between team and individual sports participation in terms of the physical and psychological demands on athletes (i.e., contrary to team sports, participation in individual sports is usually not possible with the physiological and psychological insufficiencies related to cigarette smoking). Also, as 'insiders', the authors of the study observe that some team sports in our region (football, team handball, basketball) entail cultures that permit substance use (including cigarettes), and athletes from these sports are frequently known as tobacco consumers. However, this is practically unimaginable behaviour for individual athletes in the region (i.e. the authors cannot recall a single high-level athlete from this region who is known to be a 'smoker'). It therefore seems that team sports participation together with poor tobacco prevention policies increase the chances of adolescent smoking. On the contrary, individual sports participation and a low level of conflict with one's parents are significant protective factors against tobacco consumption in boys.

Study 4: Harmful alcohol drinking among adolescents: The influence of sport participation, religiosity and parental factors (Cerkez, Culjak, Zenic, Sekulic, & Kondric, 2015)

Background, Aim & Methods: Alcohol consumption is one of the most frequent types of SA today. Apart from the known and well-proven negative health effects, alcohol consumption is recognised as a risk factor for a multitude of negative outcomes such as: fatal and non-fatal injuries, poisonings, car crashes, drownings, falls, burns, alcohol-related suicides, homicides, rapes, robberies and other assaults, risky sexual activity, and longer-term physical and emotional impairments resulting from alcohol drinking. Parental monitoring, religiosity, and sports participation have not been studied extensively in a multivariate manner with regard to their potential to act as buffers against alcohol consumption among adolescents. We considered this type of methodological approach particularly important because it is very probable that sport variables, religiosity and parental factors are interrelated. Therefore, the calculation of the univariate relationships between those variables (i.e., predictors) and SA (i.e., criteria) could result in serious interpretative errors due to the confounding effects. The aim of this study was to investigate gender-specific relationships between religiosity, parental monitoring, parental education, and sports factors as predictors of alcohol consumption among adolescents.

Results: According to the study's results, for boys harmful alcohol consumption seems to be mediated by their participation in individual sports (Odds ratio: 0.78; Confidence Interval: 0.61-0.99) and higher paternal levels of education (Odds ratio: 0.78; Confidence Interval: 0.63-0.93), whereas a higher level of conflict with one's parents is significantly related to higher levels of harmful alcohol consumption (Odds ratio: 1.41; Confidence Interval: 1.13-1.76). The model successfully classified 75% of boys as harmful drinkers, which was determined by scoring ≥ 11 on the AUDIT scale; while 41% were deemed non-harmful drinkers. Among girls, harmful drinking is expected for girls who experience a higher degree of conflict with their parents (Odds ratio: 1.72; Confidence Interval: 1.33-2.23), with 90% and 23% of girls successfully classified as non-harmful drinkers and harmful drinkers, respectively.

Discussion & Conclusions: Evidence suggests that athletes typically consume alcohol in social environments, which leads to greater consumption given the inherent social nature of team sports. In such cases, post-exercise drinking is rationalised and justified by athletes in many ways, including "everyone is doing it", "I only drink once a week", and "I can run/sauna it off

the next morning”. In some cases, these episodes are romanticised, and the drinking prowess of the athletes is admired. The media covers such ‘incidents’ extensively; consequently, adolescent athletes do not recognise drinking as harmful. In addition, there is no doubt that alcohol consumption is socially acceptable in the region we studied (Modric et al., 2011; Sekulic et al., 2012). This attitude leads to the general acceptance of alcohol drinking in young athletes, as well. It is not surprising that previous studies in the region (Modric et al. 2011) failed to define a clear relationship between general sport participation variables and alcohol drinking, given that they did not study individual and team sports separately. Although further studies are needed to confirm this hypothesis, it seems that boys involved in individual sports are more concerned (and/or more aware) about the possible negative effects of alcohol consumption (i.e., alcohol has a high calorie content, diuretic effects etc.) and, therefore, avoid such practices.

INSTEAD OF A CONCLUSION – WHAT SHOULD WE DO IN FUTURE STUDIES?

In general, it is clear that there is an evident lack of current knowledge about the influence of PE&S on SA among adolescents. Namely, the conclusions of previous studies are scattered and inconsistent, while some important factors of influence are not investigated (i.e. in-school monitoring of cigarette use; the financial status of children and consequent availability of pocket money to buy cigarettes; patterns of spending out-of-school time which are not related to sport participation etc.). One probable reason for the evident inconsistencies in the findings brought out so far is the cross-sectional nature of the studies. More precisely, such an approach does not allow objective observation of past and present sport participation as a factor influencing the consumption of substances. Briefly, it is known that there is certain (i.e. significant) proportion of 17- to 18-year-old adolescents who quit sports in this age. It is generally known, although not systematically studied, that those children who quit sport at this age are particularly vulnerable to SA and frequently start to abuse substances before they leave the sport (i.e. for the moment we cannot speculate whether the sport-failure led to SA, or vice-versa). At the same time, there is a significant proportion of their peers who actually do not misuse substances while doing sports. However, when investigated through a cross-sectional study design, the relationship between children’s current PE&S status and SA is unclear. Therefore, future studies should be prospective and interdisciplinary. A prospective study would therefore not only allow any mutual relationships between the studied variables to be identified, but assure that any cause-effect relationship between the studied variables is properly detected.

REFERENCES

- Bachman, J. G., O'Malley, P. M., Johnston, L. D., Schulenberg, J. E., & Wallace, J. M. (2011). Racial/ethnic differences in the relationship between parental education and substance use among U.S. 8th-, 10th-, and 12th-grade students: Findings from the Monitoring the Future project. *J Stud Alcohol Drugs*, 72(2), 279–285.
- Baker, J. G., Rosenthal, S. L., Leonhardt, D., Kollar, L. M., Succop, P. A., Burklow, K. A., & Biro, F. M. (1999). Relationship between perceived parental monitoring and young adolescent girls' sexual and substance use behaviors. *J Pediatr Adolesc Gynecol*, 12(1), 17–22. doi: 10.1016/S1083-3188(00)86615-2

- Becerra, D., & Castillo, J. (2011). Culturally protective parenting practices against substance use among adolescents in Mexico. *J Subst Use*, 16(2), 136–149. doi: Doi 10.3109/14659891.2010.518199
- Castrucci, B. C., Gerlach, K. K., Kaufman, N. J., & Orleans, C. T. (2004). Tobacco use and cessation behavior among adolescents participating in organized sports. *American Journal of Health Behavior*, 28(1), 63–71.
- Cerkez, I., Culjak, Z., Zenic, N., Sekulic, D., & Kondric, M. (2015). Harmful alcohol drinking among adolescents: The influence of sport participation, religiosity, and parental factors. *Journal of Child & Adolescent Substance Abuse* (ahead-of-print), 1–8.
- Choi, Y. (2007). Academic achievement and problem behaviors among Asian Pacific Islander American adolescents. *Journal of Youth and Adolescence*, 36(4), 403–415. doi: DOI 10.1007/s10964-006-9152-4
- Clark, D. B., Lynch, K. G., Donovan, J. E., & Block, G. D. (2001). Health problems in adolescents with alcohol use disorders: self-report, liver injury, and physical examination findings and correlates. *Alcoholism-Clinical and Experimental Research*, 25(9), 1350–1359.
- DuRant, R. H., Smith, J. A., Kreiter, S. R., & Krowchuk, D. P. (1999). The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviors among young adolescents. *Archives of Pediatrics & Adolescent Medicine*, 153(3), 286–291.
- Ferron, C., Narring, F., Cauderay, M., & Michaud, P. A. (1999). Sport activity in adolescence: associations with health perceptions and experimental behaviours. *Health Education Research*, 14(2), 225–233.
- Garry, J. P., & Morrissey, S. L. (2000). Team sports participation and risk-taking behaviors among a biracial middle school population. *Clin J Sport Med*, 10(3), 185–190.
- Guo, H., Reeder, A. I., McGee, R., & Darling, H. (2011). Adolescents' leisure activities, parental monitoring and cigarette smoking – a cross-sectional study. *Subst Abuse Treat Prev Policy*, 6(12). doi: 10.1186/1747-597X-6-12
- Gutgesell, M. E., Timmerman, M., & Keller, A. (1996). Reported alcohol use and behavior in long-distance runners. *Med Sci Sports Exerc*, 28(8), 1063–1070.
- Hingson, R. W., Heeren, T., & Winter, M. R. (2006). Age of alcohol-dependence onset: Associations with severity of dependence and seeking treatment. *Pediatrics*, 118(3), E755–E763. doi: DOI 10.1542/peds.2006-0223
- Ivankovic, A., Ravlija, J., Skobic, H., Vasilj, I., Ivankovic, Z., Pejanovic-Skobic, N., & Pavlekovic, G. (2010). Health status of population in Federation of Bosnia and Herzegovina in 15 years of transitional period. *Collegium Antropologicum*, 34, 325–333.
- Juric, M., Carapina, M., Gilja, A., & Simic, G. (2010). Knowledge, attitudes and behaviors of young people related to drinking and driving in Mostar Region, Bosnia and Herzegovina. *Collegium Antropologicum*, 34, 39–44.
- Kiesner, J., Poulin, F., & Dishion, T. J. (2010). Adolescent substance use with friends: Moderating and mediating effects of parental monitoring and peer activity contexts. *Merrill Palmer Q (Wayne State Univ Press)*, 56(4), 529–556.
- Kondric, M., Sekulic, D., & Mandic, G. F. (2010). Substance use and misuse among Slovenian table tennis players. *Subst Use Misuse*, 45(4), 543–553. doi: 10.3109/10826080903452553
- Modric, T., Zenic, N., & Sekulic, D. (2011). Substance use and misuse among 17- to 18-year-old Croatian adolescents: Correlation with scholastic variables and sport factors. *Subst Use Misuse*, 46(10), 1328–1334. doi: 10.3109/10826084.2011.579677
- Moore, M. J., & Werch, C. E. (2005). Sport and physical activity participation and substance use among adolescents. *J Adolesc Health*, 36(6), 486–493. doi: S1054-139X(04)00260-5 [pii] 10.1016/j.jado-health.2004.02.031
- Pate, R. R., Trost, S. G., Levin, S., & Dowda, M. (2000). Sports participation and health-related behaviors among US youth. *Archives of Pediatrics & Adolescent Medicine*, 154(9), 904–911.

Pilav, A., Nissinen, A., Haukkala, A., Niksic, D., & Laatikainen, T. (2007). Cardiovascular risk factors in the Federation of Bosnia and Herzegovina. *European Journal of Public Health, 17*(1), 75–79. doi: DOI 10.1093/eurpub/ckl066

Schneider, D., & Greenberg, M. R. (1992). Choice of exercise – a predictor of behavioral risks. *Research Quarterly for Exercise and Sport, 63*(3), 231–237.

Sekulic, D., Kostic, R., Rodek, J., Damjanovic, V., & Ostojic, Z. (2009). Religiousness as a protective factor for substance use in dance sport. *J Relig Health, 48*(3), 269–277. doi: 10.1007/s10943-008-9193-y

Sekulic, D., Ostojic, M., Ostojic, Z., Hajdarevic, B., & Ostojic, L. (2012). Substance abuse prevalence and its relation to scholastic achievement and sport factors: An analysis among adolescents of the Herzegovina-Neretva Canton in Bosnia and Herzegovina. *BMC Public Health, 12*, 274. doi: 10.1186/1471-2458-12-274

Sekulic, D., Ostojic, M., Vasilj, M., Coric, S., & Zenic, N. (2014). Gender-specific predictors of cigarette smoking in adolescents: An analysis of sport participation, parental factors and religiosity as protective/risk factors. *Journal of Substance Use, 19*(1–2), 89–94. doi: 10.3109/14659891.2012.734544

Shi, L., & Mao, Y. P. (2011). Weekend television viewing and video gaming are associated with less adolescent smoking. *J Subst Use, 16*(2), 109–115. doi: 10.3109/14659891.2011.555056

Skobic, H., Sinanovic, O., Bovan, N. S., Ivankovic, A., & Skobic, N. P. (2010). Prevalence of alcohol abuse and alcoholism in general population of Mostar Region, Bosnia and Herzegovina. *Collegium Antropologicum, 34*, 29–31.

Stahl, T., Rutten, A., Nutbeam, D., & Kannas, L. (2002). The importance of policy orientation and environment on physical activity participation – a comparative analysis between Eastern Germany, Western Germany and Finland. *Health Promot Int, 17*(3), 235–246.

Steinbeck, K. S. (2001). The importance of physical activity in the prevention of overweight and obesity in childhood: A review and an opinion. *Obes Rev, 2*(2), 117–130.

Vasilj, I., Pilav, A., Maslov, B., & Polasek, O. (2009). Cardiovascular risk factors Research in Bosnia and Herzegovina. *Collegium Antropologicum, 33*, 185–188.

Verdurmen, J., Monshouwer, K., van Dorsselaer, S., ter Bogt, T., & Vollebergh, W. (2005). Alcohol use and mental health in adolescents: Interactions with age and gender – findings from the Dutch 2001 Health Behaviour in School-Aged Children survey. *Journal of Studies on Alcohol, 66*(5), 605–609.

Zenic, N., Peric, M., Zubcevic, N. G., Ostojic, Z., & Ostojic, L. (2010). Comparative analysis of substance use in ballet, dance sport, and synchronized swimming: Results of a longitudinal study. *Med Probl Perform Art, 25*(2), 75–81.