



Participation in school sports and marijuana use among male and female students

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ABSTRACT

Background: Marijuana is the most commonly used illicit substance among adolescents. There is paucity in the literature on the relationship between school sports participation and marijuana use. Therefore, the purpose of this study was to assess the relationship between school sports participation and recent marijuana use, past year marijuana use, perceived harm, perceived peer disapproval, and ease of marijuana access among males and females. We defined past year marijuana use as having smoked marijuana in the past year of survey completion and recent marijuana use as having used marijuana in the past 30 days of survey completion. **Methods:** We performed a secondary analysis of 2013-2014 Parents' Resource Institute for Drug Education Survey data including 37,616 7-12th grade students. Chi-square analyses and odds ratios were performed. **Results:** About 15% of students indicated that they used marijuana within the past 30 days of survey completion. Nearly one-fourth (23.4%) of students reported recently using marijuana in the past year of completing the survey. Males were more likely to report recent marijuana use and past year marijuana use compared to their female counterparts. Results revealed males and females who reported participating in school sports often/a lot were less likely to report recent or past year marijuana use than those who never/seldom participated in school sports. Perceived harm, peer disapproval, and ease of access also differed based on school sports participation for males and females. **Conclusions:** Sports participation had a protective effect against marijuana use. Increasing peer disapproval and perceived harm while reducing perceived ease of access may be beneficial in reducing marijuana use. Initiatives to reduce substance use among 7-12th graders should focus on increasing pro-social activities, specifically school sports participation.

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INTRODUCTION

Marijuana is the most commonly used illicit substance among adolescents [1]. In recent years, marijuana use among U.S. high school students remains at increased rates [2]. In 2014, national data revealed that 7.4% of adolescents 12-17 years of age used marijuana in the past 30 days and 13.1% used marijuana in the past year [1]. The use of marijuana during adolescence has been linked to several health risk behaviors and related consequences [3,4]. Further, previous studies indicate adolescent marijuana use increases the odds of developing a cannabis use disorder during adulthood [5,6].

The impact of substance use, particularly among adolescents who participate in sports, is a concern as previous research has revealed that many student athletes are at an elevated risk for substance use (i.e. alcohol) [7]. Research indicates that students who engage in contact sports are more likely to smoke marijuana in the past month as opposed to their

peers who did not participate in contact sports [8]. However, there are conflicting results within the literature; active engagement in sports has been found to buffer the use of illicit substances [9]. Various studies suggest that student athletes are less likely to smoke (i.e. tobacco, marijuana) due to the negative impact smoking has on performance compared to non-athletes [10,11]. Given the inconsistent findings, further research is needed on adolescent marijuana use among students who engage in sports.

In general, as perceived harm or risk of substance use increases, marijuana use decreases. Specifically, adolescents who engage in marijuana use perceive lower risks associated with use [12]. In regards to sex differences, males are more likely to report low perceived harm associated with marijuana use than females [13]. Further, when adolescents have easy access to marijuana, it may place them at increased risk for marijuana use. Approximately 47% of adolescents between the ages of 12-17 years report that it is fairly easy or very easy to obtain marijuana [14], and prior

research found that males report marijuana is easier to obtain than their female counterparts [15].

The influence of peers on substance use (i.e., peer disapproval) is a significant predictor of adolescent substance use [16]. More specifically, several studies have revealed the protective influence that peer disapproval has on substance use [17-19]. Sex may also influence risk and protective factors on substance use [20,21].

Study Purpose

There is paucity in the literature on school sports participation and marijuana use. Therefore, the purpose of this study was to assess the relationship between school sports participation and recent marijuana use, past year marijuana use, perceived harm, perceived peer disapproval, and ease of marijuana access among males and females. We defined past year marijuana use as having smoked marijuana in the past year of survey completion and recent marijuana use as having used marijuana in the past 30 days of survey completion. More specifically, the following study aims were investigated:

1. What is the extent of past year marijuana use and recent marijuana use among students?
2. Does past year marijuana and recent marijuana use differ based on sex?
3. Does past year marijuana use and recent marijuana use differ based on school sports participation among males and females?
4. Does perceived harm, ease of access, and peer disapproval of marijuana use differ based on school sports participation among males and females?

METHODS

Participants and Procedures

The present study is a secondary data analysis of the 2013-2014 Parents' Resource Institute for Drug Education (PRIDE) Student Survey that consisted of 37,616 7-12th grade students enrolled in public and private schools within a metropolitan area who were recruited by a drug coalition (77.4% response rate). Participation in the survey was voluntary and parental consent, and child assent was obtained before participation commenced; however, if parental consent and child assent was not given, the student was excluded from the study. Students were informed of the study purpose and that participation in the survey would be anonymous and voluntary. Surveys were administered during school hours while students were in their homerooms. Participants were further instructed that they could skip questions they did not want to answer. Students placed anonymous surveys in an envelope upon completion and delivered it to office staff, which was then sent out to be entered and analyzed. Participants were excluded from the study if they were missing information on past year marijuana use, past month marijuana use, perceived harm of marijuana use, perceived ease in marijuana access, perceived peer disapproval of marijuana use, and participation in school sports, which are described below. This study was declared as not human subjects'

research by our university-based Institutional Review Board and was exempt from review.

Instrument

We used the following sections/items of the PRIDE Student Survey: (1) Past year marijuana use; (2) Past month marijuana use; (3) Perceived harm of marijuana use; (4) Perceived ease in marijuana access; (5) Perceived peer disapproval of marijuana use; (6) Participation in school sports; (7) Personal/family information. Students who reported that they smoked marijuana (pot, hash, etc.) at least once within the past year were defined as having used marijuana in the past year. Students who reported they used marijuana or hashish during the past 30 days on a yes/no scale were defined as engaging in recent marijuana use.

One survey item assessed perceived harm of marijuana use. Students had to rate how much they thought people harm themselves physically or in other ways if they smoke marijuana once or twice a week on a four-point scale (1 = no risk, 2 = slight risk, 3 = moderate risk, and 4 = great risk). Perceived ease of accessing marijuana was also measured by one item and students had to rate how easy it is to get marijuana (pot, has, etc.) on a five-point scale (1 = very easy; 2 = fairly easy, 3 = fairly difficult, 4 = very difficult, 5 = do not know/cannot get). Students also rated how wrong their friends feel it would be for them to smoke marijuana on a four-point scale (1 = not wrong at all, 2 = a little wrong, 3 = wrong, 4 = very wrong). School sports participation was measured by one item and asked students how often they participate in school sports on a four-point scale (1 = never, 2 = seldom, 3 = often, 4 = a lot). Students self-reported their sex in the personal/family information section. More than 80% of agreement was achieved for variables, indicating the PRIDE Student Survey for Grades 6-12 is valid [22]. The survey was distributed to students ($n = 631$) 7 days apart to determine stability reliability and was found reliable. Results from the Pearson correlation coefficients were 0.814-0.851 [23]. Further, the results from the PRIDE survey parallel with the Monitoring the Future national survey results [24].

Data Analysis

We used the SPSS statistical software package (version 22.0) to analyze PRIDE data. Student personal/family information, past year and past month marijuana use, perceived harm of marijuana use, perceived ease of access to marijuana, perceived peer disapproval of marijuana use, and school sports participation were assessed using frequency distributions. Chi-square analyses were performed to identify past year and past month marijuana use based on sex differences. Then, odds ratios were computed to determine if past year and past month marijuana use differed based on school sports participation among females and males individually. A series of odds ratios were then performed to examine if perceived harm, ease of access, and peer disapproval of marijuana use differed based on school sports participation among females and males. Perceived harm, ease of access, and peer disapproval of marijuana use responses were dichotomized into high and low based on the median split for analyses.

RESULTS

Participant Characteristics

Of the 37,616 7-12th grade students included in our study, 51% were females and 49% were males.

Extent of Recent Marijuana Use and Past Year Marijuana Use

Exactly 15% of students indicated that they used marijuana within the past 30 days of survey completion. Nearly one-fourth (23.4%) of students reported recently using marijuana in the past year of completing the survey.

Recent Marijuana Use and Past Year Marijuana Use based on Sex

Chi-square analysis results indicated a statistically significant difference between males and females based on recent marijuana use ($P < 0.001$) and past year marijuana use ($P < 0.001$) [Table 1]. Specifically, males reported more recent and past year marijuana use compared to their female counterparts.

Recent Marijuana Use and Past Year Marijuana Use based on School Sports Participation among Males and Females

Results indicated 44.1% of students reported participating in school sports never/seldom and 55.9% of students reported participating in school sports often/lot. Specifically, nearly half of females (48.3%) and 39.8% of males reported participating in school sports never/seldom, while 51.7% of females and the

majority of males (60.2%) reported participating in school sports often/lot.

Results indicated that recent marijuana use ($P < 0.001$) and past year marijuana use significantly differed based on school sports participation among males ($P < 0.001$) [Table 2]. Results also indicated that recent marijuana use ($P < 0.001$) and past year marijuana use significantly differed based on school sports participation among females ($P < 0.001$). Specifically, males and females who reported participating in school sports often/lot were at reduced odds for reporting recent marijuana use and past year marijuana use compared to their male and female counterparts who reported participating in school sports never/seldom.

Perceived Harm, Ease of Access, and Peer Disapproval of Marijuana Use based on School Sports Participation among Males and Females

The perceived harm of marijuana use significantly differed based on school sports participation for males ($P < 0.001$) and females ($P < 0.001$) [Table 3]. Specifically, males and females who reported participating in school sports often/a lot were more likely to report high perceived harm (moderate/great risk) than males and females who reported participating in school sports seldom/never. Statistically significant differences were found between perceived peer disapproval and school sports participation for males ($P < 0.001$) and females ($P < 0.001$). Males and females who reported participating in school sports often/a lot were also more likely to report high perceived peer disapproval (wrong/very wrong) than their counterparts who reported participating in school sports seldom/never. Regarding perceived ease of marijuana access and school sports participation, there was a statistically significant difference for

Table 1: Recent marijuana use and past year marijuana use among students by sex

Item	Recent marijuana use (past 30 days)				Past year marijuana use (past 365 days)			
	No recent use n (%)	Recent use n (%)	χ^2	P	No past year use n (%)	Past year use n (%)	χ^2	P
Sex								
Female	16,008 (86.5)	2,488 (13.5)			14,995 (78.1)	4,197 (21.9)		
Male	14,410 (83.4)	2,867 (16.6)	69.316	<0.001	13,628 (74.0)	4,796 (26.0)	89.541	<0.001

All categories do not total 37,616 due to missing data

Table 2: Odds ratios for school sports participation by recent marijuana use and past year marijuana use among male and female students

Item	Males					Females				
	Did not use marijuana n (%)	Used marijuana n (%)	OR	(95% CI)	P	Did not use marijuana n (%)	Used marijuana n (%)	OR	(95% CI)	P
Recent marijuana use										
School sports participation										
Never/seldom ^a	4,912 (80.9)	1,160 (19.1)	1.0			6,590 (84.0)	1,256 (16.0)	1.0		
Often/a lot	8,074 (87.2)	1,190 (12.8)	0.624	(0.571, 0.682)	<0.001	7,778 (91.9)	687 (8.1)	0.463	(0.420, 0.511)	<0.001
Past year marijuana use										
School sports participation										
Never/seldom ^a	4,450 (71.2)	1,804 (28.8)	1.0			5,853 (73.4)	2,123 (26.6)	1.0		
Often/a lot	7,266 (76.7)	2,205 (23.3)	0.749	(0.696, 0.805)	<0.001	7,094 (83.0)	1,454 (17.0)	0.565	(0.524, 0.609)	<0.001

^aIndicates referent. All categories do not total 37,616 due to missing data, CI: Confidence interval, OR: Odds ratio

Table 3: Odds ratios for school sports participation by perceived harm, peer disapproval, and ease of access of marijuana use among male and female students

Item	Males					Females				
	Low n (%)	High n (%)	OR	(95% CI)	P	Low n (%)	High n (%)	OR	(95% CI)	P
Perceived Harm										
School sports participation										
Never/seldom ^a	3,003 (50.3)	2,962 (49.7)	1.0			3,191 (41.1)	4,575 (58.9)	1.0		
Often/a lot	3,782 (41.5)	5,336 (58.5)	1.430	(1.340, 1.528)	<0.001	2,296 (27.3)	6,099 (72.7)	1.853	(1.735, 1.979)	<0.001
Perceived peer disapproval										
School sports participation										
Never/seldom ^a	2,852 (48.4)	3,037 (51.6)	1.0			3,207 (41.5)	4,519 (58.5)	1.0		
Often/a lot	3,606 (39.7)	5,476 (60.3)	1.426	(1.335, 1.524)	<0.001	2,260 (26.9)	6,128 (73.1)	1.924	(1.801, 2.056)	<0.001
Perceived ease of access										
School sports participation										
Never/seldom ^a	3,282 (55.6)	2,625 (44.4)	1.0			4,395 (56.8)	3,342 (43.2)	1.0		
Often/a lot	5,311 (58.5)	3,764 (41.5)	0.886	(0.829, 0.947)	<.001	5,492 (65.8)	2,856 (34.2)	0.684	(0.642, 0.729)	<0.001

^aIndicates referent. All categories do not total 37,616 due to missing data, CI: Confidence interval, OR: Odds ratio

males ($P < 0.001$) and females ($P < 0.001$). Male and female participants who reported participating in school sports often/a lot were less likely to report perceived ease of marijuana access (fairly easy/very easy to get) than male and female participants who reported participating in school sports seldom/never.

DISCUSSION

This study found that among 7-12th grade students, 15% reported using marijuana in the past 30 days and 23.4% reported past year marijuana use. Compared to national data from 2014 suggesting the rate of recent marijuana use was 7.4% and 15% [1], notable differences in the rate of reported marijuana use among adolescents indicate marijuana use is higher in our population. Similar to previous research [13], adolescent males report higher rates of marijuana use in contrast to their female counterparts. The present study adds to existing literature by identifying that marijuana use remains a problem and examines how school sports participation may impact use and marijuana-related factors. Our findings strengthen the premise that the engagement in sports at school serves as a protective factor against adolescent marijuana use [7-9].

Interestingly, our study found that both male and female adolescents who reported participating often/lot in school sports were at reduced the odds for recent (past 30 days) and past year marijuana use compared to males and females who reported never/seldom participated in sports. Our results were consistent with previous literature that found an increase in physical activity and the active participation in sports lowered marijuana use among high school students [11]. Thus, increasing school sport participation rates among 7th through 12th graders may protect students from engaging in marijuana use.

Our findings revealed that reports of moderate to great harm associated with marijuana and limited access to marijuana impacted the use of marijuana among adolescents who participate in school sports. Our study extends recent literature indicating that perceived harm and access to marijuana are prominent predictors for marijuana use among youth [14]. Moreover, the present study also parallels with previous

research suggesting males are likely to report fairly easy access to marijuana and perceive lower risks associated with marijuana use [12,15]. Prevention programming should aim to address the accessibility of marijuana and the harmful effects of marijuana use, specifically among adolescent males. As marijuana use is becoming readily accessible in some U.S. states due to legalization for medical and recreational purposes, prevention specialists should educate adolescents, their peers, families, school personnel, and community stakeholders on the potential physical and psychosocial health effects of marijuana use. Caregivers and school personnel should be educated on how to authoritatively enforce rules and monitor adolescents in addition to increasing their awareness on the pronounced effect school sports participation have on adolescent marijuana use. Strategies are needed to reduce marijuana use among adolescents. Prevention specialists who work in the school setting should consider adding a sports participation component during school hours for adolescents since participation serves as a protective factor against use. Communities and high schools should collaborate to further promote the participation in after-school sports activities to help buffer marijuana use. Prevention specialists are encouraged to assess the feasibility and efficacy of this strategy.

As youth transition through adolescence, social networks (i.e., peers) have a higher influence on the formation of attitudes and behaviors [20]. Our findings were similar to previous research that suggests peer disapproval among athletes weighs more heavily on adolescent marijuana use. For instance, Mason *et al.* [21] examined the effects of peers on substance use among adolescents aged 12-17 years. Their study found that peer disapproval was associated with the decrease of substance use, and peer disapproval had more influence on marijuana use than alcohol and tobacco use [21]. Taken together, targeting peers of adolescents who participate in school sports may be a helpful strategy to strengthen disapproval of marijuana use.

Limitations

Although our study has several strengths, limitations should be noted. First, the PRIDE survey is cross-sectional data, and no

causal relationship can be determined. Second, we were limited to the variables the PRIDE survey provided since this study was an analysis of secondary data. Third, the PRIDE survey is self-report and some students may have reported socially desirable responses or had inaccurate memory recall. Fourth, the study sample was from one metropolitan area. Caution should be exercised when generalizing study findings to other geographical locations and age groups.

CONCLUSIONS

We found disproportionately high rates of past month and past year marijuana use in a sample of 7th through 12th graders. Overall, school sports participation had a protective effect against marijuana use for males and females. Increasing perceived peer disapproval and perceived harm while reducing perceived ease of access of marijuana among students may be beneficial in reducing marijuana use. In sum, initiatives to reduce substance use among 7th through 12th graders should focus on increasing pro-social activities such as school sports participation.

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