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Opioid Use Among Interscholastic Sports Participants: An Exploratory Study From A Sample Of College Students

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Abstract

Purpose—Involvement in sports increases the risk of injury and the risk for prescription opioid use and misuse. This was an exploratory retrospective study to examine if previous involvement in interscholastic sports was associated with a greater lifetime prevalence of medical prescription opioid use, lifetime risk of diverting prescribed opioids, and lifetime risk of nonmedical prescription opioid use.

Method—A web-based survey was self-administered to a sample of 4187 full-time undergraduate students at a large public university located in the Midwest. Student demographics, involvement in interscholastic sports during high school, lifetime medical prescription opioid use, lifetime risk of diverting prescribed opioids, and lifetime risk of nonmedical prescription opioid use were measured and analyzed for this study.

Results—When compared to their peers who did not participate in interscholastic sports during high school, multiple logistic regression analyses indicated that those who participated in at least one interscholastic sport during high school had greater odds of lifetime medical prescription opioid use on multiple occasions and greater odds of being approached to divert their prescribed opioid medications on multiple occasions.

Conclusions—The findings indicate some association between previous involvement in interscholastic sports and prescription opioid use and misuse. These findings further suggest that

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greater awareness should be instilled in parents and coaches regarding this form of substance misuse.

Keywords

Athlete; Young Adults; Prescription Misuse; Pain Killers

Recent research has shown that the majority of former professional football players used prescription opioids during their career, and 71% of those who were prescribed opioids misused their prescriptions (Cottler et al., 2011). Although professional athletes may be at a higher risk of prescription opioid use and misuse when compared to the general population (Cottler et al., 2011), not much research addresses prescription opioid use and misuse among amateur athletes (Veliz, McCabe, & Boyd, 2013).

According to the National Federation of State High School Associations (NFSHA) report for the 2012–2013 school year, 7,713,577 adolescents participated in interscholastic sports at the high-school level (NFSHA, 2013). Unfortunately, nearly 20% of interscholastic sports participants were estimated to have sustained an injury that resulted in medical attention by a team physician, certified athletic trainer, personal physician, or emergency department physician during this same school year (Comstock, Collins, Corlette, & Fletcher, 2012). Although interscholastic sports injury rates have dropped slightly between the 2005–06 (2.51 injuries per 1000 exposures) and 2011–12 school years (2.17 injuries per 1000 exposures), the percentage of sports related injuries that required surgery among interscholastic sports participants has increased from 5.3% during the 2005–06 school year to 8.2% during the 2011–12 school year (Comstock et al., 2012).

Consequently, adolescents may need opioid medications to manage pain due to injuries sustained through their participation in these activities, but increased access to opioid medications may put adolescents at risk of illegally diverting these medications or using them in a manner not intended by the prescriber (McCabe, Teter, & Boyd, 2005; McCabe et al., 2011). In fact, the 2011 *Monitoring the Future* indicated that 8.7% of 12th graders indicated using prescription opioids (e.g., Vicodin®) without a doctor's orders during the past year (McCabe, West, & Boyd, 2013).

Given the increasing number of adolescents who participate in interscholastic sports during high school (NFSHA, 2013) and the concomitant rise in prescribing opioid medications since the start of the new millennium (Fortuna, Robbins, Caiola, Joynt, & Halterman, 2010), it is necessary to examine if participation in interscholastic sports is associated with greater access to opioid medications and whether participation increases the risk of misusing these types of medications among adolescents and young adults. Given the dearth of research in this area, the purpose of this exploratory retrospective study was to examine whether a sample of college students (between the ages of 18 and 30) who participated in junior varsity or varsity sports during high school (referred to as interscholastic sports from this point forward) (a) were more likely to indicate lifetime medical opioid use (i.e., being prescribed an opioid medication), (b) were at a greater risk of diverting their opioid medications (i.e., were approached to divert their opioid medication), or (c) were more likely to indicate

lifetime nonmedical opioid use (i.e., used someone else's opioid medications) when compared to their peers who did not participate in interscholastic sports during high school.

Method

Participants

The data used for this study comes from the 2013 Student Life Survey (SLS). The SLS has been conducted biennially since 1999 at a large university located in the Midwestern region of the United States (McCabe, 2004). The web-based survey for the SLS questionnaire included previously tested items and scales measuring several student life characteristics and prescription drug use behaviors (McCabe, 2004). For the 2013 SLS, a random sample of 12,000 full-time undergraduate students was selected from the Registrar's Office records. The final response rate from the 2013 SLS was roughly 35% (n = 4187). Respondents missing any information on the variables used in the analysis or those who were 31 years of age or older were excluded, leaving a final sample size of 3442 respondents.

Data Collection

After Institutional Review Board approval was granted, the University Registrar's Office provided a list of randomly selected full-time undergraduates. These students were contacted via email and asked to participate in the web-based survey. All participants were informed that a research firm, unaffiliated with the University, was contracted to set-up the web survey as well as store and maintain data from the study. University officials, faculty or staff were unable to access any contact information connected with the data of any respondent. All respondents were sent information making it clear that participation was voluntary, explaining the relevance of the study and that responses were confidential. The average time to complete the survey was approximately 20 minutes.

Measures

Three questions in the SLS were designed to measure the following three conditions of opioid use in this study. First, *medical use of opioid medications* was measured with the following question: "Based on a doctor's prescription, on how many occasions in your lifetime have you used the following types of drugs? Pain medication (i.e., opioids such as Vicodin®, OxyContin®, Tylenol 3® with codeine, Percocet®, Darvocet®, morphine, hydrocodone, oxycodone". Second, *risk of diverting prescribed opioid medications* was measured by asking respondents "On how many occasions in your lifetime have you been approached to sell, trade, or give away your prescription medication? Pain medication (i.e., opioids [...])". Third, *nonmedical use of opioid medication* was measured by asking respondents the following question: "Sometimes people use prescription drugs that were meant for other people, even when their own doctor has not prescribed it for them, on how many occasions in your lifetime have you used the following types of drugs, NOT prescribed to you? Pain medication (i.e., opioids [...])". The possible response categories for the three measures were "never", "1–2 occasions", "3–5 occasions", "6–9 occasions", "10–19 occasions", "20–39" occasions", and "40 or more occasions".

The SLS also provided questions that asked respondents whether they participated in junior varsity (J.V.) or varsity sports during high school. Respondents who indicated participating in either J.V. or varsity sports were then asked to select the types of sports they participated in at the J.V. and varsity level during high school (refer to Table 1).

Finally, demographic measures on the students' gender, race, class rank, age, and cumulative GPA were obtained from the Registrar's Office records. Moreover, other self-reported demographic measures were collected with the SLS that included (but not limited to) activities that students were involved with on campus, such as collegiate athletics or participation in fraternities or sororities.

Data Analysis

For the analysis, the three conditions of opioid use were dependent variables and each was recoded as a dichotomous outcome (i.e., 0 represents never and 1 represents at least once). Further, two additional sets of dependent/dichotomous variables were created. The first one was to measure whether each condition of opioid use was sporadic (i.e., 1 to 2 occasions versus 0 or 3 or more occasions). The second one was to determine whether each condition of opioid use was repeated (i.e., 3 or more occasions versus less than 3 occasions).

There were two major independent variables in the study. The first was a dichotomous measure of whether or not the respondent had participated in interscholastic sports (i.e., 1 = yes, 0 = no). The second was a categorical variable measuring the number of interscholastic sports respondents indicated participating in during high school (i.e., *did not participate in sport – reference group*, participated in 1 sport, participated in 2 sports, and participated in 3 or more sports).

Several control variables were also included in the analyses to account for other factors that may influence opioid use and misuse (McCabe et al., 2005; McCabe et al., 2011). The control variables included gender (*Male – reference group*), race (*White – reference group*), class rank (*freshman – reference group*), age (continuous measure), cumulative GPA (continuous measure), collegiate athletic status (*Does not participate in collegiate sports – reference group*), and involvement in Greek life (*not a member of a fraternity or sorority – reference group*).

The analytic procedure for this study used one set of logistic regression models to assess the adjusted odds ratios (AORs) for the three conditions of opioid use among respondents who participated in sports during high school. Moreover, an additional set of logistic regression models was estimated to examine the AORs for the three conditions of opioid use among respondents who participated in one sport, two sports, and three or more sports during high school.

AORs, 95% confidence intervals for the AORs, and fully standardized logistic regression coefficients (b*) were estimated while controlling for gender, race, class rank, age, cumulative GPA, collegiate athletic status, and involvement in greek life for each model in the multivariate analyses (Long & Freese, 2014). Moreover, given that the skip patterns in the web-based survey only allowed respondents who indicated lifetime medical prescription

opioid use to answer the questions about being approached to divert their prescribed opioid medications, the analyses examining risk of diversion included just the respondents who indicated being prescribed an opioid medication during their lifetime ($n = 1596$).

Results

Descriptive Information

Descriptive information regarding the dependent, independent, and control variables used in the analyses are detailed in Table 1. Of the 3442 respondents in the final sample, 1488 (43%) were male and 2495 (72.5%) indicated participating in interscholastic sports during high school. Moreover, the modal number of different sports that respondents indicated being involved with during high school was 2 sports.

Nearly half of respondents used opioid medications at least once during their lifetime (46.4%), with 27.7% of respondents indicating using opioid medication sporadically (only 1 or 2 occasions) and 18.7% indicating repeated use (3 or more occasions). With regard to lifetime risk of diverting prescribed opioid medications, 15.4% of respondents who had medically used opioids were approached to divert their opioid medications at some point during their lifetime, with 11.7% indicating being approached sporadically and 3.8% indicating being approached repeatedly to divert their pain medication. Finally, 8.5% of respondents had nonmedically used prescription opioids during their lifetime, with 4.3% reporting sporadic nonmedical use and 4.2% indicating recurring nonmedical use.

High School Sports Participation and Lifetime Opioid Use and Misuse

The results from the multiple logistic regression analyses examining the three conditions of opioid use are presented in Table 2. The odds of repeated lifetime medical use of prescription opioids was higher for respondents who were involved in interscholastic sport during high school (*participated in at least 1 sport* AOR = 1.36, 95% CI = 1.10, 1.69; *Participated in 2 sports* AOR = 1.38, 95% CI = 1.08, 1.77; *Participated in 3 or more sports* AOR = 1.43, 95% CI = 1.10, 1.85) when compared to respondents who did not participate in sports (nonparticipants).

Respondents who participated in at least one interscholastic sport during high school had higher odds of being approached on at least one occasion during their lifetime to divert their opioid medications when compared to nonparticipants (AOR = 1.86, 95% CI = 1.28, 2.71). Moreover, the number of different sports respondents participated in during high school was also associated with greater odds of being approached on at least one occasion to divert prescribed opioid medications (*Participated in 1 sport* AOR = 1.82, 95% CI = 1.18, 2.81; *Participated in 2 sports* AOR = 1.76, 95% CI = 1.14, 2.71; *Participated in 3 or more sports* AOR = 2.07, 95% CI = 1.34, 3.21). In addition, participation in at least one sport (AOR = 1.64, 95% CI = 1.08, 2.48), and the number of different sports respondents participated in during high school (*Participated in 1 sport* AOR = 1.66, 95% CI = 1.03, 2.68; *Participated in 2 sports* AOR = 1.61, 95% CI = 1.00, 2.58; *Participated in 3 or more sports* AOR = 1.66, 95% CI = 1.02, 2.71), was associated with higher odds of being approached sporadically during their lifetime to divert their prescribed opioid medications. Finally, respondents who

participated in at least one interscholastic sport (AOR = 2.51, 95% CI = 1.10, 5.74), and those who participated in three or more sports during high school (AOR = 3.36, 95% CI = 1.36, 8.29), had higher odds of being approached repeatedly during their lifetime to divert their prescribed opioid medications when compared to nonparticipants.

With respect to the three measures of nonmedical prescription opioid use, no statistically significant differences were found between respondents who participated in interscholastic sports and their peers who did not participate in sports during high school. Moreover, the number of different sports respondents participated in during high school revealed no statistically significant results when compared with nonparticipants (results not shown).

Additional analyses were conducted in order to examine interaction effects between sports participation (i.e., participated in at least one sport and number of different sports) and gender. The analyses across each of the nine different dependent variables measuring the three conditions of opioid use did not detect any statistically significant interaction effects between sports participation and gender (results not shown).

Discussion

This study was the first to explore whether participation in interscholastic sports during high school was associated with lifetime prescription opioid use and misuse among a sample of undergraduate college students. In general, the analysis found that participation in interscholastic sport was associated with lifetime medical opioid use and being approached to divert, but was not associated with nonmedical opioid use. College students who participated in at least one interscholastic sport during high school had greater odds of repeated medical use of prescription opioids during their lifetime (i.e., 3 or more occasions), with those participating in three or more sports having the greatest odds. Moreover, the odds of being approached to divert opioid medications on at least one occasion, being approached sporadically (i.e., only 1 or 2 occasions), and being approached repeatedly (i.e., 3 or more occasions) were higher among former interscholastic sport participants, with those participating in three or more sports having the greatest odds of being approached to divert their opioid medications.

It should be highlighted that the association between interscholastic sports participation and being approached repeatedly to divert prescribed opioid medications revealed substantial differences between participants and nonparticipants. In particular, this study showed that college students who participated in three or more sports during high school were roughly three times more likely than nonparticipants to be approached to divert their opioid medications. Problematically, being approached to divert prescribed medication dramatically increases the risk of illegally diverting these controlled substances (McCabe et al., 2011). Moreover, diversion of controlled medication has also been found to be associated with other forms of prescription drug misuse (McCabe et al., 2011). Taking into consideration the risk factors associated with diverting prescribed medications, athletes who participate in multiple sports should be directly targeted for interventions on the proper use of opioid medications.

In summary, the results of this exploratory retrospective study provide some evidence of an association between interscholastic sports participation and prescription opioid use and misuse. Although medical prescription opioid use is not necessarily problematic, the risk of having unsupervised access to these medications can put adolescents at risk of illegally distributing or using this controlled substance. Given that adolescents who participate in interscholastic sports, particularly those involved in multiple sports, may have greater access to opioid medications, greater awareness should be instilled in athletes, parents and coaches to monitor, store, and dispose of these medications properly in order for them to be used correctly.

Finally, there are several limitations of this study that must be discussed. First, the results of this study were based off a convenience sample with a relatively low response rate, which may prevent the generalizability of the findings. Second, the measures used to assess opioid use in this study did not capture nonmedical use from a previous prescription, which may be more likely among athletes. Third, there were no measures to assess whether sports participants sustained injuries due to their involvement in sports during adolescence and whether the pain suffered from these injuries was managed with opioid medications. Finally, some of the results were based off self-reports of illegal activity (diversion and nonmedical use) and could bias survey estimates given the sensitive nature of the questions. Future research on opioid use among amateur athletes should consider these limitations when examining this emerging topic.

What Does This Article Add?

This study was the first to investigate whether previous involvement in interscholastic sport was associated with lifetime medical prescription opioid use, risk of diverting prescription opioids, and nonmedical prescription opioid use. We identified that previous involvement in interscholastic sports was associated with repeated occasions of lifetime medical opioid use and being approached to divert these prescribed medications. Given the results of this study, it is necessary to examine in more detail the relationship between involvement in competitive sports and prescription opioid use, misuse, and diversion among adolescents. In particular, it is necessary to collect data on injuries sustained from participation in sports and whether prescription opioid medications were used to manage pain suffered from these injuries.

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Table 1
Descriptive Statistics Control Variables, Major Independent Variables, and Dependent Variables (n = 3442)

	Percent
Gender	
Male	43.2%
Female	56.8%
Race	
White	68.7%
Black	4.1%
Hispanic	4.1%
Asian	12.9%
Other race	10.3%
Class Position	
Freshmen	21.4%
Sophomore	24.2%
Junior	25.1%
Senior	29.2%
GPA	
Average Cumulative	M = 3.31
GPA	SD = .519
Age	
Average Age at the	M = 19.9
Start of Data Collection	SD = 1.54
College Athlete	
Yes	3.1%
No	96.9%
Greek Status	
Greek	21.1%
Non-Greek	78.9%
Previous Involvement in Sports (J.V./varsity)	
Yes	72.5%
No	27.5%

	Percent
Number of Sports (J.V./varsity)	
No involvement	27.7%
Participated in 1 Sport	25.1%
Participated in 2 Sports	26.2%
Participated in 3 or more Spo	21.0%
Previous Involvement - Type of Sport	
Baseball	5.1%
Basketball	12.5%
Crew	2.2%
Cross Country	13.1%
Field Hockey	2.1%
Football	7.2%
Golf	5.0%
Gymnastics	1.2%
Ice Hockey	2.4%
Lacrosse	5.9%
Soccer	16.2%
Softball	5.1%
Swimming	7.8%
Tennis	13.5%
Track & Field	20.9%
Volleyball	9.2%
Water Polo	2.1%
Wrestling	2.2%
Other Sport	13.6%
Lifetime Medical Prescription Opioid Use	
Never Used Opioids Medically	53.6%
Used on at Least 1 Occasion	46.4%
Sporadic Use (Used on 1 or 2 occasions only)	27.7%
Repeated Use (Used on 3 or more occasions)	18.7%
Lifetime Risk of Diverting Prescription Opioids Among Lifetime Medical Opioid Users (i.e. being approached to divert)	

	Percent
Never approached to divert	84.6%
Approached to divert on at least 1 occasion	15.4%
Approached sporadically to divert (1 to 2 occasions only)	11.7%
Approached repeatedly to divert (3 or more occasions)	3.8%
Lifetime Nonmedical Prescription Opioid Use	
Never Used Opioids Nonmedically	91.5%
Used on at Least 1 Occasion	8.5%
Sporadic Use (Used on 1 or 2 occasions only)	4.3%
Repeated Use (Used on 3 or more occasions)	4.2%

Notes (1) SD = Standard Deviation/M = Mean

Table 2
Multiple Logistic Regression: Adjusted Odds Ratios (AOR) for Lifetime Medical Opioid Use (n = 3442) and Diversion (n = 1596)

Medical Prescription Opioid Use (n = 3442)	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Used on at least 1 occasion (medical use)	AOR	Used on at least 1 occasion (medical use)	AOR	Sporadic Use (medical use)	AOR	Sporadic Use (medical use)	AOR	Repeated Use (medical use)	AOR	Repeated Use (medical use)	AOR
Involvement in Interscholastic Sports												
Participated in Varsity or Junior Varsity Sports	1.14	.975, 1.34	.032	--	--	.944	.793, 1.12	-.014	--	--	1.36**	1.10, 1.69
Number of Interscholastic Sports												
Participated in 1 varsity or Junior Varsity Sports	--	--	--	1.16	.962, 1.4	.036	--	--	1.05	.848, 1.29	.010	--
Participated in 2 Varsity or Junior Varsity Sports	--	--	--	1.11	.916, 1.3	.024	--	--	.898	.727, 1.11	-.026	--
Participated in 3 or More Varsity or Junior Varsity Sports	--	--	--	1.14	.933, 1.4	.029	--	--	.909	.726, 1.14	-.021	--
Approached to Divert Opioid Medications (n = 1596)												
Involvement in Interscholastic Sports												
Participated in Varsity or Junior Varsity Sports	1.86***	1.28, 2.71	.143	--	--	1.64*	1.08, 2.48	.113	--	--	2.51*	1.10, 5.74
Number of Interscholastic Sports												
Participated in 1 varsity	--	--	--	1.82**	1.18, 2.81	.139	--	--	1.66*	1.03, 2.68	.118	--
Approached repeatedly to divert												
Participated in 1 varsity	--	--	--	--	--	--	--	--	--	--	--	--
Participated in 2 Varsity or Junior Varsity Sports	--	--	--	--	--	--	--	--	--	--	--	--
Participated in 3 or More Varsity or Junior Varsity Sports	--	--	--	--	--	--	--	--	--	--	--	--
Approached repeatedly to divert												
Participated in 1 varsity	--	--	--	--	--	--	--	--	--	--	--	--
Participated in 2 Varsity or Junior Varsity Sports	--	--	--	--	--	--	--	--	--	--	--	--
Participated in 3 or More Varsity or Junior Varsity Sports	--	--	--	--	--	--	--	--	--	--	--	--

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Approached to Divert Opioid Medications (n = 1596) or Junior Varsity Sports	Model 7		Model 8		Model 9		Model 10		Model 11		Model 12	
	Approached to divert on at least 1 occasion	AOR	95% CI	b*	AOR	95% CI	b*	AOR	95% CI	b*	AOR	95% CI
Participated in 2 Varsity or Junior Varsity Sports	--	--	--	.133	1.76 **	1.14, 2.71	.112	1.61 *	1.00, 2.58	--	2.19	.861, 5.56
Participated in 3 or More Varsity or Junior Varsity Sports	--	--	--	.161	2.07 ***	1.34, 3.21	.112	1.66 *	1.02, 2.71	--	3.36 **	1.36, 8.29

Notes

* p<.05

** p<.01

*** p<.001

b* represents the fully standardized logistic regression coefficient (a measure of effect size that is analogous to Beta [β] in linear regression). This provides the ability to interpret the strength of the association between the independent and dependent variable like a standardized coefficient (β) in linear regression. Using Cohen's standards (1988) a small effect size ranges from |.01| to |.20|; medium effect sizes range from |.201| to |.5|, and large effect sizes range from |.501| and higher (Cohen, 1988).

All models controlled for gender, race, grade level of college respondent, cumulative GPA, fraternity/sorority status, age, and collegiate athletic status.