DOPING SURVEY IN THE YOUTH SCHOOL GAMES IN BRAZIL

LEVANTAMENTO DE DOPING NOS JOGOS ESCOLARES DA JUVENTUDE NO BRASIL

LEVANTAMIENTO DE DOPING EN LOS JUEGOS ESCOLARES DE LA JUVENTUD EN BRASIL

Original Article
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RESUMO

Introduction: Doping control is an important means for preventing the use of illegal substances and methods in sports. Objective: This study investigated the self-reported use of illegal substances among young Brazilian students in the Youth School Games, the main sporting event among school-aged athletes in Brazil with almost 2 million students during all the phases. Methods: Cross-sectional study with athletes of the Youth School Games 2006 aged 14-17 years. The subjects were randomly selected and completed an anonymous questionnaire about substances use. Chi-square test was used for comparison of proportions between different variables on self-reported use of substances. Univariate and multivariate analyzes and logistic regression were performed. Results: Among the 402 athletes (aged 14-17) who volunteered to participate, the results showed high prevalence of alcohol (35.8%), nutritional supplements (39.1%), and tobacco (5.4%). Regarding illegal drugs and doping, 1.7% reported the use of stimulants, 2.2% illicit drugs, 0.5% anabolic steroids, and 1.7% hormones and other similar substances. Moreover, a different use of stimulants was found (especially Judo and Table tennis), medications (especially Judo and Chess) and dietary supplements (especially Swimming and Judo, with over 50% reported use). Conclusion: The present study suggests that the use of substances among young athletes is similar to the results found among adult Olympic athletes as per International Olympic Committee and World Anti-Doping Agency, especially regarding the use of dietary supplements, anabolic steroids, and stimulants according to data collected by other studies. We consider that the findings of the present work indicate the need for specific efforts to monitor, prevent, and control use of substances among school athletes in big events and competitions, such as this research on doping in the Youth School Games.

Keywords: doping in sports; youth sports; athletic performance; adolescent.

ABSTRACT

Introdução: O controle de dopagem é um meio importante para a prevenção do uso de substâncias e métodos ilegais no esporte. Objetivo: Este estudo investigou o uso autorrelatado de substâncias ilícitas entre jovens estudantes brasileiros nos Jogos Escolares da Juventude, o principal evento esportivo entre atletas em idade escolar do Brasil, com quase dois milhões de estudantes durante todas as fases. Métodos: Estudo transversal com atletas dos Jogos Escolares da Juventude de 2006 com idades entre 14 e 17 anos. Os sujeitos foram selecionados randomicamente e preencheram um questionário anônimo sobre o uso de substâncias. Foi utilizado teste do qui-quadrado para comparação de proporções entre as diferentes variáveis sobre o uso autorrelatado de substâncias. Foram realizadas análises univariada e multivariada e regressão logística. Resultados: Entre os 402 atletas (idade 14-17 anos) que tiveram participação voluntária, os resultados mostraram alta prevalência de álcool (35,8%), suplementos nutricionais (39,1%) e fumo (5,4%). Com relação às drogas ilegais e ao doping, 1,7% relataram o uso de estimulantes, 2,2% de drogas ilícitas, 0,5% de esteroides anabolizantes e 1,7% de hormônios e outras substâncias similares. Além disso, foi encontrado um uso diferente de estimulantes (especialmente judô e tênis de mesa), medicamentos (especialmente judô e xadrez) e suplementos dietéticos (especialmente natação e judô, com mais de 50% de uso relatado). Conclusão: O presente estudo sugere que o uso de substâncias entre jovens atletas é semelhante aos resultados encontrados entre os atletas adultos de acordo com o Comitê Olímpico Internacional e a Agência Mundial Antidoping, especialmente no que diz respeito ao uso de suplementos alimentares, esteroides anabolizantes e estimulantes, segundo os dados coletados por outros estudos. Consideramos que os resultados do presente trabalho indicam a necessidade de esforços específicos para monitor, prevenir e controlar o uso de substâncias entre atletas escolares em grandes eventos e competições, tais como esta pesquisa sobre dopagem nos Jogos Escolares da Juventude.

Descritores: *doping nos esportes; esportes juvenis; desempenho atlético; adolescente.*

RESUMEN

Introducción: El control de dopaje es un medio importante para la prevención del uso de sustancias y métodos ilegales en el deporte. Objetivo: Este estudio investigó el uso autoinformado de sustancias ilegales entre jóvenes estudiantes brasileños en los Juegos Escolares de la Juventud, el principal evento deportivo entre atletas en edad escolar de Brasil, con casi dos millones de estudiantes durante todas las fases. Métodos: Estudio transversal con atletas de los Juegos Escolares de la Juventud de 2006 con edades entre 14 y 17 años. Los sujetos fueron seleccionados aleatoriamente

y llenaron un cuestionario anónimo sobre el uso de sustancias. Se utilizó la prueba del chi-cuadrado para la comparación de las proporciones entre las diferentes variables sobre el uso autoinformado de sustancias. Se realizaron análisis univariado y multivariado y regresión logística. Resultados: Entre los 402 atletas (edad 14-17 años) que tuvieron participación voluntaria, los resultados mostraron alta prevalencia de alcohol (35,8%), suplementos nutricionales (39,1%) y tabaco (5,4%). En cuanto a las drogas ilegales y al dopaje, el 1,7% relató el uso de estimulantes, el 2,2% de drogas ilícitas, el 0,5% de esteroides anabolizantes y el 1,7% de hormonas y otras sustancias similares. Además, se encontró un uso diferente de estimulantes (especialmente judo y tenis de mesa), medicamentos (especialmente judo y ajedrez) y suplementos dietéticos (especialmente natación y judo, con más del 50% de uso reportado). Conclusión: El presente estudio sugiere que el uso de sustancias entre los jóvenes atletas es similar a los resultados encontrados entre los atletas adultos de acuerdo con el Comité Olímpico Internacional y la Agencia Mundial Antidopaje, especialmente en lo que se refiere al uso de suplementos alimenticios, esteroides anabolizantes y estimulantes según los datos recogidos por otros estudios. Consideramos que los resultados del presente trabajo indican la necesidad de esfuerzos específicos para monitoreo, prevención y control del uso de sustancias entre atletas escolares en grandes eventos y competiciones, tales como esta investigación sobre dopaje en los Juegos Escolares de la Juventud.

Descriptores: *doping en los deportes; deportes juveniles; rendimiento atlético; adolescente.*

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INTRODUCTION

Adolescents are naturally hardly concerned with their health and appearance. At the same time, they have to cope with substantial social, psychological and physical developments. Considering this very sensitive phase of development, athletes' education has to start earlier focusing on nutritional knowledge and attitudes about doping and performance-enhancing drug (PED).

Doping control is an important means for the prevention of the use of illegal substances and methods in sports. The World Anti-doping Agency (WADA) was created in 1999 for the purpose of eradicate doping in sports. Annually, WADA publishes a summary of analytical results reported by accredited laboratories[1]. As shown by statistics from WADA (2011)[2] 5,600 samples were found to contain illegal substances. The majority was composed by substances related to the group of anabolic steroids (59.4%), as testosterone and stanozolol, followed by stimulants (12.8%), canabinoids (7.9%), diuretics and others (6.6%).

Coaches, parents and the athletes themselves are constantly pushing themselves to better performance. It can be negative when competition and winning is "at all costs". However, it is understandable that athletes and their coaches do not take into account the negative effect of doping on their physical performance compared with the advantage of achieving important results in their careers.

An important study showed that 1% of athletes` samples collected in 2008 was positive for illegal substances in Brazil. Following the same trend found in WADA results, anabolic steroids (58.3%) were found to be the most abused substance, followed by stimulants (14.5%)[3]. Beyond the Olympic scenario, doping permeates the sports in the social sphere. Frequently reported in scientific communications, the massive use of dietary supplements and self-medication with illicit drugs among amateur athletes and exercise practitioners should be addressed herein[4].

Researches on young people regarding the abuse of forbidden substances have been done in many countries[3,5-7]. In the majority of the cases, young people use these substances for many different reasons, such as increase in performance; social, economic and muscular aesthetic aspirations, linked to alcohol and illicit recreational drug abuse[8]. Also non-medical use of anabolic-androgenic steroids (AAS) is considered an issue of public health concern with an overall global lifetime prevalence of 3,3% and a lifetime prevalence of 2,3% for high school students[9]. However, the research on the prevalence of doping and its consumer profile is still incipient, mainly due to difficult to assess the most consumed ones, dosage and period of usage[10].

Thus far, the objective of the present study was to verify the self-reported use of illegal substances among young Brazilian students in the National Youth Scholar Games of 2006. As such these youth sport competition is the main sport event among school-aged athletes in Brazil with almost 2 million students during all the game phases. More than 1,100 Brazilian public and private educational institutions are represented in this event (Brazilian Olympic Committee, 2013).

MATERIALS AND METHODS

Study design and subjects: cross-sectional study with athletes of the National Youth Scholar Games of 2006, aged 14-17 years. The subjects completed an anonymous questionnaire during the National Youth Scholar Games in Brasilia/DF. They were randomly selected by raffle and represented the entire population of athletes. The sampling procedure was organized in order to achieve an equal distribution between female and male athletes (51% female), representation of major teams (Basketball, Indoor Soccer, Handball and Volleyball) and several individual sports (Athletics, Judo, Swimming, Table tennis and Chess). All athletes had at least two years of training and competition experience. Athletes and coaches were informed in detail about the experimental procedures. The study complied with the Declaration of Helsinki and with the Brazilian Resolution 196/96. This study was approved by the Ethical Committee of the University Salgado de Oliveira (Rio de Janeiro) (reference number 1.239.180). Written informed was obtained from the athletes' responsible prior to participation.

Initially, the sample size calculated was two events of the National Youth Scholar Games (4-8% from 2,500 athletes in total) using Confidence Intervals of 95%. Questionnaires were adapted from the Prohibited List Substances of WADA 2006. Answers to the survey were confidential, treated anonymously and according to the highest scientific standards.

A total of 450 questionnaires were returned, from these were 402 completed. The data were typed by two researchers in Excel (Microsoft) for later analysis using Stata Standard Edition for Windows (v.11.2). The results were presented in absolute and relative frequency. Chi-square test was used for proportion comparison between different variables on the self- report use of substances. Uni- and multivariate logistic regression analysis were performed to determine which variables were significant with self-report use of doping. The minimum level of significance was set at $p \leq 0.05$.

RESULTS

The adverse health effects associated with the use of anabolic steroids and other prohibited substances make doping use at young age a major public health concern worldwide[11]. The difficulty of measuring the prevalence of doping in elite sport is a recurring issue worldwide[12].

The subjects were 402 athletes (aged 14-17) volunteered to participate (49% males and 51% females) (Table 1). They were recruited from 9 different sports: Athletics, Basketball, Handball, Judo, Swimming, Indoor soccer, Volleyball, Table tennis and Chess.

Table 1. Reported substances and doping use among 402 student athletes of National Youth Scholar Games.

Variable	N doping	%	N total	P value
Gender				
Female	32	15.6	205	0.40
Male	25	12.7	197	
Age (years)				
14	0	0	10	0.52
15	16	15.2	105	
16	23	15.7	146	
17	18	12.8	141	
Grade				
Elementary	5	8.3	60	0.16
High school	52	15.2	342	
School				
Public	20	13.4	149	0.75
Private	36	14.6	247	
Sports				
Athletics	6	10.3	58	0.02
Basketball	7	9.2	76	
Judo	10	34.5	29	
Swimming	3	12.0	25	
Table tennis	1	6.7	15	
Indoor soccer	7	13.7	51	
Handball	16	18.8	85	
Volleyball	6	11.5	52	
Chess	4	36.4	11	
Sports practice time				
until 6 months	5	33.3	15	0.05
6 months until 1year	2	13.3	15	
1 year until 2 years	6	10.5	57	
2 yars until 4 years	25	20.2	124	
More than 4 years	22	11.6	190	
Substances				
Alcohol				
Never	30	11.6	258	0.05
Yes, I did	27	18.7	144	
Tobacco				
Never	49	12.9	380	0.002
Yes, I did	8	36.4	22	
Supplements				
Never	24	9.8	245	0.002
Yes, I did	33	21.0	157	

Concerning the self-reported use of substances, 39.1% reported the use of dietary supplements, 5.4% tobacco and 35,8% alcohol beverages. Regarding illegal drugs and doping, 1.7% reported the use of stimulants, 2.2% illicit drugs, 0.5% anabolic steroids and 1.7% hormones and other similar substances (Table 2). With the exception of Table Tennis, the greatest use of substances among school athletes was supplements, followed by medication (Table 2). Interestingly, among the athletes of Chess, what most athletes are using is medication followed by supplements, Chess being the sport where the most frequent use of illicit drugs is made (cannabis, hashish and cocaine). This characteristic may be possibly associated with the need of "insights" and the extreme imagination use.

The correlation analysis detected as significant variables for the use of doping: type of sport, time of practice, use of alcohol beverages, tobacco and dietary supplements (Table 1). Table 2 discriminates the use of substances for different sports. Moreover, a different use of stimulants (especially Judo and Table tennis), medicine use (especially Judo and Chess) and dietary supplements (especially Swimming and Judo, which more than 50% reported its use) was found. Among Caribbean footballers female players attempted to use a banned substance in order to get fit to play while males were more likely to use a painkiller before playing games[13]. Webb and Beckford[14] investigated the nutrition knowledge and attitudes of 220 adolescent swimmers training competitively in Trinidad and Tobago. They were found to have inadequate nutrition knowledge, which could contribute to their performance and health.

Table 3 shows the variable that remains significant with and without adjustment (calculated by odds ratio). The variables that remained significant were the following: Judo, Table tennis, and Handball, use of dietary supplements and practice of sports for at least 6 months. The present study suggests that the use of substances among young athletes is similar to the results found among adult Olympic athletes from IOC and WADA, specially what concerns the use of dietary supplements, androgenic-anabolic steroids (AAS) and stimulants according to data collected by other studies[2,3,7]. A cross-sectional study with 729 competitive athletes showed that athletes appeared most willing to dope if they were to suffer an injury, a dip in performance or think others are doping and getting away with it[15].

By far, the most prevalent illicit drugs are AASs. Competitive athletes tend to use other categories of PEDs in addition to AASs. Bodybuilders use diuretics to improve muscle definition while boxers and wrestlers use it to reduce body weight required to compete at a lower weight class. Athletes also combine AAS and erythropoietin to train harder as well as to recover faster. Tranquilizers (such as opiates and benzodiazepines) reduce anxiety and can mask pain during a championship[12].

There was a tendency found for use of illicit substances (alcohol and tobacco), although it was not maintained after adjustment in the final model (Table 3). Also, it is known that the association of the mentioned substances with doping is part of the risk behavior in adolescents and

Table 2. Report substances use according sports among athletes of National Youth Scholar Games.

Sport	Stimulants (%)	Ilicit Drugs (%)	Steroids (%)	Other Hormones (%)	Medications (%)	Supplements (%)
Athletics	0	1.7	0	0	10.3	48.3
Basketball	0	1.3	1.3	0	9.2	28.9
Judo	10.3	6.9	6.9	6.9	27.6	51.7
Swimming	0	4.0	0	0	8.0	92.0
Table tennis	6.7	0	0	0	0	26.7
Indoor soccer	3.9	0	0	0	11.8	41.2
Handball	0	2.3	1.2	4.7	14.1	24.7
Volleyball	1.9	1.9	0	1.9	7.7	40.4
Chess	0	9.1	0	0	36.4	18.2
p value	0.008	0.48	0.131	0.110	0.03	0.001

(*) Stimulants refer consumption to caffeine, amphetamine, guarana, taurine and others; (**) Illicit drugs refer consumption to cannabis, haxixe and cocaine; (***) Other hormones refer use to human growth hormone and insulin.

Table 3. Univariate and multivariate logistic regression.

Variable	Category	OR Crude	CI 95%	OR adjusted	CI95%
Sports	Athletics	Reference			
	Basketball	0.88	0.28-2.77	1.30	0.38-4.56
	Judo	4.56	1.45-14.27	6.44	1.78-23.28
	Volleyball	1.07	0.32-3.58	0.99	0.29-3.45
	Handball	2.01	0.74-5.49	3.27	1.07-10.02
	Swimming	1.18	0.27-5.15	1.20	0.25-5.71
	Chess	4.95	1.11-22.0	9.33	1.78-48.78
	Table Tennis	0.62	0.69-5.57	0.64	0.06-6.48
	Indoor Soccer	1.39	0.43-4.40	1.92	0.54-6.84
Alcohol	Never	Reference		Reference	
	Yes, I did	1.70	0.98-2.97	1.52	0.78-2.96
Tobacco	Never	Reference		Reference	
	Yes, I did	3.60	1.44-9.01	2.33	0.78-6.95
Supplements	Never	Reference			
	Yes, I did	2.74	1.56-4.81	3.91	2.01-7.61
Sports practice time					
		Reference		Reference	
	6 months until 1 year	4.25	1.08-16.67	8.47	1.83-39.13
	1 year until 2 years	1.31	0.24-7.25	1.50	0.25-9.03
	2 years until 4 years	2.15	0.83-5.57	1.77	0.63-4.99
	More than 4 years	1.11	0.43-2.89	0.80	0.28-2.31

young adults[7,16,17]. The relation between the use of dietary supplements and doping remained in the final model and is frequently reported by other researchers[7].

The same source found an odds-Ratio of 4.16 for the use of doping in dietary supplements users of 20 and 30 years old. Coincidentally, we report a similar odds ratio value (3.91). The appeal of dietary supplements use and consequently doping appears well represented in young athletes, which do not seem to care about the long term consequences of rapid gain in performance. A shorter time of practice was also significant for the reporting of doping (8 times higher risk) (Table 3). A research in Australia found that most of the athletes in the sample started to use banned substances early in their careers. Personal factors, specifically the desire to be the best in their chosen sport or to win, prevailed over all other factors. In most cases, the decision to dope was carefully planned[18]. Athletes with excessive perfectionism, extrinsically motivated and who have contact with doping users have a positive attitude toward doping. Athletes who exhibit these characteristics should be considered at risk and monitored to prevent possible future sports drug use[19].

DISCUSSION

In spite of an association between the use of doping and higher physical activity level[20,21], the findings of the present study suggest that the subjects aimed at rapid gains in performance to compensate for the short time of practice. We believe that this finding is also significant, mainly because in many studies, the subjects were composed of trained individuals[7,20].

The practice of Handball, Judo and Chess were significantly correlated with doping report. For Handball and Judo, hormones and anabolic steroids were the most cited, and the use of medicines was the most reported by chess players. The use of specific medicines (as beta-blockers) or illicit drugs (as marijuana) were related to the attempt to decrease the emotional stress. The most reported substances were stimulants, diuretics and anabolic steroids. Since 1980, Anabolic steroids have been the most reported substance within the statistics from doping control[22]. Male Brazilian Handball athletes (15 to 19 years old) participated in a randomized study receiving a creatine supplement for 32 days associated with a specific resistance program. They have experienced an increase in muscle strength without changes in body composition[23].

This survey demonstrates for young participants of National Youth Scholar Games high prevalence of reported use for alcohol (35.8%) and tobacco (5.4%), very similar to the levels found in the VI National Survey on consumption of Psychoactive Drugs among 50,980 students from elementary and high school, 27 Brazilian state capitals, where the drugs most frequently mentioned by non-athlete students were alcoholic beverages (42.9%) and tobacco (9.6%)[24]. In a review, adolescent athletes are more likely to consume alcohol, smokeless tobacco and steroids than non-athletes[25]. This demonstrates that the practice of sport itself does not eliminate the consumption of alcohol and tobacco among school athletes participating in the National Youth Scholar Games.

Importantly, illicit drugs and doping were found in this sample and thus indicate the use of stimulants (1.7%), illicit drugs (2.2%), anabolic steroids (0.5 %), other hormones and similar substances (1.7%) in the above results thus pointing to the need for implantation of doping control and prevention in the future National Youth Scholar Games in addition to educational supportive means.

Deserves attention the excessive consumption of dietary supplementation (39.1%) among the National Young Athletes which may cause serious risks to health and career development in this population. We consider that most of these substances are self - administered (often in overdoses) without merits and that there is contamination of products by hormonal medications considered as doping[10]. Nutritional Supplements were used on a large scale among young German elite athletes[26].

There is a consensus in the literature that doping use started long time ago and its chemical composition has changed throughout this period. However the aims remain the same: which are the benefits or advantages upon other athletes[17,27]. We understand that the doping control in Olympic sports is an effort for the game's fairness. However, there are other threats that should also be discussed as the lack of prevention programs and ideal coverage of doping control in non-Olympic sports[28]. On the other hand, Kayser and Smith[29] suggest that anti-doping is a problem that may lead the general population to a behavior of underground doping, encouraging hazardous practice as needle sharing for intramuscular injection of those substances. These practices would be a way of exposing a higher number of people to a greater potential harm such as hepatitis B, C and HIV. Also the overall knowledge about doping among junior athletes especially regarding potential negative side effects of doping agents is poor[30].

We consider that the findings of the present work sustain the need for specific efforts for monitoring, prevention and control of the use of substances among scholar athletes in big events and competition such as the Survey about doping in the National Youth Scholar Games. In the same proportion that the sport events grow, under a social and economical perspective, it is necessary for the investment also to grow proportionally beyond the sport performance and sport. Remarkably it is necessary to invest in the long run aiming at the Public Health for the elaboration of research and educational programs for the longitudinal follow-up of the youth in sports,

so that the prevention and control could lead the youth to a fair and doping-free sport experience.

The results suggest the need to plan health education programs to particularly correct some wrong perceptions that athletes have regarding doping benefits and also create awareness among student-athletes about the side effects of excessive intake of supplements and/or medications. We need to raise public awareness of the serious health consequences of PED. In fact, there is widespread misperception that PED use is safe or that the adverse effects are manageable. However, the adverse health effects of PED use continue understudied and underappreciated.

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