

Effectiveness of a school-based doping prevention programme in Spanish adolescents

JAVIER ÁLVAREZ MEDINA¹ ✉, PEDRO MANONELLES MARQUETA², ALBERTO GRAO-CRUCES³, ENRIQUE OLIETE BLANCO¹, VÍCTOR MURILLO LORENTE¹, ALBERTO NUVIALA NUVIALA⁴

¹Department of Physiatry and Nursing, Faculty of Health Science and Sport, University of Zaragoza, Spain

²Catholic University of Murcia (UCAM), Spain

³Department of Physical Education, University of Cadiz, Spain

⁴Department of Sport and Computing, Pablo de Olavide University, Spain

ABSTRACT

The purpose of the study is to assess the effectiveness of a school-based programme to improve knowledge, attitudes and beliefs about doping. 540 adolescents (aged 12-13 years old, 50% boys) took part, from eight Spanish schools. Three hundred and thirteen of these were in the experimental group and the rest formed a control group. Six sessions were held, based on international recommendations, during the Physical Education classes, and were assessed with the Questionnaire on the Anti-doping Intervention programme. The principal results showed that the knowledge, attitudes and beliefs about doping improved in the experimental group compared to the control group, for the whole of the questionnaire ($p < .001$, $\eta^2 = .03$) and specifically for the factors Concept ($p < .001$, $\eta^2 = .004$), Utility ($p < .01$, $\eta^2 = .02$) and Sport and doping ($p < .01$, $\eta^2 = .01$). But there were no benefits observed in the factors Methods and Origin of the behaviour. In conclusion, school-based programmes may be useful for improving knowledge, attitudes and beliefs about doping among adolescents. **Keywords:** Harmful substances; Drugs; School; Sport.

Cite this article as:

Álvarez, J., Manonelles, P., Grao-Cruces, A., Oliete, E., Murillo, V., & Nuviala, A. (2019). Effectiveness of a school-based doping prevention programme in Spanish adolescents. *Journal of Human Sport and Exercise*, in press. doi:<https://doi.org/10.14198/jhse.2019.144.10>

✉ **Corresponding author.** Department of Physiatry and Nursing, Faculty of Health Science and Sport, University of Zaragoza. C/ Domingo Miral s/n. 50009, Zaragoza, Spain.

E-mail: javialv@unizar.es

Submitted for publication September 2018

Accepted for publication November 2018

Published in press January 2019

JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

© Faculty of Education, University of Alicante

doi:10.14198/jhse.2019.144.10

INTRODUCTION

Doping or the use of illegal substances to improve performance in sport is a problem that is on the rise both in high performance sport and in sport played for leisure or at school (Dunn and White 2011; Lucidi et al. 2008; Petroczi 2007; Dvorak et al. 2014). The percentage of young athletes who have at some point taken substances such as anabolic-androgenic steroids surpasses 10% (Yesalis and Bahrke 2000; Bloodworth and McNamee 2010). These substances are more and more frequently being consumed at an earlier age (Goulet et al. 2010). The risk of consuming harmful substances, both doping and non-doping, is highest in adolescence (Dodge and Hoagland 2011; Dunn and White 2011). In addition, habits acquired at this stage often continue into adulthood (Castañeda et al. 2014; Bastos et al. 2005).

Education about doping is the most recent line of action promoted by the World Anti-Doping Agency (WADA 2014). It is driven by the need for a change in attitudes and beliefs towards doping (Alarante et al. 2006). However, the majority of measures to prevent doping have been applied to athletes in their sports environment and mainly focus on the risks of consuming doping substances (Elliot et al. 2008; Goldberg et al. 2000). Two references of this are the studies *Athletes Training & Learning to Avoid Steroids* (ATLAS) and *Athletes Targeting Healthy Exercise & Nutrition Alternatives* (ATHENA) (Elliot et al. 2008; Goldberg et al. 1996, 2000), programmes for the prevention of doping in adolescent athletes specific to each gender. Both programmes lasted 3 years and involved 10 sessions in the case of ATLAS and 8 sessions for ATHENA. Each session lasted 45 minutes and included practical cases, publicity, educational games and role play. The athletes learnt to adjust their goals and self-control. The sportspeople were taught skills and attitudes to help them take decisions both while practising sport and in their everyday life. Both programmes revealed significant and important long- and short-term effects.

Nevertheless, these programmes only reach athletes in a competitive environment, where it has been shown that doping not only affects young people who compete but may also largely affect inactive adolescents (Barkoukis et al. 2016; Wanjek et al. 2007). This is the reason why schools, and more specifically, Physical Education classes, have become the perfect context for offering education in values and attitudes to prevent doping, as they permit access to the whole of the adolescent population (Duran et al. 2015). Along these lines, the World Anti-Doping Agency established directives to provide guidance in the implementation of these measures (WADA 2014). Nevertheless, the precedents to date are limited and there are no records of measures implemented in any environment in Spain (Barkoukis 2016).

In Spain, there are no programmes for information, training and prevention of doping outside the sports context, and therefore it is necessary to study the effectiveness of measures in other contexts, including schools, to enable structured action to be taken for both the sporting and non-sporting populations. On this basis, the objective of the study was to assess the effectiveness of a schools-based programme for the prevention of doping on the knowledge, attitudes and beliefs about doping among Spanish adolescents.

MATERIAL AND METHODS

Design of the study

This is a quasi-experimental intervention study. The experimental group completed a schools-based programme. The control group was not on this programme. The knowledge, attitudes and beliefs about doping were measured in pre- and post-intervention periods in both groups. The research programme was developed between April and June 2015.

The design of the study stages followed the Spanish laws that regulate clinical research in humans (Royal Decree 561/1993), the Organic Law on Personal Data Protection 15/1999, and the necessary ethics principles in the 2013 review of the Declaration of Helsinki. An induction meeting was held to inform the participants, parents and teachers of the nature and objectives of the research. Informed written consents were signed by the parents and the schools involved, after approval by the School Council.

Participants

Five hundred and forty adolescents aged 12-13 years (50% boys) from eight secondary schools in northern Spain took part in this study. The selection of the samples and the composition of the groups were chosen for the sake of convenience. Three hundred and thirteen adolescents from four of the schools made up the experimental group (EG), while the 227 adolescents enrolled at the other four schools were the control group (CG). Lost cases and those participants of the EG who received less than half of the sessions were rejected.

Measures and procedures

To assess knowledge, attitudes and beliefs about doping, participants were given the *Questionnaire on the Anti-doping Intervention Programme* (CUPIAD in Spanish), validated in adolescents (Álvarez et al. 2017). This instrument is a Likert scale with responses ranging between 1 (strongly disagree) and 5 (strongly agree), consisting of 17 items grouped into 5 factors: 1) *Concept* of doping; 2) *Utility* of doping; 3) *Methods* of doping and consequences; 4) *Sport and doping*, relating to anti-doping organisations, cases of doping in sport and ethical questions; and 5) *Origin of the conduct*, which addresses the reasons for doping. In the study sample, the instrument showed excellent adjustment indexes following a Confirmatory Factorial Analysis, (AGFI=0.945; TLI=0.911; CFI=0.929; IFI=0.930; RMR= 0.063; RMSEA =0.037; GFI=0.961; $\chi^2/gf= 1.725$) and acceptable reliability (Cronbach's alpha: 0.751).

The participants filled in the CUPIAD in the presence of the survey interviewer, at the beginning and at the end of the intervention programme, taking an average of 10 minutes.

The Anti-Doping Intervention Programme (PIAD in Spanish) lasted 1 month. It was developed by Physical Education teachers at the participating schools who received training prior to the programme. The directives of the World Anti-Doping Agency (WADA 2014) were used as reference in the design of the programme.

The PIAD consisted of six sessions, each lasting 55 minutes, twice a week. In the first session, the teacher gave each student a folder with the contents of the PIAD. Five of the sessions were developed through the practice of physical activity and one was a dynamic session consisting of a group debate in which various dilemmas regarding doping in competition were analysed. The activities and contents of the PIAD are specified in Table 1.

Table 1. Activities and contents studied during the Anti-Doping Intervention Programme

Session	Activity	Contents
Session 1	Moral dilemmas: Debate and discussion	Doping goes against the values of the true spirit of sport
Session 2	Game "Pirates' treasure"	Principles of fair play
Session 3	Game "Dodgeball"	Principles of fair play
Session 4	Educational Gymkhana	Concept, substances and methods of doping
Session 5	Pre-sports game	Importance of the struggle against doping
Session 6	Sports competitions	The values of the true "Spirit of Sport"

An active methodology was used in every session, through cooperative learning in small heterogeneous groups, the allocation of tasks and guided discovery prevailing in the teaching (Duran et al. 2015). They ended with a debate in which the group reflected together on the sessions, to help assimilate the concepts (Duran et al. 2015). Lastly, each student at home had to independently complete a small task related to the objectives developed in the session, to be handed in to the teacher at the end of the PIAD.

Statistical analysis

Values of the measured variables will be presented as mean and standard deviation (\pm SD). The normality of distribution was checked with both graphical (normal probability plots) and statistical procedures (Kolmogorov–Smirnov test). The repeated measures method of the general linear model was used for differences in dependent variables (knowledge, attitudes and belief about doping). One analysis of variance was completed: 1) ANOVA 2(groups) \times 2(time). For the analysis, a 95% confidence level was used ($p < .05$). The analysis was completed using the statistical software package for social sciences SPSS (v.21 for MS Windows).

RESULTS

The results of the effectiveness of the school-based doping prevention programme on the knowledge, attitudes and beliefs about doping in adolescents are shown in Table 2. The interaction effect (Group \times Time) turned out to be significant in the total scale ($p < .001$, $\text{Eta}^2 = .03$) and in its factors Concept ($p < .001$, $\text{Eta}^2 = .004$), Utility ($p < .01$, $\text{Eta}^2 = .02$), Sport and doping ($p < .01$, $\text{Eta}^2 = .01$) and Origin of the conduct ($p < .01$, $\text{Eta}^2 = .01$). In all of these the knowledge, attitudes and beliefs of the EG on doping improved with respect to the CG, except for the factor *Origin of the conduct*, where the results of the CG exceeded those of the EG. No significant difference was observed for the factor, Methods ($p > .05$).

Table 2. Effectiveness of the school-based doping prevention programme on the knowledge, attitudes and beliefs about doping in adolescents

Scale about doping	Group	Pre Mean \pm SD	Post Mean \pm SD	Change during intervention	Effect Group \times Time	
					p	Eta ²
Total scale	Control	3.19 \pm 0.50	3.31 \pm 0.46	▲ 0.12	<.001	0.03
	Experimental	3.37 \pm 0.54	3.63 \pm 0.46	▲ 0.26		
Concept	Control	3.62 \pm 0.93	3.75 \pm 0.85	▲ 0.13	<.001	0.04
	Experimental	3.82 \pm 0.92	4.35 \pm 0.63	▲ 0.53		
Utility	Control	2.90 \pm 0.65	3.03 \pm 0.57	▲ 0.13	.001	0.02
	Experimental	3.11 \pm 0.82	3.45 \pm 0.79	▲ 0.34		
Methods	Control	3.20 \pm 0.92	3.19 \pm 0.89	▼ 0.01	.182	<0.01
	Experimental	3.36 \pm 0.92	3.48 \pm 0.91	▲ 0.12		
Sport and doping	Control	3.51 \pm 0.77	3.57 \pm 0.70	▲ 0.06	.005	0.01
	Experimental	3.70 \pm 0.72	3.94 \pm 0.66	▲ 0.24		
Origin of the conduct	Control	2.67 \pm 0.91	3.00 \pm 0.91	▲ 0.33	.003	0.01
	Experimental	2.88 \pm 1.00	2.91 \pm 1.00	▲ 0.03		

DISCUSSION

The objective of the study was to assess the effectiveness of a school-based programme for the prevention of doping on the knowledge, attitudes and beliefs about doping among Spanish adolescents. The results reveal a positive effect from the intervention on the knowledge, attitudes and beliefs of adolescents with respect to doping. A more detailed analysis showed that these improvements occurred in the areas related to the concept of doping, the utility of this and its application to sport. This was not the case in relation to the doping methods or the origin of the doping conduct, where the EG did not significantly improve with respect to the CG.

The improvement in the knowledge about doping, its concept, utility and relation to sport observed following the six-session intervention, is in line with previous studies which demonstrate the effectiveness of similar programmes (Elliot et al. 2008; Fritz et al. 2005; Goldbert et al. 1996, 2000). The ATLAS programme, conducted by Goldberg et al. (2000) on 3207 North American male athletes revealed after 10 sessions a reduction in the use of sports supplements, including steroids, and other illegal substances including amphetamines, marijuana and narcotics. In addition to improving the eating habits and the practice of physical exercise and sport. Another example is the ATHENA programme conducted by Elliot et al. (2008), on 928 female athletes in the United States, which after eight sessions reduced the consumption of weight-reducing drugs, unhealthy foods, tobacco, marijuana and alcohol. Accompanied by an increase in self-esteem, as they considered themselves to be better athletes and with a higher capacity to reject drugs. Similarly, Fritz et al. (2005) demonstrated on 3207 adolescent American football players, that with a school-based intervention it was possible to increase knowledge about doping, and this resulted in a critical attitude and the rejection of doping substances.

Nevertheless, improvement of knowledge was not significant with respect to the methods of doping and their consequences for health. This may be because some material requires more time to be assimilated, as claimed by Elliot et al. (2008). One surprising fact was that the knowledge about the origin of doping conducts of the CG improved more than the EG. A hypothetical explication to this is that, due to the limitations of the study, an uncontrolled contaminating variant (e.g. talk on drugs) may have biased the results.

The results show that adolescents have a much greater margin for improving their knowledge about doping and its impact on health, making them more vulnerable to these practices (Boulu 2002; Ozdemir et al. 2005; Reardon and Creado 2014). Therefore, measures should be aimed at both adolescent athletes and non-athletes (Ozdemir et al. 2005; Dunn et al. 2010; Morente and Zabala 2013; Barkoukis et al. 2016). This type of school-based measure has proved to be feasible and effective, to a greater or lesser extent, in increasing knowledge about doping (Elliot et al. 2008; Fritz et al. 2005; Goldbert et al. 1996, 2000). In this respect, we consider that these aspects should be integrated into the content of the school curriculum. In Spain, the Education Bill LOMCE (2014) makes no specifications as regards doping. However, it could be incorporated into content blocks which have been included, for example “management of active life and values” in Primary Education or “acquisition of healthy lifestyles” in Secondary Education.

The principal innovation of the study is to make the intervention schools-based and not merely extracurricular aimed exclusively at adolescent athletes. This becomes even more important if we consider that education is compulsory in those countries with the highest levels of doping, as this would provide access to the whole of the school-age population.

Limitations of the study

The selection of the sample and the groups at our convenience is perhaps the main limitation. The length of the study, only six sessions, is a further limitation to observing major changes. In addition, some of the questions in the survey may have been either deliberately or accidentally misinterpreted by some adolescents. Nevertheless, the intentional erroneous information was probably minimised by the fact that the questionnaire was completed anonymously and revealed a good level of reliability and validity for this age group. Future studies might introduce similar but longer programmes and analyse the effects on the medium- to long-term behaviour of the adolescents.

CONCLUSIONS

The present study reveals that a school-based programme to prevent doping can achieve significant improvement in the knowledge, attitudes and beliefs about doping among adolescents. This significant improvement was observed for the concept of doping, utility of doping and relation between doping and sport. It was not found to be effective in relation to the methods and origin of doping.

REFERENCES

- Alaranta, A., Alaranta, H., Holmila, J., Palmu, P., Pietila, K., & Helenius, I. (2006). Self-reported attitudes of elite athletes towards doping: Differences between types of sport. *International Journal of Sport Medicine*, 27(10), 842–846. <https://doi.org/10.1055/s-2005-872969>
- Álvarez, A., Manonelles, P., Oliete, E., Murillo, V., & Nuviala, A. (2017). Validation of the scale of assessment for the prevention of doping in school (CUPIAD). *Retos*, 32, 183-188.
- Barkoukis, V., Kartali, K., Lazuras, L., & Tsorbatzoudis, H. (2016). Evaluation of an anti-doping intervention for adolescents: Findings from a school-based study. *Sport Management Review*, 19, 23–34. <https://doi.org/10.1016/j.smr.2015.12.003>
- Bastos, A. A., González, R., Molinero, O., & Salguero del Valle, A. (2005). Obesidad, nutrición y Actividad Física. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte*, 5 (18), 140-153.
- Bloodworth, A., & McNamee, M. Clean Olympians. (2010). Doping and anti-doping: the views of talented young British athletes. *International Journal of Drug Policy*, 21(4), 276-282. <https://doi.org/10.1016/j.drugpo.2009.11.009>
- Boulu, R.G. (2002). New provisions for prevention and fight against doping. *Annales Pharmaceutiques Francais*, 60 (5), 291-295.
- Castañeda, C., Zagalaz, M.L., Chacón, F., Cachón, J., & Romero, S. (2014). Características de la práctica deportiva en función del género. Estudiantes de la Facultad de Ciencias de la Educación. *Retos*, 25, 63-67.
- Dodge, T., & Hoagland, M. F. (2011). The use of anabolic androgenic steroids and polypharmacy: A review of the literature. *Drug and Alcohol Dependence*, 114, 100-109. <https://doi.org/10.1016/j.drugalcdep.2010.11.011>
- Dunn, M., & White, V. (2011). The epidemiology of anabolic-androgenic steroid use among Australian secondary school students. *Journal of Science and Medicine in Sport*, 14(1), 10-14. <https://doi.org/10.1016/j.jsams.2010.05.004>
- Dunn, M., Thomas, J., Swift, W., Burns, L., & Mattick, R. (2010). Drug testing in sport: The attitudes and experiences of elite athletes. *The International Journal on Drug Policy*, 21(4), 330-332. <https://doi.org/10.1016/j.drugpo.2009.12.005>

- Durán, C., Lavega, P., Salas, C., Tamarit, M., & Inverno, J. (2011). Educación Física emocional en adolescentes. Identificación de variables predictivas de la vivencia emocional. *Cultura, Ciencia y Deporte*, 10, 5-18.
- Dvorak, J., Saugy, M., & Pitsiladis, YP. (2014). The challenges and threats to the implementation of the fight against doping in sport. *British Journal of Sports Medicine*, 48 (10), 807-809. <https://doi.org/10.1136/bjsports-2014-093589>
- Elliot, D. L., Goldberg, L., Moe, E. L., De Francesco, C. A., Durham, M. B., McGinnis, W., et al. (2008). Long-term outcomes of the ATHENA (Athletes Targeting Healthy Exercise & Nutrition Alternatives) program for female high school athletes. *Journal of Alcohol and Drug Education*, 52(2), 73.
- Fritz, M. S., MacKinnon, D. P., Williams, J., Goldberg, L., Moe, E. L., & Elliot, D. L. (2005). Analysis of baseline by treatment interactions in a drug prevention and health promotion program for high school male athletes. *Addictive Behaviours*, 30, 1001-1005. <https://doi.org/10.1016/j.addbeh.2004.08.030>
- Goldberg, L., Elliot, D., Clarke, G. N., Mackinnon, D. P., Moe, E., Zoref, L., et al. (1996). Effects of a multidimensional anabolic steroid prevention intervention: The Adolescents Training and Learning to Avoid Steroids (ATLAS) program. *The Journal of the American Medical Association*, 276, 1555–1562. <https://doi.org/10.1001/jama.1996.03540190027025>
- Goldberg, L., Mackinnon, D., Elliot, D., Moe, E., Clarke, G., Cheong, J. (2000). The adolescents training and learning to avoid steroids (ATLAS) Program. Preventing drug use and promoting health behaviors. *Archives of Pediatrics and Adolescent Medicine*, 154, 332-338. <https://doi.org/10.1001/archpedi.154.4.332>
- Goulet C., Valois P., Buist A., & Côté M. (2010). Predictors of the use of performance-enhancing substances by young athletes. *Clinical Journal of Sport Medicine*, 20(4), 243-248. <https://doi.org/10.1097/JSM.0b013e3181e0b935>
- Laure, P., & Lecerf, T. (2002). La prevención entre los jóvenes deportistas de dopaje: comparación de una intervención basada en Educación de salud versus intervención basado en la información. *Ciencia & Deportes*, 17(4), 198-201.
- LOMCE (2014). Ley Orgánica 3/2014, de 4 de mayo, de Educación.
- Lucidi, F., Zelli, A., Mallia, L., Grano, C., Russo, P. M., & Violani, C. (2008). The social-cognitive mechanisms regulating adolescents' use of doping substances. *Journal of Sports Sciences*, 26, 447-456. <https://doi.org/10.1080/02640410701579370>
- Morente, J., & Zabala, M. (2013). Doping in sport: a systematic review of elite athletes' attitudes, beliefs and knowledge. *Sports Medicine*, 43, 6. <https://doi.org/10.1007/s40279-013-0037-x>
- Ozdemir, L., Nur, N., Bagcivan, I., Bulut, O., Sümer, H., & Tezeren, G. (2005). Doping and performance enhancing drug use in athletes living in sivas, mid-anatolia: a brief report. *Journal of Sports and Science Medicine*, 4 (3), 248-252.
- Petróczi, A. (2007). Attitudes and doping: A structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behaviour. *Substance Abuse Treatment, Prevention, and Policy*, 2(1), 34. <https://doi.org/10.1186/1747-597X-2-34>
- Petroczi, A., Mazanov, J., Nepusz, T., Backhouse, S. H., & Naughton, D. P. (2008). Comfort in big numbers: Does overestimation of doping prevalence in others indicate self-involvement? *Journal of Occupational Medicine and Toxicology*, 3, 19. <https://doi.org/10.1186/1745-6673-3-19>
- Reardon, C., & Creado, S., (2014). Drug abuse in athletes. *Journal of Substance Abuse and Rehabilitation*, 5, 95-105. <https://doi.org/10.2147/SAR.S53784>
- WADA (2014). Teacher's tool kit. Disponible en: <https://www.wada-ama.org/en/resources/education-and-awareness/teachers-tool-kit>

- Wanjek, B., Rosendahl, J., Strauss, B., & Gabriel, H. H. (2007). Doping, drugs and drug abuse among adolescents in the State of Thuringia (Germany): Prevalence, knowledge and attitudes. *International Journal of Sports Medicine*, 28, 346–353. <https://doi.org/10.1055/s-2006-924353>
- Yesalis, C.E., & Bahrke, M.S. (2000). Doping among adolescent athletes Baillieres. *Best Practice and Research Clinical Endocrinology and Metabolism*, 14 (1), 25-35. <https://doi.org/10.1053/beem.2000.0051>



This work is licensed under a [Attribution-NonCommercial-NoDerivatives 4.0 International](https://creativecommons.org/licenses/by-nc-nd/4.0/) (CC BY-NC-ND 4.0).