https://doi.org/10.53656/str2023-5s-9-imp

Research Results
Резултати от научни изследвания

IMPACT OF ANTI-DOPING CHECKS AND TRAINING ON THE VIOLATIONS AND PENALTIES IMPOSED ON BULGARIAN ATHLETES

Assist. Prof. Dr. Silvia Ilieva-Sinigerova
National Sports Academy "Vassil Levski"

Abstract. The competition and the desire to win a medal nowadays leads to more and more disregard for the principle of "fair play". The activity of the Anti-doping Center is aimed not only at inspections and punishments but also at prevention.

The purpose of the present study is to investigate the influence of anti-doping controls and education on the number of violations and sanctions imposed on Bulgarian athletes.

Methods. The study was carried out in the period 2014 – 2022 and includes official data from the Bulgarian Anti-Doping Center. In-competition and out-of-competition samples (urine and blood) conducted training for athletes and sports technicians, violations, and imposed sanctions for the research period will be analyzed.

Mathematical-statistical methods: descriptive statistics and dynamic series analysis.

Results. During the considered period, 1130±92 samples were taken, of which 66.5±12.7 were blood samples. Whereabouts failure by athletes and sports technicians are 5.6±2.8. The number of educated athletes, coaches, officials, and employees of the Anti-Doping Center in 2014 was 273 and will grow to 1,816 people in 2022.

Conclusion: There is an increase in the number of tests performed in competitive and non-competitive situations. The prevention program has convincingly expanded the scope and number of trained athletes, officials, and staff over the years.

Keywords: anti-doping; test; prevention

Introduction

For athletes of all ages, the pursuit of excellence in sports is essential. Sometimes the drive for success can be so engrossing and compelling that a young person can easily lose sight of what is fair and right (Peteva, Ivanov 2016).

As technology advances, more and more different methods of abuse and doping in sports are known. According to Richardson et al. (2022), some of the commonly used methods are anthropometric manipulation (height/weight doping), gender-

based doping, use of banned substances, force manipulation, power, and controller manipulation (data creation and modification), etc. In recent major sporting events such as the Olympic Games, and the World and European Championships, asthma has been noted as a common justification for the use of banned substances by elite athletes, according to TUE and medication use data (Allen et al. 2019).

Many anti-doping rule violations are due to ignorance, particularly among newcomers to sports, with their "accidental" intakes of untested drugs, etc. Sports professionals cannot but discuss these issues with different audiences (Gretsov et al. 2020). The development of educational materials has lagged. However educational programs, a web-based game format educational tool aimed at young athletes are both welcome attempts to improve the quality and quantity of educational material (Houlihan 2008).

An e-learning section is available on the website of the Bulgarian Anti-Doping Center (2023). Information is presented in six different ways, differentiated for athletes and administration. The anti-doping e-learning platform (ADeL) offers access to all topics related to clean sport and anti-doping; Anti-Doping Glossary; The Play True Quiz and challenge (an interactive computer game designed by the World Anti-Doping Agency to test knowledge about anti-doping); ADAMS Training is a great tool for novice users because it allows them to practice their skills without fearing they may do something wrong.

The competition and the desire to win a medal nowadays leads to more and more disregard for the principle of "fair play". The activity of anti-doping agencies is aimed not only at inspections and punishments but also at prevention.

Purpose

The purpose of the present study is to investigate the influence of anti-doping controls and education on the number of violations and sanctions imposed on Bulgarian athletes.

Methods

The study was carried out in the period 2014 – 2022 and includes official data of the Bulgarian Anti-Doping Center. In-competition and out-of-competition samples (urine and blood) conducted training for athletes and sports technicians, violations, and imposed penalties for the research period will be analyzed.

Mathematical-statistical methods: descriptive statistics and dynamic series analysis. Data will be analyzed with MS Excel 365.

Results

The study covers the period before, during, and after two Olympic cycles (2014 – 2022). The data to be analyzed covers in-competition and out-of-competition testing. Due to the large time range covered by the study, large ranges of the data obtained for some of the indicators are also noticeable.

During the considered period, 1130±92 samples were taken, of which 66.5±12.7 were blood samples. Whereabouts failure by athletes and sports technicians are 5.6±2.8. The number of trained athletes, coaches, officials, and employees of the Anti-Doping Center in 2014 was 273 and will grow to 1,816 people in 2022.

Table 1. Mean values of indicators in the period of 2014 – 2022

№	INDICATOR	MIN	MAX	SUM	R	MEAN±SD	AS	EX
1	Total doping samples	831	1544	10171	713	1130±92.35	0.535	1.624
2	Total blood samples	0	106	599	106	66.55±12.72	0.723	0.950
3	Adverse Analytical Findings	5	28	128	23	14.22±6.51	1.055	1.989
4	Whereabouts failure	0	22	51	22	5.66±2.82	1.460	0.671
5	Non-analytical results	0	26	88	26	9.77±9.83	1.000	-1.340
6	Effective sanctions	0	12	38	12	4.22±5.14	0.658	-1.633
7	Education athletes	46	1531	6323	1485	702.55±452.83	0.456	0.276
8	Education coaches, doctors, staff	15	342	1544	327	171.55±109.26	0.005	-0.731
9	Total educated people	245	1816	9366	1571	1040.66±534.40	-0.262	-0.440

It is of interest to us to examine the annual dynamics of the number of samples taken, effective sanctions, and conducted education in chronological order, considering the rate of development and the rate of growth on an annual basis. The values of the investigated indicators are summarized in (Table 2).

The total number of performed tests (in-competition and out-of-competition testing) reports a gradual increase until 2019. There was a subsequent decrease in the samples performed by 36.46%, which also covers the period of the first closure due to the COVID-19 pandemic. During the Olympic Games in Tokyo and after them, an increase in the number of in-competition and out-of-competition testing of Bulgarian athletes was observed. The average development rate of the indicator is 1.05, and the average growth rate is 0.05.

Table 2. Values of development rate and growth rate for the period 2014 – 2022

YEAR	INDICATOR	N/YEAR	RATE OF DEVELOPMENT		RATE OF GROWTH	
			Previous year	%	Previous year	%
2014	Total doping samples	895	-	-	-	-
2015		831	0,93	92,85%	-0,07	-7,15%

2016		918	1,10	110,47%	0,10	10,47%
2017		1496	1,63	162,96%	0,63	62,96%
2018		1544	1,03	103,21%	0,03	3,21%
2019		981	0,64	63,54%	-0,36	-36,46%
2020		931	0,95	94,90%	-0,05	-5,10%
2021		1225	1,32	131,58%	0,32	31,58%
2022		1350	1,10	110,20%	0,10	10,20%
2014	Total blood samples	0	-	-	-	-
2015		26	0,00	0,00%	-1,00	-100,00%
2016		33	1,27	126,92%	0,27	26,92%
2017		65	1,97	196,97%	0,97	96,97%
2018		80	1,23	123,08%	0,23	23,08%
2019		98	1,23	122,50%	0,23	22,50%
2020		90	0,92	91,84%	-0,08	-8,16%
2021		101	1,12	112,22%	0,12	12,22%
2022		106	1,05	104,95%	0,05	4,95%
2014	Adverse Analytical Findings	18	-	-	-	-
2015		28	1,56	155,56%	0,56	55,56%
2016		5	0,18	17,86%	-0,82	-82,14%
2017		11	2,20	220,00%	1,20	120,00%
2018		10	0,91	90,91%	-0,09	-9,09%
2019		13	1,30	130,00%	0,30	30,00%
2020		13	1,00	100,00%	0,00	0,00%
2021		18	1,38	138,46%	0,38	38,46%
2022		12	0,67	66,67%	-0,33	-33,33%
2014	Whereabouts failure	0	-	-	-	-
2015		0	0,00	0,00%	-1,00	-100,00%
2016		3	0,00	0,00%	-1,00	-100,00%
2017		0	0,00	0,00%	-1,00	-100,00%
2018		6	0,00	0,00%	-1,00	-100,00%
2019		0	0,00	0,00%	-1,00	-100,00%
2020		2	0,00	0,00%	-1,00	-100,00%
2021		22	11,00	1100,00%	10,00	1000,00%
2022		18	0,82	81,82%	-0,18	-18,18%
2014	Non-analytical results	0	-	-	-	-
2015		0	0,00	0,00%	-1,00	-100,00%

2016		8	0,00	0,00%	-1,00	-100,00%
2017		17	2,13	212,50%	1,13	112,50%
2018		14	0,82	82,35%	-0,18	-17,65%
2019		26	1,86	185,71%	0,86	85,71%
2020		20	0,77	76,92%	-0,23	-23,08%
2021		0	0,00	0,00%	-1,00	-100,00%
2022		3	0,00	0,00%	-1,00	-100,00%
2014	Effective sanctions	0	-	-	-	-
2015		0	0,00	0,00%	-1,00	-100,00%
2016		0	0,00	0,00%	-1,00	-100,00%
2017		0	0,00	0,00%	-1,00	-100,00%
2018		1	0,00	0,00%	-1,00	-100,00%
2019		5	5,00	500,00%	4,00	400,00%
2020		9	1,80	180,00%	0,80	80,00%
2021		11	1,22	122,22%	0,22	22,22%
2022		12	1,09	109,09%	0,09	9,09%
2014	Education athletes	46	-	-	-	-
2015		215	4,67	467,39%	3,67	367,39%
2016		513	2,39	238,60%	1,39	138,60%
2017		722	1,41	140,74%	0,41	40,74%
2018		689	0,95	95,43%	-0,05	-4,57%
2019		590	0,86	85,63%	-0,14	-14,37%
2020		852	1,44	144,41%	0,44	44,41%
2021		1165	1,37	136,74%	0,37	36,74%
2022		1531	1,31	131,42%	0,31	31,42%
2014	Education coaches, doctors, staff	15	-	-	-	-
2015		30	2,00	200,00%	1,00	100,00%
2016		156	5,20	520,00%	4,20	420,00%
2017		129	0,83	82,69%	-0,17	-17,31%
2018		143	1,11	110,85%	0,11	10,85%
2019		247	1,73	172,73%	0,73	72,73%
2020		198	0,80	80,16%	-0,20	-19,84%
2021		342	1,73	172,73%	0,73	72,73%
2022		284	0,83	83,04%	-0,17	-16,96%
2014	Total educated people	273	-	-	-	-
2015		245	0,90	89,74%	-0,10	-10,26%
2016		878	3,58	358,37%	2,58	258,37%

2017		1214	1,38	138,27%	0,38	38,27%
2018		1030	0,85	84,84%	-0,15	-15,16%
2019		1188	1,15	115,34%	0,15	15,34%
2020		1063	0,89	89,48%	-0,11	-10,52%
2021		1659	1,56	156,07%	0,56	56,07%
2022		1816	1,09	109,46%	0,09	9,46%

On the other hand, the blood samples (in-competition and out-of-competition testing) after 2014 marked a steady increase over the years, and an average growth rate of 1.19 and an average growth rate of 0.19. A sustained increase in the dynamics of trained athletes, coaches, officials, and staff is reported. The prevention program implemented by the Bulgarian Anti-Doping Center reports a 10.52% drop in those trained during the COVID-19 pandemic (2020), followed by a 56% increase in 2021.

Adverse Analytical Findings persist over time, the only exception being 2016 with 5 results. Followed by a 120% increase in 2017. The average estimated growth rate is 0.96 and the average growth rate is -0.04 (Table 3).

Table 3. Values of the average rate of development and growth by indicators

INDICATOR	AVERAGE RATE OF DEVELOPMENT	AVERAGE RATE OF GROWTH
Total doping samples	1.05	0.05
Total blood samples	1.19	0.19
Adverse Analytical Findings	0.96	-0.04
Whereabouts failure	1.29	0.29
Non-analytical results ADC	0.86	-0.13
Effective sanctions	1.64	0.64
Education athletes	1.48	0.48
Education coaches, doctors, staff	1.39	0.39
Total educated people	1.23	0.23

The Whereabouts failure have a wave-like nature, which is also related to the specifics of the Olympic cycle. Most of the reported violations were in an Olympic or post-Olympic year. The average growth rate is 1.29, and the growth rate is 0.29. The non-analytical results that are reported are for the period Rio de Janeiro 2016 – Tokyo 2020. The effective sanctions imposed since 2018 show very high dynamics with a development rate of 1.64 and a growth rate of 0.64.

According to the dynamics of development and growth, the considered indicators can be divided into three groups:

1. With the greatest dynamics in growth – effective sanctions and educated athletes, coaches, officials, and staff.

2. With an average growth rate – the total number of samples were taken (urine and blood), blood samples and yhereabouts failure.

3. With little dynamics in growth - adverse analytical findings and non-analytical results.

Discussion

Houlihan (2008) outlines some of the main problems seen in education and information strategies. Educational strategies are underutilized and often simplistic. Few educational campaigns are specifically designed for young athletes. Educational campaigns are most effective when they are long-term and reinforced by the athlete's community (parents, peers, coaches, etc.).

For educational activity to be effective, support for athletes must be felt. Counseling on pressing issues should be clearly supportive, not punitive and edifying.

Even if doping control efforts are not always successful due to new technologies and unclear boundaries between prohibited and permitted substances – anti-doping efforts still act as deterrents (Gretsov et al. 2020).

The anti-doping educational mission is not only to spread facts and knowledge but also to contribute to the formation of true sporting values and cultures intolerant of doping. The usual conventional anti-doping education about the unhealthy and unsporting aspects of doping and fair sport is often ineffective in anti-doping education programs (Gretsov et al., 2020). There is an urgent need to strengthen educational activities on doping control among athletes, as most of their knowledge on this issue comes from questionable sources. In this context, the content of educational programs should be aimed at the formation of moral knowledge and moral reasoning processes, such as ethical arguments against doping in sports or the psychosocial consequences of doping (Sas-Nowosielski, Swiatkowska 2007).

Prevention is an activity that involves all participants (parents, peers, clubs, schools, and the media). The earlier training begins, the greater the likelihood of success. Interactive learning is recommended because it is more effective than passive learning (Houlihan 2008).

Conclusions

A permanent trend of increasing urine and blood samples, which are taken in-competition and out-of-competition periods, is reported. There has been a steady increase in trained athletes, officials, and staff over the years. Considering the average rate of growth and development over the years, three groups are distinguished - with the greatest, average, and little dynamics of development. The prevention program and the training that was conducted with all participants in the competition process (athletes, officials, and staff)

fall into the first group - with the greatest dynamics and growth in development. The prevention program has convincingly expanded the scope and number of those trained.

REFERENCES

ALLEN, H.; BACKHOUSE, S.; HULL, J. & PRICE, O., 2019. Anti-doping policy, therapeutic use exemption and medication use in athletes with asthma: a narrative review and critical appraisal of current regulations. *Sports Medicine*, vol. 49, no. 6, pp. 659 – 668. DOI:10.1007/s40279-019-01075-z.

BULGARIAN ANTI-DOPING CENTER, 2023. Effective sanctions for anti-doping rules violations (29 August 2023). [Viewed on 08/30, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16573].

BULGARIAN ANTI-DOPING CENTER, 2023. *E-learning*. [Viewed on 08/10, 2023, from https://anti-doping.government.bg/en/e-obuchenie_c9].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2014_EN.* [Viewed on 08/10, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16583].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2015_EN.* [Viewed on 08/10, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16582]

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2016_EN.* [Viewed on 08/11, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16581].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2017_EN.* [Viewed on 08/11, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16580].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2018_EN.* [Viewed on 08/13, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16579].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2019_EN.* [Viewed on 08/14, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16578].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2020_EN.* [Viewed on 08/15, 2023,

from https://anti-doping.government.bg/bg/download/file/page-section/16577].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2021_EN*. [Viewed on 08/15, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16654].

BULGARIAN ANTI-DOPING CENTER, 2023. Report on the activities of the Anti-Doping Center. *Annual Report 2022_EN*. [Viewed on 08/16, 2023, from https://anti-doping.government.bg/bg/download/file/page-section/16710].

GRETSOV, A.; VOROBEV, S. A. & ANTSELOVICH, A. A., 2020. Value-motivational aspects of anti-doping education. Scientific Theoretical journal, *Theory and Practice of Physical Culture*, July, vol.7, pp. 69 – 71. ISSN 2409-4234.

HOULIHAN, B., 2008. Detection and education in anti-doping policy: a review of current issues and an assessment of future prospects. *Hitotsubashi Journal of Arts and Sciences*, Vol. 49. [Viewed August 05, 2023], Available from https://hermes-ir.lib.hit-u.ac.jp/hermes/ir/re/16448/HJart0490100550.pdf.

PETEVA, G. & IVANOV, V., 2016. Sport supplementation: review of performance enchasing dietary supplements used in sport. *European Scientific Journal*, *June,* vol. 12, no. 18, pp. 14 – 23, doi:10.19044/esj.2016.v12n18p14.

RICHARDSON, A.; SMITH, P. & BERGER, N., 2022. Zwift's anti-doping policy: Is it open to cheating? *International Journal of Esports*, vol. 1, no. 1. [Viewed August 05, 2023], Available from https://www.ijesports.org/article/90/html.

SAS-NOWOSIELSKI, K. & SWIATKOWSKA, L., 2007. The knowledge of the world anti-doping code among Polish athletes and their attitudes toward doping and anti-doping policy. *Human Movement,* vol. 8, no. 1. [Viewed August 05, 2023], Available from https://www.researchgate.net/publication/283879096_The_knowledge_of_the_world_anti-doping_code_among_Polish_athletes_and_their_attitudes_toward_doping_and_anti-doping_policy.

✉ **Dr. Silvia Ilieva-Sinigerova, Assist. Prof.**
ORCID iD: 0000-0002-6585-7107
Department "Theory of sport"
National Sports Academy "Vassil Levski"
1700 Sofia, Bulgaria
E-mail: nsastatics@gmail.com