CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi
*CBU Journal of Physical Education and Sport Sciences*
Vol.: 18, Issue: 2, 2023
E-ISSN: 2149-1046
DOI: 10.33459/cbubesbd.1156531
URL: https://dergipark.org.tr/tr/pub/cbubesbd

# Determining the Information and Thoughts of Sports Sciences Faculty Students About Doping

**Gökhan Doğukan AKARSU[1†], Eylem YALMAN[2]**

[1]Yozgat Bozok University, School of Health Services, Department of Pharmacy Services
[2]Yozgat Bozok University, Faculty of Health Sciences, Department of Midwifery

**Research Article**
Received: 05/08/2022 Accepted: 05/07/2023 Published: 31/12/2023

## Abstract

The aim of the study is to determine the level of knowledge of undergraduate students in sports disciplines about banned substances and methods that cause doping effect and the damage these substances and methods cause to tissues. This descriptive and cross-sectional study was carried out at Yozgat Bozok University Faculty of Sports Sciences in Yozgat between 1 May and 30 May 2022. Sample selection was not made, and it was completed with 480 students who agreed to participate in the research and made up 80% of the universe. The mean age of the students was calculated as 20.86±2.0 years. It was determined that 72.50% of the participants were women, and 47.50% of them had less income than their expenses. 45% of the participants think that they have sufficient knowledge about doping effects. 52.50% stated that they were partially informed by sports managers and trainers about the substances and methods that cause doping effects. As a result, it was determined that the students did not have sufficient information about the prohibited substances and methods that cause doping effect, and they were not adequately informed by the sports managers and referees. It is suggested that the subject of banned substances and methods that create doping effects should be added to their curriculum in order to eliminate the lack of knowledge of the students of the faculty of sports sciences.
**Keywords:** Doping, Biochemical effect, Athlete, Performance enhancing drug

# Spor Bilimleri Fakültesi Öğrencilerinin Doping Hakkında Bilgi ve Düşüncelerinin Belirlenmesi

## Öz

Araştırmanın amacı spor disiplinlerinde lisans düzeyinde öğrenim gören öğrencilerin doping etkisi yaratan yasaklı madde ve yöntemler ve bu madde ve yöntemlerin dokulara verdiği zararlar hakkında bilgi düzeylerinin belirlenmesidir. Tanımlayıcı ve kesitsel tipte olan bu çalışma, Yozgat ilinde bulunan Yozgat Bozok Üniversitesi Spor Bilimleri Fakültesi'nde 1 Mayıs - 30 Mayıs 2022 tarihleri arasında yürütüldü. Örneklem seçimi yapılmamış olup, araştırmaya katılmayı kabul eden ve evrenin %80'ini oluşturan 480 öğrenci ile tamamlandı. Öğrencilerin yaş ortalamaları 20,86±2,0 yıl olarak hesaplandı. Katılımcılarınn %72,50'si kadın, ve %47,50'sinin geliri giderinden az olduğu saptandı. Katılımcıların %45'i doping etkileri konusunda yeterli bilgiye sahip olduğu düşünmektedir. %52,50'si spor yönetici ve antrenörleri tarafından doping etkisine neden olan madde ve yöntemler hakkında kısmen bilgilendirildiklerini ifade etmiştir. Sonuç olarak öğrencilerin doping etkisi yaratan yasaklı madde ve yöntemler hakkında yeterli bilgilerinin olmadığı, spor yöneticileri ve hakemler tarafından yeterli düzeyde bilgilendirilmedikleri saptanmıştır. Spor bilimleri fakültesi öğrencilerinin bilgi eksikliklerinin gidermesi amacıyla müfredatlarına doping etkisi yaratan yasaklı madde ve yöntemleri konusunun eklenmesi önerilmektedir.
**Anahtar Kelimeler:** Doping, Biyokimyasal etki, Sporcu, Performans arttırıcı ilaç

† **Sorumlu Yazar:** Gökhan Doğukan Akarsu, **E-posta:** gökhan_dogukan_akarsu@hotmail.com

## INTRODUCTION

World Anti-Doping Agency (WADA) doping; in the example of an athlete's body; It is defined as the presence or use of a substance/method that has the potential to increase sports performance, threatens health unnecessarily, is against the spirit of sports, and there is evidence of its use (Işık, 2015).

The prohibited substances and methods with more preferred doping effects by athletes are also used during sports to enhance both mental and physical performance, in addition to training (Gündoğdu et al., 2017). In the modernizing world, sports has become a field of competition driven by the desire for money, fame, and the pursuit of technological and tactical superiority. Additionally, advancements in materials, knowledge, communication, and health have led to the emergence of a completely different competitive environment in sports (Porter, 1998).

However, at the end of a competition, the fame and opportunities that come with winning the match are attractive. The financial support provided by the institutions to the athletes sent to competitions and the expectation of demonstrating the best performance lead to the development of feelings of inadequacy in athletes and the use of prohibited substances and methods known as doping. The ban on doping methods in the Olympics or other sports is not only to prevent unfair competition but also to prevent sports enthusiasts from harming themselves by using these chemicals (Adami et al., 2022; Surabhi & Roy, 2019). The World Anti-Doping Agency (WADA) has banned substances and methods with doping effects to protect athletes from harmful substances and subsequently create equal opportunities (Henning & Andreason, 2022).

The substances used for their doping effects have various harmful effects on the body. One of them is anabolic androgenic steroids, which disrupt heart functions, cause hypertension, left ventricular hypertrophy, cardiac muscle proliferation, and impair liver, reproductive system, immune system, and biochemical parameters in the serum. Prolonged use reduces left ventricular relaxation and may lead to arrhythmias (Albano et al., 2021; Baggish et al., 2010; Chrostowski et al., 2011; de Azevedo Cruz Seara et al., 2017; Nottin et al., 2006; Rocha et al., 2007).

The use of diuretics can cause fainting, dizziness, headache, nausea, balance loss, cramps, renal and cardiac failure, while peptide hormones can lead to acromegaly, diabetes, thrombosis, coagulation, stroke, and heart failure (Rani, 2022). Especially among young people, there are products that are increasingly being used to create doping effects, sold and consumed under different names due to their prohibited status (Gündoğdu et al., 2017). It is crucial for young athletes starting their undergraduate education at the university to have sufficient knowledge about prohibited substances and methods that create doping effects in order to sustain their sports career as a profession. Teaching the concept of being against doping-effective substances and methods will be guiding in their future professional careers and will help prevent many health issues.

However, especially young athletes purchase and use these products without researching, relying on insufficient information they see in the media or from websites, under different chemical or brand names that serve the same common purpose. The younger generation may jeopardize their health by using these products ignorantly or with inadequate

information. For all these reasons, it is necessary to determine the knowledge level of students studying at the Faculty of Sports Sciences regarding prohibited substances and methods with doping effects and to increase their knowledge in this area.

The aim of this study is to determine the frequency of use of prohibited substances and methods that create doping effects and to determine the participants' knowledge about the effects of these substances on their health.

## METHODS

### Type of Research

The research is descriptive and cross-sectional.

### Research Area and Collection of Samples

The research was conducted at Yozgat Bozok University Faculty of Sports Sciences, which includes departments of physical education and sports teaching, coaching education, sports management, and recreation. The study was conducted with students studying in these departments of the faculty. The study was completed with 494 students who agreed to participate in the research without selecting a sample. Students who refused to participate in the study and those who filled out the questionnaires were excluded from the study, and the data of 480 students were analyzed. An 80% response rate was achieved for the population.

### Data Collection

The data were collected between May 1, 2022, and May 30, 2022, at the Faculty of Sports Sciences. The data were collected using a questionnaire prepared by the researchers based on the literature, including demographic information form that asks for students' age, gender, place of residence, marital status, income and expenses, and class information, and a doping knowledge level form used to assess students' knowledge about prohibited substances and methods that create doping effects (Barkoukis et al., 2017; Çınar et al., 2007; Erikson et al., 1990; Gündoğdu et al., 2017; Ünal & Ünal, 2003). The questionnaire was distributed to students at the end of the class, and the students completed it. The average time to complete the questionnaire was approximately 10 minutes.

### Statistical analysis

The data were evaluated in computer environment with SPPS 25 package program. Frequences, percentage, mean and standard deviation were used in the evaluation of the data.

## RESULTS

Some demographic data of the students participating in our study are given in Table 1.

**Table 1.** Demographic data table of the study participants.

| Features | | n | % |
|---|---|---|---|
| **Gender** | Female | 348 | 72.50 |
| | Male | 132 | 27.50 |
| **Average age** | | | 20.86±2.0 |
| **Place of residence** | Village-district | 86 | 17.90 |
| | City | 194 | 40.40 |
| | Big city | 200 | 41.70 |
| **Family form** | Nuclear family | 356 | 74.16 |
| | Extended family | 124 | 25.83 |
| **Working status** | Employed | 86 | 17.91 |
| | Inoperative | 394 | 82.09 |
| **Income status** | Income lower than expenses | 228 | 47.50 |
| | Income equal to expenses | 226 | 41.10 |
| | Income more than expenses | 26 | 5.40 |
| **Marital status** | Single | 460 | 95.83 |
| | Married | 20 | 4.17 |
| **Class** | 1st grade student | 240 | 50.00 |
| | 2nd grade student | 42 | 8.80 |
| | 3rd grade student | 188 | 39.20 |
| | 4th grade student | 10 | 2.10 |
| **Department** | Physical education and sports teaching | 22 | 4.60 |
| | Coaching | 218 | 45.40 |
| | Sports management | 88 | 18.30 |
| | Recreation | 152 | 31.70 |
| **Weekly sports time** | 1-3 hours | 190 | 57.92 |
| | 4-6 hours | 92 | 28.04 |
| | 7-9 hours | 44 | 13.41 |
| | 10 hours or more | 2 | 0.60 |

The average age of the students included in the study is 20.86±2.0 years, 72.50% are female, 41.70% live in a big city and 74.16% have a nuclear family. 82.09% of the students are inoperative, 47.50% have income less than their expenses, and 95.83% are single. 50% of the participants are studying in the first grade, 45.40% are studying in the Coaching department and 57.9% do sports 1-3 hours a week.

In Table 2, the opinions of the students participating in the research about the doping effect are given.

**Table 2.** Distribution of students' thoughts about the doping effect.

| **Features** | | **n** | **%** |
|---|---|---|---|
| **Thoughts on doping effect** | Anyone can use it | 28 | 5.8 |
| | Against sports ethics | 282 | 58.8 |
| | Should be used if necessary | 66 | 13.8 |
| | It should never be used | 66 | 13.8 |
| | Uninformed | 38 | 7.9 |
| **Widely used medicine/ supplement/ other*** | Stimulants | 206 | 42.90 |
| | Cannabioids | 26 | 5.40 |
| | Anabolic agents | 42 | 8.80 |
| | Beta blockers | 2 | 0.40 |
| | Diuretics | 16 | 3.30 |
| | Narcotic analgesics | 16 | 3.30 |
| | Masking agents | 12 | 2.50 |
| | Peptide hormones | 46 | 9.60 |
| | Steroids | 176 | 36.70 |
| | Other (blood transfusion, Methods to Increase Oxygen Carrying Capacity, Acupuncture, Oxygen doping etc. | 58 | 12.10 |
| **Reasons why athletes prefer doping effect*** | Calm the excitement | 98 | 20.40 |
| | To concentrate | 22 | 4.60 |
| | Excessive sense of winning | 272 | 56.70 |
| | Destroy anxiety | 20 | 4.20 |
| | All | 116 | 24.20 |

*More than one answer was given.

58.8% of the students participating in the research find that prohibited methods and substances that cause doping effect are contrary to sports ethics. In addition, it was determined that the most known (42.9%) banned substance causing doping effect was stimulant substances. It was determined that 56.7% of the students thought that the athletes used banned substances and methods that cause doping effect due to their excessive sense of winning.

Table 3 presents some information and thoughts of the participating students regarding the use of prohibited substances and methods that create doping effects.

**Table 3.** Some information and thoughts of the students regarding the use of prohibited substances and methods that create doping effects.

| **Propositions** | **Yes** | | **No** | | **Partly** | |
|---|---|---|---|---|---|---|
| | **n** | **%** | **n** | **%** | **n** | **%** |
| I know enough about doping effect | 216 | 45.00 | 96 | 20.00 | 168 | 35.00 |
| Athletes. managers and coaches have sufficient knowledge about harmful effects of prohibited substances and methods | 72 | 15.00 | 156 | 32.50 | 252 | 52.50 |
| High performance can only be achieved with prohibited substances and methods that create doping effects. | 42 | 8.80 | 344 | 71.70 | 94 | 19.50 |
| I have sufficient knowledge about useful and harmful medicine used among athletes. | 86 | 17.90 | 186 | 38.80 | 208 | 43.30 |
| I am aware of the damage to tissues caused by the use of drugs to create a doping effect. | 118 | 24.60 | 174 | 36.30 | 188 | 39.10 |
| I know that banned substances and methods that cause doping have irreversible side effects. | 298 | 62.10 | 94 | 19.60 | 88 | 18.30 |
| I know that doping is life threatening and can cause sudden death. | 276 | 57.50 | 92 | 19.20 | 112 | 23.30 |
| I know that all drugs used were detected from tissue and fluid samples. | 266 | 55.40 | 86 | 17.90 | 128 | 26.70 |
| Sufficient information is given about the doping effect in the courses in our department. | 116 | 24.20 | 198 | 41.30 | 166 | 34.50 |
| There should be a course on the doping effect in our department. | 204 | 42.50 | 60 | 12.50 | 216 | 45.00 |
| The use of prohibited substances and methods that create doping effects leads to unfair competition | 420 | 87.5 | 32 | 6.70 | 28 | 5.80 |
| I have the idea that every way can be tried to be successful. | 64 | 13.30 | 286 | 59.60 | 130 | 27.10 |
| Prohibited substances that cause doping effects should be recorded and given under the control of a doctor. | 270 | 56.30 | 126 | 26.30 | 84 | 17.40 |

45% of the students participating in the study stated that they have sufficient knowledge about prohibited substances and methods that create doping effects. 15% of the students reported that they believe their coaches and administrators who provide them with training have sufficient knowledge about the use of prohibited substances and methods that create doping effects. 71.7% of the participants believed that doping does not lead to high performance, while 17.90% believed that they have sufficient knowledge about the harmful effects of prohibited substances and methods that create doping effects. It was determined that 24.60% of the students believed that doping substances cause harm to tissues, 57.50% believed that they can cause sudden death, and 55.40% believed that residues of prohibited substances that create doping effects can be detected in body samples. Furthermore, 41.30% of the participants stated that they did not receive sufficient information about prohibited substances and methods that create doping effects during their educational life, while 42.50% believed that it should be taught as a course. 87.5% of the participating students believed that prohibited substances and methods lead to unfair competition, and 56.3% believed that drugs/chemicals that can create doping effects should be applied under controlled conditions.

## DISCUSSION

Banned substances that enhance mental and physical performance, create unfair opportunities, and pose health risks for users can easily be obtained from online shopping websites, pharmacies, and certain fitness centers. The chemicals we use as medication go through various stages and are made available for sale by the Ministry of Health. However, some substances such as dietary supplements, food additives, and their vitamin complexes do not require permission from the Ministry of Health (they are not legally mandatory). Therefore, companies that produce dietary supplements can introduce their products to the market by obtaining different permits due to the difficulty of their research. Due to the lack of supervision and regulations, these types of substances available in the market are not being investigated, their medium and long-term effects are not being examined, and therefore they are not being comprehensively evaluated in terms of health. Therefore, it is believed that our study will contribute to the literature and increase awareness among the younger generation to be more cautious about such drugs.

In this study, 72.5% of the participants were female and 27.5% were male. In a study conducted by Çetin et al. (2008), 58% of the participants were male and 42% were female (Çetin et al., 2008). In a study conducted by Yıldız (2006), 73.2% of the participants were male and 26.8% were female (Yıldız, 2006). The majority of our study participants were female. It can be stated that women are more willing to participate in the research. This difference in our study's participants may indicate that we are different from the literature.

The average age of the participants in our study is 20.86±2.0 years. In the study conducted by Çetin et al. (2008), 89.3% of the participants were between 18-23 years old, in the study conducted by Yıldız (2006), 22.3% of the participants were between 18-22 years old and 17.6% were between 23-27 years old (Yıldız, 2006), and in the study conducted by Gençtürk et al. (2009), 63.2% of the participants were in the 20-24 age range (Gençtürk et al., 2009). The average age of our participants is similar to the literature, considering that our study was conducted at a university where education is generally received in this age range.

47.5% of the participants in our study had lower income compared to expenses, while in the study conducted by Gençtürk et al. (2009), 26.3% of the participants had minimum wage or lower income. It can be said that our study participants have a lower income level. The reason for this difference from the literature may be attributed to the different period and region in which the research was conducted.

95.83% of the student participants in our study were single. In the study conducted by Çetinkaya (2019), 96% of the participants were single. In the study conducted by Sargın (2007), 97.5% of the participants were single. The marital status of the participants is similar to the literature.

50% of the student participants in our study are in their first year of education. In the study conducted by Çetinkaya (2019), 31.9% of the participants were in their first year of education, while in the study conducted by Aydemir (2019), 33.5% of the participants were in their first year (Aydemir, 2019; Çetinkaya, 2019). The reason for more first-year students participating in the research may be attributed to their willingness to participate in the study.

In this study, it was determined that less than half of the students had knowledge about doping. Brown et al. (2013) reported that 88% of the participants had knowledge about the

effects of doping and WADA (Brown et al., 2013), while Muwonge et al. (2015) stated that 60% of the participants had knowledge about the effects of doping (Muwonge et al., 2015). Öztürk et al. (2009) and Gençtürk et al. (2009) reported that only a few athletes had knowledge about substances and methods that cause doping effects and that men were more knowledgeable than women (Gençtürk et al., 2009; Öztürk et al., 2009). Substances and methods that cause doping effects occupy a significant place in the literature, and it can be stated that young adults are not very willing to read and learn about this information. Therefore, they do not have detailed knowledge about substances and methods that cause doping effects. Our study is similar to research conducted in Turkey regarding the level of knowledge about doping effects but differs from studies conducted in other countries.

In this study suggests that 15% of the participants, including athletes, managers, and coaches, believe that they have sufficient knowledge about the harmful effects of banned substances and methods. Aydemir (2019) found that between 10% and 12.3% of the participants, depending on their class, had knowledge about the substances and methods that cause doping effects as reported by their coaches (Aydemir, 2019). Mazanov et al. (2014) reported that sports coaches have less knowledge about substances and methods that cause doping effects compared to doctors, and both groups have low levels of knowledge, emphasizing the need for support (Mazanov et al., 2014). Krishnan et al. (2020) stated that athletes have low awareness of anti-doping organizations and rule violations, with less than 40% having up-to-date knowledge about anti-doping, and that health is considered more important than athletic success, with consultation with team doctors before using any medication (Krishnan et al., 2020). In this study consistent with the literature regarding the level of knowledge about the effects of doping. Errors resulting from the lack of knowledge among coaches and managers who prepare athletes can lead to the elimination of athletes, loss of competitions, and exclusion of athletes from future events. Therefore, it is considered necessary to provide more education about banned substances and methods to managers and coaches in the sports field.

In this study, 42.92% of the participants stated that stimulants are the most commonly used banned substances. Constantinou and Aguiyi (2022) found that 56% of athletes use stimulant substances, mainly to improve concentration during sports (Constantinou & Aguiyi, 2022). Çetinkaya (2019) reported that 32.2% of the participants used stimulants in their study. Our study results are similar to the literature. In our study, 56.7% of the participants indicated that banned substances and methods are used to achieve a sense of excessive winning, 20.4% to stay calm, 4.6% to improve concentration, and 4.2% to alleviate anxiety. Weber et al. (2022) and Yoncalık and Gündoğdu (2007) reported in their studies that doping use is becoming more common among athletes, does not create equal opportunities, goes against ethics, and is driven by the desire for financial gain (Weber et al., 2022; Yoncalık & Gündoğdu, 2007). Ehrnborg and Rosen (2009), Temizer (2009), and Beamish and Ritchie (2006) mentioned in their research that the purpose of resorting to doping is to enhance and maintain physical functionality, cope with social/psychological pressures, succeed, and gain social and economic benefits (Beamish & Ritchie, 2006; Ehrnborg & Rosen, 2009; Temizer, 2009). Yıldız (2006) reported that athletes use doping to seek recognition, approval, and alternative paths to success, especially for increasing muscle mass and endurance (Yıldız, 2006). The ambition, competition, fame, and financial gain expectations of athletes fuel this behavior. Thus, athletes

may be driven towards doping through psychological factors, even if they did not start with that intention. In this study is in line with the literature in this regard.

In this study, 1.70% of the participants stated that high performance cannot be achieved solely by using banned substances and methods, and individual effort is also necessary. Additionally, 58% of the students indicated that banned substances and methods that cause doping effects are contrary to sports ethics, while 56.70% mentioned that they are used due to the excessive desire to win. Weber et al. (2022) reported in their study conducted with disabled athletes that high performance can be achieved by using banned substances and methods that cause doping effects, but it is known that this is not the only way, and they resort to banned substances and methods for winning competitions, financial gain, and motivation (Weber et al., 2022). Gençtürk et al. (2009) reported in their research that 76.3% of the participants stated that the use of banned substances and methods affects the outcome of the competition (Gençtürk et al., 2009). In the results of this study demonstrate that the doping effect alone is not sufficient to win competitions and suggest that our research group is more sensitive to banned substances compared to the literature.

Regarding the knowledge of the participants, 24.6% indicated that banned substances harm tissues, 62.1% mentioned the presence of side effects, and 57.5% acknowledged that they can lead to death. When we asked an open-ended question about which tissues are affected (*please do not answer if you don't know), two participants mentioned the heart, and two participants mentioned the kidneys. In general, it can be stated that the specific tissues and organs affected are not known. Börjesson et al. (2021) emphasized the importance of psychological support in sports in their study and stated that not only athletes but also coaches, managers, and spectators require this psychological support, which positively influences athlete development (Börjesson et al., 2021). Petróczi and Aidman (2008) investigated the effects of psychological variables on behaviors and stated that banned substances and methods can be used for personal differences, chasing excitement due to risk, gaining self-confidence by winning competitions, gaining a sense of independence, and dealing with peer bullying (Petróczi & Aidman, 2008). In the results of this study align with the literature in terms of participants' knowledge that banned substances are harmful, but it is apparent that they lack specific information about which tissues and organs are most affected. Bayıroğlu (2023) emphasized the importance of psychological support in sports and stated that not only athletes but also coaches, managers, and spectators require this psychological support, which positively influences athlete development (Bayıroğlu, 2023). Petróczi and Aidman (2008) also investigated the effects of psychological variables on behaviors and mentioned that banned substances and methods can be used for personal differences, chasing excitement due to risk, gaining self-confidence by winning competitions, gaining a sense of independence, and dealing with peer bullying (Petróczi & Aidman, 2008).

## CONCLUSION

Athletes all over the world have encountered medicine called doping at some point in their lives. Doping is prohibited not only because it increases physical and mental performance by using medicine, but also because of its harm to health and inequality of opportunity. It causes temporary or permanent damage to health and causes health problems for the rest of his life. For this reason, doping substances prepared by WADA are constantly updated. In our study

and the information obtained from the literature, it was determined that doping is known to be prohibited, but what is within the scope of the ban and its biochemical effects are not known. For this reason, it is necessary to provide information about doping in institutions that provide undergraduate education. This is necessary primarily for the protection of the health of the younger generations, and also to compete on equal terms. In order to protect young people knowing that they are our future, such medicine should be given under doctor control and approval by the Ministry of Health should be obtained for all of them.

**Conflict of Interest:** There is no personal or financial conflict of interest within the scope of the study.

**Statement of Contribution of Researchers:** GDA and EY designed the study. Both authors searched the literature, collected data and performed statistical analysis. The authors made critical revisions by co-preparing the article. Both authors gave final approval for the article.

**Information on Ethics Committee Permission**
**Name of Board:** Yozgat Bozok University Ethics Committee
**Date:** 16/02/2022
**Issue/Decision Number:** 30/35

## REFERENCES


Adami, P. E., Koutlianos, N., Baggish, A., Bermon, S., Cavarretta, E., Deligiannis, A., ... & Papadakis, M. (2022). Cardiovascular effects of doping substances, commonly prescribed medications and ergogenic aids in relation to sports: A Position statement of the sport cardiology and exercise nucleus of the European Association of Preventive Cardiology. *European Journal of Preventive Cardiology*, *29*(3), 559-575. https://doi.org/10.1093/eurjpc/zwab198

Akarsu, G. D. (2021). Doping amacıyla sık kullanılan ilaçların biyokimyasal etkileri. *Akdeniz Spor Bilimleri Dergisi*,*4*(3), 447-457. https://doi.org/10.38021/asbid.960388

Albano, G. D., Amico, F., Cocimano, G., Liberto, A., Maglietta, F., Esposito, M., Rosi, L. G., Nunno, D. N., Salerno, M. & Montana, A. (2021). Adverse effects of anabolic-androgenic steroids: A Literature review. *In Healthcare MDPI, 9*(1) 97. https://doi.org/10.3390/healthcare9010097

Aydemir, Y. (2019). *Antrenörlük eğitimi bölümü öğrencilerinin doping hakkındaki bilgi düzeyleri ve görüşlerinin incelenmesi: Bartın Üniversitesi örneği*. Yüksek lisans tezi. Bartın Üniversitesi, Eğitim Bilimleri Enstitüsü, Bartın.

Baggish, A. L., Weiner, R. B., Kanayama, G., Hudson, J. I., Picard, M. H., HutterJr, A. M. & PopeJr, H. G. (2010). Long-term anabolic-androgenic steroid use is associated with left ventricular dysfunction. *Circulation: Heart Failure*, *3*, 472-476. https://doi.org/10.1161/CIRCHEARTFAILURE.109.931063

Barkoukis, V., Lazuras, L., & Harris, P. R. (2015). The effects of self-affirmation manipulation on decision making about doping use in elite athletes. *Psychology of Sport and Exercise*, *16*(175),81. https://doi.org/10.1016/j.psychsport.2014.02.003

Bayıroğlu, G. B. (2023). Sporda doping ve psikolojik etkileri. Berat Koçyiğit, Gül Bahar Bayıroğlu (Ed.), *Spor Bilimlerinde Multidisipliner Araştırmalar* İçinde. Efe Akademi Yayınları.

Beamish, R., & Ritchie, I. (2006). *Fastest, highest, strongest: A Critique of high-performance sport*. Routledge.

Börjesson, A., Ekebergh, M., Dahl, M. L., Ekström, L., Lehtihet, M., & Vicente, V. (2021). Men´s experiences of using anabolic androgenic steroids. *International Journal of Qualitative Studies on Health and Well-being, 16*(1), 927490. https://doi.org/10.1080/17482631.2021.1927490

Brown, A. A., Poreko, K. K. A. & Eliason, S. (2013). Drug use in Ghana: Knowledge, Perceptions and attitudes in a small group of elite students sports persons. *Biomedical Human Kinetics*, 5(1) 1-5. https://doi.org/10.2478/bhk-2013-0001

Çetin, E., Dölek, B. E., & Orhan, Ö. (2008). Gazi Üniversitesi Beden Eğitimi ve Spor Yüksekokulu öğrencilerinin ergojenik yardimcilar, doping ve sağlik hakkindaki bilgi ve alişkanliklarinin belirlenmesi. *Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi*, *6*(3), 129-132. https://doi.org/10.1501/Sporm_0000000103

Çetinkaya, B. (2019). *Türkiye üniversite sporları federasyonu süperlig; Müsabakalarına katılan sporcuların doping bilgi düzeyleri ve doping ile ilgili düşüncelerinin incelenmesi*. Yüksek lisans tezi. Muğla Sıtkı Koçman Üniversitesi Sağlık Bilimleri Enstitüsü, Muğla.

Chrostowski, K., Kwiatkowska, D., Pokrywka, A., Stanczyk, D., Wójcikowska-Wójcik, B. & Grucza, R. (2011). Renin-angiotensin-aldosterone system in body builders using supra physiological doses of anabolic androgenic steroids. *Biology of Sport, 28*, 11-17.

Constantinou, D., & Aguiyi, I. (2022). Use, perceptions and attitudes of cognitive and sports performance enhancing substances among university students. *Frontiers in Sports and Active Living*, *4*, 744650. https://doi.org/10.3389/fspor.2022.744650

Çınar, V., Öztürk, M. E., ve Şebin, K. (2007). Doping ve sporcularda kullanımı/dopıng and usage. *Beden Eğitimi ve Spor Bilimleri Dergisi*, *9*(3). Retrived from: https://dergipark.org.tr/en/download/article-file/297092

de Azevedo Cruz Seara, F., Barbosa, R. A. Q., de Oliveira D. F., da Silva, L. S. G., Carvalho, A.B., Ferreira, A.C.F., Nascimento, J. H. M. & Olivares E. L. (2017). Administration of anabolic steroid during adolescence induces long-term cardiac hypertrophy and increases susceptibility to ischemia/reperfusion injury in adult Wistar rats. *The Journal of Steroid Biochemistry and Molecular Biology, 171*, 34-42. https://doi.org/10.1016/j.jsbmb.2017.01.012

Ehrnborg, C., & Rosén, T. (2009). The Pychology behind doping in sport. *Growth hormone & IGF research, 19*(4), 285-287. https://doi.org/10.1016/j.ghir.2009.04.003

Erikson, O. B., Mellstrand, T., Peterson, L., Renström, P., Svedmyr, N. (1990). *Sports Medicine Health & Medication*. Raynor Design.

Gençtürk, G., Colakoglu, T., & Demirel, M. (2009). Elit sporcularda doping bilgi düzeyinin ölçülmesine yönelik bir araştırma güreş örneği. *Beden Eğitimi ve Spor Bilimleri Dergisi*, *3*(3), 13-221. Retrived from: https://dergipark.org.tr/tr/pub/bsd/issue/53576/713941

Gündoğdu, C., Çelebi, E., Beyazçiçek, Ö., Beyazçiçek, E., Tüfekçi Ş., ve Özmerdivenli, Ş. (2017) Triatlon atletlerinin doping ve anti-doping konusundaki görüşlerinin belirlenmesi. *Konuralp Tıp Dergisi*, *9*(63), 9. https://doi.org/10.18521/ktd.280117

Henning, A., & Andreasson, J. (2022). 'There's a new sheriff in town': The Rodchenkov Act, anti-dopism, and the hegemony of WADA in international sport. *Sport in Society*, *25*(6), 1160-1175. https://doi.org/10.1080/17430437.2022.2064100

Işık, S. (2015). *Gelişim çağındaki basketbolcularda doping kullanımı eğilimi ve bilgi düzeyinin incelenmesi.* Yüksek lisans tezi. Çanakkele Onsekiz Mart Üniversitesi Sağlık Bilimleri Enstitüsü, Çanakkale.

Krishnan, A., Datta, K., Sharma, D., Sharma, S. D., Mahajan, U., Jhajharia, S., & Yadav, M. (2020). Survey of antidoping knowledge, attitudes and practices amongst elite Indian sportsmen and the way forward. *Medical Journal Armed Forces India*, *78*(1), 88-93. https://doi.org/10.1016/j.mjafi.2020.03.020

Mazanov, J., Backhouse, S., Connor, J., Hemphill, D., & Quirk, F. (2014). Athlete support personnel and anti-doping: Knowledge, attitudes, and ethical stance. *Scandinavian journal of medicine&science in sports*, *24*(5), 846-856. https://doi.org/10.1111/sms.12084

Muwonge, H., Zavuga, R., & Kabenge, P. A. (2015). Doping knowledge, attitudes, and practices of Ugandan athletes': A Cross-sectional study. *Substance abuse treatment, prevention, and policy*, *10*(1), 1-8. https://doi.org/10.1186/s13011-015-0033-2

Nottin, S., Nguyen, L. D., Terbah, M. & Obert, P. (2006). Cardiovascular effects of androgenic anabolic steroids in male body builders determined by tissue Doppler imaging. *The American Journal of Cardiology*, *97*, 912-915. https://doi.org/10.1016/j.amjcard.2005.10.026

Öztürk, E. G., Suveren, S., & Çolakoğlu, T. (2009). *Türkiye'de doping, sporcuların doping bilgi düzeylerinin ölçülmesi (hentbol örneği).* Yüksek lisans tezi. Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Beden Eğitimi ve Spor Öğretmenliği Anabilim Dalı, Ankara.

Petróczi, A., & Aidman, E. (2008). Psychological drivers in doping: The Life-cycle model of performance enhancement. *Substance abuse treatment, prevention, and policy*, *3*, 1-12. Retrived from: https://link.springer.com/article/10.1186/1747-597X-3-7

Porter, M. E. (1998). Clusters and the new economics of competition. *Boston: Harvard Business Review*, *76*(6), 77-90.

Rani, D. (2022). Drugs, doping and their effects on sports performance. *International journal of economic perspectives*, *16*(6), 21-31. Retrived from: https://ijeponline.org/index.php/journal/article/view/270

Rocha, F. L., Carmo, E. C., Roque, F.R., Hashimoto, N. Y., Rossoni, L. V., Frimm C., Anéas, I., Negrão, C. E., Krieger, J. E. & Oliveira., E. M. (2007). Anabolic steroids induce cardiac renin-angiotensin system and impair the beneficial effects of aerobic training in rats. *American journal of physiology. Heart and circulatory physiology*, *293*, 3575-3583, https://doi.org/10.1152/ajpheart.01251.2006

Sargın, C. (2007). *Beden eğitimi ve spor öğretmenliği bölümü öğrencilerinin doping bilgi düzeyleri (Marmara, Ege ve İç Anadolu örneği)*. Yüksek lisans tezi. Sakarya Üniversitesi, Sakarya.

Surabhi, M.S. & Roy, A. (2019). A Comprehensive dissection of the nike vapor fly controversy in light of sportsand doping laws. *Law Audience* J., *2*, 1–11.

Temizer, A. (2009). Doping-sporda ilaç suistimali. *Ankara: Hacettepe Üniversitesi Dergisi*, 1-6.

Ünal, M. & Ünal, D. (2003). Sporda doping kullanımı. *İstanbul Tıp Fakültesi Dergisi*, *66*(3), 189-198 Retrived from: https://dergipark.org.tr/tr/pub/iuitfd/issue/9287/116067

Yildiz, A. (2006). *Cumhuriyet Üniversitesi Beden Eğitimi ve Spor Yüksekokulu ve Sivas İli amatör liglerinde değişik branşlardaki sporcuların doping kullanım oranlarının araştırılması*. Yüksek lisans tezi. Cumhuriyet Üniversitesi, Sağlık Bilimleri Enstitüsü, Sivas.

Yoncalık, O., & Gündoğdu, C. (2007). Sporda ahlaki bir sorun olarak doping. *Fırat Üniversitesi Doğu Araştırmaları Dergisi*, *6*(1), 128-134. Retrived from: https://dergipark.org.tr/tr/pub/fudad/issue/47124/593299

Weber, K., Patterson, L. B., & Blank, C. (2022). An Exploration of doping-related perceptions and knowledge of disabled elite athletes in the UK and Austria. *Psychology of Sport and Exercise*, *58*, 102061. https://doi.org/10.1016/j.psychsport.2021.102061

Whitaker, D. L., Geyer-Kim, G., & Kim, E. D. (2021). Anabolic steroid misuse and male infertility: management and strategies to improve patient awareness. *Expert Review of Endocrinology & Metabolism*, *16*(3), 109-122. https://doi.org/10.1080/17446651.2021.1921574