

Research article

Assessment of knowledge about the doping in the rehabilitation assistance of performance and recreational athletes

Alisa Tăbîrță¹, Victoria Chihai¹, Serghei Cebanu¹, Ina Pogonea¹, Tatiana Timercan¹, Artiom Jucov², Gheorghe Ștefan³

Citation: Tăbîrță A., Chihai V., Cebanu S., Pogonea I., Timercan T., Jucov A., Ștefan G. - Assessment of knowledge about the doping in the rehabilitation assistance of performance and recreational athletes
Balneo and PRM Research Journal
2024, 15(2): 706

Academic Editor(s):
Constantin Munteanu

Reviewer Officer:
Viorela Bembea

Production Officer:
Camil Filimon

Received: 18.04.2024
Published: 21.06.2024

Reviewers:
Mariana Rotariu
Constantin Munteanu

Publisher's Note: Balneo and PRM Research Journal stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2023 by the authors. Submitted for possible open-access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

- 1 „Nicolae Testemitanu” State University of Medicine and Pharmacy, Chisinau, Republic of Moldova;
- 2 Anti-Doping Agency, Chisinau, Republic of Moldova;
- 3 „Atletmed” National Sports Medicine Center, Chisinau, Republic of Moldova;

* Correspondence: Alisa Tăbîrță, E-mail: alisa.tabirta@usmf.md

Abstract: Background: During the activity of performance and recreational athletes can arise critical situations that imply medical rehabilitation treatments. In the process of functional recovery, the applied methods can be sometimes aggressive and intense. The lack of knowledge of forbidden substances may pose a threat for the athlete's health and performance. It is of utmost importance that the medical personnel that care for athletes take into consideration the risks and effects of doping substances.

Methods: A group of 53 physicians - specialists in the field of physical medicine and sports medicine participated in the written study. The investigation was carried out according to the Questionnaire for the evaluation of anti-doping knowledge. By means of 14 categories of simple introductory questions, the questionnaire allowed the collection of data on the doctor's seniority and job, age, gender and general knowledge about substances and methods of interest in sports. The data of the participants in the questionnaires were collected and entered into a Microsoft Excel database and were analyzed in the MEDCALC statistical software program version 12.7.0. The data were analyzed using the SPSS program, version 21. Descriptive analysis was performed using the means and standard deviations of PEAS Instrument variables and mean difference tests were performed on two-response variables along with analysis of variance (ANOVA).

Results: The majority of doctors (40/75.48%) do not have information about test procedures for inert substances and almost half of them (25/47.17%) do not know the anti-doping rules and standards developed within World Anti-Doping Agency (WADA). Of the people surveyed all (53/100%) positively noted the effectiveness of anti-doping programs, but 18 (33.96%) of the respondents distinguished exaggerated actions in the mass media regarding the issue of doping and 35 (66.04%) of the respondents did not have accusations against mediating the issue of doping. Of all the people investigated, the majority (49/92.45%) are ready to report on cases of doping in the anti-doping organization or the sports federation. 24 (45.28%) marked agreement in these actions and total agreement - 25 (47.17%) physicians.

Conclusion: In the evaluation of the knowledge of specialist doctors involved in the assistance of people who practice performance and recreational sports, a discrepancy in the knowledge about doping was determined. The development of strategies and policies by informing doctors from medical rehabilitation and sports medicine in the field of sports doping will offer athletes access to quality medical services and safe professional activity.

Keywords: medical rehabilitation of athletes, doping substances, World Anti-Doping Code

1. Introduction

Functional deficits caused by physical injuries in sports activities are critical and challenging problems for both athletes and specialists in the field of surgery, orthopedics, and medical rehabilitation. Injuries can not only lead to decreased competitive performance, but also impose long-term or permanent limitations on athletes' independent functioning, affecting physical, psychological and emotional well-being. [1] Medical rehabilitation after injury or surgery is vital for a full and a functional recovery and rapid return of the athlete to competition. Whether post-traumatic or post-operative, medical rehabilitation requires a progressive and sequential plan for proper functional restoration. For an athlete, the priority is to restore full range of motion, muscle strength and neuromuscular control. [2] During rehabilitation from injury, athletes may experience depression, report feelings of frustration and anger, and experience a loss of identity. The psycho-emotional state greatly influences the rehabilitation process by increasing the duration of the treatment and respectively by decreasing the athletes' confidence in their functional capacity. [3]

In medical rehabilitation interventions to increase strength and improve motor skills are the optimal strategies in athletic performance. The early increase in muscle strength is conditioned by the capacity of the muscle to generate force and the improvement of the coordination of inter-muscular mechanisms. The recovery of motor skills and resistance training invoke mechanisms for similar adaptations in both short and long term. The neurophysiology of these processes is succeeded by an increase in corticospinal excitability and an increase in cortical inhibition. [4] In this sense, any exotopic substance that potentiates tissue metabolism interferes maliciously in healthy and adequate rehabilitation and can be considered in the category of doping substances.

The use of doping substances is one of the most important threats in sports. At the same time, doping is a serious problem in today's society because it is found not only in performance sports, but also in amateur or recreational athletes. This problem occurs more and more frequently among young people who go for training in gyms or fitness centers. [5] It is already a decade since the Spanish scholars Morente-Sánchez and Zabala studied doping in relation to the attitudes, beliefs and knowledge of athletes and members of the coaching staff of the Spanish soccer team. At the end of the study they found a lack of information about the issue of doping, they mentioned the risk or vulnerability of athletes when they use doping substances.[6]

Extensive research on athletes involved in individual and team sports has highlighted a lack of knowledge regarding anti-doping regulations and the definition of doping, as well as doping issues contained in the World Anti-Doping Code. Studies conducted by questioning athletes have confirmed the use of nutritional supplements without consulting a professional doctor. [7,8]

The results of a recent survey noted an impressive number of athletes who used nutritional supplements without being aware of the activity of the supplement's ingredients, how they worked, the recommended dosages and the potential side effects of the supplements. The athletes admitted that they would like more information about the use of nutritional supplements and other doping substances. [9] Therefore, such information must be provided by medical personnel well trained in the field. Physical medicine and rehabilitation physicians are responsible for functional recovery, and a gap in knowledge about the use of doping substances and nutritional supplements can create large discontinuances in rehabilitation treatment. The development and implementation of educational programs about the dangers of doping are viable for both athletes and physicians. In addition, in order for educational programs to be more effective, it is beneficial to take into account the extent of the doctor's knowledge about the use of various prohibited substances by athletes. As a large proportion of athletes require physical

medicine and rehabilitation interventions, we were interested in investigating the knowledge of physicians in this field about the impact of banned substances and methods.

The aim of the study was to collect relevant data on the attitudes towards doping among doctors in the field of physical medicine and sports medicine, as well as to analyze the information of doctors about the impact of doping on the rehabilitation process.

Materials and methods

This descriptive, cross-sectional study had a sample of 53 physicians - specialists in the field of physical medicine and sports medicine, who are involved in the provision of rehabilitation services for athletes. Participation in the study was voluntary and anonymous. The investigation was carried out according to the Questionnaire for the evaluation of anti-doping knowledge. The questionnaire included a short introduction, which clearly explained the intended purpose of the research. Through 14 categories of simple introductory questions, the questionnaire allowed the collection of data on the doctor's seniority and job, age, gender and general knowledge about substances and methods of interest in sports. The Knowledge about the World Anti-Doping Agency section (4 questions) highlighted the information of doctors about the activity of the World Anti-Doping Agency, the development of anti-doping rules and standards, the beliefs of the environment regarding the use of doping substances, the testing and disqualification of athletes. The section Motivations perceived by athletes who consume doping substances (5 questions) and the section Beliefs about doping (6 questions) reveal the doctor's attitude towards doping, and the section Effectiveness of anti-doping programs (9 questions) scored the doctor's practical skills in collecting samples of doping control and suggestions for improving the doping testing system and anti-doping programs. The answers to the questions in the section General Susceptibility to Doping (5 questions) can predict the doctor's actions towards a patient who administers prohibited substances. The respective questionnaire included free questions (rated as: "totally disagree", "disagree", "somewhat agree", "agree" and "total agreement" or "pro" and "against") respecting the demands formulated in the medical and sociological literature.

Data from the survey participants were collected and entered into a Microsoft Excel database and analyzed in the MEDCALC statistical software program version 12.7.0, applying variational, correlational and discriminant analysis methods. We analyzed data and variables by descriptive statistical analysis and expressed results as either mean $\pm$ standard deviation (SD) or number (%). Data were analyzed using the SPSS program, version 21. Descriptive analysis was performed using means and standard deviations of variables from the PEAS Instrument, and mean difference tests were performed on variables with two response alternatives along with analysis of variance (ANOVA).

Results

The survey results of 53 doctors were estimated and analyzed, of which 34 (64.15%) were women and 19 (35.85%) were men. The average age of the doctors was 41.67 ± 7.37 years, with variation intervals from 31 to 62 years. The length of service was 23.61 ± 3.48 years with variation intervals from 5 to 31 years, and 32 (60.37%) of the doctors worked in medical centers. We aimed to give a panoramic view of the characteristics of the items, which reflect the general knowledge of doctors about substances and methods involved in sports, the results being shown in table 1.

Table 1. General characteristics of the investigated persons.

Parameters	n abs	%	p
Work			
• Medical center	32	60,37	p>0,05
• Sports school	12	22,65	p>0,05
• Sports club	8	15,09	p<0,05
• National team	1	1,89	p<0,05
Residence environment			
• Urban	49	92,45	p<0,05
• Rural	4	7,55	p<0,05
Cases of doping during the career			
• Yes	8	15,09	p>0,05
• No	45	84,91	p<0,05
Do you know cases of doping of Moldovan athletes at the Olympic Games, Paralympic Games, world, European, domestic championships?			
• Yes	52	98,11	p<0,05
• No	1	1,89	p<0,05
Do you know the risks of doping?			
• Yes	53	100	p<0,05
• No	0		
During your career, have athletes and coaches requested information about prohibited substances and methods?			
• Yes	42	79,24	p<0,05
• No	11	20,76	p<0,05

Thus, out of 53 investigated doctors, 49 (92.45%) live in urban areas and only 4 (7.55%) in rural areas. For the most part (32/60.37%), doctors work in medical centers, sports schools (12/22.65%), less numerous being in sports clubs (8/1.09%) and national teams (1/1.89%). Only 8 (15.09%) of the surveyed doctors presented cases of doping during their career, and 45 (84.91%) of the respondents did not mention such an experience. Most of the doctors interviewed (52/98.11%) showed knowledge about cases of doping of athletes from the Republic of Moldova at the Olympic Games, Paralympics, world, European or domestic championships and only one doctor (1.89%) did not present an affirmative answer. Information about prohibited substances and methods was requested from 42 (79.24%) doctors and 11 (20.76%) of the respondents did not address this subject in discussions with athletes or coaches. It is remarkable that all doctors (100%) know the risks of doping.

We continued the study with the assessment of doctors' answers to the Knowledge about the World Anti-Doping Agency (WADA) compartment. (Fig. 1)

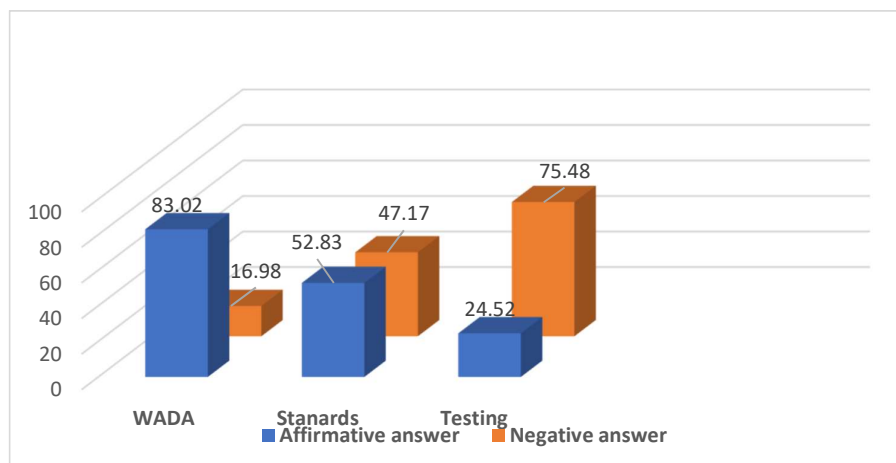


Figure 1. Assessment of physicians' knowledge of WADA.

The survey for the Knowledge about the World Anti-Doping Agency compartment revealed that most doctors (44/83.02%) know about the respective world structure and only 9 (16.98%) people did not give an affirmative answer. The number of people who know the anti-doping rules and standards developed within WADA and those who do not possess this information was divided as follows: 28 (52.83%) of the respondents are informed and 25 (47.17%) do not possess the information. 13 (24.52%) of the respondents had an affirmative answer about the procedures for testing and disqualifying athletes, and the majority (40/75.48%) of the respondents did not have eloquent information.

Doctors' answers to the questions in the Doping Convictions and Motivations perceived by athletes who consume doping substances allowed us to conclude the doctors' attitude towards the use of prohibited substances and doping in medical practice. (Fig. 2)

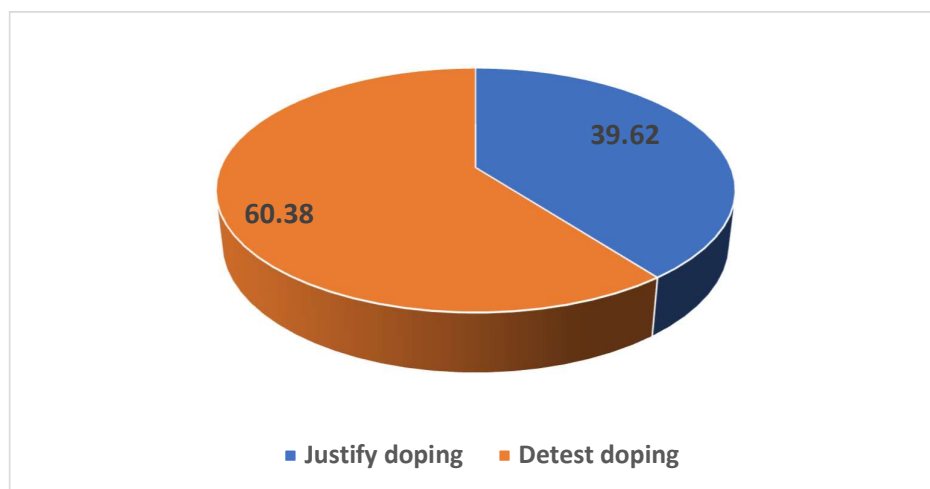


Figure 2. Doctors' attitudes towards doping.

Thus, 21 (39.62%) of the doctors justify doping in the athlete's activity, thus arguing for an accelerated recovery after trauma, increasing performance, prolonging the career in sports, however, 32 (60.38%) of the respondents do not agree with the presence of doping in sports.

Of the people surveyed, all (53/100%) noted positively the effectiveness of anti-doping programs. But, 18 (33.96%) of the interviewees distinguished exaggerated actions in the mass media regarding the doping problem and 35 (66.04%) of the respondents had no complaints about the media coverage of the doping problem. It was surprising that 16

(30.19%) of the respondents are for the legalization of medicinal methods and physical medicine methods in order to improve the athlete's performance. (Fig. 3)

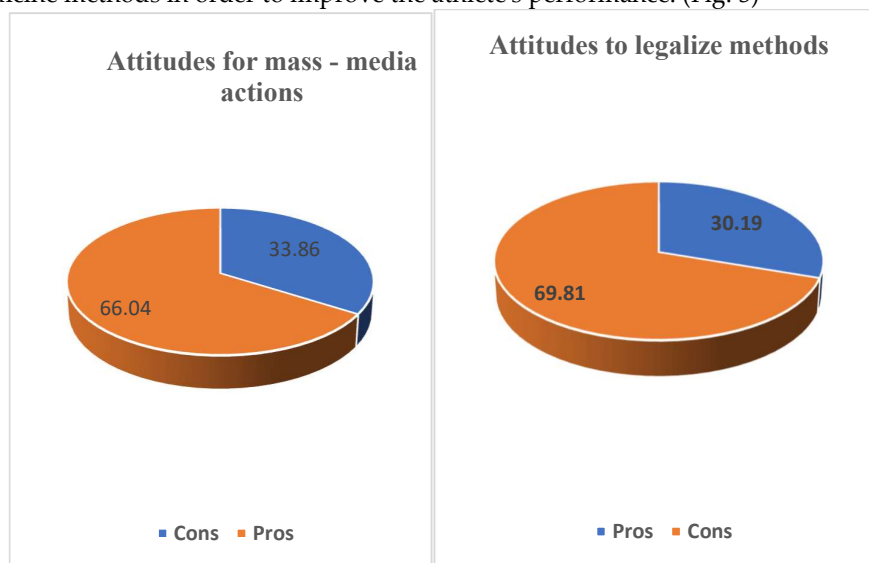


Figure 3. Physicians' attitudes towards mass media actions and the legalization of medicinal and physical medicine methods for improving sports performance.

The general susceptibility to doping was determined by the prompt answers to the questions of the respective chapter. Thus, not all doctors are ready to immediately report on the case of acceptance or administration of prohibited substances by the athlete. (Fig. 4)

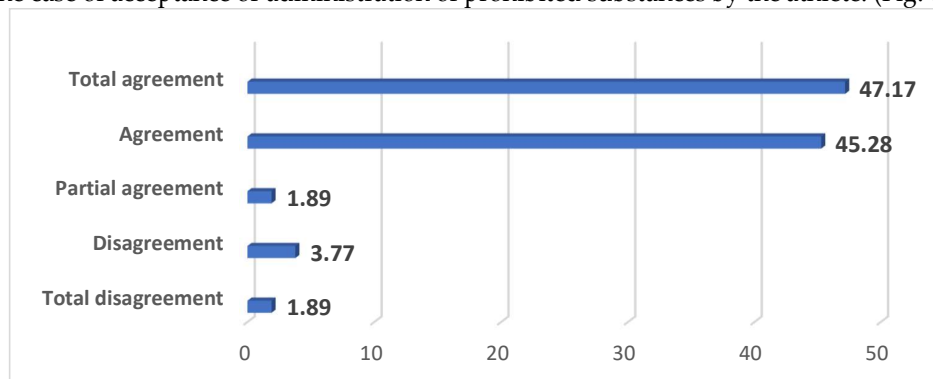


Figure 4. Doctors' susceptibility to doping

Of all the people surveyed, the majority (49/92.45%) are ready to report doping cases to the anti-doping organization or sports federation. 24 (45.28%) and 25 (47.17%) people agreed with these actions. A doctor (1.89%) would prefer a discussion with the athlete about the inadmissibility of the use of substances and doping methods, without notifying the competitive bodies. Two of the people surveyed (3.77%) would prefer to research all the details about the prohibited substance and appeal to the common sense of the athlete, hoping that he will not use it again and a doctor (1.89%) will not take any action against the doped athlete.

Discussions

The 53 doctors from the field of physical medicine and rehabilitation and from the field of sports medicine participated in our study. These specialists manage different types of musculoskeletal injuries in patients of all ages and abilities who play sports. The involvement of physical medicine and rehabilitation doctors in serving athletes is

characteristic not only for the Republic of Moldova, but several international studies report on such an experience as well. [10]

Of the doctors interviewed, 60.37% work in medical centers, providing medical services to athletes of different performance, all of them being doctors of physical medicine and rehabilitation. The majority of doctors (40/75.48%) do not have information about test procedures for inert substances and almost half of them (25/47.17%) do not know the anti-doping rules and standards developed within WADA. Therefore, doctors require sufficient information about various medicinal substances and non-medicinal methods that can improve function and resistance to exercise, but endanger the health of the athlete. Defining the boundary between treatment and enhancement is currently conventional in professional medical practice. Studies in the field address the integration of the scientific field of medicine with the social and personal aspects of the athlete. [11]

Undoubtedly, the use of performance-enhancing drugs in sport is a real crisis and specific measures are needed to stop the abuse of illegal substances likely to undermine the fairness of competition. Doping, along with various forms of cheating, has been recorded throughout the history of sports. [12] The results of the investigation of doctors from the Republic of Moldova surprised by the attitude towards doping. Only 32 (60.38%) of the respondents do not agree with the presence of doping in sports, and 21 (39.62%) of the doctors continue to justify the presence of prohibited substances and methods in the athlete's recovery through accelerated recovery after trauma. At the same time, 16 (30.19%) of the respondents pleaded for the legalization of medicinal methods and physical medicine methods in order to improve the athlete's performance, although according to the initial survey, all doctors stated that they know the risks of doping in sports and positively noted the effectiveness of anti-doping programs. The conflicting results of our investigation are not exceptional. The new Olympic and Paralympic Model Formulary (2018) adequately addressed the medication of athletes participating in the Olympic Games. Current literature sources pay particular attention to the pattern of drug use in athletes with particular emphasis on analgesics and various biological supplements. [13]

The athlete's success is the result not only of daily training, but also of combating fatigue and muscle pain. Increasing sports performance and early recovery conditions the use of drugs and doping substances. [14] Probably, this is how it is explained, that 16 (30.19%) of the investigated doctors are in favor of the legalization of medicinal methods and physical medicine methods in order to improve the athlete's performance, and 18 (33.96%) of the interviewed distinguished actions exaggerated in the mass media regarding the doping problem.

It is certain that pain management has constantly influenced athletic conditions, thus necessitating the use of prohibited analgesic substances. Medications can be prescribed by a doctor for pain control, but they can be obtained illegally and carry potentially serious health risks, including addiction. Thus, the doctor's role in medication management is fundamental. [15]

The assessment of the general susceptibility to doping of the investigated doctors showed that the majority (49/92.45%) are ready to report doping cases in the anti-doping organization or the sports federation and only one doctor (1.89%) will not undertake action against the doped athlete.

Conclusions:

During the evaluation of the knowledge of medical specialists involved in the assistance of high performance and recreational athletes was determined a discrepancy between the urban and rural specialists regarding their insight on doping.

The majority of doctors have a negative attitude towards the consumption of forbidden substances in sport. However, the somehow important rate of those that support doping is directly proportional with the low level of knowledge in the field.

The development of any strategies and policies in doping through the information of doctors engaged in the medical rehabilitation and sports medicine field will give the athletes access to quality medical services and safe professional performance.

Author Contributions: *For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used “Conceptualization, A.T. and V.C.; methodology, V.C.; software, S.C.; validation, T.T., A.J. and A.T.; formal analysis, V.C.; investigation, G.Ş.; resources, V.C.; data curation, A.T.; writing—original draft preparation, I.P.; writing—review and editing, V.C.; visualization, I.P.; supervision, A.J.; project administration. All authors have read and agreed to the published version of the manuscript.”*

Funding: *“This research received no external funding”*

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Nicolae Testemitanu” State University of Medicine and Pharmacy, Chisinau, Republic of Moldova, protocol n. 33 date of approval: 29.03.2021.

Informed Consent Statement: *“Informed consent was obtained from all subjects involved in the study.”*

“Written informed consent has been obtained from the patient(s) to publish this paper”

Data Availability Statement: *“Not applicable” here.*

Acknowledgements: None

Conflicts of Interest: *“The authors declare no conflict of interest.*

References

1. Lu Frank J.H.; Hsu Y. Injured athletes' rehabilitation beliefs and subjective well-being: The contribution of hope and social support. *Journal of athletic training*, 2013, 48.1: 92-98.
2. Wilk Kevin E.; Ellenbecker Todd S.; Macrina L.C. Rehabilitation of the overhead athlete's elbow. *Elbow Ulnar Collateral Ligament Injury: A Guide to Diagnosis and Treatment*. Cham: Springer International Publishing, 2021. 327-356.
3. Gledhill A.; Forsdyke D.; Murray E. Psychological interventions used to reduce sports injuries: a systematic review of real-world effectiveness. *British Journal of Sports Medicine*, 2018, 52.15: 967-971.
4. Tallent J., Woodhead A.; Frazer A. K.; Hill J.; Kidgell D. J.; Howatson G. Corticospinal and spinal adaptations to motor skill and resistance training: Potential mechanisms and implications for motor rehabilitation and athletic development. *European journal of applied physiology*, 2021, 121, 707-719.
5. Loukovitis A.; Skoufa L.; Barkoukis V. An examination of football player's beliefs about anti-doping education. *Discobolul-Physical Education, Sport & Kinetotherapy Journal*, 2020, 59.2.
6. Zabala M.; Morente-Sánchez J.; Mateo-March M.; Sanabria D. Relationship between self-reported doping behavior and psychosocial factors in adult amateur cyclists. *The Sport Psychologist*, 2016, 30(1), 68-75
7. Thornton H. R.; Delaney J. A.; Duthie G. M.; Dascombe B. J. Developing athlete-monitoring systems in team sports: data analysis and visualization. *International journal of sports physiology and performance*, 2019, 14(6), 698-705.
8. Middleton K.; Vickery-Howe D.; Dascombe B.; Clarke A.; Wheat J.; McClelland J.; Drain J. Mechanical differences between men and women during overground load carriage at self-selected walking speeds. *International Journal of Environmental Research and Public Health*, 2022, 19(7), 3927
9. Thornton H. R.; Delaney J. A.; Duthie G. M.; Dascombe B. J. Developing athlete monitoring systems in team sports: data analysis and visualization. *International journal of sports physiology and performance*, 2019, 14(6), 698-705

10. Olufade O. A., Patel A.; Cherian C.; Waterbrook A. L.; Zaremski J. L.; Sussman W. I.; Myers R. A. Suggested curricular guidelines for musculoskeletal and sports medicine in physical medicine and rehabilitation residency training. *Current Sports Medicine Reports*, 2021, 20(7), 366-373
11. Juengst Eric T. Annotating the moral map of enhancement: Gene doping, the limits of medicine, and the spirit of sport. *The ethics of sports technologies and human enhancement*. Routledge, 2020. 173-202.
12. Palmi I.; Berretta P.; Tini A.; Ricci G.; Marinelli S. The unethicity of doping in sports. *La Clinica Terapeutica*, 2019, 170 (2), e100-e101
13. Alexander L. A.; Eken M. M.; Teoh C. S.; Stuart M. C.; Derman, E. W.; Blauwet, C. A. Patterns of athlete medication use at the 2018 PyeongChang Paralympic games: a descriptive cohort study. *American Journal of Physical Medicine & Rehabilitation*, 2022, 101(3), 270-278.
14. Mazzeo F. Drug abuse in elite athletes: Doping in sports. *Sport Science*, 2016, 9.2: 34-41
15. Gee C. M.; Nightingale T. E.; West C. R.; Krassioukov A. V. Infographic. Doping without drugs: how para-athletes may self-harm to boost performance. *British journal of sports medicine*, 2021, 55(16), 937-938.