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The prevention of crime related to the use of doping among prisoners

Zapobieganie przestępczości związanej ze stosowaniem dopingu wśród więźniów

One of the most important challenges related to internal security of prisons is caused by the prisoners' desire to use illegal substances, including alcohol, drugs and doping. Today, most prison administrations have quite good methods of detecting alcohol and drugs in prisoners' bodies, even though these detection methods are used quite inconsistently. However, there are no simple and widely used method in prison for detecting the presence of illegal doping substances in prisoners' bodies.

The article shows the need to provide prison administrations with a method of detecting doping substances in prisoners' bodies. The ESI-MS (mass spectrometry with electrospray ionization) method was also presented, which – according to the author – could be used by penitentiary systems as a mean of detection.

Key words: doping, illicit substances, crime prevention, addiction, withdrawal syndrome.

Jednym z największych wyzwań związanych z bezpieczeństwem wewnętrznym więzień jest powstrzymanie osadzonych od zażywania nielegalnych substancji, w tym alkoholu, narkotyków i dopingu. Obecnie większość administracji więziennych ma relatywnie dobre metody wykrywania alkoholu i narkotyków wśród więźniów, mimo iż te metody wykrywania są stosowane dość niekonsekwentnie. Jednak w więzieniu nie ma prostej i szeroko stosowanej metody, dzięki której można wykryć obecność nielegalnych substancji dopingujących u więźniów.

W artykule przedstawiono zapotrzebowanie administracji więziennej na metodę wykrywania substancji dopingujących w ciałach więźniów.

Przedstawiono również metodę ESI-MS (spektrometria masowa z jonizacją elektrosprej), która – według autora – może być wykorzystana przez systemy penitencjarne jako środek wykrywania.

Słowa kluczowe: doping, nielegalne substancje, zapobieganie przestępczości, uzależnienie, syndrom abstynencyjny.

Introduction

In many countries, the number of drug users in prison has increased in the last two decades. The main examples of drugs are: cocaine, heroin, cannabis and anabolic steroids. Drug use has various negative consequences – addictions, infections (for example, HIV infection through the use of contaminated syringes), illness or mental disorders. Hedrich et al. believe that every sixth prisoner is a drug addict[1]. It is worth adding that most prisons in Europe struggle with a problem in the form of prisoners using illegal substances[2].

Doping has many definitions, but in general it refers to the use of substances by athletes, as well as methods prohibited by the World Anti-Doping Agency (WADA) – to the substance or method found on this list must fulfill these conditions, among others: improves training or competition results, or when it is dangerous to user's health. However, not only professional and top amateur use prohibited substances, but also people who practice recreational sports and/or abuse drugs. In the first two cases, the consumption of doping agents is motivated to increase physical endurance, improve competition and training results, and to reduce body fat[3]. However, people outside athletics such as prisoners mainly take them to stimulate the central nervous system.

One of the main doping substances are anabolic steroids (*Anabolic-androgenic steroids – AAS)*, a group of lipophilic hormones derived from cholesterol, which includes the male sex hormone

[1] D. Hedrich, M. Farrell, *Opioid maintenance in European prisons: is the treatment gap closing?* „Addiction" 2012; 107(3), pp. 461-463.

[2] H. Stoever, *Mental Health and Addiction in Prisons*, „Written contributions to the International Conference on Mental Health and Addictions in Prisons" 2013, pp.10.

[3] G. Kanayama, K.J. Brower, R.I. Wood, J.I. Hudson, H.G. Pope Jr, *Anabolic-Androgenic Steroid Dependence: An Emerging Disorder*, 2009; 104(12), pp.1966–1978.

– testosterone and numerous synthetic derivatives of testosterone[4]. As previously mentioned, they are common not only in the sports environment, but also among people for whom external appearance is important and strive to increase muscle mass. Synthetic testosterone derivatives have now become a problem due to their abuse by adolescents and adults for non-medical purposes. They allow for a relatively short period of time to achieve a visible increase in muscle mass and performance. The effect of this use of anabolics is a number of very adverse changes in the human body. Some of these changes are visible and easy to grasp (e.g., muscle hypertrophy). Abuse of anabolics can lead to acne vulgaris (which often leads to the appearance of permanent scars that remain for life), increased body hair, increment of aggressive behaviour and stretch marks resulting from too fast muscle growth[5].

Three isomeric heptylamines [1,3-dimethylamylamine (1,3-DMAA or methylhexanamine), 2-aminoheptane (tuaminoheptane) and 1,4-dimethylamylamine (1,4-DMAA)] are prohibited substances according to the WADA. These three compounds have the same summary formula, but a different structural formula. It is worth mentioning that 1,4-DMAA is found in geranium plants together with 1,3-DMAA[6],[7],[8]. 1,3-DMAA is particularly problematic due to its effect on the human body and its origin in dietary supplements[9],[10].

As mentioned earlier, doping is not only a problem among world-class athletes, but also among recreational users such as prisoners. Criminal policy bans the use of drugs such as cocaine, cannabis and heroin. Less

[4] E. Mutschler, G. Geisslinger, H.K. Kroemer, P. Ruth, M. Schafer-Korting, *Farmakologia i Toksykologia,* 2010, pp. 446, 447, 467, 470, 387, 388.

[5] F. Hartgens, H. Kuipers , *Effects of androgenic-anabolic steroids in athletes*. „Sports Med", 2004; 34(8), pp.513-54.

[6] J.S. Li, M. Chen, Z.C. Li, *Identification and quantification of dimethylamylamine in geranium by liquid chromatography tandem mass spectrometry.* „Anal Chem Insights" 2012; 7(1), pp. 47-58.

[7] H.L. Fleming, P.L. Ranaivo, P.S. Simone, *Analysis and confirmation of 1,3-DMAA and 1,4-DMAA in geranium plants using high performance liquid chromatography with tandem mass spectrometry at ng/g concentrations.* „Anal Chem Insights" 2012; 7(1), pp. 59-78.

[8] P.A. Cohen, J.C. Travis, P.H.J. Keizers, P. Deuster, B.J. Venhuis, *Four experimental stimulants found in sports and weight loss supplements: 2-amino-6-methylheptane (octodrine), 1,4-dimethylamylamine (1,4-DMAA), 1,3-dimethylamylamine (1,3-DMAA) and 1,3-dimethylbutylamine (1,3-DMBA)*. „*Clin Toxicol*" 2018; 56(6), pp. 421-426.

[9] C. Di Lorenzo, E. Moro, A.D. Santos, F. Uberti, P. Restani, *Could 1,3 dimethylamylamine (DMAA) in food supplements have a natural origin?* „Drug Test Anal" 2012; 5(2), pp. 116-121.

[10] K.G. Austin, J. Travis, G. Pacec, H.R. Lieberman, *Analysis of 1,3-dimethylamylamine concentrations in Geraniaceae, geranium oil and dietary supplements*. Drug Test Anal. 2013; 6(7-8), pp. 797-804.

focus is put doping drugs that are used in sport[11]. In many countries there are criminalizing laws related to doping[12]. For example, in Kenya in 2016, the act referring to the penalty for the use of doping substances was approved[13]. And United Kingdom seeks to improve the act on the criminalization of doping[14]. In many countries, the focus has been on testing non-elite players. Anti-doping activities are similar to those with drugs, consisting of supervision, detection and punishment. It was not until the 1968 that a List was created that contained substances banned for the needs of the Olympic Games. Initially, the List contained few groups of prohibited substances. Over the years, the List has been constantly modified[15]. Despite the efforts of the World Anti-Doping Agency and tightening control, both doping and masking methods are constantly moving forward[16].

Drugs are very often linked to crime[17]. People who do not use narcotic drugs or stimulants commit crime much less frequently than people who abuse them[18]. Thus, if the perpetrator consumed e.g. stimulants in a short period of time and was imprisoned, it may cause a problem for the judiciary. Inmates can be aggressive towards prison service, because some stimulants have a very stimulating effect. Their effect is comparable to cocaine or caffeine – which incidentally from 1984 to 2004 was recognized by the medical committee of the International Olympic Committee as a banned substance in sport, and its use was banned during the competition. In 1987, the caffeine urine threshold was 12 μg/mL. However, in 2004 WADA decided to remove caffeine from the List of prohibited substances[19].

[11] A.D. Henning, P. Dimeo, *The new front in the war on doping: Amateur athletes*." Int J Drug Policy" 2018; 51, pp. 128-136.

[12] J. Murphy. *Where in the world is doping a crime?* Retrieved 12 Dec 2016 from http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/FlagPost/2013/April/Where_in_the_world_is_doping_a_crime_doping_in_sports_pt_6. 2013.

[13] *MyGov. President Kenyatta signs Anti-Doping Bill into law*. Retrieved from http://www.mygov.go.ke/?p=8772. 2016

[14] *BBC. Doping: Kenya given until 2 May by Wada to pass new rules*. Retrieved from http://www.bbc.com/sport/athletics/35990512. 2016.

[15] A.V. Christiansen, *We are not sportsmen, we are professionals: Professionalism, doping and deviance in elite sport.* „Int. J. of Sport Management and Marketing" 2009; 7 (1-2), pp. 91-103.

[16] R.A. Vlad, G. Hancu, G.C. Popescu, I.A. Lungu, *Doping in Sports, a Never-Ending Story?* „Adv Pharm Bull" 2018; 8(4), pp. 529-534.

[17] P. Bean, *Drugs and Crime*. „Criminology & Criminal Justice" 2002; 10(1), pp. 99-101.

[18] B.A. Gropper, *Probing the links between drugs and crime*. National Institute of Justice Research in Brief. 1985

[19] M. Aguilar-Navarro, G. Muñoz, J. Salinero, J. Muñoz-Guerra, M. Fernández-Álvarez, M. Plata, J. Del Coso, *Urine Caffeine Concentration in Doping Control Samples from 2004 to 2015.* "Nutrients" 2019; 11(2), pp. 286.

Mainly all attention is focused on detecting doping agents, but one should remember about the health of users – including convicts[20]. And doping substances can cause side effects such as: shortness of breath, tachycardia and hypertension[21].

Aggression, possession and use of prohibited substances

In each unit there are prisoners who will try to get illicit substances or deal them to other prisoners. Under the term "illicit substances" is meant substances whose production and trade are acts prohibited by law. Zurhald et al. found that approximately half of the convicts had come into contact with intoxicants during their lives[22]. This also applies to people who abuse alcohol[23]. Many prisoners were taken to prison by consuming drugs or alcohol as a consequence of the offenses they had committed (for example: burglary, theft). Mostly commercial crime in order to enrich and spread illicit substances. Very often detention in a prison means (in some cases only temporary) limitation of the use of various narcotic drugs, psychoactive substances, sleeping pills, alcohol or stimulants. On the other hand, detention in prison may mean for some people the first contact in their life with prohibited substances or the exchange of one substance for another, e.g. one that is more difficult to detect[24],[25]. Cannabis takes first place in the most commonly used drugs in penitentiary establishments. However, what about the lack of such popular intoxicants? Then the prisoners are looking for the most easily available substance that will lead them to intoxication of the body. Such substances may be, e.g. stimulants or alcohol. Alcoholism is also a huge problem among prisoners. The impact of alcohol affects society as a whole. Many people in prison have committed a criminal act that is related to alcohol[23].

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[20] O. Barroso, I. Mazzoni, O. Rabin, *Hormone abuse in sports: the antidoping perspective*. „Asian J Androl" 2008; 10(3), pp. 391-402.

[21] V.S. Good, P.L. Kirkwood, *Advanced Critical Care Nursing 2nd edition*, pp. 803.

[22] H. Zurhold, C. Haasen, H. Stöver, *Female drug users in European prisons: a European study of prison policies, prison drug services and the women's perspectives*. „Political Science" 2005, pp. 38, 51, 207-216.

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[25] L. Moller, H. Stöver, R. Jurgens, A. Gatherer, H. Nikogosian, *Health in prisons. A WHO guide to the essentials in prison health,* WHO Regional Office for Europe, Copenhagen 2007, pp.85-111.

In recent years, new psychoactive substances (NPSs), mainly of synthetic origin, have been introduced for use, which have become a major drug and health problem[26],[27],[28],[29]. Some data show that the use of NPS among prisoners was found in 22 European Union countries. Of which, 8 of them accurately documented cases of use in prisons, including Germany, Poland and Sweden[30]. According to the United Nations Office on Drugs and Crime (UNODC) and the European Monitoring Center for Drugs and Drug Addiction (EMCDDA) the main substance groups of NPS are: synthetic cannabinoids, synthetic cathinones, aminoindanes, piperazines, plant based substances (e.g. Salvia divinorum) and other substances (e.g. 1,3-dimethylamylamine (DMAA)[31]. Side effects (short-term) of using NPS can be: paranoia, psychosis and seizures[31].

Psychotropes, stimulants and alcohol can cause aggression in perpetrators taking these substances. Aggression is a very common phenomenon in prisons and one of the reasons for its occurrence is: sociometric division – a group hierarchy is created in every social group and in the same way among prisoners; stress and frustration associated with imprisonment in prison[32]. On the other hand, inmates can use, for example, cannabis to calm down and relax for reasons such as stress, not coping with the situation.

Crime prevention

Many studies have confirmed that intoxicants and stimulants increase crime. Klötz et al. said in their research that people who took anabolic steroids committed twice as many weapon-related offenses as

[26] United Nations Office on Drugs and Crime, *The challenge of new psychoactive substances*, 2013 https://www.unodc.org/documents/scientific/NPS_Report.pdf.
[27] R.F. Forman, D.B. Marlowe, A.T. McLellan, *The Internet as a source of drugs of abuse*. „Curr. Psychiatry Rep" 2006, (8) pp. 377-382.
[28] O. Cottencin, B. Rolland, L. Karila, *New designer drugs (synthetic cannabinoids and synthetic cathinones): review of literature*. „Curr. Pharmaceut. Design" 2013.
[29] S. Gibbons, *'Legal highs' – novel and emerging psychoactive drugs: a chemical overview for the toxicologist*. „Clin. Toxicol. (Phil)" 2012; 50, pp. 15-24.
[30] European Monitoring Centre for Drugs and Drug Addiction*, New psychoactive substances in prison*. „Rapid Communication" 2018.
[31] https://www.unodc.org/LSS/SubstanceGroup/GroupsDashboard?testType=NPS
[32] https://sw.gov.pl/assets/37/57/00/d31df8ad4e7c372a3345013eb2f4ff3465120491.pdf

non-steroids[33]. Due to the increase in prisoners' interest in narcotic drugs, psychotropic substances and stimulants, authorities may have a problem with detecting substances. Due to easily available drug tests it is easier to detect amphetamine or one of the main cannabis compound – THC (Δ9-Tetrahydrocannabinol) than doping substances. This may be another problem for the judiciary, because despite the negative test result, the convict may notice behavior indicating intoxication of the organism. Thus, tests for intoxicants, psychotropic substances, including – stimulants are most needed to determine how many prisoners are under influence who need treatment or withdrawal. The method by which it is possible to detect doping substances found in dietary supplements like 1,3-DMAA or 2-tuaminoheptane is electrospray ionisation mass spectrometry (ESI-MS).

Physical capacity and doping

For every prisoner, on the day they get to prison, the whole lifestyle changes, regardless of whether the perpetrator returns after release or serves a sentence of several years. Over time, most inmates realize that the physical body is very important and has a great start in the prison environment[34]. Most prisoners strive to improve their body and fitness in order to assimilate and accept the prison culture. It is a kind of rules and habits in prison culture in penitentiary centers. Increasing physical potential in prisons is a mask with which they can hide their weaknesses, pain and sensitivity[35]. Exercise helps them not only increase muscle size and strength, but also improves mental health hygiene, by reducing anxiety or depression[36]. Prisoners feel more confident and behave much more confidently when dealing with inmates. Some perpetrators may strive for a quick (sometimes illegal) change of some body parameters (strength and muscle mass). The use of steroids in prisons among prisoners is 10-times higher than in the general population. It is worth noting that

[33] F. Klötz, M. Garle, F. Granath, *Criminality Among Individuals Testing Positive for the Presence of Anabolic Androgenic Steroids*."Arch Gen Psychiatry" 2006; 63(11), pp. 1274-1279.

[34] M. Maycock, „*They're All Up in the Gym and All That, Tops Off, Fake Tan*" *Embodied Masculinities, Bodywork and Resistance Within Two British Prisons.* "New Perspectives on Prison Masculinities" 2018; pp. 65-89.

[35] L. Dirga, *Body as a Project: The Relationship Czech Prisoners Have to Their Bodies.* University of West Bohemia. 2017.

[36] K. Choudhry, D. Armstrong, A. Dregan, *Prisons and Embodiment: Self-Management Strategies of an Incarcerated Population.* „Journal of Correctional Health Care" 2019; 25(4), pp. 338-350.

younger people use steroids more often and this is also associated with feeling more confident in the environment of older prisoners. In British prisons, there has been an increase in the problem with steroids that are readily available. As mentioned earlier, the use of steroids is associated with health problems, and also poses a security risk, e.g. aggression, violence. Steroid testing is more expensive to test for other drugs, so testing is much less common[37].

Withdrawal syndrome

Each substance used affects the human body. Both long-term and short-term consumption of prohibited substances may, as a consequence, lead to withdrawal syndrome after abrupt cessation of use of the substances in the event of addiction. In addition, it should be noted that imprisonment is associated with a sudden change in lifestyle. Part of this change is related to the sudden loss of access to some substances used before deposition. People who go to prison may be under the influence of various intoxicants, which may lead to withdrawal syndrome. Alcohol withdrawal syndrome seems to be easier to diagnose by prison administrations than doping withdrawal syndrome. The reason may be even a fairly short time of occurrence of this syndrome in case of alcohol withdrawal. The first symptoms occur after 6 hours[38]. However, in the case of withdrawal syndrome of stimulants, the first symptoms may occur at different times. Symptoms of osteation may include: pain in muscle or joints, mood swings, headaches, reduced libido, anxiety or depression. It should be considered that recipients are exposed to depression during the first few months after stopping stimulants, and this mental disorder can last for over a year[39],[40]. With each substance, the withdrawal syndrome works differently. In some cases, abrupt withdrawal of stimulants is dangerous and can lead to convulsions, a heart problem.

[37] R. Meek, *Sport in Prison: Exploring the Role of Physical Activity in Correctional Settings (Routledge Research in Sport, Culture and Society*, 1st Edition. „Routledge Research in Sport, Culture and Society" 2013; p. 155.
[38] J.S. Gortney, J.N. Raub, P. Patel, L. Kokoska, M. Hannawa, A. Argyris, *Alcohol withdrawal syndrome in medical patients.* "Cleve Clin J Med." 2016; 83(1), pp. 67-79.
[39] National Institute on Drug Abuse. *Anabolic steroid abuse*. 2006.
[40] D. Piacentino, *Anabolic-androgenic steroid use and psychopathology in athletes: A systematic review. „Current Neuropharmacology"* 2015; 13(1), pp. 101-112.

Method: ESI-MS

This method was further described and discussed in another article, which showed the possibility of distinguishing between stimulating substances[41]. Thanks to this, it is possible to examine prisoners in terms of consuming doping substances during their stay in prison, as well as on their return from pass. This is very helpful for prison administrations and the judiciary, because in cases of doubt, steps can be taken to investigate the suspect for doping substances.

Conclusions

The topic of drugs in prisons is known worldwide and is extensively analysed in the academic literature. All the time, drugs are smuggled into prison and used by convicts. Prisoners strive to change their bodies by increasing their muscles to feel confident in prison culture. The body is a tool that is very practical when serving a sentence34**.** Therefore, they use doping substances to be able to increase their physical potential. This is a threat to prison administrations, since aggression as well as withdrawal syndromes are noticeable in recipients when using stimulants. Popular drugs can be easily detected by drug testing. However, a method for detecting stimulants is needed. The presented tests confirm this possibility by the ESI-MS method. This can help fight crime because you can minimize drug use in prisons and outside in the community and can also help reduce aggressive behavior among prisoners. One article concerns (among others) the distinction between heptylamines found in stimulants, i.e. the abovementioned: 1,3-DMAA amines and 2-aminoheptane.

[41] I. Zaremba, R. Frański, M. Kasperkowiak, *Differentiation of isomeric heptylamines by in-source collision-induced dissociation of [M+H]+ ions*. „Rapid Commun Mass Spectrom" 2019; 33(9), pp. 848-885.

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