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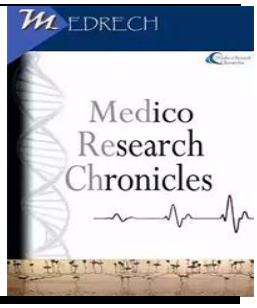

Pharmacy vs. Doping: Educating for a Cleaner Sport

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ABSTRACT

From a legal standpoint, doping refers to the use of prohibited substances or methods by athletes to enhance performance, which is illegal under national and international laws governing sports A major public health concern, doping in sports is on the rise and becoming more complex, using physiological, mechanical, and pharmaceutical methods. In the context of sports, doping is defined as the use of performance-enhancing drugs (PEDs) or other banned substances and methods by athletes to gain an unfair advantage in competition. Combating doping is an important responsibility of pharmacy practitioners. Although most in the pharmaceutical sector are in favor of outlawing performance-enhancing drugs from athletic competition, more specific training on anti-doping and doping is necessary.

The average pharmacist's knowledge score on the illegal status of pharmaceuticals is 53.2%, (according to a survey in Qatar) and their understanding of doping and anti-doping is minimal. Around half of the students in India had some ideas of which medications are illegal for athletes to consume. The knowledge level of pharmacy students is modest. Statements against doping in sports were also met with unfavorable views from them.

The purpose of this research was to examine the pharmaceutical industry's involvement in anti-doping medications and the pharmacists' understanding, perspective, and behavior about doping in athletic competition.

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1. INTRODUCTION

There are three primary arguments against allowing athletes to take performance-enhancing drugs. (1) The first is that doing so might have negative effects on their physical and mental health. (2) By providing an unethical edge to those who take banned drugs, doping renders sporting events unfair. (3) Thirdly, athletes serve as role models in our culture, and if they use performance-

enhancing substances, it might encourage other young athletes to do the same.

A major public health concern, doping in sports is on the rise and becoming more complex, using physiological, mechanical, and pharmaceutical methods. It exists in the professional and amateur spheres. Despite the massive investment of millions of dollars in cutting-edge scientific research, drug detection methods, doping control procedures, educational campaigns, policy advancements, and the implementation of harsh penalties for dopers, the use of performance-enhancing drugs (PEDs) continues to be prevalent in sports.

Possible causes of the widespread use of performance-enhancing drugs include the financial interests of sportsmen, coaches, and their sponsors, social pressure to achieve better outcomes, media portrayals of sporting events, and, of course, human nature itself. Herein lies a formidable obstacle for the medical community, including doctors, pharmacists, and dietitians, as well as for sports science groups and the general public.

In the battle against doping, healthcare providers play a crucial role. For athletes seeking basic health information or drug treatment details, pharmacists might be the first point of contact. Those working as pharmacists have an in-depth understanding of the biological composition of medications. When it comes to preventing doping in athletic events, the worldwide pharmaceutical organization acknowledges pharmacists as authorities. Consequently, in order to have a substantial impact in the fight against the illegal use of prohibited drugs, pharmacists should be well-versed in the topic, have excellent communication skills, and be aware of the dangers of doping.

2. ANALYSIS

2.1 Undermining of Pharmaceutical Integrity and Patient Safety by Doping Abuse

At first look, the pharmaceutical industry's concerns about doping misuse may not be immediately apparent. The idea that such abuse is desirable due to its impact on sales is indeed widespread, but mistaken. In addition, some people believe that ESAs were created for doping purposes because of the notoriety surrounding their usage in high-profile athletic events. These misconceptions are completely at odds with the realities of cutting-edge medical research. Medicine research and discovery takes a long time and costs a lot of money. It involves building manufacturing facilities, conducting clinical studies, and creating safe distribution networks.

Developing and optimizing a description of the optimal way to treat patients while maximizing the benefit-risk profile requires tight cooperation between committed scientists, doctors, and regulatory organizations. Whereas, doping improperly disregards the advice and results of these organizations in favor of enhancing athletic performance alone. Furthermore, no regulatory body has ever authorized ESA doping, and it is banned in most nations. The usage of such agents and techniques has prompted sports authorities to crack down on the practice and punish those who disobey the laws.

The absence of a reasonable safety assessment technique linked with improper usage is a major concern for pharmaceutical firms when it comes to doping. Even for legal reasons, athletes may illegally acquire medications and utilize them for doping before safety testing are finished. The long-standing cooperation between pharmaceutical businesses and regulatory bodies, who aim to optimize the benefit, is sidestepped in this way by the improper usage. When an athlete takes performance-enhancing drugs, he or she mostly thinks on the positive effects on performance and downplays or overlooks the negative effects.

So far as medicine is concerned, there is no good justification to subject a healthy, average person to the dangers of doping. Doping poses a significant threat since it goes against established regulatory protocols, makes it very improbable that the patient is being closely watched or that the medication is being supplied properly by a medical professional, and so on. Doping also carries the less-discussed dangers of improper drug storage and handling, which may lead to criminal usage. Transporting items in the trunk of a vehicle or using other unsuitable storage alternatives where high temperatures are common may cause them to deteriorate, which can impact both the quality and safety of the product. It is believed that immunogenic breakdown products, such as aggregates, are produced when ESAs are stored inappropriately and may contribute significantly to immune responses to protein therapies.

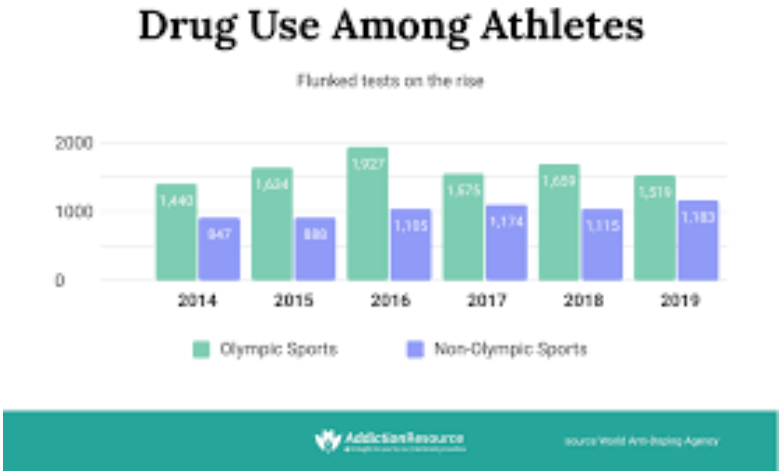

Fig 1: Drug use among athletes

Serious antibody-mediated pure red cell aplasia may result from immune responses to rHuEPO. In this scenario, antibodies against the product cross-react with the endogenous hormone, rendering it inactive. Because of a decrease in levels of active circulating endogenous EPO (eEPO), severe anemia develops as a consequence. Put simply, the research-based biopharmaceutical industry's dedication to patient safety and strong ethical standards are fundamentally at odds with the many negative connotations associated with doping misuse.

2.2 Combating Doping in Sports through Innovation and Collaboration

Many nations have made it illegal to use performance-enhancing drugs (doping) in athletic competitions, and no regulatory body has ever approved of this practice. A growing number of drugs and methods are being used for doping, including more modern medications like growth hormones and erythropoiesis-stimulating agents, as well as more "traditional" ones like steroids, b-blockers, and blood transfusions. Since would-be dopers could think that innovative new medications are undetected by present procedures, they are of special interest. For anti-doping efforts to be effective, the biopharmaceutical sector and organizations like the World Anti-Doping Agency must work closely together.

When it comes to determining whether or not new medications have doping potential, the pharmaceutical industry is in a prime position to help with the early phases of developing detection techniques. It is critical that anti-doping organizations and the

biopharmaceutical sector work together in a unified front to combat doping in sports and ensure that athletes play by the rules.

Medications have been an integral part of human history from the dawn of time as a means to better health and overall well-being. From the initial discovery of penicillin as a revolutionary treatment for bacterial infections to the more recent development of recombinant DNA technologies that have improved patient understanding and treatment, we have gone a long way. We are now on the cusp of revolutionary changes in medical care.

At the same time, we have grasped the difficulties of providing safe and effective medical treatments to a greater extent. To comprehend illness processes, find possible treatments, and then create, test, and sell the findings takes years—if not decades—of study. Pharmacovigilance research and further clinical trials are conducted to determine the most effective and safest treatment techniques and opportunities, even after they have been approved by the regulatory bodies that control their production, distribution, and usage.

Proper medication use is of the utmost significance, and it is the shared obligation of healthcare providers, pharmaceutical companies, and the general public. This involves regulations and checks on distribution, as well as enforcement, to ensure that the medications are used safely by those who need them, while discouraging or punishing those who would abuse them. When drugs are used for reasons other than their intended ones, the carefully developed rules for proper usage may be disregarded. Included in this category are both the well-known issues of drug users and those abusing addictive drugs for'recreational' reasons and its misdirected usage, particularly when used in a harmful way. The practice of drug doping, in which a person uses a drug or blood product to enhance their sports performance, is an example of such misuse.

Most of us like going to, watching, or even participating in athletic activities. best of us can respect athletes who give their best for the win. We pay particular attention to and reward those who reach the top level. Rarely does this call for anything less than extraordinary levels of work, commitment, and sacrifice, along with years of training. But alas, there are others who will resort to dishonest means to get an unfair edge. While everyone knows that cheating, at its worst, may lead to intentional harm to rivals, few realize how damaging it can be when drugs are used improperly to boost performance. We are all let down when an athlete's doping ruins the joy of a spectacular performance.

When a cheater beats an athlete's record, it's a letdown for the athlete and his or her fans since the athlete had worked so hard to reach the previous milestone. There might be a vicious cycle if some athletes think their rivals are doping and think they need to dope too to be on equal ground. When we see our favorite athlete cheating with drugs, we start to question if they are really extraordinary. Doping has happened in almost every sport since some players would do everything that can improve their performance. activities that need a steady hand, like archery or shooting, as well as strength activities, like weightlifting or throwing, long-distance running, cycling, swimming, and skiing, fall under this category. Abuse is more common in high-speed events like the 100-meter dash because of the small margin of error that determines the winners.

Doping occurs when an athlete's urine or blood contains any quantity of a banned drug that is used to enhance sports performance. The range of drugs and methods utilized for doping continues to expand. The use of androgenic steroids or growth hormone may enhance muscle mass, b-blockers can improve shooting scores, and erythropoiesis-stimulating agents (ESAs) or blood transfusions can prolong the time it takes for working muscles to become exhausted by

improving oxygen delivery. Aside from that, there are agents whose only function is to avoid being detected by other chemicals.

Examples of such medications include diuretics, which work by increasing the body's rate of excretion, and plasma expanders, which work by decreasing the drug's concentration in blood. Donated pee has also been shown to have been adulterated by introducing proteases that break down the protein hormones used for doping, making it impossible to detect.

2.3 Risks and Ethical Dilemmas of Performance and Image Enhancing Drugs

Drugs that improve one's appearance or performance are not without their hazards. Take testosterone and similar chemicals as an example. They are known to cause shrinking testes, liver failure, heart attacks, and strokes.

Human growth hormone use is associated with an increased risk of diabetes and acromegaly, an abnormally large development of the bones of the face, hands, and feet. Additionally, the dangers of using performance and appearance enhancers are not yet fully understood. Whether or whether these medications are safe and effective is often uncertain due to a lack of study.

There are other dangers associated with injectable performance and appearance enhancers. The use of non-sterile needle techniques may lead to infections that are very dangerous, if not fatal. Buying performance- and image-enhancing medications from a street vendor or internet retailer is risky business. It is possible that a questionable manufacturer lacking in quality standards is behind what seems to be a high-grade product. There is a risk that products bought from internet vendors or street vendors may be fake or contain harmful ingredients. The label may not always reflect the actual contents or dosage.

Although some manufacturers include "for research purposes only" or similar language on their medication labels, the reality remains that selling these pharmaceuticals to the general public is against the law. Possession of performance and image boosting drugs without a prescription may also be prohibited, depending on the medication and your state of residence. Many sports have anti-doping regulations that prohibit the use of performance and image enhancing substances.

Doping encompasses not only the use or attempted use of prohibited substances or methods by athletes, but also anyone who assists, encourages, aids, conspires with, covers up, or engages in any type of international complicity involving an anti-doping rule violation or any attempted violation, as well as the widespread use and abuse of medicines, dietary supplements, and other substances among athletes across many different sports. According to the World Anti-Doping Code (WADC), this is absolutely forbidden. Having said that, there has been no discernible decline in the number of anti-doping rule violations in recent sporting events, including the Olympic Games. No longer are doping tests limited to elite international tournaments; they are now administered at all levels of domestic competition, irrespective of the age of the competitors. Among the younger generations, it can be an especially big societal issue.

The “World Anti-Doping Agency (WADA) has exclusive discretion over whether substances or methods are added to the prohibited list. The WADC states that if the substance or method meets two of the following three criteria”—(1) improving performance in sport, (2) posing a health risk to athletes, or (3) going against the spirit of sport—then it should be considered for inclusion. In order to better comprehend drug usage, it is crucial that both athletes and the general public have information about the proper use of substances and anti-doping efforts. On the other hand, public access to data on doping is low and data on doping in particular is scarce. A lack of understanding of doping and rules leads athletes to ingest

banned drugs in cases of accidental doping, which makes up the majority of anti-doping breaches.

A large number of OTC medications in Japan include ingredients that are illegal to possess or possess in any way. While it is assumed that all athletes be familiar with and comprehend the WADC laws, this may be a challenging task at times; hence, assistance from experts in the field, such as pharmacists, is required.

2.4 Collaborative Efforts in Anti-Doping-The Role of WADA and the Pharmaceutical Industry

Sport has the potential to improve people's lives in many ways: it may unite people from different backgrounds and nations, bring them together, keep them entertained, and even help them emotionally and physically. Using drugs for performance enhancement instead of their prescribed medicinal purpose is completely unethical.

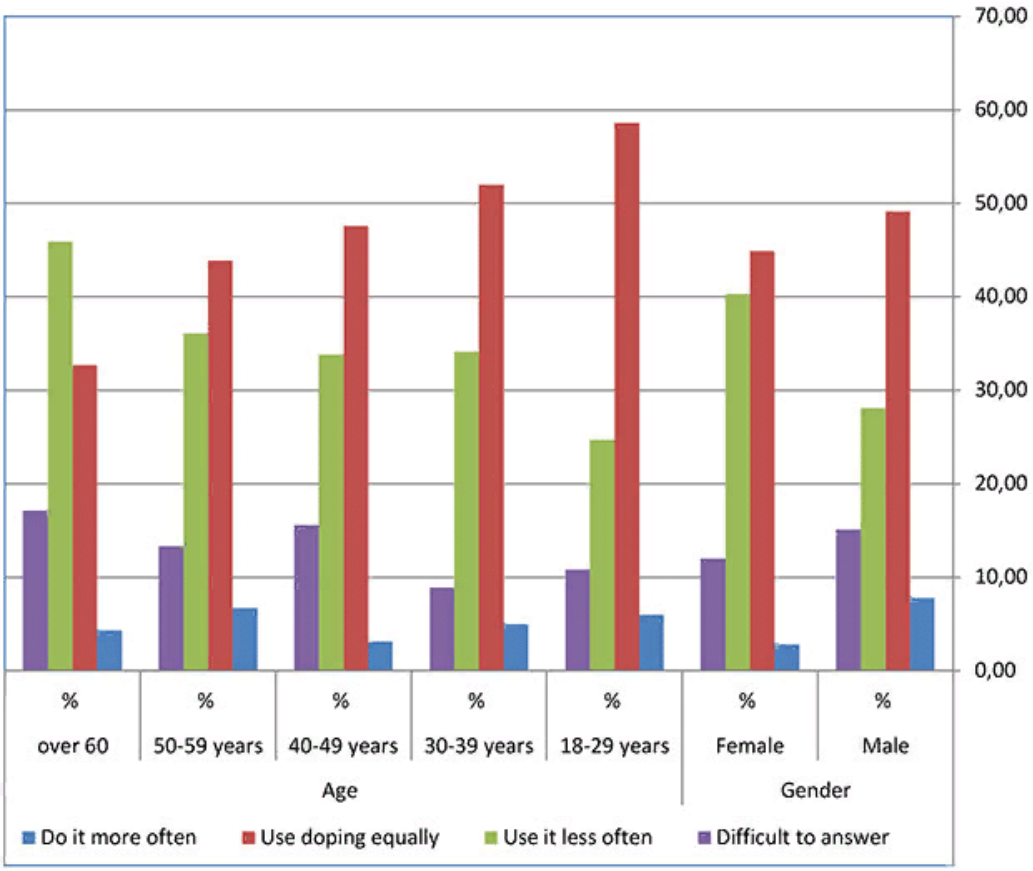

Fig 2: Genderwise and agewise distribution

In sports, the "World Anti-Doping Agency's (WADA)" job is to spearhead a global effort to eliminate doping from competition. In order to prevent the physical and reputational harm that may result from doping in sports, this group brings together players, governments, scientists, policymakers, lawyers, and other important stakeholders to provide a fair playing field for athletes. The pharmaceutical sector, which is founded on research, is one of those crucial players in the goal of universal health coverage.

Proper and safe medication usage is supported by the "International Federation of Pharmaceutical Manufacturers and Associations (IFPMA)", the trade group having formal ties to the UN. WADA and the IFPMA will keep working together to ensure

that athletes participate in clean sports. They have a number of goals in common, such as:

- Sharing information regularly about new pharmaceutical substances that could be used for doping so that tests can be developed and made available early;
- Making sure the Therapeutic Use Exemption program (TUE) is strong and effective so that only athletes with valid medical conditions can apply for it;
- Working together to combat fake medicines; Speaking out against doping at events like the Fight Against Doping and the International Conferences on the Pharmaceutical Industry; and
- Identifying Multiple bilateral agreements between research oriented pharmaceutical businesses and WADA have considerably benefitted the last 20 years of WADA's responsibility for updating the List of Prohibited Substances and Methods. Even in this intricate and multifaceted field of sports science, the WADA-pharma collaboration has remained a robust and fruitful cooperation after 20 years.

Both the 2010 and 2020 agreements between WADA and the IFPMA attest to the organizations' long-term commitment to working together to safeguard clean sport and promote the decrease of drug abuse in both the sporting world and society at large. For the sake of sports everywhere and all athletes, the two groups reaffirm their commitment to working together in the future.

3. CONCLUSION

Doping in sports often involves the use of legal pharmaceuticals that have been diverted from their original medicinal use. The development of anti-doping analytical methods to detect the abuse of drugs in development by the health industry and their potential doping effects is a significant challenge for anti-doping authorities. This is necessary because they must anticipate future doping trends and ensure that these drugs are not made available to athletes who intend to abuse them.

With this goal in mind, the "World Anti-Doping Agency (WADA)" has consolidated many agreements with pharmaceutical industry representatives to lay the groundwork for future cooperation and to make it easier to track down and share details about new treatments. To guarantee fair play and the health of the athletes, it is essential that drug regulatory bodies work in tandem with WADA and the pharmaceutical and biotechnology sectors to combat doping in sports.

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