Original Article

Doping and anti-doping testing in sports: are we only pointing at the bright side of the moon?

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Background: The term doping is conventionally identified with the use of methods or substances which may artificially boost athletic performances, so corrupting the essential spirit of equity and fairness in sports. Ample media coverage of famous doping cases has generated a misleading persuasion that cheating may be more prevalent in popular disciplines than in others.

Methods: In order to obtain information about recent cases of doping in all sport disciplines (i.e., analytical adverse findings; AAFs), we investigated the 2015 Anti-Doping Testing Figures recently released by the World Anti-Doping Agency (WADA), which provides a comprehensive picture of all adverse findings identified in 2015 by the Organization.

Results: Beside bodybuilding (15.0%) and powerlifting (14.0%), the second higher prevalence of AAFs has been recorded in casting (7.1%), followed by Muay Thai (7.3%) and equestrian (6.3%). Despite the relatively low number of athletes tested, meaningful frequency of doping cases has also been found in draughts, sled dog competitors and in bowling.

Conclusions: The evidence that many less popular sports disciplines have a remarkable number of AAFs calls for urgent interventions aimed to increase the number of anti-doping controls in young and recreational athletes to prevent serious harm to the public health. Screening for recreational drugs is also an issue, since this can actually be seen as an interference in private life.

Keywords: Doping; sports; sport; laboratory medicine

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Introduction

Doping in sports is conventionally defined by the World Anti-Doping Agency (WADA) as "the occurrence of one or more of the anti-doping rule violations set forth in the World Anti-Doping Code". Technically, speaking, it can hence be described as the presence of a prohibited substance or its metabolites or markers in an athlete's sample, the use or attempted use by an athlete of a prohibited substance or a prohibited method, evading or failing to submit to sample collection, tampering or attempted tampering with any part of doping control, or else possession of a prohibited substance or a prohibited method (1). Despite this technical definition is quite difficult to understand for the general public, there is collective consciousness that the term doping could be identified with the use of methods or substances which may artificially boost athletic performances, so corrupting the essential spirit of equity and fairness in sports. From a genuine medical perspective, it can also be added that the use of any substance or method which can jeopardize athletes' health should be considered doping (1).

Irrespective of the fierce debate around the definitions,

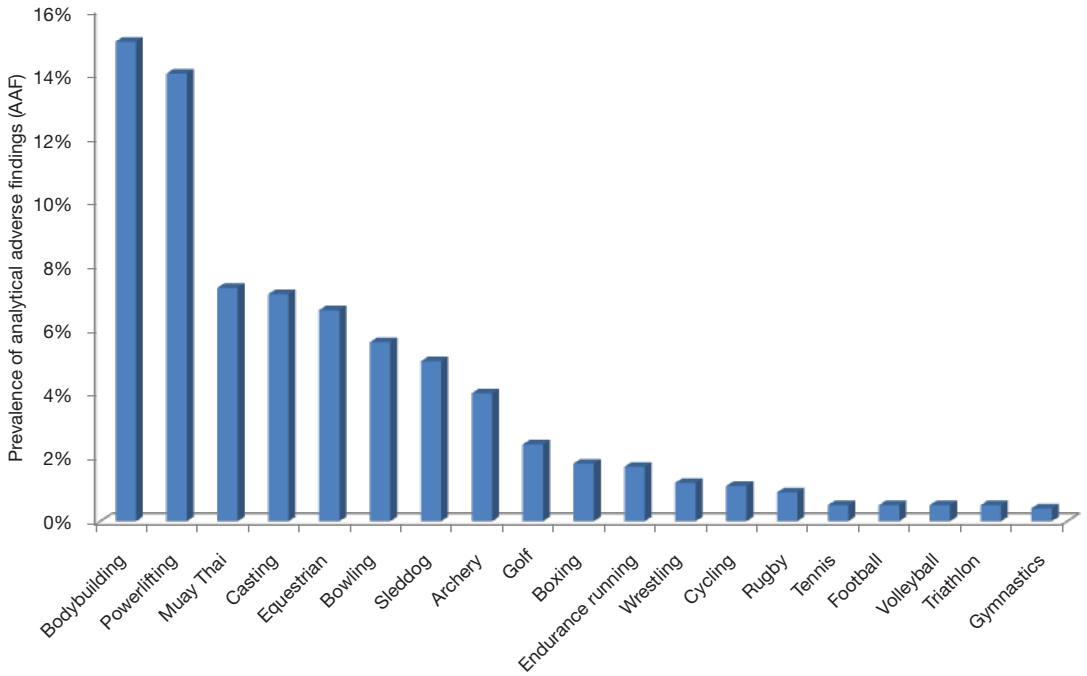

Figure 1 Prevalence of analytical adverse findings (AAFs) in different sport disciplines in 2015.

most of us would agree that doping is no longer a problem restricted to top-class athletes competing in official competitions, but has become a social plague and a primary healthcare issue, which has broadened its boundaries to embrace elite and even recreational activities.

There is a common misconception about the burden of doping in the different sports. Ample media coverage of famous doping cases in cycling has generated a misleading persuasion that doping may be more prevalent in endurance sports (i.e., cycling, long-distance running) and powerlifting, whereas the frequency of adverse analytical findings (AAFs; traditionally identified with positive anti-doping tests) is less common in other sports disciplines. Nevertheless no recent data have been published about this issue, so raising doubts as to whether less common disciplines may still be plagued by a relevant number of adverse findings.

Methods

In order to obtain information about recent cases of doping in all sport disciplines, we investigated the 2015 Anti-Doping Testing Figures recently released by the WADA, which provides a comprehensive picture of all adverse findings identified in the 2015 by the Organization (2).

Results

The accurate scrutiny of the 2015 Anti-Doping Testing Figures released by the WADA (2) yielded some surprising findings (*Figure 1*). The prevalence of AAFs in all cycling disciplines and long-distance running in the 2015 was a modest 1.1–1.7%, meaning that only 224 positive cases were confirmed out of nearly 23,000 tests performed in cycling whereas only two positive cases were confirmed out of 116 tests performed in long-distance running, respectively. Going through the pages of the WADA report, however, the figures for other and less popular sports for which a significant number of tests had been carried out is quite embarrassing and unexpected. Beside bodybuilding (15.0%) and powerlifting (14.0%), the second higher prevalence of AAFs has been recorded in Muay Thai (7.3%), followed by casting (7.1%) and equestrian (6.3%). Despite the relatively low number of athletes tested, meaningful frequency of AAFs has also been found in draughts and sled dog competitors (both 5%) as well as in bowling and archery (for athletes with an impairment, 5.6% and 4.0%, respectively). What also emerges clearly from the WADA report is that cannabinoids and masking agents were the most frequent AAFs in casting athletes, thus raising doubts as to whether these positive cases are "true" doping cases or

simply "accidental findings".

Discussion

Doping in sports has deeply emerged as a public healthcare issue (3), so reinforcing the need to develop and implement novel strategies to counteract this rather unfair attitude (4). The media coverage of many doping cases of top-class athletes competing in very popular sports disciplines such as cycling, mountain ski and long-distance running has contributed to generate the misleading persuasion that less popular sports, often involving recreational or semi-professional athletes, may be somehow less contaminated by the use of unfair practices than others.

The accurate scrutiny of the 2015 Anti-Doping Testing Figures released by the WADA (2) paves the way to some important reflections (*Figure 1*). First, a large number of so-called "recreational" drugs are probably taken by athletes in the context of private life, for purposes other than enhancing athletic performance. For example, it seems rather unclear why athletes should be taking cannabis before an important competition, inasmuch as this drug would depress many aspects of athletic performance rather than improving the outcome of the competition (5). Notably, whether or not some recreational drugs are actively used by the athletes outside an official competition should not be an issue for anti-doping agencies such as the WADA, since these drugs will not predictably alter sports performance and race results. The WADA and other anti-doping agencies have not been established to moralize a wicked world and limiting personal behaviors. This is a kind of intrusion in private life, which cannot be accepted. According to our perspective, anti-doping testing aimed at unmasking the use of recreational drugs is hence meaningless; it does not help the athlete, nor will benefit healthcare economics due to disproportionate costs of anti-doping tests. On the other hand, the evidence that the use of banned substances is much more diffuse in less popular sports such as casting, draughts and sled dog than in universally broadcasted sport disciplines is a firm endorsement to that doping is a public healthcare issue and we should probably concentrate more on the "dark side" of the moon represented by minor sport disciplines.

Conclusions

Our common perception of doping in sports is misleading, at least in part. Doping is a much more widespread phenomenon than media coverage contributes to represent. Several less popular sports disciplines were found to have a remarkable number of AAFs, which calls for urgent interventions aimed to increase the number of anti-doping controls in young and recreational athletes to prevent serious harm to public health. Along with other areas of laboratory medicine (6), anti-doping testing should also be more committed to precision (personalized) medicine, aimed to define specific panels of tests for likewise specific sport disciplines and athletes.

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Footnote

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/jlpm.2017.03.02). Giuseppe Lippi serves as the unpaid Editor-in-Chief of *Journal of Laboratory and Precision Medicine* from November 2016 to October 2021. The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The institutional ethical approval and individual informed consent were waived.

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