

Comparative analysis of use of doping drugs among team sports and individual players at Olympics Games from 1968 to 2020.

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Abstract: The practice of doping has existed in sport since ancient times. The International Olympic Committee published its first list of prohibited substances in 1967, while the World Anti-Doping Agency (WADA) was established in 1991. The present study aimed to compare reported doping-drug use among athletes competing in team and individual sports at the Olympic Games. For this purpose, information was compiled on athletes who were found guilty of using substances prohibited under the applicable WADA and International Olympic Committee rules. Records of athletes who failed doping controls conducted by WADA and the IOC Medical Committee during the Olympic Games were collected from multiple sources. The analysis indicates a significant difference in reported doping cases between athletes in individual and team sports.

Keywords: Sports Doping, Olympic Athletes, Performance-Enhancing Substances, Anti-Doping Policy, Comparative Analysis

INTRODUCTION

Competitive sport is fundamentally associated with the pursuit of superior performance and success. Historical accounts indicate that athletes in the ancient Games experimented with particular diets and other approaches to gain an advantage, with records dating as far back as 668 BC. In modern sport, substantial investment is made in equipment, sportswear and specialised training, while coaches and trainers promote methods intended to improve competitive performance. Once conventional methods have been exhausted, some athletes may nevertheless consider pharmaceutical means of achieving further improvement. Although performance-enhancing drugs may affect athletic performance, their use is prohibited for several reasons. Such substances can harm athletes, and their use can compromise the fairness of competition (Wagner, 1991). At the same time, the fairness argument is open to debate because equal access to pharmaceuticals would not necessarily remove other inequalities, such as differences in training facilities and dietary support. Athletes also occupy an influential

position as role models. If young people come to believe that sporting success requires performance-enhancing drugs, their use may spread beyond elite competition and create wider social consequences.

PURPOSE OF THE STUDY

- To determine the prevalence of reported drug-abuse cases among sportspersons participating in individual events at the Olympic Games.
- To determine the prevalence of reported drug-abuse cases among sportspersons participating in team events at the Olympic Games.
- To examine whether a significant difference exists in reported drug cases between athletes participating in team sports and those participating in individual sports at the Olympic Games.

METHODOLOGY

The study compiled information on athletes who were found guilty of using prohibited performance-enhancing substances on the basis of decisions associated with the World Anti-Doping Agency (WADA) and the IOC Medical Commission during the Olympic Games. The information was obtained mainly from publicly available material, including Wikipedia and other references considered reliable for the study. Records were compiled for the Olympic Games held in 1968, 1972, 1976, 1980, 1984, 1988, 1992, 1996, 2000, 2004, 2008, 2012, 2016, and 2021 (Tokyo).

For analysis, the reported cases were initially separated into two categories: athletes from team sports and athletes from individual sports. The cases were subsequently organised according to the nationality of the athletes involved. The sport in which each athlete competed at the time of the violation was also recorded. In order to examine the distribution of cases over the full period from 1968 to 2021, the data were additionally organised by Olympic year.

STATISTIC TECHNIQUE

Descriptive statistics were applied to determine the extent and pattern of reported doping cases in team and individual sports at the Olympic Games.

To test the study hypothesis, a t-test was employed to examine the significance of the mean difference between team sports and individual sports. The level of significance was fixed at 0.05.

RESULTS OF THE FINDINGS

Table 1 presents the cumulative percentage distribution of reported doping cases in individual and team sports across the Olympic Games from 1968 to 2021.

Table 1: Cumulative Percentage Analysis of Doping Cases in Individual and Team Sports across the Olympic Games from 1986 to 2021.

Years Sports Types	1968	1972	1976	1980	1984	1988	1992	1996	2000	2004	2008	2012	2016	2021	Total doping cases	Sports types wise %
Team Games	0	2	1	00	02	00	01	00	01	05	05	07	02	7	33	9.96 %
Individual Sports	1	05	10	00	10	10	04	07	14	32	87	99	15	04	298	90.04 %
Years wise percentage distributions	0.30 %	2.11%	3.32%	00%	3.62%	3.02%	1.51%	2.11%	4.53%	11.17%	27.79%	32.02%	5.13%	3.32%	331	100%

The figures in Table 1 show that the largest share of reported doping cases, 32.02%, occurred at the London 2012 Olympic Games. The Beijing 2008 Games accounted for the next largest share, 27.79%, followed by Athens 2004 with 11.17%. The distribution also shows an increase in reported cases from Athens 2004 through London 2012, followed by a noticeable reduction at the next two Olympic Games.

Across the period examined, team sports accounted for 9.96% of the reported cases, while individual sports accounted for 90.04%. Thus, most of the recorded cases in the dataset were

associated with individual sporting disciplines. The distribution is shown graphically in Figure 1 (A).

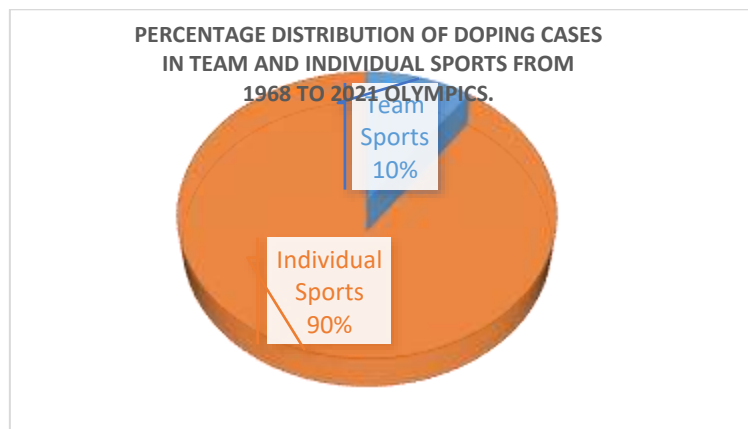


Figure No. 01 (A): Graphical presentation of the percentage distribution of reported doping cases between team and individual sports at the Olympic Games from 1968 to 2021.

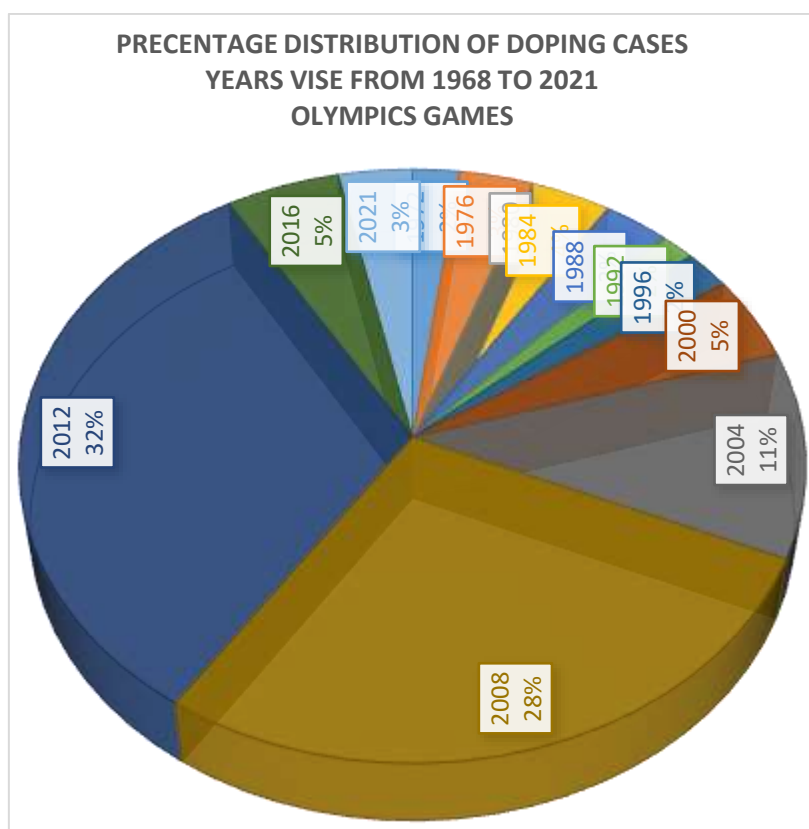


Figure No. 01 (B): Graphical presentation of reported doping cases across the different Olympic Games from 1968 to 2021.

The cumulative percentage distribution of reported doping cases according to sports discipline for the Olympic Games from 1968 to 2021 is provided in Table No. 02.

Table 2: Cumulative percentage analysis of doping cases in all Olympics Games on the basis of sports discipline from 1968 to 2021.

NAME OF THE SPORTS	NO. OF DOPING CASES	% OUT OF TOTAL DOPING CASES IN OLYMPICS GAMES FROM 1968 TO 2021	RANKING OF THE SPORTS DISCIPLINES IN WHICH DOPING CASES FOUND.
Athletics	175	52.87%	1 st
Weight lifting	84	25.37%	2 nd
Wrestling	16	4.83%	3 rd
Cycling	12	3.62%	4 th
Equestrian	09	2.71%	5 th
Collectively in Swimming, Modern Pentathlons, Rowing, Boxing, Judo, Volleyball, Gymnastics, Baseball, Shooting, Canoeing, Sailing and Basketball	35	10.57%	
Total doping cases reported are 331 in the Olympics Games from 1968 to 2021.			

Table 2 indicates that athletics accounts for the largest share of reported doping cases, with 52.87%. Weightlifting represents the second-largest share at 25%, while wrestling accounts for 4.83%. Cycling and equestrian are represented by 3.62% and 2.70%, respectively, placing them fourth and fifth in the table. A combined 1.2% of cases is reported for swimming, modern pentathlon, rowing, boxing and volleyball. Less than 1% of cases are reported for judo, gymnastics, baseball, triathlon, shooting, canoeing, sailing and basketball. The corresponding graphical presentation is provided in Figure No. 2.

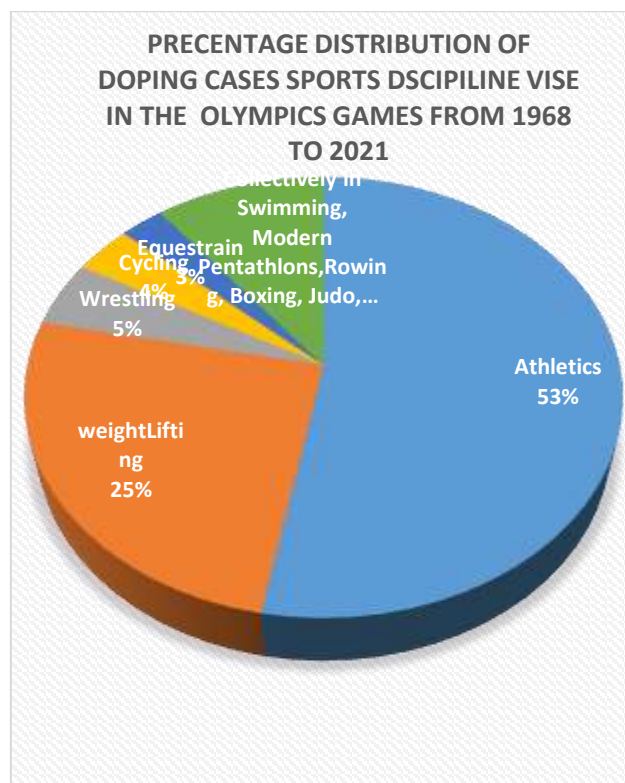


Figure No. 2: Graphical presentation of the total reported doping cases across different sports disciplines at the Olympic Games from 1968 to 2021.

Table No. 03 presents the cumulative percentage distribution of reported doping cases according to the nations represented by athletes involved in doping cases at the Olympic Games from 1968 to 2021.

Table 03: Cumulative percentage analysis of doping cases on the basis of nations in all Olympics games from 1968 to 2021.

NAME OF THE COUNTRIES	NO. OF DOPING CASES	% OUT OF TOTAL DOPING CASES IN OLYMPICS GAMES FROM 1968 TO 2021	RANKING OF THE COUNTRIES.
Russia	72	21.75%	1 st
Belarus	24	7.25%	2 nd
Ukraine	23	6.94%	3 rd
United States	19	5.74%	4 th
Turkey	16	4.83%	5 th
Kazakhstan	13	3.92%	6 th

Greece	12	3.62%	7 th
Bulgaria	10	3.02%	8 th
Spain	07	2.11%	9 th
Moldova			
Hungry			
China	06	1.81%	10 th
Azerbaijan			
India	03	0.90%	15
Total doping cases reported are 331 in the Olympics Games from 1968 to 2021.			

According to Table 3, Russia accounts for 72 reported cases, representing 21.75% of the total, while Belarus accounts for 7.25%. Ukraine represents 6.87% of the reported cases. The United States accounts for 5.74% and is shown in fourth position in the table. Turkey, Kazakhstan, Greece and Bulgaria follow at the fifth, sixth, seventh and eighth positions, respectively. Spain, Moldova and Hungary are shown at the ninth position, while China and Azerbaijan are placed together at the tenth position. A number of other countries reported smaller numbers of cases beyond these positions. The table records three cases involving Indian athletes during the Olympic Games from 1968 to 2021. The corresponding graphical presentation is given in Figure No. 3.

Figure No. 2: Graphical presentation of the percentage distribution of reported doping cases by country at the Olympic Games from 1968 to 2021.

The results of the test of the mean difference in reported doping cases between individual and team sports at the Olympic Games are presented in Table No. 04.

Table 04: Significance of mean difference in doping cases in Individual and team Sports in Olympics Games

Variables	Total no. of doping cases	Mean	SD	T-ratio
Individual Sports	298	25	22.34	2.43*

Team sports	33	2.16		
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*Significance at .05 level of confidence. Tabulated T Value at .05=1.96.

The results in Table 4 indicate a significant mean difference in reported doping cases between individual and team sports. The calculated t value of 2.43 exceeds the tabulated value of 1.96 at the 0.05 level of significance, with 318 degrees of freedom.

DISCUSSION OF FINDINGS

The study findings indicate that the proportion of reported doping cases in individual sports is higher than that observed in team sports during the Olympic Games from 1968 to 2021. The largest numbers of reported cases within the individual-sport category are associated with athletics, weightlifting, wrestling, cycling and equestrian. The country-level results also show larger numbers of reported cases for Russia, Belarus, Ukraine and the United States. The study attributes this pattern to the importance attached to prestige, status, ranking and medal-table performance, which may create incentives for the use of prohibited means in sport. The data also show a substantial reduction in reported cases in the two most recent Olympic Games considered in the study, which is presented as an indication of the efforts of the IOC Medical Committee and WADA to control the use of prohibited substances in international sport.

CONCLUSION

Doping has a long history in sport, with athletes seeking performance advantages since the ancient Games (Holt et al., 2009). The present analysis considers fourteen Olympic Games from 1968 to 2021 and identifies the distribution of reported cases across this period.

Among the 331 recorded cases, 90% were associated with individual sports and 10% with team sports. The reported difference is statistically significant. Athletics and weightlifting account for the largest portions of the dataset. One possible distinction between the two categories is the competitive setting: team athletes compete within a group, whereas athletes in events such as track and field or weightlifting may depend more directly on individual performance and the athlete-coach relationship (Wagner, 1991).

The largest reported shares occurred at Athens 2004, Beijing 2008 and London 2012. The pattern should not automatically be interpreted as evidence that athletes in those periods were inherently more dishonest; increased testing and subsequent re-analysis may also have contributed to the number of cases identified. The reported decline in Rio 2016 and Tokyo

2021 is an encouraging part of the record and is consistent with the study's observation of continuing anti-doping efforts by the IOC Medical Commission and WADA (World Anti-Doping Agency, 2021). Russia, Belarus, Ukraine and the United States occupy the highest positions in the national table. The study does not regard medal prestige as a justification for prohibited means. It records three Indian cases during the period examined.

These figures represent cases that were detected and recorded and therefore cannot indicate the full extent of doping that may have remained undetected. Nevertheless, the findings show a substantially larger number of reported cases in individual sports, particularly in events in which strength and speed are central to performance. The results underline the continuing importance of anti-doping measures and the value of maintaining integrity in Olympic competition; sporting achievement is most meaningful when it is attained through clean competition rather than prohibited performance enhancement.

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