



## Descriptive Analysis of Sports Coaches' Knowledge Level Regarding Basic Concepts of Doping

Imas Damayanti<sup>1\*</sup>, Euis Heryati<sup>1</sup>, Abdi Wadud Syafi'i<sup>2</sup>, Nur Faizah Romadona<sup>1</sup>, Ichfa Namira<sup>1</sup>, Fiska Maya Wardhani<sup>1</sup>, Setyo Wahyu Wibowo<sup>1</sup>

<sup>1</sup>Faculty of Medicine, Universitas Pendidikan Indonesia, Indonesia

<sup>2</sup>Department of Mining, Sekolah Tinggi Teknologi Mineral Indonesia, Indonesia

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#### Correspondence

\*Imas Damayanti

Address: Jalan Setiabudhi No.

229, Kota Bandung, Jawa

Barat 40154, Indonesia

E-mail: [imas\\_d@upi.edu](mailto:imas_d@upi.edu)

### Abstract

The purpose of this study was to analyze sports coaches' level of knowledge regarding the basic concepts of doping. The study employed a quantitative survey design with a cross-sectional approach, conducted among 29 sports coaches in the city of Bandung. The instruments used were a doping knowledge test and a general information questionnaire, both distributed online. The results indicate that coaches' knowledge levels vary across domains. Understanding of the definition of doping is relatively high (83–86%), while knowledge regarding regulations and prohibited substances shows significant variation (59–100%). Knowledge about anti-doping agencies is also generally good (79–96.5%). These findings indicate an imbalance in understanding, where coaches grasp the basic concepts but have not yet fully mastered the technical and regulatory aspects. In conclusion, there is a need for more systematic and comprehensive anti-doping education, particularly regarding regulations and prohibited substances.

**Keywords:** knowledge, coach, sport, doping.



## Introduction

Sports competition is an activity with a long history dating back to prehistoric times and has evolved into an essential component in shaping the social and cultural values of civilizations. This activity not only contributes to the development of character traits such as hard work, discipline, and teamwork, but also promotes innovation in various fields, including sports technology (Guttmann, 2004). Nevertheless, history has also demonstrated that sports competitions are not free from the potential for misconduct that may undermine these values (Riordan, 1977).

The fundamental principles of modern sports are fair play and sportsmanship. However, the pressure to achieve victory, prestige, and economic benefits often encourages various forms of cheating, one of which is doping (Waddington, 2000). Doping is defined as the use of substances or methods prohibited by the World Anti-Doping Agency (WADA) because they can enhance performance unfairly and endanger athletes' health (World Anti-Doping Agency, 2021b). This practice not only violates the ethics of sport but also compromises the integrity of competition and may have serious consequences for both the physical and psychological health of athletes (Backhouse & McKenna, 2019).

Sports coaches play a highly strategic role in doping prevention efforts. In addition to being responsible for athletes' technical development and performance, coaches also serve as authority figures who exert substantial influence on athletes' behaviors and decisions (Boardley & Kavussanu, 2021). In many cases, coaches become the primary source of information and attitude formation regarding the use of performance-enhancing substances or methods. Therefore, the level of coaches' knowledge concerning doping is a highly crucial factor. Coaches with adequate understanding can act as agents of education and prevention, whereas coaches with limited knowledge may become sources of misconceptions or even indirectly normalize doping behavior (Ntoumanis et al., 2021a).

On the other hand, sports coaches come from diverse backgrounds. These differences include both formal educational pathways and empirical field experience. Not all coaches acquire knowledge about doping through systematic academic education; consequently, their understanding may vary depending on the sources of information they obtain (Petróczi & Haugen, 2022). In addition, other factors such as years of coaching experience, type of sport, competitive level of the athletes being trained, and position within the coaching team may also influence their

level of understanding regarding the concept of doping (Engelberg et al., 2020a).

Based on these conditions, it is important to conduct an analysis of sports coaches' level of knowledge regarding the basic concepts of doping while considering these various characteristics. This study is expected to provide a preliminary overview of variations in coaches' knowledge and serve as a foundation for the development of more targeted anti-doping education programs. Nevertheless, this study remains preliminary in nature, with limitations in the number of respondents and the diversity of coaching backgrounds included. Therefore, further studies with a broader scope and nationally representative samples are required.

## Methods

### Research Design

This study employed a quantitative survey design with a cross-sectional approach. The research was conducted in Bandung, Indonesia, from May to June 2024.

### Participants

The participants consisted of 29 sports coaches from various sports disciplines in Bandung. Subjects were recruited using a snowball sampling technique. Initial participants were contacted through students of the Faculty of Sport and Health Education, Universitas Pendidikan Indonesia, and recruitment was subsequently expanded through participant recommendations.

### Instrument

Two instruments were used in this study:

1. Doping Knowledge Test for Coaches, which measured coaches' knowledge regarding:
  - a. the basic concepts of doping,
  - b. prohibited substances,
  - c. anti-doping regulations, and
  - d. anti-doping institutions.
2. General Coach Data Questionnaire, which collected demographic and background information of the participants.

Prior to data collection, both instruments were reviewed by experts in sports science and sports health to ensure content suitability and clarity.

### Procedure

The questionnaires were distributed online to the participants. Participation in the study was voluntary, and all respondents provided informed consent before completing the questionnaires. Participant confidentiality and anonymity were maintained throughout the study.

## Data Analysis

Data were analyzed using descriptive statistical methods. Responses from the Doping Knowledge Test for Coaches were scored based on the number of correct answers for each item. The results were tabulated and presented in the form of frequencies, percentages, and narrative descriptions to describe the level of coaches' knowledge across several domains.

Demographic data obtained from the General Coach Data Questionnaire were also analyzed descriptively and summarized using frequencies and percentages.

## Results

A total of 29 coaches completed the online questionnaire. As presented in [Table 1](#), the majority of respondents were within the age range of 20–30 years. Most respondents were male (86%). The majority served as sole coaches or physical education teachers who coached individually (65.5%), while 24% were head coaches and 3% were assistant coaches/team members. The distribution of sports disciplines was relatively balanced, with slightly more respondents coming from team sports (52%) than individual sports (48%). Approximately 76% of the coaches had more than three years of coaching experience, while only a small proportion had less than one year of experience (6%). The majority of athletes coached by the respondents competed at the regional/provincial level (88%), followed by the national level (10%), while only a small proportion coached athletes competing at the international level (6%). Detailed demographic characteristics of the participants are presented in [Table 1](#).

Based on the collected data, it can be observed that the coaches' level of knowledge generally varied across domains, with high numbers of correct responses in some domains but lower scores in others. Even within the same domain, variation across items indicated inconsistencies in understanding. These findings are consistent with recent studies showing that anti-doping knowledge is often partial and uneven across aspects of concepts, regulations, and practices ([Ntoumanis et al., 2021b](#); [Petróczy et al., 2022](#)).

Understanding the definition of doping is not merely a matter of memorization but reflects a fundamental conceptual understanding necessary to prevent misclassification between doping and non-doping practices. The findings demonstrated that coaches' knowledge regarding the definition of doping was relatively high, with correct response rates of 86% and 83%. Nevertheless, a small proportion of coaches still demonstrated misconceptions. This finding is consistent with recent studies indicating that understanding of basic definitions tends to be better than knowledge of more technical aspects, although misconceptions remain present ([Backhouse et al., 2021](#)).

Knowledge regarding anti-doping regulations and laws in Indonesia showed substantial variation, with two items achieving 100% correct responses, while other items had correctness rates of only 59–65% ([Table 2](#)). This finding suggests inconsistencies in coaches' understanding of anti-doping regulations. Similar findings have been reported in previous studies indicating that regulatory aspects are among the most difficult areas for coaches to comprehend ([Engelberg et al., 2020b](#)).

**Table 1**

*Demographic Characteristics of Respondents (n = 29)*

Characteristic		n (%)
Age	20-30	13 (44,8)
	31-40	11 (37,9)
	>40 years old	5 (17,3)
Gender	Male	25 (86)
	Female	4 (14)
Coaching Status	Head coach	7 (24,2)
	Sole coach/ PE teacher	19 (65,5)
	Assistant/ team member	3 (10,3)
Type of sport	Individual	14 (48)
	Team sport	15 (52)
Experience as coach	> 1 year	2 (6)
	1-3 years	5 (17)
	> 3 years	22 (76)
Athlete's competition level	International	2 (6)
	National	3 (10)
	Regional	24 (88)

**Table 2**  
Sports Coaches' Knowledge Level Regarding Doping

Domain	Item no.	Correct Answers n (%)	Correct Answers n (%)
Knowledge of the definition of doping	1	25 (86)	4 (14)
	2	24 (83)	5 (17)
Knowledge of anti-doping laws/regulations in Indonesia	3	29 (100)	0 (0)
	4	17 (59)	12 (41)
	5	24 (83)	5 (17)
	6	19 (65,5)	10 (34)
	18	18 (62)	11 (38)
	19	9 (62)	20 (69)
Knowledge of prohibited substances	20	29 (100)	0 (0)
	10	27 (93)	2 (7)
	11	22 (76)	7 (24)
	12	26 (90)	3 (10)
	13	23 (79)	6 (21)
	14	19 (65,5)	10 (34,5)
	15	18 (62)	11 (38)
Knowledge of anti-doping institutions in Indonesia	16	20 (69)	9 (31)
	17	17 (59)	12 (41)
	8	23 (79)	6 (21)
	9	28 (96,5)	1 (3,5)

Regarding knowledge of prohibited substances, the results showed relatively high but inconsistent levels of understanding, with correctness rates ranging from 59% to 93% (Table 2). Several items indicated that coaches had not fully recognized prohibited substances and their practical implications in sports settings, as reflected by incorrect response rates ranging from 34% to 41%. These findings align with the literature stating that the complexity of the prohibited substances list represents a major challenge in anti-doping education (Chan et al., 2021).

Knowledge regarding anti-doping institutions in Indonesia also demonstrated relatively high correct response rates, ranging from 79% to 96.5% (Table 2). This suggests that coaches are generally familiar with the relevant institutions, although in-depth understanding of their functions and roles may not be equally distributed among respondents (World Anti-Doping Agency, 2021a).

## Discussion

The findings of this study indicate that coaches' levels of knowledge are not homogeneous and that gaps exist across different domains. This has important implications considering that coaches are key actors in athlete education and doping prevention efforts. Such imbalances in knowledge may increase the risk of misinformation, potentially leading to doping practices, whether intentional or

unintentional (Boardley et al., 2022; Ntoumanis et al., 2021b).

According to the World Anti-Doping Agency, doping includes violations of one or more provisions of the World Anti-Doping Code, including the use of prohibited substances or methods as well as manipulation of doping control procedures. Although this definition is relatively clear, in local contexts semantic drift often occurs, where the term "doping" is broadly used to refer to foods or drinks believed to enhance performance. This phenomenon may lead to conceptual misconceptions, which have also been identified in recent studies concerning public and sports practitioners' understanding of doping (Backhouse et al., 2021; Overbye & Wagner, 2020).

Gaps in understanding the definition of doping may also affect comprehension of regulations and legal aspects. Coaches who do not comprehensively understand anti-doping regulations are at risk of making incorrect decisions. For example, the use of medications for medical conditions without checking for prohibited substances may result in anti-doping violations. Recent studies have shown that unintentional doping frequently occurs due to insufficient knowledge regarding regulations and Therapeutic Use Exemptions (TUEs) (Chan et al., 2021; Mazanov et al., 2021).

The relatively good level of knowledge regarding anti-doping institutions indicates adequate exposure to information; however, this

may not necessarily be accompanied by deep understanding or active engagement. This is important because the effectiveness of anti-doping programs largely depends on the interaction between coaches, athletes, and relevant institutions (Barkoukis et al., 2021; World Anti-Doping Agency, 2021a).

The variation in knowledge levels identified in this study was likely influenced by internal factors such as age, experience, and educational background, as well as external factors such as access to anti-doping education. Previous studies have demonstrated that coaches who do not receive formal anti-doping training tend to have lower and less consistent levels of knowledge (Boardley et al., 2022; Petróczi et al., 2022).

This study provides a preliminary overview of coaches' knowledge regarding doping; however, it has several limitations, including a small sample size, limited geographical coverage, and the use of self-report-based instruments. Therefore, further studies employing more robust research designs and structured educational interventions are needed to improve coaches' understanding comprehensively (Engelberg et al., 2020b; Mazanov et al., 2021).

## Conclusions

Based on the findings and discussion of this study, there are still variations in sports coaches' levels of knowledge regarding doping. Variations were also identified within each knowledge domain across the assessed aspects. Therefore, stronger and more systematic anti-doping education programs are needed, particularly concerning regulatory aspects and prohibited substances. Further research is necessary to more accurately mitigate the risk of misinformation among coaches, which may ultimately also affect athletes.

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