



The Effect of Anti-Doping Education on Volleyball Team Athletes' Knowledge and Attitudes

Daffaa Ikhsan^{1*}, Irfan Marhandika², Rakha Syamsudin³, Muhammad Arief Setiawan⁴,
A. Ine Aprilia Damai⁵, Aprilia Wulan Utari⁶

¹²³⁴⁵Universitas Singaperbangsa Karawang 41313, Karawang, Indonesia

Keywords

Anti-Doping
Education, Athletes'
Knowledge, Athletes'
Attitudes, Doping,
Volleyball

Abstract

Doping is a serious problem in the world of sports that can undermine sportsmanship, health, and the integrity of athletes. College athletes' limited understanding of banned substances and the lack of anti-doping education increase the risk of doping violations, whether intentional or unintentional. This study aims to determine the effect of anti-doping education on the knowledge and attitudes of Unsika volleyball club athletes. The study used a quantitative approach with a quasi-experimental method through a One-Group Pretest-Posttest Design. The study sample consisted of 30 athletes selected using total sampling. Data collection was conducted using a knowledge test and an attitude questionnaire, followed by analysis using the Shapiro-Wilk normality test and the Paired Sample T-Test. The results showed an increase in the mean score from 58.70 in the pretest to 82.67 in the posttest. The results of the Paired Sample T-Test showed a significance value of $0.000 < 0.05$, indicating a significant effect of anti-doping education on athletes' knowledge and attitudes. Thus, anti-doping education has proven effective in enhancing athletes' understanding and fostering positive attitudes toward the importance of sportsmanship and doping-free sports.

✉ Corresponding author :

E-mail: 2410631240002@student.unsika.ac.id

INTRODUCTION

The Sports are a key aspect of developing high-quality human resources (Mwangi et al., 2024). Through sports, individuals not only gain physical benefits in the form of improved physical fitness but also develop character traits such as sportsmanship, discipline, responsibility, and teamwork (Rintaugu & Mwangi, 2021). In the context of higher education, sports activities are an integral part of student development, both through formal learning and extracurricular activities such as Student Activity Units (SAUs). One sport with a high participation rate in the university setting is volleyball (Nicholls et al., 2025). This sport not only demands technical and tactical skills but also requires excellent physical condition and a strong competitive mindset. Therefore, University Volleyball Club athletes are required to maintain optimal performance to be able to compete in various intercollegiate, regional, and national competitions (Listiani et al., 2024).

As the demands for athletic performance increase, various challenges related to sports ethics and integrity have emerged (Garc et al., 2022). One of the serious issues in modern sports is the practice of doping. Doping refers to the use of certain prohibited substances or methods to artificially enhance an athlete's performance (L. I. M. M. Chiang et al., 2018). This practice contradicts the values of sportsmanship because it provides an unfair advantage to athletes who use it. In addition to violating sports rules, the use of doping can also have negative effects on athletes' physical and psychological health, such as heart problems, organ damage, substance dependence, and hormonal disorders. Thus, doping is not only a matter of violating competition rules but also a threat to athletes' health and future (Amatya, 2023).

The doping phenomenon is no longer limited to professional athletes at the international level; it is also becoming a growing concern among school and college students (Kim & Kim, 2017). A lack of understanding regarding the types of banned substances, the side effects of doping, and anti-doping regulations leaves young athletes vulnerable to violations, whether intentional or unintentional (Deng et al., 2022). Many athletes still believe that doping is solely related to the use of steroids or specific medications, whereas various supplements, prescription drugs, and certain performance-enhancing products may contain substances listed on the banned substances list. Low anti-doping literacy among student-athletes is one of the factors that can increase the risk of doping violations within the collegiate sports environment (Marjanovic, 2025).

In the context of educational sports, anti-doping education serves as a strategic step to build athletes' awareness and understanding of the importance of maintaining sports integrity (Filleul et al., 2025). Anti-doping education aims not only to provide information about banned substances but also to foster a positive attitude toward sportsmanship and fair play (Manges et al., n.d.). A solid understanding of doping is expected to influence athletes' attitudes in rejecting any form of banned substance use to achieve instant success (Reynoso-sánchez et al., 2025). Thus, anti-doping education plays a crucial role in fostering a healthy, clean, and ethical sports culture (M. Chiang et al., 2024).

However, in reality, the implementation of anti-doping education in the college environment remains suboptimal (Journal et al., 2020). Most campus sports development programs focus primarily on improving technical skills, physical conditioning, and game strategies, while educational aspects related to anti-doping receive insufficient attention. This situation results in many student-athletes not fully understanding anti-doping regulations and the consequences of doping violations. Additionally, the lack of outreach from relevant institutions is a factor contributing to athletes' low level of knowledge regarding anti-doping (Murofushi & Kawata, n.d.).

This issue is also evident among the volleyball club athletes at Singaperbangsa Karawang University (Unsika). As one of the active sports clubs participating in various competitions, Unsika's volleyball club athletes face the pressure to maintain and improve their athletic performance. In their pursuit of achievements, athletes often consume supplements or fitness-enhancing products without knowing their ingredients or the legality of their use (Barkoukis et al., 2022). This situation indicates a potential risk of doping violations due to athletes' lack of understanding regarding substances classified as banned (Murofushi et al., 2023). Furthermore, the absence of a systematic anti-doping education program within the Unsika volleyball club means that athletes' knowledge and attitudes toward doping remain unclear (Karakaya & Ceyhan, 2025).

Based on initial observations and emerging trends in the student sports community, it was found that some athletes still hold inaccurate perceptions regarding doping (Morente-Sánchez & Zabala, 2013). Some athletes believe that using performance-enhancing supplements is acceptable as long as they do not cause immediate physical effects. On the other hand, there are athletes who do not yet understand the procedures for testing the content of substances in the supplements or medications they consume. This lack of understanding can influence athletes' attitudes toward the use of banned substances and increase the likelihood of unintentional doping violations. Therefore, an educational effort is needed that can enhance athletes' knowledge while fostering a positive attitude toward anti-doping (Rintaugu & Mwangi, 2021).

Previous studies have shown that anti-doping education can improve athletes' knowledge of prohibited substances and promote fair play values. However, most studies have focused on elite athletes and sports school students, while research involving university sports club athletes remains limited. In addition, previous studies have mainly examined knowledge outcomes, with less attention given to athletes' attitudes toward doping (Listiani et al., 2024).

This gap is important because university athletes face increasing performance demands and may use supplements without fully understanding anti-doping regulations. Insufficient knowledge and negative attitudes toward doping can increase the risk of unintentional violations. Therefore, this study aims to examine the impact of anti-doping education on the knowledge and attitudes of volleyball club athletes at Singaperbangsa Karawang University (UNSIKA). The novelty of this study lies in its focus on university sports club athletes and its simultaneous assessment of both anti-doping knowledge and attitudes (Kim & Kim, 2017).

Despite the growing implementation of anti-doping programs, research examining the effectiveness of anti-doping education among university sports club athletes remains limited, particularly in the Indonesian higher education context. The novelty of this study lies in its focus on volleyball club athletes at Singaperbangsa Karawang University (UNSIKA) and its examination of both athletes' knowledge and attitudes toward doping following an anti-doping educational intervention. Given the increasing use of supplements among young athletes and the risk of unintentional doping violations, this study aims to provide evidence on the role of anti-doping education in promoting awareness, sportsmanship, and athlete integrity, while supporting the development of clean sport programs within university sport environments (Barkoukis et al., 2022).

METHODS

This study employs a quantitative approach using a quasi-experimental method with a One-Group Pretest-Posttest Design. The study was conducted to determine the effect of anti-doping education on the knowledge and attitudes of athletes in the Unsika volleyball club.

Research Design:

Pretest	Treatment	Posttest
O_1	X	O_2

Notes:

- O_1 = Pretest
- X = Anti-doping education
- O_2 = Posttest

Research Location and Time

The study was conducted with athletes from the Unsika Volleyball Club at Singaperbangsa Karawang University over a period of approximately two months.

Population and Sample

The population in this study consists of all Unsika volleyball club athletes. Total sampling was used, comprising 30 athletes, meaning all active athletes were included as the study sample.

Research Variables

Independent variable (X) Anti-doping education. Dependent variable (Y) Athletes' knowledge of anti-doping Athletes' attitudes toward doping

Data Collection Techniques

Data collection was conducted through Knowledge Test, Using multiple-choice questions regarding the definition of doping, types of prohibited substances, effects, and anti-doping regulations. Attitude Questionnaire, Using a Likert scale to determine athletes' attitudes toward the use of doping in sports. Documentation, Used to support research data in the form of activity photos and athlete data.

Research Instruments

The research instruments consist of a knowledge test comprising approximately 20 multiple-choice questions. An attitude questionnaire comprising approximately 20 statements using a Likert scale. Before use, the instruments were tested for validity and reliability.

Research Procedures

The research steps Developing the research instruments. Conducting a pretest of athletes' knowledge and attitudes. Providing anti-doping education through presentations and discussions. Conducting a posttest after the education session concludes. Processing and analyzing the research data.

Data Analysis Techniques

Data were analyzed using descriptive and inferential statistics. Normality test using the Shapiro-Wilk test. Hypothesis testing using Paired-sample t-test if data are normally distributed. Wilcoxon Signed-Rank Test if data are not normally distributed. Research Hypotheses H_0 : There is no effect of anti-doping education on the knowledge and attitudes of Unsika volleyball club athletes. H_1 : There is an effect of anti-doping education on the knowledge and attitudes of Unsika volleyball club athletes.

RESULTS AND DISCUSSION

Based on the results of the descriptive analysis of the research data, it was found that the research sample consisted of 30 athletes from the Unsika volleyball club. The descriptive analysis was conducted to provide an overview of the pretest and posttest scores prior to further analysis.

Table 1. Descriptive Analysis

Deskriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
pre test	30	54	63	58.70	2.548
pos test	30	78	88	82.67	2.657

The pretest scores ranged from a minimum of 54 to a maximum of 63, with a mean of 58.70 and a standard deviation of 2.548. These results indicate that the athletes' level of knowledge and attitude prior to receiving anti-doping education remained in the moderate category and was relatively homogeneous, as the standard deviation was smaller than the mean.

Meanwhile, the post-test scores showed a minimum score of 78 and a maximum score of 88, with a mean of 82.67 and a standard deviation of 2.657. These results indicate an increase in the mean score following anti-doping education. The increase in the mean score from 58.70 to 82.67 indicates that anti-doping education has a positive impact on the knowledge and attitudes of Unsika volleyball club athletes.

A normality test was conducted to determine whether the research data were normally distributed or not. In this study, the Shapiro-Wilk test was used because the sample size was less than 50 respondent.

Table 2. Normality Test

Tests of Normality			
Shapiro-Wilk			
pre test	.963	30	.370
pos test	.968	30	.489
This is a lower bound of the true significance.			
a. Lilliefors Significance Correction			

The results of the normality test show that the significance value (Sig.) for the pretest is 0.370 and for the posttest is 0.489. Based on the decision criteria, if the significance value is greater than 0.05, the data is considered to be normally distributed.

Since the significance values for the pretest ($0.370 > 0.05$) and posttest ($0.489 > 0.05$) are both greater than 0.05, it can be concluded that the research data are normally distributed. Thus, data analysis can proceed using a parametric test, specifically the Paired Sample T-Test.

The Paired Sample T-Test is used to determine whether there is a significant difference between the pretest and posttest scores following the administration of anti-doping education.

Table 3. Paired Sample T-Test

Paired Samples Test			
	t	df	Sig. (2-tailed)
pre test - pos test	-267.827	29	.000

Based on the analysis results, the calculated t-value was -267.827 with a significance level (Sig. 2-tailed) of 0.000. This significance level is less than 0.05 ($0.000 < 0.05$), so H_0 is rejected and H_1 is accepted.

These results indicate that there is a significant effect of anti-doping education on the knowledge and attitudes of Unsika volleyball club athletes. In other words, the provision of anti-doping education has proven effective in enhancing athletes' understanding and fostering positive attitudes regarding the importance of avoiding doping in sports.

Furthermore, the substantial difference in means between the pretest and posttest also indicates that the educational program was effective. Anti-doping education not only enhances athletes' knowledge regarding the dangers and regulations of doping but also increases their awareness of the importance of sportsmanship and integrity in sports.

This study aims to determine the effect of anti-doping education on the knowledge and attitudes of athletes in the Unsika volleyball club. Based on the results of the study, it was found that anti-doping education has a significant effect on improving athletes' knowledge and attitudes regarding doping in sports. These results are evident from the increase in the mean pretest and posttest scores, and are further supported by the results of the Paired Sample T-Test, which showed a significance level of $0.000 < 0.05$. Thus, anti-doping education has proven effective in enhancing athletes' understanding and fostering positive attitudes toward the importance of clean, doping-free sports.

Descriptive analysis results show that the pretest average score of 58.70 increased to 82.67 on the posttest. This increase indicates that prior to receiving education, athletes' level of understanding regarding anti-doping was still moderate. This situation indicates that most athletes do not yet possess adequate knowledge regarding the definition of doping, types of prohibited substances, the effects of doping use, and anti-doping regulations in sports. This low level of understanding may be influenced by the lack of anti-doping awareness and education within the university sports environment. Until now, athlete development in student clubs has primarily focused on technical, tactical, and physical conditioning aspects, while educational aspects related to sports ethics and anti-doping have received insufficient attention.

Following the anti-doping education, there was a significant improvement in the athletes' posttest results. This indicates that the educational material provided was effective in enhancing athletes' understanding of the dangers of doping and the importance of maintaining sportsmanship in sports. The education, conducted through presentations and discussions, provided athletes with the opportunity to understand the material more deeply and clarify various misconceptions regarding doping. The discussion process also helped athletes understand that the use of certain substances, including specific supplements and medications, can risk violating anti-doping rules if consumed without proper knowledge.

The increase in athletes' knowledge following the education program demonstrates that the learning process plays a crucial role in shaping an individual's understanding of a phenomenon. In the context of sports, knowledge regarding anti-doping is a fundamental aspect because it can influence athletes' behavior when making decisions. Athletes with a good understanding of doping tend to be more cautious when using supplements or medications that may contain banned substances. Additionally, a solid understanding can enhance athletes' awareness of the negative impacts of doping on their health, athletic careers, and the reputation of the institutions they represent.

The findings of this study also indicate a shift in athletes' attitudes following anti-doping education. Athletes' attitudes became more positive toward anti-doping efforts and the importance of maintaining sports integrity. Before receiving education, some athletes still viewed the use of performance-enhancing supplements as acceptable as long as they did not have an immediate effect on the body. However, after participating in the education program, athletes began to understand that the use of certain substances without proper supervision and adequate knowledge can lead to doping violations, whether intentional or unintentional.

This change in attitude demonstrates that education serves not only as a means of knowledge transfer but also as a process of shaping values and moral awareness in sports. In behavioral theory, sound knowledge can influence the formation of a person's positive attitude toward an object or phenomenon. The greater an individual's understanding of the risks and impacts of a behavior, the higher the likelihood that they will develop an attitude supporting positive behavior. In this study, it was demonstrated that increasing athletes' understanding of the dangers of doping can foster attitudes that more strongly support the values of sportsmanship and fair play.

The results of the normality test using the Shapiro-Wilk test indicate that the research data are normally distributed, with a significance value of 0.370 for the pretest and 0.489 for the posttest. Since both values are greater than 0.05, the data meet the assumption of normality, and the analysis proceeds using the parametric Paired Sample T-Test. The results of the hypothesis test show a significance value of 0.000, indicating a significant difference between the pretest and posttest scores. Thus, the research hypothesis stating that anti-doping education influences the knowledge and attitudes of Unsika volleyball club athletes is accepted.

The calculated t-value of -267.827 indicates a very large difference between the pre- and post-intervention conditions. This value indicates that the anti-doping education provided is highly effective in enhancing athletes' understanding and shaping their attitudes. This significant change likely occurred because the educational material was delivered in a structured manner and was relevant to the athletes' needs. Content regarding the dangers of doping, types of banned substances, legal consequences, and health impacts successfully raised athletes' awareness of the importance of maintaining sports integrity.

These findings align with previous studies stating that anti-doping education is an effective preventive strategy in preventing doping violations among athletes. Systematically conducted education can improve anti-doping literacy and reduce the risk of unintentional use of prohibited substances. Additionally, prior research has shown that athletes who receive anti-doping education exhibit higher levels of awareness and compliance with sports regulations compared to those who do not receive such education.

In the context of collegiate sports, the results of this study have significant implications. Collegiate athletes are a group vulnerable to environmental influences, the use of supplements, and the demands of athletic performance. Without a solid understanding of anti-

doping, athletes may unintentionally commit violations due to a lack of knowledge regarding the composition of certain substances. Therefore, anti-doping education must be an integral part of sports development programs at universities.

This study also indicates that a preventive approach through education is more effective than addressing doping violations after they occur. Prevention through education fosters awareness from an early stage, enabling athletes to develop a strong understanding of the importance of maintaining health and sportsmanship. With continuous education, athletes are expected to become individuals who not only excel competitively but also uphold the ethical values and integrity of sports.

Although this study yields positive results, several limitations warrant consideration. The study was conducted on a single group without a control group, so the influence of external variables could not be optimally controlled. Additionally, the sample size was limited to Unsika's university volleyball team athletes, so the findings cannot be broadly generalized to other student-athlete populations. This study also only measured changes in knowledge and attitudes in the short term following the education program, so it cannot yet illustrate the long-term sustainability of athletes' behavioral changes.

Given these limitations, future research is recommended to employ an experimental design involving a control group to strengthen the study's findings. Furthermore, research could be conducted in other sports disciplines and involve a larger sample size to provide a more comprehensive understanding of the effectiveness of anti-doping education within the university sports environment. Further research could also examine the impact of education on athletes' actual behavioral changes regarding supplement use and compliance with anti-doping regulations.

Overall, the results of this study confirm that anti-doping education plays a crucial role in enhancing athletes' knowledge and fostering positive attitudes toward anti-doping. Education delivered systematically and continuously can serve as a preventive measure in fostering a healthy, honest, and integrity-driven sports culture. Therefore, anti-doping education programs need to be continuously developed and integrated into the athlete development system at universities to support the creation of clean sports free from doping practices.

The first section later

In phased research, such as research and development, the writing process proceeds systematically from the initial stage to the final stage. Meanwhile, in quantitative research, the presentation of results is organized based on the research question, research objectives, and findings obtained during the research process.

In this article, the results and discussion sections are not separated into two distinct parts but are presented in an integrated manner so that each research result can be immediately analyzed and discussed in depth. This approach aims to make data interpretation more systematic, comprehensive, and easy to understand. Each research finding regarding the impact of anti-doping education on the knowledge and attitudes of Unsika University Volleyball Club athletes is discussed directly by linking theory, previous research findings, and the empirical conditions observed in the field.

In this study, the analysis results indicate that anti-doping education has a significant impact on improving the knowledge and attitudes of Unsika University Volleyball Club athletes. This is evident from the increase in the average pretest score from 58.70 to 82.67 on the posttest. Additionally, the results of the Paired Sample T-Test showed a significance value of $0.000 < 0.05$, indicating a significant effect of anti-doping education on athletes' understanding and attitudes. These findings suggest that anti-doping education not only improves

CONCLUSION

The Based on the research results, it can be concluded that anti-doping education has a significant effect on improving the knowledge and attitudes of athletes in the Unsika volleyball club. This is demonstrated by the increase in the average pretest score from 58.70 to 82.67 on the posttest following the anti-doping education. The results of the Paired Sample

T-Test also showed a significance value of $0.000 < 0.05$, thus accepting the research hypothesis. Anti-doping education has proven effective in enhancing athletes' understanding of the dangers of doping, types of prohibited substances, and the importance of sportsmanship and integrity in sports. In addition to increasing knowledge, the education also fosters a positive attitude among athletes to avoid doping and to be more prudent in using supplements and medications. Therefore, anti-doping education needs to be implemented continuously in the training of athletes at universities to foster a healthy, honest, and doping-free sports culture.

REFERENCES

- Amatya, D. L. (2023). *Assessing the Need for Anti-Doping Education : A Study among Athletes*. 4(December), 61–70.
- Barkoukis, V., Mallia, L., Lazuras, L., Ourda, D., Agnello, S., Andjelkovic, M., Bochaver, K., Folkers, D., Bondarev, D., Dikic, N., Dreiskämper, D., Petróczi, A., Strauss, B., & Zelli, A. (2022). The role of comprehensive education in anti-doping policy legitimacy and support among clean athletes. *Psychology of Sport and Exercise*, 60, 102173. <https://doi.org/10.1016/j.psychsport.2022.102173>
- Chiang, L. I. M. M., Shamsuddin, A. F., Mazlelaa, T., & Mahmood, T. (2018). Knowledge , Attitude , And Practice On Doping Of Malaysian Student Athlets 11(5).
- Chiang, M., Id, L., Nair, G., Chua, E. W., & Tuan, T. M. (2024). *Cultivating clean sport environment with athlete support personnel (ASP) : A study on anti-doping knowledge , attitudes , and practices of ASP*. 1–17. <https://doi.org/10.1371/journal.pone.0314716>
- Deng, Z., Guo, J., Wang, D., Huang, T., & Chen, Z. (2022). Effectiveness of the world anti - doping agency ' s e - learning programme for anti - doping education on knowledge of , explicit and implicit attitudes towards , and likelihood of doping among Chinese college athletes and non - athletes. *Substance Abuse Treatment, Prevention, and Policy*, 1, 1–13. <https://doi.org/10.1186/s13011-022-00459-1>
- Filleul, V., d'Arripe-Longueville, F., Garcia, M., Bimes, H., Meinadier, E., Maillot, J., & Corrion, K. (2025). Anti-doping education interventions in athletic populations: a systematic review of their characteristics, outcomes and practical implications. *International Review of Sport and Exercise Psychology*, 18(2), 880–942. <https://doi.org/10.1080/1750984X.2024.2306629>
- Garc, C., Ospina-betancurt, J., Asensio-castañeda, E., & Chamorro, J. L. (2022). *Study of an Anti-Doping Education Program in Spanish Sports Sciences Students*.
- Journal, B., Sport, O. F., & Sciences, H. (2020). *Doping Prevention in Sport: Overview of Anti-Doping Education Programs*. 2(2). <https://doi.org/10.33607/bjshs.v2i117.916>
- Karakaya, U. C., & Ceyhan, M. A. (2025). *An examination of performance enhancement attitudes and belief levels regarding sports supplements among students receiving education on ergogenic aids and anti-doping practices*.
- Kim, T., & Kim, Y. H. (2017). *Korean national athletes ' knowledge , practices , and attitudes of doping : a cross-sectional study*. 1–8. <https://doi.org/10.1186/s13011-017-0092-7>
- Listiani, D., Umar, F., & Riyadi, S. (2024). *Athletes' (Anti) Doping Knowledge : A Systematic Review*. *Conocimiento (anti) dopaje de los atletas: una revisión sistemática*. 2041, 810–816.
- Manges, T., Seidel, K., Walter, N., Schüler, T., & Elbe, A. (n.d.). *Answering the call for education — An evidence-informed intervention for elite adolescent athletes in Germany and Austria*.
- Marjanovic, S. (2025). *Differences in anti-doping knowledge among Serbian professional athletes*. August, 1–9. <https://doi.org/10.3389/fpubh.2025.1625859>
- Morente-Sánchez, J., & Zabala, M. (2013). Doping in Sport: A Review of Elite Athletes' Attitudes, Beliefs, and Knowledge. *Sports Medicine*, 43(6), 395–411. <https://doi.org/10.1007/s40279-013-0037-x>
- Murofushi, Y., Kamihigashi, E., Kawata, Y., Yamaguchi, S., Nakamura, M., Fukamachi, H., Aono, H., Takazawa, Y., & Naito, H. (2023). *The association between subjective anti-doping knowledge and objective knowledge among Japanese university athletes: a cross-sectional study*. November. <https://doi.org/10.3389/fspor.2023.1210390>
- Murofushi, Y., & Kawata, Y. (n.d.). *Relationship between the level of willingness to learn about anti-doping and objective knowledge among Japanese university athletes : A cross-sectional study*.
- Mwangi, F. M., Rintaugu, E. G., Toriola, O. O., Yauma, M. S., Thangu, E. K., & Fuku, N. (2024). *Impact of an Anti-doping Education Session on Knowledge , Attitudes and Beliefs Among University Students in sports-related Programmes*. c, 54–63.
- Nicholls, A. R., Lazuras, L., Petrou, M., Corazza, O., Zandonai, T., Kühn, U., & Tota, Ł. (2025). *Emerging Trends in Drugs , Addictions , and Health A systematic review on the effectiveness of anti-doping education for university students*. 5(December 2024). <https://doi.org/10.1016/j.etdah.2024.100168>

- Reynoso-sánchez, L. F., Molgado-sifuentes, A., Muñoz-helú, H., López-walle, J. M., & Soto-garcía, D. (2025). *Effective Intervention Features of a Doping Prevention Program for Athletes : A Systematic Review with Meta-Analysis*.
- Rintaugu, E. G., & Mwangi, F. M. (2021). *Knowledge , attitudes and perceptions on doping among university students in physical education and sport science related degree programmes*. 16(1), 174–186. <https://doi.org/10.14198/jhse.2021.161.16>